DRAFT MINUTES OF OCTOBER 22, 2003, INSTREAM FLOW AND HYDROLOGY MEETING

Blue Lake Hydroelectric Project (FERC No. 2230) Relicensing

Prepared by:

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Prior to the subject meeting, a site visit was conducted to familiarize the attendees with the Project layout and environs. Minutes of that site visit are at the end of these meeting minutes. The subject meeting convened at the Centennial building in Sitka at about 10:20 am. In attendance were:

Ben White	Alaska Department of Natural Resources (ADNR)-OHMP
John Dunker	ADNR DML&W, Water Resources
Karl Wolfe	City and Borough of Sitka (CBS) consultant
Linda Shaw	National Marine Fisheries Service (NMFS), Habitat
Richard Enriquez	US Fish and Wildlife Service (USFWS)
Joe Klein	Alaska Department of Fish &Game (ADF&G)
Kevin Brownlee	ADF&G Sport Fish
Bob Chadwick	ADF&G Sport Fish
Ken Coffin	US Forest Service (USFS), Sitka
Cheryl Enloe	Sitka Tribe of Alaska (STA)
Douglas Dobyns	STA
April Jensen	CBS
David Turner	FERC
Nick Jayjack	FERC
Marlene Campbell	CBS
Joe Donohue	ADNR Alaska Coastal Management Program
Dean Orbison	CBS
Marlene Campbell	CBS
Mike Prewitt	CBS consultant
Keven Kleweno	RCA
Richard Riggs	CBS
Charlie Walls	CBS
Hugh Bevan	CBS
Mark Buggins	CBS
Brad Person	RCA
Margaret Beilharz	USFS (by teleconference)

The attendees gave their names and organizations, then Dean began the meeting.

Dean: I'd like to start with the purpose of the meeting. When we sent out ICD we asked for suggestions on studies. We had a meeting in April for fisheries and wildlife and at that time we decided to hold a separate meeting for hydrology and instream flow and that's what this is.

Dean then gave a project history, said that the project was installed in 1959, with a condition for 50 cfs at sawmill creek at the Fish Valve Unit (FVU) and showed an aerial photo of the Blue Lake and Sawmill Creek areas.

Dean said that in the 70's, before Green Lake came on line, there was a shortage of water. Sitka applied for a license amendment requesting that under adverse conditions Sitka could decrease instream flow from 50 cfs to 22 or 37 cfs depending on time of year. The License was amended to allow for that. There were a few years when Sitka decreased the instream flow.

Since 1982, Sitka has had more capacity (Dean said that capacity is governed more by how much water you have than by turbine capacity). Since the amendment, adverse conditions have never happened. Sitka has not imposed the 22 and 37 cfs conditions.

In 1991 City applied for another amendment for the Fish Valve Unit (FVU), to make power from fish releases. Dean described the FVU and the Pulp Mill Feeder Unit (PMFU), then showed a schematic of the project and intake, the Howell-Bunger valve, the dewatered reach and the bypassed reach.

Margaret Bielharz joined by phone.

Dean described the "slot", falls, the PMFU discharge into Sawmill Creek, drain valve to Sawmill Creek, city water treatment plant, taps for industrial, bulk water and municipal water sources, all connections at lower portal.

Any questions?

Doug: Are we going to talk about operation rules for Green lake?

Dean: Green lake has no way to bypass water, it's closer to the ocean. The Vopad River is a falls dumping right into tidewater, so there is no fish reservation. There is no way to remove water from the reservoir other than to generate like crazy.

Doug: What's the operating rule curve?

Dean: The Blue Lake plant is the base load plant, but lowers generation at night and increases during the day. Green lake is the "lead" plant, it takes the swing*s*. Every time someone turns on a light, green lake notices it. Green lake turbines have 9 mw each while Blue Lake turbines are 3.5 mw each, so if you need a machine that's going to respond to big changes you should do it with the larger machine.

We can base load the second machine at Green Lake just as we do at Blue Lake. One machine at Green lake is always the "lead" machine, and we can preferentially allocate load to the other three. If you have 13 mw of load, probably 10 of it is base load, so you allocate 3 mw to the lead machine.

There is more water available at Blue Lake but bigger turbines at Green Lake. If we ran both Green Lake machines wide open, we would run out of water in a hurry. We run at "nameplate" in Blue Lake quite often.

Dean turned it over to Mike for framework agenda item.

Mike: There are two things we want to do in this meeting. First, this is a study planning meeting on how to do instream flow studies; second is the overall framework for consultation. There are various levels of experience with relicensing. On some large projects in the lower 48, the instream flow studies become the object of very extensive consultation.

Our proposal is to do instream flow much as we are doing for other resources, that is to have a "natural" group of people who convene for meetings at more or less natural intervals based on where we are in study planning, study conduct and reviewing the results.

We also have a sense that the way things are with state agencies, if this got to be as large as it could, it's very time consuming for every one. We don't want to drop anything just to save time, but we don't want it to take years, and have meetings every month.

Are there comments first on the group? We think the people here today are the "natural" members of the instream flow team. If there are others in your agency or elsewhere whom you feel should be in the group please say so now or in your comments as soon as possible.

No comment on group composition.

Mike: If someone in your agency is going to be replaced, please notify us. The Communications Protocol allows e-mail. Is that OK for this group?

No comment on proposal to use e-mail.

Mike: Today is an introductory meeting, we plan to have about 3 or 4 more meetings in all over the relicensing period. Is there any comment on that level of effort?

No comment.

You can comment after this meeting if you wish.

On the instream flow methodology, we received comments from several agencies. Most were not highly specific. In one case, we received comment that we should use the Instream Flow Incremental Methodology (IFIM) or the Physical Habitat Simulation (PHABSIM) component of that. Alaska Department of Fish and Game (ADF&G) said that there is a variety of methods available ranging from hydrology based methods up to IFIM and PHABSIM. Those comments were general enough that we don't believe that they stand as a consensus that we should do IFIM.

Establishing the impact baseline is important because impact is the difference between the baseline and conditions after the action to be taken. Our understanding is that baseline is *the* existing condition, therefore we are not required to provide mitigation for impacts of the existing project.

We'd like to add that the City is committed to increasing instream flow both in terms of frequency and quantity of flow in the bypassed reach. Also, the potential 22 and 37 cfs during adverse conditions is still in the license. We feel that we could change that condition on relicensing. Over the period of the license, the City has consistently released more than the 50 cfs minimum, in the range of 60 cfs, and today, because we're drafting the reservoir, we are releasing 70 cfs.

John: Could you define adverse conditions?

Dean: drew a graph of lake level vs. time, starting in October, showed spill elevation of 342', today lake is spilling. Later when it gets colder, then it stops raining, lowest level is about 265' In December, we have more heating load, so more water is needed to generate it, so lake level drops, all winter long. In May it gets warmer, the load goes down, rain increases, so the lake level starts back up. It continues to go up all summer, through the fall, when it starts to spill again, then into winter when it starts to go down. This is a cycle that happens every year.

It's in our interest to keep as much water in the lake because it's a bigger bank account and because the head is higher. At El. 260' it takes twice as much water as if it was at El. 342'. If you put the hydro generation at Fish Valve Unit, you get half as much generation per cfs as at the Blue Lake powerhouse site.

The Rule Curve is an established curve of lake level vs. time under maximum generation. The Rule Curve was generated in 1974. If we stay above rule curve, it is likely that we will spill that year. We want to spill every year. If we have a dry year, we run below the rule curve, and that is defined as "adverse conditions". If we are above the rule curve, we aren't' going to run out of water, so we maintain an instream flow above 50 cfs.

We have found that we can go below the rule curve if we have an average year the next year. We have a model into which we put all these flows and it will say what will happen in a dry, average and wet year.

Mike: We can use the model to evaluate, given both Green and Blue Lake storage, the need to operate relative to the rule curve, whether the rule curve can be changed, and the relative "threat" of the 22 and 37 cfs conditions. We'll talk this afternoon about the areas and opportunities.

But let's go back to how to evaluate the levels of flow we've decided on. We won't know how much more water until we start using the model. We'd like to use the model to help us in this evaluation process, and we invite the agencies and others in this meeting to join us in operating the model in the process.

Back to flow recommendations. There were some letters a few years ago saying that, based on certain approaches, a flow recommendation in the range of 300 to 600 cfs in the bypassed reach for extended periods of time.

We have evaluated these flow recommendations with the model flows which mimic the natural hydrograph are not going to be possible economically. We're not making recommendations today, but it looks as though the flows which might be economically feasible would be in the lower range of the flow regimes.

If negotiations wind up in the lower part of the flow regime it's our feeling that the IFIM and everything that goes with it in terms of cost, uncertainty, time and effort could be excessive.

So our proposal would be to spend time with this work group looking for another way of evaluating flows just in the lower part of the regime.

So what would the agencies like to see in terms of a method?

Linda: You are basically saying you don't want to use IFIM.

Mike: If we wind up working in the lower flow range, given the very good fishery baseline, right down to where individual fish spawn, etc, we think we could develop a way of determining the effect of flow on target species without having to go through the expense and time of an IFIM.

If we conduct an IFIM we come up with a relationship between flow and habitat. Any flow regime can be easily evaluated in terms of dollars for the specific uses of the water, be they hydroelectric generation, municipal water sales, bulk water export, etc. When you do an IFIM, you wind up with a Weighted Usable Area, and unless something has happened in the past few years that I don't know about, WUA is an index which has not been related scientifically or through experience or even in the gray literature to the number of fish that may return to the river. So you're left with taking hard numbers on the one side against a calculated index on the other side, and the decision-makers have a problem. If you could say this is how the population is going to respond, you'd have a workable component of an optimization system to serve in the decision process. But if

the WUA has no relationship to fish, you have to take it on faith, and that gets difficult at the decision making level.

Linda: You're talking about your problems with IFIM. You're saying that you have something else, and I'd like to know what that is.

Mike: In my experience with IFIM, we've found that in the lower part of the flow regime there is a linear relationship between WUA and flow. So, using something less complicated, could a similar relationship be developed by the working group to determine the relationship in the flow range between say 20 and 100 cfs?

Linda: So what are you proposing?

Mike: Given the biological baseline we have in the river, that is knowing where the fish migrate, spawn and rear, we can go to specific areas which we believe are important for the target species in terms of how they might respond to flow. At those places, we can do simple, empirically-based hydraulic simulation to determine how much water would be over those areas at a given flow. You're not dealing with preference curves, especially those that need to be developed in the river. You're just looking at how much flow it takes to get water over the top of these areas. We have an excellent baseline and we don't have very many species which are directly dependent upon flow. We can sort through those and get down to a limited number of key species and life stages. We don't need substrate preference curves because we know where they spawn, we've watched them, it's empirical data. It's pre-calibrated for this river.

We then start using this within the flow regimes which the model says we'll be looking at. We work at showing the flow relationships for the limited number of species and life stages we've selected and try to optimize things for them in terms of getting water for them.

Linda: And what are you going to base your preference values on?

Mike: Typically for spawning, you want to have water over the area you've selected to evaluate spawning in.

Linda: So you're saying dewatered vs. watered?

Mike: Not necessarily. If you just have 2 inches of water, that's not good. We may come back to looking at what may look like crude curves here, but they're not going to have all the process involved that you would get into if you had a Class III curve under IFIM.

I'm not in a position to define all of this today. But given the good biological information we have, I can see using that as a basis of a relationship between flow and fish. And that relationship might have inflections in it. That's really what we're looking

for. And those inflections often come as a function of wetted perimeter, which is a major factor of what we're proposing.

Kevin: Two questions: First, is Margaret still on the line?

Margaret: (on conference phone) Yes, I'm still here.

Kevin: And next, do you have any case studies or literature or other projects where this has been used?

Mike: Yes, there is a body of information. It's not as big as for IFIM, because that gets done everywhere all the time, but there is information on other methods where people start looking at wetted area, and the lessons that have been learned from all of that. But as far as reports on another methodology? No. We do the method for this project based on the conditions in the river at hand.

Kevin: It sounds like you are proposing a wetted perimeter method, and there is some information on that.

Mike: Yes. You use wetted perimeter as the basic hydraulic simulation technique for a limited number of high value areas and areas which are sensitive to changes in flow, under the assumption that if you take care of those you should be taking care of the other areas which are less sensitive to flow

Then you use Karl's knowledge on exactly where the fish spawn, which has preference tied into it, and if you don't provide water to that area, you are going to lose this year class of spawning, and that means population. I'd rather deal with that than with something a lot more complicated which you have trouble keeping track of.

We can spend a lot of time doing IFIM, or we can spend some of that time to work on a method like this which uses the best biology and good hydraulic simulation tools.

Kevin: I have two comments: No matter what we come up with, we are not going to have something that we can take directly to energy and fish so we're not getting around that. Everything will be in some sense an index.

Mike: Agreed.

Kevin: We don't have the slope of that habitat vs. flow relationship.

Mike: But the objective is to use your wetted perimeter, your biology and your depth, and to some extent velocities, you can solve for velocity by continuity, and you'll get a shape to that curve. I think you can get at least as close as WUA does, and probably closer for this stream, and you'll spend a lot less time and money. We could decide today to go with IFIM and I know exactly which steps we would take. I've done all the things

involved in IFIM and it gets so complex at some point that it hard to step back through it and see how to got to where you are.

This way, we build it up through what we know, we base it on biology, we do simple hydraulics and we try to get insights into which way to go. I'm just saying, can we have the door open to have another meeting to work on how that might be done. If we can't reach agreement among the group then fine, but that's our proposal today.

Doug: Are there fish above the falls?

Mike: There are fish above the falls, but we haven't found any anadromous fish. There was a coho salmon found above the falls before our studies began.

Doug: My question is what is the flow at which fish can ascend the falls. If a flow changes the dynamics of how we look at the upper reaches. I'm looking at what that flow might be and whether we might have the opportunity to adjust that.

Mike: I probably should have built the background a little better. In our earlier consultation, we talked about evaluating the falls as a passage barrier, and concluded based on agency recommendations that we conduct a Powers and Orsborne technique which is a method of actually measuring the falls at different flows, the height, the slope, the setback the depth of the water at the top and bottom, the pooling and stilling characteristics at the bottom, not to say whether they're a barrier or not but to see if there is a flow at which fish can use the falls for passage. We'll be conducting that study this summer and into the next fall. That's a separate study from the instream flow study we're discussing at this meeting.

Doug: Would this influence your decision on flows?

Mike: It ties very strongly into the available habitat on which we evaluate the flows in the larger reaches.

Doug: How much information do you have on bedload and how flow manipulation affects it, particularly in the high volumes.

Mike: Today the amount of information on sediment transport is very limited. Beginning this summer however, as part of our earlier consultation, we have committed to doing what's called the US Forest Service Habitat Evaluation Process in which look at the width/depth ratios, the sediment, the channel configuration, the floodplain characteristics as a baseline to track that type of thing over the longer period of time. It's not an instream flow/habitat study, it doesn't tell you the immediate changes in habitat with flow at a given point, but it looks at the long term processes of channel formation and channel configuration.

Doug: Looking at the stream today, I didn't see a lot of off-channel habitat. Will you be looking at doing something about this.

Mike: It's one of those streams that doesn't have a lot of off-channel habitat. It's a very incised channel that doesn't have a valley bottom, doesn't have backwaters and side channels. Those are some of the reasons why it doesn't have a large coho salmon population. With the Forest Service Technique, we'll be looking at those things.

Doug: Question about using the as-built environment as the baseline. (Difficult to hear)

Mike: The pre-project baseline is not something we completely dispense with. There will be NEPA documents which we will discuss tonight in the Scoping Meeting. The pre-project condition is valuable because it tells you the potentials for what you might do on relicensing, which direction you might go, whether a feature or condition was there before. We will look at the pre-project in that respect, but the objective isn't restoring original conditions, but noting the potential. Mike (to Nick Jayjack of FERC): Is that fair to say?

Nick: I'm coming late in the game and maybe you've discussed this, but I don't see what we are trying to achieve. If the group hasn't established what they'd like to see out there, maybe we should make a list of what we'd like to see what we are trying to achieve, and then try to come up with tools to achieve that goal.

Mike: We've (the City) described what we are trying to achieve as a raising of the overall base flow and a raising of the minimum flow up to points at which we believe the overall economics of the project will be affected, within a range of what we think now, and this is very speculative, a range within which that could happen.

Nick: When an application comes in, there are flow recommendations the agencies give us, there are flow proposal the applicant gives us and what I do is evaluate that flow from a biological or fisheries perspective and our project engineer evaluates the flow in terms of engineering and our comp. development section asks what the public interest and balance is. So what I would like to see is what are the biological goals here, because our attorneys are going to ask us "what is the benefit of say 100 cfs from the fishery perspective". I'm going to need to be able to explain that to them. So I would think there has to be some sort of biological goals here of putting more flow in the stream and I would think that would drive what study you're going to do. We know what the applicant's goal is, they want to still be able to generate electricity, but what needs to be enhanced in the stream from a biological perspective? I don't know if that's been established yet.

Mike: No, and it wouldn't be in this meeting. That would be more in the target species selection. You only get one flow in the river at a given time; it favors some species and not others.

Nick: What I'm saying is maybe you need to know what that is before you can start.

Mike: I agree with that as well, and believe that our very general proposal would follow the outcome of that decision, but that's still a way in the future.

Kevin: (To Nick) Do the objectives need to be qualitative or do they actually need to be numbers of fish for a species. Qualitative would mean to increase capacity for spawning or to increase access to rearing habitat or to insure access to seasonal side channels, things like that. Those are pretty easy to target once you identify the site-specific conditions. It would be much harder to target quantitative objectives.

Nick: The answer is yes, it could be either. It all depends on how the federal and state agencies want to manage the river. As a fishery biologist, I look at what are your goals, what are you trying to do out there. Have you identified that maybe you need some more spawning habitat for pink salmon? I would argue that PHABSIM would apply here because it measures habitat, it could be one tool. Another agency might say we are looking at a more holistic approach. There I would identify one methodology as perhaps being a modified Tenant approach which looks at a whole stream approach for flows. So having qualitative or quantitative goals would help me as a FERC biologist to determine what the benefits are. On a project where the sole purpose of a minimum flow was simply to provide access for sturgeon and we just looked at a flow study that told us what kind of flow would give the depth and the width of the channel we needed to bring the sturgeon up to the dam.

Mike: In this river system you can go through the species and start picking the ones which might be helped by flow. In a meeting we could discuss what remains on the table after we've looked at the various biological factors, the management constraints and the economic constraints.

Kevin: Couple of comments on IFIM. First, I agree that it can be very complicated and expensive to do thoroughly but I disagree that it's hard to keep track of where you've been and where you're going. It's carefully documented in the consultation process and in the actual development and running of the model and it's actually very well structured to keep track of how you got where you end up. And so it really depends on close coordination without losing track. You have to consult on appropriateness of literature curves in an expert decision format then you really need close documentation of how you came to consensus and that needs to be part of the record. But that can be accomplished. Agencies are learning that there are ways of integrating other satellite components of PHABSIM and augmenting through validation to make it much more site specific in an expert context, actually having people on the ground say that "yes, this works and the results are appropriate" so it's still has potential depending on how we can bring in satellite methods and checking for whether it gives us the essential information for the range of flows we are working under and the decisions we have to make.

Mike: Your comments on IFIM are still valid, and what I wanted to say is that we didn't want to go straight to it without considering other methods. Nick's comment is good that relicensing is based on management objectives, what do we want in this river with these

resources, under the opportunity offered by having an action through which something is likely to change.

That may lead to another meeting at which we can talk about all of these things. At that meeting the management objectives should be discussed first. The City also has objectives for this Project in the community which have to be met. And let's talk about biology in some detail because there's a lot knowledge about the fish. Let's talk about where you can get the bang for your buck in terms of water, and how we evaluate what benefits the water is providing.

We should have the meeting fairly soon, so we can be done in time to get on the river next spring. We don't have a long window of time when we can access the stream after snow melt and before the water comes back up, when it 's hard to access the river.

That's just the method, whether we devise one on our own, whether we take something off the shelf of use something off the shelf and modify it to meet the purposes, which come in through resource management objectives, and hopefully a mutual look at the objectives of the city and the agencies around both development and non-development resources. I think we can have a productive one-day meeting with those objectives.

Kevin: before the meeting, do you have information on an inventory on the character of the stream.

Mike: As in the Forest Service type information? No, that'll have to wait until next summer because we have too much water to look at it now.

Kevin: That may have a bearing on the specific application.

Mike: I really don't think that with the water up we can do the Forest Service Region 10 thing, for the remainder of this year.

Karl: I don't think we can deal with it this year.

Kevin: What level is the Forest Survey to be?

Mike: It's level III.

Discussion between Karl and Kevin which is largely inaudible, about conditions for various kinds of surveys.

Mike: Karl's got some good habitat maps showing what's in the channel.

Kevin: Not really numbers, but showing a pool here, a riffle there.

Karl: I can bring that up; it's fairly distinct. Inaudible.

Linda: Would it be possible to get some level of analysis on limiting factors? You've already mentioned spawning, it would be good to see more. Inaudible.

Discussion on fish. Need for periodicity information.

Mike: We'll do a draft agenda for the upcoming meeting and get it out at least 2 or 3 weeks in advance. We've got the reports from previous years, and we can get you the data from this year, which was a big escapement year for many species.

Kevin: We have a good recent biological baseline, but we don't have a good historical baseline and so everything we look at will be how fish use stream under existing flow regime. Since we're talking about flow under whatever you can do economically, we're raising the bar a little by taking the operational regime and looking at how fish can benefit from it. If we had a strong historical baseline we'd have how many fish can be produced and how the fish could benefit from flow.

Nick: How does this stream compare to others?

Kevin: I wouldn't call it typical or non-typical. There are a lot of streams like it, some are very productive, some aren't. There are thousands of small watersheds in southeast Alaska and a lot are similar.

Nick: Are there records for other similar streams?

Kevin: You're asking a good question, can we go find some other streams where we can match up. It's a good idea, I haven't done it. You have to have people who know the streams.

Inaudible.

Mike: We're taping, a lot of these comments aren't getting on tape. You might speak up so we can record your discussions.

Linda: I'm still not sure what you're proposing, and I have a question about it. How are we going to deal with the uncertainties in your methodology?

Mike: As I've thought through I've thought that the uncertainly is taken care of as you develop it, using actual fish locations, hydraulic information, stage information, tying that to the fish, if the uncertainty gets so high that you can't live with it then you don't do it. But you start the process and see what can be done. It hasn't been done before so in the sense of a national review, this is something that you've never seen before. But pieces of it have been done in a lot of different places. One of the reasons I feel so confidant that something can be worked out is that we started early getting the fisheries baseline data and you can do a good job of describing which fish species come up at which time of the year, in which numbers and which habitats they use. And that greatly reduces the

uncertainty to me. Often an application of IFIM in a river system where you don't know that much biology would leave a lot more uncertainty.

Tape change.

Q: Unidentified: Question on target species, management objectives.

Mike: It's probably the most important question in studies like these; I've seen a lot of studies where we hadn't determined which species we were trying to enhance, and it is the management agencies which make the call. There is a sport fish aspect, a commercial fishery aspect, the T&E species aspect, although I don't think that's applicable here, but it would be very applicable if it happened. All of these things have to be distilled into a single objective for this river. On projects where the objective remains at dispute at the end of the process, the instream flow settlement simply doesn't happen. It happens but it's disputed and it's never satisfying.

Nick: from an agency perspective, there could be multiple goals which a regime achieves.

Joe: I would support the need for agency goals. On uncertainty, IFIM and the techniques associated with it have some uncertainty assumptions associated with them. For this process, it's important to ID them and state whether we agree with them. We should establish a process for dispute resolution.

Mike: Good idea. Any thoughts on how we handle dispute resolution at this time? (no comments). OK, we'll make sure it's on the agenda for the next meeting.

John: No one has mentioned resident fish in the reservoir.

Mike: Whatever instream flow regime we adopt for the river, will affect seasonal water surface elevations in the reservoir. We are doing the studies in Blue Lake to determine which tributaries are most likely to be used at which time of the year, so we can evaluate what happens if we've released so much water that the fish have to ascend too far up the tribs to spawn, you've got a problem. And all it does is add to this multiple objective optimization we're talking about. We are gathering as much information as possible to be able to quantitatively evaluate various lake levels during various seasons, primarily as they affect fish spawning and incubation. There's the other question about how various reservoir volumes associated with those lake levels might affect fish populations in terms of how much room they have to life in and what they live on top of and we'll do the best we can with that.

Linda: A point of clarification. IFIM can address more than fish. Are you going to focus your instream flow on fish and not address wildlife and recreation?

Mike: There's nothing that says the method we're proposing couldn't be used for wildlife, for example, those associated with water level. If you're talking about multiple

preference factors for aquatic wildlife and calculating a WUA for them, I haven't seen that done on any project recently; it's typically not done. The focus will be fish. It's the main issue, and the one we want to spend our money on.

Linda: Are you anticipating that this other method would have an incremental component and an alternatives analysis component.

Mike: Definitely. It's create a relationship between fish habitat or usability and flow which will be the incremental aspect.
Final comments on this topic?

Group breaks for lunch.

After lunch, Dean introduces the next topic, which is the reservoir operations model.

Dean: I put on each table a block diagram of the model. I want to go through the diagram and explain the model.

I started building the generation model in 1995 because we had a dry year. We were running in adverse conditions. But, even though we were in adverse conditions, we didn't go to the 22 and 37 cfs in Sawmill Creek. We had actually created the adverse conditions because we drafted the lake down to do some work on the intake. I needed to know how far we could lower the reservoir and still recover, so we came up with this model. I've been using the model to predict when I needed to run diesels so I don't run out of water at the end of the year. I saw that this same model could also be used to answer questions related to relicensing. The model isn't done yet, and we're making modifications.

As we go through relicensing, we can make changes to make it fit our needs.

Dean shows a block diagram of model inputs and outputs.

Dean: On the left side are inputs, on the right side are outputs. Blue lake inflow is from the Sawmill Creek gage from 1929 –1957, with a few years fudged. We have this information from hydrographs. From 1994 to 2002 is based on operational data. The flows are based on knowing what the lake level was at the beginning of the month, subtracting off what it was at the end of the month, knowing the volume you had there, and then adding to it the water you used for generation and the water you spilled based on the staff gage.

For the years from 2000 to 2002, USGS put in the staff gage at the bridge which measures the actual flow in the stream so all you need to add in is Blue Lake generation to get total flows. The inputs come from three different places and they are all relatively good. There are also data for Green Lake which is based on a USGS gage there plus pre-project gage from 1916 to 1982.

Those are the "fixed" inputs.

The model uses fixed inputs, and we have variable inputs that we put into the model. We can pick a wet dry of average year, and a percentage of an average year. We can take any year, but I usually take the average and then some percentage of that.

The other variable input would be the fish valve release and the PMFU. The Blue Lake and Green Lake output are set by saying "how do I want to match the load between the two plants or how do I want to distribute the load between the two plants."

Under required flows are those that don't generate power, municipal drinking water, the industrial water, bulk water, Howell Bunger valve release.

The output comes in three different screens--

The Forecast Output is an Excel spreadsheet. Inputs are monthly but outputs are daily. We are going to want to add flows in Sawmill Creek to this spreadsheet.

The information is presented in spreadsheet, it's also presented in graphic form, by month, and a bar chart which shows how much power is generated at each plant and how much diesel generation I need to run for peaking and average daily load. Loads are calculated based on daily average, and there's a factor so we can turn average into peak.

The model was developed from a generation interest and we're trying to adapt it for other purposes and I think it will work well.

Dean configures model on screen. Shows output chart. Describes lake levels which result from a certain input. It's programmed for an average year times 0.8 for a safety factor.

Dean shows the Excel spreadsheet, shows system load, how much at Blue Lake and Green Lake, no unmet load, water stored in each lake, spill level how much spill should be in each lake.

Dean shows model run. Describes factors shows what inputs can be changed.

Q: I thought the fish valve couldn't go up that high.

Dean: It can't, but this is a game, a model to say "what if?"

Q: But wouldn't you want to have those constraints in the model?

Dean: We'll get to that. Dean continues to describe model set-up and run, situations that can be set up and input. Describes system variables, difference between day and night demands, penstock pressure (if less than 80 psi in penstock, can't maintain fire water pressure in town) so there's a function in the model so you don't go below 80 psi.

Discussion of penstock pressure and water elevation. Takes much more water to generate power at low lake level.

Reservoir limits. This function allows minimum reservoir levels. When you get to the minimum level, the elevation curve starts drawing a flat line. Blue Lake is set at 265 because of lack of turbine responsiveness which affects system frequency. We can also put these limits in for a habitat reason.

Annual load in Sitka is 100,000 mwh per year. The model allows that to be changed. At end of the license period we can ask, when load is 140,000 mwh, how is it going to work then?

Capacity Difference is where I decide which percentages of generation will be carried by which machines and which lake.

Demonstrates choosing which year, using average or a percentage of average.

Shows output of model run, spreadsheet, load chart, generation contribution for each lake, unmet load (no diesels)

Q: Can you show which cfs this would be?

Dean: Yes, at Blue Lake there is a big difference depending on the reservoir elevation. At Green Lake the difference is less because it has a spill elevation of about 390' something instead of 340' something.

Nick: Just for clarification, the real reason we prefer to generate at the Blue Lake powerhouse is because the water falls further and we have more head.

Dean: Exactly. From a practical standpoint, we will have difficulty obtaining a turbine that operates efficiently over a wide range of flow. If you tell me you need 22 cfs today and 75 cfs next week, that's difficult. We can't deal with that huge window very easily.

Q: If you did come up with that wide range, could you retrofit the turbine?

Dean: Yes, that's something we want to look at. But you won't be able to retrofit it to be able to go all the way from 22 to 100.

Dean shows a "haze chart" or reservoir elevations vs. months in dry, wet and average years. Dean notes that reservoir names have been switched on charts.

Q: On the dry year, when line is at bottom, is that when diesel might kick in?

Dean: Yes, (describes outcome in wet and dry years). The idea is for the lake level to recover every year so we have a full lake level in November. We have to meet the load. The higher the lake level, the better we can meet the load. We try to keep both lakes at as

high a level as possible because of the best electrical performance and because we have the most capacity. If we have to do maintenance, we have to drop one lake level down, while I do that I'll be storing in the other lake to be able to recover. That's how the "capacity difference" is used in the model.

Q: How often do you have to draw the levels down? Is it regularly scheduled?

Dean: We have to do a tunnel inspection every ten years, but it turns out that about every five years something will break. The intake is down 130 feet. We can't dive for long at that depth, so we draft the lake to 260 feet so I'm diving in 45' rather than 140' feet. To do this, we'll run one reservoir harder than the other to draft it. The year Blue Lake doesn't break, Green Lake does, and we have to draw it down. I've plotted the actual lake levels over the last six years.

Linda: So, is this graph showing a rule curve?

Dean: This graph doesn't show a rule curve, it shows what the lake level would do on an average year. If we want to make a rule curve, we increase the average load until both lakes just barely spill. That's your rule curve, that's your maximum generation for the whole system.

Dean shows what rule curve would look like.

Nick: Can you model three dry years in a row, and look at where you would start on the second year to see if you recovered?

Dean: Yes, we can do multiple year runs (shows how on model). In playing with the model I've found that you have to have three dry years (75% of normal rainfall) in order not to be able to recover, at current system loads.

Linda: Is this model part of the instream flow incremental method?

Mike: This is part of the overall instream flow operation issue and this model will show reservoir elevations which are important to fish and wildlife issues. What has yet to be developed is Sawmill Creek streamflow. We'll have that broken down probably in three areas of the stream so you will be able to see monthly stream flows in three different segments of the stream. That would feed directly into the flow vs. habitat relationship we develop.

Linda: So you're proposing an additional box for biological response?

Mike: Let's assume we're going to use IFIM because more people are familiar with that, IFIM would give you a flow vs. WUA relationship, so for any flow that came out of the model you could calculate a WUA and then create a time-series of habitats to go along with the time series of flow from the model. So whether we use WUA or some other

index, we can calculate a series of those indices. How you deal with those series is another matter for consultation, but the calculations are simple.

Kevin: Can you add a constraint to show minimum lake levels for Blue Lake rainbow trout spawning?

Dean: Yes. Let's suppose we set a minimum level of 300 feet at this time and 280' in this month and something in between, and the model says you'd better stop and it's going to hold you at no generation and say Whoa!. It can be modeled, but I can tell you that stopping generation for a month would be very difficult, and we can't do it.

Kevin: But we can put it in the model even if we just fall back on reviewing the output to see when it happened.

Mike: You can run lots of years and see a frequency of impact. That's easy to do.

Linda: Could you run the model backwards?

Dean: We can hold everything constant and change the streamflow requirements on a monthly basis, and see what happens if we go to different flow requirements. Put in what you want and see if it works, and if it doesn't, try something different until you find what you want.

Nick: So it could be an iterative approach.

Dean: It answers whatever you ask it.

Q: This is a post licensing questions. Once the project is relicensed, will we have the ability to operate, say, relative to snow pack?

Dean: No, we don't have any information on snow pack. You can look up into the mountains. Last winter we didn't get much snow, but it was raining. The lake level stayed up. We wondered what will we do next summer when there is no snow pack to melt? The answer is we didn't have to do anything, because we were generating from a high lake level all winter, we got more energy from the water, because it rained during the snowy season. So the snow pack wasn't necessary because the reservoir did not need to recover. The worst situation is snow in Oct. and Nov. and in Dec. it starts raining, which washes away the snow pack and causes huge floods which spill losing the water.

John: What about late melt?

Dean: I've never seen it. When it start warming up, the snow melts and the lake rises But the best indication for snow pack is avalanches.

John: I guess there's no way to annualize the major maintenance schedule.

Dean: No, but when we decide to do work, we need to plan a year ahead so we can manipulate the reservoir. I need parts, and if I can't get them, I need to do it the following year.

Richard: Why can't you change the fish valve.

Dean: We can. We can set it anywhere we want in the model. We put the inputs in and the model tells us how the system will react to the input.

Richard: If there is a level required for rainbow trout spawning, that would be a required flow….

Dean: No it would be a minimum lake level. We can set a minimum lake level. It's sounding to me like I need to modify the model so we can put in minimum lake levels for trout, or for some other reasons. These are things that can be done by changing the model. There are a lot of things I haven't shown.

Mike: The proposal is to use this model for problem solving, to see how things would behave under different inputs. We should have monthly minimum reservoir levels as constraints. As much input as we can get from the group about which inputs to add, they are fairly easy with Dean's program to add them.

John: Can model deal with parts of a month?

Dean: The hydrology that goes into the model is based on monthly values. We can change the variable any day of the month. You can say you want a minimum flow on a certain date, but the calculations of flows coming in and out of the lake come in monthly blocks. (Dean shows example on screen.) It's important to understand that lake levels and hydrology are all done monthly. If you show 460 cfs inflow in august, it's that amount every day.

Margaret: Can we talk about ramping.

Dean: The model doesn't tell you how things look at this time step.

John: If you were looking at months where the difference between two adjacent months was 100 cfs, if you knew the reservoir level during those months, you could say how much reservoir level that would account for. I'm looking for ways of accounting other than monthly rates.

Dean: We know that if the lake drops 2 feet how many acre feet that was. For example in Fish Valve flow. In January 1 we want the flow to be 100 cfs. On Jan 5 we want 50 cfs. On April 5 we want 75. See, on the output, we can set the different flows for different days.

Linda: Is Sawmill Creek flow just the FVU and spill, or does it take into account precip or runoff, etc.

Dean: No it doesn't. We have a staff gage here and there (points to upper and lower staff gages) and a correlation between the two gages, and there is another stream that comes in here, the difference between these staff gages is what comes in this stream, and it's about 5%.

Doug: Can you put in 5 or 8 scenarios, and get a set of scenarios and show how these things tend to change without getting too complicated?

Dean: the answer is yes, that's what the model's for.

Doug: Would it be helpful to do this?

Joe: Perhaps it would be better if we did that after we've done the instream flow assessment (very hard to hear).

Dean: In answer to your question, yes, I could come up with some runs, but as Joe pointed out it would be better if we knew which questions we are trying to answer before we start asking them.

Mike: It is valuable to do a sensitivity test to see what's driving this, particularly regarding certain months. It's not going to answer decision questions but it will help familiarize us with the model and show times and places which react more.

Dean: Keep in mind that this model draws very specific curves but we don't know if we are going to encounter a low water year of a high water year. We also don't know which year we are going to use to set the criteria. Are we going to design for a low water year or for an average water year and then run out of water half the time, or a high water year and run out all the time. We have to assume how much risk we are willing to take. It will be a difficult thing to decide.

Mike: There is a good deal of experience with this, and there are ways of doing this to reduce risk. For example, if snow pack is known, you can measure it and people run their systems very precisely. If we get extra water we'll give it to you, etc. It's all about eventually finding the flow recommendations that will become the License Articles.

Linda: What exactly is your goal for reservoir operation, when do want to see spill?

Dean: Our goal is to spill every year.

Linda: At what time?

Dean: When we spill depends on the rain. Usually it starts in October or September.

Linda: So it's not really at any particular time of the year.

Dean: No, it just needs to fill up so you can recharge your batteries *so to speak*.

Linda: So if you spill in May……

Dean: There's no way that would ever happen.

Linda: I know, but would it matter?

Dean: Yes, it would. We want it to spill right before it starts snowing, because when its snowing you're storing the water in the mountains. At the same time, during the remainder of the year we want to keep the level as high as we can so it takes less water to do the same thing. However, you will not find that we will start up our diesels until we are down here where we are afraid we are not going to recover. In other words, we could run the diesels a lot to assure high reservoir levels, but that wouldn't achieve our overall objectives.

Ten minute break.

After break:

Dean: Next topic is hydrologic data needs. I've talked about the original hydrographs, and those from 1994 through 2002 from the upper and lower staff gages. These are the ones we've had and have now, and we plan to continue to use them because they tell us what we know.

Joe: It would be interesting if your dry, wet and average years were summarized in a table and also to see what spills were in those years.

Dean: Answer to your first question is from the operations chart, we can average the output.

Joe: Do we have that data?

Dean: No, but I do, and you can have it. We can show you the wettest, driest, any year you want from each run.

Dean: Your second question is whether we can show the spill, and all we have to do is take that off the charts as well. We will call the spill "Sawmill Creek" flow, and we can plot it against the months. Dean shows how it varies through the year.

Joe: But can we get historical data based on this output?

Dean: Yes, we can back calculate from generation.

John: You said you were using the low historical year. Would it be better to rank years by deciles or using excedance?

Dean: Yes, that's been done, but for this model we're using a wet, dry and average year.

John: Monthly exceedance is sometimes a more real way of dealing with things. Maybe the dry, average and wet are best for reservoir operations, but maybe for instream flow annual exceedances might be useful.

Dean: How do you do it? How do you decide that?

John: Well I don't have any experience in doing this for a reservoir, and this is true for a lot of us; we don't have a lot of projects around here with storage. (Discussion of annual, monthly, exceedance and averages, Kevin, Dean, John, contribute.)

Mike: This can get pretty hairy when you look at all the ways you can represent flows with averages, percentiles, exceedances, etc. Mike describes problems with various ways of representing dry, average, etc. This group will really have to look into ways of doing this. These are detailed questions for the hydrologic consultation over the next several months.

John: Don't get me wrong, I don't think it's a model limitation that it only works with monthly means but it might be a limitation if you can't input any year other than your dry wet, etc.

Dean: I will input any year you dream up.

Dean: There may be more to it that. I just hate to set criteria for a dry year when we live in an average world. And we ought to think in terms of the average world but have the ability to cover ourselves when we get into a dry year.

Mike: One of the inputs we'd like today or soon is your ideas about the gaging system. We feel it is adequate for our purposes. It's maintained by the USGS so the quality of the data is good. If you have recommendations, let us know.

Kevin: How do you acquire lake stage?

Dean: We have a pressure transducer at the FVU. We measure that pressure, look at flow at hydro plant, calculate the difference, and calculate stage.

Mike: In the model, though, it's done using an elevation/capacity curve, right?

Dean: That's right.

Kevin: My next question is how do you get inflow?

Dean: We don't get inflow to the lake. I take the elevation at the beginning of the month, subtract it from the elevation at the end of the month, that's the difference in elevation that happened during the month, then I add to it what was generated, and the other water like the drinking water, we add to it all the differences, and that's how we infer what the inflow was.

Kevin: So, you could back calculate through your entire history of operation?

Dean: No, I had to come up with the inflow for the reservoir for the last 6 years, that's the way I did it. When they did the original hydrographs, the project wasn't there, they had a stream gage right on Sawmill Creek and it measured it, there was nothing in between. Since we have the reservoir there we have to back-calculate.

Mike: So that's why you have a monthly average for flow. You have the elevation at the beginning of the month and the elevation at the end of the month. You calculate the difference in volume in cubic feet, divide by the number of seconds in a month, and come up with cfs.

Dean: Right. Any more questions.

Doug: My concern is for sub-surface flows through the gravel. With spill today we saw the gage at the campground bridge was at about 4 feet. When you're not spilling, but you're running the FVU you're still getting about 3 feet. What I'm wondering is at what point upstream are you not saturating the gravel and providing through the gravel flow? When you are spilling, you are saturating the gravel, when you're not at what point are you not saturating it?

Dean: The substrate in the dewatered reach is not gravel it is cobble on bedrock, so there is no subsurface flow when the dam is not spilling. The staff gage is 50 yards below the hydro. We set the turbine at 50 cfs, and to confirm that's what the turbine is putting out, we have the staff gage in right downstream to confirm that the controls on the turbine are providing what the regulations require. The USGS maintains the gage and recalibrate it after every storm event to give us a new rating curve. There isn't any subsurface flow because there is good agreement between the gage and the turbine. There is good agreement between the visual gage and the control in the turbine, and that's why we only have to look at it once a week because they shake hands.

STA: I've seen when certain streams dry out they seem to seal and form a barrier.

Dean: This part of the stream is watered year 'round; it's never dry.

STA: But your dewatered part of the stream is often dry and I've been working on the assumption that there are fish wanting to use Reach 6.

Dean: We can walk up there any time you want. It's not the kind of place where there is gravel, it's all cobble and big boulders and bedrock. All the gravel was washed down, and lodged underneath the bridge.

Q: Are there fish in that segment?

Karl: Yes, there's just enough oxygen.

John: Has the lower gage has been moved?

Dean: It may have been moved 5 feet. When we had our own gage in there, we had an electronic pressure gage and we were having a heck of a time keeping it running and USGS said "we can put a bubbler in there with nitrogen" and we said go for it, and they moved it over 5 feet so they wouldn't have to use my pipe. But it's basically the same place and it's also the same place as the original hydrograph.

John: So it's the same place as the pre-project gage?

Dean: Yes.

John: And is it under tidal influence?

Dean: Yes, under extreme high tide and extreme flood conditions.

Linda: If there are worries about the gaging system could we put a new one in just above tidal influence?

Kevin: That's a good question, but USGS installed the gage and it's pretty much their call on the reliability of the data, they can extract out the tidal influence.

Dean: Yes, and when I say a high tide, you're talking about a 12 foot tide under a flood condition, and that only happens only how many hours per year? To me it's not worth worrying about. It's certainly within the accuracy of the gage itself, but when we did it didn't seem worth the problems associated with putting it somewhere else, and it's also a good place because there's a transect right there and we can measure the bottom to calibrate the gage.

Kevin: USGS won't publish data that's not good. Their annual report says how good the data are, and they won't publish it if it's not good.

Dean: They haven't published data from this gage yet, it's only been in few years, but it's a matter of time.

Mike: The last topic is water rights. The issue is that we are in the middle of a federal action and we're looking for feedback from both FERC and the state agencies about what the process might actually entail in terms of the existing water rights. For example, there

are license articles and water rights which relate to them, and some might say that in a relicensing the world is open for restructuring. We don't have any proposals, but would be inter

Linda: Can we talk a little about the water rights.

Mike: Yes, we can, we have a diagram that shows the water rights and their locations. Copies of diagram are passed around.

John: Water rights are a state created right to the use of water and one of its characteristics is that it is property right. A water right can be loss in only two ways, one is voluntary relinquishment and the other is abandonment and forfeiture. That's pretty much it under state law. Now we recognize that a federal actions such as an NPDES permit could pre-empt an allocation, but from DNR standpoint, FERC licensing is not an opportunity for reallocation of a state water right. A comparison would be if there was a new project and a piece of property on which was the best site for a powerhouse, you'd have to do something about that. Even if the license were to grant eminent domain, you'd have to compensate monetarily for the taking of that private property. So water rights are parallel to that situation.

Linda: John, explain what you mean by forfeiture or abandonment.

John: Forfeiture is voluntary. Abandonment in Alaska law is failure to put water to beneficial use with the intent of abandoning that use. The state has never gone through a revocation process based on abandonment.

Dean: In the case of heart lake, when they built the mill, they used the water to clear the mudflats where they built the mill, APC had water rights and retained them to do that was not put to beneficial use and it was forfeited. Happened in 1999.

Q: Can the state define what the use is? For instance, can you lose it if it is issued for hydroelectric generation?

John: Yes, the right is specific for a particular use and the use cannot be change unless the water right is amended through a state administrative process. It depends on how that use is defined in the certificate, and some of our older water rights uses are defined in very broad terms, such as "industrial" or "commercial" leaves a lot of latitude. More recent water rights are more specifically defined. Sitka's water right for the project is defined for "hydroelectric" use.

Dean: The chart of picture we just passed out is from a spreadsheet John sent, and I just made a picture of the spreadsheet. Starting at the reservoir there is an allocation for FVU for 50 cfs for that, the license was issued in 1991 but the instream flow was required way back in 1959. Next down the line we come to the filter plant and again that has a 1991 priority date to it. The water that goes through the filter plant is also allocated for bulk export. So not all of it is for bulk export; the rest of it goes into Sawmill Creek. Going

down the line, we have the 16-inch fire line, and on that we have two certificates, one for the mill water and it's 48 cfs, and then there's the mill, industrial and public water. Next there's a 20 inch line that goes to the water treatment plant. Originally there was no allocation for drinking water, but in the 1980's the City decided that, rather than use Indian River for our drinking water source, we would use Blue Lake, and we went to DNR to get an allocation for a water right and they said it's not that easy. Why don't you take part of your 200 mgd allocated for hydro and we'll reallocate it as drinking water. Hydro was originally 200 mgd, now it's 191 because we transferred 9 of it over to municipal drinking water.

Mike: Are dates in parentheses priority dates?

Dean: Yes.

Mike: Do they correspond to the dates that the water rights were issued?

John: First, recall that the state came into existence in 1959, water use act was enacted in 1966, and somewhat later we actually began administering it, so these are old water rights. Old water rights are given a priority dates were beginning with putting the water to beneficial use. Newer water rights priority dates are normally the dates of application. So for the public water supply and the hydro, those are old pre-water use act priority dates established with the beginning of beneficial use. Public industrial had the old priority date because it was established when the Alaska Pulp Company got the water right after the fact. The others are more recent and they correspond to the dates when the water rights were applied for .

Linda: Question of bulk water.

John: There were two transfers of water rights, LAS 19669 transferred just enough for the export, and a little bit for hydro to City, and then they requested the transfer of the remaining water right, and by that time during the preceding five years the mill had begun using less water than it had a right for, so we reduced the right on transfer to the City. We ended up with a total allocation that was considerable less than the allocation when the mill was operating.

Dean: The Mill's original allocation was 50 mgd and when the mill shut down from the 5 years prior to shutdown, they had only been using 31 mgd and so only 31 mgd was transferred to the City. This additional 12. 5 was actually transferred before that, and so it still comes out to be less than the original 50 mgd that was allocated to the mill. Is that right?

John: Yes, that's right.

Dean: So, 12. 5 plus 31 comes to about 44, that means that there is still 6 mgd that hasn't been allocated from the mill.

John: Let's be clear though, it's not that it's there in a discreet package to be allocated. What we've just been talking about would demonstrate whether there's unallocated water there. The fact that we once allocated 6 mgd more isn't the same as a hydrological demonstration that it's really there.

Dean: One of the interesting things that I came across in the process of making this chart was I went through and added up all the uses and it came to a total of 505 cfs, and then I looked at my hydrological data and the average inflow into Blue Lake is 462 cfs, which says that on an average year the water is over-allocated, and what I understand is that when the time comes that we run short, the water is divvied up based on priority dates. Right?

John: Right.

Mike: John, do the water rights are associated with uses which are tracked. Are they also associated with the points of use?

John: Yes, they are specific to points of diversion and points of use.

Mike: And could those be transferred or changed?

John: Yes, it's possible.

Mike: And the uses themselves, could they be restructured if the relicensing headed in that direction?

John: Yes. Not without it's red tape. But yes. Those changes have to be applied for and DNR has to review them and under current law there has to be a decision of whether there has to be public notice and meetings and so forth. Because as you can imagine some of these changes in uses could affect other water right holders and we have to afford due process to those other stakeholders.

Mike: We are talking about taking the LAS 13326 for 50 cfs and making it into something different under the new license. If it became something greater than that, say 60 or 70 cfs which arrived as an Article to the new license, would that require a change in the water right?

John: One limitation we have is we can't amend the water right to increase the amount. That would require a new application which would bring with it a junior priority date.

Kevin: Just to throw out a scenario, if the licensing created a new water right under the federal action on relicensing, it would seem to create a vulnerability if the instream flow were a mandatory condition, but if there is a water shortage, that's a junior water right and it would be the first one shut off. Whereas if the Blue Lake water right of 1958 had some of the water relocated, which can be done, it would protect that water.

John: Yes, we call that a transfer and change of use, and if that were done, it would carry with it the old priority date. But it sounds like because of the relative efficiencies of generation it would be difficult to quantify.

Dean: It would be easy to quantify, to determine the cost of moving that generation up. It costs half as much to generate power at Blue Lake as at the FVU. What we would have to do would be to weigh the economic advantages or disadvantages against the benefits we would get from the instream flow. And our problem is how do you assign the value of the instream flow that you can compare to the value of the generation?

Nick: Since the water right is property, the licensee has two years after relicensing to acquire all property, so I don't know if the City would still have to acquire the property end of it.

Kevin: inaudible

Linda: Why was a water right was issued when generation started at the FVU, but not originally?

John: Originally, the release, which was just a pipe, was just a condition of the license. Clearly when you put a turbine on the pipe, it becomes a use. If it were done today, even without hydro, you could say that that's a diversion for habitat maintenance. That's more modern thinking.

Q: Discussion about diversion and return flow.

John: If Sitka had never gotten a water right for their hydro and they were to do so now, we would be looking at a water right at the dam for the intake, and part of that would be a diversion for fish with a return flow at the campground, and a beneficial use for fish habitat. But back when this was done, we didn't think about return flow, we didn't talk about fish flows.

Linda: Why couldn't we transfer the fish valve water right?

John: We could, and we would assign the old priority date.

(Inaudible discussion about transfers of water rights from various points, uses.)

Linda: Are we headed for a situation where the water is over allocated and we're not going to theoretically be able to increase instream flows?

Tape change.

John: The term "over allocated" can be defined many different ways. Keep in mind that during most of our administrative discussion of water rights they were defined in terms of the maximum rate of diversion. Later we began to talk about them in terms of acre feet.

Had we been adding up acre feet, we'd find that it's not over allocated. You can conclude from adding up all the cfs values that we're over allocated. We'll see, that's one of the things we can do with this water balance model.

Mike: So there are potentials here, as we look at the water rights, for changing quantities and points of diversion, locations, and a lot of this will pop up as we proceed. Working within the water rights structure and being able to change things offers a lot of flexibility to fashion a flow regime, realizing that there are administrative things that have to be taken care of.

Any other comments or thoughts on the water rights issue. It's one of the things that will remain an integral part of consultation from here on out.

If there are none, we are pretty close to being done. We'd like to thank you for getting up early and staying late to attend the site visit and this meeting. We'd like to remind you that there is a Scoping meeting in this room this evening at 7:00 pm. It's public anyone can come. Site visit tomorrow will be longer and more detailed, at 9:00 am.

Dean: We are going to listen to the tapes and make a draft set of meeting minutes, then distribute them for review. You can review it and send it back. We'll finalize the minutes based on the comments.

Action Items.

Mike:

1). We owe members of group some better hydrographs before we get together again; Agencies need to give us some goals, we need you input on fisheries goals.
Updating so model covers streamflow.

2). We will be having another meeting on the details of the instream flow and hydrology studies. Conference among yourselves as agencies and see where you want to go with that. At the next meeting hopefully we can come to a decision as to the method we will be using to quantify the fish habitat vs. flow relationship. We'd like to have that meeting before December 15. Anyone who might be completely out of action between now and that date. If you can give us blackout dates or those that are good.

Joe: We need periodicity information and a map of habitat. Where would you like to have the meeting?

Mike: We'll do it wherever it requires the least total transportation. Can I assume that everyone in the room is interested in attending that meeting? No comment. Maybe can dovetail this meeting with the fish population studies in Blue Lake. Is there any objective to another meeting? No comment.

Thanks for your attendance.

Linda: How about Limiting Factor Analysis?

Mike: We'll talk to Karl about that.

Blue Lake Hydro Hydrology Meeting Site Visit 10/22/03

A site visit of the Blue Lake hydro facilities was conducted from 8:00 – 10:00 am on 10/22/03, prior to the Instream Flow and Hydrology Meeting. The following individuals were in attendance:

Ben White	ADNR-OHMP
John Dunker	ADNR DML&W Water Resources
Karl Wolfe	CBS consultant
Linda Shaw	NMFS Habitat
Richard Enriquez	USFWS
Joe Kline	ADF&G
Kevin Brownlee	ADF&G – SF
Cheryl Enloe	STA
Douglas Dobyns	STA
April Jensen	CBS
David Turner	FERC
Nick Jayjack	FERC
Marlene Campbell	CBS
Joe Donohue	ACMP
Mike Prewitt	CBS consultant

Dean Orbison conducted the tour. The following items were observed and described:

1. Lower staff gage.
2. Blue Lake reservoir was observed from the end of the Blue Lake road.
3. Blue Lake dam was observed from the top of the access ladder. The dam was spilling at the time.
4. The Fish Valve hydro and the bypass valve was observed. The 50 CFS flow set point was described.
5. The dewatered reach was observed from the fish valve hydro.
6. The upper staff gage was observed and the operation of both staff gages was explained.
7. The bypass reach was observed from the Beaver Lake bridge and the Blue Lake road.
8. The filter plant and Pulp mill feeder hydro discharge in to Sawmill Creek was observed from the Blue Lake road.
9. The relative locations of the barrier falls and the slot in the by-pass reach was observed and explained.

10. The lower portal and the penstock taps were observed from above the portal. Each tap was explained.
11. The Pulp mill feeder hydro building and it's piping were observed.
12. The turbine pit overflow returning to Sawmill Creek was observed. The future bulk water export piping was explained.
13. The Blue Lake after bay was observed.
14. Sawmill Creek was observed below the powerhouse.