

**ALASKA STATE LEGISLATURE
SENATE SPECIAL COMMITTEE ON WORLD TRADE, TECHNOLOGY AND
INNOVATION**

February 26, 2009
8:05 a.m.

MEMBERS PRESENT

Senator Lesil McGuire, Chair
Senator Gary Stevens
Senator Bill Wielechowski

MEMBERS ABSENT

Senator Hollis French
Senator Lyman Hoffman

COMMITTEE CALENDAR

Alternative Energy Opportunities & Technologies in Arctic and Sub-Arctic Alaska

PREVIOUS COMMITTEE ACTION

No previous action to record.

WITNESS REGISTER

Mead Treadwell, Chair
U.S. Arctic Research Commission
Anchorage, AK

POSITION STATEMENT: Delivered PowerPoint on the Arctic Research Program and Alaska

ACTION NARRATIVE

8:05:50 AM

CHAIR LESIL MCGUIRE called the Senate Special Committee on World Trade, Technology and Innovation meeting to order at 8:05 a.m. Present at the call to order were Senators Stevens, Wielechowski, and McGuire.

The U.S. Arctic Research Program and Alaska

CHAIR MCGUIRE announced the business before the committee is to hear from Mead Treadwell who has been asked to talk about the Arctic as well as standard and alternate energy opportunities.

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MEAD TREADWELL, Chair, U.S. Arctic Research Commission, said this is a Presidential appointment and he is one of seven commissioners. He named the five commissioners who accompanied him to Juneau. He described the commission as the pilot fish for the \$400 million per year Arctic Research Program that involves at least 15 federal agencies cooperating with over 12 nations and using research infrastructure worth billions of dollars. We believe this research helps build the U.S. competitive position, he said.

The commission is, by law, charged with submitting to the President and Congress a biannual report on goals and objectives for Arctic research. The 2009 report will again ask the federal government to focus on five research themes: 1) Environmental change in the Arctic and Bering seas; 2) Arctic human health; 3) Civil infrastructure; 4) Natural resource assessment and earth science; and 5) Indigenous languages, identities, and cultures.

He said that while he was asked to talk about energy, he would like to highlight that on the issue of Arctic human health they are being intensive this year to respond to the suicide problem in Western Alaska. They are asking Congress to fund a study by the National Academy of Sciences to dig deeper to find what other medical information can be developed to help fight the problem. Working with the National Institute of Health, there will be a conference in Anchorage in early June on behavioral health problems in the Arctic region and he welcomes legislative participation.

MR. TREADWELL referenced the civil infrastructure research theme and said that the U.S. Army Corps of Engineers is taking a leadership role. Finally, he noted that for the first time since the commission was created in 1984 there is a social science or anthropological theme in the Arctic research plan. The point in mentioning that indigenous languages, identities and cultures is included as a research theme is that this generation is losing the languages of their grandparents faster than the Arctic sea ice is shrinking. Losing a language is a tremendous loss of human knowledge and is a serious concern. The commission will be encouraging federal agencies to work with school districts to do immersive language training. The current problem is that even though schools have money for the program, there is sometimes a shortage of qualified teachers.

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MR. TREADWELL said after he became chair two years ago the commission urged the President to review and revise U.S. Arctic policy. Last time the National Security Council adopted an Arctic policy for the U.S. was in 1994. The new policy was signed in January 2009 and in her confirmation hearing Secretary Clinton said they are looking forward to implementing that policy. It looks at a number of things, but for the first time it talks about the policy with respect to climate change in the Arctic, shipping in the Arctic, and the need to have stronger international cooperation on research. He acknowledged that this committee has urged ratification of the Law of the Sea Treaty, which commits the nation to work on international cooperation including joint search and rescue activities, discussion of regional fisheries agreements, and other activities to make sure that shipping is safe secure and reliable.

After the Russians planted a flag on the surface of the ocean bottom at the North Pole, an issue in Arctic policy that has been discussed at length centers on what is happening with sovereign rights and jurisdiction in the Arctic. The U.S. has a maritime boundary with Russia that makes it clear that what Russia can claim under Law of the Sea may benefit the U.S. If the treaty is ratified, the U.S. has the right under the Law of the Sea to make a claim to an area outside the 200-mile limit that is geologically part of the continental shelf. Currently work is being done to do bathymetric and seismic research in the Arctic Ocean to help prove up the claim. That will essentially add considerable territory to the U.S. off Alaska.

CHAIR MCGUIRE asked to see a slide of some of shipping routes that are discussed in the Arctic policy.

MR. TREADWELL displayed a slide showing the Bering Strait and said if you wanted to enter the Arctic Ocean for a trans-Arctic shipment or to take the northern sea route across the top of Russia or to go through the Northwest Passage over the top of Canada you would need to enter through the Bering Strait from the Pacific Ocean. He noted that some people are calling it the "Bering Gate." You would exit the Arctic Ocean either to the west of Greenland, to the east of Greenland through Fram Strait near Spitsbergen or over the top near Norway. The most direct route is straight across and if ice conditions continue to change that could be a major route going past Alaska shores. For 50 years global aviation has traversed these great circle routes and made Alaska a crossroads. What happens with shipping over the next few years is something the commission has spent considerable time and money on.

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MR. TREADWELL noted that it's of interest to Alaska that there is a disputed boundary with Canada on the Beaufort Sea. That boundary was last negotiated when Alaska was owned by Russia and Canada was owned by Britain. Documents only go to the ocean edge. The U.S. feels that it is customary international law to follow the headland and Canada has a different view. What is at stake is a 6,200 square nautical mile pie slice within the 200-mile limit that, because of the disputed ownership, is not being leased for energy purposes.

MR. TREADWELL said much of what the commission has done looking at research on Arctic energy began with sponsorship of an Arctic energy summit and International Polar Year activity that was held in the fall of 2007 and has continued since. They looked at rural energy, extractive energy, and sustainability issues. The event drew people from all countries surrounding the Arctic and others across the world.

Arctic energy research in Alaska has global implications, Mr. Treadwell said. Safer and more efficient fossil fuel development is an important subject for research for a number of reasons. Senator Murkowski recently stressed the importance of new exploration techniques onshore and offshore to safely get oil and gas up and out. This is something the commission has been watching closely. Longer winter drilling seasons in a warming climate led to the tundra study that helped to discover ways to do this. The American people were promised a robust oil spill research program in the Arctic, sub-Arctic and around the country but funding for that program has gradually slipped away. The commission is pushing hard to coordinate committees in the federal government to reengage. The disputes over drilling in the Beauford and Chukchi seas highlight the importance. Entities in the federal government and industry are working on joint programs in Norway to help improve cold weather oil spill response. The commission again is calling for stronger oil spill research. The state has in the past been a player using the 470 fund, but there is a similar federal fund and significant money is available. Hopefully more of that will be committed to oil spill research.

Safe secure reliable shipping also is an issue in the Arctic. Russian Arctic oil shipping has been increasing over the last few years as new projects go online in the western Arctic. Currently it all heads west through the Arctic, but it certainly has the legal right to head east through the Bering Strait so it

is in Alaska's interest for regimes to be in place to see that safe shipping is ensured in this area.

Finally, carbon sequestration is a goal of the U.S. climate change technology program and the use of gas hydrates has brought Japanese investment to Alaska through a joint industry program.

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SENATOR STEVENS asked if he intends to talk more about Alaska's rights and responsibilities in Arctic shipping.

MR. TREADWELL replied he will address that topic shortly.

He noted that the commission has also done some work on the issue of alternative energy and the goal the governor set to have 50 percent of the state's power production to be from renewable energy is very ambitious. The motivation for stronger research can stabilize costs and mitigate global climate change. The focus on alternative energy can be rural, urban, and export; it can be onshore and offshore; it can cover electric power, heat and ultimately all transport modes. Some of the work going on in Iceland on hydrogen power for ships could be very important to Alaska's fishing industry and ultimately lead to more stable power costs for shipping. Because of the issues with black carbon, the world may over time want to commit itself to hydrogen power shipping. That research is important to Alaska.

The state has tremendous natural assets including hydro, wind, tides, geothermal, waves, biomass, and solar that can be applied to power and other energy needs. Also, Alaska and the Arctic may be a geo-engineering venue as well. There are some grand schemes to mitigate climate change in a faster way and are worthy of research. He recapped that between fossil fuels and alternative energy, Alaska has great opportunity to do research that contributes to the state and the world.

MR. TREADWELL responded to a question and explained that the idea of geo-engineering is to slow the heating of the atmosphere. One idea is to darken the atmosphere of the Arctic for about a five-year period by distributing aerosols or dust in the upper layers. That might bring enough reduction of heat to bring back the Arctic ice pack and counter the effects of greenhouse gases. Another project relates to magnetic forces and currents. The earth has chimneys at the North and South poles where particles enter and leave the earth's atmosphere by riding

magnetic currents. There may be some way to manipulate those currents or they may be unwittingly manipulated already to export carbon dioxide or carbon molecules. At this stage those are fanciful science, but it would only happen in the Arctic region so it's important to pay attention.

MR. TREADWELL highlighted the USGS study that came out last summer assessing the undiscovered oil and gas potential of the Arctic. He displayed a chart that shows that about 15 percent of the world's undiscovered conventional oil and about 30 percent of the undiscovered conventional gas is to be found within the Arctic Circle. Thus, the Arctic as a venue for traditional hydrocarbon production is likely to be significant for some time to come. It is something that Alaska should keep its eye on. Alaskans know about dependence on oil revenue but Russia is certainly dependent on significant oil revenues nationally based on Arctic oil production largely in the northwest. Norway is also dependent economically on oil production in the North Sea and Greenland has been given incentive by the government of Denmark for self sufficiency from oil reserves to potentially achieve political independence. Likewise northern Canada is dependent on working on major oil and gas development. Of course, Alaska is working hard to get its gas to market and find new sources on and offshore. The point is that the Arctic is an energy province with fossil fuels being a significant part of the region. In Iceland hydro and geothermal power is a major part of the country's economy and exports.

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Alaskans learned the hard way that oil spills can't be ignored so efforts to improve oil spill response in Arctic waters continue. He noted that lots of work is going on in the Beauford and Chukchi seas, but efforts to test oil spill response in cold weather has moved to Norway where more on-water testing is allowed. We've been supporting a joint industry program there, he said. Largely because of production in the western Arctic and Russia, more ice-class tankers have been constructed. Ice capable tankers and LNG tanker orders to serve the Russian market have been growing considerably. That is just one thing the commission found in the Arctic shipping assessment that it helped sponsor financially. They will take that shipping assessment to the ministers of the eight Arctic nations in April and one thing it will point out is that Arctic shipping isn't in the future; it's now. In 2004 close to 5,000 ships of 100 tons or greater were operating in those waters and it's time that the nations get together and make sure it happens safely.

CHAIR MCGUIRE questioned how they are regulated today.

MR. TREADWELL explained that there is a voluntary code for the way ships must be constructed to operate in the Arctic. The U.S. is part of the Arctic policy signed in January 2009 saying that it will go to the UN with Canada to try to make that polar code mandatory rather than voluntary. A number of design changes are needed for a ship to safely operate in Arctic waters, but to make something compulsory on the world oceans it has to be agreed to by the International Maritime organization. That is a UN body in which all nations of the world participate. The Coast Guard currently is working with Russia to set up traffic systems in the Bering Strait. Other issues are going on with the marine exchange where they are working to build an identification system for locating ships. Ships are required to broadcast their position but without receivers to process the information it's worthless. That issue was on the front page of the Juneau Empire just yesterday, he noted.

MR. TREADWELL displayed slides of the minimum ice cover in the Arctic Ocean in 2002 and in 2007 to show that the change is dramatic. Scientists have varying estimates on when the Arctic Ocean might be ice free in the summer. The current consensus is that it will be around 2030 to 2040, but there have been estimates as early as 2013. One of the reasons this is happening is because the thick multi-year ice that builds up has been flushing out of the Fram Strait east of Greenland in the last several years. Annual-ice melts comparatively easier. Other issues are that the temperature of the Arctic Ocean itself and the atmosphere are warming. Arctic habitat is changing quickly and has affected polar bears and other species. Understanding what is happening in the ice cover is important and has given the world a sense that the Arctic is more accessible. In the fossil energy field the Office of Management and Budget estimated that the lease sale in the Chukchi Sea last year would earn about \$60 million, but the bid was about \$2.7 billion for rights to drill in that region.

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MR. TREADWELL said one thing that is interesting about global climate change is that the Arctic exhales carbons as the tundra warms. About one quarter of the world's carbon dioxide is stored terrestrially either in the boreal forests or the tundra itself so carbon and methane releases certainly should be watched. He noted that gas hydrate research is an important initiative of the U.S. Department of Energy, the Japanese government, and

industry in Alaska because gas hydrates may up-well anyway and these deposits could be new sources of natural gas.

He displayed a chart prepared by Katy Walter with UAF showing the out-gassing of methane from a pond. Last year NOAA reported a new spike of methane in the atmosphere. Methane is nearly 24 times more potent as a greenhouse gas than CO2 so the Arctic may become a major contributor of greenhouse gases as warming occurs. There's an energy component and a climate component there, he said.

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MR. TREADWELL said the U.S. Climate Change Technology Program was one of the most unsung programs of the previous administration. It was a multi-billion dollar commitment by the U.S. to improve alternative energy technologies. However, it did not look closely at opportunities for alternative energy research in the Arctic. He said he believes that this program will be substantially revised in the present administration. Stimulus money is available and is one reason that the commission produced the document "Why the Arctic Matters: The Potential Contribution of Arctic Research to U.S. Climate Change Mitigation Strategy." Right now the U.S. has aggressive plans to develop alternate energy solutions including: reducing emissions from energy end-use and infrastructure; reducing emissions from energy supply; capturing and sequestering carbon dioxide; reducing emissions of non-CO2 greenhouse gases such as methane; enhancing capabilities to measure and monitor greenhouse gases; and basic science to technology development. The commission has repeatedly made the point that Alaska and the Arctic need to be in on this program.

MR. TREADWELL thanked Senator Murkowski for the trips she sponsored for the Secretary of Energy to come to Alaska last year and noted that he included correspondence the commission has had with the Department of Energy as well as the commitment made by the out-going Secretary of Energy to put a staffer in Alaska to help develop more alternative energy research. According to the head of the Renewable Energy Lab, that commitment will be fulfilled. For over a decade there has been a Department of Energy sponsored Arctic energy office in Alaska but it is funded through the DOE fossil fuels program and thus money has only been spent on fossil fuel energy research. The congressional mandate is broader than that and the commission has asked the Secretary of Energy to include funding for renewables. Unfortunately, the only alternative energy done in Alaska by DOE is considered an earmark. The commission has asked

that DOE embrace the program and work with Alaska on something that is vital not only to the state but to the country and world. The point they've made repeatedly is that Alaska pays more for its energy. Even costly testing might cost less than what is currently being spent on diesel fuel in 200 villages that are off the road system and off the electric power grid. He said that point has been made successfully and thanks go to Senator Murkowski and the DOE for committing to have researchers in the state.

Some work has also been done to build capacity at the University of Alaska to do work on alternative energy. There are congressional authorizations that are unfunded, but the point is that as this committee looks at many things the state is doing with its own funds to work in the alternative energy area, trying to leverage power resources is something that everyone needs to work together on. This means focusing on issues like gas hydrates, inflow, rivers, power production, and biomass replacements. These are all things DOE is doing around the country and the commission questions why it isn't doing it in the Arctic as well.

CHAIR MCGUIRE expressed appreciation for the information and said legislators who are going to the upcoming energy conference will echo that request in their scheduled meetings with the DOE.

MR. TREADWELL urged the committee to read the federal plan on alternative energy research and asked members to recognize that DOE will probably be revising it in the new administration. The commission will work to ensure that the Arctic component is involved in the revision.

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MR. TREADWELL said housing is another issue he wants to address. Alaska Housing Finance Corporation (AHFC) did a survey in 2005 in conjunction with the Cold Climate Research Center in Fairbanks and the commission would like to see that program become more robust. One way that Alaskans can help reduce fossil fuel energy use and be more efficient is to upgrade insulation in houses. He noted that the money that Alaska has committed to this program represents a significant percentage of what's being done nationwide.

CHAIR MCGUIRE related that the Senate Resources Committee had the Cold Climate Research Center visit this last week when legislation was introduced implementing a lot of the

conservation recommendations from that report including new building code requirements.

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SENATOR WIELECHOWSKI added that the committee is interested in further conversations about alternative energy resources and ways to reduce energy consumption in Alaska.

MR. TREADWELL said some people working with the new Secretary of Energy have expressed an interest in coming to Alaska to look at opportunities and needs and to learn more about projects like the geothermal project at Chena Hot Springs.

CHAIR MCGUIRE said this Senate committee would be interested in partnering and helping to host a DOE delegation.

MR. TREADWELL said this is an area where the current administration and the state have every opportunity to work together. A major issue in the climate talks that will take place in Copenhagen this year is how to make sure that the less developed countries can advance while efforts are underway to reduce carbon use. Developing appropriate energy sources for small villages that are off the grid has global implications.

CHAIR MCGUIRE agreed and added that consumers in China and India want consumer items that make life more comfortable and the U.S. could have taken a more leadership role.

8:46:35 AM

MR. TREADWELL displayed a slide showing shipping routes and said that a northern sea route saves up to 40 percent of the distance between eastern Asia and northern Europe compared to going through the Suez Canal. Also, transiting through the Suez Canal is most constrained in the fall season when the Arctic is the most open. Lloyds Shipping has indicated it might be able to reduce insurance rates for shipping in the Arctic if there are better rules and if there are ship salvage and tug capabilities in the area. Alaska needs to decide what it wants to ensure safety. The commission has been working on not only the marine shipping assessment, but also arguing for more research in this area. He said it's not just melting ice that's making Arctic shipping routes potentially attractive. It's also changing technology and global demand for Arctic resources.

MR. TREADWELL displayed a slide of an ice-breaker built by Aker Arctic Technology of Finland and noted that it is propelled by an Azipod, which consists of an electrically driven propeller

that is mounted on a steerable pod that can turn 360 degrees. Essentially it can make the bow of the ship the stern and vice versa. The next slide showed an ice-breaking container ship built by Aker Arctic for use by Russia in the Arctic Ocean. The stern is spoon shaped to make it easier to back through heavy ice. One of the big issues in Russia is whether or not these ice-breaker ships need to pay for ice-breaker escort services. This technology has been adopted by the U.S. and the first Coast Guard icebreaker has been built for use in the Great Lakes. He noted that ships are being built that are larger than the canals of the world can handle so the prospect of bringing those ships through shorter sea routes is attracting attention.

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Several years ago the Legislature funded a project that looked at the prospect of an Arctic container shuttle link from Adak to Europe. The finding was that trans-Arctic ships could operate 360 days a year. Right now Arctic LNG carriers are under review and although the state is well invested in pipelines, the changes in Arctic shipping may ultimately change the picture on pipelines as well.

CHAIR MCGUIRE asked which countries are currently shipping LNG.

MR. TREADWELL replied there are LNG shipments in Arctic waters from Russia and Norway bound mostly for European ports. He said he's unaware of any other LNG Arctic projects that have been proposed but the issue has been studied in the past. One proprietary project shows that at a certain speed shipping would be economic compared to a pipeline. He surmised that newer ships would likely attain that speed. An issue in Alaska is port depth but with the newly accessible Arctic Ocean the state needs to be prepared for energy and mineral development.

CHAIR MCGUIRE asked if he's had conversations with FERC about what an export license would look like.

MR. TREADWELL said no.

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MR. TREADWELL urged the committee to think about what the Coast Guard does now on other shores and pointed out that it doesn't have the capability to do that in the Arctic right now. The Healy is a light icebreaker and the two polar-class icebreakers that were commissioned in the Nixon administration are ready to be retired. Alaska's Congressional Delegation and the commission have worked hard to give the Coast Guard the capability to build

new polar-class icebreakers and came close in the stimulus package. He suggested that a resolution from the Alaska Legislature in support of icebreakers is important because Alaskans and this Arctic coastline deserve the same protections that the rest of the country gets. He encouraged the committee to invite Admiral Brooks to address the committee on this important topic as part of the state's homeland security objectives and environmental objectives.

CHAIR MCGUIRE said you can look forward to a resolution from the committee and an invitation will be extended to the admiral.

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MR. TREADWELL displayed a map to show that the North Magnetic Pole is moving at an ever increasing rate across the Arctic Ocean towards Russia. It's an interesting element of Arctic research that has energy implications and climate change implications. CO2 in the atmosphere is being monitored closely and is now at higher levels than at even the warmest times of the earth. A climate regime to be developed in Copenhagen in December will be an attempt to get all nations to sign on. The targets that are chosen and the timing to get to those targets will have a dramatic impact on what happens in the Arctic in terms of erosion, ice melt, shipping, habitat platforms for wildlife and subsistence users. Alaska has an important stake in what happens in Copenhagen in December. The commission has been asking for a special assessment of what the targets that are being discussed mean for Arctic residents because that's not well understood.

[9:00:01 AM](#)

With the melting icecap the reflectivity in the Arctic Ocean is lessening and the solar radiation is being absorbed by the darker land and dark blue ocean surfaces. Techniques to stabilize multi-year ice will help show the world that we've turned the corner, but as yet modeling isn't good enough to figure out what targets will help to bring the ice back.

MR. TREADWELL noted that just yesterday the two-year program called the International Polar Year ended. It was the first time since the International Polar Year of 1957 that there has been a sustained assault by scientists from 60 countries on the mysteries of the Arctic and Antarctic. Arctic research plays an important part in Alaska's economy and the knowledge that is being worked on could play an important part in answering current problems.

CHAIR MCGUIRE thanked Mr. Treadwell for the presentation and the work he's done on behalf of the state and the country. We look forward to continuing the dialog, she said.

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CHAIR MCGUIRE adjourned the Senate Special Committee on World Trade, Technology and Innovation at 9:01 am.