ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE
February 3, 2012
3:33 p.m.

MEMBERS PRESENT

Senator Joe Paskvan, Co-Chair
Senator Thomas Wagoner, Co-Chair
Senator Bill Wielechowski, Vice Chair
Senator Bert Stedman
Senator Hollis French
Senator Gary Stevens

MEMBERS ABSENT

Senator Lesil McGuire

OTHER LEGISLATORS PRESENT

Senator Cathy Giessel

COMMITTEE CALENDAR

Presentation: North Slope of Alaska Facility Sharing Study by Thomas Walsh, Petrotechnical Resources Alaska

- HEARD

Presentation: North Slope facilities, Capacities and Expansion Technologies/New Developments in Upstream Oil and Gas by Bill Barron, Director, Division of Oil and Gas, Department of Natural Resources

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to consider

WITNESS REGISTER

THOMAS WALSH, Managing partner
Petrotechnical Resources Alaska (PRA)
POSITION STATEMENT: Gave presentation on North Slope facility sharing study.

BILL BARRON, Director
Division of Oil and Gas
Department of Natural Resources (DNR)
Juneau, AK
POSITION STATEMENT: Gave presentation on North Slope Facilities and Capacities and Expansion and Technologies.

ACTION NARRATIVE

3:33:24 PM
CO-CHAIR JOE PASKVAN called the Senate Resources Standing Committee meeting to order at 3:33 p.m. Present at the call to order were Senators French, Wielechowski, Stevens, Co-Chair Wagoner and Co-Chair Paskvan. Senator Stedman joined the committee a minute later.

North Slope Facility Sharing Study

3:34:00 PM
CO-CHAIR PASKVAN said the purpose of today's meeting was to learn about the North Slope Facility Sharing Study and new upstream developments in order to move production forward. He said the study was originally released in 2004 by Petrotechnical Resources Alaska (PRA) and from it he hoped to learn about the historical and current water and gas handling constraints on the North Slope. These issues must be advanced and understood in order to have the full spectrum of reasons why the decline in Alaska's oil production began in 1989 and is continuing today. They cannot talk about North Slope oil production without talking about the scientific and engineering facts of both the below ground reservoir and the above ground infrastructure in addition to the economic variables.

CO-CHAIR PASKVAN invited Mr. Walsh to present the study noting that he was one of the authors. He also noted that Director Bill Barron would follow Mr. Walsh's presentation with an analysis of where the state is now on these issues. And time permitting, he would also speak about a few of the exciting advances in oil drilling and extraction technology. He also hoped to hear directly from the industry regarding their current understanding of facility sharing and processing facility constraints and what might be understood about debottlenecking issues that are important for the central North Slope.

3:37:02 PM
THOMAS WALSH, Managing partner, Petrotechnical Resources Alaska (PRA), said he is the founder of PRA, an oil and gas consulting

firm in Anchorage, and that they had been in business since 1997. Their clients are major oil companies, the State of Alaska, the federal government, the Native corporations, and the independent oil companies.

MR. WALSH said he was a little taken aback thinking that the report was seven years old and he did a little catch up, but he hoped the slides would be of some interest and value for the committee.

CO-CHAIR PASKVAN noted the presence of Senator Giessel in the audience.

MR. WALSH said he is a geophysicist and had spent the last 8 to 10 years doing project management and this is the type of project that he enjoys getting involved in.

CO-CHAIR WAGONER asked who commissioned the study.

MR. WALSH replied the Alaska Department of Natural Resources, Division of Oil and Gas, commissioned the study in May 2004. He said the study concluded that facility sharing is critical for the future of the oil and gas industry on the North Slope. He also noted that the report had not been updated.

3:41:08 PM
SENATOR STEVENS asked why the legislature was just receiving a 2004 report and if it had been presented to the legislature before.

MR. WALSH replied the report was delivered with a presentation to the Division of Oil and Gas in 2004, but not to the legislature. It has been published on the division's website since 2004 and was prominently displayed on the home page. He explained further that the motivation for preparing this study was to look at the existing production facilities on the North Slope that produce oil and separate gas and water from that oil and eventually transport that oil through the pipeline system to the market.

3:42:40 PM
He said existing facilities have been established over the last 30 years on the North Slope and have produced a great deal of hydrocarbon. Increasing third party access to those facilities to increase production on the North Slope was the guiding principle behind the study.

CO-CHAIR PASKVAN asked by third party access if he meant potential producers other than the big three oil companies.

MR. WALSH answered yes - independent exploration and potential production companies that are not owners of those facilities. He said they wanted to avoid regulation of facilities access and it was felt the opportunity for access was available because there was interest on all sides for that occur and he still believed that.

Another motivation for the study was to develop a fair and equitable sharing process for North Slope facilities access - implying that the owners of those facilities need to benefit from offering the opportunity to utilize the facilities as well as the third party producers that would like to process their liquids there but aren't an owner of the facilities. The State of Alaska was also interested in seeing conservation measures - no wasting of resources and development in an environmentally safe manner as well as benefiting from the production of the hydrocarbons.

He said achieving mutual benefit for all parties and getting information out about the existing facilities and the opportunities for sharing them and the constraints were all drivers behind the project.

MR. WALSH said the project goals were to characterize the existing facilities including exploration activities in 2004 and the facilities and pipelines that have been constructed across the North Slope. He would show where facilities exist and peel the layers of the onion back to determine what components go into those facilities all the way down to the separation facilities, the vessels, the pipelines, the wells and all the other assorted assets.

3:46:46 PM
Another goal was to tabulate the current throughput of those facilities, something that was partially gained through Alaska Oil and Gas Conservation Commission (AOGCC) files, but information from flow stations and gathering centers really has to come from the operators. So, this was something that from the very beginning was going to require significant input from the owner companies of those facilities.

3:47:22 PM
Another goal of the study was to quantify theoretical capacities from design specifications of the facilities and from the owners

and operators of the companies. Then to identify, quantify and market excess capacity - the idea being to get the word out that these facilities do exist and there may be excess capacity in one or more of them. Independents have always had concerns here about access to land, to data and to production facilities. Not a lot of people understand this, and it was about getting that information out to them so it would hopefully attract them to come and explore on the North Slope.

Then the study was to identify the needs and desires of the independent explorers and producers as well as the needs and desires of the North Slope facility owners/operators - and try to get everyone on the same page and create a dialogue whereby people could start negotiating for facility access.

Another goal was to describe how facility access is managed in other oil and gas provinces. They looked at a Canadian and a Norway example and created guideline principles for facilities sharing negotiations for North Slope potential producers and for facility access on the North Slope.

3:49:37 PM
MR. WALSH said the parties impacted by the issues are:
-the major oil companies (that own the facilities on the North Slope) currently producing and operating on the North Slope,
-potential third party producers attempting to explore and develop on the North Slope
-the State of Alaska as a shareholder (who obviously commissioned this report)

3:50:24 PM
One of the benefits of facilities access is it would mitigate North Slope oil decline by including independents, basically bringing in more low gas cut and water cut oil. He explained that all barrels of oil produced on the North Slope and typically around the world have a component of water and gas associated with them. If you have a means of exporting gas, you sell that gas and the water typically is recycled and injected back into the ground to keep reservoir pressure up to keep the oil flowing out. At the current time, Prudhoe Bay production is very high in gas content, about 9 bcf/day is coming out with the oil and that gets stripped out. As these fields mature, the amount of water that is produced with the oil and the amount of gases produced with the oil are increasing while the amount of oil is decreasing. So they get what is called high gas/oil ratio (GOR) oil and high water cut oil.

CO-CHAIR PASKVAN asked what the ratios were in 1980 and how they are expected to change over time scientifically.

MR. WALSH replied that he didn't have the initial ratios for Prudhoe or Kuparuk, but the average barrel of oil has a gas cut of 20,000 standard cubic feet of gas; when Prudhoe first came on line that number would have been significantly less. So, when gas comes to the surface something has to be done with it and at Prudhoe it's re-injecting it into the field.

3:55:01 PM
CO-CHAIR PASKVAN said it's critical to understand why throughput of oil began to decline in the first place and asked him to explain that.

MR. WALSH answered that basically fields and facilities are designed to maximize throughput to commercially develop a field. So you build your facilitates to reach a certain plateau of production that you will try to extend for as long as you can, and the facilities are constrained by that initial oil flow. You want to maximize that oil flow up front and typically build your facilities to handle that. At some point several things happen; two critical ones are that your oil volume has been reduced to the state that it is now depleting and declining. The other constraints are on handling water and gas and you reach a point where capacity of the original facility to handle those is exceeded.

He said there have been numerous expansions of facilities at all of the major producing assets on the North Slope and even with those expansions, constraints will be reached again in the future. Then it becomes an issue of getting to a point where you have invested so much that you just continue using the facility without replacing major structures - much like using up an old car by putting in oil and gas but not replacing the body. At that point, all the future investments are for continuing to accelerate production not to create new oil - you just allow for cycling of more gas and water that will bring the oil to the surface faster. There is no new oil or new added value.

3:59:05 PM
MR. WALSH's said handling gas and water is expensive and that sharing facilities reduces unit operating and transportation costs. He explained that bringing in new oil that doesn't have as much gas and water needing to be separated and re-injected lowers the lifting cost, because.

Another benefit is that sharing facilities extends the economic field life for mature fields. He explained that eventually every field gets to the point where you really can't get any more oil out and you've reached your economic limit. If new oil is brought in, it will extend that base production as well as add new production to those facilities and extend field life.

He explained how it could also accelerate new field development if third-party explorers and producers were able to shorten their cycle time by making a discovery right next to a producing asset. One-mile pieces of three phase pipeline could be put in and things could turn around a lot faster than if you have to build an entire new facility.

Maximizing resource exploitation is another benefit and gathering up all the satellite pools around Prudhoe is a good example of that. Many companies are doing that; a good example is Jim Weeks with Ultrastar Exploration that is getting ready to drill its third well north of Prudhoe Bay. The size of that prospect is such that it would not really make sense to build new facilities and it makes more sense to just bring production through existing facilities. So, that resource probably could not be exploited without the opportunity to use the existing facilities.

CO-CHAIR PASKVAN interjected that many people are interested in whether Prudhoe and Kuparuk have reached the end of their economic life.

MR. WALSH replied that is the subject of much debate and he had a schematic slide of the production decline curve and said that Director Barron would address that, as well, with more recent production decline information. Certainly the operators and owners of Prudhoe Bay have said there is a lot left to produce there but every barrel gets more expensive to develop. But Prudhoe Bay is not at the end of its commercial life either; neither is Kuparuk.

He said there is a lot more to be gained through this synergistic approach and potential for facilities sharing. The owners would like to extend field life and the value of their assets into the future and they see that opportunity through offering their facilities to other producers.

4:02:44 PM
CO-CHAIR WAGONER asked if Ultrastar has a facilities sharing agreement.

MR. WALSH answered yes; it has a joinder agreement with Prudhoe Bay owners that was negotiated years ago before the first of the three wells was drilled. That agreement is one example of a successful negotiation process. Some of its details are yet to be determined, because oil hasn't been brought to the surface yet that Ultrastar can bring to the facilities. And until you know the quality and the specifications of the oil, you can't come up with the final terms.

He went to the next benefit that is in everyone's interest which is to minimize waste/footprint. Directional drilling from one small pad is the first thing that comes to mind and then making pads smaller and smaller. It makes sense to reduce the footprint and if that can be done through existing facilities rather than building new facilities that is certainly a benefit.

4:04:29 PM
Another slide showed the benefits of flattening out the lifting cost curve and production decline curve by bringing in new production. The next slide showed a schematic of growing the pie through facilities access on the North Slope. The idea is that there are three major owners of facilities on the North Slope with a lot of smaller partners and a given volume of oil that is being produced through them. If they can provide access to potential third-party producers the number of producers will grow and the whole pie will grow by bringing new oil into the system, hopefully without disrupting the oil flow that is currently being produced by the owner companies.

4:07:41 PM
He recognized some challenges; one was to overcome unaligned interests. This was a driving force for DOG in desiring to carry out this study. There were comments by independent companies saying they would like to get access to the facilities and they didn't know how to do that. Some folks who were very knowledgeable, Jim Weeks is one who used to be vice president of Arco, and now he is on the other side of the table, knew what the issues were for the operating and owner companies and was able to speak their language. He didn't need this report to go and negotiate his facilities access, but a lot of people didn't have that experience. The idea here was to overcome those unaligned interests by educating people on what the factors are.

4:08:37 PM
SENATOR WIELECHOWSKI asked if the issue of sharing facilities problem had been overcome.

MR. WALSH replied that he had several examples of where people have either exercised the opportunity to negotiate facilities access or gone with stand-alone facilities. The overlying picture is that there really haven't been any significant discoveries since the report was written. Both Nikaitchuq and Oooguruk had been discovered, so there hasn't been a great test of this because no one is knocking on the door wanting to produce oil through the facilities. It's a sad situation.

He said the report was helpful in getting the discussion going and everyone recognizes that the opportunity does exist and that the owner companies are willing to discuss it. BP, in particular, has said they would work terms with anyone.

SENATOR WIELECHOWSKI said this year is a good one for exploration with a number of new companies coming in and asked if a framework is in place. Did he have any recommendations for this session? And if someone made a discovery, could the facilities handle them now?

MR. WALSH replied that he would hesitate to answer the first question at this point. There are incentives in place for people to invest in their own facilities; he didn't know if the state had weighed in in terms of incentives for access to them. He was more in favor of incentives than regulations to force people to cooperate. But for the second question about current capabilities, one good example is Badami (BP) that doesn't have oil but has great facilities that are capable of producing 35,000 barrels of oil a day; it has gone one step beyond facilities access and has tried to attract exploration. It is good to see that Savant and ASRC have partnered to explore and develop that area.

4:14:04 PM
SENATOR FRENCH said the more common situation is going to be like the one Senator Wielechowski pointed out where you have a liquids and gas stressed facility and a new development near that facility. In order for the new development to get its oil into that facility the owner would have to back out some of their own oil, and that gets complex. But he had just heard from operators on the North Slope that the one place it is working is CPF3.

MR. WALSH added that Pioneer is bringing Oooguruk oil through CPF 3.

SENATOR FRENCH said CPF 3 gets gas stressed in the summer and shuts off Oooguruk's oil then. It's a difficult arrangement.

4:16:02 PM
MR. WALSH agreed and added that calculating the value of the backed-out oil is a key negotiating point. Any constrained facility will have the same problem.

Other challenges were addressing system dynamics - finding constraints and opportunities - and maintaining a high standard of operational integrity when new producers want to access a facility. The very capable producers and operators that are working up there now are challenged to keep up with some issues with aging facilities, so bringing in new operators is a challenge.

MR. WALSH said reconciling conflicting asset valuations is one of the costs of facilities access or capital recovery. The value of the capital equipment that is associated with the production of the third party producer's oil as well as future investments in that capital to accommodate their production are all issues that need to be negotiated, Mr. Walsh said. He provided some examples not in the packet; one was the Pioneer Oooguruk processing at CPF 3 in the Kuparuk River Unit, a good example of a contract that was negotiated between two parties successfully and allowed Pioneer to very quickly turn around development of the Oooguruk field.

Another example of access to Prudhoe Bay facilities was the Ultrastar joinder agreement; without it, because it is too small for construction of stand-alone facilities, bringing production on at the Ultrastar prospect would have been very challenged. ENI, on the other hand, has developed the Nikaitchuq field and gone with stand-alone production facilities and is bringing pipeline quality oil to Kuparuk; that decision was educated by commercial review and looking at other available opportunities. Mr. Walsh said, in considering going into constrained facilities and potentially paying back-outs, capital fees and so forth, you have to look at whether it makes sense to build your own facilities. This is an example of where a company has gone that route.

4:19:20 PM
CO-CHAIR WAGONER asked if company A is an explorer and comes up with a well with commercial production, how do they evaluate whether it's worth it to them to build their own treatment

facility or enter into negotiations with, and maybe pay for, the retrofitting of an existing facility to put that oil through.

MR. WALSH answered that it is very dependent on that companies' commercial terms - their cost of capital and their target IRR and so forth. It's very difficult for an outsider to do that review. He was sure ENI did a diligent commercial analysis to determine they wanted to go stand-alone.

CO-CHAIR PASKVAN asked if these water and gas issues are unique to Alaska or are they in other parts of the world. Is it Alaska-specific in any way.

MR. WALSH answered that the production characteristics and the increase in natural gas production or water production with barrels of oil is not unique to Alaska. That is very common throughout the world in oil and gas production. There are varying grades of oil in the various basins around the world. Some areas have waxy oil or tar-rich oil; there are lots of different constraints. The production characteristics of Alaska's oil are very good and Alaska is not unique in terms of having to deal with increasing amounts of cycling gas and water. However, it is a bit unique in terms of the cost of developing assets on the North Slope.

Another example that really hasn't been finalized yet is Brooks Range Petroleum that has a significant lease hold position on the North Slope and has been aggressively exploring their acreage and acquiring new. They have leaned toward stand-alone facilities, although they have an interest in discussing facilities sharing if the terms are right. Their model for development of their assets has been based on satellite production facilities and trying to create facilities that would be shared by a number of producers. The processing would occur there and then pipeline quality oil would be brought to the common carriers. Brooks Petroleum doesn't have any commercial production, yet, but maybe soon. They are very knowledgeable about the whole process of facilities access and have the ability to negotiate terms as they see fit.

He summarized that evaluation of facilities sharing must be done on a case-by-case basis and each company has to figure out whether it makes sense for them to begin the negotiation process.

4:25:39 PM

MR. WALSH said he asked the operators and owners what they thought the benefits would be to them in facilities sharing. In most cases, the response was they always knew they would be facility constrained eventually and at some point would be actively marketing access to those facilities, and they were very much in favor of creating an environment where people would come to them.

They were also asked what they wanted potential third parties to know and the response was to let people know what assets exist, where there might be existing capacity and what terms would be if oil has to be backed out - and to get the information out there. This process educated people on what the issues were and allowed for more of an open dialogue. The quick response from the operators to the question of identifying existing or future excess capacity was that they are constrained in most of their assets. So there would be back-outs in lots of cases. But Badami was a case in point of a 35,000 barrel a day capacity facility that had no flow at the time.

Finally he said they asked the process for and the cost of gaining access and those answers were what got folded into their guideline information and merged with what was gleaned from other facilities sharing arrangements around the world.

4:30:54 PM
MR. WALSH explained his graph of production in Alaska that accompanied his presentation. Another map was of recent exploration activity on the North Slope produced by the Division of Oil and Gas. Other slides showed units and processing facilities and pipelines that were spread across the North Slope. He said another study was done on the break-over geographically for determining whether building a stand-alone facility was more practical than accessing existing facilities and they found anything beyond 25 miles from a production facility was that point. You might at least partially process it at the site and then send one or two phase production. He showed a schematic of flow in a basic production facility.

4:34:08 PM
CO-CHAIR PASKVAN asked him to provide the key points and a summary.

4:35:18 PM
MR. WALSH hurried on to another slide on pipeline capacities and projected field production saying the key point was that they know there is room in the oil transport pipelines and

particularly in TAPS. That is not where the constraint is. Rather, it is the gas and water handling in the fields. He showed a slide on TAPS pipeline specifications (the quality of oil that has to be produced before going into TAPS). He said for the most part all of the pipelines on the North Slope at the 2004 timeframe looked like they would currently have room for oil transport or would in the very near future. Another slide showed constraints of existing fields and facilities and showed that everything was near full or expected to be at capacity with the exception of Badami.

MR. WALSH said the key components that go into the costs of facilities access are sharing the capital cost of the original asset and then the operating costs of processing the liquids, and the back out which could range from 2 to 50 percent (a key component). Another schematic production profile showed typical base production of all the oil produced on the North Slope; he said it's critical to maximize that base production along with the satellite stream of fluids (high quality and not needing a lot of processing) and that is what the operators on the North Slope are doing. The profile showed windows of oil that would have to be backed out, when a satellite field starts to decline and the high water cut barrels that get brought back in (deferred production).

4:39:07 PM
CO-CHAIR WAGONER asked if they have to go through AOGCC to get permission to reduce production of certain wells when they start that process.

MR. WALSH answered this happens on a daily basis and they have a "choke model" that shows which wells should be flowing and which ones should not. If a well is shut-in the Alaska Oil and Gas Conservation Commission (AOGCC) would be notified. The philosophy behind facilities sharing is getting the best oil into the system. Another slide presented the "guiding principles" for facilities access and what should be addressed between negotiating parties.

In summary, he said facility owners and independents are generally supportive of facilities sharing, and the value of facilities sharing is dependent on proximity of production and the characteristics of the oil to be processed. A means of motivation exists to implement facilities sharing agreements and no oil is currently being held up due to facilities sharing issues that he knew of. The only oil that may be held up because of constraints is the base production oil that would only

accelerate the decline curve if it were produced quicker. Finally, more transparency and more discoveries would be helpful, along with more oil and people coming to knock at the door of the operators and asking for access.

4:43:40 PM
CO-CHAIR PASKVAN thanked Mr. Walsh and announced an at ease from 4:43 to 4:43:52 p.m.

North Slope Facilities Capacities and Expansion and Technologies New Developments in Upstream Oil and Gas

4:44:53 PM
CO-CHAIR PASKVAN announced the next order of business would be comments from Bill Barron, the director of the Division of Oil and Gas.

4:45:09 PM
BILL BARRON, Director, Division of Oil and Gas, Department of Natural Resources (DNR), said that was a good overview of facilities sharing by Mr. Walsh. His presentation would try to put some actual production data for the committee so they can have a dialogue about how the concepts for facilities sharing are impacted by actual production and reservoir management.

CO-CHAIR PASKVAN thanked the division for responding to his questions back in June and those answers were included in their packets.

4:46:35 PM
MR. BARRON said he included an appendix which has all the slides of production data, but this presentation is trimmed for expediency and dialogue. The first slide was of the Prudhoe Bay Unit in terms of oil and NGLs in green and water production in blue. He said this was very typical exhibit of what one would expect to see in an oil reservoir that has "water drive mechanism," which means you have naturally occurring water from the edge or the base of the reservoir moving in support of the pressure of the reservoir and a field that is under water flood. The curve was a fairly flat plateau after an initial production and decline. The inverse is true of the water - very low up front and then increasing over time.

MR. BARRON said the next graph was of the total fluid versus the total liquids (all water and all oils combined), and what he wanted to show was that over time, especially since January 2001

to date, total fluid production through Prudhoe Bay was essentially the same with some wild variations due to facility upsets or seasonality, but part of their discussion with the general public is that it was at 2 million barrels and now it's at 600,000. Clearly there is excess capacity. The problem is that processing facilities are at capacity.

He explained that at the outset of a facilities design process, engineers will work with their reservoir counterparts to try and get an idea of how big the field is and what kind of flow capacities it will have, and they will design a facility around those initial concepts. For example, if you build a facility to handle 1,000 barrels a day when you first bring it on, you might have 900 barrels of oil and 100 barrels of water. Twenty years into the life, you now have 100 barrels of oil and 900 barrels of water. You're still at facility capacity, because you're still processing the same amount of fluid. That is a natural dynamic of the field; in some fields it's more rapid and some are slower. Typically oil fields begin at their outset as oil fields and at the end of their life they become world class water processing plants.

Two combined curves on page 2 illustrated the water/oil ratio (how much water is brought in with the oil) and the gas/oil ratio (GOR). Mr. Barron said the oil/water ratio at inception at Prudhoe Bay was incredibly low, "essentially zero." It's now approaching 4/1 (80 percent water cut). That tells him that there is still robust life left in the field in terms of oil production; you're just having to manage water at a much higher volume. In terms of the gas, as reservoir pressure drops, more gas breaks out of the oil, which increases your oiled gas recovery, which begins to compound the problem.

Another problem in mature fields is that water is heavier than oil, and as fluids are produced out of a reservoir, if you do not put enough fluid back in, your natural pressure will decrease. The more that you lose reservoir pressure the harder it is to extract the oil out of the reservoir, because you still have to lift it out. At the initial phase of a field, you have "free flow" without artificial lift. There are various means of artificial lift: injecting gas inside the tubing (gas lift), pumps, rod or jet pumps, rocking horses - to name a few.

MR. BARRON next showed a diagram of the GOR at Prudhoe Bay by facility (flow stations), that showed facilities located where the oil is regionally from. He explained "regionally" in terms of maybe a well is more affected by water flood and that means

it's not necessarily in the gas cap and would have a lower GOR. But the water/oil ratio would probably be higher, because it is affected more by the water flood. Conversely, maybe the wells that the next two pump stations are working from are predominantly within the gas cap, near it or affected by much more gas cycling effort. And the conundrum for shared facilities becomes where is the third party coming into and what kind of product is he bringing. This gets into the incredible dynamic issue of reservoir management. Both of the major operators on the North Slope have incredibly sophisticated numerical simulations that they run on a very routine basis. They look at where they think wells will begin to "gas out" or "water out." They then plan their work-over programs, their drilling programs and their shut-in programs to minimize the impact of the water or the gas fronts as they come into those areas. To work through that in a facility sharing program gets even more dynamic, because they will probably have to back-out wells prematurely, and that could have a significant "knock on effect" on ultimate recovery, which is where the Alaska Oil and Gas Conservation Commission (AOGCC) would step in and walk through everyone's understanding of how they will get the oil back.

4:56:08 PM
He said that Kuparuk has a very similar response to Prudhoe Bay's in terms of declining and plateauing production and total liquids versus water injection, but the Kuparuk reservoir is separate and very different in terms of its fluid characteristics. For example its GOR is just now at about 2 whereas Prudhoe Bay is at about 25. Part of that is because of all the gas cycling that has been going on and part of it is directly associated with what kind of oil it is. Kuparuk oil is less gassy and a completely different quality of crude than oil in Prudhoe Bay. These are the dynamics companies have to deal with in designing facilities and how to work in shared facilities.

MR. BARRON said everything in Prudhoe Bay in general is full, either because of gas handling issues or water handling issues. Badami is open; the Pioneer and ENI operations also have some capacity.

4:58:12 PM
SENATOR STEDMAN asked him to define "full" in layman's terms.

MR. BARRON explained that flow from any individual well and flow through a facility are a little bit different. The flow capacity of a well is going to be defined by the energy of the reservoir

and/or the introduction of an artificial lift system. A facility that is capacity-limited has either too much water or too much gas to put in any more oil. If the facility processes 1,000 barrels a day; the wells have to flow to the flow stations and if the facility can only handle 1,000 barrels a day, they have to figure out which wells they can produce relative to reservoir management.

5:00:13 PM
SENATOR FRENCH said from an operator's perspective it means something is going to pop; you're at the physical limits of the plant.

MR. BARRON agreed and said "debottlenecking" is an industry term for modifying a plant to remove more fluid.

SENATOR FRENCH said debottlenecking is a key word and they need to find out what is really constraining new oil on the North Slope and if either a tax change or an investment change can make a difference to the pipeline.

SENATOR WIELECHOWSKI asked if new oil is found on the North Slope, would the current facilities be able to handle it.

MR. BARRON answered not the production facilities but the pipeline could.

CO-CHAIR PASKVAN said to get to the pipeline you have to go through the facility.

MR. BARRON said that wasn't correct.

CO-CHAIR PASKVAN modified his statement saying if the oil didn't need treating it could go directly into any of the oil transit lines on the North Slope.

SENATOR WIELECHOWSKI asked how often you get 100 percent oil coming out of the ground.

MR. BARRON replied you very rarely get it at inception, but you would design your own stand-alone processing facility for your own benefit and then ship the oil to the oil transit lines.

SENATOR WIELECHOWSKI asked if new oil was discovered at Prudhoe Bay or Kuparuk is it fair to say that very little would make it to the pipeline because the processing facilities simply can't

handle dealing with the gas and water that is likely to be in the total composition.

5:03:54 PM
MR. BARRON replied if the requirement was for that oil to go through the existing facilities, it would not make it in. But it is not a requirement for development.

SENATOR FRENCH said chances are if they found new oil at Prudhoe Bay or Kuparuk it's going to be lower GOR oil than what is currently in those facilities and they would make room for it.

MR. BARRON replied that would be correct.

SENATOR FRENCH said no one is going to drill a well on the North Slope and expect to get it in the pipeline without going through a production facility.

MR. BARRON replied that was correct, but it wouldn't have to go through the existing facilities. They would have to build their own stand-alone facility.

5:05:22 PM
He said the next series of slides was relative to new technologies.

CO-CHAIR PASKVAN said it might be better to do that on another day and he would certainly accommodate his schedule.

CO-CHAIR WAGONER asked if there is a point at which a company would decide to try to go into existing facilities and share it because of the size of their discovery.

MR. BARRON answered that he would have to think about that a little bit, because some of this gets back to corporate culture and how a company wants to develop its property. If it's a small amount, they might try to shoehorn it in. If it's big, the likelihood is that they would do their own facility. Some of the new ideas are truck-able modules that are small in terms of overall size that can be bundled together and brought onto location fairly quickly.

5:07:37 PM
SENATOR FRENCH asked how heavy oil fits into the facilities-constrained on the North Slope, particularly with respect to Milne Point, which is where BP is doing its CHOPS program.

MR. BARRON replied the interesting thing about heavy oil, especially the CHOPS, is to move it into the pipeline it will have its own stand-alone facility, because a tremendous amount of sand will be brought up with the oil. So the sand has to drop out of the system into its own vessels; the oil then is still very viscous and has to be blended with a diluent, which is the current production of the North Slope. In other words, a lighter crude is then blended with the heavy crude to get to where it can be moved into the transit lines and into TAPS. So there is a really need for overall project integration for the successful completion of the CHOPS program across Milne Point that needs a blend of the two crudes to get into the overall system downstream.

SENATOR WIELECHOWSKI said he heard today that no oil is currently being held up due to facilities sharing issues, but he has also heard just the opposite over the years especially from the smaller independents. It would be extremely expensive for them to build facilities of their own. He asked if he had heard otherwise and also if he thought statutory changes were needed on facilities sharing.

MR. BARRON replied that he didn't know of any oil that has not been allowed in the line or is being held up. He knows of healthy robust discussions by many players in terms of the complexity of facility sharing. The division is encouraging them to not necessarily think about process facility sharing but more in terms of overall facility sharing including roads, pads, power, people, camps and things that can minimize costs, decrease the cost to a new player and maximize overall throughput from all the North Slope. He didn't see a need to make any statutory changes to facility sharing. It's too dynamic and it's a very difficult issue.

CO-CHAIR PASKVAN thanked both Mr. Walsh and Mr. Barron for their presentations.

5:12:08 PM
Finding no further business to come before the Senate Resources Standing Committee, Co-Chair Paskvan adjourned the meeting at 5:12 p.m.