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Sakhalin Energy Investment Company LTD.

SEIC Response to ISRP Report: Impacts of Sakhalin II Phase 2 on Western North Pacific Gray Whales

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Revision Details

Rev	Location of Change	Brief Description of Change

Ref. & ISRP Report Quote	Issue	SEIC Analysis	Action	Target date	Status	Final ref.
INFORMATION GAPS HIGHLIGHTED IN ISRP REPORT						
P. 21: *The following topics have been identified as needing additional research: 7.1 Distribution: Wintering regions, migration routes, historic distribution and habitats use, tendencies of modern dispersion (e.g. Kamchatka and Commandor Islands observations)*	Panel recommends additional research on total distribution range of WGW (breeding/feeding areas, migration routes, habitat use).	SEIC also considers this important information with regard to protection of the WGW and feels that this is not only the responsibility of SEIC but also of conservation organisations.	As means to increase knowledge on distribution range satelitte tagging is considered. SEIC and ENL are funding satellite tagging studies on EGW in 2005 to see if this is feasible to conduct on WGW in 2006 (conform IWC recommendation).	Jun-05	Closed	Future Satellite Tagging reports.
P. 21: *The following topics have been identified as needing additional research: 7.2 Ecosystems, 7.3 Population properties, 7.4 'Skinny' whale phenomenon, 7.5 Communication system, 7.6 Contamination.*	Panel recommends additional research on ecosystem dynamics of WGW habitats, population properties, 'skinny' whale phenomenon, communication system and contamination.	SEIC has been conducting studies on prey and habitat characterisation (incl. contamination), population properties and behaviour.	SEIC will continue their studies and build further on the baseline data that have been gathered to date.	None	Ongoing	WGW Research and Monitoring reports and publications.
P. 36: *Given the potentially important effects of noise disturbance on gray whales in their feeding grounds, it is important (1) that appropriate quantified guidelines are established to determine when (and what) action should occur and then (2) to monitor both received sound levels and whales to ensure that appropriate mitigation measures are quickly implemented when necessary. The CEA does not specify how this will be achieved in the detail needed for rigorous review, particularly with respect to recorder placement and the need for simultaneous visual tracking of whales.*	The CEA does not specify how monitoring of received sound levels and whales will occur to ensure that appropriate mitigation measures are quickly implemented when necessary – particularly with respect to recorder placement and the need for simultaneous visual tracking of whales.	SEIC agrees that this was not specified in the CEA as it was work in progress.	A 2005 noise monitoring programme and scopes of WGW research have been developed and both aspects are covered. Autonomous underwater acoustic recorders will be placed at behavioural stations to enable analysis of behaviour related to received noise levels.	Feb-05	Closed	0000-S-90-04-T-7466-00-01 2005 Offshore construction Noise Monitoring Programme / 2005 WGW Scope of work
P. 42: *Beginning in March 2005, vessel traffic in Aniva Bay will increase as vessels begin delivering supplies and equipment to Korsakov for construction of the oil and LNG terminal at Prigorodnoye. The collision risk to gray whales posed by this new traffic was not addressed with any degree of rigour in the documents received from SEIC.*	Collision risk to WGW posed by increasing vessel traffic in Aniva Bay was not discussed properly in SEIC documentation.	Collision risk for WGW in Aniva Bay is not considered a real issue as they do not occur there. The issue is with increased ship traffic in La Perouse Strait during WGW spring and autumn migration.	Navigational corridors have been defined in Marine Mammal Protection Plan. The route through the Perouse Strait is in accordance with existing traffic separation zone.	Mar-05	Closed	0000-S-90-04-P-0048-00 Marine Mammal Protection Plan 2005
P. 45: *A possible means to minimise risk of collisions for ships departing Prigorodnoye would be to route them immediately offshore from the southwestern tip of Sakhalin and then plot the lane through La Perouse Strait equidistant from each coast to minimise the amount of time spent transiting close to shore. While this route may add a small amount of time to the total transit, it could be applied only seasonally when the whales migrate through the area.*	Route ships departing from Prigorodnoye immediately offshore from the southwestern tip of Sakhalin and then plot the lane through La Perouse Strait equidistant from each coast to minimise the amount of time spent transiting close to shore. While this route may add a small amount of time to the total transit, it could be applied only seasonally when the whales migrate through the area.	The issue is with increased ship traffic in La Perouse Strait during WGW spring and autumn migration is recognised by SEIC.	Navigational corridors have been defined in Marine Mammal Protection Plan. The route through the Perouse Strait is in accordance with existing traffic separation zone.	Mar-05	Closed	0000-S-90-04-P-0048-00 Marine Mammal Protection Plan 2005
P. 43: *The zones of sensitivity outlined in the Marine Mammal Protection Plan are mentioned but not defined in the CEA (Section 6.2.2), so the status of this proposed mitigation measure is uncertain.*	The WGW zones of sensitivity and establishment of corridors are mentioned in the CEA but not specified.	At the time of the CEA the development of these mitigation measures was discussed with all parties involved and was work in progress.	These zones and the approach are outlined in the 2005 Marine Mammal Protection Plan.	Mar-05	Closed	0000-S-90-04-P-0048-00 Marine Mammal Protection Plan 2005
P. 44: *SEIC proposes to limit vessel speeds in the nearshore and offshore feeding grounds to 5 knots at night and during periods of reduced visibility, and to 7 knots during daylight with good visibility conditions. However, it is not clear how visibility is to be judged.*	Panel finds it unclear how visibility is to be judged when limiting vessel speeds during periods of poor visibility.	This comment has been taken into consideration and will be updated in 2005 Marine Mammal Protection Plan.	SEIC has update Marine Mammal Protection Plan defining visibility criteria.	Apr-05	Closed	0000-S-90-04-P-0048-00 Marine Mammal Protection Plan 2005
P. 47: *A discussion of potential direct and indirect effects of gas releases and consequences thereof was not found in the documents provided for review. Natural gas poses a risk of platform or pipeline explosion that could disrupt production and transportation operations and have potential direct and indirect effects on the whales and their habitat. The apparent lack of attention to gas-associated risks is a serious shortcoming of plans for Sakhalin II Phase 2.*	No discussion of potential direct and indirect effects of gas releases and consequences thereof was provided in SEIC documentation.	Gas releases are discussed in quantitative risk analyses for design HSE cases.	None required - gas releases are considered in detail in the platform risk analyses during design, and have no possible impact on the WGW population, except as a possible cause of an unlikely event that could result in total platform destruction and have a consequential oil spill.	May-05	Closed	4000-T-90-04-T-7067-00-01 Lunskoye Quantitative Risk Assessment, 3000-T-90-04-T-7067-00-01 Piltun-B Quantitative Risk Assessment, Risktec Report SEIC-07-R-02 Molikpaq Quantitative Risk Assessment

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P. 50: *These [persistence time] estimates indicate that sea surface temperature and wind speed are important determinants of persistence time, but the CEA does not give the year-round information on regional sea surface temperature and wind speed needed to predict their actual influence on persistence times of spilled oil.*	CEA does not provide the year-round information on regional sea surface temperature and wind speed needed to predict the actual influence on persistence times of spilled oil.	Provision of this data was not required given the scope of the CEA but was of course used in determining trajectories. The influence of time and energy on fate of the oil slick was modelled and this can be related back to the distribution of wind speeds and temperatures in the region to determine the probability of persistence. This work has no implication or use for OSR, but if deemed significant for environmental impact assessment, can be done. A reassessment of the physical character of the Phase 2 crude oil (spreading coefficients, viscosity, evaporation rates under a range of conditions, emulsification rates under realistic conditions etc) and also chemical characteristics of the crude oil and weathered residuals is also intended. Some laboratory weathering studies are also planned.	Future analytical work will be undertaken as required for oil spill plan development.	Phase 1 at end of 2005, Phase 2 at end of 2006	Closed	Facility OSRPs.
P. 51: *The available information is not sufficient to determine persistence patterns of rule out persistence times that are sufficiently long to expose the feeding areas, whales and prey populations to oil and at least some portion of its more toxic components.*	Available information is not sufficient to determine persistence patterns or rule out persistence times that are sufficiently long to expose the feeding areas, whales and prey populations to oil and at least some portion of its more toxic components.	Available information does not allow this to be quantified with absolute certainty but available literature and oil characteristics do allow for a qualitative prediction. The approach taken in the CEA was conservative and trajectories used assumed persistence.	Expectations here need to be discussed and defined with relevant scientists.	Phase 1 at end of 2005, Phase 2 at end of 2006	Closed	Facility OSRPs.
P. 51: *The CEA does not explicitly consider effects of possible emulsification processes on persistence time, and as a result may be underestimating the persistence of oil spills at sea. Underestimates of persistence time contributes to important biases in estimating both trajectories and excursion envelopes for spilled oil. As a consequences, sizes of excursion envelopes presented in the CEA are very likely biased downwards.*	Effects of possible emulsification process on persistence time are not considered – may be underestimating the persistence of oil spills at sea. This contributes to important biases in estimating both trajectories and excursion envelopes for spilled oil. Panel feels that sizes of excursion envelopes presented in the CEA may be biased downwards.	Vityaz crude oil can be emulsified but the emulsion is unstable. The characterisation work undertaken did not specify mixing energies used to emulsify oil. This work is being redone. However, the excursion envelopes assume persistence and so are conservative. Actual envelopes will be smaller.	Work has already been commissioned.	Dec-05	Closed	Future Oil Spill reports.
P. 51-52: *3.1.2.4 Key Scientific Information and Gaps: Prediction of oil spill effects will be enhanced by several types of information currently not available, including: (i) Direct acute toxicity of spilled oil to prey, by prey species, (ii) Pattern of change over time in acute toxicity of oil to prey, by prey species, due to natural weathering of spilled oil, (iv) Chronic effects of spilled oil on prey health and life history, including age-specific survival threats, age-specific fecundity rates, feeding efficiency and population-level resilience to additional disturbances, both natural and anthropogenic (e.g. a second spill) and (v) Acute and chronic effects of spilled oil on prey food supply.*	Require information on: (i) Direct acute toxicity of spilled oil to prey, by prey species, (ii) Pattern of change over time in acute toxicity of oil to prey, by prey species, due to natural weathering of spilled oil, (iii) Chronic effects of spilled oil on prey health and life history, including age-specific survival threats, age-specific fecundity rates, feeding efficiency and population-level resilience to additional disturbances, both natural and anthropogenic (e.g. a second spill) and (iv) Acute and chronic effects of spilled oil on prey food supply.	Obtaining meaningful toxicity data on indigenous amphipods will take a considerable time and is a complex task (RU labs to be assessed and calibrated or getting suitable test species. / individuals overseas for testing). Problems with specificity of tests, i.e. similar amphipods at similar temperatures etc need to be found.	IUCN Panel requested information on the effects of crude oil on amphipods. However, a study such as this will not add significantly to the management of risk in so much as the pipeline will not pass through the feeding ground. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline are spatially separated.	N/A	Closed	N/A
P. 51: *3.1.2.4 Key Scientific Information and Gaps: Prediction of oil spill effects will be enhanced by several types of information currently not available, including: (iii) Alteration of acute toxicity patterns for spilled oil resulting from application of dispersants.*	Require information on alteration of acute toxicity patterns for spilled oil resulting from application of dispersants.	There is ample evidence in the available literature on influence of dispersants on the effects of oil on a range of marine species. Toxicity data alone does not indicate effect. This is influenced in the short-term by distribution, dilution etc and in the longer term by considering dilution, threshold effects and HC degradation.	It is not clear how this would add to the ability to create useful mitigation measures. To be discussed further with the Panel. NEBA Studies are being undertaken to assess utility of disperstants. These do not specifically address the feeding area.	End of 2005 for NEBA study.	Closed	NEBA Scopes & final assessment.

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P. 51: *3.1.2.4 Key Scientific Information and Gaps: Prediction of oil spill effects will be enhanced by several types of information currently not available, including: (vi) Potential for spill-derived contaminants to concentrate through the food chain and become detrimental to WGW health and population parameters.*	Require information on the potential for spill-derived contaminants to concentrate through the food chain and become detrimental to WGW health and population parameters.	There is very little evidence for accumulations of these in food chains as a result of spills and even less on the significance of HC's that have been detected.	This information will not add significantly to the management of risk in so much as the pipeline will not pass through the feeding ground. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline are spatially separated. SEIC can however undertake to monitor for these post spill, should a spill occur.	N/A.	Closed	Future monitoring work, should a spill occur. Post construction benthic monitoring programme along the pipeline.
P. 52: *3.1.2.4 Key Scientific Information and Gaps: Prediction of oil spill effects will be enhanced by several types of information currently not available, including: (vii) Potential patterns of acute and chronic toxicity and health impairment of gray whale prey in the event of spillage of drilling muds, domestic sewage or other toxic pollutants from offshore drilling platforms or other categories of project infrastructure.*	Potential patterns of acute and chronic toxicity and health impairment of gray whale prey in the event of spillage of drilling muds, domestic sewage or other toxic pollutants from offshore drilling platforms or other categories of project infrastructure.	SEIC could possibly support a better inventory of non-oil spill risk –including plume distributions of non-oil losses and discharges but it needs further discussion with the Panel to determine whether this will significantly add to our knowledge. Waste management plans are in place for all platforms and vessels.	Needs further discussion with the Panel to clarify. However, using the Molikpaq as an analogue there will be no discernible impact on the environment beyond 250m from the platforms from routing charges. SEIC can undertake to monitor in the event of an unplanned discharge.	May-05	Closed	
P. 55: *As tanker-based transportation is known to constitute a significant risk of a spill, specific information was requested on all tankers that have loaded at the Vityaz Marine terminal and those that will be used to carry oil from the Prigorodnoye export terminal. All that was provided was a list of names, ages and hull configurations for tankers that have loaded to date. Thus, a credible characterisation of the fleet with regard to spill risk was not possible.*	Panel requested information on all tankers that will be used to carry oil from the Prigorodnoye export terminal, but only received information on those tankers that have loaded to date.	Information on future vessel traffic was not available at the time of publishing the CEA. No tankers have loaded at Prigorodnoye to date. It is unlikely that this will represent future tanker traffic at Aniva. If possible, SEIC could try to obtain this data.	Future vessels are under design or will be chartered. They will be double hulled tankers and will carry normal shipping risks of collision. It needs further discussion with the Panel to see what, if anything, is required.	May-05	Open	Discuss with Panel.
P. 55: *The CEA did not discuss in any detail the relative consequences of spills associated with the alternatives, but they could be important and are considered in more detail below in section 1.3.1.1 (selection of platform location and pipeline alternatives.*	Panel requires spill or blowout trajectory modelling.	Spills from platforms are covered in the CEA and modelled. Excursion envelopes for blowouts will be similar. Worst case blowout volumes are relatively high and initial (0-12 hour) perimeters may be slightly different (larger) due to influence of spreading. Duration of blowout will also influence these.	No additional action required, already undertaken in CEA. Further modelling is being undertaken for all sites.	Jul-05	Closed	0000-S-90-04-T-7462-00-E Comparative Environmental Assessment / Facility OSRPs.
P. 57: *The CEA did not model the worst-case scenario, I.e. that of a platform blow-out, but such modelling is essential for a thorough and unbiased assessment of risk. The CEA did not model spills occurring during winter months when weather conditions may be more severe than those modelled (10-year averages for spring, summer and autumn) and when the sea may be covered with ice. Again, such modelling is essential for a thorough and unbiased assessment of risk.*	CEA did not model a platform blowout (worst-case scenario) or spills occurring during winter months when weather conditions may be more severe than those modelled and when sea may be covered with ice.	This comment has been taken into consideration and further work will be undertaken during OSRP planning.	Modelling in winter conditions will be done as part of the OSRP planning.	End of July 2006	Closed	Future OSRPs
P. 59: *The leak detection system proposed by SEIC is capable of detecting leaks equal to 1% of the daily amount of oil transported. However, a more effective leak detection (0.4%) has been reported for the TransAlaska Pipeline System (U.S. Bureau of Land Management 2003). This system employs a combination of deviation alarms for pressure and flow rate, line volume balance leak detection, and transient volume balance leak detection systems. This might be considered a 'best practice' but the CEA does not explain why such a system (with a corresponding level of detection) is not proposed for use in Sakhalin II Phase 2.*	CEA does not explain why a more effective leak detection system (0.4%, as opposed to 1%) is not proposed for use in the Project.A2	SEIC should look at available systems as part of internal QA/QC to verify ALARP.	The ATMOS leak detection model meets the leak detection criteria noted. The study of the sensitivity has been completed and is currently available for review	Apr-05	Closed	Internal review ongoing
P. 60: *For the PA-B platform at the current stage, the HSE case has not yet been completed. Until this document is completed, it is not feasible to evaluate the likely effectiveness of the proposed system or to accept assurances regarding prevention and response strategies.*	HSE Case for PA-B was not provided (or complete) at time of publishing the CEA.	The HSE Case for PA-B was not finalised at the time of publishing the CEA.	Operations HSE cases are planned for 2005. In realtion to the western gray whale, there is no new information of significance that will be contained in the HSE cases.	Dec-05	Closed	HSE Case is under contract in Operations and will be ready by December

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P. 62: *Information is needed on the following topics for a comprehensive analysis of risks associated with Phase 2: (I) Risks related to construction and operation of Prigorodnoye Oil and Gas Export Terminal.*	Require information on risks related to construction and operation of Prigorodnoye Oil and Gas Export Terminal.	This comment has been taken into consideration and further work will be undertaken.	QRA update commissioned.	Jul-05	Closed	QRA Update
P. 62-63: *Information is needed on the following topics for a comprehensive analysis of risks associated with Phase 2: (iv) a more thorough analysis of pipeline spill risk to compare the base case and Alternative 1, based on the likelihood of a spill due to pipeline length, more disturbance associated with construction and other relevant factors (e.g. bottom type) versus the chance that a spill would reach the nearshore gray whale foraging habitat.*	Require information on a more thorough analysis of pipeline spill risk to compare the base case and Alternative 1, based on the likelihood of a spill due to pipeline length, more disturbance associated with construction and other relevant factors (e.g. bottom type) versus the chance that a spill would reach the nearshore gray whale foraging habitat.	This work has been undertaken. The bottom profile was considered in risk analysis. The base case is not proceeding and so no comparison is required.	Further QRA work will be done on the final pipeline route option when decided on.	Jul-05	Closed	QRA Update
P. 63: *Information is needed on the following topics for a comprehensive analysis of risks associated with Phase 2: (vii) spill response plans, particularly with respect to winter scenarios, training and 'practice' exercises, coordination of Tiers 2 and 3 and measures to protect WGW and their habitat.*	Require information on spill response plans, particularly with respect to winter scenarios, training and 'practice' exercises, coordination of Tiers 2 and 3 and measures to protect WGW and their habitat.	OSRPs for Operations are being prepared and these aspects are being addressed. Further expert input will be sought during the planning process.	Corporate Operations OSRP and facility OSRPs are being prepared	Plan ready for approval by Sept 2005. To be approved by July 2006.	In progress	Future OSR documentation.
P. 69: *The soil within the cofferdam will be removed to a level for pipeline burial prior to installation. It is unclear from the report whether this is to be a temporary structure for construction purposes or permanent. If temporary, and the pipeline is buried to a depth of 7m near shore, the landfall is likely to have little ongoing effect on shoreline currents, however if permanent, several issues may arise.*	Panel cannot determine from the CEA whether the landfall is permanent or temporary. If permanent, the landfall may disrupt shoreline currents and sediment flows around the cofferdam structure.	SEIC needs to communicate clearly on status of landfall and cofferdam.	**Nature of Landfall** The Landfall is a temporary artificial structure which is designed to enable the pipelines to be pulled ashore in a trench with minimum disturbance to the shore. The trench is needed to prevent exposure from the elements. To minimise the width the trench in the nearshore and surf affected area, a cofferdam is used consisting of steel sheetpiles. The common known cofferdam is in fact a trench with "vertical" walls to guide the pipelines. This method presents a safe passage for the pipelines trough the nearshore and surf zone, without having to excavate large quantities of sand from the side slopes. **Landfall Design** The layout of the Landfall site requires a land area of approximately 300 m width (along the shore) by 200m length (measured from the waterline towards inshore). In this area the cofferdam is erected with approximate dimensions of 20 m wide by 180 m long. The cofferdam will extend from the low waterline directed inland. The cofferdam is designed to guide the pipelines approximately 5m deep under the shore line and coastal dunes inshore for minimal 100m, which is required due to shore erosion and ice scour. **Landfall Construction and Removal** The Landfall will be entirely constructed prior start of the pipeline pull-in. This comprises installation of the sheetpiles of the cofferdam and excavation by dry equipment to the required pipeline depth before the shore pull begins. Then when the offshore laybarge is ready, the pipelines are pulled through the cofferdam for about 180 m inshore where a tie-in with the onshore pipelines can be made safely. When the pipelines integrity has been verified and tie-in with the onshore pipeline has been done, the cofferdam is completely backfilled inside with the excavated material and all the sheetpiles are removed. Finally the site is reinstated to its natural state and levels. This entire operation is planned to take place in 2006.	Apr-05	Closed	ISRP Report actions spreadsheet.

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MITIGATION MEASURES / RECOMMENDATIONS IN ISRP REPORT						
P. 34: *The monitoring and mitigation component of the CEA (Section 4.6.6) mentions 'establishment of "shut-down" criteria in the event that the real-time noise monitoring programme indicates noise levels and impacts on the whales near the Piltun feeding area that are higher than predicted, and considered unacceptable.' However, unacceptability remains undefined. Throughout the document there is a lack of measurable criteria for action. It is thus extremely difficult to evaluate the efficacy of the monitoring and mitigation measures provided.*	Throughout the CEA there is a lack of measurable criteria for action. Panel therefore finds it extremely difficult to evaluate the efficacy of the noise monitoring and associated proposed mitigation. Lack of specificity throughout the CEA in both monitoring methods to be used and the criteria for transferring the monitoring results into mitigation action. While the conclusions section of the CEA states that noise impact criteria are based on available information and professional judgement. Panel is concerned that such statements are not metric.	Noise criteria in CEA are developed to predict impact. Noise criteria in the field need to be developed based on real time observations and will be different. SEIC considers "action criteria" that are measurable in real time part of risk management. Evaluation of the actual impact on WGW is yet another step that requires thorough analysis of monitoring data gathered at the time of operations. The flow of information to the relevant specalists required to be involved in the decision making process is defined in the Marine Mammal Protection Plan.	Discuss with panel the range of events that would be considered as likely triggers for action.	May-05	Open	0000-S-90-04-P-0048-00 Marine Mammal Protection Plan 2005
P. 35: *Scheduling activities to avoid co-occurrence with feeding gray whales and mother-cal pairs would reduce noise impacts.*	Schedule activities to avoid co-occurrence with animal aggregations - avoid peak season of whales, e.g. before July or after September.	Considering the nature of the work complete avoidance of WGW feeding season is not possible.	Construction schedules have been (and are being) developed as much as possible taking WGW feeding season into consideration	Closed	Closed	Project teams' construction schedules.
P 35: *Methods to partially mitigate the effects of noise on marine mammals include: (3) removal or quieting of equipment.*	Removal or quieting of equipment / vessels. It is recognised that this is time consuming and dependent on the operators ability to comply with SEIC standards.	SEIC is aware that noise mitigation of the source is time consuming and not always possible because of other commitments of the vessels	SEIC has developed a “Mitigation Document” that outlines potential noise sources on the vessel. All actions possible are being considered taking into account contracting and time limitations.	Ongoing	Closed	5025-S-90-04-T-0020-00-E Noise mitigation Strategy relevant to Sakhalin II Construction & Operations
P 35: *Methods to partially mitigate the effects of noise on marine mammals include: (1) avoidance of critical habitat.*	Avoidance of critical habitat. Pipeline route as far away as possible from feeding area. Panel concedes that re-positioning of activities (to some extent) is no longer a viable mitigation options.	SEIC agrees that avoidance of critical habitat is an effective mitigation method.	SEIC is currently pursuing Alternative 1.	Apr-05	Closed	http://www.sakhalinenergy.com/news/nws_releases_20050330.doc
P. 35: *The use of 'ramp-up' (also known as 'soft-start') procedures is mentioned as a potential mitigation strategy, specifically for seismic survey operations (e.g. air guns). Although this is the industry-standard mitigation measure (JNCC 2004), there is ongoing discussion about its effectiveness and the level of safety that it provides for marine mammals.*	Panel questions the effectiveness of ramp-up procedures but their arguments are mainly based on seismic activities. The Panel mentions untested effectiveness and problems associated with habituation.	SEIC has re-evaluated the use of "ramp-up" or "soft start" procedures. These are mainly related to pulsed sounds and noise from offshore pipeline construction and platform installation is vessel related. No information exists on PTS from vessel related noise.	PTS / TTS is not expected to occur for the nature of the current offshore activities.	None	Closed	No ref.
P. 35: *Bubble screens (or curtains) have been considered as means of mitigating against noise by a number of authors. The mechanism of sound propagation through bubble screens, however, is not fully understood.*	Mitigation through bubble screens was challenged	Bubble curtains can be effective and are worth while in considering reduction of noise, although it surely has some limitations. An overview of bubble curtains effectiveness and its limitations are given in SEIC's Noise Mitigation Strategy document.	SEIC considers the use of bubble curtains or other mitigation in case noise predictions point out that further mitigation is needed for specific activities in operations phase (PA-B).	Ongoing	Closed	5025-S-90-04-T-0020-00-E Noise mitigation Strategy relevant to Sakhalin II Construction & Operations, section 4.2.5.2, p22-24
P. 44: *Observer programmes such as those proposed by SEIC to prevent collisions with western gray whales have another important limitation, unless those observers are truly independent. Any observer working for a company that stands to lose large amounts of work time (and money) when whales are sighted is subject to a clear conflict of interest. Assuming that an observer in such circumstances will be able to maintain appropriate vigilance and judgement is more an act of faith that reason. Whether true or not, the observer may anticipate that full and accurate reporting would place his/her livelihood at risk. Thus, observer programmes require independent oversight or verification of compliance to ensure their effectiveness.*	Observer programmes require independent oversight or verification of compliance to ensure their effectiveness.	SEIC has been using MMOs successfully since 2003. During the seismic survey in 2003 eight shutdowns and 10 occurrences of preventative measures were implemented when there was reason to suspect that whales may be present. SEIC has confidence in the integrity of the marine mammal scientist they use for the program.	SEIC has been communicating with IFAW in 2004 to have their MMOs participating in our programme. The marine mammal scientists proposed were however already contracted as MMOs for SEIC. Although SEIC has confidence in the integrity of the MMOs, practical implementation of independent oversights can be discussed.	May-05	Open	Discuss with Panel.
P. 61: *Monitoring will be most effective when based on an array of permanent stations in the whales' foraging habitat. Station arrays will be most informative when stratified by habitat characteristics such as depth, exposure to waves, exposure to ice scour, sediment characteristics and proximity to project infrastructure. Stations should be distributed randomly within strata.*	Provide an array of permanent monitoring stations in the whales' foraging habitat. Stratify station arrays by habitat characteristics (depth, exposure to waves, exposure to ice scour, sediment characteristics, proximity to project infrastructure). Distribute stations randomly within strata.	For the acoustic program conducted under the joint WGW programme permanent monitoring stations have been monitored for ambient noise since 2001 and will be continued to be monitored on the long term. Hydrological data also exist of these points.	A study such as this will not add significantly to the management of risk in so much as the pipeline will not pass through the feeding ground. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline are spatially separated.	To be determined	Closed	N/A

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P. 62: *The following variables, measured of time, ,will provide information on trends in chemical habitat characteristics for prey populations: Concentrations of total organic carbon and total organic nitrogen; Depth within sediment of the oxidation-reduction discontinuity layer; Concentrations of petroleum hydrocarbons in sediments and in gray whale prey species; Concentrations of chemical components of Vityaz crude oil, such as polycyclic aromatic hydrocarbons (PAH), known to have the capacity for deleterious effects on marine organisations, including known or potential gray whale prey species.*	Monitor chemical habitat variables important to gray whale prey: (i) Concentrations of total organic carbon and total organic nitrogen; (ii) Depth within sediment of the oxidation-reduction discontinuity layer; (iii) Concentrations of petroleum hydrocarbons in sediments and in gray whale prey species; (iv) Concentrations of chemical components of Vityaz crude oil.	Monitoring of pollution on benthos in general and specific WGW prey have been conducted in several years. Also studies of pollution of benthos around Molikpaq have been conducted from 1998 onwards.	An independent summary of the effect of Molikpaq routine operations on the environment was commissioned by SEIC in 2003 and has been provided to IUCN. Both the platforms and the pipelines will have robust, RF approved post-construction monitoring programmes in place. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline/platforms are spatially separated.	May-05	Closed	Ruddall Blanchard (SEIC website)
P. 62: *The following variables, measure over time, will provide information on trends in prey populations: density and size distribution, by species, of gray whale prey, biological stricture of benthic prey communities (species number, evenness and consequent indices of diversity).*	Monitor biological variables associated with gray whale prey: (i) Density and size distribution, by species, of gray whale prey; (ii) Biological structure of benthic prey communities (species number, evenness and consequent indices of diversity).	A detailed benthic study is conducted under the joint WGW program that includes the suggestions under (I), (ii)	An oil-related study such as this will not add significantly to the management of risk in so much as the pipeline will not pass through the feeding ground. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline are spatially separated.	May-05	Closed	N/A
P. 71: *An analysis of the percentage of feeding ground that may be affected under different current and wind scenarios would be valuable in assessing the risk of dredging activity to the benthic communities. The CEA does not include this type of analysis. One way to address the smothering problem would be to plan dredging, for both platform and pipeline construction, with consideration of the currents (including the nearshore eddies described in Dobrynin et al. 2004), winds and tides. If dredging activities occur only in conditions when the suspended materials are swept offshore and away from the Piltun feeding area, or to the south rather than onshore and northwards, this should reduce some of the risk of smothering benthic communities on the Piltun feeding ground. Once operations are underway, monitoring from air and surface of the direction and coverage of the suspended sediments could be useful to determine whether sediments are flowing towards the feeding ground, and if necessary, operations could be suspended until ocean conditions change.*	Conduct an analysis of the percentage of feeding ground that may be affected under different current and wind scenarios to assess the risk of dredging activity to the benthic communities. Monitoring from air and surface of the direction and coverage of the suspended sediments to determine whether sediments are flowing towards the feeding ground, and if necessary, suspend operations until ocean conditions change.	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 Lunskoye in 2004 (where sediments are broadly similar, and where construction methodologies and water depths are near identical). The results indicated general transport to the south, based on net current direction. The same can be expected for the Piltun area, this means away from the feeding ground.	Potential to use data from Lunskoye together with information from conditions in Piltun to do a prediction of potential effects from sedimentation plumes. However, a study such as this will not add significantly to the management of risk in so much as the pipeline will not pass through the feeding ground. The fact that SEIC selected Alternative 1 ensures that the nearshore whale feeding area/prey benthos and the pipeline are spatially separated.	Apr-05	Closed	N/A
P. 71: *The issue of artificial reef effect of the platform is not addressed in the CEA. Mitigation to prevent changes in the composition and abundance of marine organisms around the platforms is probably not feasible, but monitoring those changes may be important to future interpretations of changes in the broader Sakhalin Shelf ecosystem.*	While Panel concedes that mitigation to prevent changes in the composition and abundance of marine organisms around the platforms is probably not feasible, monitoring these changes may be important to future interpretation of changes in the broader Sakhalin Shelf ecosystem.	Monitoring of benthos communities (pollution related and composition) is part of the permit requirements. Benthos studies in WGW feeding area are also planned for long term.	This item was discussed in the Phase I Offshore Environmental Monitoring Data provided to the Panel. In line with RF commitments and international best-practice, SEIC will conduct post-installation and operations ecological monitoring around the platform. This will be sediment based survey work aimed at assessing any changes which may be caused by the platform(s) but will not include fisheries monitoring.	May-05	Closed	Review of Phase I Offshore Environmental Monitoring Data June 1998 – October 2001 (2003).

Ref. & ISRP Report Quote	Issue	SEIC Analysis	Action	Target date	Status	Final ref.
P. 71: *The CEA does not address any potential ecological effect from the construction of the pipeline landfall and no mitigation is proposed. However, depending on nearshore conditions, including winds, tides and aperiodic currents, the disruption of alongshore currents by 'berms' or breakwaters can have significant downstream effects on distribution of sand and erosion. In order to achieve the least possible shoreline impact, it would be necessary to (a) consider alongshore currents in landfall design, (b) conduct surveys of the downstream shoreline prior to installation, and (c) monitor these areas following installation so that if major changes beyond the natural dynamics of the shoreline were to occur, the landfall could be redesigned.*	Consider alongshore currents in landfall design and conduct surveys of the downstream shoreline prior to installation. Monitor these areas following installation so that if major changes beyond the natural dynamics of the shoreline were to occur, the landfall could be redesigned.	Monitoring of benthos communities (pollution related and composition) is part of the permit requirements. Benthos studies in WGW feeding area are also planned for long term.	This is not perceived to be an issue by SEIC as the pipelines are buried to prevent ice-scour and therefore no such berm/breakwater effects will be observed at the landfalls. Any such effects during construction will be short-lived and temporary.	May-05	Closed	N/A
P. 98: *The Panel's review identified the following general areas of future research: Continued, uninterrupted annual monitoring of important population parameters including abundance, trends, survival rates, reproductive rates and age(size)/sex structure – analysis of the resultant time series of data may provide an early warning of problems within the population.*	Panel recommends undertaking monitoring on: · Continued, uninterrupted annual monitoring of important population parameters including abundance, trends, survival rates, reproductive rates and age(size)/sex structure – analysis of the resultant time series of data may provide an early warning of problems within the population.	SEIC agrees. SEIC has committed to a long term WGW monitoring plan. Studying population demographics structure and health through Photo-identificaiton is part of these studies.	Development of exact details of the long term monitoring program and its different components is ongoing with ENL and the russian scientists and institutes involved in the program.	Ongoing	Closed	Future WGW monitoring documents.
P. 98: *The Panel's review identified the following general areas of future research: Annual monitoring of gray whale foraging and habitat use patterns, including prey, habitats and variability in foraging patterns over space and time – the resultant time series of data may identify changes in habitat correlated with certain development activities.*	Panel recommends undertaking monitoring on: · Annual monitoring of gray whale foraging and habitat use patterns, including prey, habitats and variability in foraging patterns over space and time – the resultant time series of data may identify changes in habitat correlated with certain development activities.	SEIC is currently undertaking this work and is planning to continue this in future years.	No direct action identified. Development of exact details of the long term monitoring program and its different components is ongoing with ENL and the russian scientists and institutes involved in the program.	Ongoing	Closed	Future WGW monitoring reports
P. 98: *The Panel's review identified the following general areas of future research: Real-time monitoring of behaviour and (if possible) physiological responses by the whales during periods when levels of underwater noise increase noticeably (e.g. during construction and seismic surveys).*	Panel recommends undertaking monitoring on: · Real-time monitoring of behaviour and (if possible) physiological responses by the whales during periods when levels of underwater noise increase noticeably (e.g. during construction and seismic surveys).	Real time acoustic monitoring will be conducted, also acoustic monitoring for a wide range of Hz in relation with behavioural observations. Physiological responses are difficult to measure in real time under field conditions.	Further discussion required with the Panel.	May-05	Closed	Discuss with Panel.
P. 98: *The Panel's review identified the following general areas of future research: Recording and monitoring of whale/ship encounters (including strikes, near misses and safe avoidance) to determine if adjustments are needed to vessel traffic based on ship size, location, speed, daylight or other pertinent variables.*	Panel recommends undertaking monitoring on: · Recording and monitoring of whale/ship encounters (including strikes, near misses and safe avoidance) to determine if adjustments are needed to vessel traffic based on ship size, location, speed, daylight or other pertinent variables.	Is being done under the MMO program. Special forms exist to report such incidents.	Although no action is required, it may be useful to further clarify this item through discussion with the Panel.	May-05	Closed	Discuss with Panel.
P. 98: *The Panel's review identified the following general areas of future research: Surveys at regular intervals during the open-water season along the eastern Sakhalin coast to detect stranded gray whales (or floating carcasses), coupled with a serious effort to investigate cause of death in the event of finding a dead gray whale.*	Panel recommends undertaking monitoring on: · Surveys at regular intervals during the open-water season along the eastern Sakhalin coast to detect stranded gray whales (or floating carcasses), coupled with a serious effort to investigate cause of death in the event of finding a dead gray whale.	SEIC considers such a programme to be useful and will review whether it can be implemented.	Maybe in cooperation with students from Sakhalin State University under existing contract.	To be determined	Open	To be determined
P. 98: *The Panel's review identified the following general areas of future research: Investigation of the ocean dynamics (currents, tides, winds) in the vicinity of Sakhalin II, the Piltun and offshore feeding habitats and Piltun Lagoon – inter alia this will allow for better modelling of the dynamics of oil spills and improved response strategies.*	Panel recommends undertaking monitoring on: · Investigation of the ocean dynamics (currents, tides, winds) in the vicinity of Sakhalin II, the Piltun and offshore feeding habitats and Piltun Lagoon – inter alia this will allow for better modelling of the dynamics of oil spills and improved response strategies.	SEIC already records winds. DVNIGMI oceanographic data is extensive in the area and based on field surveys over decades. SEIC OSR consider this a more than adequate basis for OSR planning needs	SEIC consider that this work would provide no benefit for OSR.	N/A	Closed	No ref.

Ref. & ISRP Report Quote	Issue	SEIC Analysis	Action	Target date	Status	Final ref.
P. 98: *The Panel's review identified the following general areas of future research: Investigation of the ecology of Piltun Lagoon and the Piltun foraging area, and the links between them; inter alia this will provide a more secure basis for evaluating the likely risks to gray whales and their prey, and better inform decisions on siting pipelines and other activities.*	Panel recommends undertaking monitoring on: · Investigation of the ecology of Piltun Lagoon and the Piltun foraging area, and the links between them; inter alia this will provide a more secure basis for evaluating the likely risks to gray whales and their prey, and better inform decisions on siting pipelines and other activities.	SEIC has undertaken lagoonal characterisation studies in the past to assist with sensitivity mapping for oil spill response, but this didn't include the link to gray whale prey.	A study such as proposed will not add significantly to the management of risk since SEIC selected Alternative 1 that ensures spatial separation of the nearshore whale feeding area/prey benthos and the pipeline.	May-05	Closed	No ref.
P. 98: *The Panel's review identified the following general areas of future research: If one or more spills or releases occur, investigation of (1) any direct, acute effects of oil and gas on whales and (2) the effects of chronic exposure should spilled oil remain present for a prolonged period.*	Panel recommends undertaking monitoring on: · If one or more spills or releases occur, investigation of (1) any direct, acute effects of oil and gas on whales and (2) the effects of chronic exposure should spilled oil remain present for a prolonged period.	SEIC commits to undertaking monitoring in this area.	SEIC is currently undertaking onshore background HC surveys in 2005. This will be continued through operations phase and following any spills. SEIC is currently developing post spill monitoring plans and protocols.	N/A	Closed	No ref.
POTENTIAL CONCERNS WITHIN ISRP REPORT						
P. 30: *Studies of short-term behavioural responses to underwater noise associated with aircraft, ships and seismic survey operations indicate that there is a probability of 0.5 that whales will respond to continuous broadband noise when received sound levels (RL) exceed ca. 120dB and to intermittent noise when levels exceed ca 170 dB.*	The Panel is concerned about a possibly strong reaction to a particular frequency or combination of frequencies.	SEIC notes that the criterion used (>120 dB) is based on observations of gray whale responses to industrial sounds of types not greatly different from those occurring during planned activities. It is not likely that reactions to a given received level of construction sound would be greatly different from those previously documented. However, slightly greater responsiveness to a particular received level might be predicted given that dredging and pipelaying are likely to produce tones at numerous frequencies, superimposed on the broadband sound.	Discuss with panel the range of events that would be considered as likely triggers for action.	May-05	Open	Discuss with Panel
P. 31: *Although no hearing threshold audiograms were available, ear structure and behavioural responses to industrial noise strongly suggest that gray whales hear well in the low frequencies (<2kHz) of noise generated by ships and construction activities. Underwater noise from industrial activities can mask communication signals among whales, or other important signals that whales may obtain through listening (passively) to their environment.*	Underwater noise from industrial activities can mask communication signals among whales.	Masking of communication sounds is not much of a concern on the feeding grounds, where gray whales do not call much.	Further discussion required with the Panel.	May-05	Open	Discuss with Panel.
P. 37: *Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 1. Transmission of noise through WGW habitats.*	Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 1. Transmission of noise through WGW habitats: Model and predict received levels from multiple (or single) noise sources in shallow-water environments and determine what aspects of the noise signal would be disturbing to a WGW.	SEIC has, through acoustic monitoring, sufficient information on TL characteristics in WGW habitat. A literature review study has been conducted to obtain all available information on hearing availability of WGW, EGW and other baleen species.	Although a literature review study has been conducted and this study was already provided to the Panel, further discussion may required to clarify this item with the Panel.	May-05	Closed	0000-S-90-04-T-7448 Literature Review of Underwater Acoustic Source Levels and Gray Whale Hearing Relevant to Sakhalin Energy Operations
P. 37: *Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 3. Behavioural and physiological responses of WGW to noise.*	Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 3. Behavioural and physiological responses of WGW to noise.	SEIC agrees that it would be good to know whether stress is an issue. However, this has not been studied or documented in any baleen whale. The western gray whale may not be the population in which one should try to develop such an innovative methodology.	Further discussion required with the Panel.	May-05	Open	Discuss with Panel.
P. 37: *Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 4. gray whale hearing abilities.*	Key requirements for an improved appraisal of the effects of noise on WGW off Sakhalin include obtaining better (quantitative where possible) information on 4. WGW hearing abilities.	The main question is not (or should not be) what gray whales hear; rather, the main question in this area is how, and in what circumstances, they are affected. There is much evidence that gray and other whales often do not react (at least overtly) to sounds that are audible as long as the sound source is not directly approaching the whale or otherwise "threatening".	Further discussion required with the Panel.	May-05	Open	Discuss with Panel.

Ref. & ISRP Report Quote	Issue	SEIC Analysis	Action	Target date	Status	Final ref.
P. 37: *In summary, there are two critical scientific information gaps related to the noise field that western gray whales experience from multiple sources: (1) inability to accurately model and predict received levels from multiple (or single noise sources in shallow-water environments, and (2) uncertainty regarding what aspects of the noise signal (e.g. the saliency of the signal) would be disturbing to a gray whale.*	Panel summarises that there are two critical scientific information gaps related to the noise field that WGW experienced from multiple sources: 1. Inability to accurately model and predict received levels from multiple (or single) noise sources in shallow-water environments; 2. Uncertainty regarding what aspects of the noise signal (e.g. the saliency of the signal) would be disturbing to a gray whale.	(1) Through the validation document of the acoustic model SEIC believes that the modelled RL from multiple sources is accurate enough to do predictions on the RL from construction activities (2) This second concern is difficult to assess under field conditions as a lot of factors will influence the reaction of the whale. SEIC feels that the available data on gray whale responses that come from tests with sounds similar to the construction sounds, are representative enough to do predictions on gray whale reactions.	Further discussion required with the Panel.	May-05	Open	Discuss with Panel.
P. 38: *Noise from the Sakhalin II Project may: (1) cause hearing loss (TTS or PTS) in, or mask sounds important to, gray whales, (2) cause temporary or permanent displacement of gray whales from their prime feeding habitat off Sakhalin Island, (3) cause stress to gray whales that remain in a noisy habitat in order to feed.*	Noise from the Sakhalin II project may cause hearing loss (TTS or PTS) in, or mask sounds import to, gray whales.	SEIC feels this to be unlikely; whales are not likely to enter or remain for long in an area where the sound level is so high as to cause TTS or (especially) PTS.	Further discussion required with the Panel.	May-05	Open	Discuss with Panel.
P. 41: *Collisions between vessels (of several types) and whales occur throughout the world, killing or injuring the whales (e.g. Laist et al., 2001). Between 1970-1999, 35% of 35 North Atlantic right whale deaths for which the cause could be determined were from collisions (Knowlton and Kraus, 2001).*	The Panel expresses their concern with regard to collision risks and references right whale examples.	SEIC is aware of the potential for collision risk and has developed mitigation measures to adequately address these. SEIC notes that comparison of collision risks with the Eastern Gray Whale population is more appropriate than the Northern Right Whale population.	Mitigation measures regarding collision risk are provided in the Marine Mammal Protection Plan, and can be discussed with the panel.	May-05	Open	Discuss with Panel.
P. 87: *The limited modelling exercise shows that persistent effects on the population are potentially more serious than shorter-term effects of larger magnitude. Even in the undisturbed case, there is some risk that the population will not increase, and this risk is substantially enhanced in some impact scenarios.*	The modelling exercise undertaken by the ISRP shows that persistent effects on the population are potentially more serious that shorter-term effects of larger magnitude. Even in the undisturbed case, there is some risk that the population will not increase, and this risk is substantially enhanced in some impact scenarios.	SEIC is well aware that the WGW population is facing risk of extinction due to population demographics and current threats within their distribution range. With the extensive monitoring programme in the Piltun area and planned potential satellite tagging studies SEIC is contributing substantially to the knowledge of WGW ecology that is being used in defining mitigation measures and project planning.	Further discussion required with the Panel.	May-05	Open	Discuss with Panel
P. 115: *After reviewing SEIC's methods and plans for modelling noise in gray whale habitats, three areas of concern were identified: (1) measurement accuracy and reliance on noise spectra, (2) source level determinations and (3) use of a modified Range-dependent Acoustic Model (RAM).*	Various concerns raised regarding the source level measurement methodology.	All concerns are addressed in the document "Acoustic Model Validation". Details of monitoring protocol are provided in "Guidelines for measurements of Underwater Acoustic Source Levels". These two documents address the main concerns.	No action required.	Apr-05	Closed	0000-S-90-04-T-7006-00 Acoustic Model Validation and 0000-S-90-04-T-7466-00 Guidelines for measurements of Underwater Acoustic Source Levels.