

Terms of Reference for the Astokh 4D Seismic Task Force

2009 ASTOKH 4D SEISMIC SURVEY

Background

Sakhalin Energy's (SEIC) preliminary plans for carrying out a 4D seismic survey in the vicinity of the Molikpaq during the summer of 2008 were presented and reviewed by the WGWAP during its meeting in St Petersburg. There it was agreed to establish a WGWAP Task Force that would provide independent expert advice to the company as it prepares the required comprehensive Environmental Impact Assessment (EIA) that outlines the mitigation and monitoring measures intended to ensure minimal environmental impact whilst meeting the survey's technical objectives.

The seismic Task Force held a workshop in The Hague, Netherlands, between 25 – 28 June 2007. The workshop reviewed and analyzed, as a contribution to the EIA, noise predictions and estimated whale densities for the proposed 2008 Astokh seismic operations in the light of potential effects on gray whales, and made recommendations on mitigation and monitoring.

Following SEIC's decision to postpone the Astokh seismic survey to the summer of 2009, the WGWAP at its last meeting in Lausanne, Switzerland, and SEIC agreed to convene a second workshop to build on and complete the work of the first workshop of the seismic Task Force.

Objectives

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

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

Participants

The seismic Task Force and the workshop will be chaired by Greg Donovan. The composition of the Task Force will include at least: M. Angelatos, D. Bell, J. Cooke, G. Donovan, G. Gailey, J. Muir, D. Nowacek, R. Racca and A. Vedenev. Where outside expertise is deemed necessary by either Panel members or SEIC, they will indicate this to the Chair as soon as possible (both the topic and the nominated expert or experts). If there is disagreement over an expert for a particular topic, the Panel and SEIC may nominate one person each and the Chair will inform IUCN.

A final list of participants will be developed by the beginning of February. February has been chosen as the review of the "white paper" will have been completed by then at the latest; depending on the nature of the review, it may be necessary to invite an

outside seismic expert or experts to the workshop. It was agreed that at least John Diebold (Columbia University) should be requested.

The Task Force's Focal Points are Sarah Gotheil, IUCN, Programme Officer and Matthew Angelatos, SEIC, Project Leader.

Modus Operandi

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

Topic	Lead persons
Review of available publications on previous seismic work in the area (1997, 1999, 2001) incl. sound levels, behaviour, mitigation measures	Gailey, Angelatos, Nowacek
Update of review of what is known on effects of sound on cetaceans	Gailey, Nowacek
Generate 'white paper'* on seismic survey methods, incl. reducing array gun volumes	Angelatos
Independent review of the 'white paper'	Diebold
Consideration of dose-based approach: <ul style="list-style-type: none"> • How to compute (including discussion of appropriate metrics) • Estimation of received dose under various scenarios with full examination of modelling uncertainty • How to interpret including 	Racca, Vedenev, Gailey, Nowacek

* At the 3rd meeting of the Western Gray Whale Advisory Panel, SEIC volunteered to provide a paper - henceforth referred to as the "white paper" - outlining its position with regards to the feasibility of using different technology and reduce source volume for the 2009 seismic survey, as compared to the 1997 survey. In particular, the paper will discuss whether sound production and recording and analysis methods could be changed, so as to allow a comparable level of information to be gained using lower source volumes. A key question that will be addressed is whether analytical methods and methods of implementation of the seismic operations can be improved to an extent that would enable the results of surveys to be compared, even when the two surveys have been conducted using different technologies

<ul style="list-style-type: none"> ○ review of available mammalian literature ○ effect of duty cycles, allowable doses, weighting, threshold levels, etc 	
Real-time calibration issues – framework for comparison of real time measurements with modelling results and consideration of how to react if differences found	Nowacek, Racca,
Real-time monitoring and related issues	Vedenev, Racca
Estimation of expected distribution and numbers of whales (geographic and temporal)	Muir
Estimation of MMO detection function	Muir
Review of existing mitigation measures, including examination of time trade-off (between length of survey and triggering of measures). Simulation involving information from past surveys and potential mitigation measures	Gailey, Nowacek, Angelatos

Reference material

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

Basic Data

Coordinates of seismic lines; speed of ship; frequency of shots; source depth and geometry, including delays between guns if any; source levels and 3-directional profile of sound; frequency profile of source levels; plus other data required for modelling purposes as agreed.

Additional data

1. *Earlier seismic surveys in the region*

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

2. *Geophysical data*

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

Timeline

Identify data needs	Early January 2008
Identify and circulate references	Mid-January 2008 (latest)
Circulate first draft of analysis outlines	Mid-January 2008
Computation and significance of received dose – note to be sent by Roberto	Early January 2008
Source optimisation white paper circulation – ready for external review	End January 2008
Submission of basic data for sound level calculations	End January 2008
Circulate working papers for workshop: a) Previous Sakhalin seismic b) Effects of seismic on cetaceans c) Dose-base approach literature review	Mid-February 2008
4-day workshop – aim should be to try and finalise report at Workshop	13 – 16 March 2008, Lausanne, Switzerland
Workshop report (final or close to final)	April 2008 – available for review by GWAP If a second workshop is not necessary, the final report will be available by end of May.
Second 4-day workshop – only if necessary, i.e. if there are issues unresolved at the March 2008 workshop *	Beginning of July 2008
Final report	July 2008

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

Safeguards

Data providers' rights will be protected. No use of the data will be made without the express permission of the data providers. Any use of the data by the GWAP will protect the data providers' rights in accordance with paragraph 3(e) of the GWAP TOR. Any other use of the data will be subject to agreement between the scientists and institutions providing and using the data. The rights of any third parties contributing additional data will be similarly respected. Any external experts engaged to assist with the modelling shall assent to these conditions.