WESTERN GRAY WHALE ADVISORY PANEL NTF-5

NOISE TASK FORCE

REPORT OF THE NOISE TASK FORCE
AT ITS 5TH MEETING

11-12 OCTOBER 2013
AMSTERDAM, THE NETHERLANDS

CONVENED BY THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE

Report of the 5th Meeting of the Noise Task Force

PARK INN BY RADISSON AMSTERDAM AIRPORT SCHIPHOL HOTEL, THE NETHERLADS
11-12 OCTOBER 2013

CONTENTS

ACRONYMS

AIS	Automated Information System
AUAR	Automated Underwater Acoustic Recorder
Company	Sakhalin Energy Investment Company
DTAG	Digital Acoustic Recording Tag
EIA	Environmental Impact Assessment
GIS	Geographical Information System
IUCN	International Union for Conservation of Nature
MMO	Marine Mammal Observer
MMP	Monitoring and Mitigation Programme
MNR	Russian Ministry Of Natural Resources and Ecology
MVA	Multivariate Analysis
NTF	Noise Task Force
OBS	Ocean Bottom Seismometers
PCoD	Population Consequences of Disturbance
Photo-ID	Photo Identification
POI	Pacific Oceanological Institute
PML	Perimeter Monitoring Line
SEER	State Environmental Expert Review
SEIC	Sakhalin Energy Investment Company
SEL	Sound Exposure Level
UNDP	United Nations Development Programme
WGW	Western Gray Whale
WGWAP	Western Gray Whale Advisory Panel

REPORT OF THE 5TH MEETING OF THE NOISE TASK FORCE (NTF-5)

1 INTRODUCTORY ITEMS

The 5th meeting of the Noise Task Force (hereafter NTF) was held at the Park Inn by Radisson Amsterdam Airport Schiphol Hotel, the Netherlands, from 11-12 October 2013 under the chairmanship of Greg Donovan. The list of participants is given as Annex A.

1.1 Introductions and Logistics

The Chair noted that the Company had suggested meeting in early October to focus on the proposed 2015 seismic survey. Whilst this was earlier than anticipated at NTF-4 it was advantageous as it provided more time to plan. He noted that the NTF was in a much stronger planning position than it had been for the last major survey given the extensive work that had gone into planning the 2010 Monitoring and Mitigation Programme (MMP). He clarified that whilst this was a meeting of the Noise Task Force, its primary focus is on the 2015 seismic survey; thus the overwhelming majority of the time would be spent on that but there would be some very brief progress reports on other issues.

Despite some logistical and financial difficulties, thanks to the good efforts of Tatiana Saksina and Anete Berzina from IUCN, most members were able to participate, with the possibility of some participation by Skype if needed.

1.2 Adoption of Agenda

The Agenda is given as Annex B.

1.3 Available Documents [IUCN]

The NTF-4 report was available, as were previous Western Gray Whale Advisory Panel (WGWAP) and Task Force reports. Some PowerPoint presentations were made available to NTF members.

1.4 Rapporteur

Jennifer Ross-Jones acted as rapporteur. The final report was co-ordinated by the Chair with assistance from Task Force members.

2 UPDATE ON THE STATUS OF THE PREPARATION FOR 2015 SEISMIC SURVEY

2.1 Basics of 3D/4D Seismic

Van der Veen provided an introduction to the fundamentals of seismic surveys, in particular drawing attention to the need for such surveys as part of good oil field management practices, some of the complications of interpretation of the results and the frequency of such surveys. The details of the presentation are not repeated here but the presentation formed a useful framework for later discussions. The baseline 3D survey was the 1997 survey; the first 4D survey was that of 2010.

2.2 General Frequency of Surveys

A major focus of the discussion related to the timing of this and future surveys, as had been raised during previous WGWAP meetings. Van der Veen reported that the timing for such surveys (usually between 2-5 years once production has begun; see item 3.1) was dependent upon a number of factors, including the production from the reservoirs and which reservoirs are being used, the injection rate, how quickly the wells can be drilled, and how many slots are available to drill, including a consideration of economic variables including the ability to analyse, as well as acquire the data. In summary, he noted that it is not possible to state exactly how frequently surveys will be needed – to a large extent it depends on the results of the previous survey compared to expectations. The Company stated that a frequency of 5 years would not be optimal for reservoir management, given the possibility of unforeseen changes.

In conclusion, the NTF noted its understanding from Van der Veen's presentation that the likely future frequency of surveys would be 2-3 years.

2.3 Contracting, Procurement and Preparation Timeline for 2015

The Company summarised the procurement process. It noted that the work would be competitively tendered in the usual manner. It plans to issue the tender invitation in November 2013 with a tentative recommendation to the Board of the Company around February 2014. This would leave one year for the winning bidder to obtain necessary approvals and permits, prior to survey start-up in June 2015. Van der Veen noted that the timing the new survey to be in 2015 struck a balance between having visible production effects in the reservoir on 4D seismic and the ability to respond in timely fashion to information obtained from the surveys.

3 SCHEME OF WORK FOR 2015 SEISMIC SURVEY

3.1 Update on Goals and Objectives

Van der Veen reminded the NTF that the Company is planning for a 3D/4D survey in 2015 across Piltun-Astokh as part of the ongoing reservoir monitoring effort. Typically a repeat 4D seismic survey is foreseen every 2-5 years, with timing dependent on reservoir performance and business decisions to be made. Sakhalin Energy's first 4D monitor survey was across Astokh (145 km^2) in 2010.

The objectives of the survey in 2015 are:

(1) Seismic monitoring of hydrocarbon production and water injection at Piltun and Astokh fields;

(2) Provision of a state of the art 3D image for planning of future production wells;

(3) Inclusion of 4D seismic work at Lunskoye in the same campaign, following Piltun-Astokh.

He noted that the proposed main mitigating measure for the survey will be a start in June 2015, as soon as the sea is "ice free" in order to avoid the peak of the whale feeding season. Lines closest to shore will be preferentially acquired first.

3.2 Survey Area Recapture

Van der Veen noted that this will be the second 4D survey across Astokh, following the 1997 3D survey and 2010 first 4D monitor survey. In 2015, contingent work scope will be added in the form of an undershoot of the Astokh production platform, which is achieved by placing Ocean Bottom Seismometers (OBS) on the seafloor that record signal while the main streamer vessel records the streamer data. Recording will be simultaneous, thus minimising the requirement for additional shots.

By contrast he noted that this would be the first 4D survey across Piltun, where only the 1997 3D survey exists as baseline. In addition, at Piltun the Company is planning a platform undershoot via recording into OBS on the sea floor, as contingent contract scope.

To achieve better efficiency compared to the 2010 4D across Astokh, the Piltun and Astokh surveys will be combined into one survey of 350 km^2. This combined survey will be faster to acquire than two separate surveys of 145km^2 and 140 km^2 respectively, due to the number of time-consuming line turns involved.

Van der Veen also noted that there will be options to record re-shoots with broadband streamers across South Piltun and the Piltun East Flank, which forms 150km^2 of additional contingent scope. Both segments are offshore and to the east of the main survey. The objective for these re-shoots would be to obtain a broadband 3D image. The Company will decide later whether to execute these options.

He concluded that the maximum survey size across Piltun-Astokh will be close to 500 km^2 if the above contingencies materialise. The expected timeframe is around 40 days for the Piltun-Astokh survey and 40 days for the Lunskoye survey.

3.3 Survey Methods

The Company reported that it will follow industry standards for this work, taking into account discussions within the NTF and WGWAP as appropriate, based upon using the 2010 survey as a reference. More technical issues are discussed under Item 4. Technical downtime needs to be improved over 2010. There were a number of difficulties during start-up of the 2010 survey, e.g., related to the transition of the survey vessel and equipment from tropical into cold waters. These same difficulties should not recur in future.

4 2015 SEISMIC SURVEY DESIGN AND TECHNICAL PARAMETERS

4.1 Transects

Van der Veen reported that the lines will in effect be the same as used previously in order to allow comparison with previous surveys. In response to a question, he noted that during the 2010 survey, approximately one in five lines had to be reshot due to feathering (deviation of the towed cables from a straight line behind the vessel).

4.2 Streamers

Van der Veen reported that the Company plans to aim for an 8- to 10-streamer vessel configuration towing streamers 100 m apart, retracing the lines sailed in 2010 that were acquired with 6 streamers towed 100 m apart. This will create overlap with sail lines from 2010. This overlap will reduce the requirement for infill lines in 2015 resulting from unpredictable cable feathering and thus should reduce the acoustic energy input into the environment.

As part of the tender notification, the Company will also request the option to deploy state-of-the-art streamers that can be towed deeper while at the same time allowing retention of a broader frequency spectrum in the recorded data. Towing deeper means the vessel can continue to acquire data in marginal weather conditions, thus reducing weather-related downtime.

4.3 Airguns

Van der Veen reported that a requirement for 4D monitor surveys is to repeat as closely as possible the prior (baseline) acquisition geometry (see Figure 1 below). This means there is limited flexibility to change source configuration, since the amplitude spectrum of prior surveys needs to be matched, or bettered (see Figure 2 below). Also, the sail line azimuth is locked in. Still, some flexibility remains with respect to a few parameters and this flexibility will be used to increase the efficiency over that achieved in 2010. The intention is to make the overall duration as short as possible while still obtaining the required data.

Van der Veen noted that the seismic source will be comparable to that of 2010 (which was a 2620 in^3 airgun array operating at 2000 psi) with the requirement that the signal spectrum (as represented e.g., by Figure 2 below) can be matched. The source pattern will be the same, using so-called ‘flip flop’ shooting with two sources towed by the vessel.

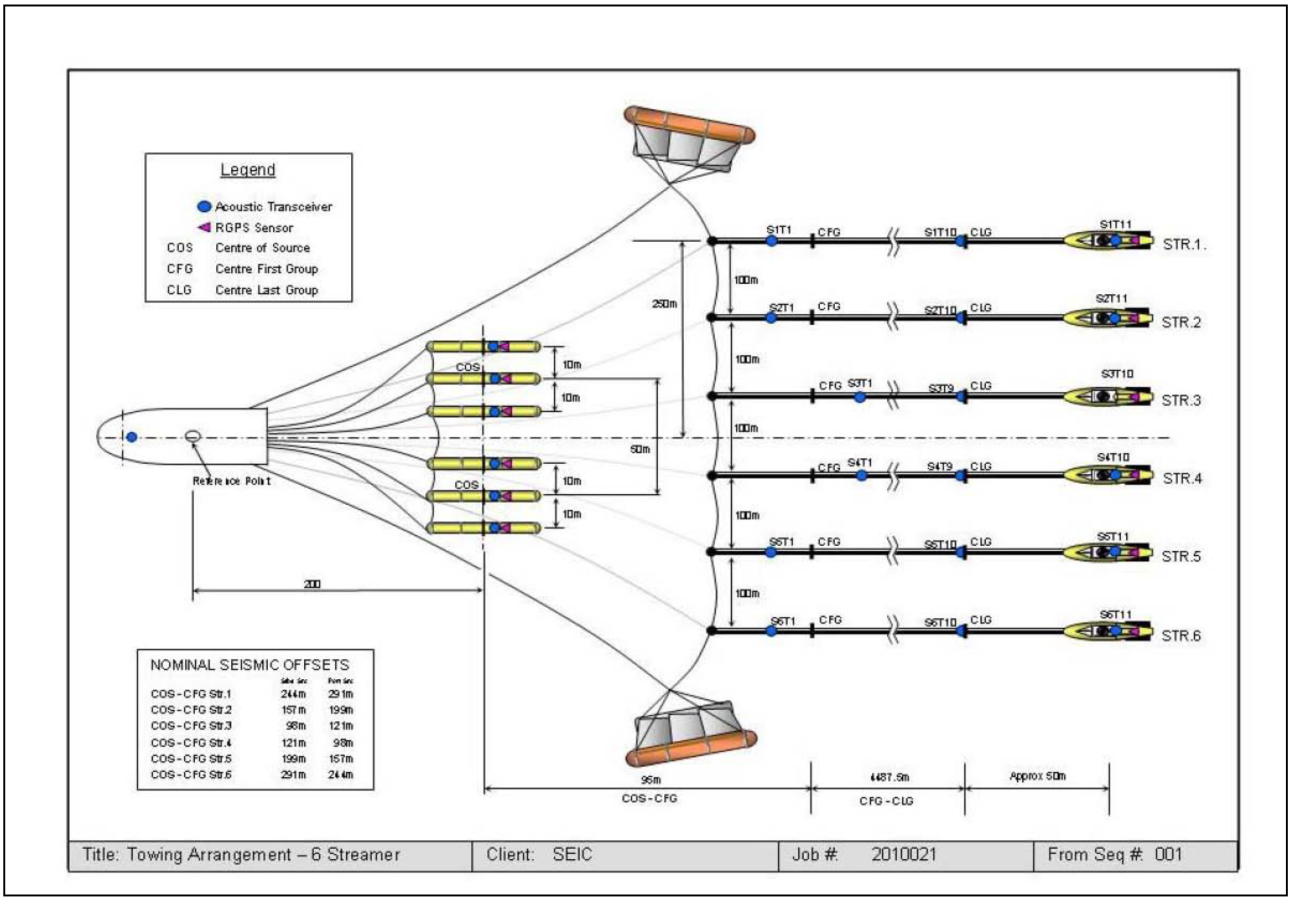

Figure 1. Diagram of the vessel layout of the 2010 4D Astokh survey.

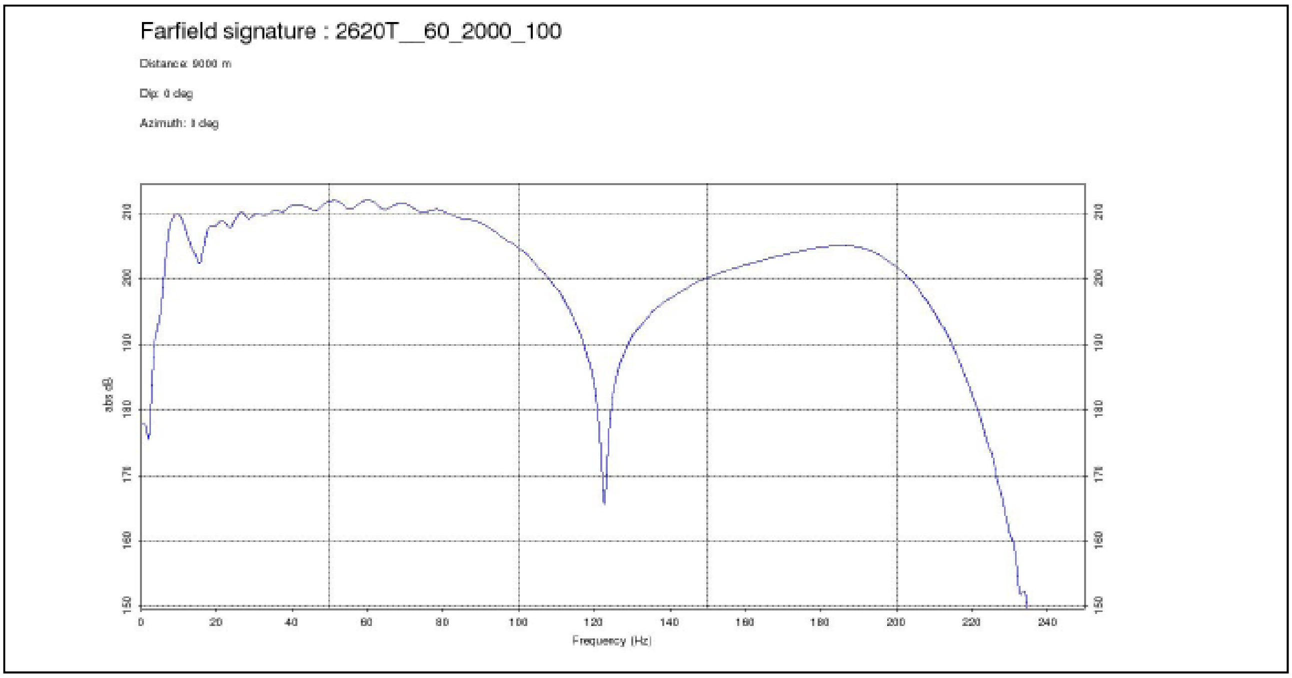

Figure 2. Modelled far-field amplitude spectrum for the 2010 4D survey, with full recording system response filter and source ghost (but without receiver ghost). The 2015 survey will have to be recorded with a source that can be matched to this amplitude spectrum.

4.4 Other Equipment

Van der Veen reported that the inclusion of contingent scope OBS recording around the platforms will not lead to a significant increase in the number of shots required to complete the survey. OBS recording will be done jointly with the main streamer vessel. The streamer vessel is not allowed to 'shoot' close to the platform with streamers deployed, so this will leave a gap in streamer coverage that the OBS recording would be meant to compensate for. At the end of the survey the vessel can pull in the streamers and shoot the missing segments, while recording takes place in the OBS spread on the seafloor. This will accomplish OBS coverage near the platform. If successful, OBS recording may establish a baseline image for future OBS repeat surveys, which have a potentially smaller footprint than streamer surveys; this remains somewhat speculative at this stage.

4.5 Alternative Options

The issue of alternatives to the traditional seismic survey approach has been raised several times at NTF and WGWAP meetings. Van der Veen commented that use of a less invasive source would be the ideal but that at present, commercial alternative technologies that will work in the Sakhalin area are not available. The Company is monitoring the situation for the future, but does not consider it possible that a suitable alternative would become available for 2015, when the focus will be on improved efficiencies within the current approach.

The NTF **reiterated** the importance of monitoring developments in this field.

4.6 Conclusions

The NTF recognised that the final details of the equipment used will depend on the results of the tendering process. It **agreed** that the Company should endeavour to obtain the most appropriate equipment with special reference to the maximum number of streamers and their ability to work in cold conditions. It also **agreed** that ideally all modelling options/predictions should be taken into account before a final decision on vessel/equipment is taken. Van der Veen stated that, while the Company understood these concerns, this may not be possible in practice. However, the Company would keep the NTF informed.

5 2015 SEISMIC SURVEY ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

5.1 Overview of EIA Process

Donaghy provided a short overview of the Russian Federation EIA process:

(1) From the perspective of the present survey, the plan is for the contract to the seismic company to be awarded in April 2014;

(2) State permits will only be given after the receipt of a positive report from the unified State Environmental Expert Review (SEER) with respect to the EIA;

(3) The process of stakeholder consultation is carried out by the contractor (in conjunction with the Company). In addition to the EIA, the contractor must show that equipment has a 'technical passport';

(4) The Company must submit the MMP to the regulators by December 2014 (as part of a submission made on an annual basis);

(5) For the Company to meet its survey deadlines, all permits and licenses must be obtained by May 2015.

5.2 Implications for the NTF

There was considerable discussion on the implications of these dates for the work of the NTF.

The Company noted that once the SEER process has begun, any changes mean that the state review needs to be restarted. It is therefore important that the technical details are ready for submission by December 2014 at the latest. In terms of the NTF, this must include the *details* of the MMP and any acoustic modelling. To ensure that the final details are ready by December, the NTF **agrees** that the 'broad-brush' details (e.g., whether photo-identification work will be undertaken) of the MMP must be completed by the beginning of October 2014 with the final details (e.g., where and how the photo-identification work will be undertaken) ready as soon as possible after that for submission in December. The NTF also noted that the Company must produce an EIA to international standards as part of the Lenders' Agreement by May 2015.

There was also a short discussion on the United Nations Development Programme's (UNDP) project that will be looking at ensuring the Russian Federation and international requirements for monitoring are similar. The Company is part of that project. Vedenev noted that the Russian Ministry Of Natural Resources and Ecology (MNR) has established an expert team to look at monitoring in conjunction with the UNDP project with a view to incorporating monitoring requirements of industrial activity on sea shelf into legislation; this will initially focus only on large cetaceans resident in Seas of the Far East of Russia and be expanded later to all Russian Arctic Seas. New MNR's monitoring requirements plan will be mandatory from the middle of 2015.

5.3 Acoustic Modelling

Racca reported that the modelling approach adopted for the EIA and the 2015 survey will be essentially the same as in 2010, i.e., to construct an acoustic footprint of the entire operation with a focus on 'key' levels, e.g., injury and behavioural disturbance. Transmission loss data have been incorporated into the model validation. He noted that there were a number of issues to be considered:

(1) Whether it is better for the modelling work to begin now based upon a 'worst likely' scenario with respect to the array being used and its configuration or better to wait until the specifications are known;

(2) Whether new information from an examination of the 2010 [and 2012] survey (including temporal variation in 'noise case' offset; propagation assumptions) suggests any changes to the modelling approach/assumptions used then, recognising that by the end of the survey the choice of the 'noise case' was very good.

Further discussion was deferred to later items.

6 MITIGATION AND MONITORING PLAN FOR 2015 SEISMIC SURVEY

6.1 Lessons Learned from 2010 Seismic Survey MMP

The Chair introduced this item, noting that there had been considerable discussion of this during WGWAP-9 and as part of subsequent analyses of data (see WGWAP and Task Force reports[1]). In summary, the 2010 MMP was successful and provides a solid basis for the 2015 survey. However, some of the details may need to be modified in light of the 2010 experience. Donovan also noted that the proposed survey area was much larger this time. He highlighted the following points:

(1) Analysis/modelling:

- Noise modelling – need to cover all scenarios and give consideration to whether any changes in assumptions are required;
- Whale distribution modelling/ Perimeter Monitoring Line (PML) – need to incorporate new sightings data, especially for offshore areas;
- Information on effects – need to revisit the new MVA and case study data to see if any changes to the MMP are required.

(2) Survey

- Design/area – need to expand to consider areas not covered in 2010;
- Timing – execution as early as possible was the primary mitigation measure in past surveys; hence need to ensure equipment can cope with cold conditions;

[1] Available at www.iucn.org/wgwap

- Possible revision of A- and B-lines – need to review in light of any new information from 2010;

(3) MMP:

- Observers – behaviour and distribution – quality and consistency of approach is essential;
- Angle distance measurements – important for mitigation measures, as well as monitoring;
- Acoustic 'cases' – need to examine 2010 field experience and see if the process can be made less ‘stressful’ through an improved protocol for selection and communication of applicable cases;
- Logistics in field – starting early/field camps – the logistics may need to be re-examined in the light of the 2010 experience;
- Training/practice – essential for all personnel but especially observers for behaviour and distribution;
- Big Eye binoculars – need to ensure that their use is not a problem this time around.

6.1.1 Short update on publications and plans

The NTF was pleased to hear that plans for publication of the papers from the 2010 survey were scheduled for a special theme section of *Endangered Species Research.* Koen Bröker had been the driving force behind this work. The Chair also noted that he believed it was important to try to get Bröker involved in the planning of the 2015 survey given his leading role in the 2010 survey.

The Company supported the publication of the volume and had arranged for the authors to develop papers for consideration for publication. The editing of the special theme section would be undertaken by Reeves and Donovan provided that funding can be arranged for the former. The final papers will also be valuable for the planning work or the 2015 survey.

6.2 Initial Plans for the MMP

Evans presented information from the Company on its initial plans for the MMP. This was based on the experience, analyses and documentation for the 2010 survey along with the Nowacek *et al.* paper[2] on responsible practices for marine seismic surveys (in press at the time of the meeting).

As in 2010, the primary mitigation measure proposed by the Company is again to carry out the survey as early in the season as logistically feasible (and thus presumably when fewest whales are present), recognising that this will depend on factors such as sea ice and the ability to get onshore camps set up. In addition, it is again proposed to incorporate measures to discontinue acquisition of survey lines when needed to protect whales; details will need to be reassessed in the light of experience gained in the 2010 survey and subsequently.

The A- and B-line approach is again proposed by the Company, although the details will need to be reviewed in light of the experience gained in 2010 and 2012.

Marine Mammal Observers (MMOs) will be the key to the success of the MMP. The Company will place experienced, bilingual MMOs on all vessels and effort will be put on learning from the lessons of previous surveys with respect to logistics, including the management of shifts. No decision has yet been taken with respect to vessels but this will take into account what vessels are available and their suitability, based upon previous experience. Collection and archiving of data will follow the usual procedures.

With respect to command and control in the field, it is clear that there needs to be single-point accountability that is understood by all; Bröker took on this role in 2010 and was responsible for making mitigation decisions. This needs to be very clear, as there were some differences of opinion as to what this entailed during the 2010 survey.

One area for which the Company particularly requests NTF advice relates to the question of distribution teams. The present plan is that there will be no special distribution team effort in 2015 over and above the

[2] D.P. Nowacek, Bröker, K., Donovan, G., Gailey, G., Racca, R., Reeves, R.R., Vedenev, A.I., Weller, D.W., and Southall, B.L, (2013). *Responsible Practices for Minimizing and Monitoring Environmental Impacts of Marine Seismic Surveys with an Emphasis on Marine Mammals*, Aquatic Mammals, vol. 39, no. 4, pp. 356-377.

usual Joint Programme work which is planned to begin on 1 August; during the survey therefore there will be no distribution monitoring other than by vessel-based MMOs and distribution scans during behavioural observations.

In discussion, the NTF generally agreed with the approach of following the 2010 paradigm, but recognised that many of the details would need to be reviewed by the NTF before the end of 2014 (see Item 5.1). The question of distribution teams will need to be addressed more thoroughly and the Chair requested a more substantiated explanation of the Company's position at the next meeting to assist in those discussions. Of particular relevance is the longer PML for 2015 (A-lines will be some 2.5 times longer than in 2010) and the number and composition of teams required to monitor the A-zone properly.

The Chair reiterated the value of involving Bröker in the discussions and noted that the question of ramp-up needed to be re-examined in the light of any new information that might have become available since 2010.

6.3 Archival and Real-time Acoustic Monitoring

The Company recognises the great importance of archival monitoring and, while it indicated that it would as a minimum keep renewing the licenses for the radio-telemetry links used in the past, it noted that technological improvements may be necessary. It is also important to consider the issues of necessary manpower, buoys and other equipment in the context of the 2015 survey. Consideration needs to be given to the fact that the time period will be longer and the area greater (especially if the 'options' for corollary seismic survey effort are exercised). Monitoring a greater number of buoys has practical implications. This will be considered at the next NTF meeting. The NTF noted that, while it had been informed that contracts are in place with respect to acoustic monitoring, they can be modified in the light of NTF advice.

In respect to acoustic monitoring in real-time, the Company noted that this would be based upon the 2010 experience with any modifications arising out of new data analyses. The questions of the number and type of buoys and the method information transfer are important matters to be taken up at future NTF meetings.

Racca gave a presentation regarding the possibility of a revision to the original concept of a static boundary for the behavioural mitigation protection zone. In the 2010 Astokh seismic survey, the boundary was defined by the envelope of all individual single-pulse footprints along a seismic acquisition line, and it remained unchanged regardless of the progress of the seismic source along the line. This approach could be considered prudent for a novel and untested MMP in 2010, as it was easy to implement and resilient to gaps in the flow of information from the vessel regarding its location. Its intrinsic inability to account for the dynamic nature of the sound footprint, however, could force an entirely unneeded shutdown if a gray whale was sighted in the protection area far behind the seismic source. This weakness would become especially critical during later parts of the survey when the number of whales in the region is expected to be increasing, and by forcing lines to be reacquired it could result in a worsening, rather than mitigation, of the potential disturbance.

A revision to the 2010 approach proposed by Racca is based on the estimation of a 'layback' from the current position of the seismic vessel behind which the received sound level would certainly be below the threshold defining the boundary of the behavioural protection zone. Racca showed an example based on the trailing edge of the static boundary at the start point of a seismic line, which provided the minimum required layback at that particular location. While it would be possible and expedient to simply translate that same layback for any later position of the source along the line by adding a precautionary buffer to account for any changes in the propagation environment (bathymetry), in a pre-season modelling context an exact trailing region could be estimated for every source position along the seismic line. It would be preferable for practical reasons to keep the layback distance fixed for the whole line, so the maximum estimate of the trailing region along the line plus some adequate precautionary buffer could be used.

Racca pointed out that in enacting shutdown decisions due to the presence of whales in the protection zone, the region behind the layback distance could be ignored. A whale behind the trailing region of the footprint would experience sound levels below the protection threshold, akin to being inshore of the static boundary. From a contextual standpoint, the whale would be sensing a receding source of sound which arguably would be less likely to trigger a reaction.

In the proposed revision of the mitigation protocol the observation teams would still scan the full area and monitor for any anomalous whale behaviour. The observers would still report to the MMP control centre the presence of whales within the entire original protection zone, relieving them from the distraction of having to keep track of a changeable boundary. The assessment of whether a sighted whale would be behind the layback distance from the seismic source beam, thus requiring no shutdown, would be entirely managed by the control centre. The updating of the trailing boundary in the control centre GIS map display would be relatively easy to implement because of the fixed layback distance (for a given line and active model case) behind the seismic vessel position. The updating can be automatic, based on the AIS data feed, or done manually upon position checkpoint reports sent by the seismic vessel. As a failsafe plan, if for any reason the control centre cannot track the progress of the seismic vessel, the protection zone would remain fixed at its most recent update or default to the original static boundary.

In discussion, a number of points were raised with respect to this suggestion that will be addressed in future NTF meetings:

(1) Shut-down occurred four times during the 2010 survey (WGWAP-9), although only once due to a whale entering the critical zone. The longer duration of the 2015 survey may make this more likely to occur as more whales may have entered the Sakhalin area;

(2) From a Company perspective, shut-downs have cost implications;

(3) Shut-downs inevitably make the period of operation longer which has implications for the primary mitigation measure, i.e., finish as early as possible;

(4) Further thought needs to be given to the logistics of the implementation such an approach and its level of precaution from a whale's perspective, i.e., the trade-off between completing the survey as quickly as possible and the potential effects on individual whales;

(5) A proper evaluation needs to be based on information from modelling using the 2015 source configuration and extent of the planned survey area;

(6) The required level of monitoring must be determined (see Item 6.2) and its practical feasibility assessed;

(7) The issue of off-broadside pulse levels needs to be investigated in the light of 2010 data.

The NTF **agreed** that this suggestion is worthy of further consideration and has the potential to make the survey more efficient with no detriment to the whales.

7 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

7.1 Acoustic Work

The NTF reviewed the work of an *ad hoc* group established to consider what future work was required from an acoustic perspective. This is summarised in the table below.

Task	Subtask	Person(s) responsible	Timeline (time required – days)	Priority	Notes and questions
Acoustic monitoring stations – evaluation of options (all should be archival)	Radio-telemetry	JASCO – POI	To be determined	A	Would need more to cover the area; proven technology; on-board processing? Permits?
	Long range wifi	JASCO – POI	To be determined	A	Networked buoys with 1-2 transmitting; directional receive antennas; on-board processing? Permits?
	Satellite-linked	JASCO – POI	To be determined	B	Range not an issue; increase in delay for receiving data; on-board processing? Permits?
Archival acoustic buoys		JASCO – POI	To be determined	A	Positions TBD; consider 2010 data at NTF6
Source verification		SEIC & JASCO	To be determined	A	Need for injury radius and to verify propagation model

Propagation modelling	North sector (new)	JASCO	1 Feb ’14 (15)	A	Full waveform to calculate SEL if deemed necessary
	South sector (repeat if array is different)		1 June ’14 (15)	B	
Exposure criteria	New data on responses	WGWAP (DPN)	1 June ’14 (3)	A	Consider 2010 data from ESR papers at NTF6
	Dose-response	WGWAP (DPN/BLS)	1 June ’14 (5)	A	Review/consider new NMFS proposal
	Real-time mitigation	WGWAP/JASCO	1 Sept ’14 (2)	A	If cumulative noise is quantity we regulate, how do we do real-time?
Multi-sensor acoustic tag (e.g., DTAG)	Proposal outlining long term usefulness of this approach	WGWAP (DPN/BLS)	1 Dec ’13 (2)	B	Proposal to describe benefits and needs for tagging: baseline and during SS
	Investigate permitting	WGWAP (GT)	1 Dec ’13 (2)	A	Can tags be imported? Built in Russia?
Concurrent noise sources anticipated		IUCN	1 June ’14 (5)	A	Construction or seismic surveys proposed for summer 2015
EIA	Russian Federation	SEIC (contractor)	1 Oct ’14 (?)	A	Need ‘broad brush’ MMP description
	International	SEIC	1 Dec ’14 (?)	A	Need detailed MMP including cumulative effects analysis, including PCoD proposal

The NTF **accepted** this work plan subject to contracts being put into place where needed and recognising the need to discuss any financial constraints.

Issues that arose in discussion included:

(1) The importance of obtaining necessary permits and starting work early on this;

(2) The need to review most recent analytical papers from the 2010 survey;

(3) The need to consider how and when (e.g., is it realistic for 2015) to incorporate the cumulative effects issue (and the value of DTAG data on feeding and movements);

(4) The need to determine the correct balance between finishing the survey as quickly as possible and taking into account individual whales and circumstances – the possibility of different rules as the survey progresses warrants further investigation;

(5) The possibility of using 3-4 DTAGs in a ‘feasibility/baseline’ study in 2014 (Tsidulko to investigate the permit question and Nowacek to produce a discussion paper related to this and Item (3)).

7.2 Monitoring 2015 Behaviour Component

The NTF considered the work of an *ad hoc* group established to examine the behaviour component of monitoring as discussed below.

As was true for the 2010 Astokh survey, the objectives of behaviour monitoring are two-fold:

(1) To facilitate implementation of mitigation measures;

(2) To learn more about behavioural responses of gray whales to noise.

The NTF **agreed** that the following areas would need special attention during the planning of the behaviour component:

(1) Determination of number and placement of behaviour observation teams, taking into account any revised PML, as well as logistical issues;

(2) Specifications of ‘infrastructure’ requirements, e.g., location and elevation of observation towers on southern spit and land observation stations on northern spit, spacing between stations;

(3) Personnel – must have necessary training and certification (details not yet available but should be reported to NTF);

(4) Leaders – ideally this would include experienced people such as Gailey and/or Sychenko – if this is not possible they should have an important role in the training;

(5) Quality control – a quality control process for data needs to be developed by the Company and the NTF for trial in 2014, with a further control check prior to 2015 field season – participation in this work by Gailey and/or Sychenko would be valuable.

The NTF **agreed** that the Company should consider the above items and report back on progress at the next NTF meeting.

The NTF **agreed** that it is also important to obtain the maximum benefit from the lessons learned in 2010. A number of issues require further consideration:

(1) As previously recommended, Gailey (and/or Sychenko) should review the report of the behaviour component of the 2012 seismic survey monitoring programme and provide advice concerning strengths, deficiencies, improvements, etc. – IUCN should be able to facilitate this;

(2) The 2010 behaviour criteria and data collection protocols should be provided to the NTF and reviewed and re-evaluated in the context of the length and configuration of the PML for the 2015-16 survey, the number of observation teams on spit, etc. One example is the issue of how to manage the trade-off between scans and focal follows – focal follows may last several hours, precluding regular conduct of scans. This could be addressed by enlarging the teams so that both long focal follows and regular scans can be conducted, or alternatively by establishing explicit priorities to guide the allocation of time and personnel in regard to the two types of tasks;

(3) Communication protocols (e.g., between observation teams and control centres) from the 2010 survey need to be reviewed and re-evaluated in the context of 2015-16 survey features;

(4) Satellite tagging data should be incorporated into the thinking and planning around the 2015-16 MMP. For example, it was previously assumed that the whales arrived from the south, following the coast of Sakhalin, whereas we now know that at least some of them arrive from the northeast, and possibly much earlier (mid-May) than previously assumed.

The NTF **recommends** that the Company and IUCN address the above items and report back on progress to the next NTF meeting.

In discussion, the NTF **agreed** that the practical implications of starting the survey as early as possible from the vessel’s perspective or the monitoring teams’ perspective need to be evaluated in terms of the appropriate trade-off.

7.3 Distribution and Related Matters

The NTF considered the work of an *ad hoc* group established to examine distribution and related matters as discussed below.

7.3.1 Data and analyses

As was the case for the 2010 survey, the NTF agreed that whale distribution data from previous years will be used to guide the designation of the primary gray whale feeding ground which will then be used to:

(1) Define PML where sound levels will be measured in real time and recorded;

(2) Allocate survey lines to 'A' and 'B' categories for the purpose of implementing the mitigation programme.

The choice of PML will not necessarily coincide with the boundary of the area within which the 'A' mitigation regime applies.

The default will be to use the same analytical methods as before unless examination of the updated datasets suggests otherwise. The required steps are:

(1) List the available datasets (systematic and opportunistic sightings; distance bias; possibly also telemetry data from the existing tags whilst in the Sakhalin area), and ensure that they are updated to

include all years of data up to the most recently available. Note any provisos associated with the data (e.g., 2005 was excluded last time because of 'anomalous' distribution);

(2) Provide updated density maps (1km x 1km square) by year and by using the existing methods, initial split as last time, i.e., 1 June-31 July; 1 August - 30 September. To aid in assessment of the significance of any changes, the map data should also be provided in tabular form, with the number of sightings alongside the estimated density for each square by period by year;

(3) Make final choice of appropriate combination of datasets;

(4) Decide on the method of calculating PML: review last time's approach (95% of whale distribution for June and July, excluding 2005), and if necessary make modifications;

(5) Re-examine the question of distance bias – update if possible.

The NTF **agreed** that work on determining the PML needed to be given high priority.

7.3.2 Logistical issues

The NTF identified two issues for further work by the Company to assist the work of the NTF:

(1) Provision of the rationale for not employing distribution teams for the 2015 survey;

(2) Provision of plans for MMO training in distance estimation with a focus on key mitigation distances and consideration of the use of markings on streamers as reference points.

7.3.3 Mitigation measures

The NTF noted that the proposed new survey covers a much greater area than the 2010 survey. This has obvious implications for the time taken to complete the survey in view of the primary mitigation strategy of completing the survey as quickly as possible when fewest whales are expected to be present. The NTF agreed to re-examine rules for A-lines with the aim of achieving best balance between completing the survey as soon as possible and providing effective individual animal mitigation, especially given longer lines.

7.4 General

The NTF agreed that there is a strong baseline from the 2010 survey to assist in finalising the MMP for the 2015 survey. However, it also identified considerable work that needed to be undertaken given the October 2014 (broad-brushed information) and December 2014 (final submission) deadlines. The Company expressed its view about the importance of identifying what it saw as ‘essential’ versus ‘nice-to-do’. The NTF noted that, in working towards the 2015 survey, the fact that surveys would occur about every three years must also be considered. It was agreed that there was a need for internal communications led by IUCN involving regular teleconferences and monitoring of deadlines.

In terms of future work, the NTF noted the need for at least three meetings ideally before the October deadline.

(1) The possibility of meeting in January, perhaps back-to-back with the Joint Program meeting in Vladivostok should be explored. Alternative venues suggested were Japan or Korea;

(2) A meeting towards the end of April or the beginning of May;

(3) A meeting in September (the Company to explore what would be needed by that time).

The NTF agreed that it would be extremely valuable for Bröker to be involved in its discussions. The Company indicated that it would not be in a position to fund his attendance, noting that he was now working for Shell in Amsterdam. IUCN would investigate other possibilities.

Finally, the NTF noted that the ability of Panel members to participate in the work between October and December 2013 (i.e., before the start of the new financial year) was a matter that needed to be resolved with some urgency. IUCN and the Company agreed to give this high priority.

8 OTHER BUSINESS

8.1 Short Progress Report on Photo-ID Boat Experiment

The Company noted that it expected the experiment to be completed by 15 October 2013. If possible, the Company would provide a short paragraph on the outcome (not the results) for inclusion in the final report.

8.2 Short Discussion on Publicising the Forthcoming *Aquatic Mammals* Paper

The NTF had a brief discussion of how to publicise the Nowacek *et al.* paper on responsible practices for marine seismic surveys that included scientists from the Panel, the Company and advisors, that was due to be published in mid-November 2013.

IUCN will circulate the proposed approach and press release for comments. There will be a targeted media campaign. There was a short discussion of potential future conferences at which it might be useful to publicise the paper. The NTF agreed that it was important that technical experts (e.g., Nowacek, the lead author) should be present at any appropriate oil and gas conferences where the paper is to be publicised and where technical discussions might ensue.

8.3 Implementation of 2013 Noise Monitoring at Platforms

The Company provided a short update on the 2013 noise monitoring studies at the platforms:

(1) PA-B: two mini Automated Underwater Acoustic Recorder (AUAR) stations failed due to hardware problems and 1 station was lost but then found (it worked about half of the time);

(2) PA-A: two mini AUAR stations failed due to hardware problems and 1 station was successful;

(3) ‘Regular AUARs’ in the Piltun feeding area and around PA-A and PA-B were successfully retrieved and had collected data satisfactorily.

The Company noted that there are clearly issues with the new mini AUAR technology that is being developed by POI that require further work. It will provide at a future meeting any results of the analyses of the data that were collected.

9 ADOPTION OF REPORT

The Chair thanked all participants, including the Rapporteur and Interpreters, for their attendance and assistance. All NTF members received the rapporteur’s notes. The NTF members agreed to submit summaries of their presentations to the Chair as soon as possible after the meeting so that they could be incorporated into the final report, along with the final reports of the three working groups.

Addendum by the Chair after the meeting: In the event, only Racca and van der Veen supplied the text and so the draft report for other sections was developed by the Chair on the basis of the rapporteur’s notes.

That being said, the Chair apologised that his workload meant that he was unable to submit the final draft of the report until late March 2014. He considered such a delay unacceptable and stated that every effort should be made to allocate sufficient resources to ensure that this would not happen in the future.

Annex A – List of Participants

Justin Cooke (WGWAP)
Mike Donaghy (Sakhalin Energy)
Greg Donovan (WGWAP)
Richard Evans (Sakhalin Energy)
Doug Nowacek (WGWAP)
Roberto Racca (Sakhalin Energy)
Randall Reeves (WGWAP)
Grigory Tsidulko (WGWAP)
Alexander Vedenev (WGWAP)
Marko van der Veen (Sakhalin Energy)

IUCN

Tatiana Saksina (IUCN)
Anete Berzina (IUCN)
Jennifer Ross-Jones (Rapporteur)

Interpreters

Alexander Danilov
Grigory Shkalikov

Annex B – Agenda

1. INTRODUCTORY ITEMS

1.1. Introductions and logistics
1.2. Adoption of agenda
1.3. Available documents
1.4. Rapporteur

2. UPDATE ON STATUS OF PREPARATION FOR 2015 SEISMIC SURVEY
2.1. Introduction to 3D/4D surveys
2.2. Contracting and procurement
2.3. Preparation timeline

3. SCHEME OF WORK FOR 2015 SEISMIC SURVEY
3.1. Update on Goals and Objectives
3.2. Survey Area Recapture
3.3. Survey Methods

4. 2015 SEISMIC SURVEY DESIGN AND TECHNICAL PARAMETERS
4.1. Survey transects
4.2. Streamers
4.3. Airguns
4.4. Other equipment

5. RUSSIAN FEDERATION 2015 SEISMIC SURVEY EIA
5.1. Overview of EIA process
5.2. Acoustic modelling

6. MITIGATION AND MONITORING PLAN FOR 2015 SEISMIC SURVEY
6.1. Lessons learnt from 2010 Seismic Survey MMP
6.1.1. Brief update on publications and plans
6.2. Marine mammals observers
6.3. Archival acoustic monitoring
6.4. Real-time acoustic monitoring
6.5. Behaviour monitoring
6.6. Distribution surveys

7. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

8. OTHER BUSINESS
8.1. Short progress report on photo-id boat experiment
8.2. Short discussion on publicising the forthcoming *Aquatic Mammals* paper if time
8.3. Short progress report on noise recordings in 2013 (at the platform)

9. ADOPTION OF REPORT