

**ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE**

April 8, 2011

3:46 p.m.

MEMBERS PRESENT

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

MEMBERS ABSENT

All members present

OTHER LEGISLATORS PRESENT

Senator Cathy Giessel

COMMITTEE CALENDAR

SENATE BILL NO. 49

"An Act relating to the interest rate applicable to certain amounts due for fees, taxes, and payments made and property delivered to the Department of Revenue; relating to the oil and gas production tax rate; relating to monthly installment payments of estimated oil and gas production tax; relating to oil and gas production tax credits for certain expenditures, including qualified capital credits for exploration, development, and production; relating to the limitation on assessment of oil and gas production taxes; relating to the determination of oil and gas production tax values; making conforming amendments; and providing for an effective date."

- HEARD & HELD

PREVIOUS COMMITTEE ACTION

BILL: SB 49

SHORT TITLE: PRODUCTION TAX ON OIL AND GAS

SPONSOR(S): RULES BY REQUEST OF THE GOVERNOR

01/19/11 (S) READ THE FIRST TIME - REFERRALS

01/19/11 (S) RES, FIN
03/09/11 (S) RES AT 3:30 PM BUTROVICH 205
03/09/11 (S) Heard & Held
03/09/11 (S) MINUTE(RES)
03/11/11 (S) RES AT 3:30 PM BUTROVICH 205
03/11/11 (S) Heard & Held
03/11/11 (S) MINUTE(RES)
03/14/11 (S) RES AT 3:30 PM BUTROVICH 205
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03/18/11 (S) Heard & Held
03/18/11 (S) MINUTE(RES)
03/30/11 (S) RES AT 3:30 PM BUTROVICH 205
03/30/11 (S) <Above Item Removed from Agenda>
03/30/11 (S) MINUTE(RES)
04/01/11 (S) RES AT 3:30 PM BUTROVICH 205
04/01/11 (S) Heard & Held
04/01/11 (S) MINUTE(RES)
04/08/11 (S) RES AT 3:30 PM BUTROVICH 205

WITNESS REGISTER

CATHY FORESTER, Engineering Commissioner
Alaska Oil and Gas Conservation Commission
Anchorage, AK

POSITION STATEMENT: Delivered a PowerPoint discussing oil and gas activity on the North Slope.

ACTION NARRATIVE

3:46:36 PM

CO-CHAIR JOE PASKVAN called the Senate Resources Standing Committee meeting to order at 3:46 p.m. Present at the call to order were Senators French, McGuire, Stevens, Stedman, Wagoner, and Paskvan. Senator Wielechowski arrived soon thereafter.

SB 49-PRODUCTION TAX ON OIL AND GAS

CO-CHAIR PASKVAN announced the business before the committee would be to consider the merits of SB 49 learning from Cathy Foerster, Commissioner of the Alaska Oil and Gas Conservation Commission (AOGCC). The AOGCC mission is in part "To protect the public interest in exploration and development of Alaska's

valuable oil and gas resources" and to "ensure greater ultimate recovery of those ... resources." Commissioner Brian Butcher was asked to attend to respond to questions directed to the Department of Revenue and Kevin Banks would be available via teleconference to respond to questions directed to the Department of Natural Resources (DNR).

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CATHY FORESTER, Engineering Commissioner, Alaska Oil and Gas Conservation Commission (AOGCC), introduced herself and noted that she asked AOGCC Commissioner Dan Seamont to attend the hearing via teleconference.

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SENATOR WIELECHOWSKI joined the committee.

MS. FOERSTER explained that because of the common feeling that oil price is the primary driver behind decisions relating to oil and gas expenditures, most of the charts in the presentation will have permitting, exploration, drilling, and workover activities superimposed on graphs depicting an oil price or trend.

She displayed a graph depicting the first purchase price for U.S. crude oil from 1950 to 2010 and noted that oil price information older than the mid-1970s was surprising difficult to find. The curve reflects the nominal price paid to the operating company when the produced oil was metered and then removed from the lease or lease sales. She noted that the graph was available online from the U.S. Energy Information Agency.

The page 4 graph depicted West Coast spot prices for North Slope crude from 1995 to 2010. She noted that the shorter term look was probably more germane. The page 5 graph showed the U.S. and North Slope price forecasts in the background to illustrate that prices were very close over the shorter term.

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SENATOR FRENCH said he recently read an article in the Petroleum News that pointed out that for the last several months North Slope Crude had brought a premium for over the average U.S. price, which is contrary to the normal history of prices. He asked if that price premium had come to her attention.

MS. FOERSTER replied she wasn't aware of that.

CO-CHAIR WAGONER added that he's not sure why but Alaska crude was \$120 last night and today the West Coast price was \$110. That represents roughly an 8 percent difference.

SENATOR FRENCH said the article pointed out that for several months Alaska Crude had been as much as \$10 over West Texas Intermediate. This is highly unusual and has something to do with a supply glut in the Midwest and tighter supplies on the West Coast.

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SENATOR STEDMAN reminded the committee that the issue of West Texas not being the benchmark was discussed last year.

MS. FOERSTER said the next chart shows world events that correspond to pronounced changes in crude oil prices from 1970 to 2010. She noted that this graph introduces a third price trend, the U.S. price in real dollars, and suggested it's helpful to be reminded of the difference between real and nominal over time. She pointed out that in 1986 pandemonium set in after Saudi Arabia abandoned the role of swing producer.

She said the graph on page 7 shows Alaska oil and gas activity from 1950 to 2010. The number of drilling permits issued by the AOGCC is superimposed over the U.S. nominal price. She explained that from the late 1950s to the late 1960s oil and gas activity in Alaska occurred predominantly in the Cook Inlet Basin, and about 1968 on that work took a backseat to exploration and development on the North Slope. The spike in the number of permits between 1977 and 1985 reflects the emphasis on developing the Prudhoe Bay, Kuparuk, and Milne Point oil fields. The abrupt drop in the number of approved permits from 1985-1987 probably reflects the abrupt drop in oil price caused when Saudi Arabia abandoned its price-controlling, swing producer role.

In the time period from the late 1980s to present day activity has been affected by continued development of Prudhoe Bay and Kuparuk as well as exploration and development in the satellite fields within the Prudhoe Bay and Kuparuk units and new fields like Alpine, Fjord, Nanuq, Oooguruk, and Niakuk. In 1995 the Kuparuk owners reached alignment on satellites and that's when those fields started to come on. It wasn't possible to move forward without commercial agreement among the owners on how to divide the costs and spoils of those developments. The severe dip in activity in 1999 reflects that the wellhead price for Alaska Crude dropped to about \$9 per barrel. That was also the

year that both BP and Arco were busy buying and being bought so a lot of effort was spend on activity other than drilling.

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MS. FOERSTER said the graph on page 8 adds a curve depicting the number of active wells in the state. It illustrates that the number of wells has grown steadily since the late 1960s. She explained that active wells must be inspected by AOGCC field personnel and anything that has not been plugged and abandoned is considered active. She noted that the legacy wells in the NPRA were not included.

SENATOR FRENCH said he assumes that these are not all oil wells.

MS. FOERSTER responded that's correct and some aren't properly abandoned so AOGCC has to keep an eye on them.

SENATOR FRENCH asked how many actually are oil wells.

MS. FOERSTER replied she didn't know but she'd find out and get back with the information.

SENATOR WIELECHOWSKI asked if she had a sense of what percent of the leases were active.

MS. FOERSTER suggested that Mr. Banks with the Department of Natural Resources (DNR) could better answer the question. She noted that he was available now or he could follow up later at the committee's discretion.

CO-CHAIR PASKVAN voiced a preference for Ms. Foerster to finish the presentation.

MS. FOERSTER pointed out that while Alaska currently has over 4,600 active wells, that number is small compared to other states. For example, Texas has over 300,000 active wells, California has over 60,000, and New York has about 12,000. The reason for the disparity is that the Lower 48 states have been developing their oil and gas resource for a lot longer than Alaska and they don't have the access issues that Alaska has so they are able to exploit all their basins. She noted that Mr. Seamont likes to point out that Alaska has exploited just 2 of approximately 20 basins in the state.

SENATOR WIELECHOWSKI asked her to expand her discussion of why Alaska has so many fewer wells than other producing states when it's one of the leading producers of oil in the country.

MS. FOEFSTER pointed out that there's been production going on in Texas for over 100 years and oil wells are everywhere, whereas Alaska has oil wells on just the North Slope and in Cook Inlet, which doesn't represent much of the state's land mass. That being said, the average production rate in Alaska is about 150 BB/day while the average production rate for Texas wells is less than 10 BB/day. This reflects Texas's long production history and the large number of "stripper wells" in operation. Because production costs are relatively low, somebody is making money from those wells eking out a barrel here and there.

SENATOR WIELECHOWSKI noted that over the last decade the number of rigs consistently working in Alaska has been just 10 or 11 while other states have had much higher counts. He asked if there's a correlation between rig counts and production.

MS. FOERSTER said the rig count in the Lower 48 is fairly constant, but because of the transportation infrastructure those rigs have the ability to move from state-to-state over the course of a season. Alaska isn't connected to that infrastructure so it's expensive to move a rig up here and it has to be made "Alaska-ready" before it can be put to work.

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MS. FOERSTER said the next graph overlays the 130 some active oil and gas reservoirs onto the previous graph. She mentioned that the number of wells has grown steadily and that the AOGCC is responsible for monitoring and regulating each of them.

She next displayed a timeline showing when the major oil producing fields on the North Slope were developed. A red star depicts the time of initial discovery, a gold bar shows the period of initial development leading to production and a green bar represents the start of regular production. In some cases development began almost immediately and for a variety of reasons there was a lapse of several years or even decades in other cases. One reason for delay is that technology sometimes didn't exist to make the play viable. The West Sak pool in the Kuparuk River field is a good example of this. A pilot well in the 1980s was unsuccessful, but now that horizontal and multi-lateral technologies exist that type of well can produce enough to be commercially viable. Ugnu-Kuparuk is another example; in this case, viscous oil technology is just now developing.

SENATOR FRENCH asked if she knew the circumstances of the Kuparuk River field. More than a decade lapsed between discovery

and the beginning of production and it's now the second largest oil field in North America.

MS. FOERSTER said her understanding is that the operators that developed Prudhoe Bay also put money into Kuparuk but their time and money first went to develop the larger Prudhoe Bay field.

She provided several more reasons that development of a field may take time. The pool may be too small to justify stand-alone facilities and it's either too far from existing infrastructure or there isn't yet a commercial agreement with the owners of the nearby infrastructure. Also, a small pool may be underlain by a bigger pool and the operator may wisely decide to product the small pool on the way out. For example, Tabasco overlies the Kuparuk reservoir and the Brookian is underlain by the Point Thomson reservoir.

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SENATOR PASKVAN returned attention to page 9 that shows the steady increase in the number of active oil and gas reservoirs and asked what that means to Alaskans.

MS. FOERSTER replied that gradual but steady increase is a normal way for a good oil basin like the Cook Inlet or the North Slope to develop. Time and money is spent building infrastructure to get the "big elephant" and over time the smaller operators come in and work commercial agreements with the large owners.

SENATOR FRENCH asked if she would take a few minutes to talk about what the AOGCC does and a little of her background since the entire state is captivated by both current and future activity on the North Slope.

MS. FOERSTER explained that the Alaska Oil and Gas Conservation Commission (AOGCC) is charged with preventing waste of hydrocarbon resources, with encouraging greater ultimate recovery of those resources, with protecting the correlative rights of the owners of those resources, with protecting the fresh ground waters during drilling and production operations, and with assuring the safety of the people working in those fields during the operations under the AOGCC purview. The AOGCC recently has been given other responsibilities, but for the purposes of the discussion today those are the core responsibilities. There are three commissioners; statute requires one commissioner to be a petroleum geologist, one to be a petroleum engineer, and one to be a member with relevant

experience to the oil and gas industry. That position currently is filled by an attorney whose experience is extensive.

SENATOR FRENCH asked which position she filled and how long she had served on the commission.

MS. FOERSTER replied she's the petroleum engineer and she's served for about six years. Before this she had many years in the industry.

SENATOR STEVENS noted that the Governor recently announced a goal of one million barrels [of oil production per day through the Trans Alaska Pipeline System (TAPS) within 10 years] and asked if that volume is a concern.

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MS. FOERSTER replied she tries not to worry about things that are beyond her control but she believes that Alaska has good operators that are doing a good job of developing the resource. If the Legislature developed new ways to incentivize additional exploration and production, AOGCC would help implement those ideas. She stated that production does decline in a mature basin and it's her belief that unless the [federal] government releases more land, there probably aren't any easy answers for increasing volume in the pipeline to a million barrels or higher.

SENATOR STEVENS asked if AOGCC had a goal of "the maximum volume possible."

MS. FOERSTER replied anything is possible but unless the federal government opens new areas, another Prudhoe Bay is unlikely. She said later in the presentation she'd show some production graphs that illustrate about what it takes to make increments in the line.

SENATOR WIELECHOWSKI asked if it was the role of AOGCC or DNR to manage the resource.

MS. FOERSTER replied it's the operator's role to manage the resource. AOGCC's role is to assure that the management results in the greater ultimate recovery without waste.

SENATOR WIELECHOWSKI asked if it was her understanding that oil production could be increased in the Prudhoe Bay, Kuparuk, and Alpine fields if more gas was injected into the wells.

MS. FOERSTER explained that facilities have only so much fluid handling capacity and when a mature field produces more water and gas there is less room for oil to come through. At that point the only way to produce more oil is to increase the gas handling or water handling facilities. She said that later in the presentation the production graphs for Prudhoe will show that when the gas handling capacity was increased, the result was an increase in the oil rate. But that's not cheap, so there has to be sufficient bang for the buck to justify the buck. She suggested that's a question to discuss with the operator, not AOGCC.

CO-CHAIR PASKVAN asked her to explain to the listening public what she means when she uses the term "mature field."

MS. FOERSTER said she is referring primarily to Prudhoe Bay and Kuparuk. Those are the mother lode and both have been in production since the late 1970s or early 1980s. She continued to explain that in the early years, when Prudhoe was a black oil field, the operators recognized the need to maintain reservoir pressure. Typically that's done by reinjecting gas and water. Prudhoe didn't produce a lot of gas and water so the operators treated seawater and injected that for pressure maintenance. She said that as a field matures the pressure drops a little bit and more and more of the production is the injected gas and water.

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SENATOR WIELECHOWSKI said his understanding of the announcement yesterday by Mr. Mulva, [Chair and CEO of ConocoPhillips,] was that one proposal was to build facilities to help reinject gas to increase pressure and produce more oil. He asked if that was her understanding.

MS. FOERSTER replied she hadn't talked to anyone at ConocoPhillips, but she suspects that Mr. Malva was talking about additional gas handling capacity and additional compression to reinject the gas. They've done this before and there is a bang for that buck, she said.

SENATOR WIELECHOWSKI said he's trying to figure out at what point an operator has to be told to do that in order to extract more of the resource and avoid a potential waste situation.

MS. FOERSTER responded the DNR or the governor can talk to the operator about doing any number of things, but according to the assistant attorney general, an operator can't be forced to do anything it can't make money doing. If an operator is doing

something that is going to reduce the ultimate recovery or put any recovery at risk, then the AOGCC would step in to stop the activity or to suggest doing it another way.

CO-CHAIR PASKVAN asked Ms. Foerster to continue the presentation.

MS. FOERSTER reminded the committee that she was discussing the reasons why there can be a time gap between discovery and production. Another reason might be that the reservoir isn't competitive with other projects the operator has going. Northstar, for example, had a high cost and low return and the operators could invest elsewhere and make more money. Sometimes an operator has bigger fish to fry and lets a project drop and somebody else picks it up. Oooguruk is an example of that. Another reason might be that the co-owners can't agree on whether or how to develop the resource. The agreements among the owners might not be in place to even allow the development as with the Kuparuk satellites. Permitting could also be the hold up; CD-5 at Alpine is an example of that. Another possible hold up is litigation. A lot of things make it complicated and for whatever reason it can take a long time to get a North Slope field into production.

MS FOERSTER displayed a graph of Alaska's average daily oil and NGL production rate by year from 1960 to 2010 and said she likes to state the obvious; Prudhoe Bay and Kuparuk enabled the infrastructure on the North Slope. In the 1960s and early 1970s there was just Cook Inlet. Prudhoe Bay came on in the late 1970s followed by Kuparuk and Milne Point in the 1980s. A production spike at Prudhoe Bay in the late 1980s occurred when the pressure and other benefits from water flooding in enhanced oil recovery (EOR) kicked in. Small bumps in the declining production occurred at Prudhoe Bay in 1990 and 1993 when GHX-1 and GHX-2 (gas handling expansion) were completed. She noted that those are the kinds of projects that enable the operator to do more with the gas that they're getting more of.

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The steep production decline of the 1990s was slowed by a miscible injection expansion (MIX) project, which allowed the operator to do more gas cap water injection (GCWI) and EOR. This was done to augment the pressure support of the gas cap to prepare for a gas cap blowdown.

The production dip in 2006 was likely due to the shutdown that resulted from the pipeline leaks, but once production resumed

the performance was the same as before the shutdown. Similar to Prudhoe Bay, Kuparuk benefited from EOR in the late 1990s. She noted that Endicott, Lisburne, Point McIntyre as well as the Prudhoe and Kuparuk satellites were discovered during the major field development of Prudhoe Bay and Kuparuk but had to wait on alignment of ownership and other issues before development could go forward.

MS. FOERSTER pointed out that the production decline stopped for a short time from 2000-2003 when the 700 million barrel Alpine field and the 200 million barrel Northstar field came on. At that time Alpine was the largest discovery in the last ten years in the U.S. She opined that an Alpine would need to be discovered every three years in order to stem the current decline and maintain status quo.

SENATOR WIELECHOWSKI mentioned a bill under consideration to encourage a gas-to-liquids plant on the North Slope and asked what impact could be expected in the form of enhanced oil recovery from the CO₂ spinoff from a GTL plant of, say 70,000 barrels.

MS. FOERSTER replied the impact would be negative until such time that Prudhoe Bay is ready for blowdown. In fact, it might create a bigger problem than the intended solution. At Prudhoe Bay the gas that comes out of the reservoir is needed for pressure maintenance and a lot of that gas and the NGLs that come from it are used right there or in other fields on the North Slope.

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SENATOR WIELECHOWSKI asked if 2.7 bcf offtake hadn't already been authorized. He recalled testimony during AGIA that AOGCC though it could be ready to authorize significantly more than that.

MS. FOERSTER reminded him that during that same testimony she said it was easy for the AOGCC to say that because a pipeline was 10 years away, but if a pipeline magically appeared the AOGCC would likely convene an emergency hearing and take that allowable away.

SENATOR WIELECHOWSKI asked if it was possible to take 2.7 bcf/day right now and 4 bcf/day in the future.

MS. FOERSTER replied there will be a time in the future to do either, but not today.

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CO-CHAIR PASKVAN asked her to expand on that answer.

MS. FOERSTER responded it will likely be 7-10 years before AOGCC will feel comfortable with a major gas sale from the North Slope.

SENATOR WIELECHOWSKI questioned why AOGCC authorized 2.7 bcf offtake if it didn't feel it was possible to do.

MS. FOERSTER replied that authorization was granted in the late 1970s or early 1980s and she didn't know what the people on the commission were thinking at that time. She reminded the committee that several years ago the current commissioners ordered a study after which they convened a hearing and determined that because there was no way for the gas to go anywhere until the pipeline was built, there was no reason to remove the allowable. She reiterated that the commission went on record saying that if the good fairy magically made a pipeline appear the commission would convene an emergency hearing.

CO-CHAIR PASKVAN asked Ms. Foerster to continue the presentation.

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MS. FOERSTER displayed a graph and explained that embedded in each wedge for the particular field is all the development drilling and workover activity that is essential to maintaining the production rate and slowing decline from the fields.

The next chart is the same as the previous with the addition of oil price forecasts in the background. She said Alaska has been fortunate that in recent years the continued decline in North Slope production volume has been offset by increases in the price of oil.

The pie chart on page 13 shows the kinds of wells and the number of each kind that were drilled throughout Alaska in 2010. She acknowledged that the numbers may be off by one or two because reports are sometimes late even though the AOGCC requires operators to report within 30 days of completing a well.

She said that according to AOGCC records, a total of 183 wells were drilled in 2010; 168 were on the North Slope, 12 in Cook Inlet, and 3 in other parts of the state. On the North Slope 125 were oil producers, 39 were service wells (i.e. miscible

injectant, water injection), and 4 were exploratory wells. In Cook Inlet 4 wells were gas producers, 3 were exploratory wells looking for gas, 3 were exploratory wells looking for underground coal gasification, and 2 were exploring for geothermal. The three wells that were drilled elsewhere in the state were all looking for geothermal. Alternate energy wells totaled 8.

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CO-CHAIR WAGONER asked where the coal wells were drilled.

MS. FOERSTER replied they were the CERI (Colorado Energy Research Institute) underground coal gasification wells.

The chart on page 14 shows the timing of prominent discoveries on the North Slope going back to 1950. The U.S. price of oil is in the background.

She said the next chart shows the number of exploratory wells targeting conventional oil or gas that were drilled on the North Slope from 1996-2010. The columns are superimposed atop the oil price graph. The wells that were drilled over more than one calendar year were counted only in the year that the operator completed the activity.

CO-CHAIR PASKVAN asked if Alaskans should be alarmed that the chart shows that just 4 exploratory wells were drilled on the North Slope in 2010.

MS. FOERSTER pointed to other low years and suggested that sustained low production would be cause for alarm, not a low year here and there. There are a number of reasons for a low year not the least of which is that operators could be busy with new developments. For example, Pioneer and E&I have their hands full developing Ooguruk and Nakiachuk.

SENATOR WIELECHOWSKI asked if the same rigs are used for exploratory wells as for development wells.

MS. FOERSTER replied it's a yes and no answer. Some rigs are solely dedicated to exploratory drilling and lay down when the exploratory season is over; some rigs can move from place-to-place and some can't; and some exploratory wells require extra capability and therefore a special rig. For example, a rig that might drill a shallow well to the west of Kuparuk couldn't drill a Point Thomson well.

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She said the next chart shows the same price trend that's on the previous slide and the same columns but they're subdivided by operator. This visual illustrates that in the earlier years the exploratory drilling was done by ConocoPhillips, its predecessor, and BP. After 2000, BP's activity slowed and ConocoPhillips' activity has been up and down. In 2004 and beyond new operators began to show up, which is typical of a mature basin. But, she cautioned, some smaller operators shouldn't be welcome in the state. She used the analogy of a lion - representing Exxon or BP - killing and feeding on a wildebeest. The birds - representing the Pioneers and E&Is - move in next followed eventually by the worms. Right now Alaska is attracting a lot of birds, and what it doesn't want is the worms, she said.

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MS. FOERSTER displayed a chart depicting the number of development and service wells and wellbores targeting oil and gas that were drilled on the North Slope from 1950-2010. The legacy wells that were drilled in the NPRA between to 1940s and 1980s were not included. The U.S. nominal price of oil is displayed in the background. She observed that any number of conclusions could be drawn from the data. One could be that the increases in activity conform to increases in price, but that only holds until 2004. Another conclusion could be that the spikes and dips in activity correlate with major field developments. She pointed to Prudhoe Bay and Kuparuk in the 1970s and 1980s and then to the satellites and Alpine. Other conclusions could also be drawn demonstrating that statistics can be used to prove anything.

She said the next chart also illustrates the development and service wells and wellbores targeting oil and gas drilled on the North Slope, but the date range was narrowed to the most recent 15 years, 1996-2010. The U.S. nominal price of oil was again in the background. Just as before, she said, any number of conclusions could be drawn, but none were overly obvious.

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CO-CHAIR PASKVAN asked her to explain to the listening public the meaning and purpose of a "development well."

MS. FOERSTER explained that there are two or three kinds of wells that an operator drills during exploration and development. The first kind is the exploration well, which includes dry holes. Once a find is made, delineation wells are

drilled, which are still typically classified as exploration wells. These step-outs tell the size and geology of the reservoir including fluid properties that the operator needs to know in order to determine whether or not the find is large enough to develop. The foregoing pre-development wells often are throw-away wells that are drilled cheaply and less robustly and wouldn't be allowed to be used as a development well. Once the operator finishes gathering the data the wells are plugged and abandoned. Occasionally the delineation wells are built robust enough to be used as a development well.

The third kind of wells are the development service wells. They are used to produce the oil or gas, to reinject gas into the gas cap, and dispose of water and EOR fluids.

CO-CHAIR PASKVAN asked if the depiction on page 18 was common or typical of a mature field.

MS. FOERSTER replied the chart not only shows what would be seen in a mature basin where the big field is mature but also the little fields that have come on since the early 1990s. These include the Prudhoe satellites, the Kuparuk satellites, Point McIntyre, Alpine, Northstar, Ooguruk, and Nikaitchuq.

SENATOR WIELECHOWSKI asked if, because of improved technology, 164 wells in 2010 produce as much oil as 165 wells in 2005

MS. FOERSTER replied a well drilled in 2010 may have greater capability than a well drilled in 1995 because of improved technology. For example, a vertical West Sak well wasn't commercial in the pilot years of the 1980s, but horizontal drilling opened a lot bigger component of flow into the reservoir. That was a step change in technology and the ability to drill multi-laterals was another step change because that made it possible to take the one well bore at the surface and drill additional well bores off of it fingering out down hole.

CO-CHAIR PASKVAN asked approximately when technology for both horizontal drilling and multi-lateral drilling was first used.

MS. FOERSTER replied horizontal drilling technology was used in the West Sak about year 2000.

SENATOR WIELECHOWSKI asked if she knew if development and service wells were capital costs and operating costs, and if she knew roughly the average cost per well.

MS. FOERSTER replied she didn't have a good number for the total cost for drilling a well but it probably varies depending on the type. A replacement well probably isn't a capital cost, but upgrading or getting new reserves might be a capital cost. She said her general sense is that capital costs tend to be for getting new reserves or improvements, whereas fixing and replacing things generally tend to be operating costs.

She said the chart on page 19 is the same as the previous chart, but the columns are subdivided to indicate the number of wellbores by operating company. Again, the price of oil is in the background.

SENATOR FRENCH observed that the graph on page 19 shows that BP and ConocoPhillips were very active on the North Slope over the last 15 years, whereas ExxonMobil didn't show much drilling activity during that timeframe. He asked if ExxonMobil owned about 20 percent of Prudhoe Bay.

MS. FOERSTER clarified that the color segments on the bars represent operatorship of the wells, not ownership. The only area where ExxonMobil is the operator is Pt. Thomson.

SENATOR WIELECHOWSKI asked if one party has veto power when a new well is drilled or if all the parties have to have signed separate agreements.

MS. FOERSTER replied every operating agreement is different and they change over time. Typically, a majority of the owners have to agree, but it's a contract so it's whatever the people making the contract want it to be.

CO-CHAIR PASKVAN asked her to continue.

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MS. FOERSTER said the chart on page 20 shows the same information as the previous chart, but for just the wells BP drilled. It reflects an overall Slope-wide decrease in activity since 2005. She suggested asking BP what the numbers mean because she couldn't find an answer.

The next chart shows the same information for the ConocoPhillips operated wells. There was a decrease in drilling activity in the West Sak and Alpine in 2004-2008, and then an increase in 2010 due to the increase in multi-lateral wells at Kuparuk.

SENATOR WIELECHOWSKI noted that the 2010 data was reported as of March 1, 2011 and asked what the deadline was for reporting the wells.

MS. FOERSTER replied AOGCC likes to receive a report within 30 of completing a well.

The next chart shows the actual footage drilled for all wells and wellbores on the North Slope from 1996-2010. The price of gas is shown in the background. Green depicts development wells, blue depicts service wells, and yellow depicts exploratory wells. There were no stratigraphic wells drilled during this time. She drew attention to the dip in 1999 and explained that was the year that BP and Arco were busy buying and being bought.

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The chart on page 23 shows the number of active drilling and workover rigs for each quarter from 2005-2010. The West Coast Spot price curve is in the background. She explained that a drilling rig is used to make a new open hole or set casing in a new hole and a workover rig is used to fix broken or underperforming wells. Some rigs can be used for both drilling and workovers and either type can be used to complete a new well. The next two charts show the same information, first for active drilling rigs and next for workover rigs.

MS. FOERSTER said the next two charts were inspired by some of the questions Senator Paskvan asked in earlier hearings. The first one shows the portion of the workovers that were attributed to production enhancement from 2003-2010. These are things that help a well produce more. The red segments show perforation work, which enhances production. The green segments show chemical and mechanical stimulation work. Scale build up in the wellbore area can diminish production and the remedy might be to pump acid into the wellbore and reservoir. Hydraulic fracturing is another type of stimulation. The blue segments show workovers to isolate water or gas; the idea is to plug off things that don't bring money.

SENATOR FRENCH asked her to confirm that it's possible to do a workover on a well and that's not drilling a well.

MS. FOERSTER agreed that a workover is one thing and drilling is another.

SENATOR FRENCH asked her to confirm that a workover can significantly increase production. Perforations, for example, can give access to a whole new zone.

MS. FOERSTER agreed that adding perforations can give access to a whole new zone or an untapped part of a zone. She noted that one of the biggest workover bangs is hydraulic fracturing.

SENATOR FRENCH asked if it's fair to say that the level of activity in 2010 was above average over the last eight years.

MS. FOERSTER opined that the production enhancement activity in 2010 was very healthy. Continuing, she said the purple segment shows work to convert wells from injectors to producers or producers to injectors. The immediate rate drops when a producer well is converted to an injector well but the EOR impact provides a big bang.

The chart on page 27 depicts specific types of maintenance and repair workover activity on North Slope wells from 2003-2010. The red segments depict tubing and casing repair work. As metal corrodes, holes develop resulting in losses in mechanical integrity. The AOGCC does not allow producers to produce wells that don't have mechanical integrity; the producer has to either shut the well in and secure it or fix it. The green segment depicts pump repairs or replacement; many wells have down-hole electric submersible pumps, and if one breaks the pipe has to be removed. The blue segments depict scale or corrosion inhibition work. She described the purple segment as a hodgepodge of miscellaneous things.

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CO-CHAIR PASKVAN asked if the major increase in repairs in 2006 and after was related to the spill at Prudhoe.

MS. FOERSTER replied the events related to the spill were surface infrastructure repairs. The chart represents down-hole maintenance and repair. The only correlation is that both the surface facilities and the down-hole facilities are getting old. She noted that there was a lot of scale and corrosion inhibitor work done in 2009 and that preventative work might save money over time.

CO-CHAIR PASKVAN asked what takeaway message the last two charts convey.

MS. FOERSTER said she likes to draw an analogy to the way somebody treats their car. They either take their car back to the shop when something needs to be fixed or they park it along the road when something breaks and they walk away. Walking away bodes poorly for the car. These slides show the operators are still taking the car to the shop to be fixed and even putting in a new radio or new seat covers. This shows they're doing enhancement activities as well as repairs. They're not about to give up on the car and park it by the side of the road.

MS. FOERSTER observed that the graphs reflect healthy work being done on a mature field.

SENATOR WIELECHOWSKI asked how job intensive workover activity is versus development wells versus exploratory wells.

MS. FOERSTER replied they are all job intensive, but remote exploration is even more so. Even a simple workover can be very labor intensive because every procedure that's performed on a well has several jobs associated with it.

CO-CHAIR PASKVAN asked what she sees as the future of production on the North Slope.

MS. FOERSTER replied the lion is still chewing on the wildebeest. Unless another wildebeest walks by and he grabs it, the lion will fill and go away and the jackals, hyenas, vultures, and crows will stay and nibble on smaller things. That's as far down the chain as she wants to go. New opportunities probably don't exist in this playground so it's a good thing the lion is still here, she stated.

CO-CHAIR PASKVAN thanked the AOGCC and Ms. Foerster in particular.

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There being no further business to come before the committee, Co-Chair Paskvan adjourned the Senate Resources Standing Committee at 5:02 pm.