

**ALASKA STATE LEGISLATURE  
HOUSE RESOURCES STANDING COMMITTEE**

February 4, 2014

5:06 p.m.

**MEMBERS PRESENT**

Representative Eric Feige, Co-Chair  
Representative Dan Saddler, Co-Chair  
Representative Peggy Wilson, Vice Chair  
Representative Craig Johnson  
Representative Kurt Olson  
Representative Paul Seaton  
Representative Scott Kawasaki  
Representative Geran Tarr

**MEMBERS ABSENT**

Representative Mike Hawker

**OTHER LEGISLATORS PRESENT**

Representative Andrew Josephson

**COMMITTEE CALENDAR**

OVERVIEW(S): UPDATE - ALASKA LNG PROJECT

- HEARD

**PREVIOUS COMMITTEE ACTION**

No previous action to record

**WITNESS REGISTER**

STEVE BUTT, Senior Project Manager  
Alaska LNG Project  
ExxonMobil Development Company  
Houston, Texas

**POSITION STATEMENT:** Provided a PowerPoint update on the Alaska LNG Project.

**ACTION NARRATIVE**

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**CO-CHAIR ERIC FEIGE** called the House Resources Standing Committee meeting to order at 5:06 p.m. Representatives Seaton, P. Wilson, Johnson, Saddler, and Feige were present at the call to order. Representatives Tarr, Kawasaki, and Olson arrived as the meeting was in progress. Representative Josephson was also present.

**OVERVIEW(S): Update - Alaska LNG Project**

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CO-CHAIR FEIGE announced that the only order of business is an update on the Alaska Liquefied Natural Gas (LNG) Project.

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STEVE BUTT, Senior Project Manager, Alaska LNG Project, ExxonMobil Development Company, introduced himself, noting he has been with ExxonMobil since 1985. He said he was in operating, project, and technical roles in the U.S. until 1997, after which he went to various countries for work in operations, project startup, and LNG startup. Over the last two years he has been working with the project participants under a "concept selection agreement" in which BP, ConocoPhillips, ExxonMobil, and TransCanada have been evaluating an LNG project in Alaska.

MR. BUTT displayed a slide entitled "The Alaska LNG Project" and emphasized that this is an LNG project, not a pipeline project, an important differentiation from previous pipeline projects. He said a pipeline project takes gas from one place to another, has a different regulatory environment, has a different business model, and very different alignment factors. In an LNG project an infrastructure must be built to transport, treat, and liquefy the resource - gas on the North Slope - so it can be sold to buyers. While a pipeline is an integral part of this project, it is not a pipeline project. It is a project where resource owners need to work together to create infrastructure to be able to monetize that resources.

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MR. BUTT said three important filters are used when considering an LNG project: alignment, risk reduction, and cost - the "ARC" of success. Alignment is used to ensure that all the parties are working together. Risk reduction is developing an understanding of the uncertainty and driving down that

uncertainty. Not as much resources are at risk early in the life of a project, but the levels of uncertainty are much higher. As a project is matured the uncertainty must be reduced to reduce risk; as larger investments of time, people, and money are made there is a lot of confidence in what is being done. Through that process, cost is driven down. Cost of supplies is the single most important metric in evaluating the competitiveness of an LNG project because the gas market is a commodity business. The buyers of LNG are trying to buy the utility value of the gas. While discussing the project, putting on a buyer's hat will provide an understanding of what it is that a buyer wants. A buyer wants reliable delivery of LNG to its re-gasification system for 30 years. Every couple days a buyer wants to see an LNG carrier delivering energy so that the buyer's economy can grow. Mr. Butt explained he will discuss the Alaska LNG Project in terms of the ARC of success: getting alignment amongst the parties, facing the risks and managing uncertainty, and driving down costs of supply to make the project competitive in a broader global market.

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MR. BUTT moved to the slide entitled "Accomplishments," noting the Alaska LNG Project has an integrated concept. This is important, he said, because it is the first time all of the resource owners and the primary producers on the North Slope have actually worked together to evaluate an LNG process. In so doing, Prudhoe Bay, Point Thomson, and all the facilities required, were looked at as an integrated system. Previous pipeline projects had firewalls between those projects and the producers. Thus, conversations between those projects and those producers were under very restrictive terms and without a free flow of information or a free exchange of ideas that would allow looking for improvements. Regulatory and federal law require this to be done to preserve a competitive environment because a pipeline is about moving gas from one point to another and it must be ensured that anybody wanting to move gas in that system has a fair opportunity to access it. Access for others is still wanted [in the Alaska LNG Project], but it is a different model because the resource owners are creating an infrastructure to sell a resource that they own and finding a way to get it to a market. The parties have worked together to come up with an integrated design with benefits from that integration. Selection of the LNG plant site, the Nikiski industrial area on the east side of Cook Inlet, has been finalized. In turn, this allows finalization of the pipeline corridor from Prudhoe Bay to the plant site, which allows all of the regulatory work to be

done to further reduce uncertainty. Answering the questions of plant location and pipeline route allows for making decisions that point toward the lowest cost of supply.

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MR. BUTT reported that a safe and successful summer field season was accomplished in 2013. About 150 people worked on conducting detailed assessments of the route for fisheries, waterways, cultural heritage, and other elements to ensure that if the pipeline is built there will be no environmental damage and there is the right information for the regulatory environment. About 100,000 hours of work was done without any incidents and the goal is to preserve that incident-free record. Also accomplished was confirmation of the ability to integrate into existing operations at producing fields, an essential element of this project and for being able to work together. The Prudhoe Bay operator has done a good job of integrating the east and west areas of the field, which has enabled identification of the places to get the gas to source gas to this project. Much has been done to progress the gas treatment facility. Some of the routing work has been finished. Most importantly because it is such a big project, it has been figured out how to move all the elements of this project around, such as the sealifts and other logistics that will be required.

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MR. BUTT turned to the slide entitled "Potential Benefits," noting that at \$45-\$65 billion the project will be the largest single investment in Alaska's history. It will create 9,000-15,000 jobs [for design and construction] and about 1,000 long-term jobs [for operations]. Industrial jobs have a high multiplier to create other jobs in service sectors and other elements of the economy. The Alaska Oil and Gas Association (AOGA) recently estimated the multiplier effect at 9:1. The project will create an export market while also providing gas to Alaskans. A unique benefit of an integrated project such as this is the tremendous amount of tax revenues that are generated from the sale of the gas to buyers. According to estimates by Black & Veatch, consultant to the Department of Revenue (DOR) and the Department of Natural Resources (DNR), \$1.5-\$2.0 billion in tax revenue will be generated annually to the state. The project's infrastructure will provide gas to Alaskans because the pipeline will go from Prudhoe Bay to the east side of the Cook Inlet with five offtake points contemplated. The locations of these offtakes will be determined by working with the state.

MR. BUTT turned to the slide entitled "Safety, Health and Environment (SHE)", saying the project is proud to be off to an incident-free start and wants to stay that way. The project developers are committed to safe and environmentally responsible development. As the project is progressed effort will be made to preserve Alaska's biodiversity, ecosystems, and traditional knowledge. He displayed photographs of people conducting a data survey, checking a burrow pit from an early prospector, Denali National Park and Preserve, a waterway being surveyed by a crew, and a highway area along which the pipeline would come down.

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REPRESENTATIVE P. WILSON inquired about the number of state and federal permits that will be required for such a large project and how this will work given the state's permitting backlog.

MR. BUTT replied hundreds of permits will be required. In 2013, project developers had a good experience working with the State Pipeline Coordinator's office, which did an excellent job helping the project get all the permits it needed for doing the survey work between Livengood and Prudhoe Bay. The project's work could not have been done without that help. However, knowing the office's capacity, the office would be overwhelmed. As it moves into the more detailed design phase, the project will have to assist in defining what kind of capacity is needed at state and federal levels. It is likely that thousands of small permits and hundreds of primary permits will be needed, which all get triggered by the Federal Energy Regulatory Commission (FERC) process under the Environmental Protection Agency (EPA) where an environmental impact statement (EIS) must be filed to receive the right authorizations to proceed. Once that initial permitting process is done, hundreds of permits and thousands of rights of way will be required.

REPRESENTATIVE P. WILSON surmised [the State Pipeline Coordinator's office] will need to hire additional personnel.

MR. BUTT responded he thinks so and the project has some rough estimates. The project has been trying to understand what the framework of the federal regulators looks like and has had a great experience with the state's regulators. Capacity needs to be built, but it would be best if it is a collaborative process where everyone works together to define what kind of permits are required and what kind of capacity the regulators are going to need to address it.

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MR. BUTT addressed the slide entitled "Challenges", pointing out that the most important challenge is the project's scope. Megaprojects, he explained, are traditionally defined in industry as anything over \$1 billion and sometimes \$10 billion is used as a cutoff. At \$45-\$65 billion the Alaska LNG Project is on the order of five megaprojects being constructed simultaneously in one place. It takes much planning to manage the arctic challenges, remote challenges, and access challenges of something this big. During the planning processes care must be taken to ensure the right welders are available for the pipeline and that those welders are not creating competitive risk for the welding or the other craft skills required in the other elements of the project. Another challenge is the very complex commercial arrangements that need to be worked through. Foreign buyers want to understand that LNG will be provided to them reliably for 30 years. The complex buyer arrangements need to be considered as a fundamental area in which it is demonstrated that the risks have been contemplated and the uncertainties managed because buyers want to know the project is going to deliver. Long-term commitments are required because LNG buyers do not want to build the infrastructure necessary to have an economy that relies on LNG if they do not have a long-term supply of LNG. Both buyers and equity owners of the project have a very long-term view.

MR. BUTT continued his discussion of challenges, advising there is tremendous uncertainty related to permitting. Exactly how many permits will be needed is unknown because no one has undertaken a project this big before. Conversations have been held with FERC and the State Pipeline Coordinator's office. Other elements of the state have been very supportive and helped the project to complete its work in 2013 and get off to a good start in 2014. The complexity of the permitting scope is hard to pin down until the project is further along and better understood. Another big challenge, he said, is to understand the commercial and fiscal issues, especially with the state. It is important to remember that the state is one of the largest resource owners in the state. It is important to remember that getting the big three producers to work together is challenging, but is not enough. All four primary resource owners in the state must work together because they need to be aligned on hundreds of small decisions. How to manage different elements of the project and how to trade value across the elements of the project can be a real challenge if folks are not aligned. Having different

drivers creates misalignment and misalignment creates uncertainty, which compromises the ARC of success because compromising risk and uncertainty usually increases cost.

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MR. BUTT said the legislation currently pending before the legislature from the Department of Natural Resources (DNR) and the administration can really help the Alaska LNG Project work through this uncertainty. In doing that, the "three p's" must be understood: participants, percentage equity, and process. Who are the participants? Who are the participants from the state? Who signs the agreements? What is the percentage equity? What is the state's equity in the project? One of the most important things going forward in the joint venture agreement is, What equity does everybody hold and is the state comfortable with it? What is the process to enable all the little decisions, such that in moving from this legislative session to the next nothing is binding? This gives everybody a chance to get comfortable with things and move into Pre-FEED so that uncertainty can be reduced. As uncertainty is reduced on technical and commercial factors, everyone can make much better decisions; plus, all the resource owners, including the state, have multiple off-ramps along the way. Once Pre-Feed is entered, which has never been done before in Alaska on a project like this, there can be a tremendously deeper understanding of the factors. Assumptions about the future are usually wrong; decision makers are usually best served by defining a process that allows the work to be done to understand the issues and then make the decisions. Then, after those decisions have been made, there are multiple offerings. Commercial issues get worked concurrent to Pre-FEED. By the legislature defining the "three p's," the state enables the project to move forward and resolve these challenges. These challenges are important and touch those primary elements of the ARC of success.

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REPRESENTATIVE P. WILSON noted the producers have experts who know how to make these kinds of negotiations and have done so for many years, whereas the state can only do its best. She asked how the state can work with the producers while ensuring that the best deal is being made for the State of Alaska.

MR. BUTT agreed the producers have lots of experience with LNG, but said he views that as a benefit because the state has three of the world's largest LNG producers and marketers as part of

the arrangement. The state has had confidential one-on-one conversations with each party on how to manage marketing, he related. The different producers cannot talk to each other about marketing because that is collusion. Each producer has talked with the state about ways it could help sell the state's pro-rata share. He invited committee members to talk to the folks at DNR and DOR about those conversations because they can give a more complete answer than he can. By leveraging the strength of those producers and their working with the state, the state gets confidence that it can manage that. Every deal must be fair and durable or it will not work for anyone, and that is how conversations about the off-ramps are gotten into. As the parties learn more, they can assess whether they are still comfortable or need to make adjustments. As currently written, the pending legislation does not presuppose any decision that is irrevocable; it creates a process to get more information as Pre-FEED is entered. The intent of that process is different than any of its predecessors: to give folks in the state and in the legislature time to learn more and get comfortable with it because it is complex.

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REPRESENTATIVE KAWASAKI noted the producers participating in the Alaska LNG Project will be making money, and said it is unfair to talk only about the potential benefits to the state without also talking about the potential rewards for the producers. Along these same lines, he continued, there are the challenges from the state's perspective versus challenges from the producer's perspective. He asked to hear more about the upside of the Alaska LNG Project for the corporations. He added he would also like to hear about the challenges of the project; for example, how small communities will be impacted by heavy traffic or how schools will be impacted by having too many students.

MR. BUTT responded it goes back to the ARC of success. The view of the producers, he related, is that they have resources they would like to commercialize in a manner that can generate returns commensurate with the risks. Looking forward, the companies are trying to take the hydrocarbon resources they own on the North Slope and find a way to create an infrastructure that allows them to monetize those resources. In relation to the alignment element, looking at those risks just for the independent companies does not represent all of the resource owners. Until a structure is created where all the resource owners are working together, it is very unlikely that an infrastructure of this scale can be successfully built because

it is so large. Alignment is necessary and all four resource owners must have a shared risk profile and a shared return so that selling LNG generates those benefits and distributes those revenues against the equities and the project is structured such that each of the owners owns capacity in the project. Owning capacity in the project gives these owners flexibility. For instance, each of the four owners owns some percentage of that capacity. They have the ability to fill that capacity and they have the ability to leverage that capacity by filling it with the resources they own and then generating revenue from that. There is language in the current legislature that gives those parties unilateral opportunities to expand. If, for example, one party wants to bring in more gas from other parties, it can do that because it owns that capacity in the project. Alignment has been created so that all four parties have shared benefits and risks and those benefits and risks look a lot alike. That is good for the producers because they own a resource that they can commercialize if they can have the right infrastructure to do it. If there is not an aligned infrastructure that allows the producers to get the gas from the North Slope and liquefy it to the tidewater, they cannot sell it. This is the same for the State of Alaska's resource. Generating that alignment gets a position where the parties work together and can win together.

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CO-CHAIR FEIGE said it should be noted that the state is taking on a risk by being a venture partner with the producers and its share of the gas.

MR. BUTT concurred.

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REPRESENTATIVE SEATON understood all the parties are equal partners and any one of the partners can expand to put more gas in and take the risk of the cost, but the requirement is that all the other parties get a reduction in tariff. He asked how that works.

MR. BUTT replied the structure is a little bit different than the aforementioned. Words like tariffs, rates, and structures talk about a pipeline, not an LNG project. In an LNG project, he explained, [a party] owns capacity. In a pipeline, [a party] owns some element and other parties are tariffed in to compensate [the party] for the capital that [the party] has invested. In this project, [the state] owns some portion of the

capacity and [the state] can fill that capacity as it chooses. If [the state] wants to exceed its volume of that capacity, [the state] can do it as long as it does not harm the other parties. [In this project], it is okay for any one party to bring in some additional gas as long as it benefits and does not harm other parties. There is some expansion capacity in this proposed system, but if that capacity is exceeded and a unilateral investment in capacity is needed, parties have that option under the Heads of Agreement (HOA). A party can expand or invest or do what it chooses as long as it is not harming the other parties. Expansion can be done with compression or other means. However, it is not really changing tariffs. For example, the three parties that are not expanding still own their capacity, are still putting their gas through that capacity, are liquefying that capacity, and are generating revenues against that. "If another party wants to bring in more gas, then they have a financial incentive to sell some of their space to other parties. If they want to expand, they can invest and monetize that space by charging other parties. But the anchor tenants - the first four in - own capacity and fill that capacity and generate revenue on that capacity. That is the right that they are buying and that is why this project is different than a pipeline and that is why the HOA as it is written allows a higher level of alignment." It is an important difference and that subtlety is what he is pointing out.

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CO-CHAIR FEIGE said the way he looks at this is that a person can buy a seat on an airline or can have a fractional ownership of an aircraft, in which case the person is entitled to a percentage of hours that that aircraft flies over the season as opposed to buying a spot on somebody else's plane.

MR. BUTT agreed with Co-Chair Feige's analogy.

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REPRESENTATIVE SEATON said [the Alaska LNG Project] allows a fractional owner to expand its use of that aircraft. Previous things have had requirements of shared benefits but not increase in cost. Here, however, he is understanding that Mr. Butt is saying there are not guaranteed shared benefits; that if a party chooses to expand, the party only does not harm the others, but the others that are not investors are not shared beneficiaries.

MR. BUTT answered he thinks Representative Seaton's language is accurate. He invited Representative Seaton to set up an appointment with the owners' committees, saying that those fiscal representatives are excellent at this and helped write the HOA. The key way to think about it, he continued, is that a party maintains alignment in that capacity, the party owns its fractional share, owns its element of capacity. If a party chooses to expand its capacity, it can do so as long as it is not harming the others.

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MR. BUTT addressed the slide entitled "Next Steps," pointing out that the field studies and environmental baseline assessments must continue since they are critical to managing the regulatory uncertainty, given that regulatory uncertainty overlays all of this. The hope is to do another field study in 2014, which will be bigger than the one done in 2013. The engineering and design work must also continue being done for an integrated project. Moving into Pre-FEED is really about taking a much higher level of commitment in terms of resources, primarily engineering and technical resources, to make much more detailed decisions. The analogy of building a house can be used. In concept selection, a decision is made on where to put the house and how many bedrooms and bathrooms it will have. When getting into Pre-FEED, thought must be given about how big the joists are in this house, how thick the walls are, and what the floors and heating will look like, and evaluation of whether this house will work as a place to live for the next 30 years. In FEED the level is even more detailed, such as determining what fixtures, door knobs, and cabinet hinges to use so that by the time this house is about to be built there is no uncertainty in what it is going to look like and what it will be like to live in. The Alaska LNG Project needs to move into that and that is why the joint venture agreement and Pre-FEED are being looked forward to.

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MR. BUTT continued his discussion of the next steps, saying the project is hoping to move forward on state and federal licensing applications. There are ways the project can work forward on this that will provide better understanding through Pre-FEED and help in evaluating the licenses that will be needed and help address regulatory uncertainty. Also being worked on is a durable [gas] fiscal regime. The HOA is specifically written to give the legislature the time to think about it and to come back in subsequent legislative sessions to work it further. That

time is important because as the engineering is progressed and understanding is gained on what the project looks like, it will also provide understanding on what is the regulatory environment and what is the fiscal environment of the project. For example, determination of the tax and interest rates will provide an understanding of what the mortgage will be for the next 30 years and provide confidence on the affordability of the project.

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REPRESENTATIVE KAWASAKI noted that much field work, engineering, and permit preparation has been going on under AGIA or AGDC or a combination of the two. He asked how many of the aforementioned next steps would be done under any of those scenarios should a bill be passed.

MR. BUTT responded the intent would be to progress them all.

REPRESENTATIVE KAWASAKI asked whether the aforementioned next steps will be moved along if HB 277, or something like it, is not passed and there is no HOA or Memorandum of Understanding.

MR. BUTT replied it is hard to envision folks being able to move forward on the ARC because there would be no alignment, the participants and their percentage of equity would be unknown, and the process would be unknown. Not having alignment creates a tremendous risk and compromises cost. Therefore it is hard to envision moving forward without some better alignment and work on those three elements.

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REPRESENTATIVE TARR inquired as to what factors would be deal breakers for ExxonMobil moving forward on the project.

MR. BUTT answered that on behalf of the project he would like to speak on behalf of all of the producers. He offered, if so desired by Representative Tarr, to bring owner representatives from the team to talk about each of the individual companies. Far more important, he continued, is that the competitiveness of an LNG project is measured by cost of supply, not internal seriatim. If an LNG project has the right level of alignment and right level of risk and uncertainty reduction, the cost of supply can be driven down to the point where the project is not competing with other projects internal to other portfolios. Those are risk decisions and resource allocation decisions that each of the owners must make. What is really being competed

with is the global LNG market. Natural gas demand is anticipated to grow about 65 percent by 2040 and LNG is the largest, fastest growing energy product in the world. If LNG can be delivered at the lowest cost of supply, that LNG will displace something else if it is not meeting new needs. As economies in the Far East and other parts of the world grow, they seek to increase their standard of living which grows their demand for energy, and LNG is an excellent fit for that because it has a low carbon footprint relative to other products. As economies grow, they create an infrastructure that requires LNG and, as more people are buying LNG, more demand for LNG is created because the infrastructure on the other side of the ocean is in place to use the LNG. When [ExxonMobil] first started its LNG business 20 years ago, demand was very limited because very few places could buy LNG since it must be warmed up to return it to a gaseous state. More and more LNG has been used over the last 20 years because it is a reliable fuel that has helped economies grow, so more and more regasification terminals have been built and the demand has grown. Regarding competitiveness within any one corporation for resource allocation, he said only the individual owners can answer that. But more importantly, the resource owners are going to be much more likely to want to invest in a project if they have confidence in it, see alignment, and know the project will be delivering gas at a cost of supply that is competitive. Mr. Butt further noted that he has heard much conversation about market timing -- that if LNG is not delivered by a certain time window it cannot be delivered. He offered his belief that that is untrue because the LNG business is a commodity business. Folks want the utility of the gas, the gas is the same wherever they get it, and what they want is the ability to heat their homes and keep their lights on. He related he has spent 14 years overseas, most of them in places where the standard of living is very different than what is taken for granted in the West. Folks are hungry for that energy and want to increase their standard of living and improve their economy. To help those economies grow, corporations want to be able to deliver gas in a more cost competitive and efficient manner than other projects and that generates the success and that helps corporations make resource allocation decisions.

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REPRESENTATIVE SEATON, regarding the next step of establishing a durable gas fiscal regime, noted that a past problem has been oil being a more valuable commodity than gas. He recalled there was an absolute determination that a fiscal regime for gas had

to include a fiscal regime long-term for oil. He asked whether that is still a portion of this project.

MR. BUTT responded that oil and gas are two sides of the same coin. Mother Nature creates them together and puts them together in the same place. A healthy oil business underpins a gas business. To get low cost of supply, Alaska's big advantage is that it has developed infrastructure that can be leveraged. As long as that infrastructure is healthy, it is a benefit to the project. But, if for any reason the oil industry is not healthy and that infrastructure cannot be relied upon, it becomes a disadvantage, which creates uncertainty and increases cost. That oil and gas are bundled together is an owner issue and the owner representatives would be happy to talk to members about the fiscal structures.

REPRESENTATIVE SEATON requested this issue be addressed when the owner representatives come before the committee because it is a question that also needs to be heard by the general public.

MR. BUTT reiterated that the owner representatives will be happy to do so.

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REPRESENTATIVE TARR related that many people have been suggesting the state is operating within a window of time. She understood Mr. Butt to be saying that the more accurate way to approach this is to focus on the low cost of supply because things will line up due to the predicted increase in demand.

MR. BUTT concurred and reiterated that it is the ARC of success. Aligned parties that reduce risk and reduce cost will result in success because there will be a low cost of supply that can capture that market as it grows at whatever pace it grows. Markets go up and markets go down and he has never met anyone who can accurately predict them. But, he continued, something he does know is that commodity businesses are driven by cost and low cost always wins.

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MR. BUTT resumed his presentation, turning to two schematic slides to show what the Alaska LNG Project will look like and how it will be built [one slide labeled "Producing Fields" on the left and "Gas Treatment Plant" on the right; the other slide labeled "Storage and Loading" on the left and "Liquefaction

Plant" on the right]. He explained the Alaska LNG Project will begin with the anchor fields of Prudhoe Bay and Point Thomson on the North Slope and the gas will be moved down through the Railbelt to Nikiski on the east side of the Cook Inlet where it will be liquefied and exported. The anchor fields of Prudhoe Bay and Point Thomson provide enough critical mass resources to give investors the confidence that they can build this very, very expensive megaproject. Point Thomson is a newer field under development, while Prudhoe Bay has been on production for decades. The Prudhoe Bay operator has done an excellent job of preserving that asset and that gives the tremendous advantage of integration. Being two sides of the same coin, oil and gas come together and for decades the Prudhoe Bay operator has been producing the reservoir fluids, separating out the gas, putting the oil in the Trans-Alaska Pipeline System (TAPS), and returning the gas to the reservoir, called cycling. The gas has been taken out of the ground and reinjected three times. A big advantage of the Alaska LNG Project is that the resource location is known. That advantage is fundamentally tied to the health of the existing infrastructure, that that oil business continues to operate in a manner that allows the use of those wells and the compression facilities for this project.

MR. BUTT elaborated in regard to integration, stating that by being able to work together the LNG project is different than pipelines. Through integration with the Prudhoe Bay operator, it is known exactly where to get the gas. The central gas facility has a 52-inch header that separates the low-stage compression machines from the high-stage compression machines. It is known exactly how to modify the existing facilities and how to get the gas into an LNG project for export. No other project could do that. By having that integration, it is also known how to put the carbon dioxide back into the ground. It is also known how to handle the power. That integration is so fundamental that it has also been a huge benefit in the gas treatment plant. This element of being able to work together differentiates an LNG project from a pipeline project because the resource owners own the resource and own the infrastructure, whereas a pipeline company has to have conversations through firewalled, regulated structures to maintain competition.

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MR. BUTT noted carbon dioxide is injected into the ground for pressure maintenance, and is an extremely important element of the Alaska LNG Project. For this project, he continued, about 3.5 billion cubic feet a day [of gas] is taken out of the

Prudhoe Bay and Point Thomson fields. About 25 percent of the gas is at Point Thomson and about 75 percent of the gas is at Prudhoe Bay. Prudhoe Bay is currently cycling 7-9 billion cubic feet of gas every day. A portion of the cycled Prudhoe Bay gas is taken off, Point Thomson gas is added, and is put into the top of the pipeline. The 3.5 billion cubic feet of gas per day is about 10 times what Alaskans use every day, so there is plenty of gas for export. Work has occurred on an integrated basis to ensure that the gas can be treated such that it can be used by folks in the Interior. The term "gas," he pointed out, creates a tremendous amount of confusion. Rich gas, wet gas, and gas put in cars -- the same word is used to mean fundamentally different things. The gas put in a car is nothing like the gas in this pipeline. The word gas is used to describe gas in a natural state produced from wells where it has a lot of non-hydrocarbon components. The word gas is used to describe treated gas that has only hydrocarbon components. The gas that will be put into this project is a hydrocarbon product that can be liquefied and used for utilities.

MR. BUTT reiterated that the integration of the oil business and the gas business is a big advantage in this project. The wells do not have to be drilled; they can just be leveraged for the gas. Point Thomson is about 60 miles to the east [of Prudhoe Bay], and is currently under construction. The Point Thomson operator has invested about \$1.8 billion to date and thinks production will begin second quarter 2016. Point Thomson is important because it is a gas field; it is different than Prudhoe Bay because it has a lot of gas and a little bit of oil. Prudhoe Bay, the largest oilfield in North America, has a lot of oil and a little bit of gas. The difference can be compared to getting the gas out of a balloon and getting the toothpaste out of a tube. Gas can be moved much faster out of a balloon than toothpaste can be moved out of a tube. If the tube is squeezed too fast, a lot of gas will be left behind. So, in conjunction with the Alaska Oil and Gas Conservation Commission (AOGCC), the Prudhoe Bay operator has developed very careful depletion plans to use the gas so that all of the oil is taken out. As the production changes at Prudhoe Bay - as a higher percentage of gas to oil is gotten - there is the opportunity to take some of that gas off and put it into an LNG project, which is the fundamental basis of this project. This project is completely underpinned by those resources. Underpinning it with those resources creates an infrastructure that other parties can use; but this would never be created without these anchor tenants.

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REPRESENTATIVE P. WILSON said she was expecting that 75 percent of the gas would be coming from Point Thomson, given it has more gas than oil. She surmised, then, that more gas can be taken out of Prudhoe Bay because oil has [already] been taken, so more gas can be taken out of Prudhoe Bay than out of Point Thomson.

MR. BUTT replied it is also the relative size of the resources: a smaller balloon of gas and a much bigger tube of toothpaste. The volume of gas actually in Prudhoe Bay is three times the volume of gas in Point Thomson. While Point Thomson is mainly gas, it is much smaller than Prudhoe Bay. Prudhoe Bay is the largest field in North America, and it is that size that has generated that value for the state and the parties.

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MR. BUTT returned to his presentation, explaining that when the gas arrives at the gas treatment plant it must first be treated to remove impurities. The gas treatment plant required by this project will be one of the largest plants in the world. The plant will require about 250,000 tons of steel and will occupy about 200 acres. This enormous amount of steel - equivalent to the amount of steel in 140,000 Ford F150 trucks - must be manufactured and moved to the Arctic and installed in the Arctic. He displayed a photograph of the gas treatment plant as originally designed, explaining that the plant has a spine where it brings in the gas and trains on either side where the gas is treated. "Train" means that things happen from front to back. Gas goes in the frontend with impurities, comes out the backend without impurities, and it happens in series. Any process done in series is called a "train" by the industry. So, while LNG trains and gas treatment trains are fundamentally different, the word "train" is used because they both happen in series.

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MR. BUTT emphasized the gas treatment plant is important because Prudhoe Bay has 12 percent carbon dioxide (CO<sub>2</sub>). That is very high and no one has ever developed an LNG project with a gas resource that has that much carbon dioxide in it. Alaskans use about 350 million cubic feet of gas a day on average -- about 250 million in the summer and about 450 million in the winter. The 3.5 billion cubic feet per day of gas going into this system is 10 times the amount of gas used by Alaskans. The volume of carbon dioxide that must be handled in this project is 500 million cubic feet a day. So, the amount of carbon dioxide that

must be handled daily is 1.5 times greater than the amount of gas used by Alaskans. Over the life of the project the total volume of carbon dioxide is 4 trillion cubic feet. The way that carbon dioxide is handled becomes very important and it gets back to the integration issue. By working with the Prudhoe Bay operator, it is known how the carbon dioxide will be moved back into Prudhoe Bay to be reinjected to continue supporting the production there. The gas treatment plant is only required because there is so much carbon dioxide in Prudhoe Bay and 4 percent at Point Thomson. There is no market for carbon dioxide.

[6:08:52 PM](#)

CO-CHAIR FEIGE pointed out that while there is no market for the carbon dioxide, there is financial utility in it because it can be reinjected into the Prudhoe Bay oil reservoir to generate more recovery of oil over time.

MR. BUTT agreed the utility value of the carbon dioxide is important. He qualified that when he says there is no value to carbon dioxide, he is meaning there is no value in exporting it because it cannot be sold to anybody. Reinjecting the carbon dioxide gets value from it. This is different than previous pipeline projects because those projects had no integrated view and therefore had a high level of uncertainty on what to do with the carbon dioxide since it is environmentally irresponsible to vent it. Because it is an integrated project, it is known exactly what will be done with the carbon dioxide and it does have utility value. That said, he continued, given a choice of handling or not handling all of the carbon dioxide, he would choose not handling the carbon dioxide.

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REPRESENTATIVE TARR related that AOGCC documents discuss the delicate balance between reinjecting the gas and optimal oil recovery. Given the high levels of carbon dioxide, which are not seen in other locations, she asked whether reinjection is a proven method that will not cause risk or cause disruptions with oil recovery.

MR. BUTT responded reinjection is a proven method, saying it is used in other parts of the world to improve recovery. Sometimes called miscible recovery, it is injected where there is very heavy or more viscous crude because in that environment the carbon dioxide bonds with the oil, reduces its viscosity, and

improves recovery. However, that is not what would happen at Prudhoe Bay. Instead, the energy of the carbon dioxide will be used to displace hydrocarbon gas and oil to improve recovery. The Prudhoe Bay operator has come up with some excellent ideas on how to do this and to manage the reservoir in a responsible manner so that this volume of gas can be moved, which was a big uncertainty. Going back to the question of alignment, risk, uncertainty, and cost, the question of what to do with all this carbon dioxide, and whether there was a mechanism to use it, needed to be answered early in concept. The folks with the Prudhoe Bay operator are smart, he continued, and if given more time to work this through Pre-FEED and additional design they will come up with some even better ideas.

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REPRESENTATIVE P. WILSON requested further elaboration on the reinjection of carbon dioxide to provide better oil recovery.

MR. BUTT answered the pressure is about the same, but, while compressible, carbon dioxide behaves differently in reservoirs than other gases and must therefore be treated very differently. In some places in the world, using carbon dioxide instead of another gas provides benefits beyond the pressure and depletion benefits. But that is not seen at Prudhoe Bay. Instead what is seen is purely the energy benefit and carbon dioxide is just another gas that behaves a little bit differently. Responding further, he explained that miscible flooding is used in parts of west Texas where there are very deep reservoirs, more viscous oils, and higher pressures. The carbon dioxide physically reduces the viscosity of the oil, allowing the oil to move easier. So, in addition to the pressure benefit, there is a viscosity reduction benefit, and viscosity reduction means the oil moves easier. However, in Alaska, that viscosity benefit is not seen, only the pressure benefit is seen. He reiterated his optimism that the Prudhoe Bay operator will come up with something better over the next couple years. He further confirmed that Prudhoe Bay has 12 percent carbon dioxide and Point Thomson has 4 percent.

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MR. BUTT resumed his discussion of the gas treatment plant, noting there are two streams after the gas is treated and impurities removed: a hydrocarbon stream that is put into the pipeline and a carbon dioxide stream that is put back into the ground. The hydrocarbon stream in the pipeline is purely a gas

of primarily methane, a little bit of ethane, and a few lighter gas liquids, so the gas is not wet or water-rich. This gas will be put into a 42-inch line with eight compression stations and moved from the North Slope to the east side of the Cook Inlet. Important in designing a pipeline is ensuring that the pipeline does not move. The pipeline moves through three distinctive regimes: north of Atigun Pass is discontinuous permafrost where it is always cold; between Atigun Pass and the Alaska Range is discontinuous permafrost where the ground can be quite warm in the summer and quite cold in the winter; and south of the Alaska Range is soils that do not move quite as much. From a pipeline design perspective, it is very important to size the pipeline and space the compression stations to always keep the gas at the right pressure and right temperature, 30 degrees Fahrenheit (F), so the pipe does not move. North of Atigun Pass everything is cold and the gas in the pipe is consistent with the temperature outside the pipe, so it is very solid. Between Atigun Pass and the Alaska Range, care must be taken in design to keep the gas at the right temperature so the pipeline does not move even though the ground is moving. This will allow safe delivery of the gas to the LNG plant as well as to Alaskans. The project has developed a hydraulic model that contemplates five offtake points for Alaskans.

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MR. BUTT informed members that the route of the pipeline is about 800 miles and will take about three years to build. The key is to use the right arctic construction techniques. Once at the Cook Inlet, the gas will be taken into a liquefaction plant. Here is where an LNG project really differentiates itself from a pipeline project. In an LNG project, the gas temperature is made very cold. The 30 degree F arrival temperature of the gas is lowered to minus 260 degrees F, the temperature at which the gas converts itself from a gas to a liquid. Liquid gas is 600 times smaller, or denser, than when in the gaseous state. This difference in volume justifies the cost and risk of building a liquefaction plant because liquefaction allows for safer and more efficient delivery of the gas. Instead of 600 cargos of gas, only one cargo of LNG is put on the water. To do that, it is estimated that about three trains are needed for the liquefaction plant. The gas is dehydrated at the liquefaction plant to remove anything that is not methane because anything not methane freezes first, causing operability problems. At the end of the process, very cold methane will be had with a little bit of ethane, allowing the project to sell a rich LNG spec at about 1,100 British Thermal Units (BTUs). This is important

because it gives a very wide market appetite since a lot can be done with rich LNG. The ethane can be removed for other industrial uses and a little bit hotter gas can be burned. Regarding gas to Alaskans, he noted that the gas in this line will burn a little bit hotter than the traditional utility spec of 960 to 1,000 [degrees F]. So, gas taken directly out of this pipeline into a home utility service without some form of correction would be too hot. However, straddle plants are not needed because there are no liquids to remove. Rather, the thermal content of the gas needs to be adjusted for residential users and there are many ways to do that. As the project works with the state and other parties to define where exactly to place the offtakes, the thermal content of the gas at each offtake will also need to be defined.

[6:19:49 PM](#)

REPRESENTATIVE JOHNSON inquired about what other byproducts will come out of the LNG plant.

MR. BUTT responded almost all of the gas is methane because, through cycling over the last 30 years, most of the liquids have already been removed and sold. Responding further, Mr. Butt said byproducts at the LNG plant are a little bit of ethane, the carbon molecule used in plastics and polyethylene, a little bit of propane, and a little bit of butane. The LNG plant will maybe generate about 1,000-1,100 barrels a day of liquids; while not a huge number, it is enough to provide fuel to places that do not get gas. Responding again, Mr. Butt confirmed that propane and butane are very marketable.

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REPRESENTATIVE P. WILSON surmised the amount of methane varies, but asked what approximate percent of the gas is methane.

MR. BUTT confirmed it varies, but said about 98 percent of this gas is methane.

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REPRESENTATIVE TARR inquired how much capacity increase is provided by compression stations versus looping.

MR. BUTT replied the system as designed with a 42-inch pipeline and 8 compression stations is intended to handle about 3.5 billion cubic feet of gas per day: about 2.5 billion cubic feet

[per day] for liquefaction, 250-450 [million cubic feet per day] for Alaskans, plus another 400 [million cubic feet per day] for fuel. The pipeline as designed with 8 compression stations has about 25-30 percent expansion capacity, which is about another 800 million to 1 billion cubic feet of gas without having to do anything to the size of the line. Gas is compressible, the more it can be compressed the more gas that can be moved into a very small place. The first alternative is always to use compression to add capacity. However, at some point the pressures get so high that the cost of the pipe thickness is prohibitive and then more expensive alternatives must be looked at. The project is trying to come up with a sizing design for these facilities that gives about a 20-year plateau; LNG buyers want to know there is the ability to deliver LNG for 20-30 years because they want to tie their economy to that ability to deliver that energy. If the project has a very high [price] rate, it can only deliver gas for a very small period of time, so this must be balanced and a 20-30 year life is the balance that the project has come up with.

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REPRESENTATIVE TARR understood that the final investment decision will be based on the long-term contracts and the predicted in-state demand, and that the eight compression stations will provide an additional 30 percent capacity going forward 30 years.

MR. BUTT answered that is the best engineering judgment based on what is known now. Until there is high confidence that the other resources that are out there will be produced, it would be imprudent to build something that can never be filled because that would be very expensive.

CO-CHAIR FEIGE said the expansion capability of the actual pipe, which would require more compression stations, is going to be there for some future expansion; it does not have to be filled right now.

MR. BUTT concurred.

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REPRESENTATIVE TARR inquired what the maximum number of compression stations is for this pipe.

MR. BUTT responded many compression stations could be added, but they are very expensive. At some juncture it does not make sense to add compression, so it is a balancing act as to whether to keep adding compression or to do something else. The eight compression stations are spaced about every 90 miles. Getting stations inside of every 60-50 miles is probably too many compression stations; it is a balancing act of putting in 50 or 60 miles of pipe or putting in a lot more compression. The ultimate goal is to always keep that pressure and temperature stable so the line does not move at its given capacity. Plus, at some juncture, the pressure limits on the pipe will be reached, which on this system is 2,100 pounds [per square inch].

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REPRESENTATIVE SEATON offered his understanding that if pressure is elevated in the pipe, then all the compressor stations would have be able to satisfy that newer pressure in the expansion.

MR. BUTT replied it depends on spacing, arrival pressures, and departure pressures at each of the station's changes. A nice, even system at about 2,050 pounds is wanted. However, the system can be designed such that the departure pressure from one compression station drives the arrival pressure at the next compression station depending on the length, the hydraulics, the friction losses, and other elements.

REPRESENTATIVE SEATON surmised that to get more throughput and to not increase the pressure, the system will only be looking at pressure differential between stations so the stations that would be built are capable of handling that expansion.

MR. BUTT confirmed this to be correct and said the design contemplates that capacity.

[6:27:22 PM](#)

MR. BUTT returned to his presentation, noting that once the LNG has been created a jetty needs to be built since there can be 10-15 tankers per month, which means delivery of a cargo every two days. That frequency is important because the buyer wants to see a new carrier in its harbor every two days so the buyer knows it can keep its utilities running. The specially designed LNG carriers are much different than crude oil carriers; for example, LNG carriers draft differently. Crude oil is much heavier than gas. An important difference is that LNG is not under pressure in the ships, it is only very, very cold. If the

top of a container holding LNG was removed, the LNG would slowly vaporize as it heated up. The ships carry the LNG in specially designed tanks to keep it very, very cold so it will not go from a liquid state to a gaseous state that would lose the density value while moving it across the ocean. Understanding the scope of this project helps in understanding the importance of alignment, risk reduction, and cost reduction. Delivering gas at the lowest cost is what is trying to be done and the way to do that is to get that gas really, really cold - to liquefy it - so it can be delivered in 1 ship instead of 600 ships.

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MR. BUTT stated that another element of the project is modular construction. In an arctic environment work cannot be done outside during all 12 months of the year. Some of the work is therefore moved to places where there is overhead capacity. Moving the 250,000 tons of steel needed for the gas treatment plant requires very big cranes and overhead lift capacity. He played a video showing how a module is built upside down to access everything and an overhead lift is then used to pick up the module, flip it over, reset it, and position the module in place. The most important thing in modular construction is the ability to pick things up. Modular construction techniques were pioneered in Alaska and are how Prudhoe Bay, Alpine, and Northstar were built. Over the last 20 years those techniques have been further improved in Russia and other Arctic locations. Once the modular facility is built and put in place, each facility is layered in one at a time just like a layer cake. Overhead capacity is necessary for this because, for example, a piece of deck weighs about 45,000 tons, which is about one-fifth of what has to be built for the North Slope gas treatment plant. Once built, the modules are weatherized and put on a boat for sailing to the destination. They are driven off the boat on specially designed carriers called crawlers that have up to 18 wheels per axle and can move the modules great distances. Once at its final location, the module is put on a specially designed pad and all the pieces are put back together, which is called "plug and play." The modules, and making them all fit together and work, underscore the importance for doing Pre-FEED and the very special design work.

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REPRESENTATIVE P. WILSON asked how big the modules are, how many acres it takes to build the modules, and whether the modules are being built in Anchorage.

MR. BUTT answered that Point Thomson is using these module construction techniques. Many of the modules are small enough to put on a truck and be driven and all of the camp and support modules were built in Alaska. The really heavy modules that require big overhead cranes are being built in shipyards which have the capacity to pick up really heavy things; these modules are then sailed in. Compression facilities are being fabricated right now. All of the historic projects in Alaska used these same techniques. The module is always built as close as possible because moving it is a risk; however, there is sometimes not the overhead capacity and a new shipyard cannot be created just to build one project. A balance must be struck in what modules can be built locally and the bigger heavier modules that cannot be built locally. As well, there must be a balance in the craft skills required to do this work: the 9,000-15,000 workers must all be working on the right things. Responding further, Mr. Butt confirmed there are no shipyards in Alaska big enough to do this work.

[6:35:13 PM](#)

REPRESENTATIVE TARR inquired whether shipyards in the U.S., such as the one in Louisiana, could be used.

MR. BUTT responded that as the project moves forward in design, procurement strategies are defined to determine the right place to build. A yard's productivity, safety, and cost to put the modules together are looked at. A disadvantage of Gulf of Mexico shipyards is the long distance of moving constructed modules through either the Panama Canal or around Cape Horn. However, that is the same advantage that Alaska has with market access -- LNG from Alaska can be moved to the markets much shorter distances than suppliers in the Gulf of Mexico. The location of the shipyard is not of as much concern as ensuring that the right facilities are built. The facilities must be built safely and with good integrity. The desire is to have them built as close to where they are needed as possible because of having to move them. That is why all the truckable modules for Point Thomson are built right here in Alaska. This will be the same thing for the Alaska LNG Project, but there is the balance of finding that big overhead lift, who can do it the right way, and moving the modules. Each module will likely have a different procurement strategy on who builds it and where it will come from. This project is so big that no one yard will be able to it; multiple yards will be engaged across the globe.

6:37:22 PM

MR. BUTT returned to the topic of integration, saying this kind of work is unique to this project because all of the producers are working it together. With the state discussing becoming a part of the project, the state can be a part of this bigger, aligned, and integrated process. Displaying photographs, he said it is known how to reinject the carbon dioxide, how to swing the power grid at Prudhoe Bay, and exactly where to get the gas, things that have not been done before. Other projects all had communication, but there were firewalls and they were built in isolation. Moving into Pre-FEED, looking to advance the project, the designs begin getting much more detailed, such as what kind of transformers and step-downs, and ways to manage carbon dioxide content.

MR. BUTT displayed a slide entitled "Point Thomson," pointing out the photograph of the central pad with modules built in Alaska and noting the pad has an airfield. He drew attention to the design drawing of what the facility will look like with all the gas compression facilities on it, saying work has been done to understand how the equipment will be moved in and out. He brought attention to a photograph of the kind of pipe that will be needed to handle 10,000 pounds per square inch (psi), noting the pipe is several inches thick and the diameter quite small. To provide reference, he said the tip of a person's finger is one square inch and would need to balance two [Ford] F150s to have the kind of loads associated with 10,000 psi. Because the walls must be really thick, the cost and design work at Point Thomson are important. Made of multiple materials, this thick pipe requires specialty welders with the right craft skills to weld together. He displayed the integrated design for gas sales at Point Thomson, which includes the kind of compression and injection facilities that are required.

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MR. BUTT turned to a slide entitled "Gas Treatment Plant," saying the last power of integration is at the gas treatment plant. He explained that the photo on the right shows where the plant will be placed in proximity to the Prudhoe Bay gas treating facilities and the Prudhoe Bay dock, the roads that will be required to move the facilities, and the lines that will be required. Enough design work has been done to know where the gas treatment plant will go, but more importantly, much work has been done to design the size of the gas treatment plant. To highlight the importance of this, he explained that Denali-The

Alaska Gas Pipeline and the Alaska Pipeline Project (APP) designed their gas treatment plants based on what they knew about the Prudhoe Bay gas composition, which was incomplete due to firewalls. Based on the best science and understanding that they had, it was thought four gas treatment trains were needed, meaning four facilities to handle this gas. Each of these gas facilities would require the capacity to separate the gas impurities: carbon dioxide impurities would be separated one way and hydrocarbon impurities another way. They designed the packing inside the towers for the products that strip out the impurities, called aiming, which blend with the gas and are boiled off. The towers were 128 feet tall, 28 feet in diameter, and made of steel up to one foot thick. Each of the four trains would require three vessels for the interaction and handling of the gas. However, by having an integrated view, it has been learned that the same functionality can be done with the same volume of gas with only three trains, which means moving less steel and saving a lot of cost. More importantly, the system can be balanced. There would be three treating [trains] in the north and three liquefaction trains in the south. This reduces risk over the life of the Alaska LNG Project; for example, when doing maintenance work on one treatment train, work can be done on one liquefaction train. Over the life of the project it is balanced, whereas it was not balanced before and that created a risk and created cost. An integrated view has allowed a much better understanding of the gas composition and carbon dioxide content, as well as a much better understanding of the packing inside the vessels, and ability to design it much more thoughtfully to come up with a three-train design. This huge step change, and the value of that, has been extended in that it was previously thought three sealifts would be needed to move four trains. Now it has been learned that four sealifts are needed to move three trains. So, now the utilities have been pulled forward and the gas treatment trains staged. By doing that, gas can probably be moved sooner. This integrated view has resulted in a much better solution that reduces cost, reduces risk, and moves gas quicker because there is less to build. This integrated view shows why alignment is so important and achieves the ARC of success.

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REPRESENTATIVE P. WILSON observed from the photograph that the planned facility's footprint is on top of areas with water.

MR. BUTT replied the yellow outline depicted in the photo is much larger than the footprint of the plant. Drawing attention

to the diagram left of the photo he explained that within the bigger footprint, the actual place where the trains are located is much smaller. The orange, yellow, and green shapes are the gas treatment trains and the blue shapes are all of the utilities, all of which take up about 20 percent of the total space. Large spaces must be cordoned off for the plant because there must be a long distance between the plant and the flares that are shown at the top of the diagram. No facilities will be put on the marshy areas and a gravel pad for the plant will be placed on top of the area that is dry during the summer. In further response, Mr. Butt confirmed the yellow outline on the photograph is less than 200 acres and that the actual footprint is much less, but that with the roads it is about 200 acres.

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MR. BUTT continued his presentation, moving to the slide entitled "Pipeline" and reporting that much progress has been made on the pipeline. He explained that once the site was designed, the route could be finished south of Livengood and a couple really critical special design areas figured out. How to pass Atigun Pass is important because it is very tall and already has a pipeline in it, so thought is needed in how to put a gasline near TAPS. Drawing attention to the picture in the lower left of the slide, he said care is needed near Denali National Park and Preserve; three alternative routes go through Glitter Gulch, which has many valleys and chasms that present challenges for ensuring that the pipeline does not move. Also being worked on is how to cross the Cook Inlet, but the decision on how to cross the Cook Inlet is driven by whether the Susitna River is crossed.

MR. BUTT related that the lead LNG and marine plant site is the Nikiski industrial area located on the east side of the Cook Inlet. Ocean data gathering equipment has been put into the inlet to gather data on tides, current, and ocean conditions; a skid measures all of the data in a very non-intrusive manner by sitting on the sea floor. The Nikiski area was chosen after looking at the entire coastline and knowing that there are lots of other good sites in Alaska. A good site needs adequate geotechnical stability and access to the shoreline for export. The current site was chosen because the civil work required to make a large enough flat spot for the plant is much less than for some of the alternatives. Additionally, this site has much less snowfall, allowing a little bit higher labor productivity and a little bit higher operability since work must occur there 12 months of the year. A very transparent work process is

currently ongoing with the plant owners at this site, he said. The team's goal is to come up with fair and durable transactions to acquire the land, although there are alternatives to work with in the event that enough land cannot be acquired.

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MR. BUTT, responding to Representative P. Wilson, said the LNG and marine site will take up between 400 and 800 acres, but the actual plant itself is a much smaller footprint. A lot of space is needed for construction and moving in the modules. Actually defining a specific number [of acres] is not done because that number is unknown until Pre-FEED is completed. Pre-FEED is where layout is finalized, which is driven by the question of hydraulics, which is driven by elevation. The ups and downs of the site must be known for the hydraulics since gravity always wins and fluids run downhill. That must be known when designing the layout so when things are put on the ground it is known what is above what. The layout must be designed to make the process as efficient as possible so none of the energy is lost.

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MR. BUTT addressed the slide entitled "Plans for a safe 2014 field season," reporting that the focus of surveys for the 2014 field season will be between Livengood and the east side of the Cook Inlet. To be environmentally responsible, work will be done on ice profiling and data gathered in fishery areas. Much help is needed from the state and federal agencies because the permitting must be worked in an integrated manner.

MR. BUTT concluded by saying he has shared thoughts on what an LNG project would look like, why the proposed Alaska LNG Project is very different than previous pipeline projects, and provided ideas on how to filter the things that are being talked about. Anything that aids alignment between the resource owners and the folks who build the project helps. Anything that helps identify and reduce risks, anything that helps reduce uncertainty, will help advance the project. An environment needs to be created where folks are confident that they can invest \$45-\$65 billion in the project and folks are willing to put their economy at risk for 30 years and buy the product. There must be the confidence that that can be done at a low enough cost of supply that the project can be competitive.

CO-CHAIR FEIGE complimented Mr. Butt for providing an excellent presentation.

6:55:23 PM

CO-CHAIR SADDLER inquired as to how many other projects of this size are near this stage around the world.

MR. BUTT answered several big projects are coming on-stream in Australia, as well as projects being discussed in east Africa, British Columbia, and the Gulf of Mexico. Regarding the Gulf of Mexico, he said a range of folks are trying to permit LNG to arbitrage the differences, but they do not own the gas; they are just trying to buy cheap gas and sell it, which is a very different model.

CO-CHAIR SADDLER asked whether Alaska is ahead or behind the schedule of the aforementioned projects.

MR. BUTT responded some of those other projects are expected to come on-stream in the next couple years, some are still on the drawing board, and some are just hopes. He reiterated that competitiveness is driven by cost of supply. If Alaska has a reliable project where all the parties are aligned and deliver at a low enough cost of supply, there can be confidence in finding a way to get it to market.

6:57:01 PM

REPRESENTATIVE SADDLER recalled the history of the Trans-Alaska Pipeline System (TAPS), which was stalled for a number of years in its early phases due to legal environmental challenges. He inquired whether part of the scoping process for the Alaska LNG Project includes any evaluation of whether those who oppose hydrocarbon fuel of any kind can drag out the project in its early stages with legal challenges.

MR. BUTT replied that is considered one of the project's primary uncertainties. While everything possible is done to assess that, it is just an estimate until moving closer to design and testing some of the feasibilities. The project is very aware of those challenges, but natural gas as a fuel is advantageous and has a lot of benefits to Alaskans. The project is pleased to see Alaskans discussing the opportunity to be part of the project and invest in the project. This is something that gets alignment, so if there is a challenge then that challenge can be worked together.

CO-CHAIR SADDLER asked whether reasons to not do this project are being looked for, or whether ways are being looked for to make it happen.

MR. BUTT answered that he hesitates to speak for all the owners, but is employed for one of them and can speak to the commitment of that one owner to trying to find this work. Speaking for the folks he works with, he said he thinks they are an excellent team and their behaviors demonstrate a level of commitment that gives him confidence this can be done. The state's decision to come to the legislature in a relatively transparent process and engage the legislature in trying to get alignment and take equity is the only way it will work because everybody must be in the boat. Everybody must be pulling on the oars in the same direction or things will continue going in a circle; the question before everyone is whether everyone is ready to move past that. The best way to decide is to move forward through the gated process. Everybody has off-ramps, but also everybody will have much better decisions. It is his experience that folks having better information and doing the work before they make the decisions are usually a lot more successful.

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REPRESENTATIVE SEATON inquired whether the other large projects throughout the world that Mr. Butt is engaged in are under the similar situation of no royalty and no taxes and only in-kind gas taken by the sovereign. In other words, he continued, he would like to know whether this proposed structure is normal throughout the world or unique.

MR. BUTT responded getting alignment with the host government is fundamental and characteristic of most, although not all, LNG projects. That alignment is always critical because of wanting to work things together, rather than cross purposes, when challenges are encountered.

REPRESENTATIVE SEATON understood Mr. Butt to be saying that alignment is only achieved through gas in-kind and not by royalty or gas or production-sharing agreement.

MR. BUTT replied he does not think the implication of no tax and no royalty is quite accurate. Value elements are there. He recommended bringing the owner representatives to speak to the fiscals. Alignment between a sovereign and the project is a fundamental characteristic of most successful LNG projects because it is wanted to work together, have everybody benefit,

and have an alignment to make the project work. He said he cannot speak for the other owners and even hesitates to speak for the owner that he works for, but speaking for himself as an individual with a lot of LNG experience he can say that if there is not that alignment, the chances of success are very limited. When he looks at the challenges associated with this project, it is very difficult for him to understand how these challenges can be overcome without that level of alignment.

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REPRESENTATIVE SEATON understood the aforementioned, but maintained it is the committee's obligation to see that this particular model being proposed works and is generally incorporated around the world or why it is not. He requested a chart be provided to the committee by the owners that shows which of the big LNG projects around the world are set up in a similar situation as Alaska's.

CO-CHAIR FEIGE suggested the committee should talk with its own consultants.

MR. BUTT concurred with Co-Chair Feige's suggestion, saying data provided by the legislature's consultants would be considered more objective.

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#### **ADJOURNMENT**

There being no further business before the committee, the House Resources Standing Committee meeting was adjourned at 7:03 p.m.