

2015 SENATE ENERGY AND NATURAL RESOURCES

SCR 4008

2015 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources
Fort Lincoln Room, State Capitol

SCR 4008
2/13/2015
23820

- Subcommittee
 Conference Committee

Committee Clerk Signature



Explanation or reason for introduction of bill/resolution:

To allow and support the use of thorium reactors in this state for the creation of energy and medical isotopes.

Minutes:

1 Attachment

Chairman Schaible called the committee to order, roll was taken and all members were present. Senator Ole Larson was on hand to into the bill.

Senator Larsen: I come to introduce this resolution from individual that has an interest in thorium. Doing some research it is an old technology. As history has shown we have nuclear reactors and China is on board to build 30 nuclear reactors, they are going to experiment and try to build 2 of the thorium reactors. Thorium has a shelf life of the waste is 300 years compared to 1,000s of years. This system can actually burn the waste product from the nuclear waste. Currently we cannot build thorium reactors because the technology is not allowed yet. What we are doing now is bringing for this resolution to have them put forward the idea to do that. They are mining them and shipping them to China. China is using our technology and knowledge to help build this. As I sent the resolution to the people that will be testifying on this there are a few wording changes that I have passed out. See attachment #1. (.35-5:08)

John Kutsch and Jim Kennedy were teleconferenced in to testify on the resolution.

John Kutsch: Executive Director Thorium Energy Alliance. From what I have heard Mr. Larsen was doing a fine job about why this is such an important technology to pursue especially for North Dakota, having a lot of options that as a state you need to pursue to keep things going as well as they have and one of the things that you have is rare earth and you are strong energy economy and that could be continued long into the future using the resources you have today. Thorium is more stable, petroleum isn't as reliable and if you can base you future on an abundant and safe technology the country would be in your debt. I am at a nuclear reactor summit and this is what we have been talking about. Everyone will be easier to use, manage and source. Nuclear is the safest energy that we have and it serves the USA well. Fossil fuel, coal, gas are not as reliable but nothing is cleaner or energy dense than nuclear energy. The great thing about thorium is you get it

when you get rare earth; North Dakota has great rare earth deposits. I cannot imagine anything more effective than thorium, molten salt reactors in particular.

Jim Kennedy: I think that this needs to be stressed the technology, we are talking about isn't theoretical. It is one of 3 reactors built in the United States. The man who thought of, developed and operated held the key patents to the white water reactors in the United States. When he built the reactors, on the 3rd reactor they operated it for 22,000 hours ran it at 17,000 at full power. The characteristic of the reactor are different than anything you can have in your mind it uniquely it has features to make it the dominant reactor in the world. It operates on 2 basic principles: geometry and cross section, anything that can go on with a traditional reactor can't happen on this reactor. This is something that is already built and operates well. It represented a risk to the cold war goals of building, stockpiling and accumulating nuclear fuel for weapons so the project was buried. My involvement is because of my experience with rare earth; currently we are 100% reliant on China for all of the technical components that require rare earth. I was at a conference 7 years ago talking about rare earth we had no idea how to get rid of thorium. I ran the number in my head and they all got very excited. That is enough thorium to power all of the lightbulbs in the western hemisphere. It was a marriage of a problem, the rare earth has to get rid of 7,000 tons a year of thorium and that energy could run the entire western world electrically. It is very important for the US to treat scarce resources carefully. I think that you are making a bold and rational decision.

John Kutsch: I want to stress what Jim said: this is byproduct material, every mine throws away the rare earth minerals and it is also a regulatory issues are that people don't want to process rare earth anymore because they have to process thorium. Thorium is 3,000,000 more times dense than coal and the idea that you have a resource in your area that is long term and can help power the world. We have got to do this, China is spending a billion dollars developing American based technology right now and India is developing molten salt reactor technology it is hard to get up to speed with this but I appreciate you taking, quite rapidly, the time to learn about it. The United States has to be part of this, Canada has a very strong program the Department of Energy in the United States is working with China. I think that a state based movement can show the people that there is enthusiasm for this and will for this and a will to compete on a global stage. There is ambition to take this. This is proven technology and was left for faulty technologies. It was an unfortunate fluke of history but it is not too late but it will be soon. Once China has a monopoly on this there are vast barriers of entry these discussions will be moot. They haven't done it yet and we have some advantages to speed along and pass them. The vast amount of energy from these molten salt reactors is also very high energy, 600-700 Celsius. I will let Jim talk about the implications in detail. When you make energy that hot you don't have to make electricity anymore, the real use for these reactors would be as process heat. That is exactly what China wants to do, is stated in a memo of understanding between the department of energy and the Chinese Academy of Sciences. Create vast amounts of fertilizers and any other process there is a huge opportunity. If you believe in the hydrogen economy you will start to see if we invest in this energy we will have this very clean, very pure technology and will allow other industries to become more efficient. We could be a carbon free technology and carbon gases. We could be making things from coal so when you are looking for the next trillion dollars for our economy.

Chairman Schaible: Can you go into the water needs for this project?

Jim Kennedy: The reactor operates at such high temperatures that it is air cooled. You do not want water near any reactor if you can help it. In this reactor the fuel and coolant is the exact same thing. If I heat salt up it acts a lot like water with 2 exceptions: as you heat the salt it doesn't have a large expansion coefficient, equally important is the boiling point for salt is it so high it is above temps that you want it to go to. In the operational range of the reactor so you never have the moment when the coolant is under pressure and looking for weakness; this reactor operates with zero pressure because you use a pump to push some water which uses minimal pressure. The equation works out to zero pressure and there is nothing above 5 PSI; inside a white water reactor we use today is around 3,000 PSI. It is not water cooled, it doesn't need giant cooling towers or 6" steel pipes to contain the pressure. Every western reactor built today has a containment vessel that is capable of absorbing the entire event of a rupture. When water is converted to steam it expands a lot but in existing white water reactors the transition point between water to steam isn't enough to spin the turbine to make up for electricity efficacy. In reactors today they trick nature; they put enough pressure on the boiling that it can't transition to steam. Instead of the water boiling at 10 degrees they have it at 350 degrees and the way that it boils in between is they squeeze the water so tight that it can't transition to vapor. They squeeze the water so tight that it cannot become steam. It makes the cost so enormous that they are unviable even before they put the shovel in the ground. Building a new reactor today in North Dakota you have to commit to \$5,000,000,000 and it would take 7-8 years and no permit until it is done. This is why the existing nuclear isn't working today; this reactor is so simple that it is elegantly simple. It takes what nature gives you and simplifies it to the most eloquent equation. Imagine a 4" pipe in a loop and it is standing up vertically. We fill the loop with salt, thorium, and everywhere it is 3" the geometry inside the 3" part of the pipe makes it impossible for a chain reaction to occur inside the 3" pipe because you do not have enough of a cross section and it is everything.

Senator Triplett: We are not chemists and if anyone wants additional information they can get an email with a packet of information. I think that is highly inappropriate to go into such detail that we are not going to become experts on in the course of an hour.

Jim Kennedy: I am sorry.

Chairman Schaible: I think we can get the information or you can forward it to us.

There was no further discussion and Chairman Schaible closed the hearing on SCR 4008.

2015 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources
Fort Lincoln Room, State Capitol

4008
2/20/2015
24120

- Subcommittee
 Conference Committee

Committee Clerk Signature

Kate Oliver

Explanation or reason for introduction of bill/resolution:

To allow and support the use of thorium reactors in this state for the creation of energy and medical isotopes.

Minutes:

Chairman Schaible called the committee to order, roll was taken and all committee members were present.

Chairman Schaible: What are the wished of the committee?

Senator Laffen I am not sure it is our job to tell the federal government where to go with this. I would be inclined to say that if we are going to do that we should focus on things that are of a little more importance to us.

Senator Laffen then made a motion for a Do Not Pass with a second by Senator Triplett.

Chairman Schaible: I liked the idea of the resolution but I do not think that this is the arena that we need to be in.

Senator Armstrong: The bill's prime sponsor did offer an amendment to this. Do we want to look at that?

Senator Laffen then withdrew his motion for a Do Not Pass and Senator Triplett withdrew her second.

Senator Laffen then moved the amendment with a second by Senator Armstrong. There was no further discussion, roll was taken and the amendment was adopted by the committee on a 6-1-0 vote.

Senator Laffen then made a motion for a Do Not Pass as Amended with a second by Senator Triplett.

Senator Hogue: I know that this bill did not get a very compelling presentation but I think that our state should be doing everything that we can to encourage every form of energy out there. Half of our naval fleet runs on nuclear energy and this is another side of that and we as a state should pursue this. I do not see a problem with sending Congress a resolution.

There was no further discussion, roll was taken and the motion passed on a 6-1-0 vote with Senator Laffen carrying the bill to the floor.

15.3023.01001
Title.02000

Prepared by the Legislative Council staff for
Senator Larsen

January 13, 2015

TD
2/19/15

PROPOSED AMENDMENTS TO SENATE CONCURRENT RESOLUTION NO. 4008

Page 1, line 3, replace "more than a billion" with "thousands of"

Page 1, after line 8, insert:

"WHEREAS, these molten liquid fueled reactors are inherently safe, cannot blowup, cannot meltdown, cannot cause a widespread radiation release event in the worst possible scenario, and can consume nearly one hundred percent of the fissionable energy in the fuel which limits and minimizes nuclear waste and geologic storage issues; and"

Renumber accordingly

REPORT OF STANDING COMMITTEE

SCR 4008: Energy and Natural Resources Committee (Sen. Schaible, Chairman)
recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends
DO NOT PASS (6 YEAS, 1 NAYS, 0 ABSENT AND NOT VOTING). SCR 4008 was
placed on the Sixth order on the calendar.

Page 1, line 3, replace "more than a billion" with "thousands of"

Page 1, after line 8, insert:

"WHEREAS, these molten liquid fueled reactors are inherently safe, cannot
blowup, cannot meltdown, cannot cause a widespread radiation release event in the
worst possible scenario, and can consume nearly one hundred percent of the
fissionable energy in the fuel which limits and minimizes nuclear waste and geologic
storage issues; and"

Renumber accordingly

2015 TESTIMONY

SCR 4008

January 13, 2015

1.1

PROPOSED AMENDMENTS TO SENATE CONCURRENT RESOLUTION NO. 4008

Page 1, line 3, replace "more than a billion" with "thousands of"

Page 1, after line 8, insert:

"WHEREAS, these molten liquid fueled reactors are inherently safe, cannot blowup, cannot meltdown, cannot cause a widespread radiation release event in the worst possible scenario, and can consume nearly one hundred percent of the fissionable energy in the fuel, which limits and minimizes nuclear waste and geologic storage issues; and"

Renumber accordingly