

WGWP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
A. ISRP	ISRP-04	ISRP Report, p. 35	Continuous noise	Methods to partially mitigate the effects of noise on marine mammals include: (3) removal or quieting of equipment.		Sakhalin Energy is aware that noise mitigation of the source is time consuming and not always possible because of other commitments of the vessels	Ongoing	Closed - implemented /resolved satisfactorily		
A. ISRP	ISRP-05	ISRP Report, p. 35	Continuous noise	Methods to partially mitigate the effects of noise on marine mammals include: (1) avoidance of critical habitat.		Sakhalin Energy agrees that avoidance of critical habitat is an effective mitigation method.	Apr-05	Closed - implemented /resolved satisfactorily		
B. Lenders	Vancouver I workshop report, issues table 6.2		Continuous noise	Additional methods are needed to mitigate the effects of noise - e.g. removal or quieting of equipment. Written response from Experts to Marine Mammal Protection Plan 2005 prior to Gland also questioned adequacy of helicopter measures - height restriction alone not enough.	Sakhalin Energy	The 2005 Marine Mammal Protection Plan provides guidelines for all aircraft (minimum altitude of 450 m over Piltun feeding grounds (except where safety concerns dictate otherwise). Information on the impacts of helicopters on whales suggests that it will not be a problem at these altitudes particularly since overflights will rarely occur. (REFS: 8). Sakhalin Energy accepts that this issue will go to the WGWP.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 39, p.18 (of IISG report)		Continuous noise	Instead of hourly averages, useful information would include a larger set of statistical properties of the signal, including: • The maximum 3-minute Leq during the hour; • The 90th percentile; • The hourly Leq; • The 50th percentile; and • The 10th percentile.	Sakhalin Energy - JASCO - POI	Acoustic reports related to the CGBS installation presented a large set of statistical properties as recommended. They did not provide the 10th percentile. <u>ACTION</u> : The 10th percentile will be included in reports of the 2006 season.	Early 2007	Closed - implemented /resolved satisfactorily		
C. IISG	Item 41.1, p.20 (of IISG report)		Continuous noise	The IISG accepts the Sakhalin Energy proposal to control noise exposure on the feeding grounds on the understanding that corrective actions will be triggered using the following procedures, which assume that the 'monitoring buoys' are placed at the edge of the feeding area, i.e., between the whales and the noise sources: 1. Corrective actions will be triggered by continuous received levels at monitoring buoy(s) in excess of 120 dB re 1 µPa for four hours.	Sakhalin Energy	Sakhalin Energy confirms that the acoustic buoys will be placed at the edge of the feeding area between the whales and sound sources. With regard to the noise exposure control: 1) Corrective action to be taken at received levels of 120 dB re 1µPa for 4 continuous hours, will very likely result in a substantial decrease in progress of pipeline construction activities, which will make it impossible to finish construction in one season. These duration criteria are likely based on exposure to an individual whale. However, whales are not fixed in one point but are continuously moving in search for food. In case they do remain in one specific area for 4 hours or more, the levels of noise that they receive are unlikely to be sufficient to elicit an avoidance reaction. <u>ACTION</u> : Criteria to be discussed with scientists.	Jun-06	Closed - implemented /resolved satisfactorily		
C. IISG	Item 43, p.21 (of IISG report)		Continuous noise		Sakhalin Energy	Agree. Experiments to measure noise produced by the Akademik Oparin, Akademik Lavrent'ev and zodiacs were conducted in 2004 and 2005. On the basis of the findings, 4 stroke motors were used instead of 2-stroke motors for the photo-ID zodiac. Specific whale safety protocols have been established outlining requirements to approach whales and safety distances.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 44, p.21 (of IISG report)		Continuous noise	Distribution data should be analyzed as quickly as possible during the 2006 season so as to detect potential changes in WGWP distribution in response to noise from Sakhalin Energy activities.	Sakhalin Energy	Agree. In 2005 this was done on a weekly basis as the daily variation in distribution was too high to enable any detection of change. These weekly data were compared with historical data. <u>ACTION</u> : In 2006 a similar approach will be implemented with improvements where relevant.	June-Oct. 2006	Closed - implemented /resolved satisfactorily		
C. IISG	Item 45, p.21 (of IISG report)		Continuous noise	Whale distribution in the area south of Piltun Lagoon, specifically in the area of the pipeline landfall, should be monitored continuously throughout the critical construction periods in 2006 to enable detection of northward movement of whales early in the season. Establishment of monitoring stations in the southern area is advisable, as is the placement of additional trained observers on ships working in the area.	Sakhalin Energy	Agree. In addition to the two behavioural teams that operate north of the Piltun Bay mouth, a third behaviour team is being mobilized south of the Piltun Bay mouth in the area of the pipeline landfall to observe whales migrating north towards the feeding area. In addition, on the construction vessels that operate close to the landfall, experienced MMOs will be present to continuously scan the area for whales.	June-Oct. 2006	Closed - implemented /resolved satisfactorily		

WGAP Recommendations Table - Noise

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C. IISG	Item 54, p.23 (of IISG report)		Continuous noise	Based on the 2005 observations, criteria that trigger actions to reduce noise should be enforced more strictly for the 2006 season.	Sakhalin Energy	In 2005 special computer programs were developed that alerted the acousticians automatically if criteria were being reached. Continuous watch was kept and pro-active measures taken where needed to reduce sound levels. In 2006, Sakhalin Energy will again keep a close watch on received levels sound levels on the acoustic buoys at the border of the Piltun feeding area and relate those to offshore vessel movements and activities.	2006 field season	Closed - implemented /resolved satisfactorily		
C. IISG	Item 55, p.23 (of IISG report)		Continuous noise	Whales may have been exposed at or within the boundaries of the monitoring array during the passage of vessels. For this reason, IISG has recommended continuous real-time monitoring, at least by ear. Compressed data also should be reviewed in real time by use of streaming 3-min and half-hour averages.	Sakhalin Energy	Agree. Sakhalin Energy conducts real-time monitoring with instantaneous amplitude and spectra from all the transmitting buoys available for visual and audio analysis. Instantaneous sonograms and spectra computed from raw data give greater opportunities for vessel noise recognition.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 56, p.23 (of IISG report)		Continuous noise	We also strongly recommend that identifiable sound sources, such as drilling and pipelaying vessels, support vessels, and photo-identification inflatable skiffs, should be logged with a time-stamp by observers so that the total contribution of Sakhalin Energy to the local acoustic 'budget' can be reported.	Sakhalin Energy	Agree. It is planned that all construction vessels will be equipped with the real time satellite tracking system PurpleFinder, and their positions logged. All research vessels and boats will keep a continuous log of their movements. These data will be integrated into the acoustic analysis.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 57, p.23 (of IISG report)		Continuous noise	Whales transiting in or out of the feeding area would have received high levels close to vessels, possibly in excess of criterion levels, as would whales near project vessels working within the feeding area, such as the photo-identification inflatable skiffs. In such cases, whale exposures would have been dominated by vessel noise, introducing additional error into the analysis of the effects of construction activities. These sources of error should be considered during further analysis.	Sakhalin Energy	Only the zodiac and occasionally the larger research vessels work within the feeding area. The acoustic levels of these boats have been recorded. During the real time analysis of the acoustic data these occurrences are being detected and considered in the analysis.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 58, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (1) an appropriate acoustic monitoring effort be made in the pipeline construction zone south of the Piltun feeding ground.	Sakhalin Energy	Agree. It is a good idea to place acoustic equipment as close as possible to the Piltun landfall in order to record received sound levels that whales migrating north would experience. ACTION: Sakhalin Energy to look at available equipment and program to see whether one of the acoustic buoys can be used without compromising the existing program or if additional acoustic buoys are available.	Jun-06	Closed - implemented /resolved satisfactorily		
C. IISG	Item 59, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (2) an additional (third) behavior/theodolite team, supervised by Glenn Gailey, be on site by late May 2006.	Sakhalin Energy - TAMU	ACTION: TAMU is currently working on the logistics and hiring of personnel to get a team in the field. The earliest that this will be possible is mid June.	Jun-06	Closed - implemented /resolved satisfactorily		

WGWAP Recommendations Table - Noise

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C. IISG	Item 60, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (2 cont.) This third team will need at least one more senior person experienced with the relevant methods and equipment (theodolite, focal animal and scan sampling), two research assistants and a full complement of needed equipment (i.e. theodolite, tripod, computer, radios, phone, etc.) and necessary infrastructure support.	Sakhalin Energy - TAMU	Sakhalin Energy confirms that these recommendations will be implemented. ACTION: Personnel to be sought and contracted and trained, logistics and equipment to be arranged.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 61, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (3) The initial research at the southern location (near land-shore dredging activity) should be conducted by O. Sycheno or G. Gailey, both of whom have conducted similar observational work for the past five years.	Sakhalin Energy - TAMU	ACTION: Sakhalin Energy confirms that this recommendation will be implemented.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 62, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (4) The third (new) observation team should be trained in methodology and observation techniques established in the current western gray whale behaviour research program.	Sakhalin Energy - TAMU	ACTION: Training of 3rd team to be conducted by O. Sychenko and or G. Gailey.		Closed - implemented /resolved satisfactorily		
C. IISG	Item 63, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (5) Three observation stations in the southern region should be employed with one near the predicted 120dB footprint border to the south of the dredging activity, a second near the dredging activity (highest received levels) and a third near the predicted 120dB footprint border to the north of the dredging activities. From early June to mid-July, monitoring effort should be focused on stations 1 and 2, and after mid-July station 3 should be incorporated to evaluate potential avoidance by animals approaching the area.	Sakhalin Energy - TAMU	ACTION: The locations will be chosen according to the IISG recommendations, taking into account the local field conditions.		Closed - implemented /resolved satisfactorily		

WGWAP Recommendations Table - Noise

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C. IISG	Item 64, p.24 (of IISG report)		Continuous noise	Given the amount of construction occurring near the Piltun area in 2006, especially in the region approaching the southern portion of the nearshore feeding ground, the IISG recommends that: (6) If observations during the northbound migration indicate a complete avoidance (animals either remaining in the area and failing to progress northward to the feeding grounds or reversing to a southbound course), Sakhalin Energy should consider disruption has occurred and take action to ensure that whales are not being prevented from reaching the primary feeding habitat.	Sakhalin Energy	Agree. The communication protocol has been discussed with the offshore pipeline project team. ACTION: Sakhalin Energy to implement the communication protocol and set it out in the MMPP for distribution to parties involved.		Closed - implemented /resolved satisfactorily		
E. Vladivostok	WGWAP/Vlad-03 (4)	WGWAP 1/007	Continuous noise	The Panel recommends that for every recorder available, Sakhalin Energy provides the following: (4) These data should be provided in documentation for the St. Petersburg meeting.	Sakhalin Energy		15.04.07	Closed - implemented /resolved satisfactorily		
F. WGWAP-2	WGWAP 2/013	WGWAP 2/3 Section 10	Continuous noise	The Panel recommends that, for the period of 14-28 July 2006, the densities of whales and noise levels for a small area (blocks 7-9 from WGWAP 2/INF 11) be calculated and plotted together. Whale density should be calculated for grid cells of 10 km ² (5 km parallel to shore x 2 km perpendicular) with a 1-day average and reported in whales/km ² . The noise should be calculated with hourly averages, and the two datasets overlain on plots of standard line type with time/date on the x-axis and two y-axes, one for whale density and one for noise amplitude.	Sakhalin Energy	Sakhalin Energy will conduct this recommended analysis.		Closed - implemented /resolved satisfactorily		
F. WGWAP-2	WGWAP 2/014	WGWAP 2/3 Section 11	Continuous noise	The Panel requests that, in the future, information regarding the conduct of transmission loss (TL) experiments be included in the detailed work plan (see recommendation under Item 7).	Sakhalin Energy	The scope of TL experiments is part of WGW scope of work that is being provided to the Russian authorities for approval. This information has been provided to the panel on May 15.		Closed - implemented /resolved satisfactorily		
F. WGWAP-2	WGWAP 2/015	WGWAP 2/3 Section 11	Continuous noise	The Panel recommends that transmission loss experiments be conducted only in good-weather periods (and in daytime) to ensure that MMOs and the shore-based behaviour teams are able to monitor efficiently for the presence of gray whales.	Sakhalin Energy	All TL or propagation measurements that require the operation of a transducer inside the 20 m contour of the Piltun feeding area are conducted according the following protocol: - Operations can only be conducted in daylight and in good visibility; - MMOs on the vessel should monitor a radius of at least 1 km and if gray whales are present measurements are postponed; - Source levels of any transducer monitored by the source hydrophone should not be greater than 150 dBrms re 1 µPa-m; - These protocols should ensure that no gray whale receives a sound level greater than 120 dBrms re 1 µPa. This protocol was provided to the panel during the meeting in the form of a 1 page briefing note.		Closed - implemented /resolved satisfactorily		

GWGAP Recommendations Table - Noise

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G. GWGAP-3	WGWAP 3/032	WGWAP 3/3 Section 7.3	Continuous noise	The Panel recommends that a full report on both the acoustic and whale behaviour/distribution data from the 2007 construction season should be submitted for review at WGWAP-4. The acoustic reports should be in approximately the same form as WGWAP 2/INF.14 and WGWAP 2/INF.14a. Whale distribution data should be reported for the whole season, in 1 km ² blocks for 7-day moving averages. The behaviour data should be provided in a form similar to that of WGWAP 2/INF.6.	Sakhalin Energy	Sakhalin Energy will, as in previous years, make available the full 2007 acoustic data analysis report from POI as well as the interpreted 2007 season acoustic report from JASCO. The latter will include an analysis of the noise distribution within the monitored region of the feeding area based on all available AUAR recordings and model-based interpolation. Sakhalin Energy will provide report on 2007 behaviour monitoring in the similar form as requested.	Apr-08	Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/004	WGWAP 3/3 Section 3.2.3	Pulse noise	The detection probability from vessels is an important factor in the effectiveness of mitigation measures for seismic surveys and the Panel recommends that the issue of estimating detection function probability should be addressed by the Seismic Survey Task Force.	Seismic Survey Task Force			Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/035	WGWAP 3/3 Section 9.3	Pulse noise	The Panel recommends that a table of the estimated directional profile of sound energy (for example, sound levels at 5° or finer intervals around the clock, at a fixed nominal distance from the array) be prepared and circulated to the Task Force.	Sakhalin Energy	Sakhalin Energy will make available to the Task Force the frequency dependent directional profiles of sound energy generated by the airgun array model, in the format that is used by the Company's acoustics consultants for all acoustic footprint modeling and SEL estimations.	Mar-08	Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/036	WGWAP 3/3 Section 9.4	Pulse noise	The Panel recommends that the Seismic Surveys Task Force be reconstituted with the revised terms of reference and working approach given in Annex 5.	Seismic Survey Task Force			Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/037	WGWAP 3/3 Section 10.1.2	Pulse noise	In view of the information and concerns outlined in sections 10.1.1 and 10.1.2 of the report, the Panel recommends that Sakhalin Energy should make every reasonable effort to ensure that full-scale acoustic and behaviour monitoring of the Piltun feeding area takes place in 2008.	Sakhalin Energy	Sakhalin Energy plan to monitor sound levels and behaviour in 2008 at the same locations as in previous years. The scope of work is being finalised for 2008 but will be for approximately 75 days	Apr-08	Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/038	WGWAP 3/3 Section 10.1.2	Pulse noise	In view of this, the Panel noted that the only potentially available source of information on noise levels generated by non-Sakhalin Energy operations in 2008 would likely be from independent monitoring efforts sponsored by NGOs, and requested that IUCN make contact with SUCH GROUPS regarding the possibility of obtaining information.	IUCN	IUCN has written to both IFAW and WWF-Russia requesting clarification of their intentions regarding research and monitoring in 2008.	Apr-08	Closed - implemented /resolved satisfactorily		
G. GWGAP-3	WGWAP 3/039	WGWAP 3/3 Section 10.2	Pulse noise	The Panel recalls that the effects of seismic surveys on WGWs have been studied on at least three previous occasions (Weller et al. 2006a, 2006b; Gailey et al. 2007), and the Panel recommends that the results from all three studies should be carefully considered by the Task Force.	Seismic Survey Task Force			Closed - implemented /resolved satisfactorily		

WGWAP Recommendations Table - Noise

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H. WGWAP-4	WGWAP 4/008	WGWAP 4/4 - Section 7.1	Continuous noise	The Panel agreed with a proposal from Gailey that a dedicated comparison of scan and count methods as well as the analytical approaches used to calculate distance for data from the two teams would be a valuable contribution to proper integration of the distribution and behaviour data sets. The Panel recommends that such an analysis be provided for its review at WGWAP-5.	Sakhalin Energy	Sakhalin Energy is currently standardizing all distance estimations from all surveys to avoid differences between surveys. A comparison of methodological approaches and observational data between the two shore-based surveys will be presented at WGWAP5.	Dec-08	Closed - implemented /resolved satisfactorily		
H. WGWAP-4	WGWAP 4/009	WGWAP 4/4 - Section 7.1	Continuous noise	The Panel noted that the 'opportunistic' observations of GWGs by MMs (particularly near the outer edges of the Piltun feeding area) had been plotted in WGWAP 4/INF.10 but not used in the daily average estimated whale densities for the period from 21 June–24 July 2007. It recommends that such inclusion be attempted following the same principles as discussed under Item 10.2.1 and that the results be made available for Panel review at WGWAP-5.	Sakhalin Energy	Methods to include opportunistic data are being assessed in an attempt to include them in density analysis of GWG distributions.	Dec-08	Closed - implemented /resolved satisfactorily		
H. WGWAP-4	WGWAP 4/010	WGWAP 4/4 - Section 7.2	Continuous noise	The Panel recommends that (i) the TL experiments be conducted as expeditiously as possible, preferably in a single year.	Sakhalin Energy	TL experiments will be conducted as expeditiously as possible, but due to logistical constraints are unlikely to be completed within a single year.		Closed - implemented /resolved satisfactorily		
H. WGWAP-4	WGWAP 4/012	WGWAP 4/4 - Section 7.3	Continuous noise	The Panel recommends that equipment with the following specifications be used: (i) recording stations with analog-to-digital (A/D) converters of ≥ 16 bits, (ii) the real-time acoustic data be transmitted at this bit-depth (<i>i.e.</i> ~ 72 dB dynamic range) in the frequency range of 1 Hz–3 kHz; and (iii) a sampling rate (F_s) of ≥ 20 kHz for the archival buoys. The $F_s \geq 20$ kHz specification applies more to continuous noise from construction and/or platform operations, which can reach 10 kHz (Richardson <i>et al.</i> 1995), although signals from seismic airguns can reach 3 kHz (Madsen <i>et al.</i> 2006).	Sakhalin Energy	Sakhalin Energy and its Russian scientific partners are in the process of developing and rigorously testing a new generation of digital real-time monitoring buoys whose effective data rate specifications are still being finalized. The company has firmly committed to a sampling resolution of 16 bits and a sampling rate ≥ 20 kHz for archival recording to internal hard disk. The data rate for digital telemetry to be used for the 2009 survey perimeter monitoring will be sufficient to provide effective audio monitoring over a frequency range no less than 1Hz – 1kHz which encompasses over 99% of the source acoustic energy of the airgun array.	Dec-08	Closed - implemented /resolved satisfactorily		
H. WGWAP-4	WGWAP 4/014	WGWAP 4/4 - Section 10.2.3	Pulse noise	The Panel agreed that there was merit in the idea that a small group, including Racca, Nowacek and Vedenev, would jointly consider the result of the calibration exercise during the 'window'. It was further agreed that any details of how this might be undertaken in practice could be discussed at WGWAP-5 and the Panel requested that those individuals provide a discussion document for consideration at that meeting.	Sakhalin Energy/ WGWAP	Sakhalin Energy is open to discussion with the WGWAP on how a process of independent examination of the results of the initial sound source verification (SSV) could be undertaken in practice. In the interest of timely and effective completion of the SSV, the acquisition and processing of the data will under any circumstances be performed by Sakhalin Energy appointed scientific personnel according to established and openly documented best practices.	Dec-08	Closed - implemented /resolved satisfactorily		
H. WGWAP-4	WGWAP 4/015	WGWAP 4/4 - Section 10.2.4	Pulse noise	The Panel recommends that Constantin Avilov be asked to perform further work according to the rationale and specifications detailed in the report.	IUCN/Russian team		Sep-08	Closed - implemented /resolved satisfactorily		

WGAP Recommendations Table - Noise

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I. WGAP-5	WGAP 5/002	Section 5.2	Pulse noise	The Panel recommends that access to such data be provided in good time before its next meeting in order to help evaluate the possibility of a causal relationship between industrial noise and whale numbers/distribution.	Sakhalin Energy	Sakhalin Energy has made a commitment to provide these to the Panel two weeks before the next meeting.	End of March 2009	Closed - implemented /resolved satisfactorily		
I. WGAP-5	WGAP 5/004	Section 12.2	Pulse noise	The Panel strongly urges that every effort be made to enable an [independent] observer to be present [onboard the seismic vessel during the survey].	Sakhalin Energy	As soon as the availability of berths is known Sakhalin Energy will liaise with the contractor as to the feasibility of this and with the Panel as to who it would be. This person will have to comply with all Sakhalin Energy HSE rules as well as RF regulations	None specified	Closed - implemented /resolved satisfactorily		
I. WGAP-5	WGAP 5/005	Section 12.3.4	Pulse noise	The Panel recommends that these tabulations [on non-systematic sightings] be available in time for inspection at the proposed Task Force workshop to be held at the end of January 2009.	Sakhalin Energy	These were presented and discussed at the seismic TF meeting early February in Vancouver. The task force agreed that Justin Cooke would conduct an additional analysis on a subset of these data.	End of January 2009	Closed - implemented /resolved satisfactorily		
I. WGAP-5	WGAP 5/007	Section 12.3.5	Pulse noise	The first step [in regard to WGAP-5/006] is to compile the sightings and determine sample size. The Panel requests that the compilation be available in time for the Task Force workshop scheduled for the end of January 2009.	Sakhalin Energy	Completed and presented at the TF meeting early February in Vancouver.	End of January 2009	Closed - implemented /resolved satisfactorily		
I. WGAP-5	WGAP 5/012	Section 17	Pulse noise	The Panel requests that Sakhalin Energy provide a realistic estimate of when it expects to complete the survey, and list the factors (other than the obvious ones such as ice and weather conditions) that could contribute to a delay, and that this information be submitted to the Seismic Survey Task Force workshop at the end of January 2009.	Sakhalin Energy	Complete – discussed at the Seismic TF meeting in Vancouver.	End of January 2009	Closed - implemented /resolved satisfactorily		
J. WGAP-6	WGAP-6/004	Item 2.3	Pulse noise	In the event that Sakhalin Energy decides to work towards conducting the seismic survey in 2010, the Panel recommends that the Seismic Survey Task Force be reconstituted and reactivated to complete the outstanding items of work listed in Annex 4.	WGAP and Sakhalin Energy	Sakhalin Energy agrees to participate fully in the Task Force.	December 2009	Closed - implemented /resolved satisfactorily		
J. WGAP-6	WGAP-6/005	Item 2.3	Pulse noise	Recognizing that possibility [i.e. that the Panel may reconsider the idea of a seismic survey in 2010], the Panel recommends that sufficient advance planning be made in all aspects of monitoring and mitigation before, during and after the survey to ensure both minimisation of impact and collection of pertinent data.	WGAP and Sakhalin Energy	Sakhalin Energy will actively prepare for monitoring and implementing mitigation measures in the event that the 4D seismic proceeds in 2010.	May 2010	Closed - implemented /resolved satisfactorily		
J. WGAP-6	WGAP-6/011	Item 5.4	Pulse/Continuous noise	Thirdly, all additional information on days and locations of interest relative to known industrial events should be made available for analysis.	Sakhalin Energy	Sakhalin Energy will provide all available data on Sakhalin Energy activities, and when authorised to do so Sakhalin Energy will provide relevant information on non-Sakhalin Energy events.	None specified	Closed - implemented /resolved satisfactorily		

WGWAP Recommendations Table - Noise

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J. WGWAP-6	WGWAP-6/012	Item 5.4	Pulse/Continuous noise	Finally, all acoustic data should be archived in such a format that subsequent analyses using additional acoustic metrics (e.g. peak sound pressure, kurtosis) are possible.	Sakhalin Energy	POI stores all raw data that can be reprocessed if necessary. No raw data may be taken outside of Russia.	Completed	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/002	Item 4.3	Continuous noise	The Panel recommends that for any and all future requests for acoustic data (e.g. for use in ongoing MVA efforts), Sakhalin Energy should provide, in tabular format, 1Hz, 1-minute averages for continuous noise and 1Hz, 1-second averages for impulsive noise in frequency bands specified in the request.	Sakhalin Energy	These requirements will be taken into account when the panel requests acoustic data. However, as previously noted the panel needs to be specific as to the date and time ranges and the points at which the data is required as the data is otherwise too large.	When requested by the Panel – with requests making specific reference to this	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/003	Item 5.2.2	Pulse noise	The Panel recommends that Sakhalin Energy submit the A-line truncation proposal by 28 February 2010.	Sakhalin Energy	Sakhalin Energy will prepare and submit a proposal.	28-Feb-10	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/004	Item 5.2.2	Pulse noise	The Panel further recommends that this proposal include provision for buffer zones to ensure that the behavioural response threshold will not be exceeded at the PML during acquisition of the truncated portions of the A lines.	Sakhalin Energy	Appropriate buffer zones will be included in any proposal.	28-Feb-10	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/005	Item 5.2.2	Pulse noise	The Panel stresses the importance of adequate visual observation platforms and recommends that Sakhalin Energy test the structural integrity of the platforms under realistic field conditions and that the tests be conducted with sufficient lead time to allow for any necessary corrective measures to be implemented.	Sakhalin Energy	An additional platform will be built in Nogliki and tested.	01-Apr-10	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/006	Item 5.2.2	Pulse noise	Details are given in Section 7.6 of the SSTF-4 report and the Panel recommends that the observation vessel follow the operational decision trees described there.	Sakhalin Energy	The decision trees will be implemented as discussed.	01-Apr-10	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/007	Item 5.2.2	Pulse noise	The Panel recommends that Sakhalin Energy submit for its review an operational contingency plan as soon as possible but not later than 28 February 2010.	Sakhalin Energy	Sakhalin Energy will develop this plan but on reflection feel that the deadline should be changed to 31 March.	28-Feb-10	Closed - implemented /resolved satisfactorily		
K. WGWAP-7	WGWAP-7/008	Item 5.2.2	Pulse noise	The Panel recommends that if any of the measured data fall ≥ 3 dB outside the range (1 SD) predicted by the model, then the propagation models should be retuned and rerun until alterations give results that more closely match the data.	Sakhalin Energy	Sakhalin Energy agrees that this will be done if required. A library of pre-computed model results corresponding to different propagation conditions will be prepared prior to the survey so that the matching of estimates to measurements should only require a selection of model outputs. A full "re-tuning and re-running of the model" would only be required if the field results were outside of all estimated bounds.	< 48 hours after the Source Verification	Closed - implemented /resolved satisfactorily		

WGWP Recommendations Table - Noise

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K. WGWP-7	WGWP-7/009	Item 5.2.2	Pulse noise	The procedure for the SSV will follow standard industry practice, and the Panel recommends that the data be provided as soon as possible but not more than 48 hours post experiment to Nowacek, Vedenev and Southall for their review and validation. The data should be in the form of plots of amplitude (RMS and SEL) vs. range. The review group must respond within 24 hours.	Sakhalin Energy	Sakhalin Energy agrees to this.	Date dictated by timing of 4-D seismic survey	Closed - implemented /resolved satisfactorily		
K. WGWP-7	WGWP-7/011 (PART 1)	Item 5.2.2	Pulse noise	Pursuant to such work, the Panel recognises the importance of post-seismic survey visual monitoring, regardless of whether whales were observed in the potential impact zone (i.e. shoreward of the PML) during the survey. The Panel ... recommends that visual data continue to be collected from the behaviour and distribution stations for a period of at least 14 calendar days following completion of the seismic survey.	Sakhalin Energy	This recommendation is accepted in principle and the company will strive to achieve this. However, given the uncertainty in the seismic survey start date and survey duration, and the need to implement the joint monitoring program, a full 14 days may not be possible. Also, this applies only to field teams and not the vessel.	Dictated by concluding date of seismic survey	Closed - implemented /resolved satisfactorily		
K. WGWP-7	WGWP-7/011 (PART 2)	Item 5.2.2	Pulse noise	(continuation from above; WGWP-7/011 (PART 1)) An alternative proposal was developed by A. Vedenev (awaiting Sakhalin Energy response plus comments of other experts) and a subsequent teleconference resulted in an agreement to investigate possible behavioral response criteria. Specific action points need to be clarified (including, as appropriate, an indication of whether the action points are based on sound intensity levels or sound energy exposure). Written response to the Marine Mammal Protection Plan of 2005 also questions the definition of "acceptability" with respect to the level of whale response observed.		(continuation from above; WGWP-7/011 (PART 1)) Process leading to action under criterion #2: a) The first 3-minute interval average of 140 dB leads to an investigative response to locate the source of the noise and to determine if the noise is generated by Sakhalin Energy activities. During the time that this investigation takes place it should be clear whether a total of five, not necessarily consecutive, 3-minute intervals had occurred in the previous hour. If this is the case, and if the investigation finds that Sakhalin Energy activities are the source of the noise, three more 3-minute intervals exceeding 140dB will trigger action to mitigate the noise emission. This process allows Sakhalin Energy time to find the actual source of the noise and to decide on the most appropriate mitigation to reduce the noise in consensus with Sakhalin Energy management. The real-time received noise levels in the feeding area are considered to be reliable quantifiable parameters upon which decisions can be based, as they are independent of environmental conditions such as reduced visibility and high sea states. However, whale behaviour, distribution and abundance are also parameters for determining potential impact on the whales and because of that daily and weekly maps of whale distribution are generated and evaluated in an effort to assess real-time impacts, bearing in mind the high variability and other limitations of these data. Further expert discussion was held during a teleconference on 24 July. Dr. Vedenev's proposal was considered and Sakhalin Energy's planned changes to the noise criteria discussed. New noise criteria were finalised and these criteria were used successfully during PA-B installation. The results of the noise measurements of the PA-B are being analysed and the report, once finalized, will be made available. (REFS: 8, 16, 29b). Sakhalin Energy accept that these issues can be addressed prior to the 2006 construction season. Field observations during 2005 have not revealed any obvious negative behavioural re-actions or changes in distribution. Further analysis is being conducted to confirm these preliminary conclusions.	Dictated by concluding date of seismic survey	Closed - implemented /resolved satisfactorily		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
K. WGWAP-7	WGWAP-7/010	Item 5.2.2	Pulse noise	The Panel has consistently identified the need to assess both the effects of the seismic survey on the whales and the effectiveness of the monitoring and mitigation plan. To ensure that these assessments take place, the Panel recommends the formation of a working group to advise on such analyses following the Astokh 4-D seismic survey.	Seismic Survey Task Force	Sakhalin Energy agrees to the establishment of a Task Force that will provide advice to the Company on the types of analysis that can be carried out. However, the company and its scientists will remain responsible for doing all analyses, publishing these and presenting them to the Panel.	01-Aug-10	Closed - implemented /resolved satisfactorily		
L. WGWAP-8	WGWAP-8/005	Item 4.2.1	Pulse noise	The Panel recommends that three behavioural triggers, besides the acoustic modelling predictions and measurements, be used for temporary shutdowns of the seismic survey operations. These triggers for precautionary shutdowns are intended to refer to unambiguous signs of aberrant behaviour or distress in individual animals. The three triggers were defined as (i) repeat breaching, (ii) mother-calf pair separation of more than five body lengths and (iii) fast travel.	Sakhalin Energy	Sakhalin Energy has included these in the protocols for the 4D Seismic.	4-D seismic survey	Closed - implemented /resolved satisfactorily		
M. WGWAP-9	WGWAP-9/001	1.5.1	Continuous noise	Whilst recognising that these units [autonomous acoustic recorders] require servicing, the Panel recommends that servicing be scheduled such that no two adjacent buoys are out of commission at the same time.	Sakhalin Energy	The buoy's technology has been updated and the need to service buoys during the season mitigated. For this reason SEIC don't anticipate a need for servicing buoys during the 2011 field season at all.	WGWAP-10	Closed - implemented /resolved satisfactorily		
A. ISRP	ISRP-06	ISRP Report, p. 35	Continuous noise	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.		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 Sakhalin Energy's Noise Mitigation Strategy document.	Ongoing	Closed - moot		
A. ISRP	ISRP-09	ISRP Report, p. 37	Continuous noise	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.		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".	May-05	Closed - moot		
B. Lenders	Vancouver I workshop report, issues table 3.2		Continuous noise	Impacts to WGW from noise may be determined by frequency and other features of noise as well as received levels (RL; see also issue 4.1 regarding Gland workshop and noise teleconference). Discussions suggested that action criteria based on just RL are not adequate.		Frequency has not been included in the Action Criteria. This can be discussed in the specific noise teleconferences. Action criteria and related discussions on whale behavior were discussed during the noise teleconferences and further communication with experts is in process. Frequency components of the noise will be analysed in the post-season reports. Sakhalin Energy agree that monitoring of whale behavior and distribution and various characteristics of received sounds is needed for purposes of both assessing and predicting impacts. Such monitoring was conducted during the 2005 construction period and is planned for 2006.		Closed - moot		
B. Lenders	Vancouver I workshop report, issues table 3.7		Continuous noise	Need to obtain better information on WGW hearing abilities.	Sakhalin Energy	No changes to CEA. This is a larger issue for the IUCN and any Cooperative Review Body. Sakhalin Energy accept that the issue will go to the WGWAP.		Closed - moot		

WGAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
B. Lenders	Vancouver I workshop report, issues table 6.4		Continuous noise	The benefits of mitigation through use of bubble screens was questioned by the experts, who stated that bubble screens are not effective (in response to Sakhalin Energy issue Table distributed prior to Gland).	Sakhalin Energy	No change to Gland position. (REFS: 8). Effectiveness of this technique may be assessed in the field if employed and through function of the Collaborative Review Body.		Closed - moot		
C. IISG	Item 65, p.24 (of IISG report)		Continuous noise	Independent behavioural monitoring team employing methods that would allow to compare data with Sakhalin Energy/ENL.	Sakhalin Energy	Sakhalin Energy is happy to advise if required, but considers that this opportunity needs to be mediated by other parties.		Closed - moot		
D. WGAP-1	WGAP 1/008	WGAP 1/3 - Section 7.3	Continuous noise	The Panel emphasises its concern about one major drawback of having multiple research and monitoring teams in the field, which is that it can add to the disturbance from vessel noise or vessel presence on and near the feeding grounds. Therefore, any encouragement of independent initiatives must carry a caveat – that due consideration be given to this concern and that every effort is made to avoid or minimise additional disturbance to the whales.	All research groups	Sakhalin Energy confirms that the teams sponsored jointly by ENL and Sakhalin Energy seek to minimize disturbance to the whales.		Closed - moot		
I. WGAP-5	WGAP 5/013	Section 17	Pulse noise	Further, and also in the event that Sakhalin Energy is contractually committed to conduct the Astokh survey in 2009, the Panel requests that Sakhalin Energy obtain from the contractor information on whether it has scheduled further seismic surveys on the Sakhalin shelf in 2009 after the Sakhalin Energy survey, and permission to pass this information on to the Panel as soon as possible.	Sakhalin Energy	Sakhalin Energy will endeavour to do this and where possible report to the panel	None specified	Closed - moot		
A. ISRP	ISRP-01	ISRP Report, p. 30	Continuous noise	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.		Sakhalin Energy 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.	May-05	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-02	ISRP Report, p. 31	Continuous noise	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.		Masking of communication sounds is not much of a concern on the feeding grounds, where gray whales do not call much.	May-05	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
A. ISRP	ISRP-07	ISRP Report, p. 35	Continuous noise	Scheduling activities to avoid co-occurrence with feeding gray whales and mother-cal pairs would reduce noise impacts.		Considering the nature of the work complete avoidance of WGW feeding season is not possible.	Closed	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-08	ISRP Report, p. 35	Continuous noise	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.		Sakhalin Energy 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.	None	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-10	ISRP Report, p. 37	Continuous 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.		Sakhalin Energy 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.	May-05	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-11	ISRP Report, p. 37	Continuous noise	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.		(1) Through the validation document of the acoustic model Sakhalin Energy 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. Sakhalin Energy 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.	May-05	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-13	ISRP Report, p. 38	Continuous noise	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.		Sakhalin Energy 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.	May-05	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
B. Lenders	Vancouver I workshop report, issues table 3.1		Continuous noise	Assessment of PA-B construction noise has not been substantiated. (See also Issue 5.1 below.) CGBS will be installed in 2005; noise from installation of scour protection is a particular concern. A question was raised during the Gland workshop regarding whether this work could be delayed until after the 'peak' season (from October to November).	Sakhalin Energy	Noise footprint prediction of scour protection placement at the PA-B location, based on modeling results, was presented at Gland and showed low levels of noise. The LUN-A was installed in early July and noise monitoring was undertaken (19). Lessons learned from the LUN-A were applied to PA-B installation (July / early August). These results and the mitigation approach for PA-B were discussed during a noise teleconference on July 24. Both noise measurements of the scour protection at LUN-A and PA-B CGBS showed that these are very close to modeled levels and remain below the noise levels that are considered to be a concern for the GWs. The schedule of the PA-B platform installation late July was based on a combination of best environmental conditions (after ice season and before the stormy season) and before highest densities of whales (in August and September). Scour protection of the PA-B platform needed to start within 3 days of installation to avoid being hampered by sea current action. Delay to October was therefore not possible. Sakhalin Energy has planned its construction activities in such a way as to minimise the amount of noise generated and this was confirmed during the actual installation. (REFS: 9, 19). Preliminary data from the PA-B installation will be available for review in September in the form of a short summary report. A technical noise monitoring report of the CGBS installation will be finalized and distributed ASAP. The installation of the PA-B platform at Pittun was performed as per the plan disclosed in the CEA in November 2004. Delaying the installation would have resulted in increasing the noise exposure to the whales. Visual monitoring of GWs was carried out at all times when weather allowed, including part of the time when the 'noisiest' activities were performed.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
B. Lenders	Vancouver I workshop report, issues table 3.4		Continuous noise	The number of GW affected by noise may be underestimated. Assessment of the nature of effects and the number of whales affected is necessary to determine when oil and gas-related noise is unacceptable.	Sakhalin Energy	This issue relates to the noise impact criterion "number of whales potentially affected", stated in the CEA. Estimates are based on a large set of data and sophisticated density calculations. These distribution data show that GW are continuously moving within and between the feeding area. Although density calculations give a good estimate of the numbers of GW expected in the ensonified area, it remains difficult to determine the actual numbers affected as large part of the movements is contributed to normal movement patterns. Sakhalin Energy will conduct post analysis of the data collected in the field during the 2005 construction season. Behavioural observations of individual whales will be related to received noise levels at the location where the whale was observed. The acoustic model will be used to estimate noise levels at different parts in the feeding area using actual noise level measurements from the buoys. Sakhalin Energy accepts that the issue should go to the WGWAP.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
B. Lenders	Vancouver I workshop report, issues table 5.1		Continuous noise	The action criteria have not been defined with sufficient specificity and "acceptable" responses have not been adequately defined. Without such specificity regarding when actions will be taken and what types of responses are acceptable, it is not possible to judge whether the oil and gas-related activities will be sufficiently responsive to the needs of GWGs. Mitigation measures through temporal separation may not be adequate if and when "peak" seasons can be redefined without adequate justification. After the ISRP review but prior to the Gland workshop, Sakhalin Energy revised their definitions of seasons used to provide the most separation in time. The revisions effectively shortened the peak season at both ends with the end result being the potential for more overlap between presence of whales and noise-generating activities. Sakhalin Energy justified the change of season by referring to data on arrival and departure times of whales in the area. No actual data were provided for review, but descriptions of those data at Gland suggested that they were limited to a single year. Such limited data are inadequate for that purpose if arrival and departure times vary considerably from year to year.	Sakhalin Energy	Seasons are now defined Marine Mammal Protection Plan (2005) as follows (these are changed from previous version of GWG Protection Plan): Off season - December to April; Early season - May to June; Peak season - July to September; and Late season - October to November. During the development of the 2003 Protection Plan there was less information available regarding whale distribution and abundance. The new season definitions were updated based on continuing analysis of all presently available distribution and abundance data. (REFS: 8, 29b). For information: - the extension of the early and late season has no implication for the mitigation measures as all measures apply during the whole summer season; - the extension of the seasons does not result in an increase in overlap between presence of activities and whales as the total duration of construction activities remain the same. It does, however, encourage the operators to schedule noisy activities in June or October as during these months less whales are present than during July-Sept. The distribution maps will be updated annually to include new data. Sakhalin Energy recognises the value of temporal separation as a mitigation measure, and uses this approach when practical. Sakhalin Energy accepts that further discussion on these issues should take place with the WGWAP.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
B. Lenders	Vancouver I workshop report, issues table 6.1		Continuous noise	Additional methods are needed to mitigate the effects of noise - e.g. avoiding critical habitats. Selection of alternative 1 pipeline route maximizes the spatial separation within the context of the 3 options assessed. The location of the PA-B location was raised as a related issue (addressed below).	Sakhalin Energy	Selection of Alternative 1 for the pipeline route avoids passing directly through the western gray whale feeding ground. The selection of the PA-B position is explained in two main supporting documents--see Issue 17.1 for details. (REFS: 13, 25)		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
B. Lenders	Vancouver I workshop report, issues table 6.3		Continuous noise	The effectiveness of ramp-up procedures was questioned because the benefits are hypothetical and have not been demonstrated.	Sakhalin Energy	Ramp-up acknowledged by Sakhalin Energy as of limited applicability to construction activities. Sakhalin Energy accepts that this issue will go to the WGWAP.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

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B. Lenders	Vancouver I workshop report, issues table 8.1		Continuous noise	The need for real-time monitoring of whale responses to noise is addressed elsewhere. Such monitoring will not necessarily reveal the full extent of their responses, which may include behavioral and physiological changes which are too subtle to detect with existing monitoring methods over short periods of time, but still significant with regard to the well-being of the animals. In general, then, there is a need for a more comprehensive understanding of behavioral and physiological responses of WGW to noise.		This is an area of research to be covered under the range state wide advisory body as envisaged as a follow-up to the Gland workshop. In the period before this body exists Sakhalin Energy intends to sponsor such a workshop on an annual basis. Need for longer-term assessment of dose-response relationship. This issue may be addressed under the function of the advisory body. Sakhalin Energy accepts that this issue will go to the WGWAP.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 42.2, p.20 (of IISG report)		Continuous noise	Above this level, exposures up to 140 dB re 1 μ Pa will be permitted but must be reduced in duration by one-half for each doubling of duration (Table 1).	Sakhalin Energy	Sakhalin Energy confirms implementation of the criteria recommended under point 2) t/m 5).		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 42.3, p.20 (of IISG report)		Continuous noise	3. In Document 8, Sakhalin Energy specifies an additional triggering criterion of up to three consecutive 30-minute intervals with received average levels at monitoring buoy(s) of 130 dB re 1 μ Pa or greater; this criterion falls within the 5-dB doubling relation the IISG has recommended.	Sakhalin Energy	Sakhalin Energy confirms implementation of the criteria recommended under point 2) t/m 5).		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 46, p.21-22 (of IISG report)		Continuous noise	Shore-based observations of WGW behaviour seem well planned and executed. a) Whale behaviour observed from shore should be monitored in real time and integrated as fully as possible with acoustic monitoring.	Sakhalin Energy	a) Agree. The information from the acoustic radio transmitted buoys will be provided to the behavioural team as they are collecting data to be incorporated into the real-time behavioural monitoring system.	2006 field season	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 47, p.21-22 (of IISG report)		Continuous noise	b) Observing only from shore stations may be inadequate to test whether whales are reacting to industrial noise, that is, whales at the eastern margin of the feeding area may be inadequately monitored.	Sakhalin Energy	b) Agree. However, boat based behavioural observations need to be as unobtrusive as possible hence they need to be conducted with a small boat. Safety issues related to small boat operations offshore, especially with construction vessels operating in the area, prevent Sakhalin Energy from conducting small boat based observations. Besides the safety issue, it is expected that whale observations at the eastern edge of the feeding area and further offshore will be limited. Aerial, vessel and onshore based distribution and abundance surveys conducted since 2001 show that most of the gray whale population lies on average 2.1 km from shore, with 95% within 5 km from shore.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

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C. IISG	Item 48, p.21-22 (of IISG report)		Continuous noise	c) A real time behavioural monitoring system such as Pythagoras should include the following: i. a robust method for gauging the effect of distance from shore, and ii. testing behavioural data for heterogeneity.	Sakhalin Energy	c) i. The currently proposed real-time monitoring system implements both univariate and multivariate processing techniques. Distance from shore is one of the potential explanatory variables. Besides distance from shore, it is our intent to combine environmental factors, received sound levels, and behavioural observations in a multivariate approach to understand the potential impacts of the industrial activity in real-time. ii. Heterogeneity for shore-based observations is difficult given limited sample sizes and the inability to recognize individuals in the field from shore. Since 2004, shore-based photo-identification methods were incorporated in conjunction with behavioural observations. Information exchange with the IBM photo-ID team has been established to link their photo-identification records with animals monitored in the field in order to further evaluate heterogeneity based on the individual, age, and sex class level.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 49, p.21-22 (of IISG report)		Continuous noise	d) Shore-based behavioural and distribution observations should commence at the same time, or preferably prior to, the start of construction activities.	Sakhalin Energy	d) The very early start of the construction season forms a part of the suite of mitigation measures, and has been incorporated as we know that limited numbers of whales are expected to be present. The onshore vehicle based distribution teams will mobilize mid June as will the 3rd southern behavioural team. The two behavioral teams that operate north of the Piltun Bay mouth will mobilize in the 3rd week of June as the team leaders participate in the training of the 3rd behavioural team.	Mid June 2006	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 51, p.22 (of IISG report)		Continuous noise	It would be very useful if all vessels were tracked acoustically using the array of buoys. If the acoustic recording buoys could be synchronized, they could be used as an array to localize the sources of sounds, which could be used advantageously to understand noise signatures and inform mitigation procedures, e.g., to determine which vessel was producing the highest level.	Sakhalin Energy	Agree. This is done in real time by the Piltun lighthouse team through analysis of the raw data transmitted by an array of 5 synchronized acoustic buoys deployed along the edge of the Piltun feeding area. Individual vessels and their acoustic signal can be recognised and followed in real time.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 52, p.23 (of IISG report)		Continuous noise	Measurement of noise data from the inshore areas where whales are actually observed should be considered.	Sakhalin Energy	A combination of buoys deployed at the 10m contour near the behavioural stations and 20m contour buoys will give a good understanding of any sounds generated in the inshore area propagating into the feeding area. Through the use of an advanced acoustic model, received sound levels can be calculated at the positions that whales have been observed and tracked for behavioural parameters, which will enable a coupling of acoustic and behavioural data.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
C. IISG	Item 53, p.22 (of IISG report)		Continuous noise	Sakhalin Energy should consider targeted, boat-based real time behavioural and acoustic monitoring. The whales that are most at risk of significant noise exposure and therefore disturbance are the ones farthest from shore and thus from the observation stations.	Sakhalin Energy - WGWAP	Sakhalin Energy agrees that this can provide valuable information. However, as stated earlier, safety issues for small boat based operations pose serious limitations to this type of survey. Further investigation into the possibility of implementing boat based surveys in 2006 without any impact on existing programs and without adding extra vessels in the area have yielded no results. ACTION: Sakhalin Energy to consider with WGWAP if and how best to implement such a study for 2007 under the existing safety requirements.	End 2006	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

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C. IISG	Item 40, p.18 (of IISG report)		Pulse noise	The acoustic footprints used for the calculations of effect on whales were standardized to 10 meters depth. Such standardization does not represent the effects of the surface and bottom, which is where the whales are most frequently found. Surface and bottom levels should be reflected in the acoustic footprints.	Sakhalin Energy	10 m depth was used as a standard because most whales, and especially mother/calf pairs, are known to feed in shallow water around the 10m depth mark. It is considered to be conservative as the sound levels at 10 m depth are in general higher than at the bottom. ACTION: Sakhalin Energy will develop some examples to demonstrate the validity of using 10 m as a standard for calculating the acoustic footprint.	Jun-06	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
D. WGWAP-1	WGWAP 1/006	WGWAP 1/3 - Section 7.1	Continuous noise	The Panel recommends that it be provided with a full analysis using effort-corrected data on distribution, for each year that such data are available, overlaid onto the appropriate acoustic 'footprint' information. The results should be integrated to produce an appropriate multi-year comparison of distribution, particularly for years with and without significant anthropogenic noise	Sakhalin Energy	Further clarification is required from the WGWAP on this in relation to overlaying with the acoustic footprint. Sakhalin Energy will produce effort-corrected density analysis this year.<See further clarification submitted by the WGWAP>	To be determined depending on requirements.	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
D. WGWAP-1	WGWAP 1/007 (2)	WGWAP 1/3 - Section 7.2	Continuous noise	In addition, the panel requests the following information for its next meeting (spring 2007): (2) Actual day-by-day construction activities for each vessel involved in June-August 2006 construction.	Sakhalin Energy	The data will be provided.	28-Feb	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
D. WGWAP-1	WGWAP 1/007 (4)	WGWAP 1/3 - Section 7.2	Continuous noise	In addition, the panel requests the following information for its next meeting (spring 2007): (4) An analysis of the relationship between the 2006 acoustic data and concurrent behavioural observations.	Sakhalin Energy	On the basis of MVA report 2005 and further comments strategy for MVA 2006 will be defined.	To be defined	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
E. Vladivostok	WGWAP/Vlad-03 (2)	WGWAP 1/007	Continuous noise	The Panel recommends that for every recorder available, Sakhalin Energy provides the following: (2) 90th, 50th and 10th percentile amplitude levels calculated for 1/3 octave bands up to 5 kHz every half-hour based on ≤ 30 sec time window analysis, i.e., for every recorder, again both the real-time recordings and the post-season analysis, we should see plots of at least the 90th, 50th, and 10th percentile levels for 1/3 octave bands, with the levels calculated every half-hour based on ≤ 30 sec windows. So, the levels are taken for every 30 sec time window, averaged over one half-hour, then the 10th, 50th, and 90th percentile levels for 1/3 octave bands are calculated.	Sakhalin Energy		15.04.07	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
E. Vladivostok	WGWAP/Vlad-03 (3)	WGWAP 1/007	Continuous noise	The Panel recommends that for every recorder available, Sakhalin Energy provides the following: (3) correlations between different hydrophones, e.g., how do the recordings of a particular event compare between a hydrophone at the edge of the feeding area and one inside the area?	Sakhalin Energy		15.04.07	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
F. WGWAP-2	WGWAP 2/016	WGWAP 2/3 Section 12.1	Continuous noise	The Panel recommends that Sakhalin Energy adopts the criteria as presented in WGWAP 2/INF 15.	Sakhalin Energy	Sakhalin Energy will provide the panel with their response in a more detailed note prior to the 2007 construction season. Sakhalin Energy notes that no time was allocated to further discuss the proposed criteria at the WGWAP. Sakhalin Energy have planned all 2007 work based on the criteria successfully used in 2006. Sakhalin Energy considers that it is not technically feasible to implement the proposed criteria.		Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
F. WGWAP-2	WGWAP 2/017	WGWAP 2/3 Section 12.2	Pulse noise	The possibility of conducting on-ice seismic surveys when the whales are absent was discussed. The Panel recommends that the feasibility of this comparative approach be evaluated (see Annex 6).	Sakhalin Energy	Seismic operations in broken, moving ice are beyond the limits of current seismic technology.	31-Aug-07	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
F. WGWAP-2	WGWAP 2/018	WGWAP 2/3 Section 12.2	Pulse noise	Any and all agencies (e.g., Sakhalin State Government) that might have information on seismic surveys planned for 2008 on the Sakhalin shelf should be approached by both Sakhalin Energy and IUCN to ensure that management decisions to protect western gray whales are fully informed.	Sakhalin Energy	Sakhalin Energy will approach Sakhalin oblast authorities on the provision of the information about seismic surveys planned for 2008.	30-Sep-07	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
G. WGWAP-3	WGWAP 3/029	WGWAP 3/3 Section 7.1.1	Continuous noise	The Panel understood that in rare cases the company could decide that it was infeasible to observe these criteria strictly, i.e., even with careful planning to minimize noise, some activities would, unavoidably, produce sufficient noise to breach the criteria. In such cases, the Panel recommends Sakhalin Energy implement additional mitigation measures to minimize the risk to whales.	Sakhalin Energy	Sakhalin Energy will include this in its comments to 3/030 below.	Apr-08	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
G. WGWAP-3	WGWAP 3/030	WGWAP 3/3 Section 7.1.3	Continuous noise	At WGWAP-3, the Panel proposed a single revision to its earlier-proposed criteria for continuous noise. This revision related to the "low-level cutoff," i.e. the level below which industrial noise can be ignored and need not be counted as part of the overall dose received by the whales. The Panel recommends that the low-level cutoff be set at 107 dB re 1 μ P _{RMS} , the value resulting in the Panel's recommended maximum dose of sound energy for a 24-hour period (i.e., the extension of the function set out in WGWAP2/15).	Sakhalin Energy	Sakhalin Energy acknowledge that the use of dose based criteria are becoming the norm and will revert formally to WGWAP on this. The clarification on low-level cut-off is welcomed.	Apr-08	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
H. WGWAP-4	WGWAP 4/011	WGWAP 4/4 - Section 7.2	Continuous noise	The Panel recommends that (ii) the vessels used to deploy and pick up receivers within the feeding areas be the smallest practicable (e.g. rigid-hull inflatables) and be operated slowly and cautiously in order to reduce the risk of disturbance or collisions with whales.	Sakhalin Energy	The acoustic monitoring systems are complex structures whose safe deployment and retrieval requires a larger support vessel, often aided by a small craft. Sakhalin Energy has always ensured that these vessels are operated with full respect of whale protection measures including criteria of visibility, speed and avoidance distance.	Jul-08	Closed - no longer relevant but had not been implemented satisfactorily at the time it became moot		
A. ISRP	ISRP-41	ISRP Report, p. 115	Continuous noise	After reviewing Sakhalin Energy'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).		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.	Apr-05	Closed - superseded by a new recommendation	Vancouver I workshop report, issues table 2.1	
A. ISRP	ISRP-03	ISRP Report, p. 34	Continuous noise	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.		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. Sakhalin Energy 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 specialists required to be involved in the decision making process is defined in the Marine Mammal Protection Plan.	May-05	Closed - superseded by a new recommendation	e.g. WGWAP 3/030	
A. ISRP	ISRP-12	ISRP Report, p. 37	Continuous noise	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.		Sakhalin Energy 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.	May-05	Closed - superseded by a new recommendation	Superseded by Seismic Survey Task Force work	

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
A. ISRP	ISRP-39	ISRP Report, p. 98	Continuous noise	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).		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.	May-05	Closed - superseded by a new recommendation	IISG Items 58-63	
B. Lenders	Vancouver I workshop report, issues table 2.1		Continuous noise	Significant uncertainties have been identified with regard to modeling of received noise levels. Sakhalin Energy issued a document on noise verification and made a presentation on this topic at the Gland meeting, but a formal discussion of adequacy was not held at either the Gland workshop or during the noise teleconference. Experts' written response to Marine Mammal Protection Plan 2005 includes large concern over the accuracy of SL measurements and monitoring.	Sakhalin Energy	Additional validation has been undertaken since the CEA (4). A presentation in Gland and explanation from JASCO demonstrated the robustness of measurements and the validity of the model. Sakhalin Energy has undertaken field monitoring (19) of the LUN-A platform for extra verification of the noise footprint prediction and monitoring of the PA-B installation (July / early August). The LUN-A analyses (19) demonstrate that the model is highly accurate and slightly conservative in its predictions. All required independent expertise was not available at Gland, so discussion on this issue has proceeded with the independent scientists through a series of teleconferences. Based on all materials presented the accuracy of the model has been largely accepted. Noise monitoring during the PA-B installation (9) demonstrated that noise levels were within the levels anticipated. (REFS: 4, 19, 9). Preliminary data from the PA-B installation will be available for review in September in the form of a short summary report. A technical noise monitoring report of the CGBS installation will be finalized and distributed ASAP. Sakhalin Energy agrees that it is useful to compare the measured low frequency noise with the model and has done this. Comparison of modeled and measured spectral levels from actual Lunskeye 2004 operations (Appendix 1 of model validation report) show no systematic bias toward underestimating low-frequency levels. In fact, there is actually a tendency for the model to conservatively overestimate received levels all the way down to 10Hz with remarkably good agreement between 100Hz and 200Hz. Sakhalin Energy concurs that real-time behaviour observations and acoustic monitoring will continue to be required to determine noise exposure and its effects on GWGs.		Closed - superseded by a new recommendation	Superseded by work of WGWAP and SSTF	
B. Lenders	Vancouver I workshop report, issues table 3.3		Continuous noise	Mechanisms are needed to address uncertainties regarding potential for: - TTS/PTS, - masking, - temporary/permanent displacement; - stress impacts and - long-term or cumulative effects from exposure to noise.	Sakhalin Energy	Sakhalin Energy considers that for continuous noise sources and expected received levels in the feeding area from vessel related activities, TTS/PTS is not likely to occur because of the temporary nature of, and the noise levels generated by, the operation. Sakhalin Energy's position is that we have designed noise levels to minimise the likelihood of stress and therefore this is inherent within our mitigation measures. Ongoing WGW monitoring will address some of the long-term issues. Is noise exposure and related potentials such as TTS/PTS, temporary or permanent displacement, or stress impacts still considered an issue? We accept that this issue should be deferred to the WGWAP.		Closed - superseded by a new recommendation	Superseded by Seismic Survey Task Force work	

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
B. Lenders	Vancouver I workshop report, issues table 3.5		Continuous noise	Experts have questioned the utility of studies on migrating whales for protecting gray whales in their feeding grounds. They have raised concerns stemming from the nature of the noise (e.g. continuous versus pulsed or transient). They also have raised questions about the mechanism for Sakhalin Energy's approach is consistent with that used by Malme, Würsig, Bird and Tyack (1986, BBN Rep. 6265), which is the best available literature on the subject for feeding gray whales. Malme et al. (1986, pages. 3-133 and 3-134) used information from migrating gray whales to make conclusions about noise impacts on feeding gray whales changing mitigation measures without more complete review.	Sakhalin Energy	Some literature suggests that the reactions of migrating whales to noise may be greater than that of feeding whales. This issue was discussed in the noise teleconference and the points made were considered in the noise management strategy. In the noise teleconferences, a major concern related to behavioural reaction was transient noises. This was addressed in updated noise criteria, which were emailed to experts on July 1st. The noise criteria have since been updated based on a proposed criteria submitted by one of the panel members and were further discussed during the teleconference on 24 July (8). Details on the revised action criteria are in item 4.1. Changes in mitigation measures have taken place if this was considered appropriate only after a careful review of the data available and after consultation with experts. The use of mitigation measures is closely tracked in the field and all instances of their implementation are recorded (8). Sakhalin Energy receives daily reports from the field and can modify mitigation measures if necessary. (REFS: 8). The post-field season data analyses will add further to our understanding of noise and whales. Sakhalin Energy's approach is consistent with that used by Malme, Würsig, Bird and Tyack (1986, BBN Rep. 6265), which is the best available literature on feeding gray whales. Malme et al. (1986, pages. 3-133 and 3-134) used information from migrating gray whales to make conclusions about noise impacts on feeding gray whales. Sakhalin Energy agrees with the recommendation to demonstrate with 2005 data that regardless of perimeter received levels the criterion of >120dB ensouification of fewer than five whales was met.		Closed - superseded by a new recommendation	Various of the Continuous Noise recommendations of IISG	
B. Lenders	Vancouver I workshop report, issues table 3.6		Continuous noise	Sakhalin Energy raised its noise threshold from 120 dB to a 4-hour average of 140 dB based on studies of migrating gray whales. Among other things, this change has not been demonstrated as consistent with ALARP. The basis for this change has not been explained and some experts raised the need for more objective, transparent risk assessment in their written response to documents received prior to Gland.	Sakhalin Energy	The criteria in the CEA that were used in the planning and design stage defined acceptability as <5 individual WGWs potentially avoiding the part of the feeding area ensouified by levels of >120dB. This automatically implies that the noise levels measured at the edge of the feeding area can exceed 120 dB and still be considered acceptable. The criteria proposed at Gland are action criteria to be applied in the field situation and Sakhalin Energy has modified the original proposed field action criteria presented in Gland following further discussions with scientists during various teleconferences (8). The amended criteria are outlined below in 4.1. It should be noted that these noise action criteria and monitoring protocol were designed to determine if the predicted impact in terms of a noise footprint of >120 dB in the feeding area and associated potential numbers of whales avoiding were as measured. Noise monitoring results of the PA-BCGBS showed that measured noise levels were as modeled during the planning phase. (REFS: 8, 29b). The post-field season data analyses of the PA-B noise measurements combined with the distribution, abundance and behavioural data will add further to our understanding of noise disturbance and whales. Sakhalin Energy accepts the recommendation to demonstrate that the impact criteria used were achieved in practice. See also 3.5 above.		Closed - superseded by a new recommendation	Various of the Continuous Noise recommendations of IISG	

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
B. Lenders	Vancouver I workshop report, issues table 3.8		Continuous noise	It is critical to learn as much as possible from this exposure of gray whales to noise during this 2005 summer. Among other things, noise levels must be monitored continuously on the periphery of the feeding grounds, and corresponding whale behaviour must be documented. The results should be made publicly available so that the scientific value of this "experiment" can be maximized in terms of what we learn about noise impacts. At the end of the season a full report should be published on what mitigation measures, if any, were taken during the construction season in response to measured noise levels, how these were implemented and any relevant experience gained from their implementation.	Sakhalin Energy	Sakhalin Energy has developed a comprehensive monitoring programme to assess all potential impacts and will conduct a full analysis of the data following completion of the field season. Noise has been measured in real time during both the LUN-A and PA-B installations. (REFS: 8, 9, 19, 29b). Full analyses of all data collected will be conducted after the field season and the reports will be made public. Sakhalin Energy accept that this issue is subsumed in 3.4 and 3.6.		Closed - superseded by a new recommendation	Various of the Continuous Noise recommendations of IISG and later the MVA recommendations of WGWAP superseded this one.	
B. Lenders	Vancouver I workshop report, issues table 4.1		Continuous noise	Real-time monitoring of WGW behavioral and physiological response to underwater noise (p. 93) is essential to indicate when noise levels are excessive. Sakhalin Energy developed further criteria in the Marine Mammal Protection Plan 2005. Nonetheless, concerns were raised during noise teleconference regarding: - appropriateness of proposed RL levels, especially 140dB shutdown criteria; - adequacy of Tyack work for identification of the level at which WGW are disturbed (e.g. feeding vs. migration and transient vs. continuous source); - lack of consideration of frequency spectra and other characteristics of the noise; - lack of use of behavioral-based criteria; and - uncertainty regarding the proposed monitoring would lead to real-time feedback and modification of project actions when necessary. (continued below)	Sakhalin Energy	As described in Annex 3 (8, 29b) of the Marine Mammal Protection Plan 2005 (dated 29 July 2005), noise action criteria are based on received levels at the perimeter of the feeding ground. The placement of the buoys was chosen in such a manner that it would enable calculation of the actual footprint of 120 dB in the feeding area using the acoustic model (post field season). As for the criteria that were used to enable immediate action in the field, two sets of criteria and associated actions have been defined to address respectively the high-level transient noises of a few minutes duration (1) and moderate noise levels produced by continuous operations lasting several hours to several days (2). The criteria are: 1. Three consecutive 1.0-hour intervals of average integrated noise level exceeding 130 dB will initiate action to mitigate noise emissions. Process leading to action under criterion #1: a) The first 1.0-hour average of integrated noise level exceeding 130 dB leads to an investigative action to determine the location and possible cause of the noise source that causes the 130 dB threshold to be exceeded. This is based on all available logs of Sakhalin Energy operations that are being sent to field teams on a daily basis. b) If the noise level in the immediately-following (second consecutive) 1.0 hour time period continues to exceed 130 dB, and the investigative action cannot rule out responsibility of Sakhalin Energy activities, then communications with the vessel masters will be established to request information on any unplanned operations and possible duration of those. Decision on potential mitigation measures will be made based on these discussions. c) Actions to mitigate noise emission will be taken if the third consecutive one-hour integrated noise level averages exceed 130 dB. The use of three one-hour average levels is suitable from a perspective of implementation because it provides sufficient time to adequately investigate the noise source location and to be able to effectively mitigate the noise emissions in consensus with Sakhalin Energy management. 2. Five, not necessarily consecutive, 3-minute intervals exceeding 140dB within the first hour followed by three 3-minute intervals exceeding 140dB in the second hour will trigger action to mitigate the noise emission. (continued below)		Closed - superseded by a new recommendation	Various of the Continuous Noise recommendations of IISG and later the MVA recommendations of WGWAP superseded this one.	

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
C. IISG	Item 42.4, p.20 (of IISG report)		Continuous noise	4. In Document 8, Sakhalin Energy specifies that any five 3-minute intervals in a 1-hour period with received average levels at the monitoring buoys in excess of 140 dB re 1 µPa will trigger actions; this criterion falls within the 5-dB doubling relation as well.	Sakhalin Energy	Sakhalin Energy confirms implementation of the criteria recommended under point 2) t/m 5).		Closed - superseded by a new recommendation	Superseded by subsequent discussions and recommendations by WGWAP.	
C. IISG	Item 42.5, p.20 (of IISG report)		Continuous noise	5. Actions always will be triggered when exposures at buoys or estimated at the whales if the average level exceeds 140 dB re 1 µPa for more than 15 minutes, and received noise of 146 dB (RMS) will also trigger immediate action.	Sakhalin Energy	Sakhalin Energy confirms implementation of the criteria recommended under point 2) t/m 5).		Closed - superseded by a new recommendation	Superseded by subsequent discussions and recommendations by WGWAP.	
C. IISG	Item 50, p.22 (of IISG report)		Continuous noise	Real time acoustic monitoring could be improved. In general, the IISG recommends improvement of acoustic monitoring equipment and that the Sakhalin Energy acoustic monitoring program be operational during the entire construction season. (...) The best solution would be to use digital radio transmissions with greater reliability and dynamic range.	Sakhalin Energy	Sakhalin Energy agrees that the use of digital radio transmission would be the most ideal equipment. In the past, digital radiobuoys were used as the main monitoring equipment, but it turned out to be impractical to transmit over a digital radio link considering the amount of data and the transmitting distances required. Currently digital radiobuoys are used as back-ups. The buoys (T-AUARs) presently used for real time monitoring process and record digital data. The only part that is analog is the radio link from the buoys to the lighthouse. The dynamic range of the T-AUARs is enough for measuring the variation in received sound levels from the construction activities and to monitor for action criteria. For non-real time analysis, bottom mounted UAURs are used that record high fidelity digital data with much larger dynamic and frequency ranges.		Closed - superseded by a new recommendation	WGWAP 4/012	
D. WGWAP-1	WGWAP 1/007 (0)	WGWAP 1/3 - Section 7.2	Continuous noise	The Panel recommends that noise exposure criteria developed in the IISG report and intended for application in the 2006 construction season be followed during the 2007 season and thereafter unless, during the interim, sound exposures below the recommended thresholds are found to result in unexpected adverse effects.	Sakhalin Energy	Sakhalin Energy doesn't agree there is a valid scientific reason for changing acoustic criteria proposed by Vedenev in Gland in 2005 and adopted and implemented by the Company. Sakhalin Energy will provide the reasoning for this. <See detailed response from Sakhalin Energy regarding sound criteria>	31-Dec	Closed - superseded by a new recommendation		
D. WGWAP-1	WGWAP 1/007 (1)	WGWAP 1/3 - Section 7.2	Continuous noise	In addition, the panel requests the following information for its next meeting (spring 2007): (1) All acoustic data from buoys at the edge and inside the feeding area, reported in standard formats, e.g., dB re 1 µPa RMS levels for 1 minute intervals.	Sakhalin Energy	Further technical clarification is needed: what frequency band and spectral resolution are required <See detailed response from Sakhalin Energy regarding sound criteria>	28-Feb	Closed - superseded by a new recommendation	WGWAP-6/009 and /010 including updates in September 2009	
D. WGWAP-1	WGWAP 1/007 (3)	WGWAP 1/3 - Section 7.2	Continuous noise	In addition, the panel requests the following information for its next meeting (spring 2007): (3) Whale distribution data for 2006, corrected for effort, analyzed with respect to noise levels, and compared to appropriate historical data.	Sakhalin Energy	Sakhalin Energy is planning to produce effort-corrected density analysis this year.	See above	Closed - superseded by a new recommendation	Superseded by MVA recommendations	

GWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
E. Vladivostok	WGWAP/Vlad-03 (1)	WGWAP 1/007	Continuous noise	The Panel recommends that for every recorder available, Sakhalin Energy provides the following: (1) Spectrograms and amplitude levels for all recordings from all recorders, both real-time data from T-AUARs and sonobuoys and the post-season analysis of the recorders. These plots should take the form of those from a previous MNR report, for example, figure 1.8 from the following document prepared for the second Vancouver meeting (i.e., IISG) – 'WGWAP_13E_MNR_Report_Acoustics_Volume_1_2005.pdf'. This is a traditional presentation of acoustic data, and some completed analyses were shared at the Vladivostok briefing. Frequency analysis should be in 1 Hz steps, and time steps should be ≤1 min. We would make two recommendations regarding changes in the display of these data: i) the frequency axis should be linear, not logarithmic, and need only cover the range from 1-1000 Hz; and ii) the plots for the levels should be expanded so that the axis for the levels is larger and more readable.	Sakhalin Energy		15.04.07	Closed - superseded by a new recommendation	WGWAP-6/009 and /010 including updates in September 2009	
E. Vladivostok	WGWAP/Vlad-02	WGWAP 1/006	Continuous noise	The Panel recommends that the integrated, effort-corrected data on western gray whale distribution for <u>all years available</u> and for all platforms (shore, vessel, aerial) be calculated on a weekly basis and provided as a document for the St. Petersburg GWAP meeting. These distribution data should then also be overlain on the acoustic footprint for the corresponding periods (see Recommendation 3).	Sakhalin Energy		15.04.07	Closed - superseded by a new recommendation	WGWAP 1/006	
G. GWAP-3	WGWAP 3/031	WGWAP 3/3 Section 7.1.3	Continuous noise	The Panel recommends that adequate equipment should be made available to ensure that the most appropriate mitigation measures are followed and that the necessary monitoring data are collected.	Sakhalin Energy	Sakhalin Energy is constantly working with its acoustic contractors to improve the quality of the monitoring equipment. A special effort is being dedicated to equipment improvement in the lead-up to the acoustic monitoring of the seismic survey currently planned for 2009, in order to ensure accurate and high-availability data on which to base all mitigation measures.		Closed - superseded by a new recommendation	WGWAP 4/012	
H. GWAP-4	WGWAP 4/013	WGWAP 4/4 - Section 10.2	Pulse noise	In discussion, the Panel noted that for the sake of transparency, there would be value in having an independent observer nominated by the Panel present on the seismic vessel during the survey. While recognising that there may be logistical difficulties, the Panel recommends that Sakhalin Energy investigate this possibility and report back to the Panel by GWAP-5.	Sakhalin Energy	Sakhalin Energy will investigate the possibility of having an independent observer nominated by the Panel present during the survey.	Dec-08	Closed - superseded by a new recommendation	WGWAP 5/004	

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
J. WGWAP-6	WGWAP-6/009	Item 5.4	Pulse/Continuous noise	The Panel makes several recommendations related to the analysis, form of presentation and availability of Sakhalin Energy acoustic data. Firstly, spectrograms with clear and consistent depictions of received amplitude levels should be presented for all recorders, including real-time data from T-AUARs and the archival sonobuoys.	Sakhalin Energy	At WGWAP –7 Sakhalin Energy would like to resolve with the panel members to define precisely what is required.	None specified	Closed - superseded by a new recommendation	WGWAP-7/002	
J. WGWAP-6	WGWAP-6/010	Item 5.4	Pulse/Continuous noise	Secondly, these plots should present the acoustic data in a format described in a previous MNR report, specifically figure 1.8 in 'WGWAP_13E_MNR_Report_Acoustics_Volume_1_2005.pdf'. Most importantly, frequency analysis should be in 1 Hz steps from 1-1000 Hz along a linear rather than logarithmic axis, time integration windows should be ≤1 min, and the plots showing composite received levels should be larger and more discernable.	Sakhalin Energy	Sakhalin Energy have reviewed the current and 2005 data and believe that the formats are the same. In connection with the scales, Sakhalin Energy would like to resolve this further with the panel experts in December 2009.	None specified	Closed - superseded by a new recommendation	WGWAP-7/002	
M. WGWAP-9	WGWAP-9/003	1.5.1	Continuous noise	The Panel also requests that Sakhalin Energy provides for WGWAP-10 a final report on activities on or near the PA-A platform that could have caused the recorded noise.	Sakhalin Energy	Sakhalin Energy will look further into activities on or near PA-A in the period August–15 October 2009, and report back at WGWAP 10 if possible. Analysis to date has not shown a link to SEIC activities and the noise recorded.	WGWAP-10	Open - in progress		
M. WGWAP-9	WGWAP-9/032	5.4.3	Pulse noise	The Panel recommends that Sakhalin Energy conduct a thorough evaluation of the options of a single airgun versus an array, from the perspective of sound footprints, practicality of operation (including technical factors) and contractual issues. It requests that the company present the results of that review to the Panel for its consideration.	Sakhalin Energy	The contractor proposes a 4x4 gun array (4x40 cu. in. or 2 x80 cu. in.) in line with this recommendation. Depending on the outcome of the technical audit Sakhalin Energy will choose the appropriate source, taking this recommendation into consideration. The sound propagation of these various array combinations will have been modelled by Jasco	WGWAP-10	Open - in progress		
I. WGWAP-5	WGWAP 5/006	Section 12.3.5	Pulse noise	Because the actual negative bias in distance estimates tends to be substantially more than can be accounted by refraction alone, the Panel recommends that an empirical distance bias correction be estimated from the comparison of vessel and shore-based sightings.	Sakhalin Energy	Data on vessel sightings made from shore was reviewed at the seismic TF meeting (see recommendation WGWAP-5/007). The data do not show a specific bias that can be used to estimate a correction factor. Sakhalin Energy will assess the possibility of carrying out a specific experiment during the next field season.	None specified	Open - no action yet taken		
L. WGWAP-8	WGWAP-8/003	Item 2.4	Pulse noise	The Panel has requested , and again requests, that instead of or at least in addition to the current logarithmic depiction, acoustic data be plotted on a linear scale from 1-1000 Hz, which had been discussed in detail with Sakhalin Energy at the last meeting.	Sakhalin Energy	Sakhalin Energy will address this concern.	WGWAP-9	Open - no action yet taken		

GWGAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
L. GWGAP-8	WGWAP-8/004	Item 2.4	Pulse noise	The Panel reiterates recommendation WGWAP-7/002, noting its importance to future analyses. Moreover, the Panel emphasises that this recommendation was intended to reduce, not increase, the burden on Sakhalin Energy because only data that are needed for additional analyses would be requested.	Sakhalin Energy	Sakhalin Energy will address this concern and increase liaison with the relevant panel members to ensure that data is correctly provided.	When requested by the Panel – with requests making specific reference to this recommendation	Open - no action yet taken		
L. GWGAP-8	WGWAP-8/09	Item 4.2.2	General	In lieu of an observer on the observation vessel, the SSTF suggested that a post hoc analysis be conducted by Sakhalin Energy to compare shore based and vessel-based observations and evaluate the effectiveness of the vessel-based observation effort. The Panel recommends that this analysis be done with whatever data are available after the survey.	Sakhalin Energy	Sakhalin Energy agrees that if the data is available it will be analysed	WGWAP-9	Open - no action yet taken		
M. GWGAP-9	WGWAP-9/002	1.5.1	Continuous noise	The Panel requests that for WGWAP-10 an analysis of whale density for the period 15 August–15 October 2009 be calculated and presented (e.g. as a 1- or 2-week moving average) specifically to determine whether the observed change in distribution was statistically significant.	Sakhalin Energy	Whereas a basic analysis of moving averages of whale density at different spatial scales could be produced, the determination of statistical differences isn't trivial. These data don't have a normal distribution and are zero-inflated. Consequently, the design of an adequate statistical analysis will take more time to complete. As the main focus for WGWAP 10 is the completion of the annual reports, this analysis will probably be completed after WGWAP 10.	WGWAP-10	Open - no action yet taken		
M. GWGAP-9	WGWAP-9/004	1.5.1	Continuous noise	Finally, the Panel requests that a presentation be made at WGWAP-10 of the acoustic data for the period 15 August–15 September 2009 for buoys X-Z, in the format specified in recommendation WGWAP-7/002 for continuous noise.	Sakhalin Energy	Sakhalin Energy can process this data in the format requested, and provide it to the panel at WGWAP 10.	WGWAP-10	Open - no action yet taken		
M. GWGAP-9	WGWAP-9/005	1.5.1	Continuous noise	Reeves emphasized that there is an implicit assumption that Sakhalin Energy will keep the Panel advised on any aspects of the company's operations that could significantly change the acoustic environment or otherwise affect western gray whales. Therefore, the Panel requests that Sakhalin Energy report on this issue at WGWAP-10 by updating and clarifying information on recent changes with acoustic implications at either platform.	Sakhalin Energy	During each GWGAP meeting Sakhalin Energy provides an outlook on future SEIC activities. During WGWAP 10 Sakhalin Energy will do this as well.	WGWAP-10	Open - no action yet taken		
M. GWGAP-9	WGWAP-9/007	2.1.4	Pulse noise	The Panel requests that its members responsible for reviewing the acoustics data (Vedenev and Nowacek) be provided with the full 2010 acoustics data set (in the form of a CD) no later than two weeks before the start of WGWAP-10.	Sakhalin Energy	As in previous years Sakhalin Energy plans to provide the annual reports including the usual acoustic data set in the timeframe agreed with the panel.	2 weeks before WGWAP-10	Open - no action yet taken		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
M. WGWAP-9	WGWAP-9/012	3.1	Pulse noise	Finally, the Panel encourages the group of NGOs (i.e. the authors of WGWAP-9/19) to submit a final report that includes the complete data set.	NGOs		WGWAP-10	Open - no action yet taken		
M. WGWAP-9	WGWAP-9/013	3.1	Pulse noise	Therefore, the Panel recommends that IUCN make every effort to obtain the report or reports on these acoustic data as they become available either via Rosneft directly or via the Interdepartmental Working Group (MNR).	IUCN		WGWAP-10	Open - no action yet taken		
M. WGWAP-9	WGWAP-9/022	5.1.3.3	Pulse noise	The Panel recommends that these analyses [of the effects of noise on gray whales, see Annex 5B] are initiated and that a progress report is presented at WGWAP-10.	Sakhalin Energy	SEIC intends to analyse the available data set obtained during the 4D seismic, as soon as possible, taking into consideration other priorities as well.	WGWAP-10	Open - no action yet taken		
M. WGWAP-9	WGWAP-9/023	5.1.4.4	Pulse noise	The Panel specifically recommends that in future, survey contractors be required to demonstrate in advance their preparedness for Sakhalin conditions, including low water temperatures, so that acquisition can begin without delay once the ice clears.	Sakhalin Energy	Sakhalin Energy acknowledges that contractual readiness was an issue for 2010 4D Seismic. The point is well made by WGWAP.	Before future surveys [statement of intent at WGWAP-10]	Open - no action yet taken		
M. WGWAP-9	WGWAP-9/024	5.1.4.6	Pulse noise	Given the acknowledged need for future geophysical profiling, the Panel reiterated the importance of continuing to review developing technologies (and their potential impacts), including electromagnetic profiling. In the light of this, the Panel recommends that IUCN should commission a formal review for the Panel's consideration within the next two years.	IUCN		Dec-12	Open - no action yet taken		
M. WGWAP-9	WGWAP-9/025	5.2	Pulse noise	The Panel endorses the SSTF-6 report and its recommendations. In particular, it confirms the view that given the huge investment by the company and the Panel in designing the MMP and in collecting data during the Astokh 4D survey, it would be false economy if a shortage of resources were to preclude efforts to maximise the information obtained. The Panel therefore strongly urges Sakhalin Energy to find the necessary funding to complete the recommended analyses (described in Annex 5 [of the WGWAP-9 report]) as quickly as possible.	Sakhalin Energy	SEIC intends to analyse the available data set obtained during the 4D seismic, as soon as possible, taking into consideration other priorities as well.	Progress report and statement of intent at WGWAP-10	Open - no action yet taken		

GWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
M. GWAP-9	GWAP-9/026	5.2	Pulse noise	The most appropriate way to review the results of those analyses will be to hold a further meeting or meetings of the SSTF – the timing will need to be evaluated at future GWAP meetings in the light of progress reported by Sakhalin Energy. The Panel recommends that Sakhalin Energy present a progress report and an expected timeline for completion of the analyses at GWAP-10.	Sakhalin Energy	Sakhalin Energy will prepare a timeframe for completion of analysis by GWAP 10. It will provide progress report in presentation format, but will not provide a progress report as priorities are focussed on annual reporting and planning for data analysis.	GWAP-10	Open - no action yet taken		
M. GWAP-9	GWAP-9/028	5.2	Pulse noise	[Regarding D-tags] the Panel agreed that Vedenev and Nowacek should provide for consideration at GWAP-10 a detailed outline of potential objectives, survey area and timing, data that would become available, numbers of tags, etc.	GWAP		GWAP-10	Open - no action yet taken		
M. GWAP-9	GWAP-9/029	5.4	Pulse noise	The Panel reiterates the extreme importance of starting (and completing) any 2D survey as early in the season as possible and ensuring that the appropriate equipment is available and ready for deployment in the expected environmental conditions. Further, it recommends that an explicit requirement in this regard be included in any contract for the 2D survey and requests that Sakhalin Energy provide the Panel with an update on this as soon as possible.	Sakhalin Energy	SEIC agrees with this recommendation, noting it is entirely dependent on contractor availability.	2D seismic survey	Open - no action yet taken		
M. GWAP-9	GWAP-9/031	5.4.2	Pulse noise	The Panel agreed it was essential that archival acoustic monitoring take place along with shore-based behavioural monitoring. Based on the results of discussions in a subgroup chaired by Donovan and including Panel members and Sakhalin Energy, the Panel recommends that the monitoring programme outlined in Annex 6 [of the GWAP-9 report] be implemented during the 2D seismic survey if and when it occurs.	Sakhalin Energy	Sakhalin Energy is planning to implement the suggested MMP involving a combination of archival buoys (and if possible a behavioural team – personnel dependent as explained elsewhere).	2D seismic survey	Open - no action yet taken		
M. GWAP-9	GWAP-9/027	5.2	General	The Panel ... agreed that the present MMP [monitoring and mitigation programme] provides a baseline for similar surveys off Sakhalin and elsewhere, whilst recognising that different circumstances (e.g. seismic surveys farther offshore) may render parts of the programme inoperable or in need of modification. It recommends that the MMP be given prominence and made easily available on the IUCN website.	IUCN		Feb-11	Open - no action yet taken		

WGAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
H. WGAP-4	WGAP 4/025	WGAP 4/4 - Section 12.2	Pulse noise	The Panel therefore recommends that Sakhalin Energy provide support (e.g. financial, logistical), through a well-established program such as the JIP, for one or more CEEs involving airgun noise and eastern gray whales in a feeding area.	Sakhalin Energy	Sakhalin Energy has for several years contributed substantial financial resources to JIP, but has no authority to direct the allocation of JIP funds.		Rejected by Sakhalin Energy		
M. WGAP-9	WGAP-9/011	3.1	Pulse noise	Also, the Panel requests that data from distribution stations 1-8 be included for the same periods, and that these data are analysed statistically to determine whether there were significant changes in whale distribution.	Sakhalin Energy	Sakhalin Energy is unable to provide this analysis as these are related to not SEIC-specific activities.	WGAP-10	Rejected by Sakhalin Energy		
M. WGAP-9	WGAP-9/010	3.1	Pulse noise	Specifically, the Panel requests that Sakhalin Energy makes acoustic data from recording buoys 'A-10', 'Odoptu-N-20' and 'Odoptu-N-10' available for WGAP-10 for the following time periods: 21h 30m on 20 August to 01h 20m on 21 August, 25-31 August, 1-4 September and 11-21 September. These data should be in the format specified in recommendation WGAP-7/002 for pulsed noise.	Sakhalin Energy	Sakhalin Energy is unable to provide the acoustic data set in the format requested as these are not SEIC-specific activities.	WGAP-10	Rejected by Sakhalin Energy		
M. WGAP-9	WGAP-9/014	3.2	Pulse noise	To support efforts to interpret information on whale distribution and density throughout the 2010 season, the Panel requests that Sakhalin Energy provide in advance of WGAP-10 data from all acoustic sensors in the area for the period 15 August–10 September, in the format described in recommendation WGAP-7/002 for pulsed noise.	Sakhalin Energy	Sakhalin Energy are unable to provide the acoustic data set in the format requested as these are not SEIC-specific activities.	WGAP-10	Rejected by Sakhalin Energy		
M. WGAP-9	WGAP-9/030	5.4.1	Pulse noise	The Panel recommends that for the 2D survey, the exclusion zone for western gray whales be 1000 m (provided that this does not conflict with relevant regulations, guidelines or precedents).	Sakhalin Energy	SEIC understands the desire for the 1000 m exclusion zone for western gray whales. However, if foggy conditions limit the visibility to 500 -1000 meters, we will continue acquiring seismic until the visibility is limited to ≤500 meters.	2D seismic survey	Rejected by Sakhalin Energy		

WGAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
M. WGAP-10	WGAP-10/001	Item 2.1	Pulse noise	A workplan was agreed such that besides timely completion of the distance estimation analyses, the draft behaviour analysis and case studies would be finalised no later than WGAP-11. At least some initial results of the distribution studies would also be available by that time. The Panel recommends that Sakhalin Energy adheres to this workplan and its timelines. In order to ensure that there are no delays or misunderstandings, it was agreed that an advisory group comprised of Donovan, Cooke, Nowacek, Vedenev and Weller would be available for regular consultation with Sakhalin Energy and its contractors. Broker, on behalf of the company, will provide the advisory group (together with Reeves and Bernal/Riché) with regular (at least monthly) e-mail updates on progress, and teleconferences will be arranged if and as necessary to resolve issues. The responsibility for ensuring that this arrangement functions (i.e. regular reminders, setting up teleconferences etc.) rests with the IUCN relationship management team.	IUCN/Sakhalin Energy	The Advisory Group has convened and the first discussions are scheduled for mid August.	WGAP-11	Open - in progress		
M. WGAP-10	WGAP-10/015	Item 6.5.1	Pulse/Continuous noise	The Panel recommends that for future seismic surveys by any company, received sound levels at the edge of a western gray whale feeding area be kept below what is predicted to cause behavioural disturbance. This level was defined by the SSTF to be 156 dBSEL (per one of any radiated pulse) or 163 dBRMS. However, processing and analysis of data related to the 2010 Astokh 4-D seismic survey may indicate that these levels are either overly conservative or not conservative enough. As discussed elsewhere, until new information becomes available to revise these criteria based on measurements in 2010, the Malme et al. (1983; 1984) analyses remain as the sole basis for setting exposure criteria.	All seismic operators on NE Sakhalin Shelf	SEIC has applied these criteria. The Panel needs to determine how they will communicate this recommendation to other Operators.	During future seismic surveys	Open - in need of clarification/expansion		

WGWAP Recommendations Table - Noise

Meeting	Reference	Cross-Reference	Topic	Recommendation	Party resp.	Response	Target completion date	Status	Superseded by	Comments
M. WGWAP-10	WGWAP-10/016	Item 6.5.2	Pulse/Continuous noise	Without appropriate simple analyses, e.g. average levels in full bands and 1/3 octave bands at a given sensor, the Panel cannot conduct even preliminary analyses of these data [in document WGWAP-10/18-19] and assess any potential impacts the noise might have had on the whales. Therefore, the Panel recommends that document WGWAP-10/18-19 be expanded to include acoustic data presented in the form specified in recommendations WGWAP 6/010 and WGWAP 8/03 so that these sound data can be integrated with the comprehensive 2003-2009 data on distribution and behaviour and checked against the Panel's and Sakhalin Energy's continuous noise exposure criteria.	Sakhalin Energy	SEIC will discuss with JASCO both the feasibility and what is actually required.	WGWAP-11	Open - in need of clarification/expansion		