

# Susitna-Watana Hydroelectric Project Document

## ARLIS Uniform Cover Page

<b>Title:</b> Initial Study Report Meetings, October 22, 2014 : Alaska Energy Authority - Board Room, 813 West Northern Lights Blvd., Anchorage, Alaska 99503		<b>SuWa 259</b>
<b>Author(s) – Personal:</b>		
<b>Author(s) – Corporate:</b> Initial Study Report Meetings (2014 October 22 : Anchorage, Alaska)		
<b>AEA-identified category, if specified:</b> November 14, 2014 technical memorandum filings		
<b>AEA-identified series, if specified:</b>		
<b>Series (ARLIS-assigned report number):</b> Susitna-Watana Hydroelectric Project document number 259	<b>Existing numbers on document:</b>	
<b>Published by:</b> [Anchorage, Alaska : Alaska Energy Authority, 2014]	<b>Date published:</b> November 15, 2014	
<b>Published for:</b>	<b>Date or date range of report:</b>	
<b>Volume and/or Part numbers:</b> Attachment E	<b>Final or Draft status, as indicated:</b>	
<b>Document type:</b> Technical memorandum	<b>Pagination:</b> 247 p. in various pagings	
<b>Related work(s):</b> Cover letter to this report: Susitna-Watana Hydroelectric Project, FERC Project no. 14241-000; Filing of Initial Study Plan Meetings transcripts and additional information in response to October 2014 Initial Study Plan Meetings. (SuWa 254)  Attachments A-D (SuWa 255-258) and F-N (SuWa 260-268)	<b>Pages added/changed by ARLIS:</b> Added cover letter (4 pages)	
<b>Notes:</b> Contents: Part A. Transcripts -- Part B. Agenda and presentations.  In the electronic version, this cover page and the cover letter precede Part A only.		

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November 14, 2014

Ms. Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

**Re: Susitna-Watana Hydroelectric Project, Project No. 14241-000**

**Filing of Initial Study Plan Meetings Transcripts and Additional Information in  
Response to October 2014 Initial Study Plan Meetings**

Dear Secretary Bose:

By letter dated January 28, 2014, the Federal Energy Regulatory Commission (Commission or FERC) modified the procedural schedule for the preparation and review of the Initial Study Report (ISR) for the proposed Susitna-Watana Hydroelectric Project, FERC Project No. 14241 (Project).<sup>1</sup> As required by the Commission's January 28 letter, the Alaska Energy Authority (AEA) filed the ISR with the Commission on June 3, 2014 and conducted ISR meetings on October 15, 16, 17, 21, 22, and 23, 2014. Attached as Attachments A-1 through F-2 are the written transcripts (along with the agenda and PowerPoint presentations) for these ISR meetings.

During the October ISR meetings, AEA and licensing participants identified certain technical memoranda and other information that AEA would file with the Commission by November 15, 2014. In accordance, AEA is filing and distributing the following technical memoranda and other information:

- Attachment G: *Glacier and Runoff Changes (Study 7.7) and Fluvial Geomorphology (Study 6.5) - Assessment of the Potential for Changes in Sediment Delivery to Watana Reservoir Due to Glacial Surges Technical Memorandum*. This technical memorandum documents AEA's analysis of the potential changes to sediment delivery from the upper Susitna watershed into the Project's reservoir from glacial surges.
- Attachment H: *Riparian Instream Flow (Study 8.6) and Fluvial Geomorphology (Study 6.6) - Dam Effects on Downstream Channel and Floodplain Geomorphology and Riparian Plant Communities and Ecosystems – Literature Review Technical Memorandum*. This literature review technical

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<sup>1</sup> Letter from Jeff Wright, FERC Office of Energy Projects, to Wayne Dyok, Alaska Energy Authority, Project No. 14241-000 (issued Jan. 28, 2014).

memorandum synthesizes historic physical and biologic data for the Susitna River floodplain vegetation (including 1980s studies), studies of hydro project impacts on downstream floodplain plant communities, and studies of un-impacted floodplain plant community successional processes.

- Attachment I: *Susitna River Fish Distribution and Abundance Implementation Plan, Appendix 3. Protocol for Site-Specific Gear Type Selection, Version 5.* In accordance with the fish distribution and abundance studies, as described in Revised Study Plan (RSP) Sections 9.5 and 9.6 and in the Fish Distribution and Abundance Implementation Plan, this appendix establishes the protocol for site-specific gear type selection for fish surveys. Throughout study plan implementation, AEA has updated this appendix as needed to provide consistent direction to all field teams. Version 1 of Appendix 3 was originally filed with the Fish Distribution and Abundance Implementation Plan in March 2013. That version was updated twice (Versions 2 and 3) during the 2013 field season to accommodate protocol changes that related to FERC's April 1, 2013 Study Plan Determination, field permits, and lessons learned during study implementation. Version 4 was the protocol used for the 2014 field season and was updated with respect to the prioritization of gear use and based on 2013 data collected. This version herein, Version 5, will be followed during the 2015 field season.
- Attachment J: *Fish Distribution and Abundance in the Upper and Middle/Lower Susitna River (Studies 9.5 and 9.6): Draft Chinook and Coho Salmon Identification Protocol.* This document established a Chinook and coho salmon identification protocol to support accurate and consistent field identification across field teams. It will allow for additional quality control and assurance of field identification calls and for estimation and reporting of any field identification error that may occur in future sampling efforts.
- Attachment K: *Characterization and Mapping of Aquatic Habitats (9.9), Errata to Initial Study Report Part A - Appendix A, Remote Line Mapping, 2012.* This errata provides a corrected version of map book for Remote Line Mapping, 2012. The version filed with the ISR (June 3, 2014) used a data query to build the maps in geomorphic reaches MR-1 to UR-5 that mistakenly did not include side slough habitat, so that no side sloughs were depicted on the Appendix A maps 1 through 21. This version was corrected by including side slough habitat in the data query for geomorphic reaches MR-1 to UR-5. This version now includes side sloughs.
- Attachment L: *Characterization and Mapping of Aquatic Habitats Study 9.9, Revised Map Book for 2012 Remote Line Mapping.* This map book represents an update to the version published on June 3, 2014 with the Study 9.9 Initial Study Report and the errata provided concurrently with this filing (see Attachment K). The maps presented include all macrohabitat and mesohabitat line identifications available in the 2012 Remote Line Mapping ArcGIS

shapefile. This map book should be considered a full replacement for previous versions and represents the final product for the 2012 remote line habitat mapping effort.

- Attachment M: *Study of Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries (Study 9.12), Fish Passage Criteria Technical Memorandum*. This technical memorandum presents a proposed final list of fish species that will be included in the fish barrier analysis as well as depth, leaping and velocity passage criteria for selected fish species. AEA previously consulted with the federal agencies and other licensing participants regarding the information within the technical memorandum during a March 19, 2014 Fisheries Technical Meeting.

In addition to the technical memoranda and other information identified above, AEA is filing a short errata (Attachment N) to the *Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7), Evaluation of Continued Mercury Monitoring Beyond 2014 Technical Memorandum*. This technical memorandum, which was originally filed on September 30, 2014, evaluates the need for continued monitoring of mercury data beyond 2014 and whether the existing data collection efforts are sufficient to satisfy objectives for characterizing baseline mercury conditions in the Susitna River and tributaries (RSP Section 5.7.1). Since the filing of this TM and based upon the ongoing QA/QC of the data reported in that TM, AEA discovered errors in the TM. The attached TM corrects those errors. Additionally, the errata corrects corresponding errors in the Mercury Assessment and Potential for Bioaccumulation presentation presented during the October 16, 2014 ISR meeting.

Finally, AEA notes that data collected during the Study Plan implementation, to the extent they have been verified through AEA's quality assurance and quality control (QAQC) procedures and are publicly available, can be accessed at [http://gis.suhydro.org/isr\\_mtg](http://gis.suhydro.org/isr_mtg). On November 14, 2014, AEA posted the following data to this website:

- *Baseline Water Quality Data (Study 5.5)*, 2013 QAQC water quality data and DVRs per the Quality Assurance Project Plan.
- *Breeding Survey Study of Landbirds and Shorebirds (Study 10.16)*, cumulative 2013-2014 data.
- *Characterization and Mapping of Aquatic Habitats (Study 9.9)*, ArcGIS shapefile "ISR\_9\_9\_AQHAB\_RemoteLineMapping\_2012.shp" used to generate the maps in Attachment L.

AEA appreciates the opportunity to provide this additional information to the Commission and licensing participants, which it believes will be helpful in determining the appropriate development of the 2015 study plan as set forth in the ISR. If you have questions concerning this submission please contact me at wdyok@aidea.org or (907) 771-3955.

Sincerely,

A handwritten signature in black ink that reads "Wayne M. Dyok". The signature is written in a cursive style with a horizontal line underneath the name.

Wayne Dyok  
Project Manager  
Alaska Energy Authority

Attachments

cc: Distribution List (w/o Attachments)

**Susitna-Watana Hydroelectric Project  
(FERC No. 14241)**

**Initial Study Report Meetings**

**October 22, 2014**

**Part A - Transcripts**

**Alaska Energy Authority - Board Room  
813 West Northern Lights Blvd.  
Anchorage, Alaska 99503**

Filed November 15, 2014



# SUSITNA-WATANA HYDRO

## Agenda and Schedule

### Initial Study Report (ISR) Meetings

Geology and Soils (Study 4.5), Probable Maximum Flood (Study 16.5),  
Site-Specific Seismic Hazard Study (Study 16.6), Subsistence (Study  
14.5), Cultural Resources (Study 13.5), and Paleontology (Study 13.6)

Alaska Energy Authority - Board Room

813 West Northern Lights Blvd.

Anchorage, Alaska

October 22, 2014

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### **ATTENDEES**

Julie Anderson, Alaska Energy Authority

Nate Anderson, Alaska Energy Authority

Martin Bozeman, Alaska Energy Authority

Mike Bruen (phone), MWH

Sarah Bullock, Bureau of Land Management

Bill Kappel (phone), Applied Weather Associates

Bryan Carey, Alaska Energy Authority

Justin Crowther, Alaska Energy Authority

Wayne Dyok, Alaska Energy Authority

Andrew Frasier, Alaska Energy Authority

Kirby Gilbert, MWH

Jim Gill, MWH

Dara Glass, CIRI

John Haapala (phone), MWH

Justin Hays, Northern Land Use Research Alaska

Bretwood Higman (phone), Ground Truth Trekking

Davin Holen, Alaska Department of Fish and Game

John Jangala (phone), Bureau of Land Management

Jan Konigsberg (phone), Alaska Hydro Project  
Tracy Krauthoefer, HDR  
David Kroto, Tyonek Native Corporation  
Becky Long (phone), Susitna River Coalition  
Betsy McGregor, Alaska Energy Authority  
Kim Nguyen, Federal Energy Regulatory Commission  
Suzanne Novak (phone), Federal Energy Regulatory Commission  
Doug Ott, Alaska Energy Authority  
Dirk Pedersen (phone), Stillwater Sciences  
Chuck Sensiba, Van Ness Feldman  
Bill Simeone, URS  
Jay Stallman (phone), Stillwater Sciences  
Marie Steele, Department of Natural Resources  
Miranda Studstill, Accu-Type Depositions  
Cassie Thomas (phone), National Park Service  
Rachel Thompson, Alaska Energy Authority  
Heather Williams, MWH  
Frank Richard VanderHoek, Department of Natural Resources/OHA  
Winchell (phone), Federal Energy Regulatory Commission  
Whitney Wolff, Talkeetna Community Council  
Mike Wood (phone), Susitna River Coalition

## **INTRODUCTION**

MR. GILBERT: Well, I think we should go ahead and start. I think we're on time, and others will probably come in room. We have a small group here today. So we're going to go through some introductions and so on. I'm Kirby Gilbert with MWH.

These are the second series of ISR meetings for the Susitna-Watana



Project. Last week, we had the three, the aquatic and the geomorphology studies, and this week, we're doing the other studies, terrestrial, wildlife, and botanical. Yesterday and today have some physical sciences, subsistence and cultural resources, and tomorrow is recreation and other social sciences.

Just real quick, we do this every meeting, if we have to leave this room, we use the stairs, for any reason, and we meet in the north parking lot, if there is an emergency. Bathrooms are out and -- I think there were a lot of people here yesterday, but the bathrooms are reversed from what they were six months ago. They remodeled, so just to be aware of that.

Let's go around and do introductions. We'll start in the room and then we'll go on the phone. Just real quick for everybody, Miranda's here. We have a court reporter, transcriber of the meeting. So whenever you speak, be sure to say your name first, and we're trying to do that and not talk on top of each other, so she can get the transcript correct, and people on the phone, just don't put us on hold, please. If you have to take another call or something, just dial back into this number, because we get elevator

music -- anyway, we'll go ahead and go around the room with the few people here.

MS. KRAUTHOEFER: I'm Tracy Krauthoefer. I'm with HDR Engineering.

MR. CAREY: Bryan Carey with Alaska Energy Authority.

MS. MCGREGOR: Betsy McGregor, Alaska Energy Authority.

MR. SENSIBA: Chuck Sensiba, Van Ness Feldman on behalf of AEA.

MR. DYOK: Wayne Dyok, Alaska Energy Authority.

MS. GLASS: Dara Glass, CIRI.

MR. GILBERT: And I'm Kirby Gilbert, MWH.

MR. FRASIER: Andrew Frasier, Alaska Energy Authority.

MR. CROWTHER: Justin Crowther, Alaska Energy Authority.

MR. GILL: Jim Gill, MWH.

MS. ANDERSON: Julie Anderson, AEA.

MR. OTT: Doug Ott, Alaska Energy Authority.

MR. ANDERSON: Nate Anderson, Alaska Energy Authority.

MS. THOMPSON: Rachel Thompson, Alaska Energy Authority.

MR. GILBERT: Okay, let's have everybody on the phone identify themselves.

MR. HIGMAN: I'm Bretwood Higman with Ground Truth Trekking.

MR. HAAPALA: John Haapala at MWH.

MS. THOMAS: Cassie Thomas, National Park Service.

MR. BRUEN: Mike Bruen, MWH.

MR. GILBERT: Okay, I got Cassie, but who was the other person?

MR. BRUEN: Mike Bruen.

MR. BRUEN: Mike Bruen with MWH.

MR. GILBERT: Thanks, Mike.

MR. STALLMAN: Jay Stallman from Stillwater Sciences on behalf of FERC.

MR. PEDERSEN: Dirk Pedersen, Stillwater Sciences, contractor to FERC.

MR. KONIGSBERG: Jan Konigsberg, Alaska Hydro Project.

MS. LONG: Becky Long, Susitna River Coalition.

MR. JANGALA: John Jangala, BLM.

MS. NGUYEN: Kim Nguyen with FERC.

UNIDENTIFIED SPEAKER: (Indiscernible - speaking simultaneously).

MR. GILBERT: Okay, so Kim from FERC.

MR. WOOD: Mike Wood, Susitna River Coalition.

MR. GILBERT: Okay, well, we have quite a few on the phone.

That's great. So those of you on the phone, could you hear all those introductions here in the room?

UNIDENTIFIED SPEAKER: Yes.

UNIDENTIFIED SPEAKER: The intros were okay.

MR. GILBERT: Okay, so anybody on the outside, just speak up, or come to the table. So just let us know, because there's a lot of you today and we just want to make sure we are clear. Okay, I'll go through a couple introductory slides here real quick. A lot of you probably have been through this, if you sat in any of the other meetings, which I think a lot of

you have. So I'll just try to go through these quickly.

Yeah (affirmative), the agenda for today is a mix of things. So we've got -- some of the physical sciences studies are covered in the morning, and then we're going to go into subsistence, and then we have the cultural resources in the afternoon, even if we end early we're going to try to keep that fixed, so that cultural starts at 1:00, but could talk about subsistence, depending on how the rest of this goes this morning, but the meetings are intended to be a chance to discuss -- have everybody -- have a meaningful discussion about the results and modifications to the studies and plans to complete the study.

So the ISR meeting, yeah (affirmative), the purpose is to discuss -- this is midway check-in point on the whole study program. The purpose is to -- of the meetings are to discuss the results and any plans -- and the plans to complete the studies and any modifications, which -- and variances -- variances from the first study season and any continuing or new modifications to complete the study and the methods, and that's what we're here to discuss.

The ISR report was filed June 3rd. We've had quite a bit of time now to review those -- it's a huge compilation. There was a draft of February 3rd, and then the final ISR was June 3rd, and all 58 studies are represented in there. We've had quite a bit of time to review it.

The February 3rd document, actually, was embodied as Part A of this report, June 3rd. In addition, since that time, there has been work on quite a few of the studies and some supplemental technical memorandums were issued in September by AEA for, mostly aquatic studies. There weren't any for these studies that we're talking about today. It was for fisheries and geomorphology, 14 study areas, 21 technical memos. Is that right, Betsy?

MS. MCGREGOR: Twenty-two technical memos for 14 studies and one technical memo on dropping the Chulitna Corridor.

MR. GILBERT: Yeah (affirmative), correct. So these -- this is what the schedule is now, because once those technical memos were filed, FERC came back and extended the schedule for the study plan, the ISR study plan modification and approval process, and so there's going to be

another set of meetings in early January now, for those aquatic and geomorphological studies that had technical memorandums that are going to be scheduled shortly by AEA, but the date -- the next thing that will happen after these meetings and those meetings will be, AEA will file a meeting summary per the regulations, a summary of all the notes of all the meetings that have occurred, and then all the licensing participants have basically a month to actually file the formal comments on, not only the meeting summaries, but any modifications or comments on the results and plans to complete the study.

Then one month later, AEA and others can respond to those proposed modifications by others, and then FERC, in April, will make a determination to move ahead with the next study season, based on everything that's come into the record.

Of note, is the study season for 2015 still culminates and the date of the updated study report is still the same. That hasn't changed. That's February 2016.

So this is the schedule we're in now. We're on October 22nd. We

just have one more set of these initial meetings for all 58 ISRs. So tomorrow is social sciences, quite a few subjects again, recreation and aesthetics.

This is just another overview of these meetings and -- AEA has heard a lot about the format so let's not try to have it all just presentation. Let's keep it open for discussion. So we want to hear -- people have had a lot of time to review the ISR. We expect everybody has reviewed the ISR and is fully aware of those. So we don't want to spend a lot of time presenting -- and questions are fine, but we want to hear about all licensing participants' reaction to the modifications.

What modifications do they like or would they like to see other modifications? We want to have that discussion and that's what the whole idea here is, is a chance to really do that, and the presentations today have been up for two weeks, and some of those presentations have some information about new work or some work that was completed in 2014, that wasn't in the June 3rd ISR, and so that will be noted today and we expect that people have read that and can be ready for any questions for the



study leads that are here today, on the phone or in person.

As most people should know by now, the ISR has – each of the 58 -- studies has three parts. The first part is the February 3rd filing of the draft ISR. That's the bulk of it. Part B contains supplemental materials since February, and then Part C is the part about plans to complete the study and modifications that AEA and its technical leads are proposing.

We have all those today if we need to pull them up in discussion. We can pull them up on the screen if there's something people want to talk about, but we often are referring back to the study plan determination and the modifications moving forward to methods that were proposed and approved in the original study plan determination.

So we're going to go -- each one of these is similar today. We're going to have each study lead, they have -- present no more than 10 minutes, go through their slides. Some of the slides have more information and that will just be a quick overview. We can always go back to the slides, if needed, but we want to make sure, again, a lot of time for everybody, the participants to have questions and discuss their proposed

modification or comments on the study today.

The last three slides here, we actually have posters on the wall in the room here. These are right out of the regs. These are the criteria for modifying approved studies. These criteria for any -- and this is useful for anybody wanting to file comments and request a change. FERC has set out these rules about what it takes and what they're looking for, in order to provide the justification for a modification to an approved study plan, and so we're going to be -- today, try to go through what -- if we have -- be clear about what's -- how the studies have proceeded.

If they have variances from the original study plan of 2013, and if those variances are going to continue, those will be modifications to the study methods moving forward.

So with that, I'm going to end this part, and Wayne, I'll -- do you -- I'll let Wayne have it. Wayne's going to have a few comments about AEA's approach here.

MR. DYOK: Yeah (affirmative), thanks, Kirby, and you know, good morning, again, everyone. I'm just going to give a quick high level

overview of where we are in the process here, and I know some of you have heard this before, but there's a few new people, so I'll just be brief.

If we take a step back, we need to ask ourselves, "What are the goals for these, you know, studies," and they really have two major purposes. First, the Commission and other permitting entities will need the study information to undertake their environmental analysis, and secondly, we need it for assessing project impacts and developing protection, mitigation, and enhancement measures. So those are the two primary purposes of the studies.

Taking a step back in time, we spent a lot of time, pretty much most of 2012 in a collaborative effort to develop the right studies, and I think you all agree that these were pretty robust, you know, study plans, but also, in 2012, we undertook some work, and you'll actually hear a little bit about that, you know, today, but 2013 was our first year of conducting the studies per the FERC study plan, you know, determination, and as Kirby said, you know, that's the information that was contained in the initial study report that we filed on June 3rd, and that's really going to be the

primary emphasis of the discussions today, but as appropriate, you may hear something about the '80's data and even 2012, you know, information.

We are -- this is not a stationary process. We also conducted work in 2014, and we're going to be folding that information in as the process continues. So in 2014, we really tried to fill in some data gaps, where we didn't have access in 2013. So for example, we didn't have access to, you know, CIRWG lands in 2013. So this year, we did some additional, you know, drilling out there. So that is, you know, ongoing.

As far as the schedule goes, you're probably all aware that we're going to be having these ISR meetings in, you know, January, as a follow-up for the tech memos that Kirby and Betsy, you know, touched upon. So we'll be getting out a schedule on that, you know, after these meetings.

So we've had three days last week, yesterday, and we have today and tomorrow, so two more days. I think they've been pretty productive days. I just would like to remind all of us, though, that we really need to focus on the issues. Let's try to be, you know, constructive. Let's refrain from any, you know, comments about, you know, people themselves, just focus on

the issues.

We're all about constructive feedback. So let's understand what the data is, what it means, and how that information is going to be used in decision-making. That's really the key, and let's work together, you know, today, here, to see if we can identify and agree upon, you know, the appropriate study plan modifications for next year. Thank you.

MS. LONG: Question.

MR. GILBERT: Sure. Is that Becky?

MS. LONG: Yes, this is Becky. I just would like you guys to clarify that Chulitna is officially dropped as an access route, because yesterday, a lot of the studies, when they talk about their work in 2015, are mentioning that they're not looking at that access route. So it's pretty much a done deal.

MR. DYOK: So Becky, this is Wayne Dyok here. The way we look at the Chulitna Corridor is we have assessed it and we have eliminated it from further consideration. That's AEA's, you know, perspective. You know, FERC will have to make a study plan determination on that

particular aspect of our study plan when it comes out with its determination on April 22nd, and it is hope that we have an indication of that well before April 22nd.

MS. LONG: Thank you.

### **GEOLOGY AND SOILS CHARACTERIZATION (Study 4.5)**

MR. GILBERT: Any other questions, comments? Okay, so Mike, you're on the phone, Mr. Bruen.

MR. BRUEN: Yeah (affirmative), I'm here. Can you hear me?

MR. GILBERT: Yeah (affirmative), just try to speak up. I know you're halfway around the globe. So I'll -- do you have the slides up? Can you see them?

MR. BRUEN: Yes, I can. I'm fine. Can you hear me now?

MR. GILBERT: Yeah (affirmative), I can hear you fine. So go ahead, your slides are up. I've got the first one, your objective slide.

MR. BRUEN: Okay, we won't get into the objectives, as this is essentially what's indicated in the ISR, so we can move onto the next slide. With regard to study -- the components, these are various elements that

have been worked on to date and have been reported on. Some of them are preliminary in nature and some of them are more data documents, if you will, kind of in progress, that will be a continuation and continued as we go forward in the study plan efforts, and these -- so yeah (affirmative), that's pretty much the status on each of these.

So this really involves more or less characterization of geology and mineral resources, talking preliminary assessments on the reservoir-triggered seismicity, as well as a preliminary assessment of reservoir slope stability study that has been done relative to the impoundment of the reservoir behind the proposed dam. In addition, we continue a long-term seismic monitoring network, monitoring micro earthquakes that are recorded within the project area.

Next. With regard to variances, basically, as Wayne had indicated earlier, there were the restrictions in 2013. So this has resulted in an extension, if you will, a rescheduling of work activities that was deferred to the 2014 and 2015 study seasons, and that's the only variance that we really have, relative to geology and soils.

Next. So with regard to summary results in the ISR, basically, you know, these are several activities and tasks that were carried out. The review of the project information was really to get more familiar with the project and the work that has been done in the past, but also as a chance to use that information that was collected in the development of the current evaluation of geology and soil resources. There was a lot of good information that would then carry forward as part of this overall effort.

Regarding the Regional Geologic Study, this largely is an update that -- using a new tool that was not available back in the '80s, and that's really using the LiDAR digital imagery to enhance a better understanding of the features related to geology and soil, and so the terrain unit mapping that had been done relative to color photographs, was updated using the LiDAR to better understand landforms and mapped those within the Watana to the upper reservoir area. It does not necessarily cover all of the access and transmission corridors, but it carries some of the southern parts of at least the northern and western routes.

The same information, the LiDAR and the resulting terrain unit



mapping piece was used in the evaluation, at least from a preliminary sense of the reservoir slope stability, using the terrain unit tool and the information collected from that to identify some of the historic, and areas of potential landslides, slope failures, which are primarily very shallow-seeded features that occur in the soil along the reservoir rim, along the slope, the steeper slopes, if you will, and cataloging those, and evaluating how that may differ once you impound the reservoir.

In addition to that -- those two studies, the key one is probably the mineral resources assessment, which is -- was started. We did not get within the dam site proper, pretty much respective of the area from Watana Creek area on downstream, and so as a result, we still need to do some additional work there, but we have started the identification of the mineral resources, both metallic and non-metallic, looking at potential claims that are registered within in the area, making note of that, and looking at such things as mineral (indiscernible - interference with speaker-phone), et cetera.

With the development of, and the attempt to collect additional

geology and soil information, what we did do is create a work plan that summarizes the activities. There's a plan over the study plan schedule to look and to collect additional data acquisition, and that is continuing, but we developed a work plan to discuss that.

Next. Continuing on the results in the ISR, so what's been happening is in 2012, 2011, we had some geotechnical investigations. They were primarily focused in the dam site area, and from that, we were able to collect subsurface information relative to soil and rock conditions, with an emphasis on the rock conditions.

In addition, with those borings, we were able to install instrumentation that we are now continuing to monitor, both groundwater and ground temperature. If it's from the cores that were collected (indiscernible - interference with speaker-phone) samples were taken, as well as bulk samples from mapping efforts to do some testing of the materials, primarily from an engineering, rock property standpoint to characterize those properties that will be important in using -- the use as quarry materials and materials used in construction, as well as the

foundations of the structures that would be constructed. It included the geologic mapping, so we have multiple subsurface and surface information that's been collected.

To carry on with the information from that, we've taken that information, as well as the old information from the '70's and '80's, to begin our geologic and engineering estimates, if you will, of the characterization of the foundation of the bedrock and the soil conditions, so we can create and OMLine the geologic understanding using, essentially, a model to further develop our understanding and use that in the evaluation, both in geology and soil, as well as the engineering efforts, and this continues and will continue during the rest of the study plan.

Next. Naturally related to the geology of the soils as part of that is the seismic hazard study effort, and largely, this will be covered in 16.6, which we'll talk about a little bit later this morning, but to go back to that and just to kind of give the tie-in to that, there are efforts that have been done and the results that have been done there, our preliminary site is the site-specific seismic hazard assessment, which was carried out in 2012,

and this was basically updating the Woodward Clyde effort that had been done in the '80s to, at least in the framework at which we now use, the site-specific seismic hazard analysis.

No new data was used. It's just taking the old data and historical data that had happened during that period and using that to get a preliminary sense of where we might be looking, as far as the seismic hazards and characterizing them for the future, and now we'll continue those studies going forward.

As part of that assessment, this included using the same LiDAR imagery to evaluate (indiscernible - interference with speaker-phone) features that could be identified that one would want to look at and finding out are they more related to geomorphic results or erosion or are they a function of potentially fault displacement or faulting that might have occurred, whether it's historical or very old or something more recent.

So those studies are being carried out within 100 kilometers and we've done a preliminary discussion on that, but we now still have to do the work in the dam site proper that hadn't been done, which is really

coming up now.

As I mentioned earlier, we had done the preliminary reservoir triggered seismicity evaluation and also looked at the long-term seismic monitoring based on the seven stations that have been installed as part of the project effort.

Next. So when we look to the efforts and the results that have been recorded or the studies begin to develop, hence, the ISR reporting, we're really looking at the information that's been collected in 2014, but since we just got out of the field in September, actually, the latter part of September, we really haven't had much of an effort or much time to really get into that, and so what -- we can only give you kind of a (indiscernible - interference with speaker-phone) relative to that, because those efforts are ongoing, and what we really did is we implemented a field investigation program and it included mapping and more drilling at the site, but from that information that was collected, we now can talk more about the geotechnical instrumentation and what that's telling us.

What we have, is instrumentation on both the south side and the

north side of the dam site, at the dam site proper, and there's an indication that frozen ground could potentially be at depths of up to 230 feet on the south side, and this is -- by being frozen, what we're indicating is it's below 32 degrees, and in reality, it's no colder than 31 degrees.

So it's very close to the warming temperature of not being frozen, but by definition, because of thermocline at temperature, it would be considered frozen ground.

In addition to that, we've taken the information that we've collected and reinterpreted the bedrock sources that lie beneath the river channel. So we've been updating that map, if you will, to identify how -- what that thickness of alluvium is and width, where we might encounter bedrock below that alluvium.

To further achieve that effort and the other tasks that have been going on, we have been testing data that has been out there through accumulated engineering properties on that material and we're beginning to use that and compile more with the new information and we'll be adding to that to further understand and characterize the rock conditions at the site,

which gets into things such as looking at abutment stability, which is always very important at any dam site, to have a good understanding of that and understand what the support needs might be or if there are needs for supporting it, due to some unfavorable orientations, if you will.

So this overall geologic characterization is continuing and we're better understanding the mapping that has been done in the '80's, and we're reinterpreting that, and through that effort, the number of geologic features, which could be due to fracturing or sheering or just weak rock conditions in certain areas, had formed narrow gullies at the dam site.

We're beginning to look at those more closely, both from the drilling census and from the mapping side, and right now, what we're seeing is, from this effort, that the geologic features that are shown, may not be to the width or maybe even as prominent or continue in the persistence that was laid out in the '80s.

We're continuing our evaluation of that using 2014 data, and we'll have a better understanding of that shortly. That information has been really crucial to better understanding those features and characterizing

them. We try to make them as accurate as possible with the information we've collected.

Next. So as indicated in my earlier comments, we looked at the ground temperature. The two figures and graphs that you see here, actually represent ground temperature readings that have been measured in some of the -- in the borings that were drilled in the 2014 program, as well as those that were done back in the earlier work. So these are going to show the indication of where we have frozen ground.

Next. Within the middle of the resources document, we have an example of where the existing claims are, and what you can see from this figure is that many of the claims that have been -- are in the register are actually outside the reservoir and outside our concerned project area that we define as the corridors and the reservoir area in the red boundary.

Next. As you look to the modification, I think that's a modification from the study plan, there have been no modifications to the method. We have added, based on area, the Denali east option, and as was discussed earlier, we're dropping the Chulitna Corridor. That will be an area of



investigation in the future, and as reported earlier, also, we talked about the schedule where we've had to extend the schedule into 2015. Next. So there are no new modifications to the study plan and the Chulitna Corridor, in summary, has been dropped.

Next. So when we look to the summary of results since the ISR, we're really looking at the at the information that's coming out of the 2014 program, which as you see, has been a function with drilling, the mapping, and the data acquisition through instruments, both from the geotechnical instrumentation at the site, and the seismic monitoring station network that's been established for the project.

Next. So as we look forward, basically what we're looking at is additional data acquisition through geologic mapping, particularly more from the regional standpoint, as we look to complete the mineral resources and claims to update the reservoir rim stability, as we acquire new additional LiDAR that we're going to be reviewing, and that will also be used in the evaluation of the lineaments to accomplish another additional area.

The tools that we will be using are the geophysical survey in the area of the dam site and get a better understanding of where top of rock surface is.

Next, and as was pointed out earlier, we need to finalize the reservoir slope stability analysis, and one thing that we have not really done a whole lot of work on to this point is going to be looking at the geologic assessment, the geology of the soils along the road and transmission corridors, which would be something that we will be doing as we go forward.

MR. GILBERT: Okay, thanks, Mike, that was a good overview.

MR. BRUEN: You're welcome.

MR. GILBERT: Yeah (affirmative), sounds like you have a lot -- we'll -- okay, so now is the chance to -- for anybody, everybody to pipe in about what they think about the study, where it's at, where it's going, modifications, and you know, we've structured these to try to go down through the licensing participants, so we do start with federal agencies if -- I know we've got a few. We've got John Jangala, Cassie, and two others

on the line, but who has questions for Mike, while he's here, or any comments about the study and the modifications? Do you have any Dara?

MS. GLASS: I do.

MR. GILBERT: Okay, so...

MS. GLASS: But I was waiting to see if Cassie or John...

MR. GILBERT: Well, we can give them a chance after you go, yeah (affirmative).

MS. GLASS: So hey, Mike, when do you -- this is Dara Glass from CIRI.

MR. BRUEN: Yes.

MS. GLASS: Nice to know you made it out of the field safely.

MR. BRUEN: Thank you.

MS. GLASS: When do you expect to have your 2014 studies in, even in draft form -- what's the word I'm looking for, reviewed, written up?

MR. CAREY: The...

MR. BRUEN: Okay, well, as far as the data that...

MR. DYOK: Hey, Mike...

MS. GLASS: Mike, (indiscernible - speaking simultaneously),  
Bryan...

MR. DYOK: Mike, this is Wayne. Bryan's going to answer that  
one.

MR. CAREY: Yeah (affirmative).

MR. BRUEN: Okay, go ahead.

MR. CAREY: It's -- the 2014 type work won't be ready until -- in  
draft form until next year, 2015.

MS. GLASS: Okay, because that -- because it's, obviously, difficult  
for us to make any comments until we have the assessment from the data  
written up. I mean, we can look at the data, as well, but it's difficult for us  
to make comments on anything until we have that.

MR. CAREY: Right.

MS. GLASS: And so that's just going to be something, a  
cliffhanger, I guess, pardon the pun. I thought it was funny.

MR. GILBERT: But do you have any comments on the 2013, and  
he summarized the 2012 results, too, at this point?

MS. GLASS: Yeah (affirmative), I'm getting there.

MR. GILBERT: Okay.

MS. GLASS: Give me a break, Kirby.

UNIDENTIFIED SPEAKER: Take your time.

MS. GLASS: I sat through all three days last week. So okay, so that is very helpful because -- because our comments are, to me, well, and to all -- to us, anyway, making comments at this point in time, without having the 2014, makes it skewed, and so -- and so we're struggling with how to -- how to best do that without, you know, additional encumbrances on anybody and so that's kind of where -- we're like do we or don't we type thing.

MR. CAREY: And I'll mention the fact that under the permits up there, the raw data from 2014 will be available to CIRI and the other corporations under what the terms of the permit is.

MS. GLASS: Right.

MR. CAREY: So that should be going over to you pretty soon.

MS. GLASS: Okay. All right, so just -- and I just need to confirm

because on the access routes, on the transportation access routes, you have yet to do assessments, you have yet to do field studies? Is that what you said, Mike?

MR. BRUEN: Yeah (affirmative), Dara, we've hardly touched the surface on that. We did a little bit, as part of the mineral resources to begin to look at and start to identify potential aggregate sources based on when we -- aerial recon, if you will.

MS. GLASS: Right.

MR. BRUEN: Because we don't have the LiDAR coverage up there, but that's the extent of it. We have not gotten on the ground or spent any real time and part of the area was not accessible, as well, particularly closer to the dam site.

MS. GLASS: Right.

MR. BRUEN: We're missing something that's been -- had been deferred and we intend to take that up going forward.

MS. GLASS: Okay, and then, I have one last thing, and that -- this is kind of an overall comment and it relates to something that I said last

week regarding dropping the Chulitna Access Corridor, and I would recommend that instead of everybody at this point saying that the route has been dropped, I would suggest that you instead use the terms either requesting or recommending to FERC, because the access route to -- the Chulitna route has not been dropped yet. AEA has just requested it to be, and so I would encourage you to think about your phrasing on that.

MR. SENSIBA: Yeah (affirmative), that's exactly right. The -- it's inferred, I think, that where AEA is saying a modification to that, or any other method, for that matter, either stated in the ISR, Dara, or proposed in these meetings, that it's a proposal.

We understand that the Commission needs to issue a determination in April, and one of the determinations it needs to make is with respect to the Chulitna Corridor, but we will -- your point is very well taken.

MS. GLASS: I have nothing else.

MR. GILBERT: That's fine. If you think of something else, you can add it in.

MS. GLASS: I don't believe I will.

MR. GILBERT: Okay, so we have quite a few people on the phone.

So are there any other questions for Mike on geology and soils or...

MS. LONG: Yeah (affirmative), this is Becky Long.

MR. GILBERT: Okay.

MS. LONG: And perhaps I missed it, but have you evaluated the north side of the dam site?

MR. BRUEN: Could you be more specific as to, Becky, as to what you mean by the north side of the dam site, what kind of area extent are you referring to?

MS. LONG: Well, I mean, you mentioned, and I read in the (indiscernible - interference with speaker-phone) in a memorandum from 2011 or something, you know, talking about the frozen ground on the south side and I know there's some frozen ground on the north side, and I just wondered if you -- I mean, those are the terms that you used. So I'm just wondering if, you know...

MR. BRUEN: Right. Okay. With regard to frozen ground and the instrumentation, we do have instrumentation both on the south side and the



north side. There is an indication in one location that the temperature may be very close to 32 degrees, and therefore, it is suspect that there might be some, but at this point, because of the lack of data that we could not obtain over the past year, we -- the new instrumentation that we installed in 2012 has not been able to tell us any new information, as yet, from a winter cycle standpoint, and as well as the new holes that we instrumented this year on the north side.

So between 2012 and 2014 borings, we installed five additional borings that are instrumented that -- but at this point, we do not have a winter cycle of information to either confirm or update our initial discussion based on the one potential hole from the '80's, if you will.

MS. LONG: And what -- is that what you were basing your information on, because wasn't there a technical memorandum, like 2011 or something, that talked about that or maybe that's what it was referencing, the '80s study?

MR. BRUEN: It was referencing the '80s study.

MS. LONG: Okay, I just -- I didn't realize that. Thank you.

MR. BRUEN: You're welcome.

MR. WOOD: This is Mike Wood, can I ask a question?

MR. GILBERT: Sure, Mike.

MR. WOOD: Can you hear me, Mike?

MR. BRUEN: Yes, I can, go ahead.

MR. WOOD: I'm wondering if you have worked with the surveyors at Geovera and have the information about what they have found with their surveys, in terms of ground movement in that -- in the area of the proposed dam site, like how much their surveys may or may not have seen the ground moving? Is that incorporated in your data, your raw data?

MR. BRUEN: Now, when you say, "ground moving," I'm not sure exactly -- are you saying surface movement of the soils due to thawing and surface slumps or are you referring to some other type of movement?

MR. WOOD: I guess I just -- I'm really impressed with how the new survey, you know, in today's age, has advanced with satellite and all, and I know they've got points in bedrock and they've been measuring how the rock and how these points have been moving over the last few years, and

I'm just wondering if that kind of survey data is in your -- in what you'll be presenting down the road?

MR. BRUEN: No, I'm not familiar with that kind of information. I need -- I guess I'm going to need to circle back with them. The only thing I can tell you, from a tectonic standpoints, and I mean by plate tectonics, we have installed a GPS locator at the dam site to see how is the North American and the Pacific plates moving relative to each other, and because, you know, with the Denali fault and everything to the south of that, that area is a build up of stress. There is movement of that whole upper crust, if you will, the whole thickness of that crust, which is 20 to 30 kilometers thick. That is moving relative to the underlying earth structure.

So there's -- we know that has occurred throughout that southern -- Southcentral Alaska and we have a GPS instrument that is going to be able to record what that rate of movement is and so that, I know, but as far as another activity relative to movement, I need to get more familiar with that.

MR. CAREY: And this is Bryan...

MR. WOOD: Okay.

MR. CAREY: This is Bryan Carey with AEA. This summer, Geovera did do a survey all around the dam site, and so, at a future date, we will have more information in terms of those points.

MR. WOOD: Will that be involved in the studies that Mike's doing? Will that be -- will that information be released or where might we look for that information?

MS. MCGREGOR: This is Betsy with AEA. I'm a little bit confused as to what you're asking about, Mike. To clarify, Geovera has done the surveying for the entire project area, for all studies. They've laid out the control network and that's needed for a whole bunch of different studies, because then they survey different reference points or whatever is relevant to their study and what they're investigating.

They relate it to that controlled network. So there aren't any independent studies that Geovera's doing that has anything to do with movement. So I'm a little bit confused as to what you're driving at.

MR. WOOD: Well, I'm aware -- is that they're able to measure, you know, as surveyors, how much the ground moves throughout the year and

from year to year, and I'm just wondering if the points that have been in bedrock in the area around the proposed dam site, how much those -- their points have moved, and over the period of time that they've been up there, because this stuff is so, you know, accurate nowadays, I'm just wondering if that data is being incorporated into the geotechnical stuff.

MR. CAREY: I think the survey information would be available to (indiscernible) of geology and they will be able to take a look at that. They -- I'm sure they will also be looking at it in regard to the seismic, because, I believe, a bunch of the seismic stations up there have the GPS points on them and so if there's regional movement of -- all of Alaska is moving currently and so they can be taking a look at that, which are the rates of movement.

MR. WOOD: Okay, thank you.

MR. GILBERT: Okay, thanks, Mike. Other questions, modifications, suggestions for geology soils?

MR. HIGMAN: This is Bretwood Higman. I was curious about -- for someone like myself that's effectively just a member of the public, what

-- is it possible to access raw or semi-raw data, like you know, LiDAR data in a GIS format or something like that?

MS. MCGREGOR: This is Betsy with AEA. We have posted data. That data is available as it's processed, as Mike alluded to in his presentation. The Mat-Su Borough LiDAR did not have the accuracy that we needed. So we collected additional LiDAR data. It's not -- the processing hasn't been completed. When that's completed, that will be available.

We post the available data on the GINA website. There is a URL in each of the ISRs. Any of the data that was -- appeared in the ISRs was provided at the GINA website and additional data requests that we get from the public, we provide to everybody at large, via the GINA website. So yes, it will be available when it's processed and I don't think they're going to be finished processing it until early 2015. They actually had to -- they had a lot of weather constraints in 2013. So they actually completed collecting that data in 2015 -- I mean, I'm sorry, they...

MR. HIGMAN: Thank you.

MS. MCGREGOR: ...completed collecting the data in 2014.

MR. GILBERT: Okay, good question. Anybody else? Dara.

MS. GLASS: So I have one. I have a question, then. This is Dara Glass from CIRI, again, and so Betsy, you can probably best answer this, would it behoove us, then, since a lot of the evaluations have not been completed from the 2014 studies, to include this as one of the January meetings, as well?

MS. MCGREGOR: I don't know that there will be additional information between now and January to warrant adding them.

MS. GLASS: Will evaluations be done, though?

MR. CAREY: What -- AEA anticipates that we will be, once the information is completed, is that we will have some type of a meeting with the Board of Consultants to go over the information over the telephone, and that is normally posted on our website, all the Board of Consultant meetings, and so I don't think a TWG meeting...

MS. MCGREGOR: Yeah (affirmative), we've never had a TWG meeting on it.

MR. CAREY: Yeah (affirmative).

MS. MCGREGOR: It's all been in the Board of Consultants, so...

MR. DYOK: Could you be more specific of what you would like to get out of such a meeting, Dara?

MS. GLASS: Well, I'm just trying, in my mind, how -- again, how we're going to respond to this officially, and so I'm just, you know, trying to work through this.

MS. MCGREGOR: So in the process, the ISR, it's an initial study report...

MS. GLASS: Right.

MS. MCGREGOR: It's a progress report.

MS. GLASS: Right.

MS. MCGREGOR: You know, impact assessment isn't complete. A complete analysis hasn't been conducted. It's just a check-in point, and this is where we're at so far, you know, and here's the data that we've gathered thus far, and it's looking for comments there on that information and based on that, do you think that we need proposed modifications



moving forward.

MS. GLASS: Right.

MS. MCGREGOR: So you know, if -- we don't expect you to comment and neither does FERC, comment on things that you -- that aren't complete or haven't been, you know, reviewed yet. So I would think that you could still comment on what was provided in the ISR and that material, with the understanding that it's just a check-in point.

MS. GLASS: Right.

MS. MCGREGOR: It's just a progress report (indiscernible - speaking simultaneously)...

MS. GLASS: So you don't see any -- you don't see any TMs or anything coming out prior to you guys filing your meeting reports?

MS. MCGREGOR: Not on this particular study.

UNIDENTIFIED SPEAKER: No.

MS. GLASS: Okay, all right, that was my concern, so, okay. Well, that's fine. Thank you.

MR. GILBERT: Yeah (affirmative), and he'll -- of course,

everything rolls up in the USR and that's in February 2016.

MS. MCGREGOR: And there's another opportunity to comment at that point in time, as well.

MR. GILBERT: Right, and as Mike outlined, he doesn't have any really new modifications, even from the work he did, which is what we're looking for today, if people have -- from the 2014 work if that relates to modifications, they should be mentioned in it, but it didn't look like he had any.

MS. GLASS: For the study -- how the studies are done, yeah (affirmative).

MR. GILBERT: Yeah (affirmative). Yeah (affirmative), keep in mind that we're talking about the geology and soil characterization, you know, study here, and a lot of what Mike was just talking about with the drilling, you know, program, you know, gives some...

MS. GLASS: Is the...

MR. GILBERT: ...to that, but really, the study is a pretty straightforward, you know, study. So if you have any, you know, thoughts

based on what's in the ISR for study modifications, you know, that's what we'd be looking for.

MS. GLASS: Absolutely.

MR. GILBERT: Yeah (affirmative), it's the check-in point.

MS. GLASS: Okay, thanks.

**PROBABLE MAXIMUM FLOOD (PMF) STUDY (Study 16.5)**

MR. GILBERT: Okay, well, if there aren't any more on geology and soil, we'll turn to the Probable Maximum Flood Study and then we will be returning to Mike, here shortly for the seismic study right after this. So that's the order we've got it, so we'll try to keep to that, keep to the agenda.

So John Haapala, are you available now to go through your presentation? I've got it up on the screen.

MR. HAAPALA: Yes, I'm on the line. Can you hear me?

MR. GILBERT: Yeah (affirmative), just fine.

MR. HAAPALA: All right, good. Are we going to start right now?

MR. GILBERT: Yeah (affirmative), go ahead, have at it.

MR. HAAPALA: All right, next slide.

MR. GILBERT: Are you done with the objectives? Can you see that?

MR. HAAPALA: No, I don't. Okay, I guess my screen's a little bit slow here.

MR. GILBERT: Yeah (affirmative), there's a delay for us.

MR. HAAPALA: Yeah (affirmative), the first slide is...

MR. GILBERT: Yeah (affirmative), go ahead.

MR. HAAPALA: The first slide is the objectives. The thing I would really like to point out here, is the ultimate objective of the PMF study is to ensure the flood safety of the dam, and the design flood for dams can vary anywhere from the 100-year flood to the probable maximum flood as the inflow design flood, and we selected the probable maximum flood as the inflow design flood, and that is the highest standard of flood safety that's used for dams anywhere in the world. So these objectives are in the study. So let's go to the next slide.

UNIDENTIFIED SPEAKER: I got it.

MR. GILBERT: You got it? Okay.

MR. HAAPALA: For components, one thing I'd like to highlight is that there was a FERC Board of Consultants that reviewed the PMF study. Not all the studies, but really only a few of the studies were reviewed by the Board of Consultants, which is an expert review panel, and at several points along the way, the PMF study was reviewed by the Board of Consultants.

So a few things I'd like to highlight here, are the model calibration and verification that -- to me, that's one of the -- really the most important parts of the model. This is where kind of the rubber meets the road and prove your model out.

Also, there was development of a site-specific PMP. Coincident conditions with the PMF had to be determined, and you know, that normally includes things like initial reservoir level, but of particular importance in our study was snowpack information, determining an antecedent snowpack, which is very important to the flood run-off, and then, of course, the ultimate answer comes from reservoir routing of the PMF.

Next slide. All right, variances, for some reason, I guess my slides are showing up a little bit late, but for variance, there was one significant variance in the PMF study from the RSP, and that was in most PMF studies, the standard is to use three calibration and verification floods.

Two for calibration, one for verification, but as we were working our way through the study, it became very apparent that the maximum floods on the Susitna River occur from two separate -- there are two separate types of floods. In the spring, there are floods that are predominantly from snowmelt. You know, it could be as, you know, more than half the run-off is snowmelt, and then in the summer, there are -- there can be annual peak floods, you know, even bigger than the spring floods, but they are almost all the result of rainfall.

There, of course, is glaciers in the watershed, so there is some icemelt or snowmelt, but the August floods are -- the great majority is from rainfall run-off. So what that -- what we had to do, I felt, was to basically include three calibration and verification floods for the spring snowmelt floods and a separate three calibration and verification floods for the

summer rainfall floods.

So this is rather unusual. In most places in the country, they're either, you know, I mean, there's just really one type of flood that dominate as the annual flood, but here, there were two separate types and we really couldn't tell which one was controlling. So we did three calibration and verification floods on each one.

All right, next slide. So the summary of results, we did review the previous PMF studies that had been done from the 1980's, and one thing that stood out to me was the importance of snowmelt. It highlighted the importance of snowmelt.

Data acquisition was quite extensive, especially for developing the PMP. All major storms of record in the region were initially considered. We did do the six floods for calibration and verification and analyzed snowpack data for the spring floods.

We did a flood frequency analysis that helped us to determine where we were likely to get the maximum floods. We did do field visits. One of the field visits was in -- on May 29th, 2013, with the Board of Consultants,

and that was actually quite a coincidence, in that on, you know, just a couple of days later, literally, there was a near maximum flood of record on the Susitna River, and the unusual thing about that was that it was essentially a sunny-day flood, and that is, you know, there was really no rain that contributed in any significant way, and that is something that the Board of Consultants took note of and resulted in a request from the Board for analyzing that very condition.

All right, next slide. So for our flood model, what we selected was HEC-1 Flood Hydrograph Package. That is one of the models that FERC recommends for this purpose. It includes the energy budget snowmelt method, which is the best available method, and we do have a lot of experience in using the model.

The watershed was broken down into 29 sub-basins to Watana Dam and an additional five sub-basins to Gold Creek, so that we could use the Gold Creek gauging data for calibration and verification. The coincident conditions with the PMF, the snowpack, what we do with that is we have various pieces. One piece is the 100-year snowpack combined with the



seasonal PMP.

The second case is the probable maximum snowpack and the 100-year rainfall, and the third case was actually brought up by the Board Consultants, kind of related to our field visit was -- which was a probable maximum snowpack plus the maximum temperatures, which occur on a sunny day with no rain, and then the PMF is the maximum of those conditions.

Next slide. So the site-specific PMP development was really required on this study. For most areas of the United States, there is standardized information available from the National Weather Service, and so a site-specific PMP would be optional and not required, but in our case, it was required because there's inadequate information available from the National Weather Service.

The information that's available only covers a maximum of 400 square miles and our -- the drainage area at the dam is over 5,000 square miles, so that's far short, and a 24-hour duration, and for a watershed this big, you really need a duration longer than that.

So a storm search was conducted. It was whittled down to nine storms that were fully analyzed to determine the PMP. The storm that came up to be -- actually, the controlling maximum was August 1967 Fairbanks storm. The actual values for the PMP, expressed as average over the basin to Watana Dam, 1.78 inches for six hours, 4.4. inches for 24 hours 7.19 inches for 72 hours, that's the normal period used for PMP in many places, and 10.0 inches for nine days.

In addition to developing the maximum rainfall values, it was necessary to develop concurrent meteorologic data, that is temperature, wind speed and dew point, and the reason is, is that information goes into the snowmelt determinations.

All right, next slide. So the summary of results is that we looked at various cases, temporal variations of the PMP, seasonal variations of the PMF, and when we did sensitivity studies and the way the results came out was, the peak inflow at Watana Dam was 310,000 cfs. The reservoir routing showed a peak reservoir elevation of 2,064.5 and a peak outflow of 282,000 cfs. Freeboard was -- we did a freeboard analysis and the

freeboard available for the flood routing was adequate in all cases.

There was an April 2nd through the 4th, 2014 meeting of the Board of Consultants where they basically concurred with the methods and results, but they did ask for sun-on-snow PMF, which in my experience, it's almost an oxymoron, you know, a rain-free PMF, but it was requested. There was a basis for it and so we did it, and it turned out to be not controlling. So reporting, there is a final draft report that was issued in May 2014, and it is a complete study.

All right, next. So I always like to include this graph as, you know, the final results of the studies where here, we see -- the green line is the PMF inflow hydrograph -- or I'm sorry, the blue line is the PMF inflow hydrograph. The red line is the outflow in cfs, and the green line is the reservoir elevation, and so this shows the period of routing. It goes for about two weeks and it shows the variation of elevation and inflow.

All right, next slide. So the current status and steps to complete the study, the PMF study is now complete, subject to inclusion of any additional comments from the DOC or others, which would then be

addressed in the USR, so -- and that PMF study is included in Part C in its entirety.

MR. GILBERT: Right, thanks, John.

MR. HAAPALA: You're welcome.

MR. GILBERT: So we'll see if there's questions or ideas. So this is a study that is complete. All the methods were undertaken and it is available now and the Board of Consultants has it also. So it's one of these, that you know, perhaps there's some comments or this is a good chance to do a check-in on it, if anybody has anything at this point. Anybody on the phone have any questions or comments for John?

MR. HIGMAN: Yeah (affirmative), this is Bretwood Higman. I had a couple of questions. One -- the first, I was just wondering how climate change has worked into this and what sorts of effects different climate scenarios have?

MR. HAAPALA: All right, I would like to turn that over to Bill Kappel. Bill said that he would be calling in. Bill, are you there?

MR. KAPPEL: Yeah (affirmative), I'm here. Yeah (affirmative),

I'm on the line, you know. Yeah (affirmative), so climate change was considered in the development of the PMP values. It's addressed by several methods, including the storm list that we used to drive the PMP storm-based approach.

It considers sole events that extend through the entire period of record from the late 1800's through 2013, and so any climate variations that have occurred over that 100-year plus period of record are inherently capture in the storm database already.

Then further, those storms are maximized to reach a limit of a maximum amount of rainfall they could have produced had all the climate and weather scenarios been perfect meteorologically when they occurred. Then, those storms are combined into one PMP design storm, and so what you're doing there is putting the umbrella, so to speak, on the upper limit of the rainfall that would capture any changes in the rainfall production mechanism that could occur at the site during the useful lifetime of the values underneath all of that scenario already, and so we follow the same guideline as the World Geological Organization PMP Manual -- or Manual

for PMP Development and the National Weather Service

Hydrometeorological reports on PMP of making no adjustments for climate change, assuming that any adjustments that would need to be incurred are already captured in the max (indiscernible - interference with speaker-phone) in PMP developed data.

MR. GILBERT: Okay, thank you.

MR. HAAPALA: I -- I -- thank you.

MR. HIGMAN: (Indiscernible - speaking simultaneously).

MR. GILBERT: Yeah (affirmative), go for it.

MR. HAAPALA: I hear a little echo there now, but Bill Kappel is with Applied Weather Associates. Applied Weather Associates were the ones that derived the PMP.

MR. HIGMAN: My other question concerns the reservoir tsunami, and I'm not -- this might kind of overlap both the last two presentations. It's not uncommon to have slope failures that are often related to reservoir filling that can displace water and generate a wave in the reservoir, and so it's not really quite a probable maximum flood thing, although you can

imagine this being combined with a period of severe rainfall when the water level was higher than usual, and so I'm curious how -- it seems like somewhere in these studies that should be modeled.

Ideally, in addition to displacement by landslides, there should be tectonic tilting or offset of the reservoir itself that could generate waves, as well, and as far as my review, I wasn't able to find any reference to that. I'm curious what you guys think.

MR. KAPPEL: All right, the -- I guess you're talking about literally a landslide that would go directly into the reservoir and then displace water that would potentially over top the dam, is that what you're thinking of?

MR. HIGMAN: Right, either a landslide -- another way, that you know, you could generate a wave within a reservoir, a large wave like that would be direct tilting of the reservoir due to an earthquake or offset, for instance, if a portion of the reservoir was lifted, relative to the rest of the reservoir during an earthquake. So those are other scenarios, and the reason I see this (indiscernible - interference with speaker-phone) in the whole probable maximum flood discussion is, that you know, that would

presumably, you know, have the potential of getting a wave that then, if the water level is already high, particularly, it might overtop the dam, and you know, I assume there are engineering considerations, it's not really my area, but I assume there are engineering considerations at that point.

MR. CAREY: Okay, and this is Bryan Carey with AEA. I'm just -- the Risk for Slope Stability Study, which looks at, from the standpoint of the reservoir rim and if there was to be sloughing and create a wave, that is all under the geology and soils study, and so, at least, John, from the standpoint of evaluating what the probable maximum flood is, that would not be under this study.

MR. KAPPEL: No, actually, there is pretty specific guidelines from FERC on what goes into a probable maximum flood study and that sort of a landslide topic that you're talking about is not part of the scope in probable maximum flood studies.

MR. HIGMAN: Is there a way that such a reservoir tsunami would be modeled somewhere in the array of studies leading up to the engineering of the dam?



MR. CAREY: This is Bryan, and yes, it is being modeled, in terms of -- from the standpoint of we need to be looking at if there's any type of overtopping event, which is from the standpoint of engineering of what type of an event it could be, in terms of the size of the wave, and we also look at say, wind-driven waves, if you've got a full reservoir, and so as part of the engineering, we do look at what the effects could be in terms of overtopping and how that can be, I guess I'll say mitigated or taken care of, but the reservoir slope stability area will tell us more what the probability or possibility is of having a slope failure that could generate some type of wave.

MR. HIGMAN: That makes sense and it does seem that at some point, in order to really understand the implications of any slope failures that do seem possible, and also to understand the implications of any changes in the reservoir geometry during an earthquake, so you know, direct lifting of the reservoir floor or whatever, then there needs to be, you know, a shallow water wave model run for the reservoir volume and that's very different than looking at, for instance, wind-driven waves, longer

period waves, you know, they behave differently, they -- and of course, they have a potential to produce a much more sustained flow over the dam, and one thing that's come up with other reservoirs, including Grand Coulee and Three Gorges in recent years, is damage and death in the reservoir area. So this is something that doesn't impact the dam, but especially, these are -- the cases I know of are landslides -- landslides that went into the reservoir and generated a wave and then people died either on the shore or on boats on the reservoir, you know, that's secondary to dam engineering, presumably, but it seems like it should be addressed at some point in the studies.

MR. CAREY: Okay, yes, it will be addressed and from the standpoint, I also -- the -- interested, in terms of reading your comments, if you file any comments, in terms of written comments in regard to some of these other instances, such as Grand Coulee and such.

MR. HIGMAN: Sure, thanks.

MS. THOMAS: This is Cassie, and I'm wondering if it hasn't actually been -- the word hasn't been mentioned, but I was also

(indiscernible - interference with speaker-phone) for seiches, potential seiches, where we have a very long, narrow reservoir that could be subject, both to wind and seismic-induced seiches?

UNIDENTIFIED SPEAKER: Yeah (affirmative), that definitely -- that should be in that list, too, thanks.

UNIDENTIFIED SPEAKER: This is (indiscernible - speaking simultaneously).

MR. HAAPALA: This is John Haapala. I would comment that freeboard analysis was a part of our study and wind freeboard, wind from - - or wave run-up from wind is a part of the analysis, and what we did use was just for -- it was a 100-mile-an-hour wind, but the normal pool and it - - the waves were not overtop the dam for that. So wave generation from winds was a part of the study, but not things like landslides.

MS. THOMAS: But did that wind modeling use the (indiscernible - with speaker-phone) of a seiche due to the natural resonance of the reservoir, because those standing waves can be much higher than the (indiscernible - interference with speaker-phone) wind-driven waves.

MR. HAAPALA: Seiche, if I understand you correctly, that was not a part of it. We used the standard wind generated waves.

MS. THOMAS: Yeah (affirmative), I, you know, I think some of what we're talking about here is a seiche that forms that are under -- underwater or slope-slide, you know, slope failure or the seismicity or wind that just happens with the natural resonance of the reservoir. So you know, it seems like that would be a good thing to model, on top of the regular wind-driven freeboard analysis.

MR. HAAPALA: Well, we do -- for wind-generated waves, we do use the critical longest fetch over the reservoir. I'm not -- and a part of determining the wave run-out, is determining the set-up. The set-up is a rise in the water level, you know, that essentially, a rise in the static water level due to wind.

If you're, you know, if I understand you correctly on resonance, you know, a sloshing back and forth, that is not accounted for here, and that's not considered and not normally considered.

MS. THOMAS: Well, it is for the analogy, you know, the example

of Grand Coulee, I mean, that is something that is considered in flood protection.

MR. HAAPALA: What is it that -- I'm not sure I understand. What is it that causes this condition?

MS. THOMAS: Well, you know what a seiche is, it's a fairly sustained wave in a contained system, basically, you know, the engineering example is not -- it's not hydraulic, but the bridge that collapsed in Washington, the bridge that happened to have the natural resonance that when the wind blew at a certain speed, perpendicular to the bridge, you've got a standing wave in the bridge and it tore itself apart, but things didn't happen, you know, water -- when a reservoir or a contained system, especially a long, narrow reservoir, you can get an energy but -- whether from wind or seismicity, that can set up a standing wave, a slosh, as you called it, or a seiche, as it's usually known, that can -- you can get a wave that has a very long period, that you know, is much, much higher than the fetch type wave that you would get just from the river mounding up from the wind.

MR. CAREY: Yeah (affirmative), and this is Bryan Carey at AEA, again. The first part, in terms of a lot of that sloshing in the reservoir, if it's -- we definitely are looking at the -- in terms of the slope stability there, again, because the sloughing could cause the wave and that's been looked at in other, I'll say projects up in Alaska in the past.

In regard to the natural frequency of the dam, which is -- what has been more looked at, I'll say Tacoma narrows or these other projects, as part of the engineering analysis, we do look at the natural frequency of the dam and we do look at earthquakes or seismic movements to see what the natural frequencies are and to design for it, and so at least, those events can be lasting for longer events than what -- than what the wind -- well, those ones are being looked at under the engineering area, but not under the PMF study.

MR. GILBERT: Okay, so that's some pretty good discussion there, and...

MR. WOOD: This is Mike Wood.

MR. GILBERT: Yeah (affirmative).

MR. WOOD: Can you hear me all right?

MR. GILBERT: Go ahead, Mike, yeah (affirmative).

MR. WOOD: This -- yeah (affirmative), this is Mike Wood. I just -  
- one comment, I liked what I heard about this, being able to distinguish  
between rain events and sun events on the -- for flooding on the river and  
I'm glad you were there to witness last, you know, I mean 2013, what  
happened in May.

I suspect a lot of this conversation is about above the reservoir site,  
but since flooding does define the river below the dam site, both habitat,  
the fish, and the characteristics of the river, I'm glad to hear you talk about  
the sun events and the rain events. Did you take into consideration the ice-  
jamming events that also create a huge amount of flooding, and that  
doesn't have anything to really do with adding more water to the system,  
but the creation of ice jamming up and flooding huge areas of ground,  
we'll see that in the next month and we'll also see it in the springtime, as  
well, and so I guess, was ice considered as a factor in flooding events?

MR. HAAPALA: Our -- the limits for the PMF study, the

downstream limits of our routing was at the dam. You may be talking about areas downstream of the dam. Our concern was safety of the dam and so that is the area that we focused on. So I mean, the only -- the only real ice considerations were as they would relate to melting and contributing water to the floods.

MR. WOOD: Okay, thank you.

MR. DYOK: Mike, this is Wayne Dyok here. I think the real answer to your question lies with the ice studies that are being done.

MR. WOOD: Okay. Speaking about that, I'm just wondering if, you know, we consider ice just melting on the reservoir calmly, but in relation to wind and ice, if the ice was pushed up and broke up and jammed against the dam and the areas in which would spillway -- clog the spillways, is that a scenario that could potentially, ice-jamming in the spillways?

MR. KAPPEL: That's getting a little off the topic here. There are -- I know there are feeders on the spillway. I don't know. Bryan, are you more familiar with that?

MR. CAREY: I guess I'll just say is -- the engineering for the dam



is still ongoing at this time and so we'll have -- we're -- we have not put -- addressed that, really, and that will still take a while before we figure out exactly the configuration of the spillway and what we do in regard to the possibility of ice on the spillway.

MR. DYOK: But Mike, that's a good question and thank you for raising it.

MR. WOOD: Thank you. Thank you.

MR. GILBERT: Okay, anything else for the PMF study?

MR. DYOK: Just maybe while we have a second, John, could you compare the PMF, just for everybody's edification, what we found out versus what they did in the '80's, how they compare?

MR. HAAPALA: Yes, there was, actually, a couple of studies done in the 1980's, I think one in, actually, 1980, and one in 1982 or so, and they did come up with peak flows. Both studies were actually quite similar, in terms of peak flows, quite similar to ours. You know, that one study was 325,000 peak inflow and the other study was, I think, essentially the same as ours. So the results were actually quite similar, and you know,

and actually, you know, in any independent studies, I mean, you're rarely going to come up with the same numbers, really, but the similarities were - - and the results were, to me, were quite striking.

MR. GILBERT: Verification. Okay, well, I -- because Mike Bruen, he -- we have the next study, I'd like to try to keep going, if we can, because he's in Dubai right now, I mean, he -- and he's a long way away, so if we could keep going and then take the break, if that works for everybody? So Mike Bruen, can you...

(Coughing)

MR. BRUEN: Yes, I'm sorry. I'm here.

#### **SITE-SPECIFIC SEISMIC HAZARD STUDY (Section 16.6)**

MR. GILBERT: Okay, we're going to start in on the Site-Specific Seismic Hazard Study. We just put it up.

MR. BRUEN: Okay, what I might offer to the group is, I was listening in on the conversations relative to landslides and the effects of a potential wave and that sort of thing, and then Bryan Carey had indicated under the preliminary reservoir slope stability evaluation, that was one of

the areas that we were looking at and what we can say is, relative to reservoir rim evaluation, and we looked at several modes of failure of erosion that can occur along the rim, plus the reservoir's there with a draw-down and all of that, that's occurring during operation, and what we see is, that you know, we're going to get very shallow flows that are -- which you can see now and they have occurred historically in the past, which will continue to occur, and there's not really a situation or an identification of any large, and by -- I mean, large, I mean, very sizeable slope failures that were deep-seated and that could occur, and on top of that, when you look at where the reservoir comes in contact with the topography along the rim in the lower portions of that, it's really up on the upper break in slope, if you will, like it's starting to flatten out.

You don't have crests next to the reservoir that could be undercut and fail, and cause these deep-seated failures that can generate a wave. So based on what we've seen so far, there's no geomorphic evidence for that.

So with that, I can move onto discussing the topics. So with the objectives, the key here is talking about objectives as -- we're really

looking at identifying the seismic sources and -- which may generate future earthquakes that occur, and based on that information, is understanding -- is developing an estimate of the ground motion at the proposed dam site, and that's the main objective of all of this, so that we can come up with proper -- evaluate safety, as well as come up with proper seismic design criteria.

Next. So to this date, the key elements of that, as I mentioned earlier in the earlier discussion on geology and soils, is that we have completed the preliminary seismic hazard analysis, which we updated based on new connected -- collected information that's ongoing for this study and we did do the preliminary reservoir triggered seismicity discussion, which I just talked about one element of that.

Next. With regard to variations, the key, really, here is we've done two things, variations, and that has been that we're in the process of acquiring new LiDAR imagery to augment the area of coverage that we had already in our evaluation. We are expecting that later this year.

Additionally, we did add a new tool that we used to evaluate and

measure shear wave velocities of the bedrock beneath the dam site, as well as at each of the seismic stations. This was not originally planned for.

Next. So we look at the results in the ISR, I mean, the key things that really come out of that, are that the (indiscernible - interference with speaker-phone) and the events are the strongest contributor to ground motions at the site are going to be the intraslab or the down-going slab, the Pacific's plate that's going beneath the crust beneath the dam site.

That's going to be the key, based on everything we've found to date, and from that, when you look at that seismic source from the preliminary sense, which we still, you know, going to evaluate further, what we come up with is the deterministic, which gives you a .53g, whereas probabilistic gives you a .66g at the dam site based on that 2,500 years. Point 53 is a function of a magnitude 7.5 earthquake.

So the other key piece that has come out of that, because now we're talking about that deep earthquake, if you will, well beneath the dam site, the other element of this has been looking at the surface structure. Those within the crust where we may have seen displacement, such as you see --

that we know that exist along the Denali fault way to the north.

Well, what we're looking at, we define a similar smaller tectonic feature is within the dam site area. What we're finding is that the features that we've identified based on lineament studies have been primarily based on erosion that has occurred, and to a lesser extent, the bedding of sedimentary structures of rock or the jointing, as opposed to whether being sedimentary or igneous and metamorphic rock, and it's more a function of that and it's not associated -- or appears to be associated with tectonic faults.

Next. So with the amount of information we've collected, the key thing that's been really enlightening to all of us has been the seismic monitoring events and being able to collect this information and over the period of time in a span of a year, we've seen on the order of 1,100, 1,200 earthquakes that occur, but they're all very small.

They occur from magnitude zero to the highest that we've recorded is a 4.0, which occurred in 2013, and that was that at a depth of 42 miles beneath the dam site, which is down in that down-going slab. It's not in

the crust, the upper crust that goes down to 30 kilometers. It's much deeper than that, and that occurred, you know, only nine miles from the site, but it was at such a great depth, that the magnitude four, you know, you really don't have a concern relative to that element, but it is an indication of the seismic source that you have at considerable depth, and with respect to our preliminary study on reservoir triggered seismicity, the key there is the magnitudes that we really think -- looking at are more on the order of 6.3 to 6.5, which is lower than what we came up with in the preliminary seismic hazard assessment, where we had the .53, based on the magnitude 7.5.

Next. So what we're finding from these results are that -- so a consistency with what the state of Alaska has been doing relative to their quaternary studies and looking at faults and folds within and earthquake within the Southcentral region in the Talkeetna area, and as they have not really picked up more, nor have we, at this stage.

There were no mapped quaternary faults within what we're calling the Talkeetna Block, which is the project area, relative project area, and

maybe a little bit broader than that, but in the general area of the dam site.

What we are seeing from the focal mechanism, which are evaluations of movement and relative stresses in the rock lower in the earth relative to these earthquakes, and this based on not the really small, but those few earthquakes we've seen in the magnitude four range, and you look at the crust, what you're really seeing is undergoing, almost a north/south oriented compression, which is consistent with the convergence of the Pacific plate going down beneath the crust in the North America plate.

Next. So taking the seismicity data, we did an annual report for 2013, and this shows the earthquake activity that's been recorded, both near surface and at depth in the area of the dam site, and the dam site, if you could highlight the dam site, if you look at the three lines in the center, yes, that's correct, so that gives you an idea, where the dam site -- you see the full length of the reservoir going to the right. That gives you an order of the scale of the -- what we're looking at, the Susitna River, and what we're seeing is those earthquakes that have occurred in the crust, are those



in red, whereas those at depth are in blue, okay, and so those are in the down-going slab and the red are in the crust, the upper 30 kilometers, if you will.

So when we look at that and go to the next slide and seeing that -- would you please go to the next slide and let me point out one other thing. If you look to the east, there's a relative lack of earthquake activity. So what we're seeing, as we go further to the northwest -- further to the northwest from the dam site, you're seeing more activity in that general area, which is going more toward Denali and Cantwell and that area.

Okay, next slide. So in taking a cross-section of that, where we're looking at the southeast, which is to the right of this cross-section, and to the left, which is the northwest, where we saw more of that activity, if you will, to the northwest, what we're seeing is the definition of what the crust boundary and the point boundary is beneath the dam site.

The dam site is shown a little left of center here and what you're seeing is the red earthquakes that indicate those earthquakes in the zero to four range, and you're seeing along that narrow corridor, in that band that

was shown in the plan view, gives you an example of where that -- those earthquakes occur, and what you see is that at 30 kilometers' depth, you get to the bottom of the crust, the upper crust that goes across Southcentral Alaska, and that the down-going slab that's coming from the Pacific plate in the south, from Prince William Sound, is diving below our -- the crust at the dam site, and it's at quite a considerable depth, and you see the earthquakes that have occurred along that, it shows that earthquake, generally, right beneath the dam site at a depth of 60 kilometers, which is quite significant.

Further, taking that information that we collected, we've been able to plot that in the lower right in a sense of showing where the dam site is shown in that, and this is just a projection of that down-going slab and how it's more like -- a good analogy would be like a garage door, where you get a break in these panels, it's broken into pieces, if you will, it's not one solid coherent piece and so you have these breaks, and that's what that depiction gives, is that it's like a garage door going down, if you will.

Next slide. So at this point in the -- with the ISR, there are no

modifications planned to complete the study plan going forward. Next.

When we look at the steps to complete the study, the key to this is going to be the field assessment of any crustal seismic sources, the lineament, in the dam site area, which was not done previously, now that we have access -- and then looking at, if we do find any elements, does it have the potential of being a fault that could have displacement and activity, and so that's the continue of evaluation that we're doing now in 2014.

The key is going to be, is to characterize anything that could be a potential fault within the dam site area in the crust and to complete -- going forward, completing, after we've completed that assessment, to take that information and all the data we've collected from the seismic monitoring, which will be valuable in completing the site-specific seismic hazard assessment, the deterministic and probabilistic assessment going forward, and that will enable us to evaluate the risks to the structure, as well as coming up with seismic design criteria.

Next. So the key that's been brought up, is to identify and characterize the seismic sources at the surface and determine whether a

fault may be encountered and to further go through these types of (indiscernible - interference with speaker-phone). Thank you.

MR. GILBERT: Okay, that was a great overview of a complex study. So now is the chance for everybody else to ask questions, modifications.

MR. HIGMAN: This is Bretwood Higman. I have a couple of questions. I -- it seems like -- actually, it's a really impressive study, in terms of characterizing surface -- potential surface ruptures and that's really good.

There are a lot of instances with damaging recent quakes that -- where there wasn't an obvious surface rupture and there are, you know, there are some upper crust earthquakes in here. So there certainly seems like there's a potential for that, and I -- as I understand it, I think that is covered, but I was wondering if you could clarify how you deal with earthquakes that may not produce a prominent surface rupture?

MR. BRUEN: All right, well, there's -- go ahead.

MS. MCGREGOR: Somebody has to put their phone. We're

getting feedback.

MR. GILBERT: Go ahead, Mike.

MR. BRUEN: Okay, so yes, there's always a concern, and this is where we get into evaluating the age of the surface materials, the quaternary materials from the glacial ages that are going to be indicators if we have fault displacements within the recent past, and also looking at, from the -- you see so much more with the LiDAR that was not available in the past and many of these studies done related to dams or for other seismic hazard assessments.

The minutia that we can pull out of that and really identify features, has really enhanced considerably, and so the ability to basically have a feature that would be undetected, becomes very difficult, particularly with the age of the quaternary sediments, we have in order to be able to determine if there is a feature there, and the things that we can pick up now with the LiDAR, which was not available, you know, in the earlier study. So I think we enhanced that.

Secondly, we also look at, as we go out to the periphery of the

project area, we start to get out to, as far away as the Denali fault or the Castle Mountain fault and within the context and the structure that we see between there, we get an impression of what is the relative stress that we're seeing? What kinds of features and orientations would they do? What kind of minimum length would it have to have in order to generate something of any significance, and really, what we're finding at this point, unless it's really at the dam site, it's not going to have an impact on it and the features are going to be fairly short in length and whether they exist at all, and we're really back to looking at the key seismic source for this project is really at significant depth to the dam site. Yes, it can generate an earthquake of, you know, 7.5 order of magnitude, but it's at a considerable depth and we -- so now, we're really down to, do we have any features right near the dam site, which is our evaluation this summer, which we're continuing taking the data, as we got out of the field just a month ago, so evaluation any of those linears that were identified by the LiDAR, and as we go through that in dates and materials, and we'll look at it, and we'll have a better indication of the complete data effort.

MR. HIGMAN: Thank you. You know, this seems like this work is primarily focused on shaking, which obviously, seems like a really important engineering constraint, I noticed in the Board of Consultants' comments, there was -- they -- I think it's meeting two, and then (indiscernible - interference with speaker-phone) in meeting four, they bring up the possibility of even a very small offset on some sheer feature that is, you know, intersects the accommodation of the dam itself, and my read of what they were saying is basically, you know, the engineering of a concrete dam for shaking is well understood, and you know, it's important to get it right, but it's something that we can do, but that even a very small offset of the foundation, so you have different parts of the dam moving in different directions, would be very difficult to engineer for, and also very difficult to detect in -- with the source of studies you were doing, looking at regional tectonic, and I know in the first -- the first presentation today, there was mention of some drilling and such done -- being done at the dam site, but overall, it's -- from what I can see in the ISR and such, there doesn't seem to be much emphasis on this sort of study, looking at possible

sheer under the foundation, although it is something that's strongly emphasized by the Board of Consultants' meeting.

MR. BRUEN: With regard to your comment, yes, there wasn't a lot of emphasis in the past because we didn't have the site access and so it wasn't until this year that within the dam site area that we had access to evaluate some of the linears and previously mapped fractures of -- and geologic features, i.e., fracture zone, sheer zone, alteration zones, to evaluate it in situ.

What we are doing, though, is we've spent a considerable effort this year to doing geologic mapping of those features, as well as drilling across those features and doing in situ testing across those features to evaluate is there the potential for a fault at the dam site and also, if so, would there be the potential for future movement along that, but that is, indeed, what we are looking at currently and evaluating.

MR. HIGMAN: So my last question was going back to the reservoir tsunamis and I'm curious if you, in your tectonic studies, if you have a sense of what the maximum vertical offset could be on any feature



crossing -- so the maximum vertical surface offset on any feature, any fault crossing the reservoir itself? Is there -- I mean, if this area is generally shortening, it seems like the possibility of some sort of a thrust fault in there, possibly one that wasn't identified, exists, anyway.

MR. BRUEN: Yeah (affirmative), so at this point in time, we've not been able to identify any potential active fault at the dam site or I should say, in the dam site area, and as we're continuing, basically, that effort has not just been at the dam site, it's been all the way out into the lower reservoir and that's what we'll continue to do, but we've not identified a fault of -- with recent movement.

MR. HIGMAN: I mean, it would include things like blind thrusts, that you know, that would not necessarily leave a surface expression beyond, you know, possibly deformed river terraces or something like that, and so I would suggest that sort of study, as well. It's not just looking at lineations, but looking at geomorphic features that might provide some sense of paleohorizontal and -- so you might be able to see tilting and distributed offset on features like that, and as kind of a test of that, you can

check and see if you're picking up isostatic shifts and if you're doing that, then you're probably -- then you do have enough geomorphic evidence of past -- of the past surface that you might well detect a -- detect buried faults.

If you can't see isostatic tilting, then that would lead me to think that maybe the evidence isn't there, and you have to go to a more speculative approach.

MR. BRUEN: Yes. No, you're right, and that's part of the effort that we're undertaking this year, as we got the -- because now, you're really talking about, is there something within proximity of the dam site that might fall into these categories and looking at the stress regimes, the current and the past are coming into play, as far as, is there something that we could be not seeing as the, you know, not being exposed, that sort of thing.

MR. HIGMAN: Thank you.

MR. GILBERT: Okay, are there any other comments, questions for Mike, while we have him?

MS. WOLFF: I had two quick questions. This is Whitney with the Talkeetna Community Council. I was curious about the nexus between this study with the site-specific seismic hazards and your first study, the geologic characterization study, and perhaps I should have asked this then, but I wondered about that point you made about, you know, that it appears that the geologic features previously mapped by the other was a conservative interpretation and your recent investigations indicated that the features were less significant and narrower. I just wondered if that -- those characterizations are used in this site-specific hazard and whether you're using the old data or your new data that you got now. Could you just talk about the nexus between those two?

MR. BRUEN: Basically, up until about a year ago, with not having the access, we were using the interpretations at this time -- at that time, relative to what has been interpreted from the '80's. It's only through the recent effort in getting back out onto the dam site itself. In looking at the geology and drilling across certain features and the mapping efforts, revealing the lineaments, actually doing the groundtruthing evaluations of

those, were we able to see that what some of the gullies that these features were tied to in the abutments and the slopes adjacent to the dam or the river -- is that we're seeing a lot of it being a function of the fracturing and the freeze/thaw efforts over the years that have caused these gully forms, if you will.

So in the past, it looks and appears to be that what the interpretation was of these features could be the full width of these gullies, when indeed, in fact, a lot of that is enhanced by freeze/thaw mechanism that has occurred through the years and may be more, excuse me, a function of the fracturing of the freeze/thaw deterioration. Excuse me.

MS. WOLFF: I see. So these aren't necessarily -- these features are more surface features and not necessarily indications of faults or such?

MR. BRUEN: That's correct.

MS. WOLFF: Okay, and then could you just quantify that a little bit, this is the '80s studies that you have previously used and your slide had said the updated plan. So would we be seeing that -- will we need to wait until after the 2015 season or do you plan to put out that updated

information sooner than that?

MR. BRUEN: Excuse me. No, this would be in 2015. We're just coming out of the field. We're just basically beginning to look at the data in more depth, beginning testing. We're going to be doing some age dating, just from the materials, to have a better understanding of the chronology of what we're seeing at the site, the material, and so that's going to go on for a number of months into early next year, before we begin to craft some sort of document, which will ultimately be in the USR.

MS. WOLFF: Okay, and that would have sort of an updated -- your updated analysis of those features?

MR. BRUEN: That's correct.

MS. WOLFF: Okay, thanks.

MR. BRUEN: You're welcome.

MS. WOLFF: I want to credit you, too, it's a pretty radical work environment. I was able to get a sight of your project site, your drill site there, and I give you a lot of credit.

MR. BRUEN: Thank you.

MS. WOLFF: Thanks, that's all I had.

MR. GILBERT: Thanks, Whitney. Any other -- anybody else on the phone have any questions for Mike about the seismicity? Okay, anything, Dara? Okay, good. Well, that's great. Thanks a lot, Mike and John, I think that will finish our physical sciences. I think we should take a break here for -- let's try to do it for 15 minutes, and then we're going to completely change and go to subsistence, if that sounds good to everybody, because I think we have a new group. That will be a good transition. So we'll put you guys on the phone on mute, but we'll start up again here at quarter 'til...

UNIDENTIFIED SPEAKER: (Indiscernible - interference with speaker-phone).

MR. GILBERT: ...quarter 'til 11:00, okay.

10:28:30

(Off record)

(On record)

10:44:58

## **SUBSISTENCE RESOURCES (Study 14.5)**

MR. GILBERT: We've got a few more people here, too, but we're going to take a turn here to talk about subsistence now. So we have Tracy Krauthoefer from HDR, who will lead us through an overview.

MS. KRAUTHOEFER: All right, thank you, Kirby. So the Subsistence study objectives -- I'm not going to read that whole slide. You can read it, but basically, the purpose of the Subsistence Resources study is to demonstrate whether, and if so, the extent to which communities' harvest and use of subsistence resources within or near the project area, use project area lands to access other lands for subsistence harvest and use, and/or harvest and use resources that migrate through the project area and are later harvested in other areas.

In addition to those objectives, this study is designed to provide the necessary information needed to support the ANLCA 810 evaluations, that federal agencies would need to do, and then evaluate just project development plans to identify likely sources of impacts on identified subsistence resources or uses.

There are actually five study components. The four study components that are discussed in the ISR are the compilation of existing data, the household harvest surveys, the household harvest surveys in state-designative nonsubsistence areas, traditional and local knowledge interviews, and then lastly, 10-year mapping interviews. The mapping interviews are not discussed in the ISR because no work has been completed on that study component yet.

To date, there has only been one variance to the study, and that is the addition of the community of Knik to the selected communities for traditional and local knowledge workshops.

So to summarize the results that have already been published in the ISR, the study team did review and compile existing data for all 37 identified study communities. The Alaska Department of Fish and Game, who is a member of the study team, their Division of Subsistence, completed household harvest surveys in 10 study communities and conducted a total of 28 traditional and local knowledge workshops in seven communities. Those TLK workshops were actually done by the



other study research group, and that is Stephen R. Braund and Associates.

Pertinent data from the TLK workshops has been shared with study teams for cultural resources and health impact assessment studies, so that they can follow up individually with respondents that had particular knowledge or were interested in talking more about those subjects, and then overall, we're seeing that the combination of study methods and the resulting data are creating a comprehensive baseline of harvest and use information for the watershed and the project area.

So the summary of results that we've received since the publication of the ISR, household harvest surveys completed by Fish and Game in a number of communities in February and March of 2014. Those communities are Copperville, Glennallen, Gulkana, Lake Louise, Mendeltna, Nabesna, Nelchina, Paxson, and my apologies to the community of Paxson for spelling the name of their community wrong, Tazlina, Tolsona, and Tonsina.

Then AEA proposed modifications to the study in the ISR, again, it's just that one variance of the inclusion of Knik to the TLK workshop list

and the TLK workshops have not been completed yet with Chickaloon or Knik. We intend to implement that in 2015.

So what we have left to do on this study still, is those two workshops with the communities of Knik and Chickaloon, and then the 10-year mapping interview component, which I referred to earlier, and right now, I believe eight identified -- or eight communities have been identified for the 10-year mapping interviews, but those are set in stone. That was just something that was proposed in the study plan, but within the study plan, we said it could be revised, and those eight communities are Cantwell, Chase, Healy, Talkeetna, Lake Louise, McKinley park, Trapper Creek, and Petersville, so yeah (affirmative).

MR. KROTO: I assume that what the 10-year mapping interviews is talking about, is that just going out to the communities to see where they're harvesting?

MS. KRAUTHOEFER: Yeah (affirmative), so it's actually a very intensive interview process. The researcher -- and it would be performed by Stephen Braund and Associates. They go out and they talk with tribal

governments, local community leaders, to understand who the high harvesters are and the people who have lived in the area that have been harvesting the longest, and then they sit down and they have, you know, one or two-day interviews with those folks and they intensively map, like you know, the resources that they harvest, where they've been harvesting for the last 10 years for each of those resources and then, I think they also kind of work in reverse and point to specific areas and say, "Have you harvested anything in this area within the last 10 years," as well, so...

MR. KROTO: If I was in that community, I wouldn't be giving away my fishing secrets.

MS. KRAUTHOEFER: Well, and that information doesn't get published at that very point-specific level.

MS. MCGREGOR: It maintains -- it's confidential.

MS. KRAUTHOEFER: Yeah (affirmative).

MR. KROTO: Okay.

MS. MCGREGOR: We don't release that information. So just for the...

MS. KRAUTHOEFER: So we'll have...

MS. MCGREGOR: ...court reporter's benefit, that was David Kroto, who was talking, from Tyonek Native Corporation.

MR. GILBERT: Yeah (affirmative), it helps if you -- for people on the phone, too, if you could say who you are.

MR. KROTO: Okay, sorry, I didn't realize we were on the phone, too.

MS. MCGREGOR: And also, when she's done with her report, we'll have lots of time to ask questions, too, so...

MR. KROTO: Okay.

MR. GILBERT: Yeah (affirmative), so...

MS. NOVAK: This is Suzanne Novak from FERC. I just entered the conference here. Are we just starting on the subsistence or has it been going on a while?

MR. GILBERT: No, we -- Tracy from HDR just gave an overview - - the presentation that's been on the website. So she just ran through it, and so we're just starting to open it up for discussion and questions about

the study results and any modifications or what's left to be completed. Is there...

MS. NOVAK: Okay, great, thanks,

MR. GILBERT: Is there something you wanted to look at, I mean, go over or -- we'd be glad to take the time.

MS. NOVAK: Well, I, you know, I've already looked at the presentation. I guess there were some communities that don't have any information yet, and you were going to hold off on, I guess it was the mapping interviews until you had some of that data filled in, but you were waiting on the Fish and Game wildlife harvest ticket data to fill in the gaps. I guess I was going to ask how close are you to doing that or am I jumping the gun here?

MS. KRAUTHOEFER: Right, so -- no, I don't think you're -- because we're basically on this slide.

MR. GILBERT: Yeah (affirmative).

MS. KRAUTHOEFER: So I don't think you're jumping the gun.

MS. NOVAK: Okay.

MS. KRAUTHOEFER: So yeah (affirmative), the wildlife harvest ticket database information is part of the big overall data compilation for all 37 communities and so that component, I believe is going to be incorporated in 2015 into the data compilation, now that we have a couple of years of household survey data under our belts and have had the chance to sort of exhaustively go through everything else.

It did take a while for us to get access to the database, but we do have the access now and so once...

MS. NOVAK: Great, okay.

MS. KRAUTHOEFER: I think when our study year begins in 2015, we will be incorporating that into the analysis.

MS. NOVAK: Okay, great, thanks.

MR. GILBERT: Okay, yeah (affirmative), good question. So other questions for Tracy and her team? Dara, sure.

MS. GLASS: This is Dara Glass from CIRI. So -- and I apologize, I have not had time to look at your stuff, so you're free to say, "You need to look at it." So what about our village groups who are in the area,

Alexander Creek, Caswell, Gold Creek, Montana Creek, are those -- have those entities -- has anyone been contacted? Are you -- are those included?

MS. KRAUTHOEFER: So correct me if I'm wrong, but Alexander was part of the Susitna household surveys.

MR. HOLEN: Yeah (affirmative). This is David Holen with the Division of Subsistence at Fish and Game. We conducted those surveys. We did -- yeah (affirmative), we did contact people in Alexander Creek, and those were part of the first year of the study. So this was a two-year study that the first year was for the Susitna drainage and the second year for the Copper.

MS. KRAUTHOEFER: Okay.

MR. HOLEN: And so Alexander Creek was included as part of the Alexander/Susitna study. As far as Montana Creek, that's part of the -- I believe it's part of the Susitna North census designated place and that wasn't included. We did Talkeetna, Trapper Creek, and Chase, which are three communities in that area.

MS. KRAUTHOEFER: We do have the 1980's data, though, that's been incorporated into the data compilation analysis and the same thing for Gold Creek, that's also just been incorporated into the data compilation. That's how it's been (indiscernible - speaking simultaneously)...

MS. GLASS: Okay, so you have not spoken directly with anyone who are -- anyone who is a member of those village groups?

MS. KRAUTHOEFER: Well, so correct me if I'm -- and forgive my ignorance.

MS. GLASS: No, that's all right.

MS. KRAUTHOEFER: There are village corporations there, but are there federally recognized tribes associated with those groups?

MS. GLASS: That would be CITC. It would be CIRI.

MS. KRAUTHOEFER: Okay.

MS. GLASS: And so...

MS. KRAUTHOEFER: So we have primarily worked with the federally recognized tribes.

MS. GLASS: Okay, so that kind of leads to the next discussion, and



that is, in NEPA, the ANCSA corporations, meaning the regional corporations and their village corporations are also considered tribes and so I encourage you to make sure that you talk with someone from each of those entities, because -- and I can give you contact information or we can have a meeting at the building or whatever, but it's -- it would behoove you to do that, so that you take care of things up front and don't have to do things on the back end.

MS. MCGREGOR: Can I ask for some clarification about that, because there's many aspects to this study. There's different types of surveys going on and targeting different groups. Are we referring to the household harvest surveys that Fish and Game conducts?

MS. GLASS: No.

MS. MCGREGOR: So which...

MS. GLASS: We're talking to subsistence. I'm talking about subsistence.

MS. KRAUTHOEFER: Well, so we don't have like a big outreach effort as part of this study to contact, you know, all of the tribes and

corporations and local governments in all of the different study communities.

MS. GLASS: Right.

MS. KRAUTHOERFER: But that was never part of the study. So I don't know...

MS. MCGREGOR: It's census-based, based on the people that inhabit these areas.

MS. GLASS: Right, and so those -- there -- those people do live -- well, those people, it makes it sounds awful. We do have a lot of members that live up in that area and so maybe we can just, and I'm just brainstorming real quick, sorry, maybe what we could do is devise an email and we could send it out to those specific shareholders and see if they respond and see if they have even -- if they've -- if they have had the opportunity to participate in your survey or what have you.

I'm also trying, at the same time, to avoid political issues within the regional corporation of saying, "Hey, you guys did not protect us," and so I'm trying to accomplish at the same time, so...

MS. KRAUTHOEFER: I'm just going to defer to kind of AEA on answering or addressing that.

MS. MCGREGOR: We'll take it under consideration. I'm just confused, because from a study design perspective, I don't know how you would use that data. I mean you have an approach, a protocol...

MS. GLASS: Yeah (affirmative).

MS. MCGREGOR: ...for how you design your studies and it's consistent because it's what ADF&G does across the state.

MS. GLASS: Well, just think about it. I understand that, but -- and help me, if you can. So it's our job, as the regional corporation, to make sure that everybody is involved and the culture, just the way the culture is, we operate at a different pace and so I just -- I just want to make sure, because even though they may have received the surveys in the mail or people came to the door or whatever, they also may not understand what was being presented at the time and why these questions were being asked and so I just want to make sure that they're involved, because I know they do a lot of subsistence in the area and...

MR. DYOK: So Dara, this is Wayne Dyok with AEA. Is your issue really making sure that we do the -- it's not so much the study, really, but it's doing the consultation associated with it to inform folks and...

MS. GLASS: No.

MR. DYOK: ...make sure there's clarity here?

MS. GLASS: No.

MR. DYOK: So help us understand what you're trying to get out of this.

MS. GLASS: No, that's not -- it's not the government to government relations.

MR. DYOK: No, no, I'm not talking from a...

MS. GLASS: So no, no, I just want to make sure that they -- that their -- that their information is part of the data that is gathered, because I don't -- I don't want it to -- I don't want it to look like, "Nobody from there does subsistence anymore," when that's not the truth.

MR. DYOK: But help us understand, and maybe this is...

MS. GLASS: Does that make sense?

MR. DYOK: I'm a lay person here, in the sense of the study, and I'm not tracking how that information would be used in the study. So could you provide any insight on that, because...

MS. GLASS: Well, let's talk about Alexander Creek real quick. So Alexander Creek, the -- they -- the members of Alexander Creek talk about how they, in Western terms, hike to the Talkeetna mountains. They have a trail. They do all their subsistence in that area, and so -- and so it's that information that I just want to make sure is included, because it's important and because -- because the project affects, you know, all the way down to the river mouth, and so it -- but they go up the river into the mountains to do their hunting and -- because that's where the game is, and so I just want to make sure that -- and Montana Creek, you know, they go up the other side, and they go up from the south side and go into the mountains up there, and so I just want to make sure that information is included and not just based on licenses and subsistence permits, because...

MR. HOLEN: Do you want me to talk about it?

MS. KRAUTHOEFER: Yeah (affirmative), why don't you address

that, yeah (affirmative).

MR. HOLEN: So this is David Holen. Let me -- let me just describe a little bit of the consultation process, and then how the survey is actually implemented. If we work in a community where there's an organized tribal government, for example, Tyonek or Gulkana or any place in the Copper Basin, we consult with those community governments first, and we -- the survey has a couple of parts.

So we consult with those governments first. We get their approval to work in their community, and then we move forward. You know, as part of Fish and Game, we're social scientists. We don't just count fish or moose or -- we work with people. So we want their approval to work in their community, and that's only if there's an actually tribal government to work with in the area, and so -- or a city, you know, a community council. We also give information at community council meetings and so on and so forth.

So for example, in the case of Alexander Creek, we did that. We went out. We did a community scoping meeting. We explained what the

survey was. We have information that we hand out to people. We're very open about why we're doing the study, how it's conducted, and then we, in the case of Alexander Creek, we attempted to survey every household that lives in that area, within that census-designated place of Susitna/Alexander.

So we did that and the survey includes, you know, all resources are harvested within one year. We have demographics, economics. There's a health impact assessment component to that, and we're also looking at how changes over time, as well -- we also do key respondent interviews. So we get some more qualitative information that really explains the data that is being collected, because one year also doesn't explain harvest patterns that are going on over time.

So we attempt to try to tease out, you know, how is this year different than last year, for example. You know, you could have, for example, in 2012, we had a flood event in the Talkeetna/Trapper Creek area, which caused a real problem for people to get moose and that meant they had to go to all sorts of different areas to hunt, because they weren't

able to hunt locally. So that's an event and we try to explain why this year is different, for example.

So we do that, and then we also have the key respondent interviews and then we come back and we present the information to the communities and say, you know, "How does this look? Does this look correct? Is there anything missing," and then, you know, to get that more in depth time, Steve Braund and Associates also does these 10-year mappings, so that they provide a more in depth time sequence and they have the mapping.

We also collect map data, as well, and so we are collecting, you know, where people go within that one-year timeframe, how they're accessing that area, what kind of gear they're using while they're out there. You know, is it a rod and reel? Do they use a net? You know, do they get there on a snow machine? Was it a four-wheeler? Did they walk in? What months they're out there, for example, so -- and then we produce these maps that are at the community level, you know, we're not -- and we also don't publish certain information, like moose harvest locations. We're not trying to make a great hunting map for GMU 16 or something.



So you know, and -- so I guess that's how the consultation process works and so we try to -- but the, you know, the way that the state works, is we do our -- our sample is basically the census-designated place. So if, for example, people in Montana Creek, they would be part of Susitna North, which is that census-designated place, which includes the Parks Highway, you know, just south of Trapper Creek, part of...

MS. KRAUTHOEFER: Does it include Gold Creek?

MR. HOLEN: I am not sure if it includes Gold Creek or not. I don't believe so, because that would be -- there would be another census-designated place north of Trapper Creek, so...

MS. KRAUTHOEFER: Okay.

MR. HOLEN: But it does include that Montana Creek area and pretty much anything north of Willow, up into that area, you know, abutting Talkeetna on one side and Trapper Creek.

MS. KRAUTHOEFER: Okay.

MR. HOLEN: So that area has not been done. It was done in the '80's, though.

MS. KRAUTHOEFER: All right.

MR. HOLEN: Does that help?

MS. GLASS: So maybe it's something we can do on our end. All right, yeah (affirmative), I'll think about it.

MR. HOLEN: Okay.

MS. KRAUTHOEFER: And I mean, another thing to keep in mind is we're still refining, you know, who will be interviewed for the 10-year mapping interviews, so just keep that in mind.

MR. WINCHELL: Hi, this is Frank Winchell from FERC. I had a real quick question on the subsistence maps. Is there any possibility for feedback with individual members to look at these maps to kind of go over them to what you formulated?

MS. KRAUTHOEFER: Well, we won't -- we'll be -- we have confidentiality agreements with all of our respondents that we interview.

MR. WINCHELL: Okay.

MS. KRAUTHOEFER: If you're -- if you are interested in perhaps, maybe like, you know, a cultural resources follow-up, we can talk with the

respondent about that and maybe provide that information to the Cultural Resources study. I don't know, but no, we wouldn't be, necessarily, providing, you know, point-specific information for any given respondent and that respondent's identity, just due to the confidentiality agreements we have with respondents.

MR. WINCHELL: Okay.

MR. JANGALA: Hi, this is John Jangala from the BLM. I just wanted to bring up something, just to follow up for what Dara was talking about with the ANCSA village corporations. I don't know if everybody is aware, but back in August of 2012, DOI came out with a new policy for consultation with ANCSA corporations, including the village corporations, that basically would require any kind of departmental action that could effect ANCSA land, water, areas of resources to have some kind of consultation.

MS. MCGREGOR: Thanks for that, John, and just to clarify, we have been treating the regional and the village corporations the same as the tribes, with respect to consultation.

MR. JANGALA: Okay.

MR. GILBERT: Okay, good things. Sarah.

MS. BULLOCK: This is Sarah Bullock with the BLM. I kind of have one concern and that would be -- and I don't know how to really answer -- I don't know how to really answer this question, but there's -- I don't have any problem with the way that the study is going. However, there is large -- there's a large chunk of, you know, there's BLM and right in there, especially on the Denali Corridor, there's that large block of -- in the Chulitna Mountains, and you know, right now, it's state selected. So there's not federal subsistence use or just by ANLCA, at least for moose and caribou, large game. They can still go out there and pick berries or collect wood or something like that, but you know, the selections are somewhat fluid.

There's, you know, there's lands being conveyed all the time, and my concern is that over the next couple of years or perhaps right after the dam is perhaps built or sometime in that licensing process, that a large chunk may be conveyed back to BLM, which would, henceforth, be

unencumbered land, and you know, I don't know how you can really capture that, because I don't think you can, the difference between the movements, but that would be like a big -- that would be a game-changer, in my view, you know, with doing the 810 analysis with the different...

MS. KRAUTHOEFER: Sure.

MS. BULLOCK: Because that would, you know, that would, perhaps, significantly affect subsistence users out there, whether it be in a positive way in access or a negative way, within competing with other folks, but like -- I guess, again, I think it's like one of those unanswerable questions, because it could happen tomorrow and it could happen 20 years from now, but do you think the study would be able to predict those?

MS. GLASS: The what ifs?

MS. BULLOCK: Well, yeah (affirmative), I mean, it could be a little early, but...

MS. KRAUTHOEFER: Well, I mean, we would be -- so for the communities that we have spoken with, that we harvest -- or that we surveyed and that we've done workshops with so far, you know, with -- if

there's use in that area, we're documenting that use. So you would have that documentation of...

MS. BULLUCK: Right.

MS. KRAUTHOEFER: ...use of the area to assist you in...

MS. BULLOCK: Right.

MS. KRAUTHOEFER: But I can't speak for when it will be conveyed or...

MS. BULLOCK: Yeah (affirmative), I mean, just you know, at least, you know, maybe not in 13E, but like in different areas of Unit 13, when new areas become available, and of course, we let people know where they're at, they immediately, I don't want to say flock to them, but they'll go check them out and if this happens, you know, especially for the communities of Chase and Cantwell and all those folks, that would be additional lands that they can go pursue those caribou, dall sheep there, whatever, but I'm just kind of, you know, anecdotally noticed that once those areas become available, yeah (affirmative), because, you know, subsistence, federal subsistence regulations are a bit more liberal in, you

know, than state, even state subsistence harvest level. So it's just -- I mean, again, I think that might be -- could be addressed in the effects analysis and that sort of thing, but I just kind of wanted to get that concern out there on the table.

MS. KRAUTHOEFER: Okay, thank you. You know, certainly, we would be -- I don't know if you could extrapolate, based on the types of resources that people are harvesting and think that, "Well, if that resource is now open for harvest in this area, that you know, you could foreseeable see someone harvesting over there, too," I...

MS. BULLOCK: Yes, I don't know how you could modify your study to really capture that, because, yeah (affirmative), I don't think you can, but...

MS. KRAUTHOEFER: Were they open within the last 10 years or has it been...

MS. BULLOCK: No, it's still selected.

MS. KRAUTHOEFER: Okay.

MS. BULLOCK: It's still state selected, but I foresee, within the

next few years, lands being, perhaps, conveyed.

MS. KRAUTHOEFER: And do we...

MS. BULLOCK: Where that is -- and it's happening all the time.

MS. KRAUTHOEFER: Sure.

MS. BULLOCK: So -- but I couldn't tell you where, because I'm not the realty expert and it's complicated.

MS. KRAUTHOEFER: I guess the other thing would be to look at data from, you know, before ANCSA. I don't know if there's use data for that area, pre-ANCSA, but there might be information in there about where people were before that land was selected.

MS. BULLOCK: Yeah (affirmative), I mean, your federal records that you should have access to, how far do they go back?

MS. KRAUTHOEFER: We, actually, don't have access to the federal records, just the state wildlife records.

MS. BULLOCK: Okay, because I was thinking, you know, before about -- between 1991 and 1993, there may be some federal records out there, because that was kind of before conveyance, of a lot of conveyance,



yeah (affirmative), so. I don't know.

MS. KRAUTHOEFER: It's a very good point. It's an interesting dilemma.

MS. BULLOCK: Thank you.

MR. GILBERT: Yeah (affirmative), that is something to consider interesting. How about...

MS. LONG: Hi, I have a question. This is Becky Long.

MR. GILBERT: Sure, okay, sure.

MS. LONG: I remember in the technical work group meetings when we were talking about this study and you mentioned that in -- well, when you were collecting data, this was -- collecting data in 2012 on subsistence, you mentioned -- it was mentioned that the end of September floods in 2012, that a lot of the hunters in the Talkeetna/Trapper Creek area couldn't normally hunt where they hunt because of the flooding, and so that might skew the results. I just wondered if you have re-looked at those areas, and you probably said this, and I just didn't pick it up, but I'm just concerned that anomalous weather condition that affected, you know,

data, baseline data.

MR. HOLEN: This is David Holen for Fish and Game, and that information can be compared to earlier studies that we have, and I believe it's part of the overview. There's going to be 10-year mapping studies that will help kind of provide a more long-term sequence of where people are harvesting. So Steve Braund and Associates, I know that they are heading up -- they have got their...

MS. KRAUTHOEFER: They did TLK workshops, but they have not started the 10-year mapping.

MR. HOLEN: Okay, they haven't started the mapping yet, but they'll be covering that to try to get a longer time sequence to account for that, and like I said, we did do assessment questions. We asked, you know, was your harvest less or more in the recent years, and then we do get answers on why that was, as well, and what people are doing a little bit differently, but I believe those maps will help, and they're also going to be looking at harvest ticket data, which will, actually, describe where people are going.

For these communities in the Susitna drainage, as compared to some other places in the state, we have really good data from the harvest ticket data, because people actually do go out and get licenses. They do return their, you know, their harvest tickets, and so we have pretty good information at Fish and Game on that.

MS. LONG: Okay, I -- yes, that's great and I'm glad it's covered. I just wanted to bring it out there, but you know, your PowerPoint said you started collecting data January 2013, but didn't you actually start collecting data in 2012?

MS. KRAUTHOEFER: I'm kind of a little fuzzy on that. I don't think the household harvest started until 2013.

MR. HOLEN: No, they're in...

MS. LONG: Okay, maybe I'm -- I'm probably getting components mixed up.

MS. KRAUTHOEFER: But it would have been asking about the study year 2012.

MR. HOLEN: Correct. We would do it in January and February of

2013, and the study year would be January 1st through December 31st, 2012.

MS. LONG: Okay, I get it. I get it now. Okay, so basically, you actually started accumulating the data in January of 2013, but it was data that might have happened in 2012. I'm sorry, I'm pretty brain dead on this.

MR. HOLEN: No, it is a little confusing and we try to do that immediately following the end of the calendar year, so you know, it's a retrospective, you know, question and so we try to get it as close to the end of the calendar year as possible, so it's still fresh in people's mind as to what exactly they did.

MS. LONG: Thank you.

MR. GILBERT: Good questions.

MS. GLASS: So this is Dara Glass, again from CIRI. So I'm sorry, I probably missed this, when do you expect to have the mapping studies done, then?

MS. KRAUTHOEFER: That is a good question. I don't actually know what our schedule is for 2015 yet. We're working on that, but it will

not be until 2015.

MS. GLASS: That's 2015, okay.

MS. KRAUTHOEFER: But there is mapping data from the household harvest areas, too.

MS. GLASS: So is that going to be done...

MS. KRAUTHOEFER: That is...

MR. HOLEN: Yes.

MS. GLASS: I mean, is that done or...

MR. HOLEN: Yeah (affirmative), for the Susitna drainage, the technical paper was published in November of last year. That's available at the Fish and Game website at our technical paper database, and the other technical paper for the Copper Basin is to be published next month. We're just about finished writing it. It's going to our publications. I'm about to review it, and that will be available in about a month, and I do have to add that besides that, we also have a considerable amount of information that we collected as part of our collaboration with the National Park Service for other communities in the Copper Basin.

So this study that was funded by AEA, paid for harvest collection in 15 communities in the Susitna and Copper drainage, but all of the other communities were also covered. So we do have a complete census of those areas.

MS. KRAUTHOERFER: And some of those...

MS. MCGREGOR: Can I ask clarification on that? So there's one Copper Basin paper or publication that includes the Park Service on the AEA communities, or are there two Copper Basin?

MR. HOLEN: There's actually several. The Park Service funded one to three communities a year or one to four, so we have three publications that were funded by the Park Service, and then one that was funded by AEA for the Copper Basin, and I believe the third one funded by the Park Service will be out here shortly, as well.

MS. KRAUTHOEFER: Is the data available in the CSIS even if the paper hasn't been published?

MR. HOLEN: No, we do not release it to the CSIS until the technical paper is finished.

MR. GILBERT: Okay, other questions, comments on the subsistence? Okay, good, well, thank you, that was informative. We're going to try to keep our schedule here for cultural, because people will probably be coming in at 1:00. So we're going to break for a full lunch now, longer lunch, and we will start up again at 1:00, for cultural and paleontology. So we'll put you guys on the phone on mute until then.

11:19:34

(Off record)

(On record)

12:58:02

MR. GILBERT: Hi, for anyone on the phone.

MR. WINCHELL: Hi, it's Frank from FERC.

MR. GILBERT: Okay, we're going to start. We're going to -- we'll go around on the phone in just a second, I think, just to make sure -- it's kind of a new meeting. So I'm Kirby Gilbert, MWH. We did the physical sciences subsistence this morning and we'll go through the cultural resources and paleontological resources this afternoon.

We'll go around the table here, so you guys on the phone know who we have, and then we'll do the phone, so...

MR. HAYS: This is Justin Hays from Northern Land Use Research Alaska.

MR. SIMEONE: Bill Simeone with UR -- Bill Simeone with URS Corporation, Alaska.

MR. VANDERHOEK: Richard VanderHoek, Office of History and Archaeology.

MS. MCGREGOR: Betsy McGregor, Alaska Energy Authority.

MR. SENSIBA: Chuck Sensiba, Van Ness Feldman on behalf of AEA.

MR. DYOK: Wayne Dyok, Alaska Energy Authority.

MS. STEELE: Marie Steele, Department of Natural Resources.

MS. GLASS: Dara Glass, CIRI.

MR. KROTO: David Kroto, Tyonek Native Corporation.

MR. FRAISER: Andrew Fraiser, Alaska Energy Authority.

MR. CROWTHER: Justin Crowther, Alaska Energy Authority.



MS. THOMPSON: Rachel Thompson, Alaska Energy Authority.

MR. BOZEMAN: Marty Bozeman, AEA.

MS. ANDERSON: Julie Anderson, AEA.

MR. GILBERT: Okay, that's who we have here. We do have a court transcriber here, too, because we're recording this so we can have a nice transcript at the end. So who all is on the phone? It just sounds like a couple of you. We've got Frank, you...

MR. WINCHELL: Yeah (affirmative), Frank Winchell from FERC.

MR. GILBERT: Anybody else?

MR. JANGALA: John Jangala from BLM.

MR. GILBERT: Good. Okay, well, we might get a few others that come on, but that's great. So we have a good group. Okay, well, we'll just -- unless there's any other questions before we start, we went through kind of overview things this morning and we have every day, most of you've heard it, but we'll go ahead and jump in.

Justin and Bill will present the overview of the ISR and the plans to complete the study.

## **CULTURAL RESOURCES STUDY (Study 13.5)**

MR. HAYS: Okay, so to start with the study objectives, consult with SHPO, BLM, and Native entities during the implementation of the cultural resources survey, inventory the resources within the area of potential effect, evaluate National Register eligibility of cultural resources within the APE, that can be affected by the project, determine the potential project-related effects on National Register eligible historic properties in the APE, and develop information needed to prepare the Historic Properties Management Plan for the project.

Components of this study consist of previous surveys, which would be background information and desktop surveys of previous reports, a location model of the survey strategy, which would take into effect the topography and various variables that would lead us to higher [potential] areas.

Survey strategy and phasing of field investigations has to do with the Phase One inventory and survey, and the direct APE, and the survey strategy of phasing, similar phasing in the indirect APE. Mapping related

activities that combine ethnogeography, archaeology and modeling, ethnogeography-related activities, which Bill can touch on later, synthesis and analysis, again, would consist of ethnogeography, paleoenvironmental factors, archaeology, and other related studies, when possible.

The unanticipated discoveries protocol was [developed], so all crews are familiar with what to do when they encounter resources, and then the archaeological internship and additional workforce.

Variances in the study plan had to do with traditional cultural properties. Bill, did you want to mention...

MR. SIMEONE: Just -- well, I could read what's there. I mean, stated that all traditional cultural properties information would be incorporated into a geodatabase. To date, however, there has not been sufficient data to support such a file, and then the Dena'ina ethnogeography component has been postponed and has not been initiated, but is in the planning stages. We'll probably -- it will take place in 2015, and then...

MR. HAYS: And then the last variance was not getting enough

responses for an archaeological internship that we weren't able to do in 2013.

MR. SIMEONE: So the summary results in the ISR for the ethnogeographic study or ethnogeography study was that we interviewed 18 Ahtna elders on contemporary land use. All of them resided in Cantwell or were residents of Cantwell at one time. Some reside in Anchorage now.

We also transcribed 25 interview tapes from various sources, including the BIA, the BLM, and academic sources that have -- information that they've collected over the years from other anthropologists. We translated 31 Ahtna language narratives that have collected primarily by the Alaska Native Language Center. That translations were done by Jim Carrey and with the help of various Ahtna speakers, and then we updated the existing Ahtna place name GIS database.

MR. HAYS: The archaeology study results, 167 sites were inventoried. Eight-two were newly discovered cultural resources. The

majority of the sites [were] on the ground surface in what's known as the Denali Corridor.

The location model identified approximately 262 high-potential test areas. We were able to test 26 and recorded two newly discovered [re]sources [in] buried sediments. Lab analyses focused on radiocarbon dating, diagnostic artifacts of a certain period and age, and X-ray fluorescence technique to source certain [trace elements in obsidian] materials [from] the region. Then again, synthesis of the ethnogeographic oral histories into a modern GIS database.

There was also a facility survey conducted to Phase One level on Deadman Mountain in support of a seismic station -- was proposed to be put in place on top of the mountain.

MR. SIMEONE: The ethnogeography study results, we did complete all of the data collection for the Ahtna portion of the ethnogeography study. We held a meeting and presented the results to the residents of Cantwell on June 30th, 2014.

A final Ahtna ethnogeographic study report is in progress right now,

and then we are very much planning to start the Dena'ina ethnogeographic study in 2015, and we are working with AEA right now to develop that consultation process between CIRWG and ourselves.

MR. HAYS: Archaeology study results since the ISR, inventoried 29 more sites and that's approximately 100% of the known sites on CIRWG land, inventoried 12 sites on BLM lands, which is just 17% of the known sites. We also inventoried 30 sites on state land, 41%, and a number of newly discovered sites is still pending, based on GPS location and accuracy.

Again, I'm just pointing out, the majority of new sites were near the Denali East Corridor and/or Denali Corridor, and we also completed the field work portion of the paleoenvironmental component of this study, which was lake coring in the spring.

So proposed modifications in the ISR, AEA added a Denali East Option, we just mentioned, associated transmission corridor and study area, and that possibility could affect the sequencing of Phase One inventory and Phase Two. So work could involve investigations, which

some sites are inventoried and evaluated at the same time, rather than a seasonal phasing that was outlined in the study plan.

New modifications, the Chulitna Corridor was dropped. So steps to complete the study, AEA will implement methods in the study plan, such as inventory and evaluation, systematic inventory of archaeological and structural cultural resources within the APE and historic preservation evaluations that could be affected by the project.

In 2013 and '14, much of the area, the direct APE and indirect, was surveyed and sites were inventoried, and subsurface testing and site evaluations will occur in 2015.

MR. SIMEONE: To complete the study, AEA -- well, the ethnogeography component, we are going to start in 2015 for the Dena'ina portion of the study. That includes an assembly of ethnographic and linguistic information to help inventory and evaluate historic properties, including traditional cultural properties that may be affected by the project. As I already mentioned, the Ahtna portion is done and the Dena'ina portion will commence in 2015.

MR. HAYS: To complete the study, AEA will implement methods such as, for paleoenvironmental, lake-coring effort to obtain the environmental information for the evaluating of prehistoric cultural resources in their temporal and ecological context. Again, the field work was completed and analyses are ongoing.

MR. GILBERT: Okay. Good, well, that's a good overview, and we do have access Justin can pull up, if we need maps or anything else, the study plan determination, which is what we're kind of going off when we talk about modifications and so on.

So now is the chance for discussion and hopefully, that was quick enough, but thorough enough for people to have a good understanding of where they're at on the study, but you're welcome to ask and talk about it. So we do kind of -- we did kind of have an order here, agencies, so we were, in the other meetings, just going down the federal agencies and so on, and then state and so on, but so I guess we could just try to keep that. John Jangala, you're on from BLM, do you want to start with any -- any modifications, any thoughts you have on this study and where it's going



right now?

MR. JANGALA: The only thing that I've even thought about is something we talked about, I believe last year, and that was a look at some of the local material sources, like a Glass Creek obsidian source. Is that still within the realm of possibility?

MR. HAYS: Yes, it is. We have some artifacts and some non-artifacts samples of obsidian that we're able to, at least, measure the trace elements in-house and also compare that with the instrument at the University of Alaska Fairbanks. So far, it's an unknown source.

MR. GILBERT: Anything else, John, right now that you can think of?

MR. JANGALA: No, that's pretty much it.

MR. GILBERT: All right, well, we'll just kind of open it up for questions, comments.

MS. GLASS: So this is Dara from CIRI, and I'm a little concerned that since none of the Dena'ina have been interviewed yet that you are not going to have the time or money in order to do as great of detail as you

have on the Ahtna culture, an equal -- do the same amount or do the same level of study that you've been able to do on the Ahtna culture with the Dena'ina, and that's really -- that's really bothersome. It's very worrisome, I should say. It's disappointing that nothing has been started.

MS. MCGREGOR: I would like to clarify that. The ethnogeography effort for the Ahtna is -- was a one-year process. So there is adequate time...

MS. GLASS: It was just a one-year?

MR. SIMEONE: Yeah (affirmative).

MS. GLASS: Okay.

MS. MCGREGOR: And so there's plenty of time to work with the Dena'ina to complete it and have it in the USR.

MS. GLASS: Okay, all right.

MR. GILBERT: Yeah (affirmative), that's good. Okay, how about Richard, I'm sure you have some questions and comments.

MR. VANDERHOEK: Most of my questions are dealing with next year, but we haven't quite gotten there yet.

MR. GILBERT: Okay, well, that is what we want to try to use this opportunity to discuss. You know, we've got FERC on the line and everything. So to the extent you have some thoughts about that and what they have proposed, go ahead, this is a good chance, if you've got a few things.

MR. VANDERHOEK: Okay, I was -- well, I kind of end up putting Justin on the spot. I don't know if he's ready to talk about next year or not. I know quite a bit was put off this year or some things were put off this year, say from what was projected maybe a year ago. So does that mean that the stuff that was planned, you know, a year or more ago to do, like the -- more of the indirect APE routes are going to be looked at this time, this summer?

MR. GILBERT: Yeah (affirmative), I don't think this is unique to this study. I don't know if you guys, Wayne or Betsy, want to talk about the (indiscernible - speaking simultaneously)...

MS. MCGREGOR: Yeah (affirmative), just to clarify, the scope of the archaeological investigations hasn't changed. The timing may have

changed.

MR. VANDERHOEK: Got you.

MS. MCGREGOR: So if they weren't able to carry out everything in 2014, it's not that scope went away, it means it's deferred and it will be picked up in 2015.

MR. VANDERHOEK: Great.

MR. GILBERT: Yes, so everything, unless there was a slide, you know, a modification on that, everything that was planned, all those indirect APE sites, that's still the plan in the study.

MR. VANDERHOEK: Good, great.

MR. GILBERT: How about other thoughts and questions? Frank Winchell, do you have anything?

MR. WINCHELL: Yeah (affirmative), you know, the kind of thing -- position where, yeah (affirmative), the waiting to see more of the data come in. I guess real fast, let me see, the, what, 262 high-potential test areas, okay, is that -- help me understand that more about, is that sort of the -- is that the total amount of what you think is going to be high-potential

areas within the direct APE?

MR. HAYS: That's correct. Those areas were identified as having existing resources that make it much more habitable for, not only human resource[s], cultural resources, but other resources, as well, caribou calving grounds, beaver wetlands, nesting areas, et cetera.

MR. WINCHELL: Okay, are these -- I take it that they -- you know, they're relatively flat and have all those, you know, kind of what you would expect for a high-probability area to look like. Would it -- I guess looking at the overall direct APE map, is there any -- I mean, is it contiguous? I mean, you know, when we -- we had some good graphics in the initial study report, you know, showing areas that were covered, you know, both by pedestrian and by air, and I'm just looking for some understanding of sort of -- what -- you know, contiguousness of the areas, so it sort of looks like it's -- like because, of course, in the study plan, it's this systematic inventory and I guess, is that going to kind of, you know, thread out to that configuration where we're looking at, you know, more or less contiguous survey of areas that are high-probability, which I suspect

are going to be within the, you know, the lake area, then sort of, you know, farther out in some other place, you know, such as the drainages and things of that sort?

MR. HAYS: Well, in general, I would say they're noncontiguous, usually constrained by natural landforms, geological landforms, ravines and valleys.

MR. WINCHELL: Okay, okay.

MR. HAYS: So if you could picture what we've termed just polygons on top of the landscape that model to be...

MR. WINCHELL: Okay.

MR. HAYS: ...high or low. Some landforms naturally join each other, which would make them contiguous or a corridor, so to speak.

MR. WINCHELL: Okay.

MR. HAYS: Does that help answer?

MR. WINCHELL: Yeah (affirmative), it does, and of course, I mean, yeah (affirmative), you know, any -- you know, I can understand like the noncontiguous aspects that are being based upon the terrain again,

and I guess I would just say in general, that you know, make sure when you produce reports, all that is kind of, you know, clearly shown on the map, so that the observer can say, "Yeah (affirmative), you know, this stuff was systematically inventoried based upon, you know, high versus low probability areas," and of course, it's dependant upon, you know, whether the pedestrian folks were able to have access to those particular pieces of land based on terrain and all that stuff, just so that the, you know, so there is a good feeling of systematic inventory going across the entire direct APE.

MR. HAYS: Okay.

MR. WINCHELL: Yeah (affirmative), does that make sense?

MR. HAYS: Yes.

MR. WINCHELL: Okay. Yeah (affirmative), okay, I guess, can I continue or...

MR. GILBERT: Yes.

MR. WINCHELL: Does someone else want to talk?

MR. GILBERT: I think you can continue, Frank, and maybe others

will have questions after you're done, but I think it's good. Go ahead.

MR. WINCHELL: Okay. You know, going back to the traditional cultural properties information, you say to date, there's been -- not been sufficient data to support this file, you know, into the geodatabase, and I think I asked earlier about, you know, we are going to get some information, some useful information, I think, from the subsistence folks, especially things such as the, you know, their maps on where folks are going, and I know there is a level of confidentiality that we can't breach, but none the less, I would think that information coming from the subsistence side, that you might be able to fill in more of an understanding of potential TCPs that might be out there, based upon, you know, generational visiting of certain places, that would, you know, take place over a span of, you know, many decades or something of that sort. Is -- what's your take on that?

MR. SIMEONE: Well, that's -- I think you're right, and what we did in the report that we're working on now, is we have taken the subsistence -- the maps from the subsistence division research and we've put those



together with our research, our ethnogeographic research, and we've basically compiled a series of maps that show land use over time from about 1880 to the present.

MR. WINCHELL: Okay.

MR. SIMEONE: And we show contiguous presence of people and use on the land for all that -- over that whole period, and we show...

MR. WINCHELL: Okay.

MR. SIMEONE: ...shifts -- we show shifts in use patterns as people change residencies, if they move from one place to another or game regulations came into effect, et cetera, et cetera, but basically, what we show in, I think a series of five or six maps, is contiguous land use, as I said, from that period, from about 1880 to the present.

MR. WINCHELL: Okay. I guess a kind of final general thing I had was, you know, in the study plan itself, there was discussion, and I'm probably not pronouncing this right, the Tanana speakers.

MR. SIMEONE: Correct.

MR. WINCHELL: Okay, I see, that you know, there is, you know,

of course you've got good information with the Ahtna and then you're going to go ahead and go back and do more with the Dena'ina, but how about the Tanana? What -- I mean, and I know that they're very north of the project area, but I didn't see any mention of those folks or perhaps some kind of, what, contact or something or gathering information about potential, you know, places or I -- you know, lack of a better word, phenomena involving those folks.

MR. SIMEONE: Well, we do -- we did document some Tanana, Lower Tanana River use, but one of the things that we found was in the 1860's, there was a disagreement or I guess you would call it a battle confrontation between the Ahtna, the Western Ahtna and the Lower Tanana, and the Lower Tanana, after about 1865, never returned to the area, and so basically, it became de facto Upper Western Ahtna territory and there are no -- there are very few Lower Tanana place names, for example, in the Upper Susitna drainage.

They were there and we -- and the people who really know about that use have all -- are all deceased. So we didn't really have much chance

to get -- to talk to anybody who knew much about that.

MR. WINCHELL: Okay, and I guess, you know, and again, I'm sure you'll explain this in the narrative part of the report to kind of, you know, so the reader has that understanding of what you're saying, which is interesting, and I guess the other thing would be, you know, on the archaeological aspect, is -- would there be any way of differentiating such sites, if they were, you know, within the project area or APE? They may not be, I mean, again if they're like ephemeral kinds of sites, there may not be any way of knowing that.

MR. HAYS: Yeah (affirmative), that would be difficult to answer. There may not be ways to answer that. Usually, we're going on a dearth of information and we have to reconstruct from that, but...

MR. WINCHELL: Yeah (affirmative).

MR. HAYS: ...it would be really hard to say, it's so site-specific.

MR. WINCHELL: Yeah (affirmative), okay.

MR. SIMEONE: The best...

MR. WINCHELL: Then I guess the...

MR. SIMEONE: The best evidence is place names for that, because that area -- there are place names that refer to a Tanana presence in -- the Lower Tanana presence. So place name data is really an important piece of information, you know, that differentiates language groups and things like that.

MR. WINCHELL: Yeah (affirmative), okay, so and that certainly would be discerned, or you know, sorted out with your study results?

MR. SIMEONE: Exactly.

MR. WINCHELL: You know, those -- okay, great, okay. I guess the very last thing is I looked at the -- okay, yeah (affirmative), the list of sites there, and I assume you're going to be getting more than 167 as this goes on, and of course, you're going to do inventory, along with testing for National Register eligibility, but I assume that you're going to have a much more -- because if you've only inventoried 26 of the 268 high-probability areas, and I suspect, yeah (affirmative), you're going to be getting a lot more sites. Is that pretty much what you guys think?

MR. HAYS: I suspect so, based on the preliminary results and what

we're able to find in one -- just one large season of survey and inventory.

MR. WINCHELL: Yeah (affirmative), and I guess, you know, logistically, since you only have done 26 were tapped and you've got another 262, are you going to be able to do all of this in one -- another season or are we talking two seasons, or what's your feeling on that?

MR. HAYS: We definitely are looking at beyond 2015.

MR. WINCHELL: Beyond 2015, okay. I guess, okay. Well, I guess that's it. I guess -- and one last thing, it really struck my interest on those list of sites. You've got like a middle 1850's habitation site, is that right, like a historic site, I think I saw?

MR. HAYS: I believe we may have more than one, but it's -- I can't really recall which site you're speaking of from the 167.

MR. WINCHELL: Yeah (affirmative), is this aboriginal or would it be European or I mean, is it based on like -- I didn't get enough detail, like objects, that you know, were like historic artifacts that date to that period. Is that something -- I'm just curious more than anything, like...

MR. HAYS: We would -- we would call that period probably proto-

historic period where it's...

MR. WINCHELL: Okay, so it's aboriginal, okay.

MR. HAYS: Well, and quite a bit of overlap of Euro-American and aboriginal.

MR. WINCHELL: So there were Euro-Americans up there in the middle 1850's?

MR. SIMEONE: No, no, they didn't show...

MR. HAYS: No.

MR. WINCHELL: No, okay, so it's got to be aboriginal.

MR. SIMEONE: Yeah (affirmative), it's got to be -- yeah (affirmative), there might have been a Russian visitor that went through there, but there was no established European presence.

MR. HAYS: Right, and I should qualify, I was kind of referring to artifacts, so Euro...

MR. WINCHELL: Yeah (affirmative).

MR. HAYS: ...Euro-American goods, not necessarily the people.

MR. WINCHELL: Okay. I guess if we're on the same -- what about

the paleo-Indian aspect? I guess you've been doing the lake paleo-cores, so what are you finding there? Are you finding any signs of like, you know, Pleistocene (indiscernible - interference with speaker-phone) Pleistocene occupations, or you know...

MR. HAYS: No, not in the cultural sense. In the natural sense, what we've just learned from the lake cores is some of the lowest levels, I believe from Deadman Lake, we radiocarbon dated to about 9,200 years ago and that's just a baseline or basal date of when the area would have been deglaciated and that particular lake began to form. Whether or not that was a habitation site by humans is yet to be proven, but that's part of the ongoing analyses.

MR. WINCHELL: Okay, okay. Okay, well, great, yeah (affirmative), I think I'm pretty copacetic at this point.

MR. GILBERT: Okay, well, good. Well, thanks, Frank.

MR. WINCHELL: Yeah (affirmative).

MR. GILBERT: So we have a chance here with these guys...

MR. JANGALA: This is John Jangala from BLM again.

MR. GILBERT: Sure, John, please.

MR. JANGALA: I've got a question for Bill, and it actually relates to some of your results that you presented at the June 30th meeting.

MR. SIMEONE: Yeah (affirmative).

MR. JANGALA: I think you had mentioned that you didn't find any locations that would meet the legal definitions of a TCP. Was that just in the project APE or anywhere in here?

MR. SIMEONE: Well, it was -- as far as I was concerned, it was anywhere in the area, but I mean, that's debatable and it has to be discussed, and I can't really answer that definitively. Those are just sort of preliminary ideas that I had.

MR. JANGALA: Okay.

MR. SIMEONE: And after discussion with Ahtna and Cantwell and everything, and asking them about it, and they didn't really -- they didn't really conceive of a TCP in the area. That doesn't mean that after, we couldn't -- that it wouldn't be there, but that -- in these preliminary discussions, nothing came up.



MR. JANGALA: Okay.

MR. GILBERT: Okay, other questions, comments? Anything else, Dara? I just want to make sure.

MS. GLASS: I think it's going to be hard comment when there's nothing to comment on for us.

MR. GILBERT: Okay.

MS. GLASS: But thank you.

MR. GILBERT: Richard, anything else you want to bring up or...

MR. VANDERHOEK: I don't think so. I thought Frank brought up a couple of really good points.

MR. GILBERT: Well, that's good. Well, we'll go on then, I guess to the paleontology.

MS. GLASS: I do have one quick question.

MR. GILBERT: Go ahead.

MS. GLASS: Sorry. So -- and this is probably going to be covered in the next one, or it might be, anyway, but when you guys found -- we have discovered in our research on the Kenai and in the Tyonek area, that

often times, we'll find the house pit, but you won't find anything within the house pit, because all of the living activities took place, you know, 50 feet or more away from the house pit. So do you expand your studies out beyond where you found the house pit or are you just looking specifically at the house pit and leave it as is?

MR. HAYS: In general, [yes], we would expand it, and what we would do is if we clearly had a house pit, we would delineate a grid of either 10 meters or five meters of test pits and basically, the best strategy is to go from the known to the unknown.

So if we have a cultural resource in one pit, we'll move over five more. If there's more, we'll keep going until it Peter's out, so to speak, so it actually does get quite a bit of the coverage of the land in addition to the actual habitation space.

MS. GLASS: Okay, so five meters equals...

MR. HAYS: Sorry, so...

MS. MCGREGOR: About 15 feet.

MS. GLASS: Sorry, I can't do the math real quick in my mind.

MR. HAYS: I know, it's (indiscernible - speaking simultaneously)...

MS. GLASS: Okay, so -- but if you found nothing in that 15 feet, you stopped? You didn't go any further out? Is that what you're saying?

MR. HAYS: Generally.

MS. GLASS: All right, and are you looking at fire-cracked rock and those types of things.

MR. HAYS: Yes.

MS. GLASS: Okay, thank you.

### **PALEONTOLOGICAL RESOURCES STUDY (Study 13.6)**

MR. GILBERT: Okay, any last things for cultural? Okay, great, well, we can go into paleontology, which is pretty brief, I think, but...

MR. HAYS: Okay.

MR. GILBERT: Go ahead, Justin.

MR. HAYS: So the study objectives for paleontology w[ere] to determine the effects of the proposed project on those resources and locating, documenting, and evaluating resources within the study area.

Components include identification of potential impacts to

paleontological resources and determining the field survey and monitoring needs, and then a field survey component.

The variances to this study, the impact analysis of the geological units of the proposed project, and assertion of the associated potential fossil yield classification was deferred to 2015, and the determinations of field surveys and subsequent monitoring is also deferred to 2015.

So the summary of the results were potential fossil-bearing units identified from a literature review. I'm not very familiar with these terrains, so I won't go through each one, but there's a spreadsheet that summarized approximately 100 sites of known fossil locations in the project area.

Most occur in two distinct northeast-striking belts and [in the] east-central and western portions of the study area and a scattering of fossils a[t] other locations. Three fossil localities occur within the area that could be in the inundation zone. Twelve others occur within the transportation corridors.

Analysis of the site inventory was derived from the literature search.

“None of the known fossils in the study area are of critical scientific importance.” Archaeological crews, in 2013, reported four potential, I should add, plant fossils in the study area. The sites were assigned AHRS numbers and added to the paleontology site inventory.

This is just a map of the previously mentioned published fossil locations, the dark or black dots, just to give you the distribution and the concentrations of where these known resources are.

[In] summary, no additional work was performed and the study will resume in 2015. Proposed modifications, in the ISR, AEA proposes no modifications and the studies, again, changed a bit to include the east or Denali East Option and associated transmission line road.

Again, similarly, the Chulitna Corridor was dropped from the study area, and the current status right now, [is] to complete the study. AEA will implement methods, such as identifying the potential impacts to the paleontological resources. The team will determine the geological units that may be impacted by the proposed project and associated fossil yield classes. Based on the information, AEA will evaluate the risk of impacting

significant resources.

The literature review is now completed, and in 2015, AEA will complete the impact analysis for the classification units that may be impacted. So steps to complete and the methods, determine the need for the field survey and monitoring efforts. There needs to be a field survey. Monitoring will vary by location and be determined on the classifications for the particular location, and the development of the field program is in progress.

To complete the study, field surveys will generally be undertaken in the Four and Five Units, especially the exposed bedrock areas, Class 4A and 5A. Class Three may not require a survey. Again, the field work is planned for the summer 2015. The surveys will focus on fossil areas that may be impacted, such as inundation areas, borrow sites, and then fossil specimens will be sent to laboratories for identification in the fall of 2015.

MR. GILBERT: Okay, that's a good overview. The study was deferred, but now is a good check-in point, if there's any additional information, any modifications anybody suggests. Anything from your

end, John Jangala and the BLM?

MR. JANGALA: Nothing, except a question. Has the contractor for the paleontology section going to be the same as previously proposed?

MR. HAYS: That's the plan.

MR. JANGALA: Okay.

MS. MCGREGOR: As long as they're available. We haven't had a reason to change course.

MR. JANGALA: Okay.

UNIDENTIFIED SPEAKER: No change.

MR. VANDERHOEK: And who was that?

MS. MCGREGOR: Pacific Rim Geological Consultants.

MR. VANDERHOEK: Okay, I mean, I see that there. I was just wondering is there a name you can give me?

MR. HAYS: Tom Bundtzen.

MR. VANDERHOEK: Tom, okay, I recognize that, thanks.

MR. GILBERT: Is there a question, other comments, questions?

Richard.

MR. VANDERHOEK: So that means, then that Pacific Rim needs to do their prioritization analysis, their field work scheduling, and their field work, all in FY15, all coming up?

MR. GILBERT: Yeah (affirmative), I mean...

MS. GLASS: FY15?

MS. MCGREGOR: Not FY15.

MR. VANDERHOEK: Okay.

MS. MCGREGOR: FY16.

MR. VANDERHOEK: FY16, I'm sorry.

MR. GILBERT: Yeah (affirmative), fiscal year.

MR. VANDERHOEK: Where are we?

MS. MCGREGOR: Just for clarification, for those that don't know, the State of Alaska's fiscal year ends June 30th, 2015. So fiscal year 2016, means July 1st, 2015.

MR. GILBERT: So does that answer your question that you're asking?

MR. VANDERHOEK: I think so.



MR. GILBERT: If we can get it done, I mean, I think the intent is yes, that's the...

MR. VANDERHOEK: Yeah (affirmative), I'm just curious, is -- does that mean that they come on payroll July 1, and start figuring out what they're going to do and then trying to do it?

MR. GILBERT: Do you want to answer it, Betsy, of how that...

MS. MCGREGOR: You know, at this point in time, I would say, considering that we haven't had a study plan determination and we're not sure what the budget's going to be, it's really dependent upon what the outcome of those two events are.

MR. VANDERHOEK: Okay, just checking.

MR. GILBERT: Sure.

MR. VANDERHOEK: It's hard to start field work in the middle of the summer.

MR. GILBERT: Yeah (affirmative).

MR. VANDERHOEK: Has there been any thought to try and do a little bit of coordination between the paleontology and the archaeological

surveys, in case some kind of shared logistics can take place? I don't know, probably not, because they haven't -- the paleontology hasn't come online, just a thought, if it's...

MR. GILBERT: Yeah (affirmative).

MR. VANDERHOEK: If they're going to the same place, it could be useful.

MR. GILBERT: Yeah (affirmative), that's a good comment, yeah (affirmative). Yeah (affirmative), I know last year, there was some cultural -- you guys had found some things, right, those plant fossils that were in that were in -- that wasn't the same coordination, but there's an overlap between the studies and they're coordinating closely. They're helping manage that contractor in that study.

MR. HAYS: Yeah (affirmative), at one time, we were going to coordinate with helicopter sharing and our break and have them work when we're on break.

MR. GILBERT: Okay.

MS. GLASS: My turn?

MR. GILBERT: Dara, yes.

MS. GLASS: This is Dara Glass from CIRI. So I just have two quick questions. The first one being, and I can't remember if I've seen one of these or not, is there a map, using the data from the '80's through 2012 of all the identified sites, using just the data from the '80's through 2012?

MR. HAYS: I wouldn't know. For the record, I'm not a paleontologist, but I can...

MS. GLASS: Well, what about for even cultural sites for...

MR. HAYS: For cultural, yeah (affirmative), those are mapped.

MS. GLASS: Okay.

MR. HAYS: I guess I was thinking paleontology. Could you ask the question again?

MS. GLASS: Well, it's the -- I'm just wondering if there's a map out there using the data gathered in the '80's through, whatever, I don't think there was any, but through 2012, just showing where the identified sites are?

MS. MCGREGOR: Well, I think the map that they just showed for

this study indicates -- that's the cumulative occurrence of all sites.

MR. HAYS: Yeah (affirmative), that was cumulative, I believe. We can go back to it.

MS. GLASS: That can't be, because it is -- it doesn't include sites that are on CIRWG lands.

UNIDENTIFIED SPEAKER: Why don't you go -- you got it right there.

MR. HAYS: That's paleontology.

MR. GILBERT: Yeah (affirmative), that has to be paleontological resources only.

MS. GLASS: Right. Okay, so let's use this map. So there aren't any sites identified on CIRWG land and I'm pretty sure...

MR. SENSIBA: I think there is one.

MS. GLASS: There should be. So I'm really confused.

UNIDENTIFIED SPEAKER: There are a couple there.

MR. GILBERT: Well, this would have been the result of the...

MS. GLASS: And is this from the '80's data or is this...

MR. HAYS: This is compiled from the literature review of known fossil locations.

MS. GLASS: Okay.

MR. HAYS: So none of these are cultural. There are natural.

MS. GLASS: Interesting, okay, right. So this is all paleontological, that word that I can't pronounce. So is there one for cultural, too, then?

MR. HAYS: Yeah (affirmative).

MS. GLASS: Okay, I just need to find it, is basically what you're saying?

MR. HAYS: Yeah (affirmative), it should be on the website report.

MS. GLASS: It's out there, I just -- okay.

MR. HAYS: Unless it was restricted.

MS. MCGREGOR: You would have received the restricted report.

MR. SIMEONE: It would be restricted.

MS. MCGREGOR: We did not post location on archaeological resources out for the public.

MR. SIMEONE: Yeah (affirmative).

MS. GLASS: Okay, so it's on the report we received separately?

MS. MCGREGOR: Yes.

MR. SIMEONE: It should be.

MS. GLASS: Thank you.

MS. MCGREGOR: You're welcome.

MS. GLASS: And then my next question is -- is just because everybody has a different answer for this and when things are sent to the lab, if you're sending it in 2015, when are we going to get the results back?

MR. HAYS: Good question. It varies quite a bit from what analysis is being performed and conducted. I can give you an example. If we have a piece of obsidian glass, since we have the capabilities in our lab, we can turn that around within, you know, a week or so with somewhat reliable results and then statistically compare those to other known sources.

On the other hand, some of the ash falls, the tephra events in the area, take quite a bit more time to process and I'm not very familiar with the geochemical analyses associated with those, but I am familiar with how long it takes, and it takes a couple of months.

MS. GLASS: Yeah (affirmative), and then it just depends on your workload and everything else, too?

MR. HAYS: Sure, sure, the time of year, staffing, all those variables.

MS. GLASS: Okay, so it could be that we don't receive that information until well into fiscal year 2016?

MR. HAYS: Maybe...

MS. GLASS: If you're doing the studies in...

MR. HAYS: Well...

MS. MCGREGOR: Let's talk calendar years. If we talk fiscal years, it gets confusing.

MR. HAYS: Probably.

MS. GLASS: Okay, so -- so you're doing the study in 2015, the summer of 2015, or whenever you can get out there to do it. So do you think we would have it by the end of calendar year 2015, or do you think we'd have it going into 2015, because...

MR. HAYS: The full suite of analyses would be later than next

year.

MS. GLASS: Okay.

MR. HAYS: But like some of the, not easier, but more quickly analyzed materials, we can do for whatever reports are necessary for the filing.

MS. GLASS: Sure, okay, all right, thanks.

MS. MCGREGOR: So the USR is due, at this point in time, the current schedule, is due to be out in February 2016.

MS. GLASS: February.

MS. MCGREGOR: So they would report on as much information as they had available at that time, and then additional information would be in the draft license application in June, and then, you know, whatever is remaining, in the final license application. Then there's other (indiscernible - voice lowered) as well, aren't there?

MR. SENSIBA: Well, then the work that would be done through that time, then kind of naturally flows into what we expect to be a historic properties management plan,...



MS. GLASS: Right.

MR. SENSIBA: ...which would govern the management of -- and even in some cases, continued identification, delineation, and evaluation of historic properties, as needed, through the life of the license.

MS. GLASS: All right, okay.

MR. WINCHELL: Well, yeah (affirmative), but remember, you've got -- I mean, you've got to remember, you know, (indiscernible - interference with speaker-phone) really it affects. You can't, I mean, arguably, you've got to be able to come up with some kind of mitigation plan, as opposed to treating something for life of license, if it's going to be affected, you know, let's say it's going to be inundated by the lake, for example.

MR. SENSIBA: Sure, Frank, no one's arguing with that.

MR. WINCHELL: Yeah (affirmative), okay, just double checking.

MS. GLASS: That's kind of where I was going though, because I'm concerned about the timeline, if things are going to be able to be done in a timely manner and to the level that it needs to be, and so I was just trying

to work it out in my mind to -- I'm trying not to panic on your behalf.

MR. DYOK: It's a fair question.

MR. GILBERT: Okay, any other questions, comments?

### **NEXT STEPS AND ADJOURN**

MR. GILBERT: Okay, well, do you guys want to have another -- a wrap-up like yesterday or just to mention that...

MS. MCGREGOR: Today wasn't quite as eventful with just the materials to cover. No, I just appreciate everybody's comments, ...people's, ..., AEA's contractors, as well, as all the people that participated today. We have another set of meetings tomorrow. It's our last set of meetings. It didn't seem, from today's meeting, the comments that we received, that you know, there's significant requests or requests for additional information beyond that which we've already provided or follow-up discussion.

So we look forward to hearing your comments or seeing your comments in writing in February, and we'll provide the meeting summaries for this. We'll have the court -- when the court reporter notes are available,

we'll provide those as they'll available, and then we'll file our meeting summary in January per the current FERC cycle.

MR. GILBERT: Yeah (affirmative), great, and then tomorrow, for anybody interested, you know, we have the other social sciences. We'll start at 8:30 right back here again, and recreation and aesthetics in the afternoon. We'll try to stick with that agenda we have for tomorrow. So thanks, everybody. Thanks, Frank, I'm sure it's late your time.

MR. WINCHELL: Okay, yes.

MR. GILBERT: And John.

MR. JANGALA: Thank you guys.

MS. MCGREGOR: Thanks.

MR. GILBERT: Thanks a lot now, okay, appreciate it.

MR. WINCHELL: Bye, bye.

MR. GILBERT: Bye, bye.

1:53:24

(Off record)

**SESSION RECESSED**

