Meeting Summary
Susitna-Watana Hydroelectric Project Licensing
Aquatic Resource Issues Agency Meeting
10 a.m. - 4 p.m., October 24, 2011
Held at 4th Floor Conference Room, CIRI Building
2525 C Street, Anchorage, AK

Purpose of Meeting:

Present and discuss results of hydrologic analysis to date, discuss fish and aquatic/water quality/sediment transport initial issue and study concept identification with resource agency representatives

Attendees:

AEA:	Bryan Carey, engineering manager
AEA:	Betsy McGregor, env. manager
AEA:	Emily Ford, public affairs
CardnoEntrix	Jim Gill, assistant to AEA
MWH	Kirby Gilbert
MWH	John Haapala
Long View Associates	Steve Padula
Long View Associates	Randall Filbert
Long View Associates	Finlay Anderson (by phone)
3PPI	Sally Morsell
	John Morsell
CardnoEntrix	Woody Trihey
CardnoEntrix	Lynn Noel
CardnoEntrix	Jean Baldrige
CardnoEntrix	Steve Nevares
USGS	Dave Meyer
Ahtna, Inc.	Kathryn Martin
FERC	Kim Nguyen
FERC	David Turner (by phone)
FERC	Matt Cutlip (by phone)
EPA	Matthew LaCroix
EPA	Jennifer Curtis
ADNR, Division of Water	Gary Prokosch
ADEC	William Ashton
BLM, Glennallen Resource Area	Tim Sundlov
BLM	Mike Sondergaard
BLM	Elijah Waters
NPS	Cassie Thomas
USFWS	Mike Buntjer
USFWS	Betsy McCracken

USFWS	Jennifer Spegon
NMFS	Eric Rothwell
NMFS	Sue Walker
NOAA General Counsel	Thomas Meyer (by phone)
ADF&G	Monte Miller
ADF&G	Jason Mouw
ADF&G	Joe Klein
ADF&G	Ron Benkert
ADF&G	Mike Bethe
ADF&G	Joe Giefer
ADF&G	Jack Erickson
ADF&G	Ed Weiss
ADF&G	Sarah Hazell
ADF&G	Mark Fink
USDA –Rural Development	Eric Marchegiani
Senator Joe Thomas Office	Grier Hopkins
Aquaacoustics	Don Degan
Aquaacoustics	A M Mueller
Northwest Hydraulics	Malcolm Leythan
Alaska Restoration and Research Institute	Jeff Davis
HDR	James Brady
HDR	Robin Beebee
ABR	Terry Schick
URS	Paul Dworian
LGL Alaska	Michael Link
DOWL HKM	Kristen Hansen
Coalition for Susitna Dam Alternatives	Becky Long (by phone)
Van Ness Feldman	Mike Swiger (by phone)
Alaska Conservation Alliance	Kate McKeown
Alaska Ratepayers	Scott Crowther
R2 Resource Consultants	Dudley Reiser (by phone)

Presentations:

- David Meyer (US Geological Survey, Alaska Science Center): Hydrologic Monitoring in the Susitna Basin.
- John Haapala (MWH): Susitna-Watana Hydroelectric Project, Hydrology and Operation Modeling.
- John Haapala (MWH): Susitna-Watana Hydroelectric Project, Operations and Climate Change.

Questions/Discussion Related to Presentations

USGS - Hydrologic Monitoring in the Susitna Basin

USGS provided clarification regarding the following stakeholders questions/comments:

- Low- and high-flow statistics for the Susitna River and its tributaries.
- Establishing relationships between existing flow data and data collected in the future as part of licensing.
- Ability to assess Project-induced flow changes based on the existing USGS record.

MWH - Hydrology and Operation Modeling

MWH addressed the following stakeholder questions and comments regarding potential Project operations:

- Potential frequency of spill events at the proposed Watana Dam.
    - Spillway flows would be infrequent, i.e., at 50-year flood frequency.
    - Low-level outlet flows, when the reservoir is full and the powerhouse is already operating at capacity, would occur in most years.
- Basis of firm power reliability estimates.
    - For the base case run, firm power was defined as the power that can be supplied with 98 percent reliability during November through April.
- Relative benefits of HEC-ResSim and HEC-Ras[1].
    - HEC-RAS includes detailed hydraulic flow routing but does not include reservoir operations; HEC-ResSim includes simplified hydrologic flow routing that has been shown to produce accurate results and also includes reservoir operations.
- Effects of a lack of flow routing on modeled comparisons of natural and "with-project" flows.
    - Lack of flow routing results in failure to account for attenuation.
- Year-to-year deviations from estimated long-term average power output.
- Project generating capacity relative to inflows/reservoir storage.
    - The ratio of the average annual inflow volume to active storage is about 0.4 (40 percent).
    - The ratio of average generation to the generation that would be produced if the plant were to operate at maximum capacity all of the time is about 0.5 (50 percent). This is a typical value for hydroelectric plants that have storage reservoirs.
- Project generation versus Railbelt energy demand.

[1] HEC-ResSim and HEC-Ras have been designed and developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers to perform Reservoir System Simulation. It is intended to meet the needs of real-time reservoir regulators for a decision support tool, as well as the needs of modelers doing reservoir studies.

    - The Project could provide up to 50 percent of annual Railbelt demand.
- Source of modeled environmental flow releases.
    - Environmental flows from Scenario E-VI from Exhibit E of the 1985 Susitna Project FERC license application were used as a convenient starting point for operations modeling to present representative routing downstream and reservoir capabilities. These do not represent proposed flows for the current project.
- Inclusion of flushing flows in the operation model.
    - Flushing flows were not included.
- Estimated reservoir capacity.
    - The active storage capacity between elevation (El) 1850 feet and El 2000 feet is 2.4 million acre-feet.

MWH - Operations and Climate Change

MWH and USGS addressed the following stakeholder questions and comments regarding potential Project operations and climate change estimates:

- Potential effects of shrinking glaciers on future Project operations.
    - Glacial melting resulting from atmospheric warming may initially increase the volume of water available for power generation, although this effect is not evident in the recorded stream flow record. However, over the longer term the contribution of glacially produced water could decline. It is uncertain, and not possible to identify the inflection point between the two scenarios. In the distant future, declining flows from glacier wasting could be counterbalanced by projected increases in precipitation.
- Inclusion in operations modeling of El Niño, La Niña, and Pacific Decadal Oscillation (PDO).
    - These phenomena are incorporated into operations modeling to the extent that they have affected historic recorded flows. Additional summary information on long-term weather cycles is expected to be provided in a technical memorandum.
- Likelihood of increased precipitation in Alaska as the result of climate change.
    - In general, Alaska is expected to receive more precipitation in the future, particularly in the southern/eastern part of the state.

Study Workgroup Concepts and ILP Planning Efforts for Studies

The AEA team discussed the following study workgroup concepts and Integrated Licensing Process (ILP) planning efforts for studies:

- Work Group structure, function, core membership, and public attendance.
- Resource areas for which Work Groups would likely be formed: Aquatic; Water Quality; Terrestrial; Recreation, Socioeconomics, Aesthetics; and Cultural.
- The need to schedule Work Group meeting dates in a staggered fashion to ensure that core members responsible for multiple resources can attend all necessary meetings.

- Overview of the ILP schedule.
- Posting of materials on the AEA website http://susitna-watanahydro.org/.
- The need for 2011 Work Group meetings to allow AEA to develop requests for proposals (RFPs) for 2012 field studies.
    - It was agreed that initial meetings would be held in early December 2011.
- Agency staff stressed the need for AEA to send meeting materials to Work Group members in advance of meetings, preferably at least two weeks before meetings.

Discussion of Fish and Aquatic/Water Quality/Sediment Transport/Ice Dynamics Initial Issues and Study Concepts:

The AEA team discussed Project-related issues and potential studies and addressed stakeholder questions pertaining to aquatic resources, water quality, sediment transport, and ice dynamics as follows:

- Comments on potential issues and study needs provided by stakeholders by the end of November 2011 would be useful to help complete the PAD.
- Woody Trihey, who lead many of the aquatic studies in the 1980s, discussed the potential effects of the Project's existence and operation on (1) flow and resulting changes in fluvial geomorphology, riparian vegetation, groundwater, and ice dynamics in the reservoir and the Susitna River, downstream of the proposed dam site, including the mouths of tributaries draining into the Susitna River and side sloughs and (2) Project effects on water quality in and downstream of the proposed reservoir.
    - Impacts of the Project on the river would vary as a function of distance downstream of the dam, flow and sediment inputs from tributaries, alluvial versus bedrock conditions, elevation, etc.
- Trihey made a point that based on prior experience there are tremendous logistical and safety-related concerns and limitations associated with conducting fieldwork in the remote, dynamic, and potentially harsh conditions occurring in the Susitna River basin.
- Stakeholders asked the following questions and received responses from Trihey based on outcomes of 1980s work:
    - How would the Project likely affect turbidity in the middle Susitna River?
        - Turbidity during winter in the potentially ice-free reach immediately below the dam could actually increase as glacial flour suspended in the reservoir is released from the generating units.
    - How would the Project affect ice formation downstream of the Project?
        - Because of the release of warmer water during the normal freeze-up period, frazil ice would not be generated for a considerable distance downstream of the dam. Ice formation would be reduced or lacking in the reach between the dam and Devil Canyon.
    - How would the Project affect groundwater upwelling in side sloughs?
        - Under current conditions winter ice cover maintains upwelling in side sloughs. A reduction of winter ice in the future could reduce hydrostatic pressure, thereby potentially reducing localized upwelling.

  - How would a reduction in ice cover affect riparian vegetation?
    - A reduction in ice-induced effects on channel geomorphology would likely result in encroachment of riparian vegetation, including large shrubs and trees.
  - What effect might the Project have on reservoir ice formation?
    - The surface layer of ice on the reservoir would likely be unstable as the result of fluctuations in water surface elevation, potentially making it difficult for animals to cross the reservoir in winter.
  - What size sediment would pass downstream of the dam?
    - Only sediment particles less than about 8-10 µm would pass downstream of the dam.
  - Would the Project affect fish passage conditions in the Devil Canyon Reach?
    - The Project will reduce spring flows, thereby increasing the likelihood that Chinook will more easily pass through the Devil Canyon reach.
  - Would the Project influence the relative abundance of various habitat types downstream of the Project?
    - The river may be in a state of dynamic equilibrium, and it will be important to study the potential effects of the Project on the relative abundance of different habitat types in the Middle River.
  - How would temperature changes in the river downstream of the dam affect fish and other aquatic biota in the mainstem?
    - If more Chinook can access the reach between Devil Canyon and the dam, warmer water temperatures could increase juvenile survival and growth rates. Invertebrate production could also be increased.
  - Do both juvenile coho and chinook salmon use turbid water for rearing in the Susitna River?
    - Based on existing information, juvenile coho prefer clear water, whereas juvenile Chinook were found at the turbid water – clear water interface; it was assumed that Chinook used the turbid water for cover and the clear water area for foraging.
- Stakeholders stated that existing ice dynamics should be assessed as part of early studies conducted in 2012.
- Stakeholders emphasized the importance of thoroughly studying the Project's potential effects on turbidity.
- Stakeholders asked when LiDAR[2] data for the Susitna River would be available.
  - LiDAR data, with imagery, are expected to be available in spring 2012.
- AEA agreed to coordinate with the Alaska Department of Fish and Game to acquire a summary of recently collected salmon distribution/life history data for the Susitna River.

[2] **LiDAR** (**Light Detection And Ranging**) uses ultraviolet, visible or near-infrared light to image objects, using a narrow laser beam to map physical features with very-high resolution.

- Stakeholders asked about operational flows.
    - Answer was that given that flows would likely be base flows [3]. .

Kirby Gilbert, Sr. Regulatory Specialist, MWH & Randall Filbert, LVA

Action Items:

- AEA will post to its website the provisional recommended environmental base flows from the 1985 Susitna FERC Application Scenario E-VI from Exhibit E that were incorporated into the hydraulic and operational flow modeling presented by Haapala as a convenient starting point. Note that these do not represent proposed flows for the current project.
- AEA will coordinate with ADF&G to identify ongoing ADF&G studies within the Project Area and will post the list of studies to its website.
- To the best of its ability, AEA will post to its website meeting agendas, presentations and handouts prior to scheduled work group meetings.
- AEA will post to its website the ILP schedule.

[3] Subsequent to the meeting it has been decided that some load following ability would be beneficial to the project. Effects of magnitude, frequency, and timing will be assessed in 2012.