

ALASKA STATE LEGISLATURE
SENATE SPECIAL COMMITTEE ON IN-STATE ENERGY

February 19, 2013
7:30 a.m.

MEMBERS PRESENT

Senator Click Bishop, Co-Chair
Senator John Coghill, Co-Chair
Senator Peter Micciche
Senator Dennis Egan
Senator Bill Wielechowski

MEMBERS ABSENT

All members present

OTHER LEGISLATORS PRESENT

Senator Cathy Giessel

COMMITTEE CALENDAR

OVERVIEW: SUSITNA-WATANA HYDROELECTRIC PROJECT~ ALASKA ENERGY
AUTHORITY (AEA).

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

SARA FISHER-GOAD, Executive Director
Alaska Energy Authority
Anchorage, Alaska

POSITION STATEMENT: Presented an overview of the Susitna-Watana
Hydroelectric Project.

WAYNE DYOK, Project Manager
Alaska Energy Authority
Anchorage, Alaska

POSITION STATEMENT: Presented an overview of the Susitna-Watana
Hydroelectric Project.

NICK SZYMONIAK, Project Economist

Alaska Energy Authority
Anchorage, Alaska

POSITION STATEMENT: Presented an overview of the Susitna-Watana Hydroelectric Project.

ACTION NARRATIVE

[7:30:05 AM](#)

CO-CHAIR CLICK BISHOP called the Senate Special Committee on In-State Energy meeting to order at 7:30 a.m. Present at the call to order were Senators Micciche, Co-Chair Coghill, and Co-Chair Bishop.

CO-CHAIR BISHOP welcomed Senator Giessel to the committee meeting.

OVERVIEW: Susitna Watana Hydroelectric Project, Alaska Energy Authority (AEA).

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CO-CHAIR BISHOP announced that the order of business would be an overview from the Alaska Energy Authority's (AEA) overview on the Susitna-Watana Hydroelectric Project (SWHP). He stated that SWHP could have a 100 year long lasting positive effect for Alaska. He said he had always been an advocate for hydroelectric power. He remarked that he was involved in the original SWHP camp out of Devils Canyon in 1984 and it was moved to the Bradley Lake Hydroelectric Project (BLHP) site. He stated that it had been 30 years and SWHP was still being discussed.

[7:32:28 AM](#)

CO-CHAIR BISHOP announced that Senator Egan and Senator Wielechowski had joined the committee meeting.

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SARA FISHER-GOAD, Executive Director, Alaska Energy Authority, said AEA had made significant progress with SWHP over the past two years and noted the committee should have received the annual AEA Activities Report. She said AEA's mission was to reduce Alaska's energy costs, invest in energy infrastructure, and energy portfolio diversification.

[7:34:09 AM](#)

MS. FISHER-GOAD said Alaska's energy challenges included:

- Varied regional energy costs by region, an issue beyond the Railbelt.

- Aging facilities.
- Declining oil production.
- Highly volatile fossil fuel costs, a reason why SWHP was being reconsidered.
- Dispersed communities and no central grid.
- Short and long-term solutions, AEA had a portfolio of programs to address Alaska' energy challenges.

MS. FISHER-GOAD said AEA had a 2010 renewable energy goal for 50 percent renewable by 2025. She explained that SWHP would be a significant way for Alaska to achieve its energy goal by 2025.

She said Alaska's current electricity sources included hydroelectric at 21 percent and a small percentage from "other renewables" due to the introduction of wind projects at Eva Creek, Fire Island, and Kodiak Island. She detailed that hydropower made up 90 percent of renewables and was a historically significant resource for Alaska. She said hydropower was a significant resource for Southeast and continued to provide some of the lowest cost power in the state.

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She said SWHP's history had been studied since the 1950s and significant work was put into developing SWHP during the 1980s. She noted that SWHP's current concept had been scaled back to a smaller project.

She explained that Wayne Dyok was chosen as project manager due to his past experience with SWHP during the 1980s. She stated that Mr. Dyok brought over 30 years of experience working on international and Alaska hydro-projects, specifically on SWHP. She explained that the preliminary decision document that led to SB 42 provided AEA with the authority to proceed with SWHP. She noted that former state Senator Joe Thomas from Fairbanks and Representative Craig Johnson from Anchorage were both instrumental in funding AEA to look at large-hydroelectric. She said AEA had done an analysis of both SWHP and the Chakachamna Hydroelectric Project. She disclosed that AEA developed a preliminary decision document that showed SWHP was the project to pursue. She noted that the work done in the 1980s provided a significant amount of information for AEA to pursue SWHP and get the project completed by 2024.

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WAYNE DYOK, Project Manager, Alaska Energy Authority, explained why AEA was moving forward with SWHP as follows:

- Serves 80 percent of the state's population.
- 1,000 jobs during peak construction.
- Stable electricity rates for over 100 years.
- Long-term diversification of Alaska's energy generation portfolio.
- Clean, reliable energy source.
- Promotes integration of variable power sources like wind.

MR. DYOK addressed SWHP highlights and facts as follows:

- SWHP site would be located approximately 184 miles upstream from the mouth of the Susitna River and 87 river miles from Talkeetna.
- 10 mile impediment located downstream at Devils Canyon, an area that inhibits most anadromous fish from getting upstream.
- SWHP would provide 50 percent of the Railbelt's energy needs.
- SWHP would have an installed capacity of 600 megawatts (MW), and 2.8 million megawatt hours (MMWh) of energy on an annual basis.

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He stated that AEA had been evaluating three alternative transmission routes for SWHP and the proposed routes were the same as what was proposed in the 1980s. He said AEA was in the process of evaluating each transmission route and a final route selection would occur after AEA's engineering and environmental analysis. He noted that the transmission route decision would also involve AEA interacting with landowners, resource agencies, and people that had an interest in SWHP.

CO-CHAIR BISHOP addressed the Chulitna Corridor and asked if it had ever been traversed. He noted that the Denali Corridor was the route used in the 1980s for camp installation.

MR. DYOK answered correct. He said the westerly part of the Chulitna Corridor had an old pathway that went in a certain distance and the remaining length would be a unique overland route.

He addressed SWHP's timeline and noted that the project resurfaced in 2010 when the state established an energy policy for a 50 percent renewable goal. He said 2011 was spent primarily to introduce SWHP and review materials produced in the

1980s. He explained that a pre-application document was produced in 2011 and filed with the Federal Energy Regulatory Commission (FERC). He said 2012 was spent primarily to develop a robust study plan and preliminary fieldwork to get a handle on studies and see how SWHP had changed over 30 years. He said AEA was in the implementation phase of the two major study years. He explained that on February 1, AEA received a FERC study plan determination for 44 of the 58 studies with the remaining 14 studies potentially being approved with some modifications on April 1. He revealed that FERC told AEA that the agency had enough information to make the final determination on the remaining 14 studies. He said AEA would do the studies with a goal to file a license application with FERC in September, 2015. He remarked that AEA would not anticipate receiving a license until the early part of 2017. He noted that a seven year construction period would commence for SWHP after a license was received with the intent to have the project online by 2024.

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SENATOR MICCICHE noted that seven years was a long construction time and asked if that was typical for project the size of SWHP.

MR. DYOK answered yes. He noted that AEA would like to construct SWHP more quickly, but the project faced northern environment challenges that did not allow for 12 month concrete placement. He said AEA would challenge the detail design engineer to look at expediting the SWHP schedule.

He remarked about current employment as follows:

- 385 total individuals outside of AEA were contracted to work on SWHP.
- Majority of workers are Alaskans.
- Hydropower licensing experience in the Pacific Northwest was supplementing the workforce.
- 180 individuals anticipated to be in the field in 2013 to collecting different types of environmental and geotechnical information.

CO-CHAIR BISHOP addressed Alaska employment and asked AEA to work closely with the Alaska Department of Labor and Workforce Development (ADLWD). He noted that ADLWD had a template that could be used for employment modeling for a project that was the size of SWHP.

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MR. DYOK reiterated that AEA had prepared a study plan with FERC approving 44 of the 58 studies. He noted that he had been doing hydro-work for many years and the level of effort involved with developing the SWHP study plan was unprecedented. He said AEA worked closely with the various resource agencies, Alaska native entities, and interested members of the public to develop the study plan.

SENATOR WIELECHOWSKI asked what type of salmon impact research would be done.

MR. DYOK responded that salmon impact was a major focus for AEA's studies. He said AEA would take information from the 1980s and look at the current system to develop a habitat based analysis. He explained that the effects from SWHP's impact on water flow and water quality would be analyzed. He said AEA was working closely with the Alaska Department of Fish and Game (ADFG) and noted ADFG was collecting field work information to analyze fish populations. He disclosed that AEA had conducted initial studies on SWHP's impact on the salmon's life stages. He explained that the salmon study would extend down to the Cook Inlet and was a substantive program to really get to the heart of how SWHP might affect the anadromous fish. He stated that the results from the study would be used to make sure SWHP's effects were mitigated.

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SENATOR WIELECHOWSKI stated that his biggest concern was the potential impact on salmon. He asked if AEA was planning on keeping the legislature informed with their report findings. He inquired what some of the impacts were from releasing water at hydroelectric sites throughout the world.

MR. DYOK answered that AEA would keep Senator Wielechowski informed. He explained that SWHP would store water during the summer run-off period for potential energy use during the winter time when it was needed most by Alaskans. He said the largest flow-change effects would occur immediately downstream from SWHP, but the effects had to be observed all the way downstream. He explained that water level change and speed of change had the potential to affect the fish. He noted that AEA would like to change the flows in order to best meet the Railbelt's needs. He remarked that a balance had to be considered between the effects on fish and operating SWHP efficiently. He said in the winter the river would be free of ice from SWHP to some point downstream, a typical occurrence in Canadian hydropower projects. He noted that ice would eventually form downstream and

its effect on the fishery would dictate SWHP operations. He said in the spring time, the flows typically come up and SWHP would be able to adjust the flows, one of the beauties of a hydroelectric dam. He noted that there would be a milder breakup due to SWHP's flow control and stable flows would occur in the summertime. He affirmed that AEA would look at the impact from lower flows on each of the different [salmon] life stages and react accordingly.

CO-CHAIR BISHOP requested that AEA meet with ADFG and have them get back to the committee. He asked what streams had ADFG identified as spawning streams.

MR. DYOK replied that much of what AEA was finding was very consistent with studies from the 1980s. He noted that fish populations were not what they used to be, particularly for the anadromous salmon. He explained that the key was to work with the stakeholders and make sure all of the issues were objectively identified to allow AEA to file a complete license application in 2015.

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He explained that AEA met all of their major deliverables with the Proposed Study Plan in July and the Revised Study Plan in December. He said AEA was reviewing the 3000 reports produced from the 1980s and assimilating pertinent data with the current SWHP. He remarked that AEA had great technical information from the 1980s that had not changed and was being refined for SWHP's dam design. He noted that there had been significant developments in dam types and AEA was looking at a roller-compacted concrete (RCC) design. He said AEA spent much of last year looking at SWHP's optimized height for what the state could afford and how it would best fit into the Railbelt's energy demand. He noted that AEA had brought on a panel of world renowned experts and FERC concurred with the decision. He explained that experts were normally not brought in until a project's detailed design phase. He said it was important to get information out to make sure AEA had the right project for Alaska.

CO-CHAIR BISHOP asked if the US Army Corps of Engineers (USACE) continued to model dams in Vicksburg, Mississippi. He inquired if AEA could provide information on the USACE's background. He noted that he had been on a dam project and the project's model was still in USACE's facilities.

MR. DYOK answered that USACE continued to model dams in Vicksburg and the organization was formally called the Waterways Experiment Station. He said USACE looked at the specifics of how the flows and sediment transport would be affected by dams. He noted that mathematical models had come a long way and most of SWHP's analysis would come from mathematical modeling. He revealed that AEA had been in preliminary discussions with University of Alaska-Fairbanks (UAF) on doing SWHP modeling studies. He mentioned that AEA had done significant geotechnical work to fill in missing information from the 1980s.

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MR. DYOK said AEA conducted an independent cost estimate to not rely on a single engineer's estimate. He explained that a second opinion was important because cost was a big driver in the overall rates. He said AEA put out a request for proposal (RFP) and AECOM was selected. He revealed that AECOM had a tremendous amount of Arctic hydropower experience and was ranked by Engineering News Record as the best hydroelectric developer. He mentioned that AECOM had an office in Anchorage and was involved with many projects in Canada. He said AEA was asked to develop an estimate from a contractor's prospective and come up with unit prices and field crew development costs. He stated that AECOM confirmed that the engineer design consultants' timeline was reasonable and feasible. He said the RCC design was applicable to Alaska's cold climate and time could be saved by finding ways to extend the construction's "shoulder seasons" by using climate control techniques that incorporated large tarps. He said AECOM recommended that SWHP's reservoir could begin filling prior to project completion for early power generation. He stated that the most important finding was the cost comparison between AECOM and AEA's licensing and design feasibility engineer. He said AECOM felt that their 2012 based cost estimate was within 25 percent of what SWHP would cost and their input was helping AEA to hone in on SWHP's cost.

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He addressed cost probability distribution to make sure AEA had a good handle on SWHP's overall costs. He noted that 20 percent of items were usually responsible for 80 percent of the cost. He explained that AEA used a Monte Carlo Simulation method to run thousands of cost simulations with multiple pricing and quantity estimate errors.

He revealed that AEA estimated SWHP's cost at \$5.09 billion with a probabilistic cost distribution spread between \$4.5 billion and \$5.9 billion. He noted that the median price was \$5.19

billion and Nick Szymoniak's economic analysis would be based upon a \$5.2 billion cost estimate.

[8:05:49 AM](#)

NICK SZYMONIAK, Project Economist, Alaska Energy Authority, addressed SWHP's best capital cost estimate at \$5.19 billion, with a 90 percent probability range of \$4.48 billion to \$5.89 billion. He explained that SWHP's minimum capital cost estimate was \$3.73 billion with a maximum of \$6.48 billion.

He explained the impacts of inflation on SWHP and noted that it was important to talk about inflation prior to addressing economic benefits. He explained an inflation impact graph that started with a 2013 inflation index at 1 percent and continued to climb over time. He noted that SWHP would attain a consistent cost "flat line" by 2024 while the inflation index for all other costs continued to rise. He said SWHP's cost stability was a benefit versus power sources that were affected by inflation.

CO-CHAIR BISHOP asked if AEA had track records of other dam projects like Hoover Dam regarding "flat lined" costs. He inquired if a comparison could be shown from other dam projects.

MR. SZYMONIAK replied that he did not have comparisons to present to the committee, but acknowledged that a comparison would be an interesting exercise to put together.

MR. DYOK addressed AEA's experience with BLHP. He said when BLHP went online in 1992, the price of power was around \$0.0450 per kilowatt hour (kWh) and today it was still \$0.0450/kWh. He noted that BLHP verified the straight-line approach. He explained that a hydro project was similar to buying a structure with payments that stayed the same. He said SWHP's operational costs were a very small percentage that allowed for a horizontal straight-line for costs over time.

SENATOR MICCICHE asked to verify that SWHP's incremental costs, turbine maintenance, and human resources costs were such a small cost percentage.

MR. SZYMONIAK answered correct. He said he did not have an exact percentage, but it was a relatively small share.

[8:08:47 AM](#)

He explained SWHP's Base Case Economic Assumptions (BCEA) used to generate the power cost. He noted that AEA had taken a very

conservative approach with many of the assumptions and some optimization could be achieved. He said BCEA were as follows:

- Capital costs: \$5.19 billion.
- Power production: 2,800 gigawatt hours.
- Interest rate: 5.00 percent, with the possibility for lower cost financing to reduce SWHP's power cost.
- Debt term: 30 years, with the possibility to finance at longer terms and reduce power costs during SWHP's earlier years.
- Annual operating and maintenance costs: \$16 million, an assumption that represents 2 percent of SWHP's annual cost.
- Operation start year: 2024.

SENATOR MICCICHE clarified that the only incremental cost on a \$5.2 billion project was the \$16 million per year for operating and maintenance costs, a cost that would increase by two percent a year moving forward. He asked Mr. Szymoniak to verify that relatively low operating and maintenance costs were a reason why SWHP's operations did not increase dramatically.

MR. SZYMONIAK answered correct, one of SWHP's primary benefits.

[8:10:29 AM](#)

He explained the SWHP power costs as follows:

- Year-one rate at 2024 nominal-dollars: \$0.1810/kWh in dollars when SWHP comes online.
- Year-one rate at 2013 real-dollars: \$0.1380/kWh, a rate used to compare to current energy costs.
- 10-year average rate at 2013 real-dollars: \$0.1240/kWh.
- 25-year average rate at 2013 real-dollars: \$0.1060/kWh.
- 50-year average rate at 2013 real-dollars: \$0.0610/kWh.

He explained that reductions in the yearly averages were attributed to inflation in everything other than SWHP's consistent cost of power. He stated that SWHP's cost of power would become cheaper in real terms. He cited SWHP's significant 50-year average drop off was due to the 30-year debt retirement and all that was being paid for was the inflated operational costs.

He stated that another important note, assuming no direct state financing in the model itself, AEA had taken received funding for SWHP and the funding that was in the capital request this

year. He explained that AEA had conservatively modeled funding as being paid back at 5 percent interest and noted SWHP's earlier costs would not drive the project's cost too much.

[8:13:04 AM](#)

MR. SZYMONIAK said it was important to look SWHP's competing energy that it would be offsetting. He explained that AEA used a simple natural gas generation comparison model and SWHP was cost competitive during the early years and became much lower over time. He stated that an important caveat was that future natural gas prices were unknown and a range was presented. He explained that for the model itself, AEA was assuming a constant efficiency and fuel costs for natural gas generation; a heat rate of 8,000 British thermal units/kWh and non-fuel cost of \$0.03/kWh.

He said the natural gas price forecast was based upon \$6.50 per thousand cubic feet (Mcf) in 2013 and increased 4 percent annually, a rate that was 1.5 percent greater than the 2.5 percent inflation rate AEA was using. He explained that future natural gas prices were probably better represented with a range of \$6.00 to \$12.00/Mcf. He reiterated that SWHP's major benefit was price certainty.

[8:15:39 AM](#)

He addressed a natural gas price forecast and range graph. He said the Base Case Natural Gas (BCNG) price forecast started at \$6.50 and increased at 4 percent, with a \$6.00 to \$12.00 range that increased 2.5 percent. He explained that SWHP equaled the natural gas cost after 12 years and much sooner if prices were higher. He asserted that SWHP's energy cost became cheaper over time with greater benefits when the 30 year debt was paid off.

He addressed a graph that showed a 2013 real-dollars cost comparison between SWHP versus natural gas. He noted that SWHP would come on at a little under \$0.14/kWh and decreased in real term. He explained that natural gas price generation was modeled relatively flat and only increased for inflation, slightly more for a base case scenario.

[8:18:00 AM](#)

He said SWHP's other very significant benefit was the reduction in electricity cost uncertainty. He said price certainty would potentially impact 50 percent of the Railbelt's power generation.

SENATOR MICCICHE stated that SWHP was a project where tomorrow's rate payers could pay for funding. He asked what the impact would be for paying off SWHP over 50 years rather than 30 years.

MR. SZYMONIAK answered that paying off SWHP in 50 years had been calculated, but he did not have the data with him.

SENATOR MICCICHE asked if paying off SWHP in 50 years significantly changed the onset power cost.

MR. SZYMONIAK answered yes. He explained that power costs significantly dropped in the initial years and pushed more costs off into the future.

SENATOR MICCICHE stated that it would be interesting to see the data.

MR. SZYMONIAK answered yes.

CO-CHAIR BISHOP asked that the information be distributed to the committee members.

MR. SZYMONIAK summarized the analysis on SWHP's impact on price stability and noted that the range of power costs was a much narrower band going into the future. He said SWHP would provide increased certainty for homeowners and businesses to make investments in the future.

He summarized the economic takeaways from SWHP as follows:

- Greatly reduced future power cost uncertainty.
- Competitive with natural gas in the early years and much lower-cost over the long run.
- Equals the price of base case natural gas after 12 years without any direct state financing.

[8:21:03 AM](#)

MR. DYOK addressed what AEA's 2013 goals and milestones were as follows:

- Continued stakeholder and landowner outreach to make sure all parties were fully informed with adjustments made from input.
- Implement the Revised Study Plan. He said AEA had reimbursable services agreements with the ADFG for fisheries work and animal impact studies. He noted

logistical support involved with safely overseeing 180 fieldwork personnel, field camps, helicopter support, and obtaining land permits from all impacted parties: private, state, federal, and native corporations.

- Resources and Procurement Plan, a mechanism used to limit costs risks associated with detailed engineering design and construction costs.
- Utility Precedence Agreement with Railbelt utilities to enlist buyer support.
- Geotechnical exploration for engineering design refinement and optimization.

CO-CHAIR BISHOP asked if a hydroelectric project complements wind generation.

MR. DYOK answered yes. He said wind had a lot of uncertainty associated with it. He stated that a hydropower project had the ability to vary its generation very rapidly; 10 to 30 megawatts could be changed within seconds. He said the issue was how fast changes could be made without having an adverse effect on the environment downstream. He explained that AEA would be looking at what the environmental limits were to allow for setting the bounds. He noted that AEA was addressing a worst case scenario if BLHP's 125 megawatts went offline and how SWHP would be able to respond. He explained that hydro power had the ability to setup and support high penetration wind energy locations in the event of low wind situations.

[8:25:50 AM](#)

CO-CHAIR BISHOP stated that it would be interesting to see how fast SWHP could be throttled up.

SENATOR GIESSEL addressed how Mr. Dyok explained SWHP's power generation and asked what aspect of the transmission lines were the responsibility of the project.

MR. DYOK replied that AEA had developed a plan for transmission lines that would take the power to the Intertie. He explained that FERC's oversight was strictly from SWHP's northern and western primary-transmission lines to the Intertie.

SENATOR GIESSEL asked if Mr. Dyok was describing a "loop" for reliability.

MR. DYOK answered yes. He stated that there was no need for a third line, but two lines were required to assure reliability if

one line went down. He noted that AEA was looking at having two or three lines in the same corridor as well.

8:27:34 AM

CO-CHAIR BISHOP thanked AEA for their SWHP presentation.

8:28:20 AM

There being no further business to come before the Senate In-State Energy Committee, Co-Chair Bishop adjourned the meeting at 8:28 a.m.