

ALASKA STATE LEGISLATURE
HOUSE SPECIAL COMMITTEE ON ENERGY

February 8, 2022
10:19 a.m.

MEMBERS PRESENT

Representative Calvin Schrage, Chair
Representative Chris Tuck
Representative Matt Claman
Representative Tiffany Zulkosky
Representative Zack Fields
Representative George Rauscher
Representative James Kaufman

MEMBERS ABSENT

All members present

COMMITTEE CALENDAR

HOUSE BILL NO. 299
"An Act relating to microreactors."

- HEARD & HELD

PREVIOUS COMMITTEE ACTION

BILL: HB 299
SHORT TITLE: MICROREACTORS
SPONSOR(S): RULES BY REQUEST OF THE GOVERNOR

02/04/22	(H)	READ THE FIRST TIME - REFERRALS
02/04/22	(H)	ENE, RES
02/08/22	(H)	ENE AT 10:15 AM ADAMS 519

WITNESS REGISTER

GWEN HOLDMANN
Alaska Center for Energy & Power
Fairbanks, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation titled,
"Small Scale Nuclear Power an option for Alaska?"

ASHLEY FINAN, PhD, Director
National Reactor Innovation Center
Idaho National Laboratory

Idaho Falls, Idaho

POSITION STATEMENT: Answered questions during the hearing on HB 299.

BRUCE MCDOWELL, Advisor
Pacific Northwest National Lab
Richland, Washington

POSITION STATEMENT: Answered questions during the hearing on HB 299.

ACTION NARRATIVE

[10:19:51 AM](#)

CHAIR CALVIN SCHRAGE called the House Special Committee on Energy meeting to order at 10:19 a.m. Representatives Claman, Zulkosky, Kaufman, Tuck, and Schrage were present at the call to order. Representatives Fields and Rauscher arrived as the meeting was in progress.

HB 299-MICROREACTORS

[10:20:25 AM](#)

CHAIR SCHRAGE announced that the only order of business would be HOUSE BILL NO. 299, "An Act relating to microreactors."

[10:21:15 AM](#)

GWEN HOLDMANN, Alaska Center for Energy & Power, provided a PowerPoint presentation titled, "Small Scale Nuclear Power an option for Alaska?" [hard copy included in the committee packet]. She began on slide 2 and introduced the national lab technical experts.

[10:23:29 AM](#)

MS. HOLDMANN moved on to slides 3 and 4, on the Alaska Center for Energy and Power (ACEP), and talked about the history of the center and the current size of its organization. She explained that ACEP looks "broadly" at renewable and non-renewable energy sources statewide.

[10:24:54 AM](#)

MS. HOLDMANN turned to slide 5, addressing partnerships and funding, and emphasized that ACEP works closely with the private

sector and is currently working on about 40 projects that are funded through the private sector. She explained ACEP's primary funding sources are the U.S. Department of Defense and the U.S. Department of Energy.

[10:25:30 AM](#)

MS. HOLDMANN continued to slide 6, explaining that in 2011 ACEP released a report that reviewed the history of nuclear projects in Alaska and the feasibility of the technology at the time, which did not "really clearly fit" but has "come along" since then.

[10:26:31 AM](#)

MS. HOLDMANN advanced to slide 7, detailing updated report to the legislature. She explained that there has been a "renaissance" in the technology. She talked about an interest group ACEP formed six months earlier, and the recommendations that came from it, which resulted in review and revision of Alaska statutes relating to nuclear energy.

[10:27:56 AM](#)

MS. HOLDMANN provided a background on nuclear energy on slide 8. She explained that nuclear energy amounts to around 20 percent of the national energy supply. She talked about the safety record of the nuclear power industry in America, referencing the three significant accidents in history and pointing out that only Chernobyl resulted in deaths.

[10:29:13 AM](#)

MS. HOLDMANN defined microreactors on slide 9 and spoke to her experience flying over a "legacy reactor." She said micro reactors have a very small amount of nuclear material, produce around one to "a couple dozen" megawatts, and would be smaller than the University of Alaska Fairbanks power plant. They are capable of "load following" and producing heat. Ms. Holdmann stated that they are also factory made and can be transported to the site more contained. She emphasized the difference between micro reactors and small modular reactors, and she talked about the autonomous control system responsible for the reactors functioning.

[10:33:23 AM](#)

REPRESENTATIVE FIELDS requested more detail on load following and the time it takes to scale up or ramp down the reactors.

MS. HOLDMANN replied that the power generation aspect is like conventional steam generation; some have a storage unit for heat that then use that heat to drive a turban and ramp up and down within a minute or two. She said she wonders about the economic viability of using it in that capacity.

REPRESENTATIVE FIELDS asked how fast a source must be able to respond to qualify as load following.

MS. HOLDMANN answered that if a source can ramp up or down within a minute or two, that is load following technology.

[10:36:06 AM](#)

MS. HOLDMANN resumed the presentation on slide 10, which modeled small nuclear reactors on a chart. She explained that there is a "break" in the sizing of the reactor technology below 50 megawatts of power.

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REPRESENTATIVE CLAMAN asked where ACEP was on its "roadmap" of potential applications.

MS. HOLDMANN replied that ACEP was limited in its ability to make determinations on where one would go, citing state regulation and statute would be the responsibility of the Department of Environmental Conservation (DEC). She expressed hope for separate funding through the university to support the roadmap.

[10:39:48 AM](#)

MS. HOLDMANN, in response to a question from Representative Rauscher, explained that the confines of releasing reactor technology is licensing through the federal Nuclear Regulatory Commission (NRC). She said the technologies under development are going through the licensing process. In response to a follow-up question, she explained that the list comprises vendors actively planning to seek NRC licensing approval for their design. She added that any reactors developed out of country without seeking approval by the NRC would not be eligible for the U.S. market.

[10:41:53 AM](#)

REPRESENTATIVE TUCK asked if ACEP was limiting itself to 10 megawatts.

MS. HOLDMANN answered yes.

CHAIR SCHRAGE noted that federal requirements for small reactors have a threshold of 50 megawatts.

[10:42:25 AM](#)

REPRESENTATIVE CLAMAN referred to the earlier questions on peaking loads, baseline loads, and the quick ramping power of hydro power compared to the steadier output of fossil fuel sources, and he asked where nuclear fits on that spectrum.

MS. HOLDMANN, in response, said that sometimes hydro is used as a baseline source because of economic feasibility, and fossil fuels are often used for peaking demand. She said microreactors would not be much different from hydro power plants.

[10:44:42 AM](#)

MS. HOLDMANN resumed the presentation on slide 11, with two examples of microreactors under development that have both expressed interest in the Alaska market.

[10:45:39 AM](#)

REPRESENTATIVE ZULKOSKY asked about the capacity needed to manage such systems, specifically what is needed in terms of staff oversight and management.

[10:46:26 AM](#)

ASHLEY FINAN, PhD, Director, National Reactor Innovation Center, Idaho National Laboratory, explained that the National Reactor Innovation Center (NRC) provides regulatory oversight with resident inspectors and personnel on sight at nuclear facilities.

REPRESENTATIVE ZULKOSKY inquired about communities off the road system and how operations would affect the safety of locals and environmental conditions.

[10:49:52 AM](#)

DR. FINAN replied that the key regulator is NRC. She stated that many designs do not require intervention; in the case of an emergency, reactors shut down on their own. She emphasized that regardless, all aspects would be evaluated and approved by the regulator.

[10:51:00 AM](#)

MS. HOLDMANN added that NRC licensing is a two-phase process: one for the technology, and one for the site. She proffered that APEC is looking at applications for "hub communities" in rural scenarios.

[10:52:51 AM](#)

MS. HOLDMANN resumed the presentation on slide 12 that explained the idea of "passive safety." She explained that the 50-megawatt output is arbitrary; microreactors are more associated with "advance reactors" with a passive safety component that will automatically cool the reactor. She also explained that the fuel itself is being designed to minimize the possibility of release into the environment.

[10:55:23 AM](#)

REPRESENTATIVE RAUSCHER asked whether reactors are tested before arrival.

MS. HOLDMANN said many reactor technologies are tested at national reactor test sites, and she deferred to Dr. Finnan who is on site of one of the test facilities.

[10:56:07 AM](#)

DR. FINAN confirmed that many are pursuing the demonstration process, including in Idaho, Wyoming, Washington, and Tennessee. Approximately nine projects are moving forward. She said that many developers don't see Alaska as a place for an initial demonstration but think it would be a great place for microreactors.

[10:57:02 AM](#)

REPRESENTATIVE FIELDS asked if the fuel configuration had been tested or will be tested and if every reactor goes through the safety process.

DR. FINAN answered that there are several different fuels being used, but many are using tri-cell fuel, which has been going through a decade-long process to ensure its safety. In the event of loss of coolant, the fission products are contained within the fuel rather than being released. She said around half of the projects are using that design.

[10:59:15 AM](#)

REPRESENTATIVE FIELDS asked if all the companies are using the same fuel.

DR. FINAN answered that there are several types of fuel configurations.

[11:00:39 AM](#)

REPRESENTATIVE FIELDS assumed that passive cooling designs are tested.

DR. FINAN confirmed that the reactors do get validated by the national laboratory and tests are run. She explained that the test facility in Idaho has the capability to test fuels in multiple accident conditions, more extreme than have ever been encountered, to "make the fuel fail." She explained that by observing the failure, the laboratory can understand what it looks like and how it happens, so it can adjust its operating parameters. She noted that China has confirmed that the reactors shut themselves down, and she emphasized that the lab is not in charge of the regulatory approval.

[11:02:42 AM](#)

REPRESENTATIVE KAUFMAN asked about encapsulated fuel technology.

MS. HOLDMANN said the fuel is an important piece, and fabricating fuel is important in raw deployment.

[11:04:21 AM](#)

REPRESENTATIVE KAUFMAN asked about the diagram of the emergency and control drum driver on slide 11.

MS. HOLDMANN deferred to Dr. Finan.

DR. FINAN explained that nuclear reaction is essentially shut down by inserting a material that absorbs neutrons.

REPRESENTATIVE KAUFMAN offered his understanding that the smaller compact nature is inherently better in terms of seismic considerations.

[11:06:58 AM](#)

BRUCE MCDOWELL, Advisor, Pacific Northwest National Lab, explained that NRC does both a safety and environmental review for any site, including the potential for ground movement. He explained that during the design type review, NRC looks at the operating parameters and checks to see if the designs can withstand those. He said seismic activity is considered when choosing and approving of a site.

[11:09:05 AM](#)

MS. HOLDMANN resumed the presentation on slide 13 and talked about the use of heat pipes in passive heat extraction.

[11:10:24 AM](#)

MS. HOLDMANN showed slides 14 and 15, which listing some of the statutes that relate to nuclear energy that could be updated based on the updated technology. She explained that they propose an addition of a legal definition of a "Microreactor", as well as an update to the wording around advanced reactors. She continued to the second proposal for two additional requirements, citing interviews she conducted with former legislators around any nuclear project in Alaska. She described the requirements as "Honorius" and proposed an exception for microreactors. She finished the list by highlighting the unique legislative authority for nuclear reactors, and she proposed microreactors be exempt from it.

[11:15:06 AM](#)

REPRESENTATIVE ZULKOSKY expressed appreciation for the dialogue around diversifying Alaska's energy portfolio. She asked about what impact these plants may have on the warming of permafrost, impacting infrastructure and the environment.

MS. HOLDMANN addressed the uncertainty and expressed her excitement about the possible certainty pertaining to long-term price structures and delivery that microreactors could bring.

She recommended that from standpoint of energy security, these would be worth exploring for hub communities like Bethel. She asked Mr. McDowell to address the possible negative impacts of a microreactor.

[11:18:30 AM](#)

MR. MCDOWELL addressed the potential for reactors in Alaska and the unique challenges for NRC. He explained that the footprint is smaller, there is no water-based coolant, and the foundations will be unique due to the permafrost. He talked about how NRC regards climate change as a change to baseline conditions and the potential environmental impact 40 years from now.

[11:21:51 AM](#)

REPRESENTATIVE FIELDS inquired about price per kilowatt hour and ways to reduce that price to remain competitive with the Lower 48, citing projected costs for Valdez.

MS. HOLDMANN responded that the economics of a system is difficult, and there are still many open questions in terms of costs and requirements from NRC. She talked about the information that the Eielson Air Force Base project will provide.

[11:24:33 AM](#)

REPRESENTATIVE FIELDS mentioned that the city of Valdez has testified to their interest in a small-scale reactor, and he asked who could provide consulting services for local governments.

MS. HOLDMANN answered that ACEP has been careful not to enter NDA with any particular vendor to remain a resource for stakeholders with questions about this technology. She said very few people in Alaska are knowledgeable about this space. National labs and the U.S. Department of Energy provide support to this Alaska, as well as 20 participants from national labs who regularly inform Alaskans through the working group. She addressed Valdez specifically and talked about the internship that specifically investigated the feasibility of a microreactor in Valdez. She also expressed interest in how a micro reactor could, for example, make the Railbelt system more robust.

[11:27:38 AM](#)

REPRESENTATIVE CLAMAN asked if the Eielson project would require any statutory change, or if the legislature would need to approve a siting location chosen by the Air Force.

MS. HOLDMANN explained that it would be subject to any relevant state law if HB 299 is not passed. If the bill does pass, the Fairbanks NorthStar Borough would still have authority for approval.

[11:28:52 AM](#)

CHAIR SCHRAGE asked whether other states require legislative approval for siting.

MS. HOLDMANN offered her understanding that Alaska is unique, and she deferred to Dr. Finan.

[11:29:34 AM](#)

MS. HOLDMANN said there are a variety of other laws around the country; some have voter approval and others have legislative approval.

[11:30:26 AM](#)

MS. HOLDMANN resumed the presentation on slides 20 and 21, addressing the Eielson project. She then moved to slide 23 and summarized her personal interest in small reactors and provided her background. She emphasized the need for a path to competitive pricing. She also stated her appreciation of protecting the sensitive environment in Alaska and talked about an ongoing project to estimate the environmental costs associated with status quo. She opined that HB 299 would keep the door open to exploring the technology and for industry to consider this as a potential option.

[11:34:21 AM](#)

CHAIR SCHRAGE thanked the presenters.

[HB 299 was held over.]

[11:34:42 AM](#)

ADJOURNMENT

There being no further business before the committee, the House Special Committee on Energy meeting was adjourned at 11:35 a.m.