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Alaska North Slope LNG Project
Presentation to the House Special Committee on Oil and Gas
(February 23, 1999)

Mr. Chairman, Members of the Committee, for the record, my name is John Miller. I work for ARCO Alaska, Inc. in Anchorage and am currently Engineering Manager of the Alaska North Slope LNG project development team. Our team consists of members of the five sponsor companies and we are located in Anchorage.

Thank you for the opportunity today to review the efforts of the sponsor companies regarding Liquefied Natural Gas or "LNG". First, I'll present an overview and then move to the technical activities.

Following my remarks, Stephen Alleman will review the commercial activities that are underway. After our remarks, we will be glad to answer any questions you may have.

Let me preview the main points we will be presenting.

First, despite the today's tough economic climate, we have a project team hard at work.

Second, our innovative technical and commercial program will provide the best chance for success for an Alaska North Slope LNG project.

Finally, we don't foresee direct legislative action in 1999 – but we are positioning for some potential actions in 2000.

To be successful we must make this project competitive on a world scale. To make this project a reality, a commercial "mind set" is a must. You will hear us stress the need to consider both technical and commercial issues in our work.

Now I would like to describe a base case for the Alaska North Slope LNG Project. Later, I'll discuss how we are working to improve that base case.

In our base case, produced gas from the North Slope is routed to a nearby gas conditioning facility where carbon dioxide and other impurities are removed. This upgraded gas is similar to the gas used in homes in Anchorage.

The gas is then transported via a large diameter pipeline to an ice free port, such as Valdez. At the port, the gas is cooled in another facility to -260 degrees F. This reduces the volume by 600 times by forming a liquid, LNG.

This inherently safe liquid is loaded onto low pressure, refrigerated, ocean tankers for transport to the East Asia market.

After arrival and offloading, the LNG is allowed to warm for use as a gas for power generation and other direct heating uses.

LNG technology is well established. After several years of production and deliveries to Japan beginning in 1969, the Phillips and Marathon-Kenai LNG plant recently delivered their 1000th safe, on time cargo.

Now, I'd like to briefly review the essentials of the Sponsor Group. During the first half of 1998, two parallel activities were underway. In the Alaska legislature, HB-393, the Stranded Gas Development Act, was working its way through the legislative process. Concurrently, ARCO was leading discussions among companies interested in moving an Alaskan LNG project forward.

HB-393 provides a framework for the State to develop a new fiscal system for a gas project. Under this framework, a project can be made more competitive, yet still have checks and balances that protect the State's interests. The State, through HB-393, sent an essential signal to industry to continue efforts to make an LNG project commercial.

This signal was clearly received by our sponsor companies. Discussions among sponsors intensified as prospects for the success of the legislation grew. By early August of 1998, the sponsor companies had announced the signing of an agreement.

The five sponsor companies and their respective interests are as follows:

ARCO Alaska, Inc. (37%)
Foothills Pipelines Ltd. (22%)
Marubeni Corporation (17%)
Phillips Petroleum Company (12%)
CSX Corporation (12%) through its Alaskan-based Yukon Pacific

This is an outstanding and diverse group of sponsors.

These companies have the expertise and business interests to solve the problems facing this project. Represented are Alaska North Slope gas owners, companies with arctic construction and operations experience, a major international pipeline developer and operator, a current Alaskan LNG player that has been in the East Asian trade since the beginning, permit holders, and a major trading house in the East Asian market place. Together, there is combined knowledge and practical experience to assemble a large, international, venture to acquire North Slope gas and sell LNG in East Asia. The sponsor agreement also has the flexibility to allow other companies to participate now or in the future.

The agreement is based on the sponsors' mutual desire to establish the basis for a viable project through innovative engineering and commercial initiatives.

Please remember that the sponsor agreement covers only LNG. GTL or Gas-to-liquids is not part of this agreement. However, LNG and GTL are not mutually exclusive. There is enough gas on the North Slope for both technologies.

Under the sponsor agreement, the work will be performed in stages. The first stage involves project definition, better definition of costs, identification of potential cost reductions, and significant advances to our commercial plans. We expect to complete Stage 1 in mid-2000 and to spend up to \$20 million. The scope and budget for subsequent stages will be authorized as the project progresses. Expenditures for an entire program under the agreement could total up to \$100 million and the work could last up to 45 months.

Now, a little description of how we're structured.

A Board with representatives from each of the five companies directs the project. Under this board are two steering committees, one technical and one commercial. All five companies are represented on the steering committees as well. I chair the technical steering committee and manage the technical work effort. Similarly on the commercial side, Steve Alleman chairs that steering committee and manages the commercial work.

Steve and I have organized several teams engaged in various activities. In a moment, I will talk about an innovation we've made to the traditional concepts of project work teams.

The primary work teams are now located in Alaska, at ARCO's office complex. The project is staffed with employees from the five companies.

At latest count, we have approximately 50 people actively involved in the project, of which approximately 15 are full time.

We have adopted the concept of virtual teams. The resources of each company are at our disposal on an "as needed" basis; but individuals are not necessarily employed full time. While we have not kept a precise count, we estimate that perhaps 75 to 100 people have already contributed to the work program in some form. Further, the sponsor companies have offered any other resources that Steve or I need to get the work done.

In addition to sponsor company personnel, we will be using contractors for some of the work efforts. Our philosophy in this area will be to use those contractors that are both competitive and give us the best chance of realizing the breakthroughs that are needed for this project to become viable. If the expertise is available and competitive in Alaska, we plan to use it. If not, we will search the world to find the special expertise needed to move this project forward.

Let's now look closer to the challenges facing the Alaska North Slope LNG project and what is being done to meet them.

In 1997, the State's consultant, Pedro Van Muers conducted a study of the relative economic attractiveness of various competing LNG projects. This work formed the foundation for the principles developed for HB-393. One of the key principals was the recognition that the Alaskan project needs to become competitive over a range of economic conditions with the best new LNG projects potentially supplying the same market. Mr. Van Muers' work showed that a combination of cost reductions, modifications to state and federal fiscal terms, other major risk reductions, and development of the market would be needed for the Alaska project to have a shot at commerciality.

Both the technical and commercial work activities by our team go directly to the need to reduce costs and produce innovative solutions to make the project competitive.

Compared to other, competing LNG projects, Alaskan LNG has many positive attributes. It draws on known, developed, world class resources; it has state of the art, existing infrastructure, and it has all of the benefits of a stable government.

But, an Alaskan project has one big disadvantage: its capital costs are relatively high. The cost of an 800 mile pipeline for Alaska puts us at a competitive disadvantage to other tidewater projects, even allowing for competitors' higher field development costs. Since there seems to be no way to eliminate a pipeline, the challenge is to find incremental improvements to overcome the disadvantage.

A 1997 project cost review showed that the most reliable, unlikely to exceed, estimate for an Alaskan project is \$15 billion. This work also increased our confidence that the costs could be \$12 billion or lower. These estimates are for a gas conditioning plant on the North Slope, the pipeline system, an LNG plant and terminal in Valdez, and ships.

Our sponsor technical effort is aiming to engineer a better project by reducing project costs and defining an optimum configuration. Please keep in mind that the most meaningful cost reductions are those that are differential to other LNG projects. For example, a general reduction in the cost of materials would likely apply to all projects, not just Alaska.

When the project team assembled in late fall, we immediately turned our attention to the question of how to differentially reduce costs. One of the first activities was to bring everyone together for a data exchange. For two weeks, the sponsors shared their knowledge and put new ideas out for consideration.

As we started to sift through the ideas and focus on major work areas, we decided to challenge the traditional view of project organization. In the traditional view, teams would be organized along purely technical or discipline lines: for example, there might be civil team or a mechanical team. But we decided to rather to organize with an issue focus. The catch phrase is a "bubble team", implying that the team only exists as long as the issue needs to be worked. and is staffed by those with the expertise needed to work the problem. Teams likely have representation from both technical and commercial experts.

The technical work has initially been organized into three major areas, each dedicated to working a common set of cases. The first area is system integration, which is focussing on the integrated hydraulics for the pipeline and LNG terminal. Optimizing in this area requires the parallel consideration of at least 30 different design parameters related to the gas plant, pipeline and LNG plant.

Next, is the plants area, which is focussing on LNG plant siting as well as optimization of the LNG plant process and physical design.

Third, is the pipeline and compressor stations area, which is focussed on pipeline routing and key design and construction issues. It is in this area that we will be trying to find cost reductions that can significantly differentiate us from the competition. Finally, each of these three areas includes commercial efforts as appropriate.

I want to focus for a moment on a few of the issues that we are addressing.

The size of the project is a major consideration and there are two factors that are driving project size in different directions. On one hand, from a technical viewpoint, we want the project to be large so that it can enjoy economies of scale. That is, costs per unit of gas

sold go down as the project gets larger. On the other hand, the ability to place all the volumes of LNG in the market decreases as the project gets larger. The most critical joint technical and commercial optimization that we have identified to date is finding the minimum viable project size.

As I indicated earlier, the gas pipeline is the critical negative element that distinguishes the Alaskan project from the competition. Naturally, a major focus of our work is to find ways to reduce the pipeline costs and risks. We are examining possibilities ranging from design improvements to construction methods. We are also considering alternative LNG plant sites and their impact on overall costs. For example, a pipeline routing to the Cook Inlet is being seriously considered to see if it provides any advantages over the base case routing to Valdez.

Finally, a question that we often get is: "When will the project startup?"

For most people, the answer seems to be an easy way to get a clear vision of the project. But there is a trap in this way of thinking that I would like to share with you.

We see it as the "oil mind set" versus the "LNG mind set" and the problem makes sense when you think about it.

The "oil mind set", with which most of us in Alaska are familiar, says that the resource developers can decide to move ahead and then make the investments. For oil projects, this works, because oil is a commodity that can basically always be sold. If you will, you don't need to know whom the buyers will be to commit to developing the project.

LNG is very different.

Unlike oil, there are only a limited number of LNG buyers who can use LNG. LNG also has a limited "shelf life": it can not be stored indefinitely.

Historically, LNG projects have been characterized by long term contracts and have typically moved ahead only when buyers were secured. With an LNG mind set, we soon realize that buyers actually determine when a project proceeds.

This ties back to an earlier point I made about finding the minimum viable project. Clearly, the smaller the project, the easier it will be to get the necessary commitments for LNG purchase from the buyers. Finally, all of this is clouded by the current economic situation: reliable market projections are hard to make right now.

With this perspective, and assuming that everything goes perfectly, including the market being ready, the first LNG deliveries could begin in late 2007. Please recognize that 2007 is a very aggressive goal. To realize this date, we must be successful in making the project competitive and in securing a market that is sufficient in both size and commitment.

This is just a taste of the work in which we are engaged. I think that it shows that the sponsors have dedicated a creative, energetic group of people to this effort. It also shows that we are working on the right issues.

Now, Mr. Chairman, I would now like to turn over the briefing to Mr. Alleman. Following his remarks, we will be happy to answer questions.

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Stephen Alleman**

Mr. Chairman, for the record, my name is Stephen Alleman. I am employed by Phillips Petroleum Company, residing in Anchorage. I am currently assigned as the Commercial Manager of the Alaska North Slope LNG Project Team. With John's overview, I will go right to the commercial work effort.

As you have likely concluded through John's testimony, the commercial effort is every bit as important and extensive as the technical work. Major fiscal and risk improvements are needed in the commercial area for the Alaska North Slope LNG project to become competitive. As a result, John and I have emphasized the interrelationship of technical and commercial in how we organize and address issues. Here again, the concept of bubbles has come into play. I would now like to summarize the activities of these teams.

The cornerstone of the commercial effort is the Marketing Team. The goal of the team is to develop a marketing strategy that positions the project, when adequately defined, to quickly and efficiently move forward in the marketplace. The key Stage 1 deliverables from this team will be the marketing plan and the market proposal, which form the basis for initiating serious discussions with the buyers. Another crucial activity is the collection of market intelligence. While the primary focus of the team is the East Asia market, the potential instate demand is also to be considered.

Let me briefly offer our perspective on the market. The sponsor group does not subscribe to the concept of a market "window" that opens and then closes for an Alaskan LNG project. With all due respect to the other view, we are motivated to advance the project even if there is no "window". We anticipate that the market for expansion and greenfield projects like Alaska will come from the demand growth expected in East Asia in a timeframe beginning around 2007 and beyond. Naturally, the demand for Alaskan LNG can occur only if there is substantial economic prosperity and commensurate investment in the market for LNG utilization. Those

LNG investments, in turn, will only be made if LNG is able to compete with other types of energy, such as oil, coal, and nuclear. Securing market is about being able to compete at all levels. As John indicated, our ability to compete in the market will be improved by finding the minimum viable project size.

At the upstream end, several commercial issues are being addressed. For example, the project will need to obtain a supply of North Slope gas. The Gas Supply Team is charged with developing a basic strategy and sequencing for events leading up to a gas supply commitment. As another example, one area of potential cost savings could be the gas project's sharing of available, existing, oil-related infrastructure. The Infrastructure Sharing Team works in close cooperation with the technical teams to determine which infrastructure sharing options may be optimally leveraged and how sharing arrangements might be formed. Infrastructure may be shared with North Slope facilities, TAPS, and possibly the Valdez Marine Terminal.

As the project matures, the Project Structure and Financing Team activities will advance to the forefront. The appropriate project structure or legal entities that will effectively protect, share risks and advance the project must be anticipated. Clearly, the project can not be realized unless there is solid financing. Ultimately, some form of more creative financing may become essential toward enhancing project viability. In the past, some have questioned whether the state might have a role in helping finance the project. Prior studies of this topic have shown that the state may not be able to take the levels of risk that could make a real difference in the project economics. For example, it is difficult to visualize the state providing multi-billion dollar debt at below market rates. We certainly have not ruled out such options and will continue our investigations of the possibilities.

It has been recognized for some time that state and federal fiscal modifications will be necessary for the Alaskan project to become competitive. The Fiscal Team is responsible for advancing, in a coordinated fashion, the state initiatives through the HB-393 process and the federal initiatives through federal legislation. With the passage of HB-393 last year, we do not see that any state legislative

action is needed this year. Also, we are not anticipating federal legislation this year.

Moving for a moment to the more routine parts of the organization, the commercial area has three teams that are more related to support work: the External Communications, Legal and Economic Analysis teams. Their function is relatively self-evident.

Finally, I want to focus on one other important team. The Regulatory Team's goal is to advance a commercial/economic regulatory structure which prospectively protects both the initial throughput volumes of the project and the project cost structure.

Previous work has shown that a project will not be viable if there is any realistic chance that government can order proration. Proration occurs when initially contracted volumes must be cut back to allow for new gas to be carried. Another form of this problem occurs if the project is mandated by government to carry this new gas, and yet, is not allowed to recover the fair costs of providing that service. This is true whether the mandate involves expanding the system or not. Yet another form of this problem is a government mandate to construct greater system capacity than is needed for the initially contracted volumes.

We are just initiating our analysis of these regulatory issues; but two aspects are emerging. First, current federal and state statutes and regulation as well as conventional thinking go in the opposite direction as to what is needed. For example, federal and state law allowing the grants of right of way have not, in the past been interpreted to meet the objectives I just mentioned. Further, federal and state agencies generally do not regulate along these lines. The second aspect relates to a theme John mentioned earlier: that the pipeline is significantly detracting from the project's competitiveness. If there were no pipeline associated with this project, then this area of commercial regulation would not be as critical. To summarize this area, we will be working on commercial regulation this year. Currently, we expect that some federal and perhaps state legislative initiatives may be brought forward in the year 2000.

Now, stepping back, there are major fiscal and risk improvements that are imperative in the commercial area for the project to become competitive. With this perspective, it becomes clear that the challenge for an Alaskan LNG project is to simultaneously make the project economically competitive while developing a market that is sufficient in both size and commitment. Frankly, this will require the type of innovative, hard work that is encompassed in the Alaska North Slope LNG program. Further, the better chances for an Alaskan project will come from accomplishing the tangible activities that can lead us to become more competitive.

Even with the right work program in Alaska, we should recognize that we have a long journey ahead of us. The cost reductions, fiscal and regulatory modifications and other risk reductions needed to make the Alaskan project competitive will not come easily. Further, we need energy prices in general and LNG prices in particular to recover sooner rather than later from the historic lows that we are now experiencing. We will also need to see East Asia not only recover from its economic difficulties, but get back on the path of growth. In short, many positive outcomes are needed if we are to stay on track.

In closing, I would like to summarize what we are trying to do. First, sustain the effort to creatively position now for recovery in East Asia. Second, be different by both establishing an identity and bringing real innovative thinking to bear. Third, look for every opportunity to make the project competitive. Fourth, overcome our big difference from the competition: the pipeline. Fifth, continue to work cooperatively with government to advance the project.

Mr. Chairman, thank you for the opportunity to testify about the matters important to an Alaskan project. John and I would now be happy to address your questions and George Findling, the leader of the Fiscal and Regulatory teams, is also available to address any detailed questions in those areas.