

**ALASKA STATE LEGISLATURE
JOINT MEETING
SENATE SPECIAL COMMITTEE ON ENERGY
SENATE RESOURCES STANDING COMMITTEE**

January 26, 2010

1:33 p.m.

MEMBERS PRESENT

SENATE SPECIAL COMMITTEE ON ENERGY

Senator Lesil McGuire, Chair
Senator Albert Kookesh
Senator Bill Wielechowski
Senator Lyman Hoffman

SENATE RESOURCES STANDING COMMITTEE

Senator Lesil McGuire, Co-Chair
Senator Bill Wielechowski, Co-Chair
Senator Hollis French
Senator Thomas Wagoner
Senator Charlie Huggins

MEMBERS ABSENT

SENATE RESOURCES

Senator Bert Stedman
Senator Gary Stevens

COMMITTEE CALENDAR

Presentation: Denali Bio-Diesel
HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record.

WITNESS REGISTER

GREG MICK, CEO
Denali Bio-Diesel
Alaska State Capitol
Juneau, AK

POSITION STATEMENT: Presented an overview of Denali Bio-Diesel's proposal to reduce or eliminate the Power Cost Equalization Program.

SCOTT MCCORMICK, Vice-President
Denali Bio-Diesel
Alaska State Capitol
Juneau, AK

POSITION STATEMENT: Presented an overview of Denali Bio-Diesel's proposal to reduce or eliminate the Power Cost Equalization Program.

ACTION NARRATIVE

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CHAIR LESIL MCGUIRE called the joint meeting of the Senate Special Committee on Energy and the Senate Resources Standing Committee to order at 1:33 p.m. Present at the call to order were Senators Wagoner, Kookesh, French, Hoffman, Wielchowski and McGuire. Senator Huggins joined the meeting shortly thereafter.

Presentation by Denali Bio-Diesel

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CHAIR MCGUIRE announced today's agenda to be a presentation by Denali Bio-Diesel.

GREG MICK, CEO of Denali Bio-Diesel, said Denali Bio-Diesel is owned by Disabled Veterans, is Alaska-based and is the only licensed commercial biodiesel producer in the state. In 2009, Governor Palin and her energy adviser, Joe Balash, asked Denali them to consider a biodiesel refinery program that would reduce or eliminate the Power Cost Equalization (PCE) program.

MR. MICK explained that biodiesel contains many of the same traits as conventional diesel fuel and it is a direct replacement for petroleum diesel. A manufacturing and refining process converts high quality oils to biodiesel through pretreatment known as acid esterification followed by transesterification. Denali Bio-Diesel uses pure fish oil derived by cutting and grinding fish waste and then separating the oil out from the water and solids through centrifuging. The oil is then run through the process of transesterification.

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MR. MICK pointed out that Dutch Harbor is blending fish oil with petroleum diesel, creating a diesel blend as opposed to biodiesel.

MR. MICK said the state funds up to \$40 million in PCE subsidies for high energy costs in rural areas; this has increased 25 to 30 percent yearly. Many rural areas with substantial fishing operations could produce 100,000 to 600,000 gallons of fuel annually from fish waste. Processors currently grind up and discharge fish waste back into the ocean. This waste could be invaluable biodiesel. Communities that produce excess fuel in this way could also sell it as a commodity.

SCOTT MCCORMICK, Vice-President of Denali Bio-Diesel, said they singled out 25 high potential areas for reducing PCE cost with fish waste biodiesel production and consumption. Challenges unique to small, remote fishing operations limit the potential for a commercial biodiesel operation, he said. These challenges include transportation, access to methanol and technical services, ability to train and certify staff, ability to maintain a laboratory and to have one or two people running start up and shut down operations coinciding with the six month fishing season. Converting fish waste into a product that allows for the extraction of oil could also be a challenge because while major fisheries already use a centrifuge and fish-grinding process, many rural communities only use machetes and tables to cut up fish. There would also be the issue of what to do with the de-oiled fish waste.

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MR. MCCORMICK reported that the Environmental Protection Agency (EPA) restricts the amount of fish waste that is dumped into the water. Many fisheries then convert excess waste to fishmeal at a loss. He said fish waste can be made into more valuable commodities than fishmeal. He explained that a filtering process removes small particulates and results in oil and de-oiled fish solids. Refining the oil then results in two products, biodiesel and glycerol. A number of commodities are made from glycerol, such as soap. He reported that of 132 communities that Denali Bio-Diesel looked at, 25 are likely to produce biodiesel and a number of the others could use it as a cottage industry for making products out of the glycerol.

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CHAIR MCGUIRE said that Mr. Mick's wife takes the glycerol from Denali Bio-Diesel production and makes it into soap. Senator McGuire has tried the soap and said it is fantastic.

SENATOR KOOKESH asked what Denali Bio-Diesel does with the filtered solids and how much is produced in a typical day.

MR. MICK replied that 25 million pounds of waste in the Kenai Peninsula would yield approximately 1 million gallons of biodiesel fuel. The remaining 19 to 20 million pounds would then be converted into a fish-based fertilizer product.

MR. MCCORMICK said the fertilizer product is called a liquid hydrolysate. Removing oil and glycerol from fish waste initially results in a dry product similar to a soil amendment. The dry product can be put on another product, such as formic acid, to stabilize it, prevent pathogens from forming and allow for shipping and handling. Secondary processing converts the dry fertilizer to a liquid called a liquid hydrolysate that sells for about \$5 to \$7 a gallon. Twenty million pounds of waste would result in \$12 million of liquid hydrolysate.

SENATOR KOOKESH said he thought it was just waste.

MR. MCCORMICK replied that without a good understanding of how to process the filtered solids, it has been considered waste. Three locations in the world make fish waste into fuel. One is a tilapia farm in Honduras, where biodiesel fuels all buses. A Finnish company, VTT, is building a \$40 million company in Vietnam using large channel catfish waste. The third place is the Denali Bio-Diesel plant in Chugiak, Alaska.

SENATOR KOOKESH clarified that he was asking about the filtered solids.

MR. MCCORMICK said depending on how the fish are harvested, the amount of removed solids is 85 to 90 percent of the fish waste volume. One eighth of that can be made into a liquid hydrolysate. If mixed with peat moss, the fish waste solids can be used as top soil. California uses a mixture of peat moss and fish solids as topsoil for desert areas and low-quality earth. Plants absorb 100 percent of fish filtered solids when used as a fertilizer as opposed to absorbing only 20 percent of chemical fertilizers.

SENATOR FRENCH asked what a liquid hydrolysate is.

MR. MCCORMICK answered that the process of removing oil and glycerol from fish waste results in a dry product. Another

chemical process turns the dry product into a liquid fish fertilizer called a hydrolysate.

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SENATOR FRENCH would like to see a chart showing what is currently happening across the state and the value of waste products. He would also like to see a projection of what would happen if the state adopted a process like this and its potential economic value.

MR. MICK said most processing plants have a meal plant operating at a loss because they are in excess of what can be ground and dumped back into the water. Dealing with excess fish waste is going to become a bigger problem because the EPA reported that ground and discharged waste is not decomposing or being consumed by aquatic life, but is building up on the ocean floor. Ground and discharge practices will eventually not be allowed. Processors will have to turn to a company to convert the fish waste to biofuel, or the waste will go to landfills.

SENATOR FRENCH said, for example, it is costing a processor \$2 a pound to make fish meal that can be sold for \$1 a pound.

MR. MCCORMICK responded in the affirmative, saying the cost is about 10 to 25 cents a pound.

SENATOR WAGONER asked what nutritional value the filtered solids have and if a secondary industry could be developed using filtered solids to feed pigs, poultry or livestock.

MR. MCCORMICK replied that filtered solids have to be stabilized to avoid the formation of pathogens in the decomposing fish. Filtered solids can be used as feed within a day or two or stored at a cold temperature. If large quantities need to be shipped, then filtered solids are not usable as a feedstock but only as a soil amendment, fish fertilizer or fishmeal.

MR. MICK said the word "feedstock" creates confusion; it is an industry standard term...

SENATOR WAGONER interrupted and said he knows what feedstock is. He said he was referring to feed for livestock and noted that dried feed can be fed to poultry, cattle or pigs. He asked if the filtered solids could be stored and used as feed.

MR. MICK said many places do that with the fishmeal that is created at a loss. Fishmeal is dried, further ground, stored and sold.

MR. MCCORMICK said that fishmeal does not require vitamin or mineral additives; specific additives are required for fishmeal that will be used to feed stock.

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SENATOR HUGGINS asked if the solids have an odor.

MR. MICK said the fish waste right from the fish plants does smell like dead fish. Once the waste is ground, dried and the oil has been removed, the smell is eliminated. The biodiesel has no smell.

CHAIR MCGUIRE asked if they had any of biodiesel here with them.

MR. MICK replied no.

CHAIR MCGUIRE said she has a mason jar of the biodiesel in her Anchorage office and it is odorless.

MR. MICK said the biodiesel is odorless and non-toxic.

MR. MCCORMICK said rural communities would need some new equipment, such as a machine similar to a high speed garbage disposal, to process the amount of fish waste that would make it viable for a rural community to generate its own fuel. Such a machine processes up to a ton an hour into a slurry that is then heated and pressed to remove the oil. Home equipment could make small quantities of soap; industrial equipment could make larger quantities. A tank system, costing about \$100,000 to \$250,000, would process the de-oiled, dried solid fish waste into a soil amendment in a passive fashion.

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MR. MCCORMICK reported that 25 rural communities could produce about 4 million gallons of biodiesel annually. Depending on the region, diesel fuel costs between \$4.00 and \$10.00 per gallon. Therefore, the rural communities could create between \$16 and \$40 million worth of biodiesel.

SENATOR HOFFMAN asked if biodiesel is a substitute for diesel and if gasoline can also be made.

MR. MICK said biodiesel is a substitute for diesel, not gasoline. Biodiesel can run in diesel engines and generators and be used for home heating. Anything that burns diesel fuel can burn biodiesel with 100 percent compatibility.

SENATOR HOFFMAN asked if the BTU of a gallon of biodiesel is equivalent to a gallon of diesel.

MR. MICK replied that a gallon of diesel has approximately 140,000 BTU's and a gallon of biodiesel produces approximately 134,000 BTU's. He said that biodiesel, when run in any internal combustion engine, has far better lubrication properties than number 1 and two diesels and ultra low sulfur diesel. Biodiesel lubrication is superior and causes less wear on the engine.

SENATOR HOFFMAN asked if biodiesel can be used as substitute for low sulfur diesel.

MR. MICK replied absolutely.

MR. MCCORMICK explained that beginning in 2010, federal law allows oil companies to deliver low quality high sulfur fuel to remote regions. The oil companies had claimed it was too expensive to supply two different kinds of fuels. Mr. McCormick said this would add more pollution to the environment.

SENATOR HOFFMAN asked if there is a rule exemption for low sulfur diesel in rural Alaska this year.

MR. MCCORMICK replied yes, beginning this year.

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SENATOR WAGONER commented that the performance of his boat engine goes down if he is using low sulfur diesel, but that biodiesel would perform as good as number 1 or number 2 diesels. He asked where he can get some of Denali Bio-Diesel's product to try in his boat.

MR. MCCORMICK replied that Senator Wagoner could get some in Chugiak.

SENATOR WAGONER asked the price per gallon.

MR. MICK replied that he generally keeps the price of the biodiesel about 25 percent less than pump diesel. Methanol, which is derived from petroleum, is the one chemical needed to make biodiesel; therefore, if the price of oil sky rockets, the

price of methanol goes up too. Right now diesel in Anchorage sells at \$3.50 a gallon, the biodiesel sells between \$2.75 and \$3 per gallon.

SENATOR MCGUIRE asked if Mr. Mick also brings tanks to people's homes.

MR. MICK said he can do that upon request.

SENATOR WIELECHOWSKI asked how much fish waste there is and the amount of diesel that can be created with it here in Alaska.

MR. MCCORMICK said the 25 high potential villages could make about 4 million gallons of biodiesel per year. Alaska has enough commercial fish waste discarded every year to produce between 85 and 90 million gallons of diesel. The state consumes about 58 million gallons of diesel, all of which is imported. In the United States, just 50 percent of commercial fishery waste equates to 10 percent of national diesel needs per year.

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SENATOR HOFFMAN inquired as to why the US and the world is not implementing this technology more widely if the biodiesel can be used as a low sulfur substitute and is cheaper.

MR. MICK said biodiesel is being widely implemented throughout the United States. Last year, 750,000 gallons of biodiesel were produced and consumed in the US. In Europe, 2.6 billion gallons of biodiesel were produced and consumed. Seven states have mandates requiring all pump diesel to be B20 within the next two years. Mr. Mick explained that the "B" stands for biodiesel and the number is the percentage of biodiesel that is blended with diesel. By 2012 at least seven states are mandating biodiesel blend for all consumers.

SENATOR HOFFMAN asked for Mr. Mick and Mr. McCormick's response to those who say this is unproven technology.

MR. MCCORMICK said that when he heard that response from one individual, he asked the under-secretary at the Department of Energy to send some information to that person. He said that Denali Bio-Diesel's product has been graded by the American Society of Testing and Materials (ASTM, which is the standard by which any fuel product is measured. He said a lack of awareness and some misconceptions about biodiesel exist but a variety of information is available. He reported that a catfish farm in Alabama buried the equivalent of 20 million gallons of fuel

because they didn't know what to do with it. Biodiesel people often do not know about fishing communities or fish farms and fisherman do not know about biodiesel.

MR. MCCORMICK said that as with any product that is not main stream, it is misunderstood. Some places have mixed biodiesel with diesel and called it biodiesel. When the mixed fuel did not work, biodiesel got a bad reputation.

SENATOR HUGGINS asked about the logistics involved for offshore processors, including transloading the fish waste. He asked if it was true that the EPA is going to eliminate the processors' ability to dump fish refuse.

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MR. MICK said that it was his understanding that the EPA intends to severely limit or restrict the processors' ability to grind and discharge.

SENATOR HUGGINS asked about the logic and logistics of bringing offshore processing waste on shore for biodiesel processing.

MR. MCCORMICK felt part of the solution would be to design a refinery that can fit in a 20'x8'x8' shipping container. He said most processors have a support vessel and it would be easy to put this refinery on a ship and process waste at sea. The offshore processors would still have to deal with the de-oiled waste, but it has substantially lower pathogenic material growth.

MR. MCCORMICK noted it may be a decade before the EPA would restrict the grind and discharge ability of offshore processors.

SENATOR FRENCH asked what the catch is, what the cost is or what the main impediment to implementing this idea might be.

MR. MCCORMICK reported that over a couple of years, the infrastructure would probably cost \$6 million for two plants; one plant would be about \$3.5 million. Incrementally, each plant would cost about \$2.5 million. If the plant made 100,000 to 600,000 gallons of biodiesel, the payback would be less than 1.5 years.

MR. MCCORMICK explained that Denali Bio-Diesel was asked, as domain experts, to do a study and propose a solution; they presented this proposal as a potential solution for reducing the PCE cost and helping rural communities. A number of firms could

implement this proposed development. Mr. McCormick said that he and Mr. Mick are not financial experts and feel the legislators and others would need to decide how to manage and run this project.

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SENATOR FRENCH asked where Denali Bio-Diesel's proposal is written down.

MR. MCCORMICK explained that as he understood this committee's role and expertise not to include working out the funding, he removed four pages from the document before the committee; he had them to distribute separately. His intention was that this be solely an informational meeting.

SENATOR WAGONER corrected Mr. McCormick's earlier statement that diesel is imported into Alaska and stated that diesel is made in North Pole and in Kenai. He said most low sulfur diesel used in Alaska is made here.

MR. MCCORMICK apologized and said that was the information given to him.

SENATOR WAGONER asked if the biodiesel processing plants would be permanently in place or just when fish are being harvested and waste is being generated. He asked if the waste could sit and then a plant could be brought to process it.

MR. MICK replied that these would be permanent locations because fish degrades quickly without immediate processing or correct storage.

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SENATOR WIELECHOWSKI said he envisioned this taking off through the Emerging Technology Fund in the Omnibus bill. He said Alaska could become a pioneer and that the opportunity to provide diesel fuel, at a low cost, with payback in a year or so, certainly needed to be looked into.

MR. MICK agreed with Senator Wielechowski and said fish waste biodiesel would enable rural communities to create their own low cost fuel source. Alaska can be a technological leader and a center for excellence for the production of fish waste biodiesel. Only two other places in the world do this, a small Honduras company and a Finnish company in Vietnam. By setting up small scale refineries in rural communities, Alaska would also be a center of excellence for economic development.

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CHAIR MCGUIRE said the Blended Tax Credit of 2004 gave a \$1 per gallon subsidy for fish diesel which expired in 2008. She asked if there any new subsidies on the horizon.

Mr. MCCORMICK understood that the Department of Energy (DOE) is waiting to see if there is going to be a stimulus package and if Stimulus Two would include subsidies. Denali Bio-Diesel worked with the DOE, Congressman Peters and Senator Stabenow on some of the language used in their last \$3 billion energy bill to allow subsidies to be a consideration on a state by state basis. Congress has not decided whether there is going to be a federal mandate yet and will not know until August when they get through many of the committee meetings.

CHAIR MCGUIRE said she understood low sulfur diesel to be much more expensive and yet mandates for it are on the horizon. She understood that the Department of Transportation is easing their fleet into low sulfur diesel and it is expensive. She reminded the committee that in the late 1970's, the US started to require that gasoline be refined down and the environment harming elements be removed. The government did not require this of diesel at that time, but now the push exists. She said she sees the US going toward low sulfur diesel. She suggested Mr. McCormick and Mr. Mick look at the cost comparison between low sulfur diesel and the biodiesel itself because that will be a most relevant comparison.

CHAIR MCGUIRE said that the meeting was meant to expose committee members to the many ways that the state would recoup its investment in this biodiesel plan, including job training, energy production and independence in villages. Denali Bio-Diesel's proposal fits with the concept of Emerging Energy Technology, formerly SB 150, now within the energy plan, and could make Alaska a world leader.

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MR. MCCORMICK showed a photo of a typical commercial biodiesel refinery that processes large quantities.

CHAIR MCGUIRE asked Mr. McCormick to list costs when possible.

MR. MCCORMICK said this type of large, commercial biodiesel refinery usually costs between \$8 and \$15 million, depending on how many gallons it produces. Other designs made in Germany and Belgium cost about \$2.2 to \$2.4 million and produces between

100,000 gallons and 600,000 gallons. To use this equipment however, fish rendering equipment is also needed, as well as some extra handling and some external tanks. Both types of refineries fit in 20'x8'x8' shipping containers. They could be barged or flown to the desired location.

CHAIR MCGUIRE said the ability to ship these refineries is important.

MR. MICK said the refineries are built into a shipping container and can go on barges or a C-130. They can be transported easily to the communities.

MR. MCCORMICK said he asked for some information from the company in Whitehorse that has the contract to build housing in the pipeline area. That housing fits into a container, can be removed, unfolded and built into a facility that would be big enough to house the refinery equipment and sometimes host other community activities in a loft space. He said the refinery is self-sufficient, not requiring water and using its own fuel to run itself after an initial start up.

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MR. MCCORMICK referred to a summary chart illustrating the goals of the proposed solution: to consume locally generated waste as a feedstock, to produce biodiesel for local consumption, to produce no unusable waste or pollution and to train and employ residents of rural communities. The daily maintenance for the refinery system is no more complex than doing maintenance on a snow mobile.

SENATOR WAGONER what happens if some of the biodiesel is spilled on water.

MR. MICK replied that one tablespoon of salt is more toxic to the water than 10,000 gallons of biodiesel.

MR. MCCORMICK said these refineries would diversify the industry and increase the skills of the rural communities. The design can be scaled up or down to produce 100,000 to 600,000 gallons of output. This biodiesel system would help the state decrease or eliminate the energy subsidies. The villages would have to provide a plant site but would gain an environmentally friendly fuel, would employ people with new skill sets and would reduce reliance on imported fuel.

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MR. MCCORMICK said he does not view this as a bio-fuel program but an economic development initiative. A village with a high level operation of 600,000 gallons would employ four to eight people. A training and certification center, which the University of Alaska Fairbanks has been helping to identify and create, would probably employ 6 to 10 university personnel, most of whom would be students involved as a part of a course program. Another 8 to 10 jobs would staff a chemical and spares warehouse, an office and field positions. There would also be collateral employment growth in transportation, chemical and other industries that participate.

MR. MCCORMICK said that Argonne National Laboratory analyzed the amount of energy used to recover a fuel from its source through usage. They found that B100 fuel, fuel that is 100 percent biodiesel, is the cleanest known fuel. This was illustrated in a DOE table, "A Comparison of Alternative Fuels." The EPA looked at the exhaust emissions from the product that Denali Bio-Diesel produced and compared to petroleum, there is 101 percent less pollution. It is more than 100 percent because the fish are collected whether the waste is made into biodiesel or not, so no extra energy is used to harvest the feedstock. Every other fuel requires collection and processing of feedstock specifically for the purpose of making fuel.

MR. MICK referred to a chart of fish waste derived biodiesel pollution and said the carbon dioxide (CO₂) reduction is 96.8 percent. The nitrogen oxide (N₂O) is up slightly at 15.7 percent. The green house gases (GHG) are down 95.3%. The de-oiled fish waste is up 338.2 percent but that is then turned into fertilizer. Carbon Monoxide (CO) is down 85.3 percent. Particulate Matter, <10 micrometers, is down 162.3 percent and particulate matter, <2.5 micrometers, is down 86.3 percent.

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SENATOR WAGONER referred to a previous chart of relative greenhouse gas emissions and said he did not understand the gas emissions of liquid petroleum gas (LPG) and compressed natural gas (CNG) being almost as high as gasoline. He said LPG and CNG are much lower in emissions than diesel.

MR. MCCORMICK replied that the DOE calculates total green house gas emissions by counting how much pollution is given off to harvest the original fuel source, to transport it, to store it and to use it

SENATOR WAGONER said that it is funny math.

SENATOR FRENCH asked if it is a life-cycle approach to green house gas, from cradle to grave.

MR. MCCORMICK said the GREET model for well to wheel analysis was created by Argon National Laboratory for the DOE.

SENATOR FRENCH asked if these green house gas emissions were DOE numbers.

MR. MCCORMICK responded yes, they were DOE numbers.

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SENATOR Wagoner asked if Denali Bio-Diesel is undertaking a fish waste biodiesel refinery on the Kenai Peninsula.

MR. MICK confirmed that Denali Bio-Diesel is currently undertaking this project.

SENATOR WAGONER said he doesn't think the offshore processors are going to have to bring their waste on shore.

MR. MICK said EPA individuals willing to speak off the record and offshore processing managers themselves told him that they foresee a day when grinding and discharging will not be allowed. Material that is ground and discharged is not decomposing at the depth it is deposited into the ocean. It was originally thought that other sea life would consume ground and discharged material, but that has not been the case.

SENATOR WAGONER said it was true that other sea life doesn't consume what is ground. Sea life would consume fish waste if it was not ground. Any processor or fisherman understands that.

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MR. MCCORMICK thanked Chair McGuire for the opportunity to present.

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CHAIR MCGUIRE thanked the presenters and having no further business before the committee, the meeting was adjourned.