ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE
March 21, 2022
3:33 p.m.

MEMBERS PRESENT

Senator Peter Micciche, Vice Chair
Senator Gary Stevens
Senator Natasha von Imhof
Senator Jesse Kiehl
Senator Scott Kawasaki

MEMBERS ABSENT

Senator Joshua Revak, Chair
Senator Click Bishop

COMMITTEE CALENDAR

SENATE BILL NO. 177
"An Act relating to microreactors."

- HEARD & HELD

COMMITTEE SUBSTITUTE FOR HOUSE BILL NO. 79(FIN)
"An Act relating to sport fishing operators and sport fishing guides; requiring the Department of Fish and Game to prepare and submit a report; and providing for an effective date."

- MOVED SCS CSHB 79(RES) OUT OF COMMITTEE

PREVIOUS COMMITTEE ACTION

BILL: SB 177
SHORT TITLE: MICROREACTORS
SPONSOR(s): RULES BY REQUEST OF THE GOVERNOR

02/01/22	(S)	READ THE FIRST TIME - REFERRALS
02/01/22	(S)	CRA, RES
02/15/22	(S)	CRA AT 3:30 PM BELTZ 105 (TSBldg)
02/15/22	(S)	Heard & Held
02/15/22	(S)	MINUTE(CRA)
02/17/22	(S)	CRA AT 3:30 PM BELTZ 105 (TSBldg)
02/17/22	(S)	Heard & Held
02/17/22	(S)	MINUTE(CRA)

03/08/22	(S)	CRA AT 3:30 PM BELTZ 105 (TSBldg)
03/08/22	(S)	Moved SB 177 Out of Committee
03/08/22	(S)	MINUTE(CRA)
03/09/22	(S)	CRA RPT 1DP 3NR
03/09/22	(S)	DP: HUGHES
03/09/22	(S)	NR: GRAY-JACKSON, MYERS, WILSON
03/21/22	(S)	RES AT 3:30 PM BUTROVICH 205

BILL: HB 79
SHORT TITLE: SALTWATER SPORTFISHING OPERATORS/GUIDES
SPONSOR(s): RULES BY REQUEST OF THE GOVERNOR

02/18/21	(H)	READ THE FIRST TIME - REFERRALS
02/18/21	(H)	FSH, FIN
02/23/21	(H)	FSH AT 10:00 AM GRUENBERG 120
02/23/21	(H)	Heard & Held
02/23/21	(H)	MINUTE(FSH)
02/25/21	(H)	FSH AT 10:00 AM GRUENBERG 120
02/25/21	(H)	-- MEETING CANCELED --
03/02/21	(H)	FSH AT 10:00 AM GRUENBERG 120
03/02/21	(H)	Moved CSHB 79(FSH) Out of Committee
03/02/21	(H)	MINUTE(FSH)
03/03/21	(H)	FSH RPT CS(FSH) NEW TITLE 2DNP 1NR 4AM
03/03/21	(H)	DNP: MCCABE, VANCE
03/03/21	(H)	NR: TARR
03/03/21	(H)	AM: KREISS-TOMKINS, ORTIZ, STORY, STUTES
04/08/21	(H)	FIN AT 9:00 AM ADAMS 519
04/08/21	(H)	<Bill Hearing Canceled>
04/13/21	(H)	FIN AT 9:00 AM ADAMS 519
04/13/21	(H)	Heard & Held
04/13/21	(H)	MINUTE(FIN)
04/13/21	(H)	FIN AT 1:30 PM ADAMS 519
04/13/21	(H)	Heard & Held
04/13/21	(H)	MINUTE(FIN)
04/20/21	(H)	FIN AT 9:00 AM ADAMS 519
04/20/21	(H)	Heard & Held
04/20/21	(H)	MINUTE(FIN)
04/22/21	(H)	FIN AT 1:30 PM ADAMS 519
04/22/21	(H)	Moved CSHB 79(FIN) Out of Committee
04/22/21	(H)	MINUTE(FIN)
04/26/21	(H)	FIN RPT CS(FIN) NEW TITLE 7DP 1DNP 2NR 1AM
04/26/21	(H)	DP: ORTIZ, EDGMON, LEBON, CARPENTER, JOSEPHSON, WOOL, THOMPSON
04/26/21	(H)	DNP: JOHNSON
04/26/21	(H)	NR: MERRICK, FOSTER

04/26/21	(H)	AM: RASMUSSEN
04/26/21	(S)	RES AT 3:30 PM BUTROVICH 205
04/26/21	(S)	<Bill Hearing Canceled>
05/19/21	(H)	TRANSMITTED TO (S)
05/19/21	(H)	VERSION: CSHB 79(FIN)
05/19/21	(S)	READ THE FIRST TIME - REFERRALS
05/19/21	(S)	RES, FIN
01/26/22	(S)	RES AT 3:30 PM BUTROVICH 205
01/26/22	(S)	Heard & Held
01/26/22	(S)	MINUTE(RES)
03/18/22	(S)	RES AT 3:30 PM BUTROVICH 205
03/18/22	(S)	Scheduled but Not Heard
03/21/22	(S)	RES AT 3:30 PM BUTROVICH 205

WITNESS REGISTER

GWEN HOLDMANN, Director
Alaska Center for Energy and Power
University of Alaska Fairbanks
Fairbanks, Alaska
POSITION STATEMENT: Delivered a presentation during the hearing on SB 177.

CHRISTINA CARPENTER, Director
Division of Environmental Health
Department of Environmental Conservation (DEC)
Anchorage, Alaska
POSITION STATEMENT: Introduced and presented the sectional analysis for SB 177.

ASHLEY FINAN, Director
National Reactor Innovation Center
Idaho National Laboratory
Idaho Falls, Idaho
POSITION STATEMENT: Answered questions and provided supporting information during the hearing on SB 177.

MICHAEL ROVITO, Deputy Director
Alaska Power Association (APA)
Anchorage, Alaska
POSITION STATEMENT: Testified in support of SB 177.

COURTNEY OWEN, Civic Engagement Coordinator
Alaska Community Action on Toxics
Anchorage, Alaska
POSITION STATEMENT: Testified in opposition to SB 177.

GARY NEWMAN, Representing Self
Fairbanks, Alaska
POSITION STATEMENT: Offered his perspective and constructive criticism of SB 177.

INTIMAYO HARBISON, Staff
Senator Josh Revak
Alaska State Legislature
Anchorage, Alaska
POSITION STATEMENT: Presented the explanation of changes from version I to version G of HB 79.

TOM TAUBE, Operations Manager
Division of Sport Fish
Department of Fish and Game
Juneau, Alaska
POSITION STATEMENT: Answered questions during the hearing on HB 79.

ACTION NARRATIVE

3:33:01 PM
VICE CHAIR MICCICHE called the Senate Resources Standing Committee meeting to order at 3:33 p.m. Present at the call to order were Senators Kiehl, Stevens, von Imhof, Kawasaki and Vice Chair Micciche.

SB 177-MICROREACTORS

3:34:07 PM
VICE CHAIR MICCICHE announced the consideration of SENATE BILL NO. 177 "An Act relating to microreactors."

He asked Gwen Holdmann to present the bill.

3:35:12 PM
GWEN HOLDMANN, Director, Alaska Center for Energy and Power, University of Alaska Fairbanks, Fairbanks, Alaska, said she'd like Christina Carpenter to provide an introduction of SB 177.

3:35:49 PM
At Ease.

3:36:23 PM
VICE CHAIR MICCICHE reconvened the meeting and asked Ms. Carpenter to introduce SB 177.

3:36:30 PM
CHRISTINA CARPENTER, Director, Division of Environmental Health Department of Environmental Conservation (DEC), Anchorage, Alaska, introduced SB 177 paraphrasing the following prepared testimony.

> This one-page bill defines a microreactor according to the federal definition in the Infrastructure Investment and Jobs Act (IIJA). It also creates a carve-out from the ongoing study requirements and the legislative siting requirements.
>
> The existing study requirement involves six state departments and was designed to analyze the operations of a massive legacy reactor. We believe that the Alaska Center for Energy and Power (ACEP) along with national labs is the appropriate place for these studies. ACEP has been studying this issue for over ten years and is committed to work with DEC on a microreactor roadmap for Alaska.
>
> There are currently no microreactors in Alaska, and the timeframe for microreactors coming to the market is estimated at 5-7 years. Allowing these exemptions now, will allow microreactors to be situated without the necessity of legislative approval for land, reducing the burden on atomic industrial development.
>
> The legislative siting requirement reflects the statewide nature of a legacy reactor. A microreactor is a local issue, whereas a legacy reactor has a 50-mile emergency planning zone. A microreactor's planning zone ends at the reactor facility's door.
>
> This bill does not remove the requirement that municipalities must approve of the DEC siting permit.
>
> In addition to extensive clean energy industry support, SB 177 has received backing for a diverse group of stakeholders ranging from forward-thing Alaskans like the Copper Valley Electric Authority, clean energy nonprofits like Clear Path Action, and our own Alaska Center for Energy and Power in Fairbanks. We expect that list to grow dramatically as we continue to engage with Alaskans in upcoming weeks.

3:39:21 PM
MS. CARPENTER presented the following sectional analysis for SB 177:

Section 1:
Removes the requirement for microreactors to be situated on legislatively designated land.

Section 2:
For microreactors, exempts state departments and agencies from the requirement to conduct studies concerning changes in laws and regulation.

Section 3:
Provides the definition of "microreactor."

3:39:50 PM
SENATOR STEVENS commented on: the love hate relationship the U.S. has had with nuclear power, his assumption that most of the cooling towers associated with nuclear reactors were gone, and the most recent experience in Ukraine where large nuclear plants have become targets. He asked if microreactors placed in small communities would be safe from malicious attack.

MS. CARPENTER replied that Ms. Holdmann would discuss safety during the forthcoming presentation.

SENATOR KIEHL noted that the definition of microreactor references a federal law that identifies a size that is less than 50 megawatts (MW). He asked what the limitations were in that federal law.

MS. HOLDMANN said she'd like to address that during the presentation, but it was related to the definition of a microreactor in the IIJA, which is under 50 MW of electric power and having the characteristics associated with an advanced reactor that is defined in state statute. She offered to have Ashley Finan, the director of the National Reactor Innovative Test Site at the Idaho National Laboratory (INL), supplement that explanation.

3:42:55 PM
SENATOR KAWASAKI noted that bill Section 2 essentially exempts microreactors in the state from going through the regular legislative siting and permitting requirements and the required advance studies. He asked what those studies might look like and how they differ from the existing Title 18 requirements.

3:43:40 PM
MS. CARPENTER answered that the bill exempts only microreactors from the requirement in current statute for six state agencies to conduct ongoing studies to evaluate the various impacts of these reactors. There would still be a requirement for a one-time study overseen by the Alaska Center for Energy and Power (ACEP) and the Department of Environmental Conservation (DEC) for the siting of these microreactors.

SENATOR KAWASAKI pointed out that part of the siting requirement in AS 18.45.025(b) talks about where a nuclear reprocessing facility or nuclear waste disposal facility may be located. He asked if that would be part of the study that ACEP and DEC would do in lieu of the original facility siting permits.

MS. CARPENTER deferred the question to Ms. Holdmann.

3:45:27 PM
MS. HOLDMANN asked if he was referring to AS 18.45.027 pertaining to nuclear waste.

SENATOR KAWASAKI answered no, he was asking about AS 18.45.025(b) that talks about where a nuclear fuel production facility, a nuclear reprocessing facility, or a nuclear waste disposal facility may be located. His question was whether the ACEP and DEC study would be required to include the study of those things.

MS. HOLDMANN said Ms. Carpenter was speaking to AS 18.45.030, which pertains to the studies the six state agencies are required to do related to nuclear development and risks. The bill does not seek to change AS 18.45.025 other than removing legislative siting authority for microreactors. Nor does the bill seek to change licensing requirements, including any subsequent studies that would be required for typical licensing by state agencies. The bill only removes the requirement for ongoing and continuous studies by those six agencies.

SENATOR KAWASAKI referred to AS 18.45.030 that talks about the studies required by the six agencies before a permit is issued. The first is the requirement for the Department of Health and Social Services to particularly look at hazards to the public health and safety. He asked if that would still be required as a matter of course for microreactors.

MS. HOLDMANN answered that the agency permitting requirements will remain in place. SB 177 does not relate to changes to state permitting of a microreactor or the site on which it could be developed. This bill exempts microreactors from the ongoing and continual studies that are above and beyond the existing licensing and permitting requirements for a reactor at the state level.

VICE CHAIR MICCICHE asked Ms. Carpenter if she had anything to add.

MS. CARPENTER indicated that the response was sufficient.

3:48:21 PM
SENATOR KAWASAKI said if his reading was accurate that Section 2 creates a new subsection (b) in AS 18.45.030 "Conduct of studies concerning changes in laws and regulations with a view to atomic industrial development." that exempts microreactors from those study requirements.

MS. CARPENTER answered that is correct. SB 177 would create a carve-out for microreactors from those ongoing study requirements. That work would be done by the national labs and ACEP, although microreactors in the state would still be subject to the Nuclear Regulatory Commission (NRC) safety testing and permitting requirements as well as any DEC siting authority.

3:49:43 PM
SENATOR VON IMHOF questioned the reasoning for considering microreactors. She asked if there were companies that have advanced technology to safely dispose of the wastewater and if they currently were manufacturing microreactors at affordable prices.

MS. HOLDMANN answered that none of these reactor technologies had been installed in the U.S. but the expectation was that a number of different systems would be installed at the National Reactor Innovation Center (NRIC) at the National Laboratory in Idaho and potentially other places in the U.S. including Eielson Air Force Base in Alaska. She noted that Ashley Finan, the director of NRIC was online and available to discuss that project. SB 177 proposes to update the 40-year-old statutes that were written before microreactors were considered at the national level. She suggested that the presentation might answer some of the questions about wastewater disposal, testing, and safety. The purpose of SB 177 acknowledges that the technology has changed from the legacy gigawatt-scale light-water reactors

and that the current statutes impede the ability of communities and sites in the state to move forward with a feasibility or planned project development for a microreactor.

VICE CHAIR MICCICHE invited Ms. Holdmann to begin the presentation.

3:52:47 PM
MS. HOLDMANN began the presentation with a recognition of the ongoing help ACEP had received from national laboratory technical experts to further the idea of microreactors in the state. She specifically recognized Ashley Finan, the director of the National Reactor Innovation Center at the Idaho National Laboratory who was online today. She also provided background on herself as the director for ACEP. She relayed that she had worked on the idea of advancing microreactors for several years. Her background was in mechanical engineering and physics. She was the lead engineer at the Chena Hot Springs geothermal power plant, which is relevant to the application of nuclear reactor technology. ACEP has been interested in tracking the technology for the last 12 years and at the request of the legislature.

MS. HOLDMANN explained that the Alaska Center for Energy & Power (ACEP) is an applied research center at UAF that looks at innovative energy solutions and applications for Alaska communities and industry. She noted that earlier today she gave a presentation to Hilcorp about the potential use of microreactors for Alaska industries. ACEP has a statewide focus and has researchers based in Fairbanks, Anchorage, and Juneau.

3:54:41 PM
MS. HOLDMANN advanced to slide 6, stating that ACEP prepared reports in 2011 and 2021 at the request of the legislature. The first report focused on the historical use of nuclear energy in Alaska, including the 10 MW nuclear power plant in Galena that was under consideration about 20 years ago. It also included nuclear testing or project development such as Project Chariot, the testing on Amchitka Island, and the reactor at Fort Greeley that was deployed in 1962 and partially decommissioned in 1972. The final decommission will begin this year.

MS. HOLDMANN reviewed the recommendations in the 2021 report to the legislature:

[Original punctuation on slide 7 provided.]

- Continue to track technology and policy/regulatory trends
- Create a state working group on Small Nuclear Energy as a forum to bring together stakeholders
- Create a roadmap for Alaska nuclear applications including specific use cases and a more robust economic analysis, especially for microreactors
- Review/revise AK state statutes related to nuclear energy

3:57:09 PM
MS. HOLDMANN said she wanted to provide a few facts about nuclear energy to respond to Senator Stevens' comments about safety and his observations about the cooling towers. She discussed the following points:

[Original punctuation provided.]

- Nuclear energy supplies 20% of the U.S. electric power needs, more than all renewable resources combined (including hydro)
- The U.S. produces more nuclear energy than any other country in the world
- In the 60-year history of the nuclear power industry in 36 countries, there have only been 3 significant accidents at nuclear power plants.
- With the exception of Chernobyl, no nuclear workers or members of the public have ever died as a result of radiation exposure due to a commercial nuclear reactor accident (including Fukushima Daiichi)

3:58:36 PM
MS. HOLDMANN turned to slide 9 and described the following attributes of microreactors:

Microreactors are an emerging class of small, advanced reactors with the following general attributes:

- Output of less than 10 megawatts of electric power (MWe)

She noted that SB 177 uses the definition of capable of generating no more than 50 MWe. This aligns with the federal definition in the Infrastructure Investment and Jobs Act (IIJA) that references advanced reactor designs

that have additional attributes. Using this definition came about through consultation with the national laboratory partners.

- Capable of load following and non-electric applications (e.g., process heat)
- Factory fabricated and transportable nearly fully assembled. Requires a small operational footprint.
- Employs passively safe operating and fuel designs
- Semi-autonomous control system/minimum on-site staff.
- Long intervals without refueling (e.g., 10 years).

She characterized microreactors as a thermal battery (heat source) that can be used for power generation and other heat applications. In lieu of refueling, the reactor core may be replaced.

4:01:28 PM
MS. HOLDMANN advanced to slide 10, Small Nuclear Reactors (under development in U.S., < 300 MWe). The chart shows some of the companies that are actively pursuing licensing through the Nuclear Regulatory Commission (NRC). They are looking at U.S. markets for their technology. She pointed to the clear bifurcation at the 10 MWe scale. Below that are the manufacturers that fit in that microreactor definition. Many of those that are larger fall under what is called a modular reactor approach and are designed to replace the legacy reactors in the U.S. The benefit is that several modules can be deployed at the same site, they can be worked on individually, they have less nuclear material, and they have inherent and intrinsic safety features.

4:03:02 PM
MS. HOLDMANN advanced to slide 11 that illustrates two examples of micro nuclear reactors (MNR) under development. Both companies have expressed interest in the Alaska market. The first example is from the Seattle based company Ultra Safe Nuclear Company. They are working on a feasibility study with Copper Valley Electric Association to potentially deploy a system in Valdez, and they are looking at doing a demonstration at Chalk River Laboratories in Canada. This reactor is designed to be deployed below ground and will generate about 10 MWe. The

second example is the Westinghouse eVinci reactor design, which is just 5 MWe and more modular. It is proposed for deployment above grade in a series of four CONEX containers, just one of which has the microreactor.

MS. HOLDMANN displayed slide 12 and discussed the meaning of passive safety. She said she breaks the inherent safety into two components. One is the fuel configuration. New fuel configurations have been developed in the last decade, one of which is tristructural isotropic (TRISO) particles. These are designed with the uranium fuel at the core with multiple layers of advanced carbon materials that are heat resistant and can withstand the temperatures and physical stresses that are well beyond the threshold of current nuclear fuels. The fuel is designed to never come in contact with the environment.

The second component of passive safety is the passive cooling feature. Unlike the legacy reactors, these advanced reactors do not require active systems to cool the fuel in an emergency. Microreactors have much less nuclear material in one place and the heat from the reactor core is designed to be removed through passive thermodynamic and physical properties that take place without pumps or extra power. Advanced reactors have multiple layers of safety that she believes places them in a different category of nuclear power than the old legacy reactors.

4:07:03 PM
MS. HOLDMANN turned to the image on slide 13 of the Trans Alaska Pipeline (TAPS) and a ground cooling thermal unit that provides an example of passive cooling through the use of heat pipes. The double set of fins on the top section dissipate the heat that has been removed from the ground to keep the permafrost frozen and stable. This system uses ammonia. The temperature range is very different than for microreactors, but the concept of using a working fluid for the passive removal of heat is the same.

MS. HOLDMANN noted that the state statutes related to nuclear energy listed on slide 14 were worth looking at and that the three of the statutes listed on slide 15 were the ones the bill proposes to amend.

4:09:56 PM
MS. HOLDMANN advanced to slide 16 and explained that the University of Alaska Anchorage Center for Economic Development conducted a use case analysis of whether microreactors have a role in Alaska's future energy mix. The images on slide 17 illustrate four use cases: rural hub community, Railbelt

application, military base at Eielson AFB, and mining operation at the Red Dog Mine.

MS. HOLDMAN explained that the state map depicted on slide 18 identifies the limited number of communities in rural Alaska that have enough heating and electric load demand to host a small modular microreactor.

4:11:09 PM
SENATOR VON IMHOF noted that Dillingham has the capacity for 3 megawatts (MW) and Bethel has the capacity for 7 megawatts. She asked what capacity mining operations like Donlin [Gold], Fort Knox, or Red Dog Mine might have.

MS. HOLDMANN answered that the load requirements for mining operations typically would be in the 10s of megawatts, although the small graphite mine outside of Nome might be just 6 or 7 megawatts.

SENATOR VON IMHOF asked if the 223 MW load demand for Fairbanks was just residential and commercial or if it also included Eielson AFB.

4:12:25 PM
MS. HOLDMANN answered that the 223 MW does not include the military base. It is the load for the Golden Valley Electric Association grid and while Eielson AFB is connected, it primarily self generates from a coal plant. The load estimates on slide 18 are for the communities, but they do not show all possible applications.

MS. HOLDMANN displayed an aerial view of the National Reactor Innovation Center at the Idaho National Laboratory and relayed that this was where many of the advanced reactors are expected to be tested in the next decade. She noted that Dr. Finan was available to answer questions about the facility and the testing.

MS. HOLDMANN reviewed the information on slides 20 and 21 about the Eielson Air Force Base microreactor pilot project. She clarified that SB 177 was not introduced because of this project but it provides an example of the reason that the statutes related to microreactors need amendment.

Eielson AF Microreactor Pilot

- 2019 National Defense Authorization Act (NDAA) required the DoD to seek to develop a pilot program for the development of at least one micro-reactor by December 2027.
- Managed through the Office of the Deputy Assistant Secretary of the Air Force for Environment Safety and Infrastructure (SAF/IEE, Mark Correll)

- 1-5 MWe
- Will not be grid connected; onsite heat and power only

She noted that the microreactor will not provide all the demand so it will be run in parallel with the existing coal power plant.

- Will be licensed by the NRC; subject to state regs
- Privately owned/operated through PPA [power purchase agreement] with USAF

Proposed Timeline:

- February/March 2022 RFP [request for proposal] released
- Vender selected late 2022
- 2022-23 Permitting and licensing
- 2025 begin construction
- 2027 Commercial operation

4:15:23 PM
SENATOR STEVENS asked if she had any concerns about locating a microreactor on Eielson Air Force Base when it was already potentially a target. He asked if Fairbanks residents had a say in whether they want a nuclear reactor so close.

MS. HOLDMANN deferred the first question to Dr. Finan. To the second question, she said SB 177 does not remove local siting authority, so the Fairbanks North Star Borough will have some decision-making authority over the project.

SENATOR STEVENS asked whether villages would also have a choice about whether or not to have a microreactor in or close to the village.

MS. HOLDMANN answered yes, the bill does not remove local control in a borough or municipal government. The siting authority would revert to the legislature for a project that is located outside a municipality or borough. She noted that the NRC also has a robust process for consent-based siting for a nuclear facility of any kind.

VICE CHAIR MICCICHE asked Dr. Finan to address Senator Stevens' question about the potential for a microreactor located on a military base being a target.

4:18:05 PM
ASHLEY FINAN, Director, National Reactor Innovation Center (NRIC), Idaho National Laboratory, Idaho Falls, Idaho, explained that the Nuclear Regulatory Commission has security requirements for all reactors in the U.S. The microreactors under discussion today are all designed to withstand natural events such as tornadoes, earthquakes, and high winds as well as human-caused external events. Some of the key features of advanced reactors are the inherent safety features that make them more resilient in the event of a negative external event. No human intervention is necessary, off-site power is not required to cool and shutdown safely, and the advanced fuel forms are more resilient to impact. She offered to follow up with a more comprehensive written response.

4:19:52 PM
SENATOR STEVENS asked if she could say that humans would not be exposed to the release of nuclear energy if a stinger missile were to hit an advanced microreactor located at Eielson Air Force Base.

DR. FINAN answered that she did not have any technical knowledge or detailed information about stinger missiles or other weapons. There are standards to protect against such threats, but the information is classified. She nevertheless offered to look into the matter and follow up with what she finds.

SENATOR STEVENS said it seems that any kind of missile would be dangerous

4:21:12 PM
VICE CHAIR MICCICHE asked Dr. Finan to provide information to Senator Revak's office about the general risk of microreactors versus conventional reactors and their risk when under attack.

DR. FINAN agreed to provide the information.

4:21:39 PM
SENATOR KIEHL asked where in statute it says that the siting authority would revert to the legislature for a reactor project that is located outside a municipality or borough.

MS. CARPENTER answered that she would follow up with the exact statutory language.

4:23:12 PM
MS. HOLDMANN advanced to slide 22, Alaska Roadmap. She committed ACEP to answer the questions the committee and other Alaskans have about small microreactors and to continue to work with NRIC to develop a state roadmap leading to a possible pilot project. She acknowledged that the slide came from the 2011 report so it was more than a decade old. Nevertheless, it does show the four stage gate questions: 1) does the technology exist; 2) is it safe; 3) is it environmentally responsible to deploy in Alaska; and 4) is it cost-effective. She said these are the questions Alaskans need to have answered to determine whether or not nuclear energy was a viable option as part of the energy mix for the future.

4:24:28 PM
MS. HOLDMANN stated that ACEP does not promote one technology over another, but nuclear energy is worth keeping an eye on. She recounted the reasons she was interested in pursuing small reactors and thus the passage of SB 177:

- The idea of providing baseload energy to Alaskan communities and industry is very interesting
- The ability to load follow means they have the potential to firm up renewables and meet variable demand for industry
- It is one way for industry to reduce its carbon footprint
- They are safer than legacy reactors, but should also be compared to other status quo generation
- Competitive pricing depends on the value of heat
- There is value in long term certainty about the cost of energy
- Reduced risk of environmental contamination compared to the status quo and legacy reactor technologies
- It has the possibility to complement the existing Alaska resource mix

4:27:22 PM

SENATOR KIEHL noted that the Japanese Ministry of Health disagrees with the statement on slide 8 that nobody had "ever died as a result of radiation exposure due to a commercial nuclear reactor accident (including Fukushima Daiichi)."

He returned to his earlier question about the definition referenced in the bill that says that any advanced nuclear reactor under a certain capacity is a microreactor. He asked whether the definition of "advanced nuclear reactor" [in 42 U.S.C. 16271] changed in the Infrastructure Investment and Jobs Act (IIJA), and if she would talk about the meaning of the legal language in that definition.

4:28:30 PM
MS. HOLDMANN answered that ACEP put a lot of effort into looking at different definitions of microreactor. There really isn't a size threshold but there was concern about ensuring that the statutes wouldn't need further amendment to accommodate the developers that are proposing microreactor designs that are at or slightly above the 10 MW threshold. There was no interest in creating a definition that was unique to Alaska.

MS. HOLDMANN stated that it was the Governor's Office that chose to align the definition of microreactor in the bill with the IIJA definition, which is less than 50 MW of electric power. She suggested he ask Dr. Finan to supplement that explanation if that was the committee's desire.

4:29:50 PM
VICE CHAIR MICCICHE asked Dr. Finan to round out the response.

4:29:56 PM
DR. FINAN stated that the focus of her work is on advanced reactors that have advanced safety and other features that are suitable for different markets. She opined that there were many applications nationwide and particularly in Alaska for which the 50 MW and lower range of microreactors makes sense. However, from a technical perspective there isn't a hard line for what is and is not a microreactor.

DR. FINAN said she thinks about these as mostly advanced reactors that achieve those inherent safety features, but as Ms. Holdmann described, the limitation of potential site boundaries is an important characteristic of advanced reactors. It applies to microreactors, but it also applies to advanced reactors that are larger than the ones being considered in the definition in SB 177.

SENATOR KIEHL said he asked because unless there was a new definition in the federal law, what she described was significantly more restrictive than what is cited in the bill. The definition he found online in that federal law is anything that makes improvements to the nuclear reactor technology that existed two years ago is an advanced reactor. He suggested that if that was the definition the bill was looking for, the committee should talk about what it should say.

He also asked for some discussion about the safety of the fuel pellets that were described in slide 12 and what would happen if those were released into the environment.

4:33:15 PM
DR. FINAN answered that the major innovation in the TRISO fuel pellet is that it traps radioactive materials inside the fuel. This is distinctly different than the fuel used in today's reactors. Now the radioactive gases that leave the fuel are contained by a cladding and if that melts, the radioactive gas is released into the coolant. If several additional barriers fail, the radioactive gas can be released into the environment.

DR. FINAN stated that this advanced fuel is encased in a silicon carbide graphite matrix that does not fail at the temperatures a reactor will reach in a worst-case accident. Radioactive gases are not released into the coolant so there is not the potential for release into the environment if multiple barriers fail. This means the emergency planning zone can be reduced from the space a gas can potentially travel to the much smaller space a solid potentially can travel. Therefore, the 10-50 mile emergency planning zone can be reduced to the site boundaries.

DR. FINAN stated that the Department of Defense's pursuit of demonstration projects using TRISO fuel is an illustrative example. DoD is looking at using these microreactors in forward operating locations overseas to provide clean, secure energy that does not rely on diesel fuel supply lines that are vulnerable in national defense activities. Tests run the last 10-15 years have proved that micronuclear reactors that use TRISO fuel don't fail. The Chinese, Germans and others have experienced similar results. It is so robust that it is the fuel of choice in forward operating applications.

4:36:46 PM
SENATOR KAWASAKI asked what happens to the spent nuclear fuel or waste that's produced during reprocessing.

DR. FINAN answered that reprocessing is not envisioned in the near term, but the waste product of the reactor would be handled the same way that nuclear byproducts are handled today. That is to have a robust storage system where the waste is held until a final disposal site is identified or there is reprocessing. Waste other than spent nuclear fuel is classified from low to high level of radioactivity or toxicity and managed accordingly.

4:38:21 PM
SENATOR KIEHL asked where he could find the Nuclear Regulatory Commission's safety regulations for commercial microreactors.

DR. FINAN answered that the nrc.gov website has a library of references, including all its regulations. She offered to follow up and help identify the relevant regulations, particularly the detailed security and safety regulations.

VICE CHAIR MICCICHE asked for follow up information and source material about the difference in technologies between conventional nuclear reactors that are designed to serve millions versus these very much smaller microreactors. He described the hearing today and the follow up as a fact-finding mission. He thanked the presenters.

4:41:08 PM
VICE CHAIR MICCICHE opened public testimony on SB 177.

4:41:4530 PM
MICHAEL ROVITO, Deputy Director, Alaska Power Association (APA), Anchorage, Alaska stated that APA is a statewide trade association for electric utilities in Alaska. The association supports SB 177 so any members that are considering microreactors will be able to move forward with the knowledge that a portion of the permitting process has been streamlined. He described microreactors as a viable source of power that have the potential to lower the cost of energy for Alaskans, decrease dependency on the use of diesel, position the state for better economic development opportunities, and raise Alaska's profile as a hub of energy innovation and independence.

MR. ROVITO highlighted that electric utilities that are seeking to permit microreactors will still have to satisfy state and federal permitting requirements as well as any local requirements before a project can move to the construction phase. SB 177 streamlines the process by exempting microreactors under 50 megawatts from legislative siting authority and the

ongoing study requirements. Passing SB 177 will help electric utilities in Alaska further their mission to provide safe, reliable, and affordable power.

4:43:33 PM
COURTNEY OWEN, Civic Engagement Coordinator, Alaska Community Action on Toxics (ACAT), Anchorage, Alaska, stated her testimony was prepared by Pamela Miller, ACAT's senior scientist and executive director. She read the following:

> Thank you chair and members of the Senate Resources Committee for considering our perspective on SB 177.
>
> The Alaska Community Action on Toxics is a statewide nonprofit environmental health and justice research and advocacy organization based in Anchorage. We oppose SB 177 because it allows that so called micronuclear reactors are not subject to certain nuclear reactor siting and permitting regulations in Alaska, and may be constructed on land that has not been designated by the legislature. There are serious health and safety concerns with micronuclear reactors and they're a false solution for our energy needs and the climate crisis.
>
> Nuclear power is destructive throughout its lifecycle, from the mining of uranium, which is done predominately on indigenous lands, through the enrichment process, to the untenable problems of disposal of radioactive waste.
>
> On January 6, 2022, the Nuclear Regulatory Commission determined that Oklo [Inc.] failed to provide sufficient information on topics such as potential accidents and certain safety systems. Microreactor venders are pushing to reduce, or even eliminate entirely, personnel such as operators and security officers. In a report about the safety of advanced nuclear reactors, the Union of Concerned Scientists (UCS) determined that leaving microreactors without human guards is not safe.
>
> Even a very small reactor contains enough radioactive material to cause a big problem if it is sabotaged, and none of these reactors have demonstrated that they are so safe that they can function without operators. A single Oklo microreactor core would contain about

ten nuclear weapons worth of nuclear and radioactive material.

According to the UCS report, nuclear technology has fundamental safety and security disadvantages compared with other low carbon or renewable sources. Nuclear reactors and their associated facilities for fuel production and waste handling are vulnerable to catastrophic accidents and sabotage and they can be misused to produce materials for nuclear weapons.

It is disturbing that the primary proponents of this are representatives from the nuclear power industry who have a vested interest. Opening the door to nuclear power again in Alaska is unwise and dangerous. We are still addressing the radioactive legacy of massive radioactive contamination from the experimental SM-1A nuclear reactor at Fort Greely that was a colossal failure.

As the Union of Concerned Scientists noted in their recent report evaluating modern nuclear technologies, including micronuclear reactors, "Advanced isn't always better."

4:46:30 PM
SENATOR STEVENS asked for additional information on the experimental nuclear reactor at Fort Greely and what happened.

MS. OWEN answered that Pamela Miller had a report that she would provide by email.

4:46:54 PM
SENATOR VON IMHOF asked if she said that one microreactor was equivalent to ten nuclear bombs.

MS. OWEN restated that a single Oklo microreactor core would contain about ten nuclear weapons worth of nuclear and radioactive material.

SENATOR VON IMHOF asked specifically what nuclear weapons were used in that comparison because the presentation emphasized the comparatively small amount of nuclear fuel that is used in advanced micronuclear reactors, and the bill limits the size to less than 50 MW.

MS. OWEN asked whether she could refer the question to ACAT's senior scientist.

VICE CHAIR MICCICHE replied that would be fine and the committee could also ask Dr. Finan that question.

4:49:13 PM
GARY NEWMAN, Representing Self, Fairbanks, Alaska, paraphrased the following prepared remarks:

> Chair Micciche (on behalf of Chair Revak, who was excused) and members of the committee:
>
> My name is Gary Newman, a 50 year resident of Fairbanks, Alaska. I have long worked with and closely followed energy technology and policy in conjunction with my professional career. To be transparent, I serve on the Golden Valley Electric Association (GVEA) Board of Directors, but my testimony is solely mine.
>
> I've participated in ACEP's Nuclear Working Group and listened to testimony before legislative committees. While by no means expert in the highly technical details of the proposed technologies, I am able to critically evaluate what is being proposed.
>
> Most of the testimony has come from proponents of this potential technology, with others just opposed to nuclear at all. I'd like to offer a practical approach.
>
> 1. I would agree the Legislature is not the appropriate body for siting authority. In conjunction with state agencies, the Regulatory Commission of Alaska (RCA) is the more logical siting authority.
>
> 2. Removing the requirements of on-going studies otherwise required in AS 18.45.030 is problematic. DEC is not the only agency that should have purview over this, as the list of departments in that section demonstrates. The Nuclear Regulatory Commission (NRC) may have extensive permitting requirements, but the State of Alaska has a stake too on behalf of its citizens.

3. Instead of eliminating all on-going studies, just remove 'on-going' from that description. Why would you NOT want the state departments to look at this new proposed technology for regulations? As to local control, most small municipalities do not have the capacity or legislative authority to analyze or regulate this. In Fairbanks, it takes a simple conditional use permit approval by the Planning Commission for a nuclear power plant.

Alaskans often say we need more local control, whether at the state or local levels. SB 177 does the opposite and is premature, as all should agree that this technology is in its infancy. The proposed pilot project at Eielson AFB might be functional in 2027. Copper Valley Electric is looking at a feasibility study with a similar timeline. Let's see how these develop before absolving the State of Alaska of most regulatory engagement.

To conclude, the State of Alaska needs to have a stake in the evaluation and operation of this unproven method of power generation. Please consider just eliminate 'on-going' in 18.45.030.

Also, consider changing siting authority from the Legislature to the RCA, who already have siting authority for power generation in the Railbelt as a consequence of regulations implemented last year from SB 123 passed in the last legislature.

4:51:32 PM
SENATOR VON IMHOF asked him to submit his testimony in writing.

MR. NEWMAN agreed to do so.

4:52:02 PM
VICE CHAIR MICCICHE closed public testimony on SB 177 and announced he would hold SB 177 in committee.

4:52:24 PM
At ease.

HB 79-SALTWATER SPORTFISHING OPERATORS/GUIDES

4:53:07 PM

VICE CHAIR MICCICHE reconvened the meeting and announced the consideration of CS FOR HOUSE BILL NO. 79(FIN) "An Act relating to sport fishing operators and sport fishing guides; requiring the Department of Fish and Game to prepare and submit a report; and providing for an effective date."

He noted that there was a committee substitute (CS) for the committee to consider that reflects the discussion during the previous hearing about whether or not language about fresh water fishing should be included in the bill.

4:53:30 PM
SENATOR STEVENS moved to adopt the Senate CS (SCS) for CSHB 79(RES), work order 32-GH1608\G, as the working document.

VICE CHAIR MICCICHE objected for purposes of discussion, and asked Mr. Harbison to review the changes in the CS.

4:53:54 PM
INTIMAYO HARBISON, Staff, Senator Josh Revak, Alaska State Legislature, Anchorage, Alaska, explained that the CS removes the requirements for fresh water fishing licensure and reporting that were added in the House Finance Committee. Since ADF&G already has the authority to monitor fresh water fishing, those changes were deemed redundant. He reviewed the changes from version I to version G of HB 79 that revert those changes and align with the original bill title.

Sec. 1
Makes the license types in the bill specific to salt water guides and operators.

Sec. 2
Reverted back to version A which makes licensing requirements specific to salt water guides and operators.

Sec. 3
Conforming amendments to Title 25 which reference the above licenses.

Sec. 4
Changes due date of legislative report to December 31, 2023.

Sec. 5
Effective date changed to January 1, 2023.

4:55:39 PM
VICE CHAIR MICCICHE removed his objection. Finding no further objection, HB 79 version G was adopted.

4:56:02 PM
SENATOR STEVENS asked the department to comment on the SCS.

4:56:37 PM
TOM TAUBE, Operations Manager, Division of Sport Fish, Department of Fish and Game, Juneau, Alaska, stated that the Senate CS is essentially the same as the original bill and the department accepts the changes.

VICE CHAIR MICCICHE asked him to comment on the statement that the amendments to include fresh water fishing were redundant since the department already has the authority to monitor fresh water fishing.

MR. TAUBE answered that he believes that statement referenced the department's ability to implement fresh water log books. The department does not feel that those are necessary at this time, but they know how how many guides are operating because fresh water guides are required to register.

4:58:02 PM
VICE CHAIR MICCICHE found no further questions or comments and solicited a motion.

4:58:10 PM
SENATOR STEVENS moved to report SCS CSHB 79(RES), work order 32-GH1608\G, from committee with individual recommendations and attached fiscal notes.

4:58:28 PM
VICE CHAIR MICCICHE found no objection and SCS CSHB 79(RES) was reported from the Senate Resources Standing Committee.

4:59:12 PM
There being no further business to come before the committee, Vice Chair Micciche adjourned the Senate Resources Standing Committee meeting at 4:59 p.m.