

Alan Ehrlich

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Sent: Monday, December 23, 2002 10:01 AM
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Cc: 'Andy Graw'; 'Bruce Hanna'; 'Gavin More'; 'Jody Snortland'; 'Jonathan Allen'; 'Judy Sabournin'; 'Katherine Thiesenhausen'; 'Kevin Bill'; 'Melanie Van Gerwen-Toyne'; 'Pete Cott'; 'Vanessa Charlwood'
Subject: Minutes from 12th Dec Yellowknife Meeting



WesternGeco
Meeting Minutes - ...

Please find attached the minutes from the WesternGeco, 12th Dec Yellowknife meeting.

Rgds
Keith

(#34)

WesternGeco Meeting Minutes – December 12, 2002

Technical Workshop for WesternGeco 2002 Field Studies

Location: Yellowknife Inn, Yellowknife, Northwest Territories

Attendance: 17 people (attendee's list attached)

Purpose: The purpose of the meeting was to present and discuss the 2002 field test studies on acoustics, effects of airguns on fish, and wildlife monitoring. WesternGeco staff, regulators, consultants and a non-governmental organization were in attendance.

Agenda Schedule	Comments/Questions Raised	Response
Introduction 1:10 pm	Keith Rosindell from WesternGeco welcomed all attendees and introduced the meeting. He indicated this Yellowknife meeting was, in part, a response to the strong interest from people who could not attend the technical meeting held in Calgary on December 5, 2002. The objectives of this meeting were to present technical information previously presented in Calgary and to obtain feedback so that comments can be incorporated into the final reports on the 2002 studies.	
Project Presentation	Keith Rosindell continued from the introduction to present an overview of the 2002 test studies and the proposed 2003 programs in a presentation entitled "2003 Mackenzie River and Delta Seismic Programs". Keith provided an overview of the project history, the 2002 research area, and seismic equipment and logistics for the 2003 program.	
Acoustic Presentation 1:25 pm	Dave Hannay of Jasco Research Ltd. presented the "Acoustic Measurements of WesternGeco Airgun Noise in the Mackenzie River" study. A handout of the PowerPoint presentation was distributed to the attendees (note	

	that on slide #4, the depth of Delta Test Area is 15-30 m, not 15-20 m as indicated). He outlined the acoustic monitoring goals, study areas, equipment used, measurements taken, methods and study results. He also talked briefly about ship noise and acoustic levels measured during the fish cage exposure tests. Refer to the draft report for more detailed information.	
	Alan Ehrlich – Are the far-field and near-field distances perpendicular to the array? (referring to slide #11)	Dave Hannay – Yes, directly perpendicular.
	Steve Harbicht – How was the distance calculated between the source and the receiver?	Dave Hannay – We used a laser range finder up to 25 m (accuracy of 1-2 m) and a GPS for longer ranges.
	Masood Hassan – In layman terms, how much louder are airguns relative to the ships themselves?	Dave Hannay – Need to be careful in making comparisons like that because the difference depends on the metric used. The source level of the vessels is about 160 decibels (dB) and the source level of the airguns is 240 dB. There is about an 80 dB difference if you want to use dB as a metric for comparison.
	Keith Rosindell – The question came up, “Why are we using a 1500 cubic inch (in ³) air gun array over smaller guns?” The reason is that we know the 1500 in ³ air gun array would give reasonable data based on previous experience. We did tests on the Mackenzie River with 1500, 1200 and 1000 in ³ air gun arrays. Keith presented a slide entitled “Norman Wells: Reef Oil Play” and showed 2	

	dimensional seismic sections measured using 1500, 1200 and 1000 in ³ air gun arrays. The sections indicate that the 1500 in ³ array provides more accurate data. Indeed a prominent feature like the Norman Wells oil field (reef) would have been missed with the smaller airgun array. For this reason, WesternGeco proposes to use the 1500 cu in airgun array.	
	Mark Dahl – That reef was about 200 m long? He asked further questions regarding the dimensions of the Norman Wells reef presented in 2D seismic sections.	Keith Rosindell provided the approximate dimensions of the reef.
Fish Study Presentation 2:15 pm	Sarah Crabbe from Golder Associates Ltd. presented the “Behavioural and Physical Response of Riverine Fish to Airguns” study. A handout of the PowerPoint presentation was distributed to the attendees. Sarah outlined the study objectives, fish species that populate the river, the study areas, methods, and study results. Refer to the draft report for more detailed information.	
	Steve Harbicht – When you were doing the horizontal scanning, did you measure the size of the fish?	Sarah Crabbe – Yes, the fish were small.
	Mark Dahl – For the caged fish test, your cages were angled towards the shoreline. Didn’t Dave show in the previous presentation that the acoustic energy decreases closer to shore?	Dave Hannay – The acoustic energy does attenuate towards shore. However, actual measurements were taken at each cage site so we know what sound levels the fish were exposed to.
	Alan Ehrlich – How did you preserve the fish? [referring to mortalities and sacrificed fish]	Sarah Crabbe – In 10% buffered formalin.
	Alan Ehrlich – The differences	Sarah Crabbe – Yes, some of

	between transects for the vertical acoustic monitoring were attributed to natural variability. Was there similar variability between transects?	the transects were measured twice and they had the same high variability as between transects.
	Steve Harbicht – How large were the large fish?	Sarah Crabbe – They were double the size of the small fish.
	Steve Harbicht – In the literature search, did you find there is a difference in effect with fish size?	Sarah Crabbe – In our search, we found no published studies on different effects related to the size of fish. Remember though, no fish died in the studies due to the airguns. We used mostly small fish because we expected there would be kills in the closest cage. Large fish were placed in the cages farther away.
	Steve Harbicht – With electroshock kits, larger fish are hit harder than smaller ones.	Keith Rosindell – There was some opposition from communities to study large fish.
	Steve Harbicht – Also, handling has more of an effect on larger fish.	Keith Rosindell – Mostly small fish were observed in the main channel. Also, small fish tended to be at the bottom. Since the airgun array is only 2 meters under the water, there would be a considerable distance between the array and fish near the bottom of the river.
	Alan Ehrlich – Are these results specific to the array set-up?	Sarah Crabbe – Yes.
	Alan Ehrlich – What analyses were done for the histopathology?	Sarah Crabbe – Light microscopy, maculae, hearing structures, most organs and tissues in section. A regular pathology examination was done to assess fish health. The examination would identify effects such as hemorrhaging.
	Jennifer Morin – The literature says that 220 dB will harm fish.	Keith Rosindell – We believe the 220 dB value for effects

	What is meant by harm?	on fish comes from the days of using dynamite for river seismic. The force from dynamite and airguns is different. We don't think the 220 dB value has meaning for airgun arrays. At 225-230 dB, no fish mortality was observed in our studies.
	Steve Harbicht – Looking at the acoustic signature from the airgun arrays, it doesn't have two signals like you would see for explosives.	Dave Hannay – No, two signals are not observed with airguns. The negative pulse that occurs afterwards with explosives is likely what causes fish bladders to burst.
	Keith Rosindell – The reason you don't get an acute drop in pressure from air guns is because the blast is not from a point source. Keith further explained the difference in acoustics between dynamite and airguns. It appears that much of the concern for physical damage over 220 dB applies to dynamite and not airguns, because of a lack of a negative (vacuum) component to the airgun energy source.	
	Sarah Crabbe – There is little scientific literature available on seismic effects on fish. Of the studies, others also report little effect on fish from airguns. Those studies that do report effects on fish tended to be due to dynamite blasts.	
Video Presentation 3:00 pm	Keith Rosindell showed two short video clips taken during the 2002 studies. The videos were of airguns firing.	
Wildlife Presentation 3:05 pm	Derek Melton from IMG-Golder presented the "Wildlife Monitoring Survey for the WesternGeco Mackenzie River Seismic Test Study". A handout of the PowerPoint presentation	

	<p>was distributed to the attendees. Derek outlined the wildlife predictions of the EIA, objectives of the wildlife monitoring, methods and study results. He also indicated that no injured wildlife was observed and there was no need to halt the project because of a close approach. Refer to the draft report for more detailed information.</p>	
	<p>Alan Ehrlich – Did you make any attempt to calibrate observers?</p>	<p>Derek Melton – No. However, during the training sessions, we could spot logs from up to 1 - 2 km away and the observers were very keen to scan for wildlife. There were also observers well positioned high up on the bridge of the more stable seismic vessels. Monitoring was also conducted in teams of two, plus a coxswain. Talking to the communities, we did not expect to see much wildlife in the main channels during the test studies.</p>
<p>Community Monitoring Presentation 3:25 pm</p>	<p>O.D. Hansen of WesternGeco gave a presentation on community monitoring of the 2002 study. He identified the names of monitors and communities that were involved. Communities were primarily concerned with effects of the seismic project on fish. Monitors were to report any changes or differences resulting from the study to the Community Liaison Officer. No changes resulting from the 2002 study were reported. Reports from community monitors will be submitted with the EIAs. O.D. Hansen indicated that</p>	

	community monitoring will be done for the Liard River section of the 2003 seismic program because communities there have not been involved yet.	
	<p>Keith Rosindell – There was a general consensus from communities that it is a good program. Their main concern is for fish. Hopefully, the studies have alleviated those concerns. Please note that the two 2003 seismic projects would together provide data from the Delta to the B.C. border. The River project would be completed first; we would like to do the Liard River as first part of the River project. The Delta Project would be done last. This would coincide best with the timing of wildlife and fish movements and appropriate flows. We are happy with the results of testing. The program to date has cost over 10 million dollars. We are already getting worldwide interest from test study data collected this past summer.</p>	
	<p>Elaine Blais – When will we get the report?</p>	<p>Derek Melton – There are two regulatory processes going on. The four study reports will be included as appendices of the EIAs for the River Project and the Delta Project. We are hoping to submit a Delta Project draft in the first week of the New Year for the Inuvialuit process. We expect to see draft terms of reference for the River project before Xmas as part of the Mackenzie Valley process. We only received the histopathology results in the last few weeks and we had to</p>

		wait for those results before proceeding.
	Alan Ehrlich – Will the same EIA be submitted for both regulatory processes?	Derek Melton – Each EIA will only be for the scope of the project in that particular regulatory area. However, we will include information from all areas for the cumulative effects section.
	Jennifer Morin – Will the report get peer reviewed?	Keith Rosindell – The priority right now is for regulatory approval. Eventually we will prepare scientific papers for the fish study, the acoustic study, the wildlife study and one paper incorporating all the topics together.
	Masood Hassan – I presume the results will be published. Who owns the data? Does the NEB have a say in the dissemination of data?	Keith Rosindell – We will place no restrictions on the release of the report. There is worldwide interest and the information we have collected is important.
	Derek Melton – It is of real benefit that we were able to get passed issues of confidentiality and have study reports included in full in the EIAs as appendices.	
	Jennifer Morin – Do you see this applying to other rivers in Canada?	Keith Rosindell – We collect seismic data for a multi-group client. Our product is a non-proprietary dataset that can be bought. We might try to do the Peel River in the future. There is interest to survey the Gulf of the St. Lawrence, the Fraser River and off-shore of British Columbia. The Mackenzie and Liard rivers will probably be the last work that we will do in the NWT. These seismic surveys are very expensive, costing about 6.5 million dollars to mobilize equipment and do test studies so far.

Meeting Conclusion 4.00 pm	Keith Rosindell thanked everyone for attending and the meeting was concluded.	
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Attendee's List

Name	Organization	Contact
Masood Hassan	Department of Fisheries and Oceans	(867) 669-4913
O.D. Hansen	WesternGeco	(403) 509-4169
Mike Cardell	WesternGeco	(403) 509-4487
Robert Redshaw	Resources, Wildlife and Economic Development	(867) 920-8954
Mark Dahl	Environment Canada – Environmental Protection Branch	(867) 669-4734
Terry Matheson	Department of Fisheries and Oceans – Conservation and Protection	(867) 669-4900
Wade Romanko	Environment Canada – Environmental Protection Branch	(867) 669-4736
Stephen Harbicht	Environment Canada – Environmental Protection Branch	(867) 669-4733
Elaine Blais	Department of Indian Affairs and Northern Development – Environment and Conservation	(867) 669-2591
Alan Ehrlich	Mackenzie Valley Environmental Impact Review Board	(867) 766-7056
Jennifer Morin	Canadian Parks and Wilderness Society – NWT	(867) 873-9893
Sarah Crabbe	Golder Associates Ltd.	(403) 260-2241
David Hannay	Jasco Research Ltd.	(250) 483-3300
Derek Melton	IMG-Golder	(403) 299-5659
Keith Rosindell	WesternGeco	(403) 509-4660
John Chételat	Golder Associates Ltd.	(867) 873-6319
Leslie Green	Golder Associates Ltd.	(867) 873-6319