

ALASKA STATE LEGISLATURE
HOUSE SPECIAL COMMITTEE ON ENERGY

February 17, 2011

3:04 p.m.

MEMBERS PRESENT

Representative Neal Foster, Co-Chair
Representative Lance Pruitt, Co-Chair
Representative Bob Lynn
Representative Dan Saddler
Representative Pete Petersen
Representative Chris Tuck

MEMBERS ABSENT

Representative Kurt Olson

OTHER LEGISLATORS PRESENT

Senator John Coghill

COMMITTEE CALENDAR

HOUSE BILL NO. 103

"An Act relating to the procurement of supplies, services, professional services, and construction for the Alaska Energy Authority; establishing the Alaska Railbelt energy fund and relating to the fund; relating to and repealing the Railbelt energy fund; relating to the quorum of the board of the Alaska Energy Authority; relating to the powers of the Alaska Energy Authority regarding employees and the transfer of certain employees of the Alaska Industrial Development Export Authority to the Alaska Energy Authority; relating to acquiring or constructing certain projects by the Alaska Energy Authority; relating to the definition of 'feasibility study' in the Alaska Energy Authority Act; and providing for an effective date."

- HEARD & HELD

PREVIOUS COMMITTEE ACTION

BILL: HB 103

SHORT TITLE: POWER PROJECT; ALASKA ENERGY AUTHORITY

SPONSOR(S): RULES BY REQUEST OF THE GOVERNOR

01/18/11	(H)	READ THE FIRST TIME - REFERRALS
01/18/11	(H)	ENE, FIN
02/15/11	(H)	ENE AT 3:00 PM BARNES 124
02/15/11	(H)	Heard & Held
02/15/11	(H)	MINUTE(ENE)
02/17/11	(H)	ENE AT 3:00 PM BARNES 124

WITNESS REGISTER

SARA FISHER-GOAD, Executive Director

Alaska Energy Authority (AEA)

Department of Commerce, Community & Economic Development (DCCED)

Anchorage, Alaska

POSITION STATEMENT: Testified during discussion of HB 103.

BRYAN CAREY, Technical engineer

Alaska Energy Authority (AEA)

Department of Commerce, Community & Economic Development (DCCED)

Anchorage, Alaska

POSITION STATEMENT: Testified during discussion of HB 103.

BRIAN BJORKQUIST, Senior Assistant Attorney General

Labor and State Affairs Section

Civil Division (Anchorage)

Department of Law (DOL)

Anchorage, Alaska

POSITION STATEMENT: Answered questions during discussion of HB 103.

HOWARD LEE, Vice-President

MWH Americas

Broomfield, Colorado

POSITION STATEMENT: Answered questions during discussion of HB 103.

BRIAN SADDEN, Project Manager

MWH Americas

Broomfield, Colorado

POSITION STATEMENT: Presented a PowerPoint and answered questions during discussion of HB 103.

ACTION NARRATIVE

[3:04:52 PM](#)

CO-CHAIR PRUITT called the House Special Committee on Energy meeting to order at 3:04 p.m. Representatives Pruitt, Petersen, Saddler, Lynn, and Tuck were present at the call to order. Representative Foster arrived as the meeting was in progress. Senator Coghill was also in attendance.

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HB 103-POWER PROJECT; ALASKA ENERGY AUTHORITY

[3:05:27 PM](#)

CO-CHAIR PRUITT announced that the only order of business would be HOUSE BILL NO. 103, "An Act relating to the procurement of supplies, services, professional services, and construction for the Alaska Energy Authority; establishing the Alaska Railbelt energy fund and relating to the fund; relating to and repealing the Railbelt energy fund; relating to the quorum of the board of the Alaska Energy Authority; relating to the powers of the Alaska Energy Authority regarding employees and the transfer of certain employees of the Alaska Industrial Development Export Authority to the Alaska Energy Authority; relating to acquiring or constructing certain projects by the Alaska Energy Authority; relating to the definition of 'feasibility study' in the Alaska Energy Authority Act; and providing for an effective date."

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CO-CHAIR PRUITT established that the meeting would focus on the histories of the proposed Susitna hydroelectric project, the Bradley Lake hydroelectric dam, and the Icelandic hydroelectric

project, as well as the role of the Federal Energy Regulatory Commission (FERC) with regard to licensure of the Susitna Dam.

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SARA FISHER-GOAD, Executive Director, Alaska Energy Authority (AEA), Department of Commerce, Community & Economic Development (DCCED), furnished the Alaska Energy Authority Summary of Funds and the Railbelt Energy Fund Net Available Assets to the committee [Included in members' packets].

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BRYAN CAREY, Technical engineer, Alaska Energy Authority (AEA), Department of Commerce, Community & Economic Development (DCCED), offered a brief history of the Susitna hydroelectric project. He stated that the Susitna Basin between the Talkeetna Mountains and the Alaska Range had been studied by the Bureau of Reclamation in the 1950's as a possible hydro-electric site, with 12 possible dam sites identified above Gold Creek. In the 1960's, the US Army Corps of Engineers continued with the study of a four dam system. In the 1970's, the Army Corps of Engineers studied an idea for raising the height of the Watana Dam, to supply the energy equivalent of two dams, which would reduce the cost and the area to be flooded. In 1976, the Alaska Power Authority was created and it took over the Susitna project. In 1981, the Railbelt Energy Fund was created, primarily for the Susitna project. In the early 1980s, the price of oil dropped substantially, low cost natural gas was found in Cook Inlet, and the demand for electricity did not increase as originally projected. In 1985, the plan was restructured into three stages: build the 700 foot Watana Dam; build the Devil Canyon Dam to its full height; and add an additional 185 feet on the top of the Watana Dam. This would allow for energy production to begin earlier, and to spread the stages over whatever time frame was necessary. In 1986, this plan and its license were dropped, but the Bradley Lake hydro project license was received. In 1989, the Alaska Power Authority became the Alaska Energy Authority (AEA). In 1991, the Bradley Lake Hydro project was commissioned and it began production. He pointed out that AEA completed the Bradley Lake

project on time and under budget. In 2008, there was a \$2.5 million appropriation to re-evaluate the Susitna Hydro-electric Project and its place in the Railbelt Integrated Resource Plan. In 2010, the state declared its goal for 50 percent renewable energy by 2025.

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REPRESENTATIVE SADDLER asked which license was dropped in 1986.

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MR. CAREY, in response, stated that it was actually the FERC permit to Alaska Power Authority. He explained that the first step for a FERC license was to file a preliminary permit application, which allowed for three years to study the project, and gave a priority for the FERC license. He sketched a comparison of the former and present Susitna projects, noting that the current Watana Dam would be 700 feet tall, with a smaller reservoir of 20,000 acres, and an annual energy capacity of 2,600 giga watt hours. This would be about 50 percent of the current Railbelt electrical usage.

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MR. CAREY directed attention to the rising cost of natural gas and the decrease in availability. He expressed concern to the capacity for winter production of natural gas. He explained that this hydro-electric project would replace many of the aging natural gas facilities, although it would only replace 50 percent of natural gas usage.

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CO-CHAIR PRUITT asked about the results from the \$2.5 million evaluation.

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MR. CAREY replied that his presentation reflected the result of that study. He explained that the Railbelt Integrated Resource

plan looked at the sources for energy generation during the upcoming 50 years.

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REPRESENTATIVE FOSTER asked for clarification on the demand for fuel oil in 20 years.

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MR. CAREY replied that the use of fuel oil for energy generation would diminish within the next ten years. He explained that the original was for an 885 foot high dam, and noted that the current plan was for a 700 foot dam. He discussed the Bradley Lake hydro project, and directed attention to the similarities with a Watana embankment dam. He reported that Bradley Lake dam was a 125 foot embankment dam with a concrete face on the water side. He pointed out that, as the Bradley Lake dam was steeper, it used far less material than the proposed Susitna dam.

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MR. CAREY pointed out that Bradley Lake was glacial, with no fish, and did not require a fish ladder. He opined that the Bradley Lake project had a positive impact on the fish spawning areas at tide water. He reported that, in 1985, the financing had been obtained and the license was issued. He stated that construction began in 1987 and that the dam was put on line in 1991, with a capacity to generate 120 megawatts. He said that the average annual power generation was about 35-40 percent of capacity, with peak usage during the day. He pointed out that even in the winter, Bradley Lake project could dispatch power. He noted that the power tunnel was 3.5 miles long, and crossed three fault lines, with an additional 20 miles of transmission lines. He stated that the six power purchasers were the utilities along the Railbelt.

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REPRESENTATIVE FOSTER asked about the fault lines crossed by the power tunnel.

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MR. CAREY, in response to Representative Foster, explained that the power tunnel from the lake crossed three small fault lines, which required special engineering to manage the geological risk. He noted that the design of an embankment dam was extremely stable and built to withstand an earthquake equivalent to the Anchorage earthquake. He stated that the capital cost had been about \$350 million, even though interest rates were much higher during the 1980s. He pointed out that about 50 percent of the cost was paid through state appropriations. He reported that hydropower was more expensive than natural gas when Bradley Lake came on line; however, now the cost of hydro power was less than natural gas generation. He pointed to the power sales agreement, which allowed for the state to continue receiving funds back from the Bradley Lake project, even after the bonds have been repaid.

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REPRESENTATIVE PETERSEN asked if the financial return from the Bradley Lake project would be placed in a fund for other power projects.

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MR. CAREY agreed, but he stated that he was unsure to which fund the returns would be paid.

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MS. FISHER-GOAD offered her belief that the power sales agreement determined that funds be paid back into the existing Railbelt energy fund. She pointed out that discussion for proposed HB 103 could determine whether the returns would instead be paid into the Alaska Railbelt energy fund. She affirmed that the returns could be paid into the general fund, if there was not a specific fund for payment.

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CO-CHAIR PRUITT suggested a need for legislation to create the Alaska Railbelt fund.

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BRIAN BJORKQUIST, Senior Assistant Attorney General, Labor and State Affairs Section, Civil Division (Anchorage), Department of Law (DOL), in response to Co-Chair Pruitt, said that, under the Bradley Lake power sales agreement, the payments due after the bond payoff were to be directed into a Railbelt energy fund, although not designated into the existing Railbelt energy fund. He clarified that the fund receiving the payments must be used for power and transmission projects in the Railbelt. He stated that both the Railbelt energy fund and the Alaska Railbelt energy fund would fit this definition. He suggested for negotiations with the utilities for consensus to payment of the Bradley Lake revenue.

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MR. CAREY pointed to another advantage, as the state could receive much lower financing rates than the utilities. He noted that the financing was backed by the power sales agreement, which was exempt from the RCA, and allowed investors a greater certainty for return of investment.

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REPRESENTATIVE TUCK noted that hydroelectric projects were a huge investment with a long-term return toward economic growth. He expressed agreement for the State of Alaska to finance the project, or at least bond 50 percent of the project.

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MR. CAREY agreed that the State of Alaska could choose the bond return percentage.

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REPRESENTATIVE TUCK, referring to the Bradley Lake financing model, asked if the Susitna project would also receive a loan with a variable interest rate. He asked for a projection of the investment from the private sector.

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MS. FISHER-GOAD explained that the Susitna project was much larger than the Bradley Lake project. He reported that a financing team would be established to work with the utilities for potential power sales agreements, and with the State of Alaska to determine its involvement.

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CO-CHAIR PRUITT asked if AEA would hold the bonds for the financing of the project. He suggested that AEA establish the length of time for financing, in order to replenish the fund for other electric projects, and that the utilities should not be involved with the financing.

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MS. FISHER-GOAD explained that the power sales agreements with the utilities were the means to pay back the debt on the bonds.

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REPRESENTATIVE TUCK, referring to an earlier presentation, observed that the models reflected interest rates of 6 percent.

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MR. CAREY, in response, said that 6 percent was used as an example for the models; although the current market was substantially less, it was still unknown what the market would be in five to ten years.

REPRESENTATIVE TUCK, reflecting on the earlier design and permitting of the Lower Watana dam project, asked which

projected change in design would be presented to FERC for permitting and which design reflected the \$4.5 billion cost.

MR. CAREY explained that the original design was for an embankment dam without a concrete face. He suggested that a roller compacted concrete (RCC) face could lower the cost of the project, if it would work for that site. The idea for the concrete face had been discarded in the 1980s because it was a new technique and, for northern climates, its endurance to a freeze-thaw cycle was unknown. He declared that the technology had now been proven in Alaska. He stated that the two options would be pursued in parallel to determine the lowest cost for construction. He explained that the option to expand the dam height would be included in the license application.

REPRESENTATIVE TUCK asked if the FERC application would include the option to expand the project, and if it allowed for design change.

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MR. CAREY declared that the description should be for the project to be initially built, but that amendments for expansion to the license could be filed at a later date. He detailed that the original project design should allow for project expansion to add more generation capacity.

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REPRESENTATIVE TUCK asked if it was better to initially file for an expandable dam with FERC, in order to ensure its possibility in the future.

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MR. CAREY offered his belief that, due to greater environmental effects, it was not a good strategy to initially file for the larger project limits. He deferred to Howard Lee.

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HOWARD LEE, Vice-President, MWH Americas, agreed that it was better to apply for a license just for the initial stage of development. He declared that it would simplify and expedite the process and it would not preclude the future possibility for expansion by applying for an amendment to the license. He stated that this was a typical approach for development of large hydro basin projects.

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REPRESENTATIVE TUCK asked to clarify that this application for the smaller project would not limit an expanded project in the future.

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MR. LEE agreed.

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CO-CHAIR PRUITT inquired about the costs of the project. He referred to the Susitna Hydroelectric Project handout and directed attention to Table 3.1 on page 12. He asked about the cost discrepancy between this estimate to Low Watana and an estimate from an earlier presentation. [As other committee members had not yet received this handout, it was agreed to postpone this discussion.]

BRIAN SADDEN, Project Manager, MWH Americas, stated that he was the Project Manager for the Karahnjukar Hydro project in Iceland. He presented a PowerPoint titled "Railbelt Large Hydroelectric" which compared the similarities of the Karahnjukar Hydro project with the Susitna/ Low Watana hydro project. He reported that the Karahnjukar project was a 650 feet concrete faced, rock filled dam, in a near Arctic environment, and that its reservoir was adjacent to a glacier with three active volcanoes beneath it. He shared that a long series of tunnels connected the power house to the dam.

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MR. SADDEN relayed that the underground structure was similar to one of the Low Watana designs. He confirmed that the dam height was similar to Low Watana, and was concrete faced and rock filled. He explained the region around the dam site and some of the structures nearby. He detailed the challenges: the remote location necessitating that a 35 mile road be built; the dam fill; the major concrete work; and the need of accommodations and camp for 1,200 workers and families. He described the solutions for most of these problems. He indicated that the concrete work was kept sheltered throughout the winter, with hot air generators to keep it warm. He stated the importance for keeping up with the concrete work, as the rock fill work moved much more quickly. He pointed to the dangers and the need for constant vigilance for safety.

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MR. SADDEN, in response to Representative Tuck, described the method for securing the rebar reinforcements. He pointed out that a roller compacted concrete (RCC) dam did not need any reinforcement within the dam, which allowed it to be built more quickly than an embankment dam.

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REPRESENTATIVE LYNN asked for the height of Hoover Dam.

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MR. SADDEN replied that the proposed Watana Dam was 700 feet high, and the Hoover Dam was 726 feet high, and from an engineering point of view, this was within precedent.

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REPRESENTATIVE LYNN asked for the width of the canyons.

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MR. SADDEN replied that Hoover Dam was in a very narrow canyon, and that Watana was wider.

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CO-CHAIR PRUITT asked if an RCC dam of this height had been built.

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MR. SADDEN replied that a 710 foot RCC dam had been built in China, with a similar height concrete faced rock filled dam also built in China. He pointed out that the 770 foot Oroville Dam in California was the highest embankment dam. He noted that a smaller RCC dam had been built in a similarly seismic area of California. He indicated that few concrete faced rock filled dams had been built in the U.S., but they were a dam of choice in many places as they fit into the topography. He continued with his PowerPoint showing construction of the Karahnjukar Project. He pointed out the difficulty for pouring an RCC dam in mid winter.

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REPRESENTATIVE LYNN asked about the problems for diverting the river.

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MR. SADDEN replied that the type of dam, which was predicated by the return period of flood, determined the capacity of the diversion. He explained that a concrete dam could allow flood waters to flow over it, even if half built; an embankment dam with a clay core allowed for a 50 - 100 year flood return period; an RCC dam had a 10 - 20 year return period; a concrete faced rock filled dam could allow flood waters to pass over or through during construction, so its return period of flood was between 20 - 50 years. He pointed out that the natural flows through the Watana were very low during some periods of the year, so it was important to schedule the early work in the river during these low flow periods. He explained that an RCC dam could be built with a sluice through the base of it. He said that on the day of the actual diversion, every piece of

equipment was throwing rocks in the river to direct the downstream flow into the diversion tunnel.

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REPRESENTATIVE TUCK asked if there was a concern with glacial siltation.

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MR. SADDEN replied that the calculations indicated that the deep canyon would silt, but that full siltation would take more than 100 years. He indicated that the final studies would include calculations for siltation.

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MR. CAREY confirmed that the studies done during the 1980s calculated that full siltation for a 700 foot dam would take at least 500 years.

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REPRESENTATIVE SADDLER asked what was the oldest hydro electric dam, and what would happen at the end of its useful life.

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MR. SADDEN observed that hydroelectric projects began in the early 1900's. He noted that the life of a dam was unknown, but that maintenance could be expensive. He explained that the generators, the turbines, and the electrical equipment often wore out after 25 - 35 years. He stated that continual stopping and starting was harder on the equipment.

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REPRESENTATIVE SADDLER asked about the hazards from seismic activity.

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MR. SADDEN agreed that although this was a seismic area, dams were built in seismic zones. He reported that the available analyses, international standards, and FERC guidelines would determine design codes and statutes. He shared that a proposed design criteria for dams was a 2,500 year earthquake return period. He pointed out that a lower earthquake return period meant a smaller earthquake. In response, he conveyed that the appropriate aggregate building materials had been identified as available on-site. He opined that some of the special materials for an RCC dam were also in the vicinity.

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REPRESENTATIVE SADDLER asked about the cost overruns for dam projects.

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MR. SADDEN replied that cost overruns were a problem, but that the key was to identify, manage, overcome, and mitigate the risks. He explained that the budget analysis had to account for each of these. He offered examples of bad weather and unforeseen geology. He stated that there were many techniques to manage risk.

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MR. SADDEN stated that all hydro projects, which were not federally owned, were required to have FERC licensing. He announced that the first step was to submit for a preliminary permit, which would announce the project and give the authority to talk with the necessary agencies. He clarified that the preliminary permit did not require specific details for the project, and was usually available within six months. During this time, there was work on the full license application. The license was granted for 50 years, and included a component which required the licensee to mitigate environmental effects. He detailed that there was a choice for three separate licensing processes: traditional (TLP), alternative (ALP), and integrated (ILP). He pointed out that, although these processes appeared

similar, the ILP required the earliest involvement with FERC, as the process planning and scoping were done in conjunction with all interested parties, so that when the application was filed with FERC it was relatively straight forward. He opined that the FERC process was currently more focused on re-licensing, as there had not been many large new projects in the prior 30 - 40 years. He explained the typical licensing process, which included a filing of the initial proposal, FERC meetings and solicitation for public comments, studies, and preparation of the application. He detailed the post application filing process, which included FERC reviews with public comments and the issuance of the FERC environmental document with more public comments, all of which could take at least five years to finalize.

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REPRESENTATIVE TUCK asked if the five year time period included permitting and licensing.

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MR. SADDEN replied that this time frame included the pre-file period to the issuance of the license; however, he cautioned that the process was unpredictable and could be longer as there were many issues to be addressed. He noted that a lot of money had already been spent on environmental studies in the 1980s for the Susitna hydro project, and he commended AEA for its initial gap analysis to focus on the current study needs. He offered a licensing strategy for AEA, which included an early engagement of the resource agencies to identify critical study needs, an analysis to maximize use of the earlier environmental study work, and a strong commitment to environmental protection and enhancement. He pointed to the importance of a conceptual engineering analysis to coordinate with the environmental studies. He explained that the FERC role was to determine: the need for the project by comparing its cost with alternatives, the project development costs related to environmental mitigation costs, and the wholesale power cost regardless of the project power cost. He stated that FERC had no role in the power cost to the consumers.

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REPRESENTATIVE PETERSEN asked to define gap analysis.

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MR. CAREY, in response, said that AEA environmental contractors were doing updated wildlife studies for possible changes to endangered species listing, migration patterns for caribou, changes in hydrological information, and the possibility of salmon upstream of the dam site.

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REPRESENTATIVE TUCK asked if there were any means to expedite the process.

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MR. SADDEN replied that although there was no way to guarantee a speedy process, the key was to quickly engage with the public interests, agencies, and stakeholders to clarify the commitment and make the process predictable.

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CO-CHAIR PRUITT referred to the Susitna Hydroelectric Project handout [referenced earlier and now distributed to committee members] and directed attention to Table 3.1 on page 12. He asked for clarification about the role and authority of AEA, and requested that AEA submit a construction cost estimate.

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REPRESENTATIVE PETERSEN reflected on the difficulty for a cost estimate, as it was unknown when construction would begin, and what would be the interest rates.

CO-CHAIR PRUITT agreed, but opined that a refined estimate was important for a several billion dollar project. He pointed out that the Bradley Lake hydro project was under budget.

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MS. FISHER-GOAD pointed out that proposed HB 103 applied to a restoration of AEA powers, and was necessary for AEA to proceed and submit the preliminary permit application with FERC. She noted that the \$65 million appropriation was necessary to fund the process. She observed that proposed HB 103 defined the role and responsibilities of AEA. She offered her belief that the State of Alaska had "required and asked for a focused agency to provide focus on energy issues." She stated that AEA was fulfilling that role. She remarked that, although the FERC process could not be hastened, the preliminary permit application could be submitted to initiate the project.

[HB 103 was held over.]

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ADJOURNMENT

There being no further business before the committee, the House Special Committee on Energy meeting was adjourned at 5:00 p.m.