ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT
SETTLEMENT PROCESS

POSITION PAPER DISCUSSION MEETING #2

March 11, 1985

Northern Lights Inn
598 W. Northern Lights Blvd.
Anchorage, Alaska

Old Business: Deferred

New Business: Position Papers W-7, W-9, R-1, F-2.2, F-2.3, F-2.4, F-2.5

A T T E N D E E S

Bob Adler, Trustees for AK
Tom Arminski, APA
Bruce Bedard, CIRI Villages
Fred Chanania, PM&S
Jim Dischinger, APA
Chuck Elliott, HE
Randy Fairbanks, HE
Gene Gemperline, HE
Larry Gilbertson, HE
Chris Godfrey, EPA
Carol Gorbics, Corps
Mike Granata, ADNR
Dick Haggart, BHB
John Hilsinger, ADF&G/CF
Hank Hosking, FWS
Leroy Latta, ADNR
Eric Marchegiani, APA
Mary Maurer, ADNR/DGGS
Tom Mears, CIAA
Dallas Owens, HE
Kellie Rixse, HE
Jack Robinson, HE
Dan Rosenberg, ADF&G
Ben Rosenthal, NMFS
Phil Scordelis, HE
Brad Smith, NMFS
Tom Stuart, HE
Rick Suttle, HE
Jim Thrall, HE
Dave Watsjold, ADF&G/SF
Jim Wolfe, FMAA

ALASKA POWER AUTHORITY

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April 4, 1985
Susitna File No. 1.8.1/6.18.8.2/1.17.4.2

Mr. Dan Rosenberg
Alaska Department of Fish & Game
333 Raspberry Road
Anchorage, Alaska 99802

Subject: Susitna Hydroelectric Project
Settlement Process: Second Position Paper
Discussion Meeting Transcript Errata Enclosure

Dear Mr. Rosenberg:

Please find enclosed for your use one copy of an errata enclosure for the Second Position Paper Discussion Meeting Transcript.

Sincerely,

James B. Dischinger
Project Manager
Susitna Hydroelectric Project

jmo

cc: T. Arminski, Power Authority
J. Drennan, PMS (DC)
C. Curtis, VFSC&L (DC)
J. Lowenfels, BHBP&A
W. Larson, HE

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

SETTLEMENT PROCESS

POSITION PAPER DISCUSSION MEETING #2

Transcript Errata

Page	Line			
62	10	"stowing"	should be	"storing"
69	6	"KC6"	should be	"Case E-VI"
69	15	"KC"	should be	"Case C"
70	23	"KC6"	should be	"Case E-VI"
70	23	"KC"	should be	"Case C"
85	19	"KC"	should be	"Case C"
85	21	"KC6"	should be	"Case E-VI"
92	7	"KC"	should be	"Case C"
93	1	"KC"	should be	"Case C"
97	25	"KC"	should be	"Case C"
98	3	"KC"	should be	"Case C"

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

SETTLEMENT PROCESS

POSITION PAPER DISCUSSION MEETING #2

8:30 a.m.
March 11, 1985
Alyeska Room
Northern Lights Inn
Anchorage, Alaska

GEMINI
Reporting Services
943 West 6th, Suite 110
Anchorage, Alaska 99501
277-8591

PROCEEDINGS

MR. ARMINSKI: This is the Alaska Power Authority's second position paper discussion meeting. We're glad you could make it this morning. Would you make sure that you take the name card in front of you and put your name on it so that the recorder can note your name so that when we prepare the transcript we know who said what.

UNIDENTIFIED: Tom, if we run out of room we should have some of the staff make --

MR. ARMINSKI: Right. Okay, at this time I'd like to introduce our project manager, Mr. Jim Dischinger, who will make some opening remarks. Jim.

MR. DISCHINGER: Good morning. For those of you who were here at our last meeting, I want to thank you for the good discussion we had. For those of you who are new here at this meeting, we'd like to have that type of discussion and really get some meaningful information this morning. Thank you very much.

MR. ARMINSKI: Okay, for those you that weren't here last week, I'll just kind of go over this briefly, what we're going to try to accomplish today. We're going to discuss each of these position papers that were distributed a couple weeks ago. And if you look here or one of these pages that were on table, we've got some goals that relate to each one of these. And what we'd like to do is to try and resolve these issues if

possible. If you agree with our position, don't see any data gaps, whatever, if we can get some agreement we'd like to do that. Lacking that, we'd like to identify any data gaps that you feel are in the paper, review the analytical methods, decide if they're appropriate or not, talk about the mitigation measures that we've proposed. There may be some other mitigation measures that we haven't thought of that you may feel are appropriate. And the last two things we'd like to do are agree on how we're going to -- or, what type of settlement instrument we're going to use for each of these issues. For example, we talked about maybe a letter between an agency or an intervenor that says "we agree with you, this is not an issue, the mitigation you've proposed is adequate". Or else the resolution of these issues may be addressed in a great big formal settlement document that's presented to FERC during the licensing process.

We'd like to try and resolve exactly what means are appropriate for each of the entities to agree that this has been resolved.

Let's see. The Susitna Settlement Plan, I think you've all received a copy of that. Basically it's the intent of the Power Authority to identify and resolve these issues with all the parties. We plan to do this by discussion of these position papers and go through this process that I've just mentioned, identify data gaps, agree whether or not mitigation's appropriate and execute some sort of a settlement instrument. So I won't

dwell on that.

The -- One of the things that we've felt is necessary to do is develop a preliminary position endorsement matrix. We understand that a lot of us here are staff level people and can't speak for our organization or agency. And so at this time we may not be able to reach any sort of official agreement on an issue. This would be -- the position or the agreement would have to be elevated through our board of directors, directors, regional supervisors, whatever. But to allow us to proceed through this process, we've developed this preliminary position endorsement matrix, and a copy of that is on the -- in the back of the room there, and there's also a reduction on the table here. And basically all that does is list all the issuess on one axis and all the participants on the other axis. And it's just sort of a score-keeping card to give us an idea of where we are on each of these issues. And, for example, if you agree that this thing is resolved, you can put your initials in there that you agree or, if you disagree, you can put that in there. If you're not -- you know, if you don't care about that issue, if it's not one of importance to you, you can -- you can denote that. It's just a way of ours so we can keep track of where things are at in this process that's going to take several months.

MR. ROBINSON: Tom, you might want to mention that during the process that we go through, anyone that initials the matrix can feel free at any time to come and take their

initials off or change the preliminary -- their preliminary judgment on the Power Authority's position. So that later on in the settlement process if some things come to light that you feel influence your preliminary endorsement in any way, why, you can make those adjustments on the matrix.

MR. ARMINSKI: Okay. Old business. What we had decided to do here is that in the preceding meeting we had some suggestions on how these position papers needed to be modified, or there were some additional mitigation measures that were brought up. And we felt the best way to carry that on into the future is to revise these papers and we would discuss those revisions under old business. And I see that we don't have any of that completed today, so we're not -- I just mention it. But in the future we'll discuss those changes under old business.

So, moving right into new business, it's the discussion of the position papers. The first one is the significance of inundation or other disturbances to bald eagle, golden eagle and other raptor's nests. And it's our position that our mitigation measures that are proposed in this paper will mitigate the impact of the project on raptors. Let's see, Chuck is going to discuss that. Chuck?

MR. ELLIOTT: At the very beginning of it here, I believe in your packages you received a copy of W-7 some time ago. In the process of going through it and reviewing it, I came up with egg on my face, because a couple pages did not

include an expansion in the mitigation measure discussion about what will be done for a certain number of the nests, and that's what this paper being circulated now is. Basically it's an exact copy of the one you received, but there's a -- on pages 13 through 16, some of the mitigation measures there are expanded to address nests and in a worst case situation, that if they do get a -- if they are vulnerable to disturbance from borrow sites, what will be done. I'll address those as we go along.

But basically the paper talks about middle -- the middle basin was surveyed for raptors, 1974, 1980 to '81 and 1984. 67 raptor and raven nesting locations were reported. There are 23 golden eagles nesting locations in or near the project area, at least five of these locations will be inundation, five to seven, which represents three to four pairs of eagles, and two nesting locations will be partially inundated. As you read in there, a nesting location consists of a number of nest sites. And when we say "partially inundated", one next site out of three at a location would be affected by the project. There would still be next sites available.

Ten bald eagle nesting locations have been found in or near the project area. Three will be inundation, which represents two to three nesting pairs of eagles. One location may incur some damage because the maximum level of the water will occur -- will be at the base of the tree. And one location may be vulnerable to disturbance because of the railroad.

Peregrin falcons do not appear to nest within the project area because -- apparently because of the lack of suitable habitat. Six gyrfalcon locations have been found, one would be lost due to the project. Three goshawks locations, two would -- two nesting locations would be lost. And 25 raven nesting locations, of which 12 would be lost.

Oh, and the paper that you're receiving, the text on Page 13 through 16, the main body of the text address these nesting locations, three golden eagle, one bald eagle. On Pages 13 through 16 in the copy that was handed around to you. We addressed the idea that if borrow activities were to interfere, we took a worst case situation, talking to the engineers, that would they be able to keep outside of the distance bounds that we wanted to to make sure there was no disturbance to the nests. They could not guarantee that that wouldn't happen, so we addressed these nests as a worst case situation, if they were disturbed, what would be done. It had already been discussed in the text, it was just in the mitigation measures that they needed to be further discussed and enhanced, and that's what that revised paper is that you're getting around.

MR. BEDARD: I have a question on -- I noticed in the report that the bald eagle, there were two new sites. And the question is, a lot of these sites that you're talking about that's going to be lost had been inactive, some of them quite a few years. And I find it interesting that the bald eagles

didn't use those existing sites and created new sites. It gives me the indication that the bald eagle will go to new locations regardless whether there's old sites or not.

MR. ELLIOTT: They will. Oftentimes they'll have more than one nest site, and they may have up to three or four and use one one year and not reuse it for four or five years, or at all. But the possibility that the ones that are going to be affected may not be used or -- you know, for a number of years is -- you know, is real. But they do come back and reuse them and so they had to be considered. But a number of the nest sites, both golden eagle and bald eagle, will do this, have a number of nests and they'll use maybe one of them and then not come back to it for three or four years. But they do have a number of nests that they do not come back to for quite some time.

MR. HOSKING: What sort of plans do you have for establishing artificial nesting to see if these bald eagles are going to, in fact, utilize artificial nesting trees and this type of thing?

MR. ARMINSKI: You mean prior to initiating the project mitigation?

MR. HOSKING: Would you wait until you have a license in hand, this type of thing? Would you start in the fall of '85 or what might the plans be for that?

MR. ARMINSKI: Well, we did have that discussion with you and Larry over at the Fish & Wildlife Service, and

I -- you know, that is one thing that we might look into, is establishing trials in this area to see whether or not in fact the eagles will utilize these nest sites, the artificial nest sites. And I've not -- I don't think we've come to a decision, at least in our own minds, whether or not to exercise that option at this time yet.

MR. HOSKING: Okay, that's -- that's my question, to see if you have made any further decision on when this might be --

MR. ARMINSKI: No, we haven't.

MR. HOSKING: -- established. I'd like to recommend that we start in the fallk of '85.

MR. ARMINSKI: Any other discussion? Get some agreement that the mitigation measures that we proposed are appropriate?

MR. ROSENBERG: Yes, I agree with that. I do support what Hank is saying, though, also, that some sort of trial -- experiment, you know, some experiment be done prior to construction.

MR. ARMINSKI: One other -- I guess, Hank, this --

REPORTER: Could I find out who he is?

MR. ARMINSKI: Dan, would you put your name on your name card? Dan Rosenberg. Would you suggest that this experiment be conducted within the project area? We had some

discussion whether or not to do this near Tanana as well. Do you have any feelings as to which is the more appropriate place to do it?

MR. ROSENBERG: No, not really. What were the reasons why not to do it in the project area? Were there reasons not to do it in the project area?

MR. ARMINSKI: No, there weren't any reasons not to do it -- well --

MR. HOSKING: -- Access and that sort of thing, getting in there.

MR. ROSENBERG: Yes.

MR. FAIRBANKS: There's one other reason, too, and that is that it may be difficult to conduct an experiment where you -- you know, when the reservoir causes the lost of these nest locations, the eagles are somewhat more highly motivated to look for, you know, new nesting locations. So without having a loss of their existing locations, you know, putting in artificial nesting locations in an area won't necessarily attract eagles away from their existing locations. So we were thinking that there is -- there are some sites along the Tanana that may be subject to loss due to river action and blow-down. We were thinking it may be more appropriate to go into a place where a nest is actually lost and so obviously the eagles are much more highly motivated to seek out a new location.

MR. ROSENBERG: The only one I was maybe

curious about like I know Portage Creek was one of the proposed areas, just because there was a -- everything seemed right except that there were nest sites may have been eliminated. And I think that might be interesting, to see how well that -- how that works, attracting additional pairs. But I have no real problems with trying it up in Tanana.

MR. ARMINSKI: Any other comments on W-7? Let's see, on -- This is a -- I won't say it's peculiar but this is an item that would be addressed through the Bald Eagle Protection Act, and would, in particular Hank, you agree that the way that -- or, the instrument to settle this would be the permit that we seek with the Fish & Wildlife Service?

MR. HOSKING: (Nods affirmatively)

MR. ARMINSKI: Okay, the next paper for discussion is W-9, this is the significance of reduction in wildlife habitat due to construction camps/villages, permanent town and airstrips. Our position is that the mitigation measures that we've proposed in this paper would minimize the loss of this habitat, and furthermore, that the habitat is not unique or biologically significant, and that anything that can't be restored on site would be offset by the enhancement of other areas. Chuck, are you --?

MR. ELLIOTT: The paper utilized wetland mapping providing by the National Wetland Inventory team of the U. S. Fish & Wildlife Service. And basically we used the

information provided for facility sitings and sizes presented in the license application. And using that design for facilities and the wetland mapping provided by the Fish & Wildlife Service, approximately 26%, or about 146 acres, of wetlands will be impacted by facilities as they are currently designed and located. The areas -- the wetland areas considered are not what you would consider unique wetlands in terms of what are we talking about when we're talking about unique. The idea of looking at it in terms of waterfowl breeding areas, such as -- well, what I'm familiar with, with prairie pothole regions. There are -- the wetlands up there are primarily saturated shrub and emergent bog where there's no real standing -- large standing surface water, but the soils remain in a saturated state. More of what we think of as a bog. Primarily birch shrub, sphagnum, sedges and blueberry. And as a result of the facilities as they are designed now, about 146 acres of wetland would be impacted.

MR. ARMINSKI: Do you want to talk about the master plan?

MR. FAIRBANKS: We might mention that Harza-Ebasco is in the process of preparing a master plan for project facilities, and that master plan will include support facilities at Watana. That master plan will include a re-evaluation --or, that effort will re-evaluate the siting of these facilities and one of the criteria that we will use will be wetland habitats and other unique habitats when we're re-evaluating the locations

of these facilities, and that will include the camps, the airstrip and I think the access road. That re-evaluation, I think, is scheduled to take place this summer, and be completed by the fall.

MR. ARMINSKI: Any comments on this?

MR. ROSENBERG: Is that road on the south side of the river going to remain? What's also going to happen to the -- you know, this just includes the camps and what about all the roads in between and other -- any other -- well, primarily the roads, but what else might be out there?

MR. ARMINSKI: Okay, the master plan basically addresses all the things that'd be required to build the Watana phase of the project. When Acres (ph) prepared the license application it was basically a paper exercise. They took the maps and sited things on paper as best they could. There's been a lot of concern raised about, you know, things being located in wetlands and, in addition, from an engineering perspective, you know, for example the borrow sites are much larger than they need to be, just to demonstrate that, you know, it's feasible to build the project. You know, the road may cross wetlands, whatever, and both from a biological perspective and an engineering perspective, that's not really the most desirable way to go. So the intent of this master plan is to go out, look at the material sites, the locations of the permanent and temporary facilities, the roads, I imagine, that would go between them, and the access road for some realignment and relocation of those sites.

So that from the -- from an engineering and biological perspective we've got the best site plan.

MR. ROSENBERG: And what about rehabilitation of the camps south of -- say, for Devil's Canyon south of the river there?

MR. ARMINSKI: Okay, that's not addressed in this phase of the master plan.

MR. ROSENBERG: Okay, that'll just be addressed later on. But what's the intent there, do you know?

MR. ARMINSKI: I think what we're going to do is just go with what we've got at the present time. In detailed design we'll probably have to address that, but Watana being something that needs to be gotten underway quickly, we're working on the master plan on that.

MR. ROSENBERG: Okay. Is that road going to be a permanent road is what I was --

MR. ARMINSKI: Between the two facilities?

MR. ROSENBERG: Well, yes, to the camp that will be the construction camp, Devil's Canyon.

MR. ARMINSKI: Yes, that would be a permanent road.

MR. ROSENBERG: The other -- a couple of other comments on this. One was just some of the things that were listed as mitigation just really weren't -- really weren't mitigation, I don't think. Such as there's one about improving

the quality of the maps and they were steps towards various mitigative actions, I think, but they really weren't mitigation per se, and they were just listed under -- under mitigation for the project. Find that page.

MR. HOSKING: 6.

MR. ROSENBERG: Oh, thanks. Oh, like Number 8, refine high resolution wetland maps of the project area. And then -- well, that was -- that was the main -- some of them just didn't go quite so far, as Number 5, develop -- rather than develop and say implement a comprehensive site rehabilitation plan, but -- just minor points as to -- I didn't think all of these things that were listed as mitigation measures really were mitigation measures. And the other thing was that it is stated that the locations where facilities are sited do not contain unique or otherwise high value wildlife habitat or known special use areas. And apparently some of those areas are valuable foraging areas for black bears, and I'm only bringing it up as that I just don't think the statement is all that accurate. I don't think the conflict is something that really -- probably can't do a whole lot about, but in the bear reports, those areas were mentioned as valuable foraging areas by black bears --

MR. ELLIOTT: Yes, there are some --

MR. ROSENBERG: -- in July and August.

MR. ELLIOTT: Yes, some of the borrow sites. I guess what kind of got -- I was so into wetlands, I kept thinking

about wetlands and waterfowl, essentially, but yes, there are. You're right.

MR. ARMINSKI: We can make that revision.

MR. ELLIOTT: Yes.

MR. LATTA: Tom, could we make one other revision to Page 7? Could we change "compensation lands" to "mitigation lands"?

MR. ARMINSKI: In Number 9?

MR. LATTA: Yes.

MR. ARMINSKI: Okay, I guess, at least as far as the type of instrument that would be used to agree on the settlement, I see several things. First would be the Corps of Engineers wetlands permit, and that would -- we have a public review on that, interagency review. Second would be any state permits for rights of way, leases, materials sites, those sorts of things, which would also undergo interagency review. And I think both of these permits would have -- I assume would include mitigation measures to reduce or minimize impacts, as well as stipulations for restoration after the activities had ended. Is that correct?

MR. LATTA: Depends on the -- you know, what we agree to as the overall mitigation plan. It may just include that, we may not need anything more specific. We're still talking to Eesh (ph) about exactly how we're going to deal with all that.

MR. ARMINSKI: And I guess the third item

would be the overall mitigation plan with agreements on mitigations lands and restoration.

MR. ROSENBERG: What was that? Would you go through that one more time?

MR. ARMINSKI: Okay, I guess basically I saw three things being the instruments to address this concern. One would be the Corps of Engineers permit for wetlands disturbances, second would be any state permits for land use, primarily DNR's permits, and then the third thing would be the overall project mitigation plan, terrestrial mitigation plan within the agreements on mitigation lands.

MS. GORBICS: I would, just from the Corps' standpoint, like to agree with Leroy. The more that we can finalize here, the less we have to worry about in our permit. You know, it could be part of the project instead of part of the permit.

MR. LATTA: Right, we can keep it down to three or four pages.

MR. ELLIOTT: Just this one point while we're here if you want to take a break, an example we'll have here, if anybody would like to see an example of the detail of the wetlands mapping that's being done for the project area. We just brought some examples if anybody would like to see them.

MR. ROSENBERG: That was a problem -- a question I had. Will we be able to get these maps?

MR. ELLIOTT: Yes, I think there's 13 --

MR. FAIRBANKS: Fish & Wildlife Service is completing them right now. We've got three of the mylar versions and we can make paper copies of three of the quads right now. And the other ones are coming in weekly, just being printed up right now. So it's just a matter of weeks before we get all 13 quads.

MR. LATTA: Tom?

MR. ARMINSKI: Yes.

MR. LATTA: I should've brought it up under old business, but I'd like to discuss W-5 when we get through with these for just a moment.

MR. ARMINSKI: Anything else on W-9? Okay, R-1 is the significance of impacts on fishing, including availability of fish, access and quality of experience. This relates to recreation. Our position is that our proposed mitigation measures adequately address the impacts and that the overall effect of the project on recreational fishing would be a positive impact. Rick?

MR. SUTTLE: I think it's important to focus that R-1 is -- as Tom mentioned, it's on the activity or the opportunity for fishing. And basically our findings in this paper were based on a number of the fishery impact studies that's in the license application, as well as a number of the recent fishery studies that were done, and a couple of those are -- those are

listed in the back of this paper. This information was also considered then in conjunction with a lot of the use and demand studies that was done in Chapter 7, the recreation chapter, of the license application. And a lot -- these estimates were based on 1981 ADF&G statewide harvest studies, state comprehensive outdoor recreation plan, and in particular the participation rates of those -- that was listed in those. And some recreation data and projection methods that were developed by the Soil Conservation Service in a Susitna Area Basin Cooperative Plan done in 1978. And then also discussions with local sources on refining capture rates for the project area.

Basically the findings, as we mentioned, if we break it down into three areas, it's our -- it's our position that the downstream areas downstream of Devil's Canyon, that the opportunities for fishing will not be affected to any great degree. Reservoir areas, there's very little use there now because of the remoteness, limited auto access. And basically even with the reservoirs people will still be able to fish into those tributaries where they go now, like Kosina Creek. The upper basin area, or the area affected by the access road, will be the area that's most affected for opportunities for fishing. And there'll be a significant increase in the opportunities for fishing in that area. And we realize there that some management -- types of management, and that's what reflected in the mitigation measures in this paper, will be needed there, particularly for Deadman

Creek, where there's trophy-sized grayling. We want to maintain that management and the mitigation is -- that we recommend there is to recommend to the Board of Game that that be set up as a catch and release type fishery. That's basically it.

MR. ARMINSKI: Dave?

MR. WATSJOLD: I'm raising my hand. I'd like a little -- hear a little bit more about this propagation program proposed up there. I see you got introducing rainbow trout again, and you're talking about introducing rainbow trout in the reservoir, to create a rainbow trout fishery in the reservoir? Is that what the goal is, that option?

MR. SUTTLE: Larry, do you want to --

MR. GILBERTSON: Well, that's just one of the options being discussed, and, you know, it hasn't been officially set aside, so we just continue to include it as an option.

MR. WATSJOLD: Well, I don't believe that's even a viable option in the reservoir at all.

MR. ARMINSKI: Well, I think we've talked about this before. Is this -- should we just forget about that from now on?

MR. WATSJOLD: Yes, I was surprised to even see it in here.

MR. ROSENBERG: We've commented on that, you know, a few times in the past --

MR. GILBERTSON: We'd be happy to drop them

because I agree with you, I don't think that's a very viable alternative. We keep including it just because it hasn't been agreed by everyone that it ought to be dropped.

MR. WATSJOLD: Okay, the other one in there, propagation -- the stocking of lakes outside the project area. Can you go into that one a little bit more?

MR. GILBERTSON: Well, again, that's the same thing. We brought it up in the mitigation workshops and it's proposed as an option for mitigating for effects. And so we just continued to list it as an option until everybody agrees that we ought to pursue it or drop it.

MR. WATSJOLD: Well, we've got a very active stocking program outside the area from Talkeetna all the way into Anchorage right now that's probably pretty much maxed out. I don't think you could create any more than we're -- the Department's already creating out there now as far as stocking outside the area.

And then Number 3, the project area lakes near proposed recreation camp sites and trails will be stocked. Is this a stocking or are you talking about a maintenance-type stocking or where you're stocking from year to year? Are you talking about getting new populations established in lakes in the area? My impression is there's very little -- very few lakes that you'd be able to stock that already have fish in them to create additional fishing up in that reservoir, and there may be some lakes

up there that are landlocked that would create -- you could create catch and release fishing -- or, just put and take fishing, but being that the effort's going to be extremely light up there, the cost benefit of such a stocking program would be extremely low. I just don't see very much opportunity to work with area lakes up in the impoundment area, in those high-altitude lakes.

MR. SUTTLE: Dave, I think that's something that we do need to look at. There's -- for instance, in the recreation plan there's a camp site proposed on Mermaid Lake, and I think, you know, the benefits for fishing need to be looked at, you know, in terms of that lake. Are there -- are there, for instance, sufficient stocks in the lake now that they can derive that benefit from, or is it worth even proposing stocking?

MR. WATSJOLD: What's in Mermaid Lake right now?

MR. SUTTLE: Well, that's the thing, I don't think that's one -- in some of the access -- in some of the aquatic studies, I don't think that's one that has been looked at yet for any fishery potential.

MR. WATSJOLD: Well, right now from what I've seen the opportunities are extremely limited up there for that type of program. And of course, this Number 4, contingent on stocking rainbow trout in the reservoir, creating boat access in there, so if we're not going to consider rainbow trout in there, I don't believe that's a viable option there.

Number 5 in here, you've got additional access will be developed through trail and trail-like (ph) construction to streams identified in the project area as having recreational fishery potential. I discussed a little bit before about outside the project area access, and I know I was contacted after the mitigation meeting about my ideas on access outside the area. Is this still an option that we can look at or -- right now we've got identified additional access in the project area. I don't know where you're at in that program. I know I've provided some information on my thoughts on the access.

MR. ARMINSKI: Yes, I think it's still a consideration.

MR. WATSJOLD: Outside the project area?

MR. ARMINSKI: Sure. At least from --

MR. WATSJOLD: It's not listed in here at all and I think there should be some mention of it in there. As far as I know, you talk about including it in your mitigation, the mitigation plan that comes out. Because that's what I'd look at as a real viable opportunity, looking at recreational access outside the project area.

MR. ARMINSKI: Well, do you think that we should just -- or, basically the Fish & Game's position would be to forget about enhancement within the project area and focus on --

MR. WATSJOLD: Well, there may be some real

limited, like -- well, some of the roadsides, there may be some very isolated -- I don't think they're very large. I mean a very limited opportunity. I'm not familiar enough with all the lakes that have been looked at up there, I'm not sure whether all the opportunities have been looked at yet.

MR. ARMINSKI: Yes. Well, you know, I think, as Rick mentioned, that additional opportunities are going to be developed, for example on Deadman Creek. But we were trying to focus on creating some additional opportunities as well.

MR. SUTTLE: Number 5 here basically addressed the -- I think the transmission and access aquatic investigations report where in there there were identified some additional streams along the access quarter that may have recreational potential based on the investigations. And so that's the thing that this particular Number 5 here is addressing.

MR. WATSJOLD: Oh, okay. Yes, I read that report.

MR. SCORDELIS: Dave, there are, I think, two lakes near Watana camp, High Lake or Highest Lake, a couple of those lakes in there do have rainbow populations in them now. So that might be a particular area where a trail head and then a maintenance stocking might be effective.

MR. WATSJOLD: Have an airstrip right by High Lake. I'm not sure what the access is, whether it's --

MR. SCORDELIS: There's one there now?

MR. WATSJOLD: Yes, there's a lodge and airstrip at High Lake. I'm not sure how -- whether the average person could go up and land on that airstrip or not, I don't know what the status of that is. And the one here, I know we discussed this over and over about a year ago, and I was rather distressed to see a mitigation option in here, this catch and release fishing proposed to the Board of Fisheries. We don't feel that recommending management proposals to the Board of Fisheries should be a mitigation point in this -- in your plan. Certainly something would have to be done to manage those fish in Deadman Creek, but we feel that's our option to go into management and make the recommendations in there, and we don't necessarily agree that catch and release fishing would be the mitigation -- or, the management method we'd want to use up on Deadman Creek. And I don't feel that's appropriate to be in this plan at all.

MR. ARMINSKI: Okay, would you -- would you say that, then, as far as Deadman Creek goes that we not propose anything, basically, and that the Department of Fish & Game would take care of that through its own management efforts?

MR. WATSJOLD: Yes, I don't think -- I don't think it's a mitigation option that you have to recommend the proposal to the Board of Fisheries. We'd certainly -- I know I certainly would go in and, since it is a real unique population, we're familiar with the grayling population, it can be easily overfished, we would certainly have to recommend special

management on the stream as far as maybe spring closures, maybe terminal gear or -- this catch and release fishing also causes mortality also and it's a situation where we don't want to see catch and release fishing, because it's a -- strictly catch and release year around if it does mortalities. So it may take a number of different management options to look at to protect that population. I can't agree with just looking at catch and release fishing under that.

MR. ARMINSKI: Okay, but I guess the point is is that they --

MR. WATSJOLD: -- It be left out. I'd just as soon leave it out of there and have us worry about it.

MR. ARMINSKI: Okay.

MR. THRALL: Dave, would you like to not see it mentioned at all in that context or --?

MR. WATSJOLD: Yes, I would. We went around and around on this about a year ago about management regulations and mitigation options, and I don't think it should be included as a mitigation option.

MR. THRALL: Okay, but in that context would you have a problem with it being mentioned at other -- in another part where the Power Authority simply mentions that --

MR. WATSJOLD: -- Well, that it be regulated --

MR. THRALL: -- that the Power Authority assumes that the Fish & Game will develop a management strategy.

There's a number of places w re this sort of similar thing occurs, and I think the Power Author y's intent and thought has always been they don't -- they don' want to infringe, but they at least want to mention it in their c scussion or project impacts, not just leave a blank there.

MR. WATS OLD: Oh, yes, that's fine.

MR. THRA L: So your problem is more with mentioning it as a mitigatio option and --

MR. WATS OLD: -- Right --

MR. THRA L: -- say, trying to put words in the Fish & Game's mouth?

MR. WATS OLD: Um-hm, right.

MR. ARMI SKI: Leroy?

MR. LATT In terms of Item Number 1 with the camp sites and trails, I lked to our parks people and generally speaking they're nc opposed to it, but by the same token they want to be sure th they're involved in the development of the plan and that als the Borough trails people be in contact. And any other lando ers. But I guess we have conditional, you know, okay on tha .

MR. SUTT : And that will be carried through.

MR. LATT Yes, I assumed it would.

MR. WATS OLD: There may be still some limited opportunity with grayling Of course, our hatchery that just started has been developing a rayling fingerling. We've never

been able to grow them up past about four or five days. And we're into a research program evaluating how this is going to affect our whole program. Up 'til now stocking grayling out in any waters after they've just hatched (ph) out has been just a waste of fish. And the grayling that we're developing now, it looks like we might have some more opportunities to be able to put them in with waters that already have existing fish in them, like rainbow trout in there. But right now we're just starting off a new program and I'm not sure where it's going to fit into this mitigation option, but it certainly may be a possibility.

MR. ARMINSKI: Is there anything else? Any other comments?

MR. ROSENBERG: You did -- excuse me. You did have a number down here for a 30-inch grayling.

MR. WATSJOLD: Yes, I forgot about that one. It says 30-inch grayling, would really -- really have something there. On Page 3 of that, there's a 30-inch grayling.

MR. ARMINSKI: Well, they are trophy, right?

MR. SUTTLE: I think that's the one Larry caught.

MR. WATSJOLD: Did you let it go?

MR. BEDARD: I've caught them 24 inches in that area, though. I don't know about 30.

MR. ARMINSKI: I don't see this particular item being addressed through any permits, so I imagine that this

would be part of any overall mitigation agreement that would -- we'd submit to FERC. Does anybody have any feelings on that that that's not appropriate?

MR. ROSENBERG: One more question on the subject if the inundation of the Deadman Creek falls allowing fish access up into the lake. Will that be discussed under another issue?

MR. GILBERTSON: Yes, that's being discussed, we've got an impoundment mitigation position paper coming up it'll be mentioned in.

MR. ROSENBERG: That'll be in that one? Okay.

MR. ARMINSKI: Okay, let's move on to F-2.2, this is a discussion of potential changes in pH due to the project and the significance of impacts on salmon and resident fish habitats downstream of the dams. Our position is that there won't be any significant pH change and therefore there's no mitigation proposed. Tom Stuart will discuss that.

MR. STUART: I think the question about this issue originally came up when we were answering agency comments. Someone asked what the impact would be of flooding acidic bogs in the reservoir inundation area. So what I was trying to do was just a little rough calculation of approximately what the acidic bog area is, and it's less than 3% of the inundation area. And then in the paper we just remind you that it's kind of a basic

tenet, a fundamental truth, that the pH of a system is determined by the geochemistry, the climatology and the hydrology of the entire basin. And if you flood or inundation some acidic bogs the water coming out of the entire drainage still has enough alkalinity to buffer the system within the same pH ranges that it is now. The pH's in the system, according to Fish & Game data and R&M data and USGS water quality data ordinarily range between 6 and 8, with a mean of greater than 7 for virtually all the areas of the drainage basin. And we're talking about the alkalinities are almost always in excess of 20 milligrams per liter calcium carbonate, they're frequently 50 to 100 milligrams per liter of calcium carbonate. So we don't expect a pH change.

MR. ARMINSKI: Comments? Disagreement?

MR. ROSENBERG: No, I have no disagreement.

MR. ARMINSKI: Can we drop this thing as an issue?

MR. HOSKING: Yes.

MR. ARMINSKI: Yes?

MR. WATSJOLD: Suits me.

MR. ARMINSKI: Okay, good. Okay. Next paper is F-2.3, this relates to heavy metal concentration due to this project in salmon and resident fish downstream of the dam. Basically, our position is that the project will not substantially increase the concentration of heavy metals, although some might be expected to occur. We don't propose any mitigation other than

to monitor the fisheries -- or the fish downstream to determine if there is an bioaccumulation. And Tom Stuart will discuss this one as well.

MR. STUART: Again, an examination of the data collected by the USGS and R&M Consultants and ADF&G, it looks like the four metals that are probably a potential to give us any harmful impact would be probably mercury, copper, cadmium and zinc. And of those four, the only one that is really consistently known to increase in higher trophic level by a process by bioaccumulation or concentration is mercury. Mercury has been consistently found to increase in fish tissues when you build a new impoundment, so it's only reasonable to expect this will occur here also.

We have proposed that this may be a potential happening and that we monitor the fish populations of selected sport fish, probably, for their total mercury concentation in the fish flesh, or perhaps even narrow it down to just methylmercury in the fish flesh. If levels appear to be gaining a concentration in excess of .5 parts per million in fish tissue, I think the only way you probably can mitigate for this problem at the moment is -- that I can think of, is to educate and warn the public that the Environmental Protection Agency recommends that you not eat a considerable quantity of this material, like more than two meals a week, I think it is, of fish flesh that has .5 parts per million of methylmercury in it.

I don't know that it's going to happen. I don't even know that it's a problem right now. We haven't any -- as far as I know we don't have any baseline information about what the mercury concentration is in the fish out there.

Another consideration is that it's primarily a potential happening mostly in resident fish. The salmon that most of us are concerned about in this system, of course, are anadromous and they would pick up their mercury concentration in the ocean. They might come back 30 or 40 parts per billion. That's, I believe, what number that I see in the literature for salmon mercury concentrations. But the project won't affect the mercury concentrations. The resident fish, on the other hand, that live in the system have a potential to increase mercury, and the potential is unquantifiable. We can't guess about how much it might go up or down with construction and operation of the project.

MR. ARMINSKI: Any discussion?

MR. SMITH: Is there any way to mitigate if you do have a problem? Is there any way that that material or that metal is exported out of the system? Does it tend to concentrate in certain layers within the reservoir?

MR. STUART: I don't think that all the facts are in yet, but a decade's worth of study has shown that there are perhaps two ways to potentially mitigate this problem, that I've seen, anyway, talked about, and one of them has been studied. There's an interesting interaction with selenium. The Canadians

have found that you can potentially possibly add selenium to a system that may be creating a mercury problem and for some reason that it lowers the toxicity level or inhibits the binding of methylated mercury to tissues in higher organisms. It kind of reduces the ability to bioconcentrate mercury.

The second method, which has been tried and is successful in point source pollution areas, for example, is to simply cover the area with an inorganic sediment blanket. And that keeps the organic materials that may contain mercury from being cycled back up into the water column and into the biological food chain. We're going to do that, I think, if we build the reservoir. So we think that's a way of minimizing the potential for a problem. We'll have a continuous rain of mostly inorganic sediment.

MR. ARMINSKI: Bob?

MR. ADLER: On Page 3 you have a whole list of metals that you discounted as being not particularly toxic. By definition, when a parameter exceeds the water quality standards it has an adverse effect on some water quality benefit, whether it be drinking water or aquatic biology. And it seems to me that you have to analyze whether or not any of these substances will exceed water quality standards. And if there's a current violation, whether the violation will be exacerbated. And I don't really understand how you can say they're not particularly toxic when the water quality standards define what's toxic.

MR. STUART: What we're trying to do is talk

about the most potential for a problem with these metals. All of the metals that are listed there on Page 3 have been found to exceed on certain occasions the water quality criteria that are listed, I think, by the Environmental Protection Agency and possibly by the state, since they're very similar, and maybe the same. Most of these -- I think you can consider all of them, probably, are naturally occurring in high levels out there. There's no industry, no source that I know of, no point source or spread out source for contamination of that drainage, except placer mining operations, perhaps, way up high in the drainage. This is a naturally occurring phenomenon. I'm really not sure how to address your question. Because it occurs out there naturally, I'm not really sure if it's an existing problem that we would enhance or make worse.

MR. ADLER: Well, have you done any analysis to determine whether a violation which is currently either marginal or, as you say, only occasional might become more severe or more frequent?

MR. STUART: Only a cursory type of analysis. We have noted that most of these metals are usually found in the particulate phase. They're usually attached to inorganic or organic particulates. And we figured that we will drop 7 to 8%, at a minimum, of the particulates that are coming down through the upper drainage in the reservoir. We'll probably not send them through, so we won't be exporting nearly as many metals. But

the lower river, for example, still has the same sediments and the same kind of geology as, basically, the upper part of the drainage, so the metals still exist down there. I don't think the problem will enhance or become greater than it already is.

MR. THRALL: Tom, is a part of this question of whether we're talking about these metals in a free ion -- free ionic form or in a bound form and then whether or not they're toxic or harmful in one form or another?

MR. STUART: That could be a factor entering it. We've done no analysis to find out exactly what kinds of compounds these metals occur in. We don't know whether they're chelated by organic humic materials or whether they're fast-bound and hard bound to a silicate material of any type. We don't know of any problems --

MR. THRALL: We have not been able -- Maybe I -- I don't want to put words -- my understanding is we've not been able to find mechanisms whereby you could conjecture that -- other than the mercury, I think, whether these things would become present in a toxic form due to the reservoir, is that --

MR. STUART: That's a fair assumption. We've never found anything yet that indicates any of the rest of these metals except mercury may reach a higher concentration and higher trophic levels. Mercury's the only one out of this list that consistently does that. All of them are potentially toxic. An excess of almost any kind of element is toxic. Too much oxygen

can be toxic too. But we don't know of any problems concerning these metals at the moment, and we don't expect that they will cause -- we don't expect that the project will cause an enhanced problem of any kind with element except perhaps mercury. And we don't even expect that to be a big problem.

MR. THRALL: Is that getting to what your question -- I want to make sure we're not talking on two different levels here.

MR. ADLER: Well, I think you're tangentially addressing my concern. But bioaccumulation is only one of the concerns in terms of water quality violations on going to higher trophic levels. The high levels of aluminum in a stream can have direct impacts on fishery populations. It's not just a question of bioaccumulation on -- And I appreciate that you don't currently think that there will be exacerbated water quality violations, but my point is that I think you ought to do some quantification on an analysis rather than simply saying there's natural violations now and therefore we don't need to worry about it. You have to understand that water quality criteria are inherently conservative indicators. And a currently marginal violation might not have a measurable impact on a population, but a more severe violation might. And so I think you need to address the possibility.

MR. STUART: I think we talked about a possibility of, if we create a long-term monitoring program, we may

monitor for other heavy metals besides just mercury in some index species, maybe a variety of sports species, like grayling and lake trout and burbot, rainbow trout, something like that. We can add a number of metal analyses to a mitigation program -- or, a monitoring program, for example, if it was necessary.

MR. THRALL: Yes, that would be no problem. I think the other part of it may be, as I'm now hearing what you're saying, is that we need to go back and maybe in this position paper formalize a -- we did go through an analysis of sorts that would lead us that we -- looking for mechanisms for any of these other things to become not just bioaccumulated but elevated, and could find none. And maybe we need to go back and formalize that argument in the position paper to demonstrate what our thought processes were by which we came to that conclusion. Is that --

MR. ADLER: Yes, I think so. Presumably DEC will be doing some of that analysis in the water quality certification for the project.

MR. THRALL: I'm sure. And then the other thing is that certainly there will be on-going water -- both water quality and this monitoring program for the fish -- or, mercury, but there'll certainly be water quality data taken from now into who knows when, through construction and post-project there will be programs, monitoring programs, that will include scanning for all heavy metals. So that will continue.

MR. MARCHEGIANI: If there's some type of

analysis that you are particularly interested in having performed or completed that would allay your fears or set a situation that would make you more comfortable with the analysis?

MR. ADLER: Well, the type of analysis you've done for mercury perhaps would allay my concerns on -- if you determine what potential for uptake for, say, aluminum is present in the system and what the chemistry of a cumulation of that substance in the stream would be, perhaps that would do it. I'm not a water quality chemist, so I can't suggest what analysis there would be.

MR. MARCHEGIANI: You have a general concern that there hasn't --

MR. ADLER: -- But I know that --

MR. MARCHEGIANI: -- been an analysis made and you'd like to make sure that something has been completed so that your concern is taken care of?

MR. ADLER: Well, I know what the law requires, and the law requires no violation of water quality standards for any of these parameters, you can't pick and choose. And I know that the law requires that in order for the project to be licensed you need to get a water quality certification from the state that those parameters won't be exceeded. And, you know, it's up to the chemists and biologists to come up with the data necessary to make that certification.

MR. ARMINSKI: Tom?

MR. MEARS: Yes, this is -- this issue is one that I would hope would not be brushed off, as the pH issue was. The explanation that he's used to get to the point of saying that there's little likelihood of any problem is to me unconvincing. It does not offer me any assurance at all that the thought pattern is correct there. I also think that the consequences of being wrong in this particular instance alone make it essential that this issue be carried forth and much better researched than it is currently.

MR. ARMINSKI: Okay, can you -- Maybe you could relate to Tom the faults in his argument that --

MR. MEARS: I'm not -- again, I'll let you all know that I'm not a water -- I'm not that much of a water chemist myself. It's just following the thread of the argument here it's not convincing, the way it sets up. Just because the area's cold and biological rates are going to proceed slowly doesn't in my mind therefore say that concentrations are going to be low. I mean, it seems to me that bioaccumulation's going to proceed at a slower rate to whatever the level it would proceed at a warmer temperature. That's -- Maybe -- like I say, maybe I don't know enough about the process, but that -- but the argument that because bioaccumulation is going to be slow means that it's also going to be low, I have a hard time following.

MR. THRALL: There's a couple things. There's always a bio -- there's always mercury, methylmercury being

produced in any system. When you inundate a new area with a lot of organic materials, then you have more organic material to work with and you get an increase -- you can get a dramatic increase where this starts to show up in the system through bioaccumulation. A reservoir's essentially an open system, an open ecosystem, it's not a closed ecosystem. So if you get this process going on, if it goes on rather rapidly, you'll get -- the concentrations will go up. Over time any reservoir should, as its organic materials is oxidized, broken down, this process should decrease. What we're talking about here is that it'll never -- because of the temperature it'll never get going at a rate fast enough so that you'll notice it to the degree you would if it were very warm water temperatures. At the same time you're covering everything up with silt and essentially isolating that organic material before it has a chance for the bacteria to act on it. That's the thread of the argument. Again, I --

MR. MEARS: Yes, the specifics of it get to be curious, though. It's hard to imagine that all these sites are going to be covered with silt, you know, a week after the gates are closed and the river's --

MR. THRALL: -- Oh, certainly not a week after, but also within a week's time you're not going to have any --

MR. MEARS: -- No, you know, that's what I mean, it's just not convincing to me the way it's presented,

that no harm, you know --

MR. THRALL: One other -- just make one other point, and I'm just trying to clarify a little bit of the though process. And that is, again, we're talking about levels possibly getting up to where, you know, a regulatory agency would advise you not to eat more than, say, two to three meals of fish a week that you're catching in the reservoir. We're not talking about particularly any evidence that we've turned up in the literature of downstream fisheries effects.

MR. MEARS: Is that because the literature doesn't address it?

MR. THRALL: It's never been identified anywhere as a problem that I know of with any other project. Now, again, we --

MR. MEARS: Well, in the Churchill River instance did they go look downstream for mercury or did they not? For mercury accumulation in the fish?

MR. STUART: To my knowledge they haven't looked downstream, but that doesn't mean they haven't done it, just because I don't know about it. All they've published at the moment is the enhancement of mercury concentrations in the reservoir.

MR. MEARS: Yes, I've read that part and, you know, it's one thing to say that the fish downstream were examined and there were no -- no increase in concentrations, but

it's another thing to say that the literature is void and therefore that's proof that mercury doesn't move downstream.

MR. STUART: Oh, I don't think I said that.

MR. MEARS: Well, that's the implication of what's being said.

MR. STUART: I think if you were to -- this is my own personal opinion and I can't really validate this or reference it anyplace, because I don't think anybody's done the work. If you don't increase the productivity of the river downstream, you probably won't see any higher mercury concentrations in fish tissue downriver than you do right now in resident fish. I don't know what's down there right now, I don't think any of us do.

MR. MEARS: You know, it's all these probablies that start bothering me.

MR. STUART: Well, this is all a probably, it's a potential. So we propose to monitor it.

MR. MARCHEGIANI: Tom, just out of curiosity, there's a couple different points to think about. One, if there is a problem, what do we do about it?

MR. STUART: Okay, there's --

MR. MEARS: Well, I guess what I'm saying is that if -- I would just like to be more assured that we're not going to have a problem, because I agree with you, there's really nothing that can be done about it.

MR. MARCHEGIANI: Right. So I guess --

MR. MEARS: And more clearly, then, it would be a -- you know, then we're setting it up to be more clearly a trade-off that society has to say is okay.

MR. MARCHEGIANI: Okay, so how about what we do is within this position paper what we try to do is allay your fears, and I don't mean just write it off by any stretch of the imagination, and try to put a little more explanation and analysis in here so that we feel more comfortable and you feel more comfortable with it. Okay, if that's what's there. I mean, I'm not saying that it's going to be one way or the other, but let us take a look at it and try to put something in. The second thing is that you've more or less agreed that there really isn't much that we can do one way or the other, but you want it defined, if that's what the situation is, okay, so that if it is a trade-off that people are aware of the trade-off.

MR. MEARS: Yes, I guess I would -- I guess I would feel better if the analysis that was presented here was on the order of complexity as of the ice formation process analyses that you guys did. I thought those were fantastic. I mean, that seemed to be something that I could understand and made sense, and this doesn't.

MR. MARCHEGIANI: What we need to do is do a better job of putting pencil to paper so that it's a little more understandable on where we stand.

MR. MEARS: Well, the other thing you've got to consider here is that if this issue is not well resolved at this point, it's one that anybody that wants to oppose this project takes out in and waves back and forth and beats you over the head with forever.

MR. THRALL: Just one observation. When you mentioned the ice, this is not -- just to make it clear. This is not something that can be subjected to a mathematical modeling process.

MR. MEARS: Just because not enough is known about it?

MR. THRALL: It's just extremely complex. Once you try to get into -- believe me, I'm speaking from past experience. Once you get into trying to get into actual biological systems and modeling biological systems, and not only a single -- you know, where you're getting into microbial systems, what you're doing here, the state of the art does not exist --

MR. MEARS: Well, then perhaps it's just as well to assume -- assume that unacceptable levels of mercury will end up in all of these fish rather than no accumulation.

MR. THRALL: Well, I'm not -- I don't want to -- We can go ahead and we can do some more analyses and we can -- I think we can maybe give you background and information that will make you feel more comfortable here. But I just don't want to mislead you in that we're going to go out now --

MR. MEARS: -- Yes, I understand, what -- what it feels like is because this is a complex process that there's not a lot known about we're going to somehow assume no harm. And therefore no mitigation. And if there's not much known about it and the consequences are severe, as severe as methyl accumulation -- or, methylmercury accumulation in these fish tissues, perhaps that ought to be the stance you take, is that things are going to be loaded with mercury. Just face the facts, buy the project or not.

MR. THRALL: Well, except that -- Well, again, we need to go -- our professional judgment tells us that that's probably not necessarily the case, that there will be some bio-accumulation but it's not going to be, you know, "loaded with mercury" in the sense that we're going to have a real serious problem. But we do need to go back and do something with this, I guess.

MR. ROSENTHAL: Is it APA's view that -- or Ebasco's view that there's no technological way to mitigate for this problem?

MR. THRALL: Yes, we think we -- we think there's a natural mitigation. I think of all the arguments that we see that the sediment that's going to be settling out in this reservoir is essentially going to isolate the organic material. Once that's isolated by a few centimeters of sediment, it's essentially out of the picture. And we think that that is in fact

the most effective mitigation you could have here. It just so happens we have it naturally occurring.

MR. ROSENTHAL: Is there a fallback that you can -- that you can go on now if that does not work out, would that come to be?

MR. THRALL: We're not going to go out with a selenium program, I don't think. When you're talking about a project, a reservoir of this size, it's just not -- No, the other thing we're doing is we have a reservoir clearing program which takes out a good part of the organic material. But no, there is no known -- and Tom, you can correct me here, but as -- you know, the selenium has been shown, and I assume that's been in sort of a small scale, experimentally, and we're talking about a very large reservoir, so . . .

MR. ROSENTHAL: You're saying there's no known economical way of doing it or technologically it can't be done, which one, the former or latter?

MR. THRALL: A little of both.

MR. ROSENTHAL: Little of both?

MR. STUART: A little of both. I think if you had all the financial resources that you needed, you might be able to slow the process that would naturally occur. It's a process that occurs all over the world, every place that you inundate organic material. It's just something we've become aware of in the last couple of decades, but it probably has occurred

in every reservoir ever built. We just haven't been aware of it, haven't looked for it. There's nothing unique about the Susitna system. You probably could slow it down if we spent an enormous amount of money. You might better spend your finances to find out whether you, A, have a problem to begin with, and then monitor the system to see if you are getting up to ranges or levels that would potentially give you a problem.

MR. ROSENTHAL: Well, looking towards settlement of this issue, I see it as, you know, possibly in the future, you know, having a sufficient open-ended language in the license itself to allow for monitoring and to require, if it does become a major problem, to require some type of mitigation. I see it as being a concern here, and I'm not familiar with the economics and technology of cleaning this -- you know, cleaning it up if it is a problem. But I see that, you know, there's a concern here for that kind of language in the license, as far as stipulations.

MR. ARMINSKI: I think we've got to do as well is try and investigate, if there are any practical means of -- other than monitoring and warning people, if there is any way to mitigate this, you know. We're talking about, you know, economics, but it may not even be feasible, even if you did have the money. And I don't think that's anything we've ever assessed here.

MR. STUART: Well, the best mechanism that's

been tried on a small scale is to try to blanket the bottom of microcosms with inorganic sediment, ground quartz or something like that, ground silica. Practically, we're doing the same thing when the suspended sediments come down the river and fall out in the reservoir. So we have a -- kind of a built-in mitigation in that respect.

MR. GRANATA: How many organics would fall out as well?

MR. STUART: You mean how many organics -- how many organics are in the -- what's the concentration of organic carbon in the inflowing water?

MR. GRANATA: Well, yes, essentially that's what --

MR. STUART: I think TOC's on the less than five milligrams per liter total organic material, if I remember right. I could look it up for you real fast, if you really want to know.

MR. MARCHEGIANI: Could you put that in perspective for us?

MR. STUART: What five milligrams per liter total organic carbon is?

MR. MARCHEGIANI: Right, in relation to --

MR. STUART: That's an ordinary concentration for a river like this, or for -- most fairly good-sized rivers that are not in tropical areas. Real clean water would have less

than, say, two milligrams per liter of total organic carbon, in a big lake maybe. A large river of the fifth or sixth order like this one, probably would have anywhere between two and ten milligrams per liter, quite commonly. So it's not out of the ordinary in that respect. Again, I think this is a potential that needs to be monitored. I don't think it's a problem. I don't even know if it's a problem right now, so that's -- to begin with, we need to go out there and find out if you have any baseline data that indicates there's a problem.

MR. HOSKING: Do you have any idea when that would be established?

MR. STUART: The baseline?

MR. HOSKING: Yes, as we look through here on Page 7 and 10 and so forth, and 8, it talks about the mercury levels in reservoir fish may increase or the mercury levels in resident species below the dam may increase, and there's no indication of any baseline information that you may have.

MR. STUART: Well, we don't have any baseline information. I would ask this group -- I've already asked one group about a year ago or seven or eight months ago -- Does anybody know of any mercury analysis in fresh water fish in this state?

MR. SMITH: Hank, didn't Pat Winnekins (ph) do some work -- or he wasn't he going to, on the Susitna, even? About a year and a half --

MR. HOSKING: I'm thinking Pat's work was

more with arsenic. I don't know, Brad, about mercury.

MR. STUART: To my knowledge there hasn't been any analysis of fresh water fish in the state. Now, I talked to a couple of labs about doing the analyses and how they did them. One of them told me they might've done some work two or three years ago, they think, on maybe halibut or some type of marine species.

MR. SMITH: Was that Auk Bay?

MR. STUART: I'm sorry?

MR. SMITH: Was that Auk Bay lab you checked with?

MR. STUART: No, that was probably the Fairbanks lab that I called, a commercial lab in Fairbanks and one here in Anchorage. So I don't know of any analyses that have been done for baseline information. I don't know what the concentrations of methylmercury are in rainbow trout in the Susitna right now, or in lake trout anywhere in the drainage, for example, or dolly varden. I don't think anybody does.

MR. HOSKING: Well, I guess in relation to a monitoring program I have some concerns, like Tom Mears expressed over here, is the whole program just going to be dumped on the table and say, all right, we'll monitor and see what happens and is there some assurance from APA that some levels are going to be taken from existing species out there?

MR. GILBERTSON: You mean baseline?

MR. HOSKING: Baseline, yes.

MR. THRALL: Baseline, yes.

MR. HOSKING: Okay, is that going to be done this year, or is this in the program, Larry?

MR. GILBERTSON: We're looking at doing it in FY86 right now. It's on the list of things to do.

MR. HOSKING: Yes. Okay, I think, then, that it would be appropriate in this paper to include that aspect in there, that there will be some baseline information provided. You've got to have some reason for monitoring out there, what are you going to compare? And maybe you can tell me, I -- again, being one of these non-water chemists, why wasn't arsenic considered in this overall evaluation?

MR. THRALL: Tom, do you want to address that?

MR. STUART: Yes, I think we addressed only the metals that were listed in the original survey as having exceeded water quality criteria standards, and I don't think arsenic was one of those.

MR. HOSKING: Okay, yes, I don't know.

MR. STUART: Yes, this is a compilation of a lot of data that was gathered all up and down the Susitna drainage, from up at Denali all the way down to the Susitna station, mostly by the USGS. And I don't think arsenic was -- either total or dissolved, was listed in the excedence (sic) group.

MR. ADLER: Well, not to kick a dead horse, but the question is not whether the level is currently in excess of water quality standards, but the question is whether the dam construction and operation is going to result in increased levels of any of these parameters. And Tom, you asked what the flaw was in the analysis, and the point is that there is no analysis of those parameters. There's nothing to critique, it's just a one-liner.

MR. MARCHEGIANI: I'd like to get a feeling from you. What happens if we go out and we monitor it and we do this analysis and we find that the levels of whatever it be, arsenic, calcium, whatever, is the same, basically, with the natural conditions as with the project, but they exceed the water quality standards?

MR. ADLER: I don't -- I don't know what the legal answer to that question is. I would suspect that if the project is not increasing the levels you wouldn't ultimately have a problem with the court. But on -- there's probably no NPDES permit requirement, but that doesn't exempt the project from the requirement to comply with water quality standards.

MR. MARCHEGIANI: The implication of what you're saying is that the project has to enhance the natural conditions to meet the state water quality criteria?

MR. ADLER: No, I didn't say that.

MR. GILBERTSON: No, I don't -- that's not

what he's saying.

MR. THRALL: Well, okay, I just --

MR. ADLER: But if it exacerbates a current violation, then there might be a problem, and you might need to have mitigation measures.

MR. MARCHEGIANI: Well, what I'm --

MR. ADLER: Or in absence of mitigation measures, as Tom Mears says, you have to at least identify the problem to the public as a potential unavoidable aftereffect of the project.

MR. MARCHEGIANI: I understand that, I have no problem with that. But I guess the problem that I have is that if we have a with project condition that exceeds the standards in its present state, okay, and then we actually have a project that does nothing to the water quality, it stays the same, doesn't increase it, doesn't decrease it, the project -- at least according to the law and by -- the implication that you're saying when you say just because the water quality standards are, in a natural state, are violating the standards, that the project has to turn around and deal with them. Okay, the implication is basically is that the project has to enhance the natural water conditions to a level that meets the water quality parameters that the state has set up.

MR. ADLER: That's not what I said. I said that you may have a marginal or intermittant water quality

violation which the project might make worse or more frequent, and if that's the case, you need to address the problem. And you need to analyze whether or not that's going to occur.

MR. MARCHEGIANI: Okay.

MR. THRALL: Just as -- My understanding is that we need to go back and we need to do some additional analyses or really put on paper-what we've, I think, already done in terms of other -- say, other metals that were not included. Again, I'll emphasize, we did go through an analysis in our minds and we dismissed those that we thought the probabilities were essentially zero to have a problem. But we need to go back and put that into a written analysis. And we also, I guess, need to go back and look at our methylmercury analysis and see if we can't bolster that. And again, I'd like to emphasize that in our minds professionally we see very little probability of any problem, but want to emphasize that you cannot prove in a rigorous scientific way -- you cannot prove this. You can certainly demonstrate it very strongly, and I think we can go back and maybe strengthen our demonstration.

MR. MEARS: The thought occurs to me that if that's the case, experience in other areas shows that I can probably go find half a dozen experts that will draw the opposite scenario for me, if I'm willing to go look for them.

MR. THRALL: I'm sure I can find a number of experts to prove a lot of different things. But again, I

personally would say that we don't have a big problem here, and I think we can put together a case and I hope -- hopefully, then, we can go through this one more time and approach a resolution.

MR. SMITH: Jim, because a lot of us here aren't water quality experts or chemists, and because at least our agency is going to look towards EPA and DEC before we sign off on this, could you somehow include them in this evaluation before -- so we don't have to go through this again?

MR. THRALL: Sure. But I say just again, ultimately I think they are the -- I mean, DEC, to me, is the agency that will, in a sense, resolve this issue. Because I think it falls within their purview. Tom, is that right?

MR. ARMINSKI: Yes, that's correct.

MR. THRALL: And so, in a very sort of legalistic way, you know, that issue becomes resolved. Certainly not -- we can't say it will become resolved, say, in the public's mind. And we would rather resolve it completely in the public's mind and not to run it through a permitting process and have other people out there saying, wait a minute, we don't believe this. But that's the -- that's sort of the ultimate resolution from a legalistic point of view.

MR. ARMINSKI: I guess we could, you know, work with them closely to -- you know, to go through this reiteration of this and see if we can satisfy their concerns. "Their" being the agency that's most directly responsible for this. And

I sense that what you're saying is while you have an interest you don't have a good understanding and it isn't within your statutory purview to address this directly, but --

MR. SMITH: It's not within our area of expertise, I think that we -- yes, we arguably could and will comment to it, but there may -- these type of concerns may be very easily resolved, it's just we don't know that much to do it. And I don't like the idea of fractionalizing the whole project by saying, well, it's ultimately going to be certified by DEC so, you know, it becomes something of a nonissue or a lesser issue.

MR. ROSENTHAL: We don't suggest deferring completely to DEC, just that you gain their insight. And I don't know how much of your -- that has been done in this paper, if any at all. Has DEC commented at all on any of this?

MR. ARMINSKI: No, and I don't think anyone is here from DEC today. It's unfortunate.

MR. THRALL: The only thing, I guess we have a negative comment in that sense, that they haven't, you know, said anything directly about it.

MR. MARCHEGIANI: I think, Tom, there's one other thing that we need to have resolved or discussed would be -- and that is what happens in a place where there are natural conditions that exceed the parameters and let's say if the project does come in in the same area. I don't know what the general

feeling of the people are in the room. My feeling is if it's sitting there naturally, okay, and the project doesn't increase it and doesn't diminish it, then we haven't changed anything, and it's status quo. DEC may not view it that way, and I don't know exactly what the situation could be, but I think, you know, we're discussing issues and issue papers here, and as far as I'm concerned that's one of the most critical questions there is, because I don't see an easy to mitigate -- I mean, how do you decrease these levels? You know, what do you do? And I don't know, nobody's -- everybody says that there's a problem, but nobody's saying that there's a solution or a means to a solution here. And, you know, I'm open to listening, but it doesn't sound like anybody's meeting the issue head on, because that's what the issue really is. If we exceed that standard, what does it mean?

MR. ARMINSKI: Well, I guess -- you know, I guess there's problems and there's problems, and, you know, one is from a biological perspective and the other's from a legal perspective, and I know we've gone around in-house about these things for quite some time and recognize that we're going to have to deal with the legal side of it.

MR. MARCHEGIANI: Well, I just think it's something that, you know, is a part of this whole thing, and, you know, people need to start thinking about it. It is an issue.

MR. ROSENTHAL: From what I -- from what

I see, I don't think it's the status quo that's the problem. People are wondering what if it's exacerbated by the project.

MR. STUART: I think that's a good point. We haven't said it is a problem, I'm not saying that at all. It's just a potential.

MR. ROSENTHAL: Potential problem.

MR. STUART: Of all the metals listed that were high, the only one that is known to be exacerbated, the only problem that can be exacerbated, so far as I know, by an impoundment, is the possibility of changing mercury to an organic form and having it bioaccumulate in higher trophic levels.

MR. ROSENTHAL: And if it is exacerbated, there may need to be a solution to it. I don't -- you know, if you say there is none at this point that you've addressed, there may -- may need to be one. I don't know.

MR. BEDARD: I have a question. Would a large amount of mining operations on the tributaries contribute to this metals disturbance?

MR. STUART: Not necessarily.

MR. BEDARD: The reason why I'm saying that is recently the Denali planning block opened up that whole area to mining. And there's a lot of small miners in there that are doing a lot of land disturbance. Back in the 1890's to about 1920 the Valdez mining district was using a lot of industrial mercury in those tributaries that feed into the Susitna, and some

of that -- I'm not sure that some of that mercury, high mercury content, could be still coming from that old industrial usage, like it is in -- out at Portage Creek area and the Ericson mine. There's still a lot of mercury in that stream, actual industrial mercury. You can dig it up in your -- when you're digging for gold and you find mercury in the sediments under rocks that was used in processing. I'm just wondering if some of that mercury could have been the cause of that.

MR. STUART: Frankly, looking at the literature values for reported mercury in rivers, concentrations that are found in the Susitna are not particularly high. They're on -- they're on the -- oh, probably in the lower third of the middle range of world river concentrations of mercury. They're not really super high. And secondly, the amount of mercury that's in inorganic form, which is the measure that has been talked about here, is not the cause of the problem. That's not even -- it's just faintly related. The whole problem arises when bacteria and fungi methylate, or microorganisms methylate the mercury found in organic material in the process of using it for fuel. And that methylmercury can be concentrated by factors as high as 60,000 inside of fish tissue. The reason why it's concentrated in higher vertebrates like fish is because there's no natural mechanism to remove it from the fish very fast. It goes in much faster than it can be excreted by the fish, so it builds up, he concentrates it in his own body. Human beings then eat fish and they

can concentrate the mercury in their bodies. Since there's no good mechanism to remove the mercury from our bodies or from the fish tissues, it can accumulate to a problem where there are sub-lethal or even lethal effects. But the amount of mercury that's in the drainage is not an indicator of a potential problem. Even if it was twice as high or three times as high as it is right now, it's not necessarily an indication of that there may be a mercury bioaccumulation problem in fish.

MR. THRALL: This is obviously something that needs -- the resolution of the day is that we go back and work on this some more. Does that pretty much summarize it?

MR. ARMINSKI: Yes. If there's nothing else on this, why don't we take 15 minutes, get a cup of coffee.

(OFF RECORD)

MR. ARMINSKI: The next paper is F-2.4, that's the significance of potential changes in dissolved gas on salmon and resident fish habitats and population downstream of the dam. Our position is that the mitigation measures proposed will reduce or maintain the gas concentrations at or below existing levels, and that there will be no detectable effect on the aquatic resources. Larry, are you going to -- Tom?

MR. STUART: Here again, the data that we've used to look at this system was generated by the ADF&G group, the Su Hydro group, Dane Smith and his colleagues. They have found that dissolved nitrogen gas can be supersaturated in the

water passing through Devil Canyon, apparently by natural causes. The concentrations appear to be linearly related to the discharge. The higher the discharge, up until at least 32,500 cfs, the higher the amount of supersaturation. Beyond that I don't think we really know exactly what would happen in terms of supersaturation. The basic thrust of our idea here is that the project will reduce the peak or amplitude of flood flows and will reduce the frequency of flood flows through Devil Canyon. By doing both of those, you probably will -- you definitely will lessen the amount of supersaturation that's created by passing through Devil Canyon. There is one mitigation mechanical means which has been incorporated into the project preliminary designs at this stage, the cone valves, which will be used for releasing controlled releases, are placed in the dam so that you can release lots of water in a spray-type of discharge and not have a plunging effect that may cause additional supersaturation. So by operating the project in the manner that has been proposed, limiting the peak flows, retarding the amount of floods that go through Devil Canyon, and using cone valves as discharge mechanisms, we think that we can keep any supersaturation at or below levels that exist now. And I would remind you that Fish & Game has been out there quite a number of years and quite a number of observers, and they have not found any detrimental effects, to my knowledge, anyway, due to gas supersaturation in any of the fish species out there.

MR. ARMINSKI: Any discussion? Brad?

MR. SMITH: A couple of things. The -- while natural conditions can apparently go to 115, 116%, if there was spillage given a -- I don't know what a reasonable flood event would be, maybe you can tell me, what levels could be expected to occur downstream? It's kind of analogous to the mercury thing. Even though we have background conditions that -- or, existing conditions that do exceed saturation levels, where I'm talking 115, 116%, what could we expect with a major spillage?

MR. STUART: Well, the project has the capability of stowing and slowing releasing all floods less than the 50-year flood, if I'm not mistaken. And the maximum discharge from the turbines and cone valves together, I think, from Devil Canyon in the two dam scenario would be about 38,500 cfs, I believe. That's the most you would get, and part of that would -- only about 31,000 of that, approximately, would be going through Devil Canyon, where most of the gas saturation problem occurs, in the lower part of it. Another 7,000 of that 38,5 would be exiting via the turbine tailrace and would enter the river underneath the surface of the river down below Devil Canyon, it would by-pass the canyon rapids. So the maximum you might expect in terms of water flowing from the system through the real problem area is about 31, 32,000 cfs.

MR. SMITH: Well, what about water over the spillway during the spill?

MR. STUART: Well, that would be an

exceptional event, we think.

MR. SMITH: Yes, that's what I was -- that's what I was asking for, during the -- because the -- I mean, there was some alternatives with the spillway design, the cascade, the flip-up and suction (ph), and those were deleted or dropped. And so I'm assuming that whenever you do spill, you're going to have a little worse problems than you -- it was a design consideration or option earlier to design that spillway to mitigate for dissolved gas.

MR. STUART: I'm not sure what -- are you asking what the discharge might be under a -- say, a 100-year flood? What is the maximum discharge?

MR. SMITH: What would the resultant gas levels be with a major or a normal spill event where you actually had to discharge in excess of the 38,5? I don't know how much you would spill during a given event, whether it'd be, you know, 10,000 cfs over the spillway, 5,000?

MR. STUART: I couldn't tell you because I don't know what the discharge might be, and I'm not really sure in my own mind what would happen if you put more than, say, 32,000 cfs through Devil Canyon. Eventually you might get -- if you increase the discharge, say, up to 40 or 50, 60,000, you may not see a linearity of supersaturation increasing with increasing discharge. It may not do that at all with high discharges.

MR. SMITH: You think it would flatten out

or you mean it would get more -- like exponential?

MR. STUART: May flatten out, probably. I don't think there would be the turbulence in the plunge pools if you were running 50,000 cfs through there, maybe, or 60 or 70. But I'm not sure of that, I don't know the answer to your question. Some examination has been done, however, of the K rates. I think at 16,000 cfs and 30-some odd thousand cfs of flow at Gold Creek, Dana and the Fish & Game crews have examined the decay rates of supersaturation, and they've found that with about a 20-mile downstream flow you'll reduce your supersaturation from whatever it was at the bottom of Devil Canyon to about half of that within 20 miles. If it was 110% coming out of Devil Canyon, 20 miles later downstream you'd probably lose down to 105%.

MR. SMITH: Still, that's dependent on what the initial concentration was, right? The decay rate is --

MR. STUART: It's dependent on the percent. You know, it's dependent on turbulence and temperature and the volume of water and a lot of things. But it appears to be -- within the realm that we're talking about for discharging most of the time on the project, it appears that 50% of it will be lost upon about 20 miles of downstream travel.

MR. THRALL: Brad, you're asking, I think, basically what the supersaturation levels might be when the project does spill, right?

MR. SMITH: Maybe like a worst case analysis.

MR. THRALL: A worst case. And I think we'll have to go to the -- maybe go to the -- the best source of information here is going to be going to the literature, looking at existing system, and include that information in the position paper.

MR. ARMINSKI: Let me ask Gene a question. Is that something that we could model, based on depth of plunge, whatever, from spillway discharges? Is the --

MR. GEMPERLINE: I think that would be rather difficult. We could get some idea from that. But again, you can even do things to the spillway, you know, to -- a lot of it depends on the shape of the spillway flip bucket, and I don't think it's readily modelable. You can get an idea of what kind of plunge you might get and say -- but, you see, that's not even a -- it's not even a normal case that you'll get a spill, you know.

MR. THRALL: I think what we can do is take a look, do some back of the envelope calculations and go -- maybe go and look in the literature and report ranges of values that have occurred at other projects and report back. Is that --

MR. SMITH: Yes, I'd be interested. With --

MR. MARCHEGIANI: Could you specify, Brad, you're asking a real hard question. First of all, that -- what's a normal spill? Well, as far as we're concerned, we don't want any spills, because every ounce of water that goes out of that

-- over that spillway doesn't generate electricity. Okay, and if you've ever worked for a power company, the very first thing that they do is they try to make sure all the water stays in the reservoir. So can we go based on the assumption of a 50-year flood is basically what the reservoir will hold, can we assume that what you would like to look at is a 100-year flood and what would happen -- what would pass out of the reservoir given, let's say, a 100-year flood? See, what it boils down to is it's hard for us to turn around and say, well, you know, what do you want to look at? Do you want to look at a 100-year, 200-year, 500-year?

MR. SMITH: Well, we had -- what did we have, a 500-year event a few years ago? So I don't know what might be reasonable. A 100-year event would be more information than we have now, as far as -- I don't know what we're comparing. Normally it sounds like a very good argument to say, well, we have supersaturation conditions now in Devil Canyon and we're going to make it better, and I think that argument is logical when you're considering the cone valves and the nature of the project below the 50-year flood event. But above that, you know, I -- there's really nothing to say what would happen. And even though without the dam you'd have, with that type of event, 500-year event, you'd have very, very high levels, I don't know -- you know, maybe Tom's point is correct, that that is kind of linear, but now it's going to be spilling -- it's going to be

dropping 600 feet, or whatever the height of the spillway is.

MR. THRALL: Gene, when we spill on one -- say, one in 50 or above floods, the cone valves and the --

MR. GEMPERLINE: -- The cone valves --

MR. THRALL: -- turbines will be operating so whatever it is --

MR. SMITH: -- I realize that --

MR. THRALL: -- on the spillway is diluted by, you know, whatever factor.

MR. GEMPERLINE: There is some feeling that you can put a certain amount of flow through that -- through that spillway and not increase the supersaturation at all. So --

MR. ROSENBERG: In the executive summary on the third page on the last paragraph of the -- last sentence of the first paragraph it says, "Dissolved gas concentrations under high flow conditions with the project are expected to be no higher than those which may occur under natural flood conditions without the project." Is what we're kind of talking about now -- I get the feeling that there's nothing that supports that. What supports that statement?

MR. THRALL: I'm not --

MR. ROSENBERG: The statement says that "Dissolved gas conditions (sic) under high flows -- under high flow conditions with the project are expected to be no higher than those which may occur under natural flood conditions without

the project." You know, what's that based on?

MR. THRALL: Well, it's based on what the flow coming out of the turbines and the cone valves and the frequency and severity of floods. I mean, that -- all those things combined would indicate that you're decreasing -- maybe the wording is a little bit less clear than it should be on that. But the intent is that on -- you know, on a year-in, year-out basis you're going to have less frequent floods, you're going to have less severe floods, and you're going to have these floods passing through the turbines and through the cone valves so that you won't significantly increase gas concentrations.

MR. ROSENBERG: Yes, but what about what we were just talking in reference what we're talking about now?

MR. THRALL: We need to -- we maybe need to reference again the one in 50 or greater event to put some level of the supersaturation expected out of that. Now, obviously when you get up to the one in 200 or one in 300-year flood, and if you open the spillway up, you're going to have relatively high levels of gas supersaturation from that spillway flow. Now, what that would be in terms of what that same flood coming down the river -- that's a real problematical thing.

MR. ROSENBERG: Well, this implies to me that you know the answer to that, I guess.

MR. THRALL: I think the wording is something we need to qualify that statement. But we can put down --

Brad, let's say that we'll look at a one in a 100-year flood and do some calculations and we can give you a feeling for what that would be. Would that satisfy what your concern is there?

MR. SMITH: Yes, it would. The flow discharge data that was in the license application and the Exhibit E, is that -- has that changed with KC6? Is the reservoir operations model still the same?

MR. THRALL: Frequency of spills?

MR. SMITH: And the flood storage and all that.

MR. THRALL: It's the same.

MR. SMITH: The same.

MR. GEMPERLINE: No, actually it's better. There was -- in the reservoir operations for the KC there was a period when Devil Canyon first came on line when there was a -- there would've been a need to open the spillways, and that occurred for -- it was either 1964 or 1967, which had a peak flow which exceeded the 50-year flood. I think it was something like the sixty -- statistically, the 65-year flood. That doesn't happen anymore. The more recent simulations that we've done with E6 show that you don't have to open the spillways at all for those 34 years of record. So we've actually done a little bit better than 50-year flood.

MR. SMITH: How sensitive is this going to be, or the position statement going to be to the final flow

negotiated release?

MR. GEMPERLINE: I think what we're -- I think actually we would design to prevent the supersaturation from the 50-year flood. I think that's the --

MR. SMITH: So you're not constrained by any particular flow that might eventually be --

MR. THRALL: There are things -- there are minor modifications we could do in design --

MR. GEMPERLINE: -- Yes --

MR. THRALL: -- if it turned out to be necessary. I don't think we see that that -- Probably what will happen as you get further and further into this flow regime and defining it more and more, you'll find that you're better able to handle these flood flows. When you start out an analysis like this you make some very simplified assumptions about how the project will be operated. And as you get more data and more analysis, your assumptions become more sophisticated, and the tendency is to store water when you can and waste water only when you have to. So the frequency of spills should go down.

MR. GEMPERLINE: Especially as the project matures and there's more and more need for power generation there's going to be less and less possibility of spill. And that's -- actually that's evident from -- even from the KC and the KC6. What we were talking about, I believe, was a one in 50 chance in the early years of the project. That doesn't happen later

on.

MS. GORBICS: Going back to what Tom said, too, about whether or not the impacts would increase exponentially or level off or end up in a linear fashion. It seems to me that even if we look at just the 100-year flood we won't get a feel for that, so maybe looking at a couple instances of spillway use to get an indication of whether -- how it does increase. If we could do that.

MR. STUART: Some consideration of this question has gone back and forth between myself and Don Byer and some other people in the process of formulating some ideas for a long-term monitoring program. I recognize that there may be some data gaps. I don't know that we have any supersaturation measurements or gas saturation measurements at flows higher than 32,500 cfs at the moment. We may continue to monitor something like that, perhaps, if we need to, to try to monitor a big event, like 50,000 cfs through there, or 90,000. We might be able to catch that, I don't know.

MR. THRALL: Talking to the helicopter pilot who used to hover above Devil Canyon --

UNIDENTIFIED: -- Not a wise idea --

MR. THRALL: -- Yes, well, we aren't going to collect any more data above that.

MS. GORBICS: Well, I wasn't even thinking of that, but just modeling to -- you know, if you can model a

100-year event, you should be able to at least do a --

MR. THRALL: The further out you get there the more problematical things get. We could do it, but also then you get into the problem of you're talking about a 500-year event or a 1,000-year event, and supersaturation becomes sort of a moot point in terms of any habitat effects. If you're talking about that big a flood, your fish are not going to be worried about gas supersaturation.

MR. GEMPERLINE: Actually, the -- maybe the benefit that comes there is that you are really reducing the peak flow from that quite a bit.

MR. THRALL: But again, it can be done. We can take a look. I would hesitate to say right now what -- it's maybe something to be discussed on our next meeting under old business, but in terms of the time and effort and whether we see a return, we can certainly look at it and report back.

MR. MARCHEGIANI: I think our general feeling is is that everything that we're going to do should improve the situation. And you may not totally agree with that, but we're saying -- well, what it says in here is that you're going to improve it, you have nothing to back it up. But if you just think about what's happening, if there was no dams there, okay, and then you had a 100-year event, you would have probably in excess of 117, maybe 120%. At least the information that Dana's collected with the helicopter pilot was running around that area. And,

youknow, it was difficult to collect the information, period. Okay, if we turn around and build the reservoir, we're going to flatten that curve, so immediately as far as habitat goes your habitat survival is a lot better. We release up to the 50-year flood through the cone valves, which decreases supersaturation, and also through the turbines. So that automatically makes things better, just by doing that in itself. Now, let's say if we exceed the 50-year flood, well, then, yes, you have a certain amount that goes down over the spillway, that'll be diluted with what's actually going through the powerhouse, the general inkling is that you improve the situation. Outside of some hard and fast numbers, I don't know how else to put it that, you know, with the reservoir in all likelihood you're going to have a better situation than if you don't have the reservoir.

MR. SMITH: I think we'd agree with you and have -- you know, we're very appreciative of the cone valves and recognize that they're going to do a lot to mitigate against the problem. Normally I think things will improve. But there is -- you know, say it's 10 cfs going over that spillway. I don't know, even given the dilution factor, what -- what that really means in terms of comparison with what's there naturally. And, you know, we're not going to license the project on an inkling or something. You know, just --

MR. MARCHEGIANI: So what your real concern is what -- how much discharge goes over the reservoir and what

that means as far as -- over the spillway and what that means supersaturation-wise?

MR. SMITH: Yes.

MR. MARCHEGIANI: And that's really the issue that we should address?

MR. GEMPERLINE: We would have nothing to compare it against in a natural condition. So we couldn't say.

MR. MARCHEGIANI: Well, we could tell you maybe what it means, I mean, as far as supersaturation, but I think that -- what you're saying, Gene, is we don't have a background?

MR. GEMPERLINE: No, we don't have anything under natural conditions for flows in excess of 30,000. You know, if you had 120 -- or, 100,000 going down Devil Canyon, what are your -- what are you going to get in terms of nitrogen saturation? How can I -- I can't compare what comes out of that spillway with what might happen under a natural condition.

MR. STUART: I don't know of any way to model what you're talking about.

MR. GEMPERLINE: Yes, there's no way we could model Devil Canyon and find it. If we assumed it were a linear relationship, we'd get 150% in Devil Canyon.

MR. STUART: But it might not be.

MR. GEMPERLINE: But it might not be. But I mean, we don't really know --

MR. SMITH: That's measuring the flows at Gold Creek, or the concentrations at Gold Creek and back calculating? Or figuring what -- using your --

MR. GEMPERLINE: No, that's --

MR. GILBERTSON: Just using your linear relationship that we have from the observations that Su Hydro made. It's just continue that linear relationship out to, you know, whatever flow at Gold Creek.

MR. SMITH: I do see the problem. At the same time the information would be interesting, if nothing else, to just see what theoretical levels might be realized by the project. I mean, we can compare that against the literature and see -- I realize we may not ever have a background condition at those flows to compare against.

MR. THRALL: Well, again, we could -- I think if we take a certain assumption and say let's -- we'll look at the 100-year flood, again realizing that if you -- if you had a flood that you just had to sort of crack the spillway, you had the turbines going, the cone valves going, and you just cracked the spillway so you'd have a very thin sheet flowing out, I think the thought is you'd have no supersaturation --

MR. GEMPERLINE: -- That's right --

MR. THRALL: -- from the spillway, because you wouldn't have enough going over. So you have to pick some point where you'd get a fair volume of water going through the

spillway.

MR. SMITH: Does it actually need a plunge pool to enter -- to generate the --

MR. GEMPERLINE: No, it's the plunge -- it's the depth of the water -- the depth of the jet of water below the surface of the tailwater. It doesn't -- doesn't need a plunge pool. That commonly is called the plunge pool area, but it doesn't necessarily -- in fact, you won't have a plunge pool there.

MR. SMITH: Cascading on the rocks you wouldn't have any problem?

MR. GEMPERLINE: Yes, you could.

MR. SMITH: You could.

MR. GEMPERLINE: But you're not going to have cascading on the rocks. You're going to have flow into the -- into a tailwater pool, which is not a plunge pool, so to speak. Plunge pool is an area of the riverbed which has been excavated either ahead of time or by the action of the water.

MR. MARCHEGIANI: I guess so far our position for that, you know, we took the investment of whatever it is, $80 million, for mitigation costs to put the cone valves in because we feel that it's important we protect up to a 50-year flood, and our feeling is that that's going to be adequate to deal with the situation because we don't want to spill that water, period. We want to generate electricity with it. And that mitigation measure, we feel, is a substantial investment into the process

and as a mitigation measure should be adequate to take care of supersaturation.

MR. ARMINSKI: Can we go on to the next paper?

MR. THRALL: Okay, so we've just -- before we go, I just -- we'll include that information in our next go-around. We'll do our best to put in an analysis and shoot it by you one more time. Is that --

MR. STUART: Shall we pick a 100-year flood, for example?

MR. THRALL: Would a 100-year -- well, let's say -- I think we need to look, Gene, at what a 100-year --

MR. GEMPERLINE: -- Yes --

MR. THRALL: -- might be in terms of a split between cone valves and turbines.

MR. SMITH: Yes, I'm comfortable with a 100-year flood. Now, your point was probably well taken, but it kind of makes sense to me that -- you know, looking at everything else with the larger events, there's not much sense in --

MR. THRALL: That's -- I mean, we can do the analysis. My feeling is you'd start to get up in the very high floods -- in the first place once you get --

MS. GORBICS: When you pointed that out to me, that made a lot of sense. Yes.

MR. THRALL: The other thing is how --

MS. GORBICS: -- I'm comfortable with that --

MR. THRALL: -- how realistic -- once you get up past a 100 or 150-year flood event, it becomes sort of a statistical game whether those are real events or not. So I don't know, that's a hydrologist's -- I mean, that's just my impression. When you talk about a 10,000-year flood, I mean, you're talking about things that occur on the same frequency as the ice ages, and there's really not much use to --

MR. SMITH: -- And this -- this isn't a basic problem we have with this -- this issue. You know, it's just kind of cleaning up to get it off the --

MR. THRALL: I understand, that's -- and I think we can accommodate that without too much problem.

MR. STUART: Yes, I think we can work on that and probably add that.

MR. ARMINSKI: The last paper, F-2.5, this is the significance of changes in water temperature on salmon and resident fish habitats and populations downstream of the dam. We suggest some mitigation measures in here, and it's our position that by employing these measures the potential impacts will be insignificant. Larry, I guess --

MR. GILBERTSON: Yes, we did a -- we did an extensive literature review to establish temperature ranges within which the species were able to carry out certain behavioral or life history performance. We tempered these literature values with actual observations in the Susitna where that was appropriate.

Then we modeled or simulated pre- and with-project temperatures under a wide range of hydrological and climatologic conditions, a range that we felt would bracket the conditions that you would expect to find. And we compared then projections of with-project water temperatures to the temperature ranges for the species for each behavior or life history component that we wanted to look at. And in doing that, we found really no cases where we felt that there was a real disastrous kind of a problem. There were some cases where the projected temperatures did approach some limit of observed temperatures from the literature or from the Susitna. An example that we mention in the position paper was chinook migration. But even in that case we felt that it wasn't a significant problem, it isn't something that's going to deter the productivity of the system.

MR. ARMINSKI: Any comments?

MR. WATSJOLD: I had some questions originally but I just got this thing this morning here and it looks like some of the stuff that I was wondering about may be in there, but I haven't had an opportunity to review any of this, so I feel a little inadequate in going into the temperature thing now, now that I've got this, because it may answer some of my questions, or it may raise a number of additional questions.

MR. ARMINSKI: I don't know your name.

MR. HILSINGER: John Hilsinger.

MR. ARMINSKI: John?

MR. HILSINGER: On the first page, could you explain that Number 2 near the bottom? I have a hard time understanding exactly what that's supposed to say.

MR. ARMINSKI: The statement "mainstem winter water temperatures"?

MR. HILSINGER: Yes.

MR. ARMINSKI: Larry, do you want to talk --

MR. GILBERTSON: Mainstem -- the mainstem temperatures under natural conditions are zero degrees. In the reach of the river where most of the production is going on, the reach of -- well, the whole river essentially is zero degrees. And therefore we -- that fact, together with observations of where salmon are spawning in mainstem associated habitat, side channels and things like that, it appears that they're keying in on groundwater -- areas of groundwater upwelling. And therefore the -- I guess you could argue that therefore the groundwater upwelling is what limits spawning, but I think the reason that the fish are keying in so rigidly on these areas of groundwater upwelling are because the mainstem water temperatures are zero degrees and so a lot of areas that would be supplied with just intergravel flow are probably at fairly low temperatures also. And so we think that mainstem temperatures during the winter do limit the availability of spawning areas in the mainstem. And with project there will be a stretch of the river from Devil Canyon to somewhere between Gold Creek and Curry that will receive warmer water

temperatures. And so there is a potential for increasing available spawning habitat.

MR. HILSINGER: I guess the thing that comes to mind is that the number of spawners is going to be limited by what goes through the commercial fishery, and so there may actually not be any more spawning fish.

MR. GILBERT: I would agree. I would agree with that. This is simply saying that if more spawners did escape the fishery then with project there may be more available spawning habitat that they can make choices from.

MR. ARMINSKI: Tom?

MR. MEARS: Yes, I dislike this statement for several reasons. First of all, it seems to be -- it's a highly speculative statement to be included under something called "present knowledge." The second thing I've -- well, another reason that I object to this statement is that it almost presupposes that the fish know -- the way it's written it presupposes that the fish know that the mainstem's going to be a nicer place in the wintertime and therefore they're going to want to spawn there. And, you know, they're not. They're not going to know that ahead of time. Thirdly, the information that -- I recall reading some stuff done in Southeastern by McNeil and people that work for him years ago that seemed to indicate that the fish were attracted to upwelling water because it was upwelling, not because it was three degrees or four degrees or two degrees. They were working

with pink salmon streams where because of the normal coursing of the stream water would enter the streambed and leave the streambed, upwell from the streambed, and it was, you know, the same water, it just made a temporary trip through a gravel bar, and so, you know, I don't think the -- I guess I would use that, the work of McNeil, to challenge the theory behind why this statement is made.

MR. GILBERTSON: Well, I guess I would challenge McNeil for the Susitna. We have -- we have looked at mainstem areas as extensively as you can look at those mainstem areas, I think, and we have -- or, the Su Hydro people have located areas where the salmon do spawn in side channel and mainstem type habitats. And with rare exception those locations are associated with groundwater upwelling.

MR. MEARS: I don't disagree with that. What I'm saying, though, is in the Southeastern studies, the reason the fish went there was because it was upwelling, not because it was any difference in temperature than any of the other -- the water surrounding it. In their instance they were -- they did not have spring water or --

MR. GILBERTSON: Oh, all right, sure. But in -- this is getting a little esoteric, but in an evolutionary sense probably the reason that they're keying on groundwater upwelling is because of the temperature regime through the winter, and those individuals that key on groundwater upwelling, their

eggs are going to be more likely to survive a winter, more likely to get through the winter without freezing up. Now, on another part of your point, you know, nothing in the biological world is rigid. And it's a common thing in all the salmon populations that I've ever looked at is you have individuals that "make mistakes", and you have strays, wanderers, and we have observed that sort of thing in the Susitna. There are individuals in the population -- well, pairs in the population that do spawn in areas of the mainstem and side channels that apparently do not have groundwater upwelling, so there is a component of the population that could colonize these other mainstem areas if they became suitable for overwinter survival. That's not an uncommon thing in salmon populations.

MR. SCORDELIS: They could be spawning out --

MR. GILBERTSON: In fact, I think that's a rule -- you could say that that's a rule in salmon populations.

MR. SCORDELIS: Those fish could be spawning out there now, it's just their progeny aren't surviving because conditions aren't suitable for survival, but given those conditions, that portion of the population may become established.

MR. MEARS: I'll continue to disagree with the interpretation and I just don't think it's well founded enough to be included in a statement of present knowledge, but that amounts to an automatic mitigation. I just don't think it's -- you know, it might be nice to consider in a theoretical aspect,

but I think when it comes to toting up one side versus the other that you ought to just leave it out.

MR. GILBERTSON: Okay, Tom, we're not proposing this as mitigation, but in this case we're not -- we're not trying to tell you that there'll be all kinds of new mainstem habitat for spawning and therefore we can trade it for some other sites. That's just not the point here at all. It just --

MR. MEARS: What is the point?

MR. GILBERTSON: Present knowledge. It's what we feel is going to happen, what the conditions are going to be like with the project. If you want that stricken, I -- we can take it out without --

MR. MEARS: It would read a lot better for me. Continuing on, Number 3, operation temperatures established that the fish'll survive this whole affair. That's good, you know, I'm -- the opposite would not be good, you know, if they were -- if the predicted temperatures were going to be lethal to the fish, that's obviously not good. But I continue to have difficulty with trying to resolve this issue when we don't -- I have never figured out what the operation temp -- or, the operation regime of this dam system is going to be. It changes, it seems, from month to month and week to week, sometimes. But -- so I don't -- you know, I don't see how we can even talk about it until we get the operation temperatures or the operation regime, the scheme -- I don't know that I'm using the right terminology

here, but at least how the Power Authority is really going to operate the dam figured out, I don't know how we can even talk about temperatures any more.

Thirdly, in respect to that Number 3, I want to know whether the temperature differentials are sufficient enough to reduce the growth rate of the rearing species enough so that they will smolt in two years versus one or three years versus two. I mean, I'm perfectly willing to accept that the -- that within the framework you've been working that the fish are going to survive all this. I want to know whether they're going to continue to perform at about the same level of efficiency as they have in the past. I also want to know whether the -- what effects the colder water during the outmigration is going to have on the survival of those chums and sockeyes and so on that may be in the system -- out in the system at that time of the year. I don't see that anywhere in the information that's here.

MR. ARMINSKI: Let me just say one thing. I think as far as the operating scenarios for this project, up until recently we've always proposed KC, which -- a specific mode of operation for this project. And recently we revised that to KC6, and there's not a significance difference of the temperature regime related to either one of those. So I don't think that we change this on a regular basis.

MR. MEARS: Well, in your analysis I don't think you change it, but in the -- in the newspaper it changes

regularly as to how we're going to operate the dam and what the benefits are going to be and so forth. As far as, you know, the scientific analysis of what's going on, I agree, you haven't changed it. It's just that the politicians and would-be politicians are continuously talking about revising the flow scenarios.

MR. ARMINSKI: Well, I guess we always envision that the flow scenario would be set by this group, or one very similar to it, based on an agreement. Granted, that's -- you know, that's, like you say, subject to change with the politicians, but, you know, I think what we've proposed is a reasonable flow regime, and we certainly can't ask the politicians what they've proposed, because they don't have any idea.

MR. GILBERTSON: On your growth rate question. You want your question addressed in the position paper, is that -- or are you just asking now?

MR. MEARS: Well, I guess I'm saying that I have never considered it to be an issue that the fish would survive post-dam Susitna River. And it's always been how efficiently, how effectively they're going to do -- they're going to survive it. And I don't see anything in this temperature position paper that talks about that -- that efficiency. It's a fact we're talking about three-year smolts versus two-year smolts, we're also talking about a considerable decrease in the number of smolts that are headed to sea. So there's fish to be lost here, considerable numbers of fish to be lost, if there is a

temperature effect on age of smolting.

MR. GILBERTSON: Okay, well, you have to -- A couple things. One thing is that we did look at growth rate, and the effects of the resulting temperature regime on growth rate. And the approach we took was to try to take a worst case situation. We assumed that the fish were going to -- the fish would be rearing in mainstem waters throughout the summer, which -- you know, starting in June and going through September, which is not the case, but we assumed that. We assumed that the fish were going to stay in the middle river throughout that period, again which is -- for the most part is not the case. And there was another assumption. Oh, right, okay, I'm sorry. In the model we used, we used a model developed by a man named Brett in British Columbia. Okay, in that model he assumed that 15 degrees centigrade is the optimum temperature for growth. He was working on populations of sockeye and so for those populations I have no doubt that 15 degrees is optimum. I doubt very much that 15 degrees is optimum for fish rearing in the Susitna River, but we -- still, we used that --

MR. MEARS: If it is, they rarely experience it.

MR. GILBERTSON: Right. Right. We also assumed that the fish could feed to satiation, because the amount of ration the fish has available to them affects the optimum growth temperature. The less -- in general, the less ration you have

available the lower is your optimum temperature. So we assumed full ration. And we did that because we expect with project temperatures to be lower under -- with project conditions than under natural conditions, so we're biasing our analysis away from favoring a good -- painting a good picture for the project. The worst case, using all those things, was that it was the first -- when Devil Canyon first comes on line, that's when you're going to have the lowest temperatures. And in that case, there is between a 25 and 30% reduction in growth for fish rearing in the middle river. Now --

MR. MEARS: You're talking about the 25% reduction in growth, would that be length attained over a period of time or --

MR. GILBERTSON: It's in weight.

MR. MEARS: In weight.

MR. GILBERTSON: Right.

MR. MEARS: In weight attained over a period of time?

MR. GILBERTSON: Right. During the period June through September, the major growth period during the summer.

MR. MEARS: Rather than a 25% decline in the specific growth rate, whatever that terminology is, the daily growth rate?

MR. GILBERT: Right. Right, it was total. I'm just pulling numbers -- I think this is approximately right.

I think under natural conditions the size at the end of the year for a fish under the natural regime was something like seven grams, the fish under with project conditions was about five grams. I may be a little off, but it was something like that.

MR. ARMINSKI: How long is that --

MR. GILBERTSON: -- But another thing you have to put into perspective is -- you know, any -- a reduction of growth in the middle river system, given the number of fish that are utilizing mainstem associated waters for rearing, if you tried to measure that at Flathorn, I doubt that you could detect anything, because you're only -- you're only talking about between 2 and 5% of the production out of the Susitna River. And if you narrow it down to rearing, you're even talking about less than that. So if you went -- if you went somewhere out of the middle river and tried to measure its impact, I doubt that you'd be able to detect it, statistically.

MR. MEARS: Yes, well, I wasn't specifically speaking at this point of out of the middle river.

MR. GILBERTSON: Well, the temperatures -- by the time you get to Parks Highway bridge, you're essentially back to normal temperatures in the summer. In the winter, even prior to that. In the winter, by the time you make it to somewhere around Gold Creek you're back to natural temperatures.

MR. MEARS: So -- I mean, I don't want to lose 2% of the fish, I don't want to lose 3% of the fish. I mean,

I just -- If there's effect on --

MR. GILBERTSON: Well, in your -- in your question you made it sound like these temperature effects were going to have some kind of a significant impact on -- impact on production in the Susitna basin, and it's not really true. You're looking at -- you're talking about such a limited area and a limited number of fish that actually use those waters that will experience a change in temperature, that, you know, you wouldn't be able to measure -- measure the difference. But, okay, to get back to your point, you don't want to lose whatever that is. I understand that. And so I guess it's --

MR. MEARS: But we're saying here there's no effect in the -- you know, there's no effect on those fish because of the temperature, and I think it ought to be in there, even if it's only minor, even if it's only a small amount of fish, I think it ought to be there.

MR. GILBERTSON: Okay.

MR. SMITH: On -- if we're talking about chinooks, you do have large numbers of chinook passing through that system that could potentially be impacted. Overwintering conditions, you have, again, large numbers of the chinook apparently moving out of the tributaries and overwintering in the mainstem or areas influenced by upwelling that are accessed from the mainstem. So there is -- the potential for impact may be higher than if you just looked at what's in the system now

during the open water season.

MR. SCORDELIS: Well, winter water temperatures are going to be warmer.

MR. SMITH: Yes, but is that necessarily better for fish?

MR. SCORDELIS: Above Gold Creek. Also, Fish & Game is coming up with some findings now that chinook are not leaving the tribs for overwintering, that they're staying in deeper -- some of the deeper pools in the tributaries, Indian --

MR. SMITH: -- I haven't seen that --

MR. SCORDELIS: It's on-going right now. So it may not be true that they're all just diving out of the tribs to get down to the warmer mainstem.

MR. WATSJOLD: Well, we see -- yes, we see that in the tribs on the east side below the Talkeetna where we've done work. Usually the largest majority have moved out of the tribs, but there are always -- there's quite a number that stay in the tribs. I think it's a matter of production or rearing area, that just a few individuals stay up there that utilize that area and the rest of them go out.

MR. SCORDELIS: Dana's been more successful finding overwintering fry in the tribs this winter than in the mainstem. I don't know if that's because of their effort in locating fish in the mainstem or because of the size of the mainstem or what, it's preliminary. But right now they're finding

a lot of overwintering fish in the deep holes.

MR. MEARS: I don't know how you've ever been able to find them in the mainstem, neither have we.

MR. SMITH: What was the response to Tom's question about the different flow regimes and such? Now, we still really haven't had an analysis of E6, and I think the argument I'm hearing is that it's essentially the same as KC?

MR. GEMPERLINE: Yes, I can -- we have had an analysis and it's in the submittal of E6 to the FERC, and it's essentially the same.

MR. SMITH: But it's not in this AD -- ADIDC (ph), so it's nothing that we have before us or that we've been provided with?

MR. THRALL: You don't have it right now. It should be winging its way to you in the mail, I assume.

MR. SMITH: But the results you found are no change?

MR. GEMPERLINE: No change.

MR. THRALL: No change, or is -- well, I don't know.

MR. GEMPERLINE: Well, I mean, it's -- you know, a couple tenths of a degree some places, you know.

MR. SMITH: Yes, if that happened to be concurring with the time that we had the problems with the chinook migration, and we're right at the lower tolerance level right

now in KC, then I'd want -- then I'd have some concern and we'd have to reopen the process.

MR. GILBERTSON: Now, the point -- this touches on a point that as we go through these things, discuss them, one -- one thing that this position paper doesn't bring out, and that is that there is some flexibility in it. I mean, the major mitigation component is providing multi-level intakes. Okay, these runs that have been made may not take full advantage of that. The operating rule that was used to generate this information in the AEIDC document and then the position paper was in so following -- try to match natural water temperatures. So, you know, there are some adjustments that can be made. Like possibly -- I would have to look at the reservoir temperatures and things like that, but it's possible that if we felt that it was a serious problem that there was four degree water running down the river when the chinook were trying to migrate up, if that's the right temperature, I'm just pulling that out of the air, then there may be -- we may have some latitude in operating the intakes to provide warmer water at that time. But the reason we're going to have to work on that is that it may involved some trade-offs. I mean, if you use the warm water earlier you may lose it later and what's more important? You have to deal with some things like that.

MR. MEARS: Just struck me funny when you said it. The analysis of effects of temperature were done on

a flow model that said try to emulate natural temperatures?

MR. GILBERTSON: Right.

MR. MEARS: What is that known as in -- what flow case is that?

MR. GEMPERLINE: That's just the policy for operating the multi-level intake.

MR. GILBERTSON: That doesn't have anything to do with the flow regime, just trying to match temperature -- the temperature of the water.

MR. MEARS: Okay, but certainly the flow regime affects the ability to be able to match temperature.

MR. GILBERTSON: Sure it does. The volume of water you take out of the reservoir is going to affect, you know, how much warm or cold water you have available at given times of the year.

MR. HOSKING: With (inaudible, cough) in operation and flows and so forth are measured at Gold Creek station. Now, if you have a flow going down there, say, of 15 or 16,000 cfs, what percentage of that flow would be actually coming from the dam as opposed to tributary inflow?

MR. GILBERTSON: About 80%.

MR. GEMPERLINE: I -- it would --

MR. GILBERTSON: It varies, depending on --

MR. GEMPERLINE: -- You can have a --

MR. GILBERTSON: -- storms and --

MR. GEMPERLINE: You can have a storm in the lower -- or between -- over the entire basin and you could get -- you might get several thousand from the area between the dams and the -- and Gold Creek. So, you know, you might only have 50%. But in general, I think we're talking about -- if you don't have a storm, I think the -- I mean, the basin upstream of Watana is about 5200 square miles, and the basin upstream of Devil Canyon is about 5800 square miles. Well, that's doesn't seem -- You're talking about, out of the -- out of a 9,000 flow at Gold Creek, you might be talking about an average of around 2,000 from the intervening area. That's with Watana on line. When Devil Canyon comes on line, there isn't very much drainage area between Gold Creek, and so that contribution is much, much less.

MR. HOSKING: Just wondered what the contribution is of ambient waters and that sort of thing to temper any releases from the dam.

MR. GEMPERLINE: Well, that is included in our modeling.

MR. HOSKING: It is?

MR. GEMPERLINE: Yes.

MR. GILBERTSON: Yes, it is.

MR. SMITH: This second year of filling apparently doesn't depend on one flow case or another, but at one time they were talking about installing a low level outlet

works or maybe stratifying the cone valves at Devil Canyon and getting a low level release that way. Is that -- that's out now or -- and, I guess, to follow up on that, the charts and figures that are presented in here for Watana filling, did that assume that the multiple level access -- access to those works, or did it assume a low level release?

MR. GEMPERLINE: Well, Watana filling --

MR. SMITH: Or Devil Canyon. Both.

MR. GEMPERLINE: Well, let's -- you've got to take them separately. For filling of Watana, it assumed the low level outlet from the dam would be used until the water level in the reservoir exceeded the level required to operate the multi-level intakes. It did not include an intake at elevation -- a lower intake at elevation 1800 to try to take off some of the warmer water a little bit earlier. Didn't include that. And then that low level intake -- or, that -- the multi-level -- the intake to the cone valves would be the sole means of discharging water until the plant became operational, which would be the remainder of the second year of filling after August and then until, I think, August of the third year, when you -- the plant would become operational. At that point you would start to fill -- or, you would start to operate the units. Well, in fact, it would be a little bit earlier than August. I think you might have a unit come on line in like June of the third year. But we were actually conservative there, we didn't -- we did not

assume that -- when you have one unit on line, you have the potential of putting about 3,000 cubic feet per second through the multi-level intake, and you would have to supply the remainder of the 9,000 through the cone valve. We just assumed it would all go through the cone valve, which gave us a little bit cooler temperatures. But again, that's a worst case or a conservative type of view.

MR. SMITH: Okay, so for the different water years you looked at, some years you would be able to access the multiple level intake and other years when it was particularly low you'd pretty much release everything through --

MR. GEMPERLINE: No, in all cases that we looked at in the temperature simulations you were able to operate the intake to the cone valve sometime in the second year of filling. And you would operate the multi-level intake in the third year of filling because at that point you're passing water through the turbines.

MR. SMITH: Okay, so for one year, then, you're just going out of the cone valves?

MR. GEMPERLINE: Yes, basically.

MR. ARMINSKI: Tom?

MR. MEARS: Tables 3 to 6, the captions all include the phrase "for natural conditions in project-related scenarios". Which project-related scenarios? All of them that we've ever seen, a certain specific -- KC -- or, I got lost with

the terminology?

MR. GILBERTSON: Okay, yes, the scenarios there refers to first of all KC, and then it refers to the different operating conditions that are listed there, Watana filling --

MR. MEARS: -- Okay --

MR. GILBERTSON: Then the different load projections. I have a correction, by the way, as long as you're on the tables, if I can find it here. Table 5, that should be 1981, not 1974.

MR. MEARS: I noticed that '74 was repeated.

MR. GILBERTSON: And then Table 6 should be 1982.

MR. ARMINSKI: Are there any more comments on this one?

MR. SMITH: I have a couple quick ones. The Volume II of the relationships report, do you think that will have to be prepared before we can go into actually making comments or recommendations about the structure of the downstream temperature, how we want to select within your capability? Is that going to provide us with any information on that?

MR. THRALL: You can ask for anything. Is that what you're asking?

MR. SMITH: Well, yes, I was wondering whether one of the things that's going to be addressed in that Volume II is --

MR. THRALL: -- It may be, but I would say -- I would never hesitate to try to make your wishes known as early as possible, because the earlier -- I mean, if you wait 'til we do our analyses and we're basing them on certain assumptions, and then you come and "oh, by the way, what I'd really like to see you look at is this or that", it just --

MR. SMITH: It would help. For instance, one of the things in this -- just glancing through this and they cited one report where they're looking at bioassay work on juvenile -- I forget the species, but they were in starvation conditions, and they looked at rearing at different temperatures, zero to four degrees. They did pretty well at zero degrees, one degree, two degrees. At four degrees, they had mortality and they figured it was because the metabolism was so active at four degrees. Well, in the past we've been thinking anything we can do to get warmer water during the winter is going to be good for rearing fish. That assumes a lot of things and there may be some indications that -- there are indications that might not be the case. It seems like it might be dependent on what food source is available when they first hit that, and they may be attracted to that four-degree water, or whatever temperature above zero we experience. So that sounds like we might want to be looking at primary productivity and maybe some food studies, that we really -- I don't think have really been established in any of the -- I can't think of any tasks for FY85 that deal with that. I know we talked

about in the past things like that. I don't have them all here to present to you today, but I guess I can -- I can let you know. I'm afraid that the -- I thought a lot of that was pretty much set in concrete, that it wasn't a very flexible document at this point.

MR. THRALL: Everything is flexible up until the time it's printed. I guess we can make it so -- but, no, certainly anything that you -- you know, the worst that can happen is we'll have to say we can't do that right now, we don't have the time or the resources. But at least we know that it's something that you're concerned with. And I think our whole -- our whole approach to this is that we feel much more comfortable working on analyses that we think are responsive to your concerns, you know, than just sort of trying to set up straw men that we think maybe people are concerned with. We think -- we would rather really know what it is you'd like to know and then we'll do the best we can to provide those answers.

MR. GILBERTSON: Yes, the direct answer to your question, I would say no, don't wait for Volume II. I think that there certainly may be some interactions there and some adjustments you could make on both estimates of habitat quantity and then habitat quality when you're measuring the things together. But I think we can -- we can start doing some things with temperature now.

MR. SMITH: Can we expect any further

analysis of the relationship between mainstem temperatures and slough temperatures, upwellings? I liked what we got for flow, we had those equations that showed the relative contribution of -- from the mainstem to the groundwater of sloughs at various sites within the sloughs. Are we going to get anything like that for temperature, or is there going to be any more analysis -- That seems to be fairly -- the most important system we're dealing with, and we talked about this, and I don't know what the constancy of that flow is. And . . .

MR. GILBERTSON: Yes, there'll be some more data available. I don't -- what's his next report going to include?

MR. GEMPERLINE: Actually, we're going to look a little bit more at the quantity of flow, the quantity of the groundwater upwelling, at least the component that comes from the mainstem, and give various estimates of what it would be. The temperature, actually, of the groundwater flow has been -- we feel reasonably confident that we aren't going to change that. That appears to be equal to approximately the main -- the temperature of the mainstem, the mean annual temperature of the mainstem. At least the component that comes from the mainstem is constant at that. We are not changing the average temperature of the mainstem. We don't expect to change the temperature of the intergravel flow.

MR. SMITH: The average annual temperature.

MR. GEMPERLINE: Yes, but most -- in most of the -- Yes, we don't -- No, we don't expect to change -- See, in most cases the temperature of that groundwater --

MR. SMITH: -- Is the average annual --

MR. GEMPERLINE: -- is the average annual temperature all year round, and we're not going -- since we're not going to change that, we're not -- it's going to remain the same.

MR. SMITH: What about the mitigations being proposed, would that have any effect -- the fact that you're going in and deepening the sloughs to intercept the lowered water table, it sounds like -- for that system to work it seems to say that there's a pretty quick transfer of mainstem water into those areas and --

MR. GEMPERLINE: -- No, there's not, there's a very long lag time, in most cases. In some of the cases where the sloughs are -- some of the intergravel recorders are located fairly close to the mainstem. The travel time between the mainstem and the sloughs is very long. The head change -- a head change in the mainstem translates to a rather pronounced -- well, I should say an immediate effect in flow. It doesn't change the temperature at all.

MR. BEDARD: The downriver effect of the Devil Canyon dam, about a mile and a half away you have Portage Creek drainage, which is quite a sizable body of water. That

temperature should somewhat -- if there is a temperature change, that seems as though that would somewhat offset --

MR. GEMPERLINE: That's been included in our analysis.

MR. BEDARD: Then south of that you have Indian River, which is also a major tributary, and in between that you've got about five small tributaries.

MR. GEMPERLINE: Yes, AEIDC -- that was one improvement that AEIDC made over what was in the license application, and that is that they included the temperatures of the tributaries. And so you'll see, if you look closely at some of their -- some of the profiles in some of their earlier reports, you'll see little spikes where these tributaries come in. And the influence of that on the temperature.

MR. BEDARD: Do they have stream gauge readings of both Indian and Portage of what flow that is?

MR. GEMPERLINE: ADF&G has taken some measurements of that. In some cases it is substantial.

MR. SMITH: I'm still a little confused on the cone valve placement on Devil Canyon, has that changed at all?

MR. GEMPERLINE: No, it hasn't changed.

MR. SMITH: Is there any -- would there be any advantage in -- could you locate them in such a way that you could select for temperatures during an event above the -- you

know, below the one in 50?

MR. GEMPERLINE: Well, we looked at that, and it does have a -- I think it can raise the temperature downstream, immediately downstream, by a degree or so, for the short period when those cone valves -- for about a two-week period. If you look at the temperature simulations you'll see there's a big drop when the cone valves are first used. And that drop lasts for about two weeks, at which time you've taken all the water out of Devil Canyon and replaced it with Watana discharge, so your temperature then rises up again. For that two-week period you could improve temperatures by a small amount.

MR. SMITH: When would that normally occur? Do you have one time of the year when most of the --

MR. GEMPERLINE: -- July and August --

MR. SMITH: -- cone valve operation would --

MR. GEMPERLINE: Let me just -- And I'm just looking now at the submittal to the FERC on the temperatures. Okay, this is -- yes, this is primarily -- and I'm talking about when Devil -- you know, when Devil Canyon first comes on line. It's -- that's basically in July, and it may go over to early August, but it's usually mid to late July.

MR. ARMINSKI: Any other comments on 2.5? Okay, I guess that ends our discussion on the papers. Let me just briefly reiterate what at least I've got written down for action items here.

W-7, we're going to -- this is the raptor nests. We're going to discuss the probability of a test program to establish nests before we actually have to mitigate. W-9, this is the quantification and mitigation of habitat impacted through the support facilities. I basically didn't have any action items on that. R-1, this is the recreational fishing. We're going to look at revising our mitigation plans, particularly with respect to dropping this measure of propagating and stocking with rainbow trout in the reservoir and lakes near the area. We're also going to look into improving access outside of the project area to create a recreational benefit. F-2.2, pH, there's no further discussion or action required for that one. F-2.3, heavy metals. We're going to assess the possibility of increases in other metals in the system other than mercury. And formalize a discussion of other potential problems that might relate to those increases, if they're seen. We're going to further define what -- we're going to look at downstream accumulation or increases, particularly in mercury, based on other projects. And we're going to have further discussion on this paper regarding baseline data collection to establish what the baseline of metals in the fish. On gas supersaturation, we're going to look at or try to assess what the supersaturation potential is at events greater than a 50-year event where we have some spilling, possibly the 100-year event is what was suggested here. And on water temperature, I think what we're going to have to discuss is expand the discussion

on the impact of increased temperatures on development and smoltification. I think we have to be more precise in our specification of what the perceived impact is, rather than saying it's insignificant. I think we want to say if we're going to lose -- or, possibly impact 2 to 3% of rearing fish, we need to say that.

And that's all I've got for action items. If anyone else has got anything they want to add to that . . . Okay, our next meeting is on March -- Oh, Leroy?

MR. LATTA: W-5.

MR. ARMINSKI: Okay, let's --

MR. LATTA: Basically at the last settlement meeting Richard asked us to take a look at the mining claim situation and in the little bit of research we've had time to do so far we've found five new claims that haven't -- that have just come in the door, they're on the computer, they haven't gone to, you know, graphics to be plotted or anything yet. So it appears that the mining activity up on Jade Creek is pretty active. I'm not sure at this time how it'll affect your mitigation paper, but we can get that information to Chuck as it comes up.

MR. ROSENBERG: These are in addition to those ones that are already there?

MR. LATTA: Yes.

MR. ROSENBERG: Five new ones?

MR. LATTA: Five brand-new ones, yes. We're

not sure if they're downstream or in the actual mitigation area. If they're farther down the creek or where.

MR. ARMINSKI: Okay, our next meeting's on March 22nd. We'll try to get you some indication -- it may not go out with the initial mailing, but -- or it may not have already gone out -- Did the mailing go out already? Okay. Try to get something to you that's going to indicate what we're going to discuss under old business. We probably won't know until shortly before the meeting, but we'll try to get you something on that, so that if there's not a paper that --

MR. ROBINSON: We can, as always, get the information posted in the Power Authority office, as it is on a weekly basis.

MR. ARMINSKI: Okay.

MR. ROBINSON: We can include which papers will be discussed under old business there. At a minimum, we'll have that posted.

MR. ARMINSKI: Jim?

MR. THRALL: I just again want to remind or ask people if they would please go over to the board -- and I'm not trying to pressure you into writing off issues, I would rather have you say "no, I don't agree with that", but we want the record. So if you want to go over and look at the issues and put in some sort of a yes, no, no interest, this is a terrible thing that's got to be redone, whatever your thoughts are. Again,

this is something that Harza-Ebasco in particular needs to know so we know where we stand, and it's something that reminds us where we are on the docket.

MR. ARMINSKI: If you've got any comments, either written or verbal, that you want to pass along, just feel free to call the Power Authority or Harza-Ebasco and -- or send your written comments to the Power Authority to our attention. Anything else? Bruce?

MR. BEDARD: The only thing I was going to mention in regards to the mining claims, in the space on state land (ph), stop mining of -- or, make miners aware that their claim is subject to a power project, similar to what we had to do with the open to entry lands on Indian River. And the reason for it is, once these miners get their claims, it's like an act of God to get them out of there. Whether they have a valid claim or not.

MR. ARMINSKI: I don't think -- I don't think we can unless we've got a competing right.

MR. LATTA: I think once you've got a license then we can talk about doing several things, but at this time I don't think there's much we can do. I -- we're going to meet with Gallager as soon as things slow down a little bit and talk about it some. But right now, I think, until the license comes through, we're kind of -- we're stuck. We're talking some major -- major actions.

MR. ARMINSKI: Anyone that didn't sign the sign-in sheet, please do that before you leave so that we've got a record. And we'll have a transcript available within a week or so.

MR. ROSENBERG: Are we going to have to request -- I know a letter came by to request one. You're not just going to send them out, then?

MR. ROBINSON: They have to be requested.

MR. ROSENBERG: How big are these things?

MR. ROBINSON: Well, the last meeting's transcript, I think, Dan, was about 90 pages long. So we figure -- figure 100 pages, about 100 pages for around four hours of meeting, something like that. Depending on how fast people talk.

MR. ROSENBERG: I'd like to just get at least one copy that we could have for our files of each of these meetings.

MR. ROBINSON: Sure.

MR. ROSENTHAL: Is that the policy, you're going to give each intervenor a transcript or only if they request it?

MR. ARMINSKI: Well, it has been if you've requested it. If you want to make any request, standing request, we'll . . . Okay, that's it, thank you for coming.

END OF PROCEEDINGS

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C E R T I F I C A T E

UNITED STATES OF AMERICA)
) ss.
STATE OF ALASKA)

I, Teresa E. Mielke, Notary Public in and for the State of Alaska, residing at Anchorage, Alaska, and Electronic Reporter for Gemini Reporting Services, do hereby certify:

That the annexed and foregoing position paper discussion meeting was taken before me on the 11th day of March, 1985, beginning at the hour of 8:30 a.m., in the Alyeska Room of the Northern Lights Inn, Anchorage, Alaska;

That this transcript as heretofore annexed is a true and correct transcription of said proceedings, taken by me electronically and thereafter transcribed by me.

I am not a relative nor employee nor attorney nor counsel of any of the parties, nor am I financially interested in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 13th day of March, 1985.

Notary Public in and for Alaska
My commission expires 5/6/87

SEAL