

Boundary Hydroelectric Project (FERC No. 2144)

***Integrated Resource Analysis
Meeting Summaries
December 2008 - February 2009***

Seattle City Light

April 2009

LIST OF MEETING SUMMARIES

Meeting Date	Meeting Type	Meeting Subjects
12/3/08	Meeting	Project operations, IRA process
1/14/09	Teleconference	Terrestrial resources study report review
1/20/09	Meeting	Total dissolved gas physical model tour
1/27/09	Meeting	Terrestrial resources Project effects and non-operational PM&Es
1/28/09	Meeting	Fish and aquatic resources
1/29/09	Meeting	Water quality Project effects and non-operational PM&Es
2/10/09	Teleconference	Recreation, land use, and aesthetics resources Project effects
2/11/09	Teleconference	Cultural resources Project effects and non-operational PM&Es
2/23/09	Meeting	Terrestrial Resources Management Plan
2/25/09	Meeting	Fish and aquatic resources
2/26/09	Meeting	Aquatic habitat modeling, PM&Es, IRA process

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Quality Inn Oakwood, Spokane, WA
December 3, 2008**

In Attendance

Emily Andersen, Long View Associates (LVA)
Peter Barton, Seattle City Light (SCL)
Kristen Bonnano, USDA Forest Service (USFS)
Jerry Boggs, Selkirk Conservation Alliance (SCA)
Robert Cromwell, SCL
Rick Donaldson, U.S. Fish and Wildlife Service (USFWS)
Mike Gerdes USFS
Barbara Greene, SCL
June Hues, Bureau of Land Management (BLM)
Steve Kern, SCL
Glenn Koehn, USFS
Mark Cauchy, Pend Oreille PUD
Michele Lynn, SCL
Marcie Mangold, Washington Department of Ecology (Ecology)
Llewellyn Matthews, Columbia Power Corporation
Rosy Mazaika, BLM
Steve Padula, LVA
Doug Robison, Washington Department of Fish and Wildlife (WDFW)
Tom Shuhda, USFS
Al Solonsky, SCL
Sharon Sorby, Pend Oreille County Weed Board
Dan Trochta, USFWS

Meeting Summary

Agenda

Proposed agenda (Attachment 1:

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp):

- Introductions, Review Meeting Agenda and Goals
- Boundary Operations Presentation and Discussion
- Integrated Resource Analysis (IRA) Process
 - SCL vision and goals for the IRA process
 - IRA draft protocol
 - IRA proposed schedule

Boundary Operations

Robert Cromwell (SCL) gave a presentation on the operations of the Boundary Hydroelectric Project (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Robert explained that Seattle City Lights' portfolio is largely dependent on hydropower resources. Robert described how the Boundary Project provides reliability and flexibility to the utility's system as well as the regional grid system and the potential impacts of any constraints placed on the current operations of the project. There was a brief Q&A session at the end of the presentation.

Integrated Resource Analysis (IRA)

Barbara Greene (SCL) gave a presentation on SCL's vision for the Integrated Resource Analysis (IRA) process (Attachment 3: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Barbara explained that a protocol for the IRA process was developed to provide guidance for the 2009 discussions of project effects and protection, mitigation and enhancement (PM&E) measures (Attachment 4: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

The group reviewed the meeting dates of the IRA timeline (Attachment 5: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). SCL noted that, to the extent possible, the comment periods for the Updated Study Report (USR) (30 days; approximately mid-April to mid-May) and Preliminary Licensing Proposal (PLP) (90 days; May 1-July 29) were taken into consideration during the development of the schedule of IRA meetings. The group agreed to the addition of three new IRA meeting dates to the schedule: March 26 and April 8 and 9. Meeting participants agreed to provide feedback on any issues with the existing dates outlined in the proposed timeline to Barbara by Thursday, December 4. SCL will issue a revised timeline shortly thereafter.

There was discussion about whether technical resource workgroup meetings would be occurring concurrently with the IRA meetings; the concern being that there may not be sufficient time to have the discussions necessary for coming to consensus on issues. SCL explained that it envisioned that the set of meetings currently outlined in the IRA timeline would be the forum for the entire IRA process including resource specific discussions. Mike Gerdes (USFS) indicated that in processes similar to this one that the USFS has participated in, technical workgroups typically did the in depth review and discussion of the information on project effects and brainstormed about potential PM&Es and then reported back to the larger group on its conclusions to support the identification of cross over impacts and development of a comprehensive PM&E package by the larger group. SCL indicated that, aside from the types of meeting in which the information is discussed, it envisioned a similar approach to the model outlined by the USFS. SCL also expressed its concern with adding many more meetings to the already intense effort that is envisioned for the IRA.

At the request of the USFS, SCL will consider scheduling a WebEx meeting prior to the January 27 terrestrial-focused IRA meeting to allow the Terrestrial Resources Workgroup more time to

discuss the conclusions of the terrestrial study reports that will be issued in advance of the January 27 meeting.

In response to a question about what will be included in the PLP related to PM&E measures, Barbara indicated that to the extent tentative agreement is reached on any proposals, SCL planned to include non-operational PM&Es in the PLP. The group agreed that it is likely potential operational changes would come up during discussions about non-operational PM&Es. SCL agreed that it would also reflect in the PLP any operational modifications identified through the February 26 IRA meeting that were under consideration in the context of on-going IRA discussions. (The current cut-off for information from IRA meetings being included in the PLP is early March).

In response to mention about SCL planning to present results of test operations scenarios at the February 26 IRA meeting, Glenn Koehn (USFS) requested that relicensing participants have an opportunity to review and provide input on the scenarios before being run. Al Solonsky (SCL) indicated that SCL has developed five test scenarios and gave a brief description of several of the test scenarios. Barbara indicated that SCL would distribute a complete description of the five test scenarios and consider USFS' request.

Recognizing that SCL is not planning to having a third-party, independent facilitator participate in the meetings, Kristen Bonanno (USFS) asked whether SCL would give consideration to working with the RPs to identify a facilitator that could be utilized in the event of disagreement on significant issues. Barbara offered that another option would be to establish a policy-level group of representatives that a significant unresolved issue could be brought to for possible resolution. SCL agreed to consider USFS' recommendation.

Decisions

- IRA meeting dates for March 26 and April 8 and 9 will be added to the IRA timeline.
- To the extent any are discussed in IRA meetings held through the end of February, operational modifications will be noted in the PLP, and characterized as being under discussion.

Action Items

- Meeting participants to provide feedback on any issues with meeting dates outlined in the IRA timeline.
- SCL to re-issue a revised IRA timeline.
- SCL to consider scheduling a Terrestrial Resources Workgroup WebEx(s) prior to the January 27 IRA meeting. (*SCL is in the process of identifying dates in January for at least one, possibly two, WebEx meetings.*)
- SCL to distribute descriptions of five test operations scenarios.
- SCL to consider request for relicensing participants to have opportunity to provide input on test operations scenarios.

- SCL to consider possible ways of addressing disagreement on significant issues that the IRA participants cannot resolve.
- SCL to consider providing a CD to WDFW of the study reports that will be released December through February prior to the March USR filing.

Closing

The meeting adjourned at 3:30 pm.

Attachments: (http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

Attachment 1: Agenda

Attachment 2: Boundary Operations Presentation

Attachment 3: Integrated Resource Analysis Presentation

Attachment 4: Proposed Integrated Resource Analysis (IRA) Process

Attachment 5: Revised Licensing and Integrated Resource Analysis (IRA) Activities

**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Terrestrial Study Report Review Conference Call
January 14, 2009**

In attendance

Kathy Ahlenslager, USDA Forest Service (USFS)
Katy Beck, Beck Botanical Services
Jenna Borovansky, Long View Associates (LVA)
Kathy Dubé, Watershed GeoDynamics
Bill Fullerton, Tetra Tech (TT)
Mike Gerdes USFS
Nancy Glines, USFS
Greg Green, TT
Jim Keany, EDAW
Michele Lynn, SCL
Colleen McShane, SCL
Steve Padula, LVA
Doug Robison, Washington Department of Fish and Wildlife (WDFW)
Dan Trochta, U.S. Fish and Wildlife Service (USFWS)

Meeting Summary

Agenda

- Relicensing Participant questions and answers on final study reports
 - Erosion (Study 1)
 - Rare, Threatened, and Endangered Plant Species Inventory (Study 17)
 - Waterfowl/Waterbird Study (Study 15)
 - Inventory of Riparian Trees and Shrubs (Study 16)
 - RTE Wildlife (Study 18)
 - Big Game (Study 19)
 - Bat Surveys and Habitat Inventory (Study 20)

Erosion Study

Relicensing participants (RPs) discussed a series of questions with Kathy Dubé (Watershed GeoDynamics) regarding the methodology for calculating historical and future erosion in the Project area and conclusions in the final study report.

- Kathy Dubé confirmed that Appendix 2 was not complete relative to the spreadsheet that was provided to Mike Gerdes (USFS) upon request. The correct Appendix 2 will be provided to RPs.
- The formulas that were used to calculate the volume of material lost were discussed. Kathy Dubé confirmed that the volume lost includes only the area above the full pool

level, and that the area below the water was not included in the volume calculation.

Kathy described the calculation methods used and will provide RPs with the formulas and an accompanying diagram of how the field measurements were used in the formulas.

- RPs questioned why the elevation reference for flooded areas (from Study 2) was different in the wildlife study reports and the erosion study. Kathy Dubé and Bill Fullerton (TT) confirmed that the reported elevations were from different locations, so that the elevations as cited are correct based on the location of interest for each analysis (at Metaline or between Metaline and Box Canyon). One exception is a reference on page 37 of the Erosion Study Final Report: the reference to “1.3 feet” should be “1.1 feet”.
- Mike Gerdes noted that the Forest Service continues to be interested in determining the amount of material that is being redistributed throughout the fluctuation zone.
 - SCL does not plan to do any additional analysis of soil redistribution. The Inventory of Riparian Trees and Shrubs Final Report acknowledges (but does not quantify) the differences in substrate between pre-Project and current conditions.
- Doug Robison (WDFW) asked if the evaluation of high value resource sites included estimates of the potential for loss of submerged stumps that provide habitat to fish. Kathy Dubé noted that this was not a part of the Revised Study Plan (RSP) for Study 1. However, the amount of exposed roots on submerged stumps was measured and is noted in Appendix 2.
- Dan Trochta (USFWS) asked if there were plans to evaluate the potential for treating erosion at any of the bank swallow nest sites. SCL and the RPs discussed that a consensus at the July field trip was that since bank swallows nest sites are associated with erosion and rely upon erosion to continually produce new nesting habitat or renew habitat, it was assumed the nesting sites and opportunities would continue to be available throughout the reservoir over time, though specific nesting locations will change. Dan noted that periodic monitoring of these sites may be of interest to confirm this assumption.

RTE Plant Species Inventory

- Doug Robison questioned whether there was literature regarding weed establishment in fluctuation zones. Katy Beck and Michele Lynn noted that there is a lack of literature on this topic.
- Mike Gerdes requested that dispersal mechanisms for weeds be discussed in the Preliminary Licensing Proposal (PLP). Katy stated that for weeds that are present in the Project area, there are multiple mechanisms for movement, as the weeds are primarily spread through seeds from fruiting plants or via pieces of roots. Also, flood events provide mass dispersal opportunities.

Waterfowl/Waterbird Study

There were no questions regarding the Project effects discussed in the Waterbird/Waterfowl Final Report. Dan Trochta noted that the study identified two mechanisms that impacted goose nesting – land bridging and flooding. He asked if the study investigated the feasibility of reducing these effects through non-operational measures, for example, removal of material to

limit land bridging. Michele Lynn noted that the studies only identified the potential Project effects, but that at the upcoming Integrated Resource Analysis meetings, discussions regarding potential Protection, Mitigation, and Enhancement (PME) measures would begin.

Inventory of Riparian Trees and Shrubs

There was a discussion of the potential for vegetation establishment below the current fluctuation zone. SCL noted that due to bathymetry, there was limited opportunity for vegetation to establish, and limited information to conduct such an analysis to 1954 feet NAVD 88 (1950 feet NGVD 29). Greg Green (TT) also noted that since the same area was analyzed for potential wildlife habitat (upland), double counting could occur if it is re-analyzed for riparian potential, given the assumptions that were made in the wildlife habitat assessments.

Mike Gerdes noted that the Forest Service will be conducting such an analysis and asked if SCL would be willing to look at vegetation establishment down to 1954 feet NAVD 88. Michele Lynn noted that SCL determined this analysis was not necessary in the past (as noted in the final study report), but that SCL will consider the Forest Service's request. Mike Gerdes also noted that there is the potential for riparian stands to develop in areas that are not adjacent to existing stands, but he recognizes that this analysis is beyond the scope of what was agreed to in the RSP.

RPs had several questions about acreage numbers in the report, and SCL will confirm numbers in the report tables and provide clarification and/or confirmation to RPs.

RTE Wildlife Study

Relicensing participants discussed several details regarding backwater habitat for amphibians and macroinvertebrate populations available as a food source for bats. Dan Trochta noted that the RTE Wildlife Final Report references 2007 national guidelines regarding eagle nest disturbance distances. He noted that if any monitoring activities are proposed as PMEs for eagles, the USFWS in this region prefers to look at the local susceptibility of eagle pairs to disturbance, and also considers the Montana bald eagle guidelines to be more applicable to this region than the national guidance.

Doug Robison noted that the language in this report, and others, that refers to some reservoir conditions as "natural" is not applicable, as a reservoir would not be present in natural conditions. Colleen McShane noted that SCL will keep this distinction in mind as analyses are discussed in future documents.

Big Game Study and Bat Surveys and Habitat Inventory

Meeting participants stated that they had not yet closely reviewed these two reports, but based on initial reviews, they did not have questions. SCL will provide an opportunity for questions on these two studies' effects at the January 27 meeting. Mike Gerdes noted that his comments on the potential vegetation analysis down to elevation 1954 feet NAVD 88 also apply to the Big Game Study. He agreed with the conclusions in the Bat Study, that he does not see Project effects on bats.

Decisions

- Several information updates/corrections to reports were identified based on RP feedback, and will be noted with the FERC filing of the Updated Study Report. (The corrections will be included and summarized in an erratum to be placed at the front of each affected report.)
 - Erosion Study
 - Revised Appendix 2 tables will be provided.
 - On page 37, first paragraph, “1.3” should read “1.1”.
 - Inventory of Riparian Trees and Shrubs
 - In Appendix 1, for some stands, part of the acreage includes an area outside of the study area (i.e., the botanists measured the entire stand, whether or not part of it extended out of the study area). This appendix was used for calculations that resulted in the data in Table 5.3-1. For the other calculations in the report, a different dataset that included only those portions of stands that were inside the study area was used. To correct these discrepancies, a revised Table 5.3-1 will be provided, along with an update to the numbers in the last sentence on page 52. Appendix 1 will be revised to include only the acreages in the study area. There is a 10 acre difference between the two datasets.
 - RTE Wildlife
 - Page 55, last paragraph - A sentence is missing which makes the paragraph unclear. SCL will provide a revised paragraph.
- RPs agreed that based on their initial reviews of the final reports discussed at this meeting, the overall objectives of the RSP were met by the final study reports and that adequate information for their analyses has been made available.
 - The USFS continues to have interest in evaluating the potential for riparian vegetation and potential big game habitat to develop down to 1954 NAVD 88 feet elevation.

Action Items

- Information updates/corrections to the Erosion, Inventory of Riparian Trees and Shrubs, and RTE Wildlife final reports will be posted to the relicensing website on the January 14, 2009 terrestrial workgroup meeting page by January 23, and RPs will be notified. These changes will also be described in an erratum to be placed at the front of each affected report that will be filed with the Updated Study Report.
- Relative to Study 1, SCL will provide RPs the formulas used to calculate the loss of material for each erosion site, along with a diagram. This material will be posted to the January 14, 2009 meeting web page by January 23.
- SCL will reply to the Forest Service’s request for additional analysis of the potential for vegetation to establish down to the 1954 foot NAVD 88 elevation.

Closing

Michele Lynn stated that the draft agenda for the January 27, 2009 Integrated Resource Analysis meeting (which will be focused on terrestrial resources) will be available soon. The agenda will include a brief overview of the effects discussed in the final reports and discussed today, with the bulk of the meeting dedicated to discussion of non-operational PME concepts. She noted that preliminary PME concepts will be posted to SCL's web-site prior to the meeting.

The meeting adjourned at 12:10 pm.

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**Seattle City Light
Boundary Project Relicensing
Total Dissolved Gas Physical Model Tour
January 20, 2009, 10 am - Noon**

In attendance

Justin Arnold, AECOM/ENSR
Susan Braley, Washington Department of Ecology (Ecology)
Jenna Borovansky, Long View Associates (LVA)
Kathy Dube, Watershed GeoDynamics
Pat Irle, Ecology
Dan Kirschbaum, Seattle City Light (SCL)
Marcie Mangold, Ecology
Brian Mattox, Golder Associates
Jon Mertz, Ecology
Keith Moen, Hatch Acres (Hatch)
Kim Pate, SCL
Chick Sweeny, AECOM/ENSR
Tony Whiley, Ecology

Meeting Summary

Agenda

- Introductions
- Project Overview
- Safety Briefing
- Model Tour
- Wrap-up Question and Answer

Project Overview

Chick Sweeny and Keith Moen gave a PowerPoint presentation (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) describing the dam structure, flow in the system, and TDG Physical Model development. The Physical Model will be used to test SCL's TDG abatement alternatives identified through the field testing and relicensing study process to date.

Chick noted the physical model simulates hydrodynamic performance of the current operations, and will be able to simulate proposed gate operation alternatives, but TDG creation cannot be quantitatively predicted at this scale. The dynamics of depth, mixing, and air entrainment can be observed qualitatively. Additional computer models will be used to inform TDG performance predictions, though prototypes at the dam will also be needed to determine actual TDG performance of alternatives.

Chick explained the dam structure, and locations of sluice and spill gates, noting that while it exists, the trash sluice is not longer used. Alternative operational and structural changes at the spillways (two) and sluice gates (seven) will be tested in varying combinations to maximum TDG reduction potential.

Justin Arnold reviewed the construction of the model and the verification process to develop the scale relationship between the model and the dam. He noted that original design flow tests and documents were used in addition to more recent on site tests to calibrate both the physical and computer models and that the correlation between all models and actual data was good.

Chick noted that when tests begin with the model, photo documentation (both above and underwater), plunge pool location, air entrainment, velocities, water pressure, and wave patterns will all be observed and recorded. While qualitative, much can be learned from the changes in jet penetration under different gate scenarios.

Model Tour and Wrap-up

Relicensing participants (RPs) toured the physical model, observing the bathymetry, and gate construction. The model did not yet contain water. Chick Sweeney and Dan Kirschbaum reviewed dam and sluice gate operation, and described how the model would be used to test varying abatement alternatives.

Kim Pate noted that if RPs are interested in viewing the model once it is watered up, they should contact her. She will try to schedule an additional visit later in the spring, and SCL will be willing to host tours on an ad hoc basis if agency representatives wish to observe some of the gate tests.

Marcie Mangold asked Dan Kirschbaum to provide product information and contents of the SilverSeal Weyerhaeuser product used at the dam. She noted that she had received an inquiry from dam personnel about whether permits were required. Marcie will follow-up with Dan regarding this information.

Closing

The meeting adjourned at 12:00 pm. SCL and Ecology representatives (Marcie Mangold, Susan Braley, and Tony Whiley) stayed to meet regarding requirements for the 401 certification and the draft TDG Attainment Plan.

**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Terrestrial Project Effects and Non-operational PM&Es
January 27, 2009**

In attendance

John Armstrong, Seattle City Light (SCL)
Peter Barton (SCL)
Jenna Borovansky, Long View Associates (LVA)
Kathy Dubé (Watershed GeoDynamics)
Randall Filbert, LVA
Mike Gerdes, USDA Forest Service (USFS)
Barbara Greene, (SCL)
Jim Keany (EDAW)
Glenn Koehn (USFS)
Michele Lynn, SCL
Steve Padula, LVA
Kim Pate, SCL
Christine Pratt, SCL
Doug Robison, Washington Department of Fish and Wildlife (WDFW)
Al Solonsky, SCL
Sharon Sorby, Pend Oreille County Weed Control Board
Dan Trochta, US Fish and Wildlife Service (USFWS)

Meeting Summary

Agenda

- Opening Session and Introductions
- Discussion of Geology and Terrestrial Resources
 - Summary of Project effects
 - Discussion of Resource Goals
 - Protection, Mitigation, and Enhancement (PM&Es) Concepts
- Closing Session
 - Review of key agreements and/or disagreements
 - Identify Action Items
 - Identify Agenda Items for Next Meeting

Michele Lynn (SCL) introduced the agenda (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). She noted that since all relicensing participants (RPs) present participated in the review of Project effects at past meetings, the summary of Project effects would be abbreviated.

Review of Project Effects

Michele Lynn walked through the summary of Project Effects (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) and led a discussion with RPs on SCL's conclusions regarding Project effects related to erosion, terrestrial habitat/shoreline modification, big game, rare, threatened and endangered (RTE) plants, waterfowl, threatened and endangered wildlife, and bats.

RPs and SCL discussed the erosion estimates and methods used to estimate potential vegetation in the normal operation zone, defined by SCL as 1974 – 1994 NAVD 88. Mike Gerdes (USFS) noted that Greg Green (Tetra Tech) had described the process by which SCL estimated potential vegetation that could establish in the fluctuation zone on the January 14, 2009 Terrestrial Resources conference call. He requested that Greg provide this methodology in writing so that the USFS may apply it in their independent analysis of potential vegetation in the zone of 1954-1974 NAVD 88. The USFS and SCL agreed to disagree regarding the need for an estimate of potential vegetation in the elevation range of 1954-1974 NAVD 88.

The USFS will be working with other RPs to present a proposal to SCL after their independent analysis of erosion impacts and potential vegetation is complete.

SCL and RPs acknowledged that the original design of the erosion study did not provide for quantification of the material being “reworked” in the fluctuation zone. The USFS may conduct this analysis itself. In its Preliminary Licensing Proposal, SCL will acknowledge that Project operations have an effect on vegetation establishment in the fluctuation zone, but this effect is not quantified.

RPs agreed preliminarily with SCL's conclusions regarding no effects on big game or bats. The Forest Service is still completing its own analysis on potential road effects on big game. RPs agreed that the study reports, with noted exceptions, were well done and provided RPs with the information they need to conduct their own assessments of Project effects.

Conceptual PM&E and Resource Goals

Jim Keany (EDAW) and Michele Lynn introduced conceptual PM&Es and Resource Goals as a discussion starting point (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

RPs noted that not all possible or desirable PM&E measures are identified on the handout provided by SCL. RPs stated that there are a broad range of protection and enhancement measures that could be available, and that SCL should look beyond SCL ownership for these opportunities when developing PM&Es. RPs agreed with SCL's desired goal of the Integrated Resource Analysis (IRA) process to create a comprehensive package of PM&Es.

RPs noted that the specific items identified under terrestrial habitat goals on Attachment 2 needs to be expanded. If considering a permitting program for future shoreline activities, the impacts on wildlife and terrestrial habitats should be considered. In addition, Dan Trochta (USFWS)

noted that only RTE plants are called out, but that there are opportunities for monitoring and other potential actions related to RTE wildlife as well.

SCL and RPs discussed the characteristics of the 88.5 acres of land that SCL proposed as an addition to the BWP. The land was included in vegetation habitat typing in the Preliminary Application Document (PAD). Also, SCL will provide RPs a habitat analysis for this parcel that was completed in the 1990s.

RPs and SCL discussed the process by which the BWP was established. SCL noted that all available background information on the BWP was reviewed for the PAD, and included in the information library for RPs' reference.

RPs agreed with the treatment of the three identified erosion sites. The USFS indicated that they may have information about additional sites that may be recommended for treatment that were not identified at the July 2007 field visit.

Michele Lynn noted that SCL's initial approach to possible terrestrial PM&Es only considers non-operational PM&Es to address identified Project effects. Further, Michele noted that SCL believes that documented Project effects can be sufficiently addressed through non-operational means. RPs acknowledged SCL's proposal and are willing to discuss non-operational PM&Es, but noted that they did not want the potential for operational changes to be "off the table" during future discussions. Michele Lynn stated that as operational scenarios are investigated in the IRA process, the impact of any operational changes on terrestrial resources (e.g., land bridging or nest flooding) will be considered.

Michele Lynn stated that SCL would like to develop a comprehensive Terrestrial Resources Management Plan (TMRP) and RPs supported this approach.

Mike Gerdes outlined the key components the USFS would like SCL to consider for a terrestrial resources PME package. Briefly, they include: establishment of a terrestrial resources workgroup; development of a comprehensive TRMP; treatment of impacts to riparian and upland habitats being affected by erosion; long-term monitoring; an adaptive management plan; and, an integrated weed management plan.

Development of a Terrestrial Resources Management Plan

The group agreed that a comprehensive TRMP is preferable. Elements of the TRMP discussed and supported in principle by SCL and RP include:

- Comprehensive TRMP will address all terrestrial issues (e.g., habitat, wildlife, erosion, weeds, RTE plants and wildlife, shoreline uses, etc), with chapters for individual resource areas. (The Pelton Round Butte TRMP was cited as an example.)
- Establishment of a Terrestrial Resources Work Group.
- Monitoring and Adaptive Management component.
- An Integrated Weed Management component.

- Interpretation and Education will be discussed comprehensively with other resources (e.g., fish and aquatics, cultural, etc).

RPs and SCL discussed potential monitoring to be included in the TRMP. RPs noted that RTE plants, and eagle and bank swallow monitoring were of interest. SCL and RPs agreed that in developing a monitoring program in the TRMP, a target species list will be developed and can be reduced relative to the comprehensive species lists included in the study plans.

RPs acknowledged that developing a TRMP takes time. SCL will be including a TRMP with the License Application and will work with RPs to develop as much detail as possible by the time of the License Application. RPs and SCL determined that while RPs have not yet completed their independent analysis regarding Project effects, there is enough agreement to move forward with drafting elements of the TRMP. SCL will provide an outline and draft goals for the TRMP to RPs by February 20.

Agreements/Disagreements

- The Forest Service would like to see an estimate of potential vegetation conducted down to elevation 1954 NAVD 88, as drawdown to that elevation is authorized by the license. SCL and the Forest Service agree to disagree about the need for this analysis. The Forest Service will be conducting its own analysis between elevation 1954 and 1974 NAVD 88. SCL will provide GIS data to the Forest Service as needed, but will not be conducting this analysis.
- There was overall agreement that the end goal of the IRA process is to develop a broad PM&E package to be considered by RPs and SCL, rather than an impact by impact assessment.
- SCL and RPs acknowledged that the original design of the erosion study did not provide for quantification of the material being “reworked” in the fluctuation zone. However, SCL acknowledges that Project operations have an effect on vegetation establishment in the fluctuation zone due to the removal of fine sediment and variable hydrology.
- SCL and RPs agreed that a comprehensive Terrestrial Resources Management Plan is preferable to resource specific plans.
- A comprehensive Interpretation and Education program will be developed across resource areas.
- SCL is currently proposing to address terrestrial effects non-operationally. RPs do not want to preclude future consideration of operational options.

Action Items

- Michele Lynn will request that Greg Green provide the USFS step-by-step detail on the methodology used (including the identification of any GIS layers used) to estimate the potential for vegetation in the fluctuation zone.
- SCL will provide a draft TRMP outline including resource goals by February 20.
 - SCL will coordinate a Terrestrial Work Group conference call to discuss this draft plan.

- Michele Lynn will provide to RPs available habitat information and a description of the 88.5 acres of SCL land adjacent to the BWP. [Please note that this report references the parcel as covering 95 acres. Subsequent to preparation of the report it was determined that the actual parcel size is 88.5 acres.]
 - The information will be posted on SCL's relicensing web-site by February 5.
- The March 25 IRA meeting will include a status report on TRMP development.

Closing

The meeting adjourned at 2:00 pm.

Attachments:

Attachment 1: Agenda

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp

Attachment 2: Terrestrial PM&E Concepts Handout

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Fish and Aquatics Work Group
January 28, 2009**

In attendance

John Armstrong, Seattle City Light (SCL)
Bill Baker, Washington Department of Fish and Wildlife (WDFW)
Hal Beecher, WDFW-on phone
Jenna Borovansky, Long View Associates (LVA)
Brad Caldwell, Washington Department of Ecology (Ecology)-on phone
Jason Conner, Kalispel Tribe
Bill Fullerton, Tetra Tech (TT)
Mike Gerdes United States Forest Service (USFS)
Harry Gibbons, TT
Barbara Greene, SCL
Phil Hilgert, R2 Resource Consultants
Scott Jungblom, Pend Oreille County PUD
Bao Le, LVA
Michele Lynn, SCL
Marcie Mangold, Ecology
Ken Merrill, Kalispel Tribe
Keith Moen, Hatch Acres
Steve Padula, LVA
Kim Pate, SCL
Rob Plotnikoff, TT
Christine Pratt, SCL
Doug Robison, WDFW
Al Solonsky, SCL
Sharon Sorby, Pend Oreille County Weed Board
Tom Shuhda, USFS
Dan Trochta, U.S. Fish and Wildlife Service (USFWS)

Meeting Summary

Agenda (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

- Updates and Presentations and Relicensing Participant (RP) questions and answers on results of recent monitoring, assessments and studies
 - Bull trout captures and detections
 - Native Trout Genetic Analysis
 - Mountain Whitefish Spawning Periodicity Assessment
 - Engineering Feasibility Study (Connectivity Management Plan)

- Fish Entrainment and Habitat Connectivity Study (Study 12)
- Sediment Transport and Boundary Reservoir Tributary Delta Habitats (Study 8)
- Mainstem Aquatic Habitat Modeling Study (Study 7)
- Productivity Assessment (Study 11)

Bull Trout Captures and Detections

Al Solonsky provided information to RPs regarding the recent capture of two bull trout in fall, 2008 during continued Study 9 Fish Distribution, Timing and Abundance sampling in the Boundary Tailrace. The two fish were approximately 250 and 500 millimeters (mm) in size. The larger fish was radio-tagged and tissue samples were taken from both fish for genetic analysis. The USFWS Abernathy Genetics Lab assigned these fish back to Lake Pend Oreille which indicates that these two fish passed downstream through Albeni Falls, Box Canyon, and Boundary dams. In addition to these two bull trout, a bull trout radio-tagged by BC Hydro in the Salmo River drainage was detected in the Boundary Dam tailrace. In August 2008, a possible bull trout was captured in the Canyon Reach near Slate Creek by consultant staff during non-work hours. Unfortunately, meristic features were not recorded and no genetic samples were taken to verify this observation as a bull trout or identify population of origin. This information will be included in the Fish Distribution, Timing and Abundance addendum report which should be available in early April 2009.

Native Trout Genetic Analysis

Al Solonsky noted that the preliminary genetic analysis of salmonid samples collected during the Fish Distribution, Timing, and Abundance Study indicate that there may be native redband rainbow trout present in the Boundary Reservoir. The final genetics report will be available soon and the implications of this new information will be further discussed. It was also noted that redband rainbow trout weighted usable area (WUA) for the Boundary Reservoir reaches has been calculated and the results included in the Mainstem Aquatic Habitat Modeling Study final report.

Mountain Whitefish Spawning Periodicity Assessment

Al Solonsky presented preliminary results of the whitefish spawning periodicity assessment (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) being conducted as part of the Fish, Distribution and Abundance Study and in support of the Mainstem Aquatic Habitat Modeling Study. The objective of the assessment was to collect site-specific whitefish spawning periodicity information to assess whether the currently agreed to mountain whitefish periodicity (October 15 to February 28 with a peak period of November 1 to January 15) should be modified. Information collected from the assessment supports an SCL proposal to modify the periodicity to October 15 to January 15 with a peak period of November 1 to January 15.

- Doug Robison agreed that the data supported the proposed periodicity but would like to see the water temperatures collected at the Sullivan Creek delta location in order to ensure that the beginning of the periodicity is also still accurate. Al Solonsky noted that

this information could be provided for the upcoming February 25, 2009 Fish and Aquatics Meeting.

- Although the group was in support of the proposed periodicity, all agreed that a final decision will be made at the February 25th meeting once mainstem and Sullivan Creek delta water temperature data has been reviewed.

Engineering Feasibility Study (Connectivity Management Plan)

In support of the Connectivity Management Plan, Al Solonsky provided information to RPs that SCL was nearing completion of an engineering feasibility assessment on upstream and downstream fish passage options for Boundary Dam. The assessment was conducted by McMillen Engineering in support of the development of the Connectivity Management Plan. Al noted that Mort McMillen will be attending the February 25 Integrated Resource Analysis (IRA) Fish and Aquatics (F&A) Work Group Meeting to present the results of the feasibility assessment.

- Doug Robison asked about the process as to how fish passage options were identified. Phil Hilgert described the process which started with a brainstorming session where all possible options regardless of cost or feasibility were presented as a beginning point. Participants in this exercise included SCL, consultants, and Ken Bates, a former WDFW engineer with fish passage expertise.

Fish Entrainment and Habitat Connectivity Study

Al Solonsky provided a brief update of the ongoing work conducted in support of the Fish Entrainment and Habitat Connectivity Study. The study has faced challenges with the two entrainment sampling methods (fyke netting and hydroacoustics) being an order of magnitude apart in their entrainment estimates. Statistical correlation between the two methods is also poor. Continued effort to assess both methods and the statistical correlation is ongoing. Al noted that the Revised Study Plan (RSP) which was developed in coordination with RPs and approved by FERC states that if discrepancies in the two estimates are identified, estimates derived from fyke nets would be considered the better estimate of entrainment. It was noted that additional data past February was not expected to help inform the development of Protection, Mitigation, and Enhancement measures (PMEs) and would not be available for incorporation into relicensing documents. It was also acknowledged that continued sampling would likely not improve the correlation of the two methods. Due to these considerations, SCL proposed to end fyke net and hydroacoustic sampling on March 1, 2009.

- RPs agreed that ending fyke net and hydroacoustic sampling activities on March 1, 2009 was appropriate.

Sediment Transport and Boundary Reservoir Tributary Delta Habitats

Bill Fullerton presented the methods and results of the various components of the Sediment Transport and Boundary Reservoir Tributary Delta Habitats Study. Components included the tributary delta evolution (Attachment 3: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), delta habitat dynamics (Attachment 4: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), thermal

plumes (Attachment 5: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), fish access (Attachment 6: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) and mainstem sediment transport (Attachment 7: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The presentations focused on the various parameters used to develop the indices for modeling the quality or availability (area) of deltas habitat, thermal plumes, fish accessibility, and sediment transport.

- On the Fish Access presentation, Hal Beecher noted that the total annual duration of exposure of the delta foreset for Pochontas Creek appeared unusually high in wet and dry years versus the average water year. Bill concurred and thought that this might have been a typographical error. Bill will double check the slide and provide clarification on Hal's comment.

Mainstem Aquatic Habitat Modeling Study

Bill Fullerton presented the methods and results of the various components of the Mainstem Aquatic Habitat Modeling Study. Components included habitat distribution (Attachment 8: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), downramping (Attachment 9: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), stranding (Attachment 10: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), trapping (Attachment 11: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), fish WUA (Attachment 12: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), and effective spawning analysis (Attachment 13: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). (Note Harry Gibbons later presented macrophytes/periphyton/benthic macroinvertebrates (BMI) WUA part of the Productivity Assessment presentation). The presentations focused on the various habitat parameters, transects, and the overall design utilized to develop model indices for the respective components.

Harry Gibbons presented the rationale behind a minor modification to the Habitat Suitability Index (HSI) curves for WUA for macrophytes and periphyton (Attachment 14: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The modifications were implemented to correct for a conflict between a 0.0 depth suitability and the inundation and dewatering factors.

- RPs agreed that modifications made to the macrophyte and periphyton WUA were appropriate.

Bill Fullerton ended the Mainstem Aquatic Habitat Modeling Study presentation by providing an example of the extensive quantity and type of stranding information that can be produced by the aquatic habitat models (Attachment 15: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The point of this exercise was to highlight the number of spatial and temporal output possibilities that can be considered as the group begins to assess potential operational impacts of various Project scenarios. Bill encouraged the group to review the modeling reports and consider which of the model indices might be most appropriate to address their particular concerns. An assessment of all aquatic habitat indices at the finest temporal scale would be too extensive to review and assimilate. Al

Solonsky added that for the February 2009 meeting, SCL would provide an initial proposal of which indices it believes would be most effective in describing Project effects.

Productivity Assessment

Harry Gibbons presented an overview of the Productivity Assessment conducted at the Boundary Project. The presentation (Attachment 16: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) focused on the levels of nutrients and primary and secondary productivity including a description of factors limiting productivity. Harry presented the results of the Mainstem Aquatic Habitat Modeling Study WUA for aquatic macrophytes, periphyton, and benthic macroinvertebrates (BMI) and discussed how that information is based on the physical controls upon habitat within the Reservoir. Harry also presented the mechanics of a Trophic Production Index (TPI) approach as a means to integrate and evaluate the results of the nutrients, phytoplankton, zooplankton results with the results of the macrophyte, periphyton and BMI WUA values.

- Ken Merrill commented that the Productivity Assessment failed to account for the epiphytic portion of the macrophyte community. Ken believes that this component represents a potentially large portion of primary production that needed to be considered to provide a complete picture. Harry responded that the results of the pH and DO evaluation (Study 6) indicate that the epiphytic component does not play a significant role in affecting productivity nor pH and DO in the Boundary Reservoir at large due to overall lack of nutrients and relatively small Reservoir volume occupied by macrophytes to support epiphyton. Since the data were collected under the Water Quality effort, their difference of opinion may be addressed in the IRA Water Quality Meeting on January 29, 2009.

Decisions, Agreements, Disagreements

- There was tentative agreement on SCL's proposal to modify the mountain whitefish spawning periodicity to October 15 to January 15 with a peak of November 1 to December 30. Since some of the 2008 mountain whitefish observations were made in the Sullivan Creek delta, there were questions about potential differences between mainstem and tributary delta water temperatures. SCL will provide the work group with temperature data from the mainstem and Sullivan Creek delta to assess the spawning periodicity. A final decision will be made at the February 25, 2009 IRA meeting.
- The group agreed that fyke net and hydroacoustic sampling conducted in support of Study 12 should end on March 1, 2009. Information gathered up until this date will be sufficient to inform PME discussions and develop relicensing documents.
- The IRA F&A Meeting will be moved from March 26, 2009 to March 25, 2009. This date is tentative pending feedback from Michele Lynn on the potential to move the Recreation, Land use, and Aesthetics (RLA) IRA Meeting from March 25, 2009 to March 26, 2009.

- RPs agreed to the minor modification of the HSI curves for WUA for macrophytes and periphyton. The suitability value for 0.0 depth was changed to 0 suitability to allow the inundation and dewatering model metrics to function.
- Ken Merrill noted that the Productivity Assessment did not adequately account for the epiphytic portion of the macrophyte community; Ken suggested that it may represent a large standing segment of biomass. This issue was not resolved but was delegated to the IRA Water Quality Meeting.

Action Items

- SCL will provide F&A Work Group members with mainstem and Sullivan Creek delta water temperature data in support of finalizing the modified mountain whitefish spawning periodicity. Data will be provided on SCL's relicensing website by February 19, 2009.
- Michele Lynn will verify whether the RLA IRA Meeting can be moved to March 26, 2009 which would allow the F&A IRA Meeting to be held on March 25, 2009.
 - SCL confirmed the suggested change in meeting dates. The F&A IRA Meeting will be held on March 25, 2009 and the RLA IRA Meeting will be held on March 26, 2009.
- Bill Fullerton will re-examine the numbers presented for the total annual duration of exposure of the delta foreset for Pocahontas Creek in the fish access presentation and provide clarification to Hal Beecher.
 - Bill responded on February 2, 2009. Based on his initial review, the numbers presented in the table are correct. What is misleading about the table is that it only indicates days when the mainstem (MS) water surface elevation (WSE) was below the delta foreset slope for periods when there was water expected to be in the tributary. It does not consider days when the tributary would not have flow. So for much of the period when MS WSE would be below the foreset slope in the dry and average years, there would not be flow in the tributary (this applies to Pocahontas and Sand). Bill plans to revise the table to provide the periods when access is limited because there is not surface flow on the delta and then add another column which combines this value with the current values to provide a total.
- All RPs are encouraged to consider which indices (while reviewing the modeling studies) will be most useful in addressing their specific concerns to ensure the IRA process can be as efficient as possible.

Closing

Al Solonsky stated that the studies discussed today will be available for RP review in early February. He encouraged all RPs to review the documents in preparation for continued IRA discussions. He thanked everyone for their continued participation in the Boundary Relicensing process.

The meeting adjourned at 4:00 pm.

Attachments: (http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

- Attachment 1: Agenda
- Attachment 2: Mountain Whitefish Spawning Periodicity Assessment
- Attachment 3: Tributary Delta Evolution
- Attachment 4: Delta Habitat Dynamics
- Attachment 5: Thermal Plumes
- Attachment 6: Fish Access
- Attachment 7: Mainstem Sediment Transport
- Attachment 8: Habitat Distribution
- Attachment 9: Downramping
- Attachment 10: Stranding
- Attachment 11: Trapping
- Attachment 12: Fish Weighted Usable Area
- Attachment 13: Effective Spawning Analysis
- Attachment 14: Habitat Suitability Curve (HSI) Modifications
- Attachment 15: Summary Table of Indices
- Attachment 16: Productivity Assessment

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Water Quality Project Effects and Non-operational PM&Es
January 29, 2009**

In attendance

John Armstrong, Seattle City Light (SCL)
Karin Baldwin, Washington Department of Ecology (Ecology)
Peter Barton, SCL
Lynn Best, SCL
Jenna Borovansky, Long View Associates (LVA)
Ed Connor, SCL
Randall Filbert, LVA
Harry Gibbons, Tetra tech
Barbara Greene, (SCL)
Scott Jungblom, Pend Oreille County PUD
Tarang Khangaonkar, Battelle, Pacific Northwest National Laboratory (Battelle)
Michele Lynn, SCL
Marcie Mangold, Ecology
Ken Merrill, Kalispel Tribe
Keith Moen, Hatch Acres
Steve Padula, LVA
Kim Pate, SCL
Rob Plotnikoff, Tetra tech
Christine Pratt, SCL
Doug Robison, Washington Department of Fish and Wildlife (WDFW)
Tom Shuhda, USDA Forest Service (USFS)
Al Solonsky, SCL
Sharon Sorby, Pend Oreille County Weed Control Board

Meeting Summary

Agenda

Barbara Greene (SCL) and Christine Pratt (SCL) reviewed the day's agenda for the Integrated Resource Analysis (IRA) meeting (Attachment 1:

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp):

- Water temperature presentation and discussion
- TDG presentation and discussion
- Other water quality parameters: dissolved oxygen, pH, macrophytes
- Toxics study update

Barbara Greene explained that because final laboratory results for the October 2008 toxics sampling event had only recently become available, no draft of the revised Study 4 Toxics Assessment report would be issued to relicensing participants in advance of the filing of the Updated Study Report (USR).

Barbara noted that SCL had recently sent an email message to relicensing participants asking them to indicate whether they wanted to receive hardcopies of the USR, the Preliminary Licensing Proposal (PLP), and/or License Application. Barbara asked that relicensing participants provide a response to SCL's request by February 6, 2009, so SCL could finalize its USR order with the printing company.

Water Temperature

Tarang Khangaonkar (Battelle) gave a presentation titled *Temperature Modeling Analysis for Boundary Reservoir* (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The purpose of the presentation was to present results of SCL's assessment of the Boundary Project's effects on water temperature and explain the process and methods used in the assessment.

Following the presentation Tarang provided a summary, explaining that the temperatures under simulated natural and simulated existing conditions were similar, with slight temperature increases occurring under existing conditions during the falling limb of the hydrograph. The maximum flow-weighted temperature difference between natural and existing conditions is 0.2 °C (the flow-weighted maximum daily temperature is cooler with Boundary dam in place than without Boundary dam). The maximum surface-maximum temperature difference is 0.76 °C, but only a portion of this surface warming is attributable to Boundary dam. The highest daily surface maximum and flow-weighted temperatures with the Boundary Project in place are lower than they would be in the absence of the Project. With Boundary Dam present there are fewer days when water temperatures are above 20 °C than there would be without Boundary Dam, under existing conditions. Finally, with all dams present on the lower Pend Oreille River, there are fewer days when water temperatures exceed 20 °C than there would be under natural conditions.

Total Dissolved Gas

Keith Moen (Hatch Acres) gave a presentation titled *Study 3, Evaluation of Total Dissolved Gas* (Attachment 3: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Keith explained the Project's effects on total dissolved gas (TDG) production in relation to flow and the route through which flow exceeding powerhouse capacity is passed at the dam, i.e., spillways and/or sluiceways. Keith outlined SCL's proposed approach, including timeframe, for addressing TDG attainment at the Project, explaining that SCL was focusing on three measures to reduce TDG production at the Project during spill: throttling sluice gates, roughening sluice flow, and installation of flow splitters or aeration on the spillway's surface. All of these methods are aimed at increasing the area and decreasing the depth of spill as it contacts the surface of the plunge pool downstream of the dam. Keith outlined ongoing technical tasks, including computational fluid dynamics and physical hydraulic modeling.

Dissolved Oxygen, pH, and Macrophytes

Christine Pratt (SCL) gave a presentation titled *Water Quality Project Effects and Potential Non-Operational PM&Es* (Attachment 4:

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Christine stated that data collected in 2007 and 2008 indicate that there is a Project effect on dissolved oxygen (DO) but no apparent Project effect on pH. During months when pH exceedances occur in Boundary Reservoir, inflow pH values (representing conditions in Box Canyon Reservoir) were consistently higher than in the Boundary Dam tailrace, i.e., pH decreased between the upstream and downstream ends of Boundary Reservoir. Christine noted that pH exceedances in the reservoir are likely attributable to both background limestone geology in the Project vicinity and high pH levels of water flowing into the Project area from Box Canyon Reservoir.

Christine noted that results of Fish and Aquatics studies indicate that the Project, because it has slowed water velocities in some areas, affects the abundance and distribution of introduced and native macrophytes.

Christine stated that potential PM&Es for control of introduced aquatic macrophytes include Project operational measures, i.e., drawdowns aimed at desiccating macrophytes to reduce their abundance, or if operational measures are determined to be undesirable or infeasible, mechanical means of control such as targeted deployment of bottom barriers or, if considered acceptable, rotoation or harvest. At a subsequent IRA meeting, SCL will present aquatic habitat model results for a Project operations scenario designed to manage introduced macrophytes. These model results will be discussed in the context of cross-resource impacts, and a decision will be made as to whether such an operational approach is feasible and desirable.

Christine stated that because DO exceedances are generally of a small magnitude and also spatially and temporally infrequent, SCL proposed to monitor DO during the first five years of the new Project license term at select sites, and, following five years of monitoring, confer with Ecology to assess whether exceedances are sufficiently frequent and severe enough to warrant mitigation measures.

Relicensing participants stated that before such a plan could be evaluated, it would be necessary to explain how data would be analyzed and identify the criteria that would be used to determine whether ambient DO levels below the state's criterion of 8.0 mg/L affect aquatic biota. Relicensing participants also suggested that SCL consider developing a CE-QUAL-W2 model to assess the effects of the Project on DO concentrations, as well as possible operational measures to improve DO. SCL agreed to develop a more detailed description of how DO would be monitored and how results would be used to make decisions. The refined approach will be discussed with relicensing participants at a subsequent IRA meeting.

Toxics Assessment

Harry Gibbons (Tetra tech) gave a presentation titled *Draft Study 4 Toxics Results* (Attachment 5: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Harry reviewed the rationale for conducting additional toxics sampling at select sites during October 2008. Harry

explained the data collection methods and described the sampling locations, which were shown in aerial photos of the reservoir.

Harry reviewed the results of sampling conducted in March 2008 (previously reported to relicensing participants) and then summarized the results of the October 2008 sampling:

- No exceedances of arsenic, cadmium, mercury, or zinc
- Lead: exceedances of surface water criteria in pore water (four replicates at/adjacent to Site 8)
- Lead: exceedances of Lowest Apparent Effects Threshold (LAET) in sediments (one replicate at Site 8)
- The lead exceedances were detected adjacent to Grandview Mine, suggesting sediment input from an upland area was the source of the lead exceedances observed in October 2008.

Rob Plotnikoff (Tetra tech) showed a series of photos showing locations where toxics samples had been collected in October 2008, including photos of upland surface runoff areas that may be contributing toxics to the reservoir. Harry Gibbons stated that October 2008 sampling results confirm conclusions based on March 2008 sampling, i.e., that there is no evidence of an effect of Project operations on toxics bioavailability in Boundary Reservoir. Rather, data continue to support the idea that any exceedances of toxics criteria are driven by input from localized upland sources.

Lynn Best (SCL) showed an aerial photo of the Superfund site associated with the Grandview Mine along the east side of the reservoir, and noted that the site is near Site 8, where lead exceedances were measured. Although Lynn acknowledged that there is no definitive link between these lead exceedances and the adjacent Superfund site, circumstantial evidence suggests that a connection is likely. Lynn then described the status of plans to undertake the EPA-administered cleanup of the Grandview Mine site, the parties involved in the cleanup, and the rough timeframe for commencement of cleanup, likely 2010-2011.

Action Items

- SCL asked that relicensing participants provide a response by February 6, 2009, indicating whether they wanted to receive hardcopies of the USR, PLP, and the License Application.
- SCL agreed to develop a more detailed description of proposed DO monitoring, including a description of how results would be applied and how decisions about effects on biota would be made. The refined approach will be discussed with relicensing participants at a subsequent IRA meeting.
- Marcie Mangold (Ecology) agreed to confer with Ecology staff to make a determination, based on SCL's 2007-2008 data, as to whether the Boundary Project area is in compliance with the state's DO water quality criterion.

Closing

The meeting adjourned at 3:15 pm.

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Teleconference
Recreation, Land Use, and Aesthetics Effects
February 10, 2009**

In attendance

Bruce Bailey, USDA Forest Service (USFS)
Jann Bodie, USFS
Chuck Everett, EDAW
Randall Filbert, Long View Associates (LVA)
Susan Harris, Pend Oreille River Tourism Alliance (PORTA)
Glenn Koehn, USFS
Chris Lawson, Tetra Tech
Michele Lynn, Seattle City Light (SCL)
Carol Mack, Washington State University, Pend Oreille County Extension (WSU Extension)
Steve Padula, LVA
Susan Rosebrough, National Park Service (NPS)
Mark Ivy, Federal Energy Regulatory Commission (FERC)
Dan Trochta, US Fish and Wildlife Service (USFWS)

Teleconference Summary

Agenda

Michele Lynn (SCL) noted that the purpose of the teleconference was to discuss Project effects on recreation, land use and aesthetics resources as presented in the final Updated Study Reports (USR) for Recreation Resources (Study 21), Land and Roads (Study 22), and Aesthetic/Visual Resources (Study 23). Michele explained that the reports had been finalized for production and would not be revised prior to filing the USR with FERC.

Michele emphasized that the purpose of the teleconference was to get feedback from relicensing participants on Project effects as outlined in the reports listed above, not to discuss potential Protection, Mitigation, and Enhancement (PM&E) measures. Michele stated that discussions of PM&Es would begin at the March 26, 2009 meeting, following distribution to relicensing participants of the Recreation Needs Analysis (RNA) on March 17, 2009. Michele stated that SCL would appreciate receiving early feedback on the RNA, in advance of the March 26, 2009 meeting if possible.

Study 21 - Recreation Resource Study

- *Comment* – Glenn Koehn (USFS) stated that the USFS was prepared to discuss the Recreation Resource Study in a general way but that detailed comments on the report would be provided during the formal USR review period.

- *Comment* – Jann Bodie (USFS) stated that more information was needed regarding which roads in the Project vicinity would need improvements to facilitate recreational use.
Response – Michele Lynn (SCL) replied that the need for new roads, road improvements, or road decommissioning would be addressed in the RNA and discussed beginning on March 26. Chuck Everett (EDAW) added that once needs have been assessed in the RNA, SCL would work with relicensing participants to develop a Recreation Resources Management Plan (RRMP) that would detail measures to be implemented during the next license term. Chuck stated that SCL would engage relicensing participants in a series of meetings to develop the RRMP, which would then be filed with the license application.
- *Comment* – Susan Rosebrough (NPS) and Jann Bodie (USFS) stated that it would be necessary to conduct a site visit so that relicensing participants could see firsthand the locations for potential new trails. Susan added that before going into the field, a map showing potential trail locations should be provided.
Response – Michele Lynn (SCL) replied that before potential new trails or trail improvements could be considered it would be necessary to review the findings of the RNA to ensure that any improvements or new trails were linked to a Project effect. Michele stated that, a map showing locations of any proposed new trails and trail improvements would be provided to relicensing participants at the RNA meeting on March 26, 2009. Michele stated that a site visit to view potential locations of new trails would be arranged, as necessary, in summer 2009.
- *Comment* – Jann Bodie (USFS) stated that ratings of potential new trail opportunities in the Recreation Resource Report seemed to be based on current access and not on the potential recreational and aesthetic values of the locations.
Response – Michele Lynn (SCL) replied that the ratings were meant to provide a broad assessment of potential access, not to imply the relative value of potential recreational experiences at specific sites. Michele added that SCL was amenable to discussing the value of potential trail locations but reminded relicensing participants that recreational and aesthetic value alone would not be the deciding factor in identifying opportunities but that Project nexus, as identified in the RNA, would need to be considered.
- *Comment* – Susan Harris (PORTA) and Carol Mack (WSU Extension) stated that economic development was critical for Pend Oreille County and that establishing a water trail on the Pend Oreille River would boost the local economy.
Response – Michele Lynn (SCL) replied that SCL was evaluating the potential for participation in a water trail and that the topic would be addressed in the RNA. Mark Ivy (FERC) added that SCL was required to consider measures that would benefit the local communities affected by the Project, such as a participation in the water trail program, but that it would be necessary to demonstrate Project nexus before a measure could become part of a new FERC license.
- *Comment* – Dan Trochta (USFWS) stated that whatever recreational measures are implemented--whether terrestrial trails, facilities associated with a water trail or others--would need to take into consideration potential adverse impacts on wildlife.

Response – Michele Lynn (SCL) replied that potential impacts to wildlife associated with recreational development would be addressed in SCL's Terrestrial Resources Management Plan (TRMP) and Recreation Resources Management Plan, both of which would be filed with the license application.

- *Comment* – Jann Bodie (USFS) stated that the USFS was interested in SCL's proposed facilities upgrades intended to address Americans with Disabilities Act (ADA) requirements.

Response – Michele Lynn (SCL) replied that needs associated with ADA regulations would be addressed in the RNA.

Study 22 - Land and Roads Study

Michele Lynn (SCL) explained that land ownership maps in the Land and Roads Study had been revised for all parcels within the Project Boundary, per comments received from the USFS on the Initial Study Report (ISR). Michele stated that USFS comments pertaining to parcels, or portions of parcels, outside the current Project Boundary had not been addressed for the USR. Michele stated that if SCL determines that any parcels outside the current Project Boundary are deemed necessary for future Project operations, SCL would address such needs in the license application. Michele added that an analysis of roads as they pertain to recreation needs would be provided in the RNA.

- *Comment* – Glenn Koehn (USFS) stated that the goal of the USFS is to have accurate maps and that the USFS would again comment on the accuracy of land ownership maps during the formal review of the USR.
Response – Michele Lynn (SCL) stated that although maps would not be changed for the USR, she would review the USFS's ISR comments and respond to Glenn regarding potential oversights/errors in the USR.

Study 23 - Aesthetics/Visual Resource Study

Michele Lynn (SCL) noted that because the Aesthetics/Visual Resource study was a one-year study, the version included with the USR was the first that relicensing participants had seen, i.e., there had been no Aesthetics/Visual Resource report filed as part of the ISR.

- *Comment* – Jann Bodie (USFS) stated that although she thought the Aesthetics/Visual Resource study was well done, there was a lack of connection between it and the Recreation Resource Study. Jann stated that when crafting recreation measures, SCL would need to consider the aesthetic value of natural features at the Project that are unique in the region, such as Peewee Falls.
Response – Michele Lynn (SCL) replied that information from both the Recreation Resource and the Aesthetics/Visual Resource studies had been taken into consideration when drafting the RNA, which will set the stage for the RRMP, where implementation of recreation measures would be described.

- *Comment* – Mark Ivy (FERC) stated that the RRMP should contain a map that shows both the locations of key visual resources in the Project area and land ownership at those sites.

Action Items

- SCL will provide a map showing the locations of any proposed new trails and/or trail improvements at the RNA meeting on March 26, 2009.
- SCL will schedule a site visit to view potential locations of any new trails and or trail improvements in summer 2009, as necessary.
- Although land ownership maps included in the Land and Roads final report will not be revised for the USR, Michele Lynn (SCL) agreed to review USFS comments pertaining to the maps (which were filed with the ISR) and respond to Glenn Koehn regarding potential errors on the maps.

Closing

The teleconference concluded at 11:15 am.

**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Conference Call
Cultural Resources Project Effects and Non-operational PM&Es
February 11, 2009
9 am – 10 am**

In Attendance by Conference Call

Peter Barton, Seattle City Light (SCL)
Jenna Borovansky, Long View Associates (LVA)
Barbara Greene, SCL
Glenn Hartmann, Cultural Resource Consultants (CRC)
Steve Kramer, U.S. Forest Service (USFS)
Kevin Lyons, Kalispel Tribe
Rob Whitlam, Washington State Department of Archaeology and Historic Preservation
(WDAHP) [joined at 9:45 am]
Frank Winchell, Federal Energy Regulatory Commission (FERC)

Meeting Summary

Agenda

- Introductions
- Feedback on Updated Study Report
- Protection, Mitigation, and Enhancement (PM&Es) Discussion

Peter Barton (SCL) introduced the agenda (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp), noting that the focus of the meeting was to discuss potential components of the draft Historic Properties Management Plan (HPMP) and conceptual Protection, Enhancement, and Mitigation (PM&E) measures that will be submitted with the Preliminary Licensing Proposal (PLP).

Review of Project Effects

Peter Barton thanked Kevin Lyons (Kalispel Tribe) for providing a letter for the FERC record regarding Traditional Cultural Properties (TCPs). Kevin explained to the workgroup that he determined the Kalispel Tribe does not have any TCPs within the Project area. A copy of the letter provide by the Kalispel Tribe is attached (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

Peter Barton summarized changes to the final report from the interim report. He noted that trinomials have now been assigned to all of the sites, additional details about possible treatments at the Harvey Cabin site were added, and the Harvey Cabin was identified as being eligible for Criterion D.

Frank Winchell (FERC) stated that he thought the effects in the Project area were adequately addressed by the final report. He noted that FERC would like to see a summary of the consultation and concurrence with Determinations of Eligibility (DOEs) in the License Application (LA) in addition to the full consultation record for cultural resources to be included in the HPMP. Peter Barton stated that he has received DOEs from the USFS, and he will confirm with the Rich Bailey (BLM) that the DOEs for BLM sites will be signed.

Proposed PM&Es and Historical Properties Management Plan Elements

SCL presented potential elements that could be included in the draft HPMP (Attachment 3: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Elements of the draft HPMP and conceptual PM&Es include:

- Integrated Interpretation and Education Plan
 - Signage regarding legal prohibitions on relic collecting in a non site-specific location (e.g., boat launch).
 - Steve Kramer (USFS) indicated that the Forest Service may have interest in cultural interpretation materials that coincide with a proposed water trail in the area, including on-site interpretation at the Harvey Cabin site. He noted that this is still under consideration as the Forest Service needs to discuss all potential terms and conditions internally.
 - SCL is considering using off-site locations for educational materials. Locations being considered are the Vista House, or potentially in town at the Cutter Museum or other location.
- Monitoring of eligible sites
 - Kevin Lyons noted that monitoring of the pre-historic sites does not need to be any more frequent than once every five years, and could be accomplished from a boat.
 - The group discussed the potential for an emergency clause with a boat survey of known sites to be triggered after a high flow event.
 - Steve Kramer noted monitoring of historic sites could occur every three to five years, or if there are reported problems at the site.
 - Steve Kramer noted that the BLM may have additional monitoring interests for the Josephine Mine site.
- Evaluation of the Boundary Project for eligibility when it is 50 years old
- Level 2 recordation of the Pend Oreille Mines and Metals Company site is proposed. SCL proposes this level of recordation, since the site is currently stabilized and there are no current plans for removal. Glenn Hartmann (CRC) stated that the recordation could include line drawings, history of area, original blueprints, photos, etc. Relicensing participants (RPs) noted that SCL should discuss this level of recordation with WDAHP.
- Archival records plan
 - RPs requested that SCL specify the facility that will be used for archiving Project inform. Currently, WSU is being used.
- Emergency response protocol, including protocol for discovery of human remains
- SCL will appoint a HPMP coordinator

- SCL will provide annual reports/notification to the Cultural Resources Workgroup (CRWG), and will review the HPMP with the CRWG on a five-year cycle.

Glenn Hartmann asked relicensing participants for clarification regarding the level of cultural surveys that are recommended when SCL conducts ground-disturbing activities. RPs indicated that it is dependent on scale and the past-survey information that is available. The HPMP and study reports include information for the entire APE, though if large scale disturbances occur, additional survey may be necessary. RPs recommended that SCL include a list of categorical exclusions in the HPMP for review by the workgroup. Activities outside of those excluded would need to be reviewed in the annual work plans submitted to the CRWG.

Rob Whitlam (WDAHP) asked if there was potential for submerged archeological sites to be exposed during atypical drawdowns. SCL will consider addressing the potential for cultural surveys during planned extreme drawdowns in the HPMP.

Agreements/Disagreements

- Cultural Resource Workgroup members supported proposed elements of the HPMP presented by SCL, with comment.

Action Items

- Peter Barton will follow-up with Rich Bailey regarding his submittal of signed DOEs for the BLM sites.

Closing

The meeting adjourned at 10:05 am.

Attachments: (http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

Attachment 1: Agenda

Attachment 2: Kalispel Tribe's Summary Review for TCPs in the Boundary Project Area

Attachment 3: Boundary Project Cultural Resources Conceptual PM&Es

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Terrestrial Resources Workgroup Conference Call
February 23, 2009, 10 am - Noon**

In attendance

Jenna Borovansky, Long View Associates (LVA)
Mike Gerdes, United States Forest Service (USFS)
Jim Keany, EDAW
Michele Lynn, Seattle City Light (SCL)
Doug Robison, Washington Department of Fish and Wildlife (WDFW)
Sharon Sorby, Pend Oreille County Weed Board
Dan Trochta, U.S. Fish and Wildlife Service (USFWS)

Meeting Summary

Agenda

- Review and Discussion of Terrestrial Resources Management Plan (TRMP) Outline and Goals

Review of TRMP Outline

Michele Lynn described the goal of the meeting was for SCL to present the draft outline (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) of the Terrestrial Resources Management Plan (TRMP) to relicensing participants (RPs), discuss the goals presented for the plan, and to solicit feedback from RPs on the general direction of SCL's plan for the TRMP. Michele stated that SCL intends to submit an annotated outline of the TRMP with the Preliminary Licensing Proposal (PLP), and a final TRMP with the License Application (LA), however, SCL understands that there may be PM&Es that require additional work on the TRMP once the license is issued.

SCL replied to questions about the intent and specifics of the proposed content for each section of the outline. RPs were in general agreement that the approach to the TRMP, with suggestions outlined below and to be included in future TRMP updates, is sound and that SCL should move forward with the next iteration for the Terrestrial Resources Workgroup (TRWG) to review and provide comment. SCL reviewed the outline with RPs, and several specific areas of clarification were discussed. These clarifications and additions include:

Scope of TRMP: RPs asked questions to clarify the scope of the TRMP, and whether all terrestrial related Protection, Mitigation, and Enhancement (PM&E) measures would be included in the TRMP. SCL and RPs agreed that as PM&E discussions move forward, the goal will be to include all PM&Es in the TRMP.

Terrestrial Resources Workgroup Formation: The draft TRMP outline calls for continued consultation with a TRWG during development of the TRMP, and throughout implementation. The draft outline specifies specific participants (USFWS, WDFW, USFS, Pend Oreille County Weed Board) who have had active participation in the relicensing Terrestrial Resources Workgroup. SCL noted that all RPs have been notified of Terrestrial Resources meetings and have had the opportunity to participate. RPs noted that some agencies have statutory responsibilities, while other RPs may participate only as particular issues of interest arise, and this can make the implementation process cumbersome. RPs also noted that they did not want to limit participation at this time, as there may be instances during the implementation of the TRMP that other land management agencies (e.g., BLM) or RPs (e.g., Kalispel Tribe) may have an interest in the implementation efforts and RPs did not want to exclude participants. SCL noted that as the TRMP develops, SCL will consider how to structure participation in an inclusive manner that still allows for efficient management of the resources and adherence to goals developed during the relicensing process. RPs supported the use of annual TRWG meetings, with additional meetings as necessary, to provide input on TRMP related activities.

Geographic Scope of TRMP: Several specific comments were offered regarding the scope and location of potential activities covered by the TRMP. RPs noted that goals related to land management may extend beyond the Project boundary to other areas affected by the Project. SCL acknowledged that the TRMP may cover lands that are not owned by SCL, and activities may extend beyond the Project boundary, as appropriate to address Project effects.

Species Covered in TRMP: RPs also noted that while certain species may be identified now as priorities for monitoring or habitat enhancement, the TRMP should include a provision for additional monitoring or management for other species, if they become a management interest in the area (e.g., if wolves start to utilize the Project area in a more significant way.)

Shoreline Management Strategy: RPs questioned if only those shoreline issues that overlapped with terrestrial resources management would be included in the TRMP. SCL noted that the intent is to address all FERC required shoreline elements in the TRMP chapter on shorelines, including erosion, dock management, etc. RPs noted that a broader range of participants may be interested in this discussion than the current participants in the TRWG; SCL noted that as the TRMP is developed, all relicensing participants will be notified of topics and the draft TRMP will include items for review by all RPs. SCL hopes that RPs participating in the TRMP development meetings will solicit feedback from their agency colleagues who may have interest in shoreline issues so that SCL receives consistent feedback from each agency.

Monitoring: RPs noted that in general, where monitoring is identified in the outline as a proposed activity, there are also mitigation and enhancement opportunities in these topic areas. SCL will change the title of the resource program sections to reflect that future actions would not be limited to monitoring. SCL acknowledged that the proposed activities are not an exhaustive list, and that SCL focused on the specifics that were known at this time.

Next Steps: SCL will further develop the goals and objectives in the outline based upon RP feedback. SCL will also begin to add detail to sections that are less reliant on PM&E discussions/decisions (e.g., sections that address administrative issues).

RPs questioned how far the drafting could go given the uncertainty regarding several PM&E options, and the possibility that operational changes may be developed as the Integrated Resource Analysis (IRA) process continues. SCL and RPs discussed ideas for potential off-site mitigation efforts, but both RPs and SCL acknowledged that the working assumption in the development of the TRMP at this time is that terrestrial PM&Es should focus on available opportunities within the immediate area impacted by the Project, as proposed by SCL at the January 27 IRA meeting.

Mike Gerdes noted that the USFS will provide written comments on the structure and components of the TRMP outline, but that SCL should move ahead with next steps. The USFS may wait to provide comments until the next draft of the TRMP is developed.

SCL will meet internally and propose a schedule for the next iteration of the TRMP for RP review by the March IRA meetings. SCL noted that the version of the TRMP outline that is included in the PLP may not reflect the full extent of the discussion that has occurred.

Agreements/Disagreements

- SCL and RPs agreed that all PM&Es for terrestrial resources will be incorporated into the TRMP, unless otherwise noted.
- RPs would like the membership in the Terrestrial Resources Workgroup to remain inclusive of potentially interested parties. SCL will propose how to address TRWG membership in upcoming drafts of the TRMP.
- SCL and RPs agreed that the current working assumption for development of terrestrial PM&Es and the associated actions in the TRMP will focus on mitigating Project effects in the Project area.

Action Items

- SCL will proceed with incorporating RP comments and adding more detail to the TRMP. SCL will provide an update to RPs on the status of the TRMP and the timing of the next review draft at the March 25-26 IRA meetings.
- Mike Gerdes will provide SCL will additional comments from the USFS within the next two months.

Closing

The meeting adjourned at 12:00 pm.

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Fish and Aquatics Group
February 25, 2009**

In attendance

John Armstrong, Seattle City Light (SCL)
Bill Baker, Washington Department of Fish and Wildlife (WDFW)
Hal Beecher, WDFW-on phone
Margaret Beilharz, U.S. Forest Service (USFS)
Jerry Boggs, Selkirk Conservation Alliance
Brad Caldwell, Washington Department of Ecology (Ecology)-on phone
Jason Connor, Kalispel Tribe
Bill Fullerton, Tetra Tech (TT)
Mike Gerdes, USFS
Barbara Greene, SCL
Phil Hilgert, R2 Resource Consultants
Glenn Koehn, USFS
Bao Le, Long View Associates (LVA)
Joe Maroney, Kalispel Tribe
Marcie Mangold, Ecology
Ken Merrill, Kalispel Tribe
Mort McMillen, McMillen Engineering
Mark Miller, U.S. Fish and Wildlife Service (USFWS)
Steve Padula, LVA
Kim Pate, SCL
Christine Pratt, SCL
Doug Robison, WDFW
Al Solonsky, SCL
Tom Shuhda, USFS
Sheila Street, Columbia Power Corporation
Dan Trochta, USFWS
David Turner, Federal Energy Regulatory Commission (FERC)

Meeting Summary

Agenda

- Al Solonsky provided a brief overview of the meeting agenda (Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) which included updates/presentations on results of Final Updated Study Reports, a presentation of results on the fish passage engineering feasibility study, a review of potential non-operational Protection, Mitigation, and Enhancement measures (PMEs), and SCL's preliminary recommendation of aquatic habitat model indices.

- Whitefish Spawning Periodicity Action Item
- Fish Distribution, Timing and Abundance Study (Study 9)
- Fish Entrainment and Habitat Connectivity Study (Study 12)
- Engineering Feasibility Study
- Recreational Fishery Study (Study 13)
- Potential Non-operational Fish and Aquatic PME Table
- Aquatic Habitat Indices for Mainstem Aquatic Habitat, Sediment Transport and Tributary Delta Modeling (Study 7 and 8)

Whitefish Spawning Periodicity Action Item

As an action item from the January 28, 2009 IRA meeting, Al Solonsky presented to RPs a comparison of Sullivan Creek and mainstem Pend Oreille River water temperatures from 2007 and 2008 (Attachment 2: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The information indicated that beginning in October, temperatures from Sullivan Creek and the mainstem converge and track one another closely throughout the winter. The information suggests that the proposed mountain whitefish spawning periodicity of October 15 to January 15 is appropriate for all locations in the Boundary Project area.

- RPs reviewed the information and were in agreement that a revised mountain whitefish spawning periodicity of October 15 to January 15 is appropriate.
- Bill Fullerton will use the updated periodicity for future modeling runs that address mountain whitefish spawning periodicity and will adjust incubation and fry periodicities as appropriate.

Fish Distribution, Timing and Abundance

Al Solonsky presented results of the Fish Distribution, Timing and Abundance Study (Attachment 3: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Information included the most recent data on fish species composition in the Boundary Project, biotelemetry information, results of native salmonid genetic testing, spawning information, fish use of thermal plumes, and the documentation of non-native northern pike in the system. The final report which summarizes activities from February 2007 through September 2008 has been available for RP review since January 2009 and the presentation was brief in order to provide opportunities for discussion. An additional Addendum Report that summarizes remaining efforts through January 2009 will be available to RPs in April 2009.

Fish Entrainment and Habitat Connectivity Study

Al Solonsky presented results of the Fish Entrainment and Habitat Connectivity Study (Attachment 4: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The presentation provided RPs with a brief overview of results from the second interim report (data up to October 2008). Additionally, the presentation provided entrainment estimates derived from fyke net and hydroacoustic sampling and compared and contrasted these estimates with the available biological information from other studies. The data indicate that fyke net sampling is likely a more realistic entrainment estimate and that the entrainment risk to native salmonids is

low. Additional analysis is being conducted to assess the low correlation between the two sampling methods and the feasibility of developing a hybrid estimate. A final report summarizing all of the data to March 1, 2009 will be available to RPs in June 2009.

- Tom Shuhda inquired about approaches that might be used to account for native salmonid entrainment. Al Solonsky noted that this would be a key issue as the group continues to discuss fish passage in the future.

Engineering Feasibility Study

In support of the connectivity component of the Fish and Aquatics Management Plan, Mort McMillen presented the results of his firm's engineering feasibility assessment on upstream and downstream passage options at Boundary Dam (Attachment 5 and 6:

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). The presentation included an overview of the process and criteria utilized to identify, assess, and select alternatives for upstream and downstream passage options at Boundary Dam. Mort emphasized that this assessment was a feasibility exercise based upon the currently available information and that the identification and development of any options, if appropriate, may require additional information.

- Mark Miller noted that the group needed to clarify the objectives of fish passage at Boundary Dam. His point being that there may be different approaches for fish passage depending upon the objectives that need to be met (i.e., passing all fish versus exchange of genetic material as an example).
- An action item for RPs was to clearly identify the objectives for fish passage and connectivity so as to inform continued discussions of this issue.
- An action item is to have RPs, along with their respective agency engineers, review the Engineering Feasibility Study Report to inform continued fish passage discussions including whether there is agreement that some of the options concluded as not feasible in the report are in fact, not feasible.
- Based upon discussion related to upstream fish traps, Doug Robison is to provide a table of the Box Canyon upstream fish trap implementation schedule to the group.
- Al Solonsky will follow up with a Box Canyon contact on the details of the Box Canyon upstream fish trap.
- Kim Pate to provide RPs information on Boundary Dam encroachment at Box Canyon Dam.
- The group agreed that fish passage and connectivity will continue to be discussed at the March 25, 2009 IRA meeting.

Recreational Fishery Study

Al Solonsky presented the results of the Recreational Fishery Study (Attachment 7: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) which included information related to the recreational fishing experience in the Boundary Project, the identification of potential impacts of the existing triploid trout stocking program that is currently implemented by SCL, and the potential triploid trout management options that could be implemented in the future.

Potential Non-Operational Fish and Aquatic PME

Al Solonsky presented a table to RPs that provided a preliminary list of non-operational Fish and Aquatic PMEs and the perceived benefits to aquatic resources (Attachment 8:

http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Al noted that the intent of this table was to share with RPs some of the potential aquatic PMEs that SCL has identified and requested that RPs identify additional potential PMEs or provide constructive feedback on the existing list.

- Tom Shuhda noted his interest in fish tissue and macroinvertebrate sampling through the life of the license as a means to track bioaccumulation of toxics as a human health concern.

Aquatic Habitat Indices for Mainstem Aquatic Habitat, Sediment Transport and Tributary Delta Modeling

Bill Fullerton presented a brief overview of the various types of mainstem and tributary aquatic habitat indices that were developed to support IRA aquatic habitat modeling activities (Attachment 9: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). He summarized the various levels of spatial and temporal resolution that could be provided for each aquatic habitat index and as agreed to at the January 28 meeting, provided RPs with a preliminary recommendation of 10 aquatic habitat indices that the modeling team believed might be effective in assessing the potential impacts to aquatic resources due to Boundary Project operations.

Bill emphasized that RPs are encouraged to examine whether the recommended indices are appropriate or whether there are other indices that may be of interest. Bill also presented a Fish and Aquatic Summary Effects Table (Attachment 10: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp) showing the 10 aquatic habitat indices, a description of each index parameter, and example output for the wet (1997), dry (2001), and average (2002) water years. The RPs noted that during the future term of the new license, water years may be dryer than represented by the average year (2002) and requested that the results of indices be presented for multiple years or just dry year (2001) conditions rather than average hydrologic conditions.

Decisions, Agreements, Disagreements

- Based upon the additional water temperature information submitted at the meeting, there was agreement on SCL's proposal to modify the mountain whitefish spawning periodicity to October 15 to January 15 with a peak of November 1 to December 30.
- The group agreed that fish passage and connectivity discussions will continue at the March 25, 2009 IRA meeting and that RPs will need to prepare for upcoming discussions (see Action Items #1 and #2)

Action Items

- RPs will clearly identify the objectives for fish passage and connectivity so as to inform continued discussions of this issue at the March 25, 2009 IRA meeting.
- RPs along with their respective agency engineers, will review the Engineering Feasibility Study Report to inform continued fish passage discussions (March 25, 2009 IRA meeting) including whether some of the options that were concluded to be not feasible in the report are in fact, not feasible.
- Doug Robison to provide a table of the Box Canyon upstream fish trap implementation schedule.
- Al Solonsky to follow up with a Box Canyon contact on the details of the Box Canyon upstream fish trap.
- Kim Pate to provide RPs information on Boundary Reservoir encroachment at Box Canyon Dam.
- In the future, SCL will provide the results for scenario analyses using dry year hydrology in addition to the average year hydrology.

The meeting adjourned at 4:00 pm.

Attachments: (http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

- Attachment 1: Agenda
- Attachment 2: Mountain Whitefish Spawning Periodicity Action Item
- Attachment 3: Fish Distribution, Timing, and Abundance
- Attachment 4: Fish Entrainment and Habitat Connectivity
- Attachment 5: Upstream Passage Engineering Feasibility
- Attachment 6: Downstream Passage Engineering Feasibility
- Attachment 7: Recreational Fishery Study
- Attachment 8: Potential Non-Operational Fish and Aquatic PME Table
- Attachment 9: Mainstem and Tributary Aquatic Habitat Indices
- Attachment 10: Fish and Aquatic Summary Effects Table

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**Seattle City Light
Boundary Project Relicensing
Integrated Resource Analysis Meeting
Quality Inn Oakwood, Spokane, WA
February 26, 2009**

In Attendance

Emily Andersen, Long View Associates (LVA)
John Armstrong, Seattle City Light (SCL)
Hal Beecher, Washington Department of Fish and Wildlife (WDFW) – on phone
Margaret Beilharz, U.S. Forest Service (USFS)
Jann Bodie, USFS
Jerry Boggs, Selkirk Conservation Alliance (SCA)
Jenna Borovansky, LVA
Brad Caldwell, Washington Department of Ecology (Ecology) – on phone
Bill Fullerton, Tetra Tech
Mike Gerdes, USFS
Nancy Glines, USFS
Barbara Greene, SCL
Jennifer Hickenbottom, USFS
Phil Hilgert, R2 Resource Consultants
Jim Keany, EDAW
Glenn Koehn, USFS
Bao Le, LVA
Michele Lynn, SCL
Marcie Mangold, Ecology
Ken Merrill, Kalispel Tribe of Indians
Steve Padula, LVA
Kim Pate, SCL
Jay Pickett, SCL
Christine Pratt, SCL
Doug Robison, WDFW
Tom Shuhda, USFS
Al Solonsky, SCL
Sharon Sorby, Pend Oreille County Weed Board
Sheila Street, Columbia Power Corporation
Dan Trochta, USFWS
David Turner, Federal Energy Regulatory Commission (FERC)

Meeting Summary

Agenda

Proposed agenda (see Attachment 1: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp):

- Introductions, Review Meeting Agenda and Action Items from Previous Integrated Resource Analysis (IRA) Meetings
- IRA Process and Project Effects
- Historic Conditions and Test Scenario Modeling Approach
- Present Results of Test Scenarios
- Resource-Specific Indices of Project Operational Effects
- Review Potential Non-Operational Protection, Mitigation and Enhancement (PM&Es) Measures Discussed in IRA Meetings to Date
- IRA Process Moving Forward
- Closing Sessions

Action Items from Previous IRA Meetings

Barbara Greene (SCL) reported that per discussions at the January 27 IRA meeting, a draft outline of a Terrestrial Resources Management Plan (TRMP) was distributed to relicensing participants (RPs) February 20 for discussion during the February 23 Terrestrial Resources Workgroup conference call. Also, discussions with Ecology regarding the dissolved oxygen issue, as first discussed at the January 29 IRA meeting, are on-going.

IRA Process and Project Effects

Barbara Greene stated that discussions regarding project effects have occurred for all resource areas except recreation, which will be discussed at the March IRA meetings following the issuance of the draft Recreation Needs Analysis. Also, discussions about flooding have not yet occurred but are planned for the March 24 USR meeting.

In terms of how time at future IRA meetings will be utilized, SCL will develop a proposed schedule that identifies topics by meeting and issue it for discussion at the March IRA meetings. As the modeling effort gets underway in earnest, Barbara cautioned the group that the more modeling information that is desired, the longer it will take to reach agreement on a protection, mitigation and enhancement (PM&E) proposal.

Historic Conditions and Test Scenario Modeling Approach

Kim Pate explained that the main components of the modeling program, the Scenario Tool and the Hydraulic Routing Model, were vetted with some RPs throughout 2008 (materials for those engagements [May 22 and August 14 meetings] are available on SCL's relicensing website). Kim reviewed the descriptions of the five test case scenarios as originally introduced in December (see Attachment 2 for *Five Test Scenario Descriptions for February 26, 2009 IRA Meeting*: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp). Kim noted that

the test scenarios should not be considered operations proposals, rather, should serve as a means to confirm that the models are operating correctly and producing logical results. Also, the test scenario #5, base case with downramping rate of 1 ft/hour, has been eliminated from the analysis as the results were essentially the same as those for base case.

Bill Fullerton (Tetra Tech) gave a presentation on the general modeling approach (see [Attachment 3](#) for *Modeling Introduction* PowerPoint: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

- *Comment* – In looking at the percent exceedance curve for the 94-year period of record (1913-2006; slide 10), Doug Robison (WDFW) asked if it is fair to say that more years in the 1987-2005 period of record (that is being used for the modeling effort) are less than average.
Response – Bill Fullerton concurred. Steve Padula noted that while this is true, the years chosen to represent wet (1997), average (2002) and dry (2001) hydrologic conditions, are representative of the full 94-period of record as well.
- *Comment* – Margaret Beilharz (USFS) asked how climate change is being factored into the modeling effort.
Response – Kim indicated that the issue is a component of SCL’s analysis but that it is an element of the integrated resource planning (IRP) process rather than a component of any of the models being discussed in this meeting.
- *Comment/Response* – In the historical versus base case wet year graph (slide 17), in response to a question, Bill Fullerton explained that the period between April 1 to June 30 is a flat line because the model manages the spill to have constant reservoir elevation (April 1 to June 30 is the spring freshet when flows are above 55k cfs). Also, the reservoir is held at 1,990 ft NAVD 88 (instead of 1,994 ft NAVD 88) to provide a buffer in the event of increased inflows.
- *Comment/Response* – In the historical versus base case, dry year, graph (slide 18), in response to a question about the significant May drawdown, Kim explained that this occurred due to necessary maintenance activity. The model does not account for these types of periodic activities and therefore, eliminates their effect. Doug confirmed that these types of activities and emergencies will still occur, however, in future operations.

Results of Test Scenarios

Bill Fullerton (Tetra Tech) gave a presentation on the hydrologic modeling output of the test scenarios (see [Attachment 4](#) for PowerPoint: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

- *Comment* – Margaret Beilharz stated that if the base case is to represent the current license operating conditions, which is to operate between 1,954 and 1,994 ft NAVD 88, why would the base case model down to only 1,974 ft NAVD 88.

Response –Kim indicated that the base case scenario represents the reality of operations during the 1987-2005 period of record, which was most often within the top 20 ft. David Turner (FERC) stated that for FERC’s purposes, the base case scenario is an accurate representation of the Boundary Project’s existing conditions.

The results presented were for the average year (2002) only. SCL agreed to provide the similar information for the wet and dry years (1997 and 2001, respectively). (In the subsequent discussion below, the request was expanded to include the resource-specific indices information for the wet, dry and average years.)

Resource-Specific Indices of Project Operational Effects

Bill Fullerton (Tetra Tech) presented the modeling output for select test scenarios/indices (see [Attachment 5](#) for PowerPoint and [Attachment 6](#) for *Integrated Summary Table for Test Scenarios Based on 2002 Average Year Hydrology*: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp).

- *Comment* – Doug Robison asked when the integration of the benefits and costs of potential operational constraints across resource areas would begin.
Response –Kim indicated that that process is starting with this presentation and will continue throughout the remainder of the IRA process.
- *Comment* – Doug Robison stated that dollar values are the most helpful metric to assess the economic impact, and asked whether that information would be made available.
Response –Kim indicated that SCL plans to use 2007 economic information for purposes of analysis in its License Application. Economic information will be shared in greater detail at the March IRA meetings but, to give a general idea of the economic impacts, using the mid-Columbia 2007 price index of \$56/MWh for on-peak energy, the difference between the base case and run-of-river scenarios is \$46M/year and between the base case and holding the forebay elevation at 1,984 ft NAVD 88 is \$12M/year.

There was discussion about the assumptions used to design the thermal plume area index (slides 24 and 25). SCL agreed to review current criteria used to define the index and to consider refinements that would better evaluate the quality of the plume (versus the volume of the plume only). SCL also agreed to consider options for displaying the stranding information to better depict the change in fluctuation (slide 27).

SCL stated that it is interested in receiving feedback on the information presented – on the selected indices, if there are other indices of interest, and similarly, if there are modifications to the test scenarios or new scenarios that are of interest. As an initial step, SCL agreed to expand the *Integrated Summary Table* to include information for all of the indices proposed to date (to include the fish and aquatics indices discussed at the February 25 meetings that were not included in the current *Integrated Summary Table* for wet, dry and average years). The group discussed some of the mechanics of communications regarding modeling, such as, turn-around time, and methods for making requests and transmitting responses. Bill Fullerton indicated that depending on the complexity of a request, a new model run (from defining the scenario to

packaging the output), would take approximately one month. Modifications to existing scenarios or individual indices, would likely take less time.

During a caucus session, an Interagency group of various relicensing participant parties was formed. The Interagency group will convene March 9 to develop a comprehensive and prioritized list of modeling needs, which will be provided to SCL on March 10. Shortly after the transmittal of the list, modeling representatives from SCL and the Interagency group will have a conference call to seek any necessary clarification regarding the list. SCL will then provide a response to the modeling requests, including what requests will be fulfilled and a schedule for transmittal of the information to RPs. *(Subsequent to the meeting Margaret Beilharz and Tom Shuhda (USFS) were identified as the points of contact for the Interagency group.)*

Potential Non-Operational PM&Es

Barbara Greene reviewed a list of potential non-operational PM&Es that have been discussed at IRA meetings to date (the list was posted on the relicensing website following the meeting – see [Attachment 7: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp](http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)). Given that project effects for the recreation resource and flooding have not yet been discussed, PM&Es for these areas have yet to be identified.

Barbara also reviewed a list of management, monitoring and attainment plans that will be included in the PLP in either annotated outline or draft form (see [Attachment 8: http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp](http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)).

Decisions

- The base case, as currently defined, is a good representation of existing conditions and as such, will serve as the basis for comparison of other operations scenarios.
- Once operations scenarios are narrowed down to a select few viable options, the CE-QUAL-W2 model will be run with the specified operational constraints to determine the impact on temperature.

Action Items

- SCL to develop a schedule of topics to cover at the remaining IRA meetings for discussion at the March IRA meetings.
- SCL to prepare additional economic information for comparison of scenarios for discussion at the March IRA meetings.
- SCL to consider refinements to the thermal plume index.
- SCL to consider different options for displaying the stranding information.
- SCL to provide expanded Summary Table listing resource and operational index values for wet (1997), dry (2001), and average (2002) year hydrologic conditions for the five (5) test scenarios. *[March 6]*
- Modeling requests:

- Interagency group will meet to develop a comprehensive and prioritized list of modeling needs, which should indicate if the request is for indices regarding the existing four test scenarios or for a new scenario. *[March 9]*
- Interagency group to email Kim Pate the list of modeling requests. *[March 10]*
- Modeling representatives from SCL and Interagency group will have a conference call to seek any necessary clarification about the requests.
- SCL to provide response to modeling requests, including what requests will be fulfilled and a schedule for transmittal of the information to RPs.
- SCL to provide Interagency group a modeling request form. *[March 6]*

Closing

The meeting adjourned at 4:00 pm.

Attachments: (http://www.seattle.gov/light/news/issues/bndryRelic/br_schedule.asp)

- Attachment 1: Agenda
- Attachment 2: Test Scenario Descriptions
- Attachment 3: Modeling Introduction Presentation
- Attachment 4: Results of Five Test Scenarios Presentation
- Attachment 5: Resource-Specific Indices of Project Operational Effects Presentation
- Attachment 6: Integrated Summary Table for Test Scenarios
- Attachment 7: Draft List of Potential Non-Operational PME's
- Attachment 8: Proposed Management, Monitoring, and Attainment Plans