



SUSITNA-WATANA HYDRO

DRAFT Meeting Summary

**Geomorphology, Fluvial Geomorphology, Ice Processes, Water Quality,
Mercury Bio Accumulation, Geology/Soils
Technical Workgroup Meeting
23 October 2012**

LOCATION: Alaska Energy Authority Main Office
813 West Northern Lights BLVD
Anchorage, AK 99503

TIME: 8:30am – 4pm (AKDT)

SUBJECT: **Water Resources Studies & Geology and Soils Study Plan Updates**

ATTENDEES: **Rob Plotnikoff** Tetra Tech, **Harry Gibbons** Tetra Tech, **Paul Dworian** URS, **Felix Kristanovich** ENVIRON, **Charlie Wisdom** ENVIRON, **Roy Ireland** DNR, **Kathryn Toews** Long View Associates, **Dave Meyer** USGS, **Mike Buntjer** USFWS, **Bill Fullerton** Tetra Tech, **Marie Steele** DNR, **William Ashton** DEC, **Tim Bailey** Stephan Lake Lodge, **Brian Bjorkquist** AGO, **Jan Konigsberg** Hydropower Reform Coalition, **Michael Lilly** GWS, **Dave Brailey** Brailey Hydro, **Dudley Reiser** R2, **Robin Beebee** HDR, **Laura Noland** ENVIRON, **Eric Marchegioni** USDA, **Bryan Carey** AEA, **Catherine Berg** USFWS, **Justin Crowther** AEA, **Matt Love** VNF, **Betsy McGregor** AEA, **Keith Fetherston** R2, **Brian Carey** AEA

ON PHONE: **Richard Leo** Coalition for Susitna Alternatives, **David Turner** FERC, **Stormy Haught** ADF&G, **Bob Mussetter** Tetra Tech, **John Haapala** MWH, **Fred Winchell** Louis Berger, **Ken ?** Louis Berger, **Dirk Peterson** Stillwater, **Jay Stallman** Stillwater, **Paul Makowski** FERC, **Eric Rothwell** NMFS, **Gary Vandervine** NHC, **Wayne Dyok** AEA, **Becky Long** Coalition for Susitna Alternatives, **Sue Walker** NMFS, **Steve Padula** Long View Associates, **Hal Shepard** CWA

AEA PSP and ILP Study Plan Process (Matt Love, VNF)

The purpose of today's meeting was to provide an overview of to-date revisions made to select PSPs. Matt Love reviewed the RSP schedule, Project updates and today's purpose as explained in the "Overview of AEA Draft Revised Study Plans" presentation (available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/AEA_overview_revised_study_plans_Geo.pdf). He informed everyone that a spreadsheet of the status of each study plan is available on the AEA website (<http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Study-Table.pdf>). This sheet informs the reader whether a draft RSP is available for review or changes to the PSP have not been significant based on comments received to date and thus only the original PSP is available. Live links to these documents are imbedded in the spreadsheet. Within each draft RSP is an updated schedule, a figure showing interdependencies amongst studies and a consultation table showing comments to-date along with AEA's responses.

Ice Processes in the Susitna River Study (Robin Beebee and Bob Butera, HDR)

Robin Beebee began her presentation discussing changes made to the Ice Processes PSP. The presentation can be found at <http://www.susitna-watanahydro.org/wp->



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content/uploads/2012/10/Susitna-Watana-TWG1023-Ice-1.pdf. Robin reviewed three comments and the responses associated with them in subsequent slides. In response to a question, Robin indicated that the ice processes modeling results would not be available in 2013 and therefore would not be incorporated into the Focus Area site selections. When discussing study deliverables (slides 5-7) Robin explained that data from the 1980s and the data from the Ice Study will be compared to capture any differences in observed ice processes. She presented a sample diagram of ice cover and photographs from the Susitna River showing recent frazil ice formations. An interdependency diagram was provided on slide 10 showing the data required from other studies to complete deliverables for the Ice Study. It also lays out which other studies employ particular deliverables of the Ice Study. An input to be added to the diagram is the Water Quality Study providing modeled outflow temperatures from the reservoir.

The Ice Study presentation was followed by questions from the licensing participants:

Gary Vandervine asked if there was enough data to develop reliable 1-D modeling after one season of data. Robin Beebee said that data from the 1980s may be incorporated to add years for parameters such as temperature, meteorological data and ice cover. Break up and freeze up information will be continuously collected and added to the model as available. Robin will adjust the schedule to represent this extension of data input. Gary questioned the variability observed in the 1980s and Robin explained that in the years when data were collected, one was colder than average, one was warmer than average and the other three years were generally average. Data was collected from 1979 to 1985, with detailed data collection beginning in 1980.

Felix Kristanovich asked if climate change would be considered in the model. Robin Beebee said that such detail is out of the current study scope. Richard Leo suggested Glen Juday of UAF be contacted regarding climate change in the Susitna Valley. He would like to see climate change consideration included in the ice modeling.

Geomorphology Study/Fluvial Geomorphology Modeling (Bill Fullerton, Tetra Tech)

Bill Fullerton began his presentation discussing changes to the Geomorphology Study and Fluvial Geomorphology Modeling below Watana Dam Study (Geomorphology Modeling Study) PSPs. The presentation can be found at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Geomorphology-TWG-2012-10-23.pdf>. Bill found that many comments from multiple licensing participants were similar so he grouped alike comments into eight categories (slide 2). Geomorphology work began in 2012 so other studies could use the data in considering 2013 site selection. Currently ten candidate Focus Areas are being considered. With the updated LiDAR and 2012 aerial images (available in December, 2012) updated habitat mapping can be applied in final site selection. The focus for 2013 is to collect data for the 1-D/2-D models and hydraulic model. 2014 provides an opportunity for the Geomorphic Study to collect more data if needed. While reviewing the integration figures, Bill agreed to add Water Quality (Geomorphology included in Water Quality Interdependency Table) as a resource using the Geomorphic Study deliverables.

Slide 15 shows the five hierarchical levels applied to habitats for mapping. The first two levels are geomorphic related while the remaining three levels are habitat related. The river segments are separated by distinct hydrologic features. Separating the upper and middle segments is the proposed dam. Separating the middle and lower segments is the Three Rivers confluence of the Susitna River, Chulitna River and Talkeetna River. At this location, the Susitna River flow approximately doubles and the Chulitna influences the Susitna River with high sediment contribution.



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Bill Fullerton explained that 1-D modeling is currently being proposed from the Project dam site downstream to river mile 75 while 2-D modeling will be utilized in smaller sections referred to as Focus Areas. Based on results of 1-D modeling in 2013, the downstream extent of Project effects will be reevaluated by early 2014, and if it is found that the Project may substantially affect geomorphology downstream of river mile 75, AEA is open to reconsidering the downstream extent of the geomorphology and other related studies. Bill presented aerial maps on slide 23 of river mile 75. He explained that this area acts as a buffer for sediment transport. This is one of the main reasons, along with the relatively small proportion of sediment load contributed from the Susitna compared to the Chulitna, for the modeling portion of the Geomorphic Study to initially be limited to above river mile 75.

Bill Fullerton continued the presentation and reviewed some field data collection methods in Focus Areas (slide 27-28). Some methods are condition specific. Depending on the environmental conditions, the field crew may choose the equipment that will best suit the study needs.

Felix Kristanovich requested more detail on the parameters used both in water quality and geomorphology studies. A complete list of water quality parameters for each type of monitoring program are included in the RSPs Section 5.5 through Section 5.7 and also included in the QAPP/SAPs.

When viewing the maps on slide 31, Bill Fullerton explained that the red lines represent cross sections for the hydraulic routing model. The sediment transport model requires more cross sections than shown currently on this slide. After evaluating existing cross sections, the study leads will determine if, and where, more cross sections are necessary.

Bill Fullerton discussed the request for 2-D mesh size specifications. He explained that each site may consist of multiple mesh sizes. Depending on the processes present in a specific area, the mesh size varies depending on the detail needed/requested of that area. More specifics on mesh sizes will be available in 2014 (after field observations). An example of mesh sizes over Whiskers Slough was presented on slide 34. Bob Mussetter mentioned that the model flexibly allows for mesh size refinement as needed.

Baseline Water Quality Monitoring/Modeling (Rob Plotnikoff and Harry Gibbons, Tetra Tech)

Baseline Water Quality Monitoring

Rob Plotnikoff explained that the changes to the Baseline Water Quality Monitoring / Modeling PSPs were in response to a data gap analysis of historic data as well as comments provided by licensing participants. Rob reviewed the goals and objectives of the Baseline Water Quality Study. He then presented a selection of comments and AEA's responses. The information provided by Rob is available in the Baseline Water Quality presentation (http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Baseline_WQ_Monitoring_TWG_2012_10_23.pdf).

In slide 5, Rob mentioned the use of a combined QAPP/SAP to ensure defensible data. These documents were combined for efficiency since they both address many similar topics. In areas reliant on pending data, such as specific site selections, a place holder will be present in the QAPP/SAP. Rob asked the licensing participants if they preferred the state or federal guidance addressing this document, and it was a general consensus of the group that state guidance is acceptable (Alaska Department of Environmental Conservation QAPP Guidance Manual).



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Charlie Wisdom asked if study efforts would be intensified during pulses of ice flowing through the system, for example an ice jam breaking loose. Paul Dworin explained that water quality data will be collected continuously via permanent sensors (temperature probes), and crews will be collecting data as soon as safely possible after break up. Harry Gibbons explained that the models will simulate activity during the times that it is unsafe to manually sample. Rob Plotnikoff added that through-ice sampling for water quality may risk contaminating the sample. He said that winter sampling is planned, but may be opportunistic depending on conditions. Frazil ice restricts most boat access, light is limiting and ice thickness can be deceiving, making falling through the ice a risk.

The two final slides briefly describe the accomplishments of the Water Quality Study 2012 field efforts. For all MET stations, data streams live for easy access and backup (telemetry system capability also serves as a check that stations are operating properly). Some in-channel temperature monitoring sites are being winterized to avoid ice encasement and the risk of probes traveling downstream with that ice. The September 2012 flood caused the loss of only 4 (out of 39) temperature probe stations. Catherine Berg asked if pop-up tags were considered as a sampling apparatus. These instruments collect the data and once complete, a tag pops up and relays the information via satellite. Rob Plotnikoff mentioned the need to regularly visit sites for precipitation measurements, maintenance and to ensure that equipment is in good working condition obviate the need to use pop-up tags.

Water Quality Modeling

Rob Plotnikoff began the presentation (available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Baseline_WQ_Monitoring_TWG_2012_10_23.pdf) which covered the study's goals and objectives and any significant changes thus far to the Water Quality Monitoring Study PSP.

For all toxicity modeling, the QAPP/SAP will address specifics to the detail of algorithms, calibration information and clean hands/dirty hands procedures, as examples. Toxic modeling will be conducted and include a pathways analysis based on EPA's recommended methods. Collection of mercury data, in multiple forms, was added to the water quality studies. Maya Singer asked if the models can produce an hourly output if calibrated on a longer time frame. Rob Plotnikoff explained that if calibration issues arise, they will do so within a relatively short time frame. This allows time for additional data collection in 2014. Harry Gibbons added that there will be no way to generate direct information for calibrating a model for the proposed reservoir, but using input data upstream and within the proposed reservoir will enable construction of a "virtual" reservoir.

Determining toxicities (slide 6) will be performed by using Alaska state criteria. However, this does not address all screening levels so SQuiRT tables will be used to fill in gaps. Models (slide 7) will be used with a finer resolution throughout the Focus Areas and may identify groundwater input.

Charles Wisdom asked if toxicity of mixtures (synergistic/additive effects) will be evaluated. Rob Plotnikoff explained that synergistic/additive toxicities can be determined by using mixtures in lab bioassays. However, results have a great deal of associated uncertainty. He added that bio assays examining synergistic effects are beyond the current study plan.

Rob Plotnikoff presented a pathways analysis example on slides 10-11. Figures show possible paths for movement of mercury throughout the system and reservoir. Although it is not possible to predict



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the pathway details of an entire virtual reservoir, Paul Dworian said that this analysis can inform site selection within the inundation zone for monitoring. Charles Wisdom agreed it is important to use pathways to identify locations for mitigation and monitoring. Rob explained in detail the capabilities of the EFDC modeling in relation to a virtual reservoir. He said that the model can take into consideration wetlands, bathymetry/topography, climate data, and upstream input to create a virtual reservoir. It can also address inputs from the terrestrial environment into the aquatic environment.

Interdependencies were reviewed at the final slide of this presentation. It was agreed that sediment modeling from the Water Quality Monitoring Study would be added to the figure as an input. Dudley Reiser also corrected the Hydraulic Routing Model date as 1st quarter of 2013, rather than 4-Q 2013 as stated in the presentation. Also, wetlands and riparian studies will be added as an input for the reservoir modeling.

Mercury Assessment and Potential for Bioaccumulation (Paul Dworian, URS)

Paul Dworian reviewed updates to the Mercury Assessment and Potential for Bioaccumulation Study PSP. Paul reviewed these changes in a presentation available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Mercury_presentation_October_23.pdf. Modeling was also added to the Mercury Study to supplement the modeling already proposed by the Water Quality Modeling Study.

Paul Dworian explained that the Harris and Hutchison Model can be applied relatively early in the study process. Paul also stated that Phosphorous Release Modeling calculates the maximum concentration of mercury in fish (the peak seen in graphs on slides 7-8).

Paul presented the interdependency chart on slide 9 and added that the detailed ADEC mercury data (regarding human consumption and health risks focusing on mercury in resident and anadromous fish) is pending. He currently has been provided averages, but needs the size, age and location of fish to apply the data accurately.

Project Hydrology (Bryan Carey, AEA)

Bryan Carey presented some new information regarding predicted post-Project Susitna River flows and stages (available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Downstream-Stages-TWG-Oct-16-2012-R1-pptx.pdf>). The first group of stage slides are based on a conservative assumption that the Project would be utilized to provide all the load following capability needed for the entire Railbelt. This is a very conservative assumption as it is likely that other hydroelectric projects in the Railbelt system will be utilized to meet portions of load following needs. When viewing these graphs one must take into consideration that they are based on USGS gages placed in constrained areas of the Susitna River and during ice-free, open water conditions. The stage effects are more extreme in the confined reaches where the USGS gages are located and would dissipate in wider neighboring reaches. The second group of slides shows daily stage and flows with load following at various gage locations; stage changes are less than one foot at each location. The August flows and stages at locations on the Susitna, Talkeetna, and Chulitna Rivers show that the rivers are currently seeing daily stage swings from snow/glacial melt. Last group of slides shows the stage with and without the Project using 1984 flow data.

Additional Discussion



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Sue Walker indicated that she does not agree with AEA's distribution of draft RSPs. She said that this is a change in the FERC ILP protocol. She added that many agencies have internal comment review processes that prevent them from reviewing and providing comments on the draft RSPs and still meet the November 14th deadline for comments. David Turner said that comments on the PSP will be accepted until November 14, 2012 and addressed by AEA in the RSP, to be filed by December 14, 2012. David encouraged those who can to take into account the additional information contained in draft RSPs in their November 14th comments. Draft RSPs allow licensing participants to view changes in study plans prior to the RSP filing in mid-December, which should help with resolution of any remaining disagreements. Comments on the RSP will be accepted until January 18, 2013. A detailed calendar can be found at <http://www.susitna-watanahydro.org/project/schedule/> and an update schedule is on slide 3 of the "Overview of AEA Draft Revised Study Plans" presentation (available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/AEA_overview_revised_study_plans_Geo.pdf).

Action Items

Revise the Ice Processes Study interdependency figure to add data input (modeled outflow temperatures from the reservoir) from the Water Quality Study.

Revise the Ice Processes Study schedule to reflect that break up and freeze up information will be continuously collected and added to the model as available.

Revise the Geomorphology Study interdependency figure to add data output (sediment modeling) to the Water Quality Study.

State guidance (Alaska Department of Environmental Conservation QAPP Guidance Manual) will be used as guidance addressing the QAPP/SAP for the Water Quality Study.

Revise the Water Quality Study interdependency figure to add data input from the Wetlands Study, the Riparian Study, and sediment modeling from the Geomorphology Study.

Revise all of the interdependency figures to include RSP section numbers and include a narrative in the RSP explaining each the figure.