ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE
January 21, 2008
3:40 p.m.

MEMBERS PRESENT

Senator Charlie Huggins, Chair
Senator Bert Stedman, Vice Chair
Senator Lyda Green
Senator Gary Stevens
Senator Bill Wielechowski

MEMBERS ABSENT

Senator Lesil McGuire
Senator Thomas Wagoner

OTHER LEGISLATORS PRESENT

Representative Kurt Olson

COMMITTEE CALENDAR

CS FOR HOUSE BILL NO. 176(RES)
"An Act creating the Fort Rousseau Causeway State Historical Park."
MOVED CSHB 176(RES) OUT OF COMMITTEE

MIKE WILLIAMS, Chief Economist, Department of Revenue (DOR), provided background information on natural gas.

PREVIOUS COMMITTEE ACTION

BILL: HB 176
SHORT TITLE: CREATE FORT ROUSSEAU CAUSEWAY PARK
SPONSOR(s): REPRESENTATIVE(s) WILSON

03/05/07	(H)	READ THE FIRST TIME - REFERRALS
03/05/07	(H)	RES, FIN
03/28/07	(H)	RES AT 1:00 PM BARNES 124
03/28/07	(H)	Scheduled But Not Heard
04/04/07	(H)	RES AT 1:00 PM BARNES 124
04/04/07	(H)	Moved CSHB 176(RES) Out of Committee
04/04/07	(H)	MINUTE(RES)
04/10/07	(H)	RES RPT CS(RES) 6DP

04/10/07	(H)	DP: ROSES, SEATON, KOHRING, GUTTENBERG, GATTO, JOHNSON
04/19/07	(H)	FIN AT 1:30 PM HOUSE FINANCE 519
04/19/07	(H)	Moved CSHB 176(RES) Out of Committee
04/19/07	(H)	MINUTE(FIN)
04/20/07	(H)	FIN RPT CS(RES) 7DP 1NR
04/20/07	(H)	DP: NELSON, THOMAS, CRAWFORD, JOULE, STOLTZE, HAWKER, MEYER
04/20/07	(H)	NR: KELLY
04/30/07	(H)	TRANSMITTED TO (S)
04/30/07	(H)	VERSION: CSHB 176(RES)
05/02/07	(S)	READ THE FIRST TIME - REFERRALS
05/02/07	(S)	RES, FIN
05/09/07	(S)	RES AT 4:00 PM BUTROVICH 205
05/09/07	(S)	Heard & Held
05/09/07	(S)	MINUTE(RES)

WITNESS REGISTER

REPRESENTATIVE PEGGY WILSON
Alaska State Capitol
Juneau, AK
POSITION STATEMENT: Sponsor of HB 176.

CLIFF STONE
Staff for Representative Wilson
Alaska State Capitol
Juneau, AK
POSITION STATEMENT: Commented on HB 176 for the sponsor.

MIKE WILLIAMS, Chief Economist
Department of Revenue (DOR)
Juneau, AK
POSITION STATEMENT: Gave presentation on natural gas issues.

ACTION NARRATIVE

CHAIR CHARLIE HUGGINS called the Senate Resources Standing Committee meeting to order at 3:40:54 PM, Present at the call to order were Senators Wielechowski, Stedman, Stevens and Huggins.

CSHB 176(RES)-CREATE FORT ROUSSEAU CAUSEWAY PARK

3:42:11 PM
CHAIR HUGGINS announced CSHB 176(RES) to be up for consideration.

REPRESENTATIVE PEGGY WILSON, sponsor of HB 176, gave the committee an overview of what the bill does. In the build up for WWII, the Department of the Army constructed fortifications at several locations encircling Sitka Sound. An 8,000-foot rock and gravel road was built connecting several small islands west of the then Navy's Sea Plane and Operating Base in Sitka. This causeway terminated at the Army's command headquarters named Fort Rousseau on Makhnati Island. She said some of the original concrete structures built by the military are still in fair condition. They include a tri-level command post, anti aircraft gun batteries, three ammo magazines and two bunkers. Construction of the Sitka Airport in the late 1960s eliminated pedestrian and vehicle access. The causeway lands, most of which belong to the State of Alaska, remain under management by the as part of the Sitka Airport under the management of Department of Transportation and Public Facilities (DOTPF).

REPRESENTATIVE WILSON said, Sitka Trail Works has received federal and state grants to rehabilitate the causeway, but cannot continue until the land is transferred to the Department of Natural Resources. State Parks can provide the active management with a very small fiscal note. Without this status, there will be no authorization to move ahead with the environmental and cultural resources assessments, planning, interpretation, and rehabilitation of this historic site, thus jeopardizing the considerable grant funds committed to this effort. Since visitors are very eager to tour this WWII site, a positive revenue stream to the general fund should be realized in just a few years.

She said the proposed Ft. Rousseau Causeway State Historical Park is small. It contains 58 acres of upland area with a sliver of tidelands large enough for the footprint of a dock. It is consistent with the purpose behind the establishment of parks and in part promotes the growth and development and provides opportunities and enjoyment for the citizens of Sitka as well as visitors.

REPRESENTATIVE WILSON said this bridge couples the past with the present. The causeway has been added to the National Register of Historic Places and has been designated as an historical landmark by the National Parks Service. Preservation of the unique historical features of the Fort Rousseau area will remind all visitors about Alaska's role in WWII and allow for a glimpse into the life of the soldiers who stood ready to defend their country.

CHAIR HUGGINS asked if the $16.8 thousand fiscal note was still applicable.

REPRESENTATIVE WILSON replied that there is an updated fiscal note of $18.1 thousand.

3:46:27 PM
SENATOR STEVENS asked if the department had any plans to install placards with explanations.

REPRESENTATIVE WILSON replied yes; the business plan is a very good one.

SENATOR STEVENS asked who Mr. Rousseau was.

CLIFF STONE, staff for Representative Wilson, explained that Mr. Rousseau was a brigadier general who was commissioned by the president of the United States to accept Alaska from the Russians.

3:48:12 PM
SENATOR STEDMAN commented that during WW II Sitka was targeted by the Japanese as the next invasion point in Alaska and the US military built gun emplacements along the causeway and had radar station on Harbor Mountain. The concept is to not only tie in the military heritage of the park, but to also enhance marine-based wildlife viewing.

3:51:01 PM
SENATOR STEDMAN moved to pass CSHB 176(RES) from committee with individual recommendations and attached fiscal notes. There were no objections and it was so ordered.

3:52:10 PM at ease 3:52:30 PM
SENATOR GREEN joined the committee.

CHAIR HUGGINS called the meeting back to order at 3:52:30 PM.

Mike Williams, Department of Revenue (DOR)

MIKE WILLIAMS, Chief Economist, Department of Revenue (DOR), said his purpose in visiting the committee is to provide background information on natural gas. He read from a publication created by the International Energy Agency (IEA) last year named "Natural Gas Market Review 2007." It said:

Natural gas is becoming an increasingly global commodity. Development of previously separate regional gas markets can no longer be considered in isolation. To 2015 investment is a more serious concern than identified in earlier work. North America is preparing to import LNG from both Pacific and Atlantic producers while Pacific consumers have sharply increased LNG imports from Atlantic markets. LNG production capacity is growing from 240 billion cubic meters (bcm) in 2005 to a projected 360 in 2010 – that's a 50 percent increase. But capacity increases after 2010, 2012, depend critically on new projects being sanctioned – and very soon, I might add. LNG importers in the Pacific and European regions remain able to outbid the US in order to secure incremental supplies due primarily to differences in domestic market structure. The US price usually indicated by the Henry Hub price, therefore seems to be setting a floor price for price-sensitive LNG.

Investment in the gas sector is a serious cause for concern. Gas investments everywhere are suffering higher costs and construction delays. A selection of these LNG projects shows production delays averaging almost a year with average cost overruns of more than $2 billion US per project. Furthermore only one major new LNG liquifaction project has been sanctioned in more than a year and a half – a marked slow down compared to previous years. Reports pointing towards the formation of a gas producers association analogous to the organization for petroleum exporting countries will do little to improve this situation. The global demand for raw materials and talent has pushed up costs dramatically in some cases and reduced the effectiveness of each investment dollar spent compared to the situation reported last year. There is a distinct deficit of new long-distance pipeline investment in the period to 2015 – noting that investments in transportation over increasing distances show a distinct preference for LNG.

Regulatory uncertainty and NIMBY (not in my backyard) issues continue to slow investment in downstream pipeline and other infrastructure especially when borders must be crossed.

MR. WILLIAMS said he would divide his presentation into two parts – the world market and North American markets. He would look at the common trends and forecasts from numerous sources – Baker Hughes, BP, Ceti Gas, CNI, the Federal Energy Regulatory Commission, the International Energy Agency, Reuters, US Department of Energy, Wood MacKenzie. He said he did not endorse any one forecast. He would focus them on the trends – what happened in the past and where we are going in the future.

3:57:38 PM
He said that natural gas markets are really dynamic and changing right now. He started with the world view covering six areas: reserves, world-wide reserves, production, consumption, transportation, prices and an outlook.

MR. WILLIAMS went to his chart of natural gas reserves that indicated where the US stands in terms of trillion cubic meters (tcm). It indicates that reserves have gone from about 156 bcf to over 181 bcf in a seven-year period for a 16 percent increase. Russia has the largest reserves followed by Iran, Qatar, Saudi Arabia; Russia and Iran have about 46 percent of the world's proven reserves. The US shares about 3.2 percent and Alaska is well under 1 percent. Production increased by almost 18 percent between 2000 and 2006; Russia at 22 percent and the US at 15 percent are the two largest producers. Iran had the fastest growth, about 67 percent in that time.

3:59:19 PM
He said consumption has increased by about 3 percent a year; the US is the largest consumer at about 22 percent; Russia is second with about 15 percent.

3:59:56 PM
CHAIR HUGGINS asked where China and India fall in the consumption category.

MR. WILLIAMS replied that China consumes 45 bcm; it is primarily a coal consumer. It has signed contracts with Shell to develop IGCC facilities. One of the eight studies undertaken about fuel generation in the world included one of those plants. He thought they would become a big player in gas, but when prices went up, they backed off, but they seem to be going back into it again. He didn't know how it was going to play out.

4:01:44 PM
SENATOR WIELECHOWSKI said he thought Alaska alone has 34 tcf of known reserves and that doesn't match with his US figures.

MR. WILLIAMS reminded him of when Mr. Banks talked about proven reserves being based on what's on the book when a company files with the FCC. The US Department of Energy has Alaska down for 9 – 10 tcf, but it's a definitional issue. Proven reserves need contracts in place.

4:03:00 PM
His world production export chart covered 10 years; it indicates that exports are increasing faster than production, which means more nations are beginning to export. He pointed out that while production has increased by 3 percent/year, exports have been increasing in excess of 7 percent/year – LNG is the fastest growing at about 10 percent/year.

4:04:06 PM
CHAIR HUGGINS asked for a five-year update on construction of LNG or regasification plants in the US that are operating.

MR. WILLIAMS replied that six plants are in operation; however one of them is not on land, but in the Gulf of Mexico.

4:04:46 PM
He showed them next a chart of gas world trade routes to the Asian and European markets. He said some cargos have started off for the US, but have been diverted to Asia because of a better price there.

4:05:29 PM
MR. WILLIAMS went to his next chart and said prices aren't constant. Several things stand out; one is that US prices are far more volatile than either German or LNG prices. In part that is because of the isolation the US market has had from the rest of the world by not importing much LNG. However, that is changing. He pointed out that there is a stronger correlation between the LNG and the pipeline prices than there is between any one of those and the US prices. When price goes up in one, the other goes up almost the same amount.

4:06:43 PM
Comparing oil prices to gas prices, he went to the average annual prices in 1969 – 2005 for Japanese crude cocktail (the average price for all the crude oils imported into Japan) and LNG prices. In the mid-80s after oil prices crashed, LNG prices were higher than crude prices. Starting in 2002 crude prices started being higher than LNG prices. Around 2002 – 2004, a lot of the contracts were renegotiated and at that time they said

when crude prices go up, LNG prices will only go up 85 percent of what the crude price went up. He didn't know if this would cause companies to modify their contracts in the future.

CHAIR HUGGINS asked if he agreed with that theory about the relationship in prices.

MR. WILLIAMS replied that both prices may come down; he believed very strongly there will be a correction.

4:09:10 PM
LNG contracts have a looser linkage to crude oil and spot cargoes. He quoted an IEA study:

> Traditional LNG projects were underpinned by long-term sales and purchase contracts with consuming markets. However, more recent projects have been sanctioned with upstream stakeholders purchasing planned output and in turn marketing by themselves either through capacity and/or equity acquisition at regasification terminals in consuming countries or even direct sales to willing buyers. Those companies with regasification capacities in multiple consuming regions are also making free onboard (FOB) off-take commitments to fill those capacities or to sell a higher-payer market in a more flexible approach than previously seen.

He explained that this means that 15 years ago all of one's LNG contract would be sold in one market. That has changed over time because the plants were "debottlenecked" and had extra cargoes. As price differentials started creeping up, they started selling extra cargos to different markets not under the contract. The renewed contracts now specify you don't have to sell all the cargo to one market; you can diversity. This is the beginnings of a global market for gas. For the first time in history as much as 6 percent of the Atlantic region's 8 bcm was diverted to the Asian market in 2006.

4:11:14 PM
MR. WILLIAMS switched to a Middle East economic survey from November 19, 2007. The byline said "LNG market evolution to bring producers growing off-take diversity." He urged them as they go through AGIA to remember that the LNG market is undergoing fundamental changes and the trend is accelerating. It promises to drive the globalization of gas markets. The short term and spot market accounted for about 16 percent of trade in 2000 compared to under 4 percent 10 years ago.

He read from the Economic Times out of Singapore of November 22 that said the Dubai Multi Commodity Center (DMCC) is planning to launch a liquefied natural gas futures contract on its exchange as soon as surging energy prices increase demand for hedging tools. With a storage hub in place, they are in a good position to launch the contract, the article said. DMCC along with the company in Dubai is setting up a 40 bcf to 65 bcf LNG storage facility at a cost of about $2 billion to offer customers the ability to store and trade the product. He suspected that they would see that happen with natural gas within two years and pointed out that Qatar has already spent $200 million to set up the exchange.

4:13:00 PM
SENATOR STEVENS asked him to explain the fundamental changes he is talking about in the LNG market.

MR. WILLIAMS replied it's no longer one seller and one buyer or one producer and one consumer. The producer now has the option to sell its cargos in more than one market. To get project financing you have to show in-place contracts to purchase the gas. Over time as more producers have come on and more gasification facilities have been built around the world, companies have been able to expand their production and send extra to the new markets (regassed facilities). “It’s a very big deal; and the fact that we’re going to have spot trading in it is also a very big deal.”

SENATOR STEVENS asked if that means buyers would come to the large storage area and buy from it without having a prior commitment.

MR. WILLIAMS replied yes.

SENATOR STEVENS asked if that would make the market more volatile.

MR. WILLIAMS responded, “That’s a good question.” He thought the financial sector amplified the trends, rather than creating them. He didn’t know if that would make it more volatile.

4:14:51 PM
SENATOR WIELECHOWSKI said LNG provides more flexibility and that all things considered, it’s better than a fixed pipeline.

MR. WILLIAMS replied, “For a producer it might be, it might very well be.”

SENATOR WIELECHOWSKI asked, “How about for Alaska?”

4:15:54 PM
MR. WILLIAMS said he was asked a difficult question. One has to look at all options and one of the things about a pipeline that would head into Canada is that Alaska wouldn’t have both the liquefaction cost plus the pipeline cost. Countries that are exporting a lot of gas, like Qatar and Australia, have facilities on top of the gas reserves. Liquifaction in Alaska would occur on the water's edge, but the gas has to get there. “So, there is a difference,” he emphasized. LNG does offer more flexibility; it’s not the only factor to consider – and costs are important.

4:16:33 PM
CHAIR HUGGINS asked if shorter term contracts are the wave of the future.

MR. WILLIAMS answered that he wouldn’t say they are short term; they’re still long term, but they are not tying up the entire production volumes.

MR. WILLIAMS said he had showed them how crude and natural gas prices had diverted in Japan and he wanted to do the same for the US. He used West Texas Intermediate (WTI) and prices at the Henry Hub from 1986 - 2007. Overall the correlation coefficient was about .87 for the entire period. That means when one goes up the other goes up. But they start going apart at August 2005. A closer look after August 2005 showed that gas prices dropped below oil prices and tended to go up and down while oil prices went up; so the correlation coefficient goes negative.

4:20:07 PM
SENATOR STEDMAN asked if oil is awash with natural gas, maybe oil production is on the decline and wouldn't that make oil more valuable than gas.

MR. WILLIAMS replied no, because the transportation costs for it are going up.

4:21:05 PM
CHAIR HUGGINS recalled that the US imports the majority of its crude oil from Canada that has the number two known reserves in the world (tar sands).

MR. WILLIAMS replied yes and he said those tar sands would play into the Canadian gas coming into the US later in his presentation.

4:21:33 PM
He next presented an outlook from Ceti Gas, not because he favors it but because it's easy to read. The trends are very similar to those from the US Department of Energy or Wood MacKenzie. He likes this chart because it breaks out the world by regions and you can see the supply and the demand and also the gap. The world total at the bottom shows that gas use is increasing by 2 to 2.2 percent/ year, a typical forecast. North American has a flat supply with demand increases. This highlights the fact that the US will have to import gas and leads to the question of how that will occur.

4:23:13 PM
His synopsis of the world overview is that gas growth has continued; we're seeing more LNG; a spot market for LNG is developing; and gas and oil prices are delinking (He didn't know if they would in the future).

SENATOR STEDMAN asked if it wouldn't be the natural evolution of a market that as the gas industry develops; a spot market price develops along with it.

MR. WILLIAMS replied yes and that tankers have been getting bigger. Some of the issues surrounding that are they can't get into some of the ports.

4:24:19 PM
Moving to North America he went to supply and demand issues. Demand has four major sectors: industrial (petro-chemical plants), residential (heating and cooking), electric power (generating electricity) and commercial (heating). Other uses like plant, pipelines and transportation use smaller amounts.

4:25:05 PM
Historically industrial electricity is the fastest growing sector over the last 15 – 20 years. This is because the efficiency of combined cycle electric generating using gas is in excess of 50 percent. Moving forward, however, he said the petro-chemical industry in the US has lost market share over the last 15 – 20 years. Employment in that sector is down 33 percent since 1990; so it is not competitive. While there will continue to be growth in electricity, it's reduced.

4:26:16 PM
CHAIR HUGGINS asked him to describe petrochemical subunits, like cement, that are drifting away from production in the US.

MR. WILLIAMS replied that polypropylene is one of the biggest units; from that you get fertilizers and a wide array of products. The largest new petro plants are being built in the Middle East.

CHAIR HUGGINS asked if it is not cost effective to have them here.

MR. WILLIAMS replied that one reason those plants aren't in the US is because the prices are lower elsewhere. But he hadn't actually seen any of the contracts and he knows that the Middle East has guaranteed supplies.

SENATOR WIELECHOWSKI asked for data on geographical trends in North America that might relate to Alaska where LNG might be shipped to the West Coast versus the Midwest.

MR. WILLIAMS replied that he had a map of all the LNG plants in operation as well as the proposed plants. He has also had a map of existing pipelines in North American along with all the natural gas pipelines and LNG plants.

CHAIR HUGGINS said he had heard that most of the proposed LNG plants will not get built at the sites proposed for lots of reasons.

4:29:46 PM
MR. WILLIAMS agreed and added that he had heard about the NIMBY feelings. The industry has worked around that issue, however, by developing regasification facilities on offshore platforms with floating pipelines to shore.

4:30:10 PM
He went to an old chart on natural gas demand in the US, but said the data isn't much different now. One of the most important things on it to note was that the total demand which is 25 tcf remains stable until 2015 when it starts going up. In 2005 it actually went down due to the hurricanes in the Gulf of Mexico because a lot of petro-chemical plants in that region went down and so they weren't consuming.

4:31:51 PM

CHAIR HUGGINS asked him to differentiate between commercial and industrial use.

MR. WILLIAMS answered for industrial use for them to think about heavy industries – petro-chemical plants and things like that; for commercial use to think in terms of large buildings that house offices – software companies and things like that.

4:32:31 PM
SENATOR WIELECHOWSKI asked why residential, commercial and industrial uses are all going down.

MR. WILLIAMS opined that fuel efficiency is a big deal. Anecdotally, he has heard people with old houses have started switching out gas because of the 2005 hurricane. Thinking in terms of trends, he said, the hurricane of 2005 went far beyond price. From a consumer point of view one could ask: Do you want to have gas and is flexibility always the best thing? Pipelines have value because they are already there.

One has to look at the big picture. The downs for gas in the 2000 – 2005 timeframe are all associated with Hurricane Katrina; but in the 2005 – 2010 timeframe those industries that went down for six months started coming back; most are in operation again. One percent growth is shown in 2010 – 2015 area.

4:35:43 PM
SENATOR WIELECHOWSKI asked why those sectors are decreasing in natural gas use long term because you don't see more coal plants in the west, oil is diminishing and nuclear plants aren't being built. Natural gas is clean and relatively cheap; so why is it not on the increase?

MR. WILLIAMS replied, "Those are some of the uncertainties I'm going to leave you to ponder when I depart today." He explained that natural gas is generating spare electricity capacity right now; it is the most expensive of the fossil fuels so they use it for peaking times. Long term, though, because of the issues surrounding Hurricane Katrina and the high cost per MMBTU North American utilities are beginning to consider other options - like nuclear. Two nuclear plants were proposed to the Nuclear Regulatory Commission in September 2007 – the first two proposed in 31 years. After the hurricanes, Texas utilities proposed 15 or 20 integrated gasification combined-cycle coal (IGCC) plants. The environmentalists didn't like that; so they withdrew them and proposed five or six IGCC plants and a nuclear plant. Long term the decisions haven't been made; but utilities are

beginning to make those decisions. It's a very big deal, he stated.

4:38:11 PM
MR. WILLIAMS explained that the issues to deal with are natural gas regulations, hurricanes, international competition, price effects and legislation.

He briefed them on the history of gas regulation which began for the US in 1938; deregulation began in 1978 and was completed 14 years after that. That means the industry was regulated for almost 60 years in this country. Natural gas prices at the wellhead were pretty flat from 1938 to 1972/3 – since it was government regulated, gas was cheap so plants got built using gas. In 1973 some major things happened in the world - oil prices quadrupled at the same time gas prices started going up. For the first time in years those industries had to deal with higher natural gas prices. A lot of companies went out of business in the 80s. Because prices of oil went higher, they could actually drill for oil, but gas was constrained.

In the mid-70s the US started having a supply crunch; that's what prompted the 1978 Natural Gas Policy Act. They started saying if a well was a certain age they could charge a certain price, but the newer wells could charge a higher price because their costs were higher. After going through that for years, it was deregulated. After that prices went up. So industry has to decide what it will do going forward – use a new energy source, a different technology? Move overseas?

4:41:33 PM
He said the question of whether demand will go up is a good one. If you're producing petro-chemicals, would you rather produce it at half the cost in Saudi Arabia or do it here in the United States? If you are producing in this country, you don't have transportation charges and don't have to worry about things like quotas that may pop up in the future. He said, "It's something to consider and I don't know what the answer is, but regulation has made a difference in this country in the use of natural gas and its impact is still being felt."

He said the interruptible supply of gas is a big deal to utilities. So, price isn't the only issue for them. He said the US Department of Energy wrote a paper on the effects of cyclones on natural supplies in the Gulf of Mexico.

4:42:54 PM

He said the average US ethylene plant size is about 200,000 tons/year; Saudi Arabia is 750,000 tons/year – possibly with favorable prices, which he couldn't document. These are serious differences in efficiencies, something that shouldn't be underestimated. He repeated that he didn't know if demand would continue growing.

CHAIR HUGGINS asked what ethylene is used for.

MR. WILLIAMS replied it's used as a base for a lot of plastics.

4:44:11 PM
MR. WILLIAMS said he believes gas prices will come down. Since 2000 natural gas prices has increased and stimulated the evaluation of other fuel options. He read a medium term outlook from Ceti Gas, an international association that just deals with natural gas; he said Alaska joined as an associate member so he could understand their perspective. It said that high gas prices have stimulated competition among energies and impacted gas demand in many OECD (Organization for Economic Cooperation and Development) countries. In the power sector, substitution of one energy by another can be fairly rapid. It said the price of gas is taken seriously by the industrial sector. In the US it is prompting the largest industrial users to turn to alternative energies. Some US firms preferred to halt production because of the profit squeeze due to the high price of gas in 2005.

MR. WILLIAMS asked the committee members to ask themselves if they would put a more fuel efficient heater in their homes if natural gas prices doubled again. "I mean just think about what you might do. Would you switch to electricity?"

4:47:17 PM
He said that electric generation is the fastest growing sector of gas consumption in the US. His graph of electric generation by fuel source showed 4 trillion kilowatt hours of gross production in 2005. Coal is almost half of that; gas is about 19 percent. He quoted from the IEA that deals with gas-fired capacity:

> So much gas fired capacity was built that it outstripped demand for power and many combined cycle gas turbines are now operating at less than 35 percent load factor. Because of this, there is a substantial latent demand for gas in the power sector without any new investment in the capital structure. This dynamic

is a very important legacy of the 2000 – 2004 investment period.

4:48:52 PM
MR. WILLIAMS said that gas plants provide flexibility in electrical systems; they are relatively low capital cost and are easy to gear up and down. He displayed another chart from Wood MacKenzie on the cost energy from different methods. The highest cost was integrated gasification combined cycle at $90/million watt hours; gas was somewhere between $65 and $70; nuclear had the lowest full cycle cost.

4:51:42 PM
Natural gas has the high cost of fuel delivered to the electric power sector; nuclear has the lowest. However, gas has the lowest capital cost; nuclear the highest. These are the tradeoffs utilities are looking at right now; and he didn't think they had decided yet. All the construction for gas capacity hasn't been completed from when it started five years ago. He guessed 2010 - 2015 would be crunch time for those decisions to be made and he believed there is still room for any one of these options to come forward.

4:52:27 PM
He next showed them prices of coal delivered to a utility versus gas for 2005 and 2006; coal provided quite a benefit. Natural gas plants tend to be smaller, he said, maybe 50 megawatts; coal plants are 210 -220 megawatts. So you need four natural gas plants for one coal. So, if you think in terms of substituting a gas plant, it will likely be larger and the implication is that it takes out a significant amount of potential demand.

CHAIR HUGGINS asked if hydro is expanding at all.

MR. WILLIAMS replied not in the US, but in the developing world. In areas of drought it has gone down; damns have been removed in other areas.

4:53:46 PM
SENATOR WIELECHOWSKI asked if he had factored in the political and environmental perspectives. He asked if he foresaw more coal or nuclear generators being built in the next 20 years.

MR. WILLIAMS replied, "I believe change is afoot. He said the "Energy Act of 2005" adds a dimension he hadn't discussed yet. He read Section 13.07 as follows:

> Creates an investment tax credit program for qualifying advanced clean coal projects funded at $1.3 billion. This section also includes an additional $350 {million} for qualifying gasification projects. The gasification credits for any taxable year is equal to 20 percent of the basis of any equipment to be used in the gasification process that is placed in service during the year as part of a gasification project that has been certified by DOE.

He summarized that the federal government is offering tax incentives right now; but he just didn't know how it would play out. He said the environment is the third bullet – global warming and carbon emissions. Will coal be outlawed? Some environmentalists have positive thoughts about nuclear power, because it has no carbon emissions associated with it. Energy security is another thing to consider along with becoming more energy independent.

4:58:17 PM
CHAIR HUGGINS asked if Texas is the test site for sequestering co2 in some of its cavities.

MR. WILLIAMS replied yes. He explained that the system happens when you convert coal to gas and sequester the carbon dioxide and sell it to the oil companies for a miscible injectant to enhance oil recovery. The February 26, 2007 Oil and Gas Journal published an article on this topic called "Oil from Coal Promising as Transport Fuel." It looked at how profitable IGCC was and found that doing all three has a 16 percent rate of return.

He said the IEA came up with a study that has implications for Alaska, but he hadn't time to fully read it yet.

5:00:38 PM
CHAIR HUGGINS recognized Representative Olson.

5:00:51 PM
MR. WILLIAMS went to a 2007 US Department of Energy electric generation by fuel chart – coal, nuclear, natural gas, renewables and liquids. The forecast for natural gas from 2006 – 2030 goes up (remember the spare capacity and plants still being constructed), but at some point the coal plants are built and natural gas goes down. Nuclear plateaus and then goes up indicating that nuclear plants won't close down. He said:

This is their outlook; this is not mine. Again, it's pretty typical of what you're reading. Organizations that study this in great detail realize that there's a price effect, that there's competing fuels and there's technology. Combine that together with legislation and it has the impact to change the dynamics.

5:02:55 PM
The outlook to 2015 showed growth slowing for gas at about 1.3 percent per year with the industrial sector losing market share. Some of the issues to consider, he summed up, are supply availability, price effect and environment.

5:03:37 PM
Turning to the supply side, Mr. Williams covered indigenous supply by type and region touching on drilling and costs. A chart from Wood Mackenzie was pretty typical of what all the organizations were saying and was easy to read.

5:06:01 PM
SENATOR WIELECHOWSKI asked how Wood Mackenzie determined that Alaska natural gas would come on line by 2018.

MR. WILLIAMS replied he didn't know; it's one of their assumptions.

SENATOR WIELECHOWSKI asked how much per day it would be.

MR. WILLIAMS replied in excess of 4 bcf/day. He then went to a chart of the Gulf of Mexico and stated that Wood MacKenzie said that although the Gulf of Mexico had restored all major facility and infrastructure operations following the devastating 2005 hurricane season, production levels have fallen off significantly to approximately 8 bcf/day. Deep water projects are becoming more difficult to produce – remote costlier and subject to longer lead times and cost escalations. Longer term supplies are expected to decline and deep water volumes will not stem the overall decline setting in from the mature shelf areas. It said that due to the higher day rates for drilling rigs offered in other parts of the world, many offshore gas rigs have migrated out of the Gulf further exacerbating future supply declines as less exploration is conducted with longer development drilling periods as well. There is a slowdown in the Gulf of Mexico.

5:08:40 PM

Another chart indicated that gas prices have led to record-high drilling rates, but those had now stabilized – in part because of the higher rates being offered in other places and because of the higher cost of development in the Gulf of Mexico.

CHAIR HUGGINS said he still remained concerned after having been in Alberta, that they projected having a shortage of natural gas to make the tar sands work and yet natural gas activities, exploration and development, there are dormant.

MR. WILLIAMS responded by asking what other options they have besides gas. They are trying other techniques and alternative fuel sources like coal – recently they talked about nuclear. "So, don't think in terms of gas; think in terms of energy to develop the oil sands."

5:11:35 PM
He went to a Wood Mackenzie chart on the Gulf of Mexico that indicated declining production and increasing costs.

5:12:45 PM
SENATOR STEDMAN asked if this 2015 forecast was moved back to 2007 real dollars.

5:13:02 PM
MR. WILLIAMS replied yes; it has a lot of assumptions that he didn't necessarily agree with. His point, though, is that costs are actually increasing. He read from an IEA report to support that. It said:

> A viscous circle has started whereby the costs of obtaining energy, raw materials, and human resources are increasing the cost of incremental supplies of the same basic factors of production. An increase in the number of large-scale projects being developed at the same time; their remoteness and greater complexity and the increasing need for costly production enhancement at large mature fields have added to the upward pressure on costs.

5:14:38 PM
SENATOR STEDMAN asked if the last article was referencing North America or worldwide.

MR. WILLIAMS replied worldwide.

SENATOR STEDMAN asked if he had any projections on cost trends over the next four years.

MR. WILLIAMS replied no, but they are high. He said the April 2007Petroleum Economist said last year that no oil majors approved developments to increase LNG production and the last investment decision on an LNG scheme (Qatar Gas 3) was taking 15 months. The US contractor, Bechtel, said the cost of building LNG plants has trebled in the last six years. One of the industry's big three engineering procurement and construction contractors, along with Japan's Toyota and the Japanese/US JGCKBR Consortium, said the cost of building liquifaction plants has risen to as much as $600/ton/year production capacity – up from $200/ton in 2000. Two of the largest projects in the world under construction are over-budget and behind schedule. Time scales are becoming longer as well. The stretched contracting market means bill times for liquifaction plants are four years rather than three years. He stated that an 18-month delay in FID (final investment decision) at BP led a $6 million ton/year project to a cost increase from $400 million to $1.8 billion after the original contract expired. The article had a quote from someone at Wood Mackenzie that said, "If you leave everything equal and just ramp up the cost and then some of the economics start to look pretty miserable – not what you expect from an LNG project."

It further said the underlying causes of rising construction costs are escalating raw material prices in the tight contracting market, both signs that the LNG industry is becoming a victim of its own success. Until 2006 technological advances and increased economies of scale pushed liquifaction plant construction costs down below $200/ton. This made LNG costs more competitive when measured against alternative pipeline schemes. However last few years saw costs edge higher to the $250 - $350 range and Wood Mackenzie estimates that prices have now risen substantially above that – between $500 and $1000/ton/year.

He said they should keep in mind that when the price of crude oil decreased by 50 percent in 1986, one of the ways a company could remain profitable was to merge and that's when the mergers of the big oil companies started happening. At the same time, the service companies started downsizing. Think about it he said; the number of engineers graduating with petroleum degrees decreased and so there's a shortage of manpower. Eventually that will come around. He advised to think in terms of the next 10 years: how long does it take for someone to go to school, get a

degree and come out? Add the retiring baby boomers to that. “I mean there’s a confluence of things going on here.”

SENATOR WIELECHOWSKI asked if this was limited to natural gas or other areas, like nuclear.

MR. WILLIAMS replied it's across the board. Oil and gas is feeling it more strongly because of the "downsizing." The electric utility industry has been expanding; so they still have a lot of electrical engineers. While nuclear has been relatively stagnant in the US, it has not been stagnant around the world.

5:20:42 PM
MR. WILLIAMS hurried along and said that LNG supply global capacity is growing rapidly. The US imported 1.4 bcf in 2006; the IEA predicts that will increase by 80 percent this year and be five times larger in 2015. He said they seem to be overestimating in part because of warmer winters and because LNG cargos are being diverted to Asia.

5:21:20 PM
He said the LNG fleet is also growing. He showed a map of all the LNG projects in North America including gasification facilities that he got off of the FERC website where it is easy to stay up to date. He didn’t think all of the proposed projects would happen – maybe less than half.

5:24:23 PM
He showed a number of charts indicating among other things that Canada exported about 9.1 bcf/d to the US in 2005, about 90 percent of US imports. However, less gas will be made available to the US looking forward because of decreased production and increased domestic consumption (in the tar sands).

5:25:30 PM
In summary he said US gas production is declining; new US gas production is higher cost; Canada’s role diminishes in relative importance; the US becomes more dependent on LNG; and if there’s lower prices than natural gas, they decrease the threat from coal and nuclear.

5:25:54 PM
He wanted to leave them with some points to ponder: there is a lot of uncertainty surrounding environmental issues; how will that play out? Will new legislation enhance gas or coal? The utilities will get some standards in the US so they can have certainty and move forward with their decision-making. Will

there be a nuclear renaissance? He didn't know, but the Nuclear Regulatory Commission is actually gearing up to have a lot more applications. Is IGCC feasible; will utilities start building plants? The studies don't have commercial applications; they are only demonstration projects. Will the crude oil/natural gas price ratio remain the same; will they go back to historical standards or get farther apart? He ended by saying he would take questions.

5:28:08 PM
CHAIR HUGGINS thanked him for his very professional presentation. There being no further business to come before the committee, he adjourned the meeting at 5:29:16 PM.