10/20-21/11 COOK INLET MEETINGS

<TARGET><BILL></BILL><SUBJECT>10-20-21-11 COOK INLET MEETINGS</SUBJECT><COMM>SRES27</COMM></TARGET>

Official Business

Senate Resources Committee

Senator Joe Paskvan, Co-Chair
Room #115: 465-4907

Senator Tom Wagoner, Co-Chair
Room #427: 465-3792

Members:
Senator Bill Wielechowski, Vice-Chair
Senator Hollis French
Senator Lesil McGuire
Senator Bert Stedman
Senator Gary Stevens

COOK INLET MEETING - Kenai City Hall; Kenai, Alaska

Oct. 20, 2011 9am

9-9:30	CI Tax System, Bruce Tangeman, Deputy Commissioner Tax Division
9:30-10	Railbelt Energy Needs, Joe Griffith, President; ARCTEC
10:30-11	Marathon; Wade Hutchings, Business Unit Manager
11-11:30	Apache Corp.; Paul Abokhair, Sr. Commercial Advisor
1:30-2	Escopeta; Vladimir Katic, Alaska Project Manager
2-2:30	CIRI; Ethan Shutt, Sr. Vice President (Coal Gasification)
3-3:30	ORMAT (via teleconference)
3:30-4	Conoco-Phillips; Darren Meznarich
4pm	CINGSA Tour (Legislators only – leave from meeting)

Oct. 21, 2011 10am

10-10:30	Buccaneer; James Watt
10:30-11	LNG Alaska; Keith Meyer
11-11:30	Cook Inlet Energy; David Hall

Notes:

Presentations available online through BASIS – Committees – Hearings Schedule

No presentation for Conoco-Phillips or Cook Inlet Energy – oral testimony.

For information contact: Mary Jackson: 283-7996

Mary Jackson

From: Mary Jackson
Sent: Wednesday, October 19, 2011 3:50 PM
To: JR Wilcox (jr.wilcox@cookinlet.net); David Hall (david.hall@cookinlet.net)
Cc: Jane Conway
Subject: Friday's Tour

Here's who is going – 12 max:

✓ Senator Wagoner, Co-Chair
Senator Stedman
✓ Senator Wielechowski
Senator Giessel
~~Representative Olson~~ canceled

✓ Joe Balash DNR
~~Bruce Tangeman DOR~~ canceled
✓ Alica Egan DOR

+2

✓ Rena Delbridge – staff to Rep. Hawker
✓ TOM WRIGHT, staff to Speaker Chenault

✓ Sharon Long staff to Sen Giessel
✓ Michael Pawlowski staff to Sen McGuire
✓ Konrad Jackson staff to Rep. Olson

9

~~??? someone will want to go, I'm sure. Maybe Rick Koch – Kenai city manager~~.

C u Friday!

Mary j

+2

11

"Village with a Past, City with a Future"

210 Fidalgo Avenue, Kenai, Alaska 99611-7794
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October 20, 2011

Senate Resources Committee
Senator Joe Paskvan, Co-Chair
Senator Tom Wagoner, Co-Chair
Senator Bill Wielechowski, Vice-Chair
Senator Hollis French
Senator Lesil McGuire
Senator Bert Stedman
Senator Gary Stevens

Dear Senators:

It is with pleasure that the City of Kenai welcomes you to our community. As a resource development state, the importance of your work on behalf of the citizens of Alaska cannot be overstated, we appreciate your dedication.

During your Committee meeting, should any of you require the use of an office, computer, small conference room with teleconference capabilities, etc., we would be happy to accommodate your needs.

Thank you for your past efforts in considering legislation that has incentivized the Cook Inlet Basin for oil and gas exploration and development. Within one-half mile of Kenai's City Hall, two drill rigs are working. Additionally, a natural gas transmission pipeline is being constructed that will deliver 10mcf of gas daily to the system beginning in December of this year.

In closing, thanks for being here, and let us know if we can assist you during your visit.

Sincerely,

CITY OF KENAI

Rick R. Koch
City Manager

Rick R. Koch
City Manager

210 Fidalgo Avenue
Kenai, Alaska 99611-7794

City Hall: (907) 283-8222
Cell: (907) 398-0190
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Email: rkoch@ci.kenai.ak.us
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ALASKA NATURAL GAS
TRANSPORTATION PROJECTS
OFFICE OF THE FEDERAL COORDINATOR

Oct. 7, 2011

Senator Lesil McGuire
Alaska State Legislature
716 W. 4th Avenue, Suite 430
Anchorage, AK 99501-2133

Dear Senator McGuire:

As I read (and have re-read) your letter of August 9, I looked to the fact that a key element of the federal Alaska Natural Gas Pipeline Act of 2004 (which created this office) was a presumption "that a public need exists to construct and operate the proposed Alaska natural gas transportation project" to make North Slope gas available to markets in the Lower 48. But Congress also understood that Alaska consumers need access to North Slope gas as well. To that end, the act included language requiring that the project also address in-state needs. To help make the project feasible, the act authorizes generous federal financial assistance through a multibillion-dollar loan guarantee.

The Alaska Legislature's approval in 2007 of the Alaska Gasline Inducement Act was consistent with the objectives of the federal act, and signaled the state's willingness to materially assist in developing the project envisioned by Congress — and long envisioned by Alaskans.

When the Alaska Legislature sent HB 369 to the governor in April 2010, it marked a shift by the state to a more aggressive approach to securing in-state access to North Slope gas. You were a co-sponsor of that bill and, as you note in your letter — and as you have repeatedly pointed out in various legislative deliberations — nothing in that legislation directs a shift against the objectives established by Congress or the state's longstanding goal of a large-diameter gas line to serve out-of-state markets. To the contrary, HB 369 directs that the plan for development of an in-state natural gas pipeline be "compatible but not competitive" with the project envisioned by Congress to bring North Slope gas to the larger North American market.

As the Alaska Gasline Development Corp. July 1 report stated, the larger pipeline project envisioned by Congress would likely bring natural gas to Fairbanks and Anchorage at "significantly lower cost" than the far smaller in-state project analyzed by AGDC. And, as ADGC stated, its project was never intended to compete with a large-diameter pipeline. In accordance with the mandate of House Bill 369, the smaller in-state project analyzed by AGDC is being developed "as a fallback."[1]

[1] AGDC Report, p. 3-12.

The report concludes that the in-state pipeline could conceivably be designed, financed and built by the private sector, but acknowledges that "in all probability [that] will not happen," at least not in the timeframe envisioned.

State involvement may be the answer, the report said. AGDC correctly notes that a larger state financial commitment to the project than the almost $400 million presumed in the report might be required to move the in-state gas line to actual construction. AGDC interviewed officials with 11 North American pipeline companies to get their opinions of the project. Without identifying who said what, AGDC reported the following comments:

- The state could demonstrate its faith in the project "by assuming some of the transportation commitment risk and backstop a shortfall in capacity if it exists after an open season." The report states that 20-year shipping commitments for 100 percent of the pipeline capacity will be needed to secure attractive financing.

- Acknowledging the risk that the actual pipeline costs could greatly exceed the planning estimates, the best way to mitigate the risk would be to develop a tariff structure that recovers all costs, including any overruns, from the pipeline users. Most of the pipeline companies said they would be reluctant to accept the risk of construction cost overruns, "and many expressed the opinion that the State of Alaska should participate through both a capital subsidy, if necessary, and through firm transportation bids of royalty gas to help guarantee capacity."

- "Most of the builder/owner/operators said that the State of Alaska needs to wholly subsidize the project development costs before a successful open season," the report said. (This is similar to the $500 million in cost reimbursement the state pledged to AGIA licensee TransCanada to help cover development costs of the larger pipeline.)

- The report also warns that more state financial involvement may be necessary: "It is important to note that preliminary feedback from potential builder/owner/operators indicates that their appetite for certain risks is very limited. If that feedback is confirmed through the process of selection and negotiation with a builder/owner/operator, then more state involvement will be necessary to complete the project."

The July AGDC report suggests that a backstop commitment by the state of up to $7.5 billion might necessary to move the in-state project forward.

You asked whether the Office of the Federal Coordinator had considered potential synergies between the TransCanada/ExxonMobil larger pipeline (AGIA) and the smaller in-state line (AGDC). More specifically, you asked if we could identify any financial means or other ways in which the state's efforts to meet the need for gas within Alaska could be combined with the state's concurrent efforts to promote a major pipeline into North American markets, thereby improving the odds of success for both.

The answer, hopefully, is yes. Alaska needs both projects, and both projects are linked by the same source of gas; the same daunting economic hurdles; and much of the same engineering, permitting, routing and timing issues. They are especially linked by the reality that each project makes the other one more economically and politically attractive to Alaska. The lowest-cost gas for Alaskans would come from tapping into the economies of scale of the larger pipeline. And the money to help pay for that in-state distribution system could come from the public revenues that would be earned from a large-volume pipeline taking Alaska gas to market.

The Federal Coordinator's office is sponsoring a public forum on the questions raised in your letter to help people look at the issue, consider the options and the benefits of state financial involvement in a gas line. The forum is scheduled for 5:30 to 7 p.m. Tuesday, Oct. 18, at the University of Alaska Anchorage Fine Arts Recital Hall. We have contracted with Gavel-to-Gavel for a live video stream on the web and later rebroadcast on statewide television.

We will have a report available at the forum, setting out the issues and presenting some options for Alaskans to consider.

I offer the services of our office to assist you and your colleagues and the governor as you work toward finding the best answer to Alaska's energy and fiscal future.

Sincerely,

Larry Persily
Federal Coordinator
Alaska Natural Gas Transportation Projects

ALASKA STATE LEGISLATURE

Session
State Capitol Building, Room 125
Juneau, Alaska 99801-1182
Phone (907) 465-2995
Fax (907) 465-6592

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716 West Fourth Avenue, Suite 430
Anchorage, Alaska 99501
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SENATOR LESIL MCGUIRE

August 9, 2011

Mr. Larry Persily
Office of the Federal Coordinator
Alaska Natural Gas Transportation Projects
1717 H Street NW, Suite 801
Washington, D.C. 20006

Dear Mr. Persily, Larry

Thank you for the work you have done to ensure federal cooperation and assistance for a large-diameter pipeline to move Alaska North Slope gas to Lower 48 markets. As you know, the Alaska Gasline Development Corporation (AGDC) recently released a plan for the Alaska Stand Alone Pipeline (ASAP) project which included preliminary cost estimates, financing alternatives and an assessment of environmental, market and technical issues for an in-state line. Over the next few months the Alaska State Legislature and the Governor will be reviewing this report and considering what, if any, actions need to be taken to further the project while, at the same time, working on the Alaska Pipeline Project (APP) licensed under the Alaska Gasline Inducement Act (AGIA).

As policymakers evaluate the ASAP report and continue to monitor progress on APP, there will be a tendency for some to continue to pitch one project against the other. Doing so ignores the cooperative operating environment in which both are currently being developed. I fear that if Alaskans characterize the projects as competing prospects we could miss opportunities to fully develop North Slope gas and thereby minimize the benefits of gas development to Alaskans and our nation.

As you are well aware, it was I who insisted on the inclusion of language that directed the AGDC to prepare a plan that was "compatible not competitive" with the AGIA project. I fought for this language because I felt that it was important to avoid costly litigation that could cause unnecessary delays for both projects and because I truly believe that the two efforts, if developed in concert, could complement each other and ensure gas deliveries to Alaskans and the Lower 48 states.

Has the Office of the Federal Coordinator (OFC) generally considered potential synergies between the APP and ASAP projects? More specifically, has your office identified or could you identify financial means or other ways in which the State of Alaska's efforts to meet the need for gas within Alaska could

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SENATOR LESIL MCGUIRE

be combined with the state's concurrent efforts to promote a major pipeline into North American markets, thereby improving the odds of success for both?

Again, the Office of the Federal Coordinator has been an invaluable resource for Alaskans and I have greatly appreciated the public forums and educational opportunities you have provided for the public. Any information you could provide that could help Alaskans evaluate these projects in a holistic context would be greatly appreciated.

Thank you for your continued service.

Sincerely,

Alaska State Senator Lesil McGuire

Senator.Lesil.McGuire@legis.state.ak.us

Tom Wright

From: Joe Dubler <jdubler@ahfc.us>
Sent: Friday, September 23, 2011 11:43 AM
To: Tom Wright
Cc: Dan Fauske; Michael Rocereta; Daryl Kleppin
Subject: Response to ANGDA Cook Inlet Alternatives email

Tom,
Our commercial guys have addressed the most glaring issues that we have with the data:

- In the ANGDA analysis, the only ASAP tariff which is correct is for the 500 mmscfd case. ANGDA estimated the ASAP tariffs for the 250 and 167 mmscfd cases. ANGDA doubled the 500 mmscfd ASAP tariff to get their estimated ASAP tariff for the 250 mmscfd case. Similarly, they tripled the 500 mmscfd ASAP tariff to get their estimated ASAP tariff for the 167 mmscfd case. These assumptions are considerably (~50%) higher than ASAP tariffs for the 250 mmscfd case. ASAP did not publish tariffs for a 167 mmscfd case. **Conclusion**: The ANGDA calculation of ASAP CI natural gas prices for the 250 and 167 mmscfd cases are significantly overstated.
- For the LNG import from Canada, ANGDA used "proprietary estimates" for LNG plants, shipping, etc. which seem low and AGDC has no way of validating. Similarly, for LNG import from the North Slope ANGDA used "order of magnitude" costs estimates which (according to the AACE methodology) have significant uncertainty (-50% to +200%). This makes any detailed comparisons using their pricing highly speculative. Note: the Sahkalin LNG import gas price appears reasonable.
- ANGDA also compares an ASAP "bullet line" tariff to the spur line tariffs from Glenallen and Delta Junction. These comparisons are not relevant. AGDC acknowledges that, if you built a big gas pipeline to Valdez or Alberta, ASAP would become a spur line and the tariffs would be significantly lower.
- Not sure of the reference to the heating cost/value of white birch. This not a realistic option for supplying power and heat to the majority of Alaska residents.

Let me know if you need anything else.

Joe Dubler | Alaska Gasline Development Corp | 907.277.4475 phone | 907.277.4484 fax

ALASKA NATURAL GAS
TRANSPORTATION PROJECTS
OFFICE OF THE FEDERAL COORDINATOR

State fiscal options to help move Alaska gas

The goal of this paper is to ask: What could the state do to help the economics of a large-volume natural gas pipeline from the North Slope to out-of-state markets, combined with a smaller in-state line to serve Alaska's energy needs? And should the state do anything? We identify several fiscal options, but do not suggest these are the only ones that might help put a gas pipeline into Alaska's future.

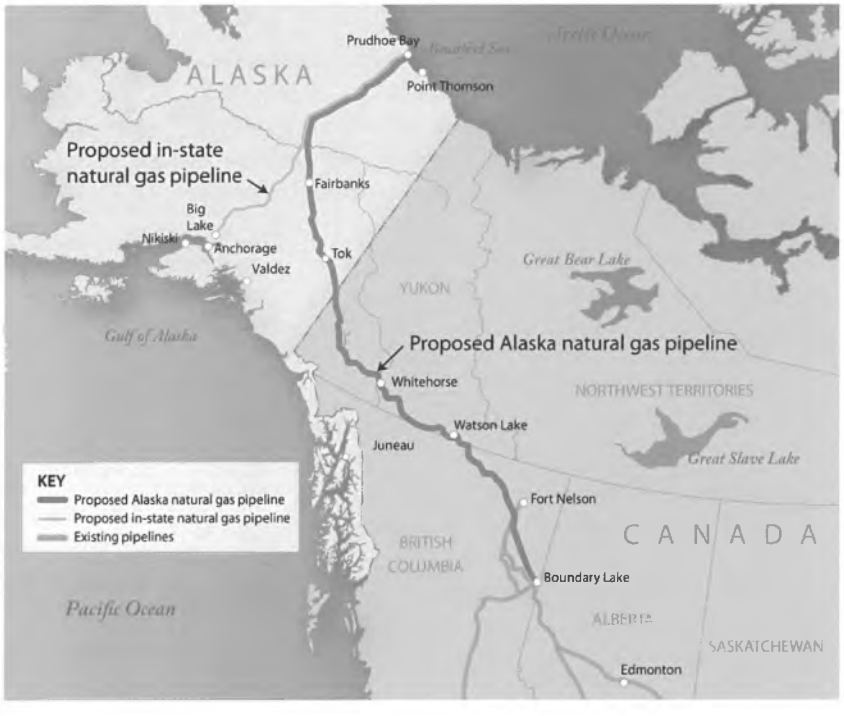
The rewards of state financial involvement with any Alaska gas delivery system could be large: Public revenue from selling the state's stranded gas resources, jobs for Alaskans, and long-lasting low natural gas prices for Alaska homeowners, businesses and utilities thanks to the economies of scale that will greatly reduce transportation costs to in-state markets.[1] Moreover, entry to the worldwide market for North Slope gas promises to improve oil and gas exploration economics and prolong the life of the trans-Alaska oil pipeline.

Certainly, stability of gas supply for Alaskans is essential for any project, especially one with state dollars invested. Southcentral residents and businesses worry that Cook Inlet production could fall short of meeting local needs in the years ahead, and Fairbanks would love to see affordable gas break the economic stranglehold that costly diesel has on its economy. Those concerns have prompted renewed interest in a smaller in-state line to meet local needs if a big pipeline is not going to happen.

While the Alaska Gasline Inducement Act (AGIA) of 2007, which is helping to partially fund development expenses for the larger pipeline to out-of-state markets, requires off-take points along the line for Alaska deliveries, it does not create or fund any mechanism to build and operate a spur line(s) for in-state distribution. The Alaska Gasline Development Corp. (AGDC), created by House Bill 369 in 2010 and partially funded for its initial project development costs, could fill that role if the Legislature and governor so choose.

There would be benefits to planning an out-of-state line and in-state spur to coincide with the same

ALASKA GAS PIPELINE PROJECTS



[1] The July 2011 report by the Alaska Gasline Development Corp. analyzing an in-state pipeline estimated the gas treatment plant and pipeline tariff at $5.63 per million Btu, assuming there are customers for 100 percent of the gas. Because of economies of scale, the tariff on the much larger TransCanada/ExxonMobil project, for example, would be less than half that amount to pipe gas to Fairbanks. The bigger project would require a spur line to serve Southcentral, so the tariff to move gas to Anchorage would be higher than the cost to the Fairbanks area, but likely still less than $5.63.

in-service date. Construction and mobilization efforts could be coordinated, along with scheduling and labor needs. Perhaps more importantly, decisions on the two lines are linked politically and economically for the state.

But could coordinated state assistance get both a large gas line and an in-state delivery system built? A detailed examination of economics, markets and financing strategies would be useful if the state wants to seriously consider its options.

However, there are risks to state financial participation. This background paper identifies some of the risks associated with selected approaches the state could take to help move North Slope gas to Alaska consumers *and* key out-of-state markets, but it does not identify every risk or every potential reward. Markets create their own uncertainties. For example, companies spent almost $10 billion in the past decade building or expanding liquefied natural gas import terminals at U.S. ports because they thought the nation was running short of gas. They guessed wrong.

Federal encouragements

If the state of Alaska decides to provide further assistance with a gas pipeline, it will find itself aligned with federal policy.

Congress, through passage of the Alaska Natural Gas Pipeline Act of 2004 and other legislation, committed the federal government to assist an Alaska gas line project. The 2004 legislation created the Office of Federal Coordinator to oversee federal agency permitting, and also set out an expedited schedule for the Federal Energy Regulatory Commission to prepare the project's environmental impact statement.

In addition, Congress has:

- Authorized a federal loan guarantee to cover much of the project debt (up to $21 billion, as of 2011), which would reduce the cost of borrowing for construction, thereby reducing the debt service payments and pipeline tariff. A lower tariff means a higher "netback" value for the gas as it leaves the ground at North Slope fields, providing more revenue for the producers and the state.
- Provided for accelerated tax depreciation for the pipeline in Alaska, allowing the owners a faster payback on their huge upfront construction cost. Based on current cost estimates for the more than 700 miles of pipe in Alaska, the tax break could reduce the pipeline tariff by an estimated 6 cents per thousand cubic feet (mcf).
- Granted a tax credit for the Prudhoe Bay gas treatment plant, projected by TransCanada/ ExxonMobil to cost as much as $12 billion. The credit could reduce the estimated tariff by 11 cents per mcf.

Assuming the accelerated depreciation and gas treatment plant tax credit reduce the tariff by 17 cents, and adding in the potential savings from a $21 billion federal loan guarantee (estimated at 10 cents to 15 cents per mcf), the reduction in shipping costs from the federal incentives could total $450 million to $550 million a year (close to a 10 percent savings on shipping costs). The tax incentives and loan guarantee, however, are available only for a project that serves U.S. Lower 48 markets.

Alaska paradox: Robust finances, precarious economy

If Alaska wasn't so wealthy, the resources to invest in or assist with a gas line wouldn't be available, and this discussion would be of little more than academic interest.

No state in the union, and only a few sovereign nations, can boast the per-capita financial assets accumulated by Alaska. As of June 30, 2011, the state held $55.5 billion (over $78,000 for every resident) in the Alaska Permanent Fund, Constitutional Budget Reserve Fund and other savings accounts. If Alaska truly wants a gas line(s) to become a reality, it likely has the means to help make it so.

Living on the economic edge

A recent study by Scott Goldsmith of the University of Alaska Anchorage Institute of Social and Economic Research found that half of all Alaska jobs are due to a single industry — petroleum — either directly from that industry or through state outlays financed by petroleum royalties and taxes.[2] North Slope oil

[2] Scott Goldsmith, "Alaska's Petroleum Industry: Transformative, But is it Sustainable?" Presentation sponsored by Northrim Bank, Anchorage, April 2011.

production peaked at 2 million barrels per day in fiscal year 1988 and since then has declined every year but one. Between FY 2009 and 2010, output dropped 7 percent. There is little evidence to suggest the trend will soon reverse.

The state has been protected from the economic effects of this decline by rising oil prices, which as of Oct. 12 stood at $110 per barrel for North Slope crude. However, many Alaskans remember that as recently as December 1998 Alaska oil briefly sold below $9 per barrel. The unbalanced and precarious oil-dependent state of Alaska's economy lends urgency to the discussion of what the state might do to sustain the economy, monetize the stranded gas assets on the North Slope and help lower energy costs for a significant share of residents.

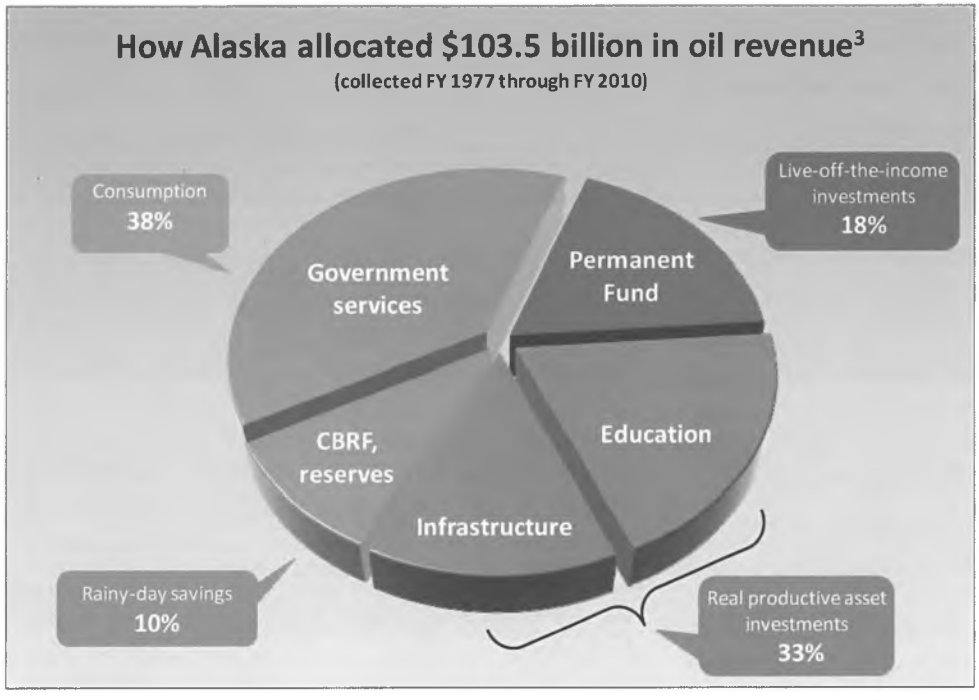
Finding the right balance

There are three distinct ways any individual or organization can use savings to help secure its economic future:

- Live-off-the-income: Put the savings in financial investments with the goal of eventually living wholly or partially off the earnings.
- Rainy-day savings: Place the money in safe, short-term investments to cover emergencies or budget shortfalls.
- Invest in real productive assets: Put the savings in non-financial investments that increase future productivity. For Alaska, these include transportation (roads, ports, harbors and airports), energy projects, other infrastructure, education and job training.

The first two kinds of investments usually go out of state. The third generates real assets in Alaska.

How to deploy the state's billions in financial assets has been a continuing issue for Alaskans. Since 1977, when North Slope crude first flowed down the trans-Alaska pipeline, the state has collected $103.5 billion in oil revenue. About 62 percent has been saved or invested. But as the chart shows, only 33 percent ($34.5 billion) was invested in productive assets including infrastructure and education. Thirty-eight percent was neither saved nor invested; it has been consumed in the form of government services. Eighteen percent has been channeled into the Alaska Permanent Fund, where it supports the state's unique and hugely popular live-off-the-income program, the Permanent Fund dividend. And 10 percent has been allocated to three "rainy-day" accounts, including $10.3 billion in the Constitutional Budget Reserve Fund.



[3] This chart was prepared by Gregg Erickson based on published data from the Alaska Department of Revenue (DOR), Legislative Finance Division (LFD) and the Alaska Permanent Fund Corp. (APFC). Small discrepancies in additive subtotals are due to rounding.

DOR data shows the state received $103.5 billion from oil. The infrastructure investment total ($14.2 billion) is from LFD's historical general fund capital budget data series, plus an estimated $3 billion appropriated to capitalize the Alaska Housing Finance Corp., Alaska Industrial Development and Export Authority and other smaller endowments. Permanent Fund investment income and other investment earnings on oil revenue are not included.

Education investment of $20.4 billion was calculated as a percentage of total general fund operating spending as compiled by LFD to approximate spending through the Department of Education and University of Alaska.

Options for state fiscal assistance to a gas line

The options discussed here were chosen to illustrate broad categories of approaches the state could take to financially assist with a gas pipeline project(s). No development means no revenue and no public benefits for Alaska, so state financial assistance leading to a pipeline that otherwise wouldn't be built is a plus.

1. Provide direct subsidies

The direct-subsidy model familiar to Alaskans is the 2007 Alaska Gasline Inducement Act (AGIA). Under AGIA, the state established a list of "must-have" conditions for a pipeline developer. These included the licensee's acceptance of financing and rate-setting methodologies to produce lower tariffs, a commitment to expand pipeline capacity as needed, adoption of local-hire policies, the opportunity for in-state delivery of gas at reasonable costs, and acceptance of a timeline for submitting a project application to the Federal Energy Regulatory Commission (FERC).

In return, the state agreed to provide the AGIA licensee up to $500 million to help offset the developer's initial design and permitting costs. The state awarded the license to TransCanada in 2008. As part of the deal, TransCanada agreed to submit a project application to FERC by October 2012. If FERC determines that the application is complete, federal law requires a decision by the commission late summer 2014.

By making the subsidy available early in the development process, when risks are highest and potential payouts are the most distant, the state's $500 million provides a clear benefit to project economics. Another advantage is that the state knows from the outset the maximum size of its financial commitment.

This design and permitting subsidy, while moving the project ahead in the risky, early years when it lacks contracted customers, is only one piece of the puzzle to lock in a gas line. The AGIA subsidy will get you a building permit for the pipeline, but without customers and financing there will be no pipeline.

ExxonMobil in 2009 signed up as a partner on the project, and in 2010 TransCanada/ExxonMobil held an open season to solicit bids from potential customers. Though the developer received several bids, it has yet to announce any signed shipping deals on a pipeline to move 4.5 billion cubic feet of gas per day into North America markets.

It appears the AGIA subsidy, by itself, is insufficient to make the gas line a reality. The project is high-centered, waiting for a push from the market and maybe the state to move it forward.

The state could build on the AGIA model by offering a substantial direct subsidy in return for further commitments by the licensee, including commitments to proceed to actual construction. But this could prove very costly to the state, in that it's likely any pipeline developer would require significant sums of state dollars to start ordering steel pipe for a project lacking enough shippers to pay the mortgage. And though a bold move, a direct state cash subsidy cannot change market economics or guarantee the state a positive return on its money.

2. Make equity investment

The state agency created and directed by the Legislature in 2010 to develop a plan for a smaller in-state gas line recommended in its July 2011 report that state ownership of the project would produce the lowest tariffs for moving gas down the line. The Alaska Gasline Development Corp. ran the numbers assuming the state would borrow 100 percent of the estimated $7.5 billion needed for construction. The cost of borrowing money using the state's solid credit rating would be less than what a private owner would expect for a return on its equity investment in the project. Lower cost of capital means a lower tariff. The AGDC analysis calculated that state borrowing to pay the entire in-state pipeline project cost could drop the tariff at least 25 percent from the cost of private ownership — and maybe more if the Internal Revenue Service agreed to let the Alaska Railroad Corp. issue tax-exempt bonds for the project.

But there are risks to the state. Adding the gas line debt to the state's existing debt "would make Alaska's percentage of debt compared to gross domestic product three times any other state," the AGDC report said.[4] State financing of the project "may result in a downgrade of the state's (credit) ratings, depending on the rating agencies' views of the risks and reliability" that pipeline revenues could cover the bond payments, the report added. A downgrade would boost the cost of

[4] Alaska Gasline Development Corp., "Alaska Stand-Alone Gas Pipeline Project Plan," July 1, 2011, pages 4-10.

future borrowing not just for the state, but for school districts and municipalities, too. And borrowing so much money could hinder the state's ability to borrow for other needs in the years ahead, such as for schools or roads. AGDC in its report acknowledged those risks and said it would strive to convince rating agencies that the state could handle the debt.

Another risk would be if tariff revenues were insufficient to cover the pipeline debt payments and operating expenses. If that happened, the state would be liable to cover any shortfall.

The costs of such a potential subsidy are significant. If the state is ready to take such a $7-billion-plus financing risk for the small pipeline, it is worth considering the potential of incurring the same size risk to assist a much larger line to serve out-of-state markets *and* the smaller spur line moving what is needed to meet Alaska's needs. The public benefits of marrying large-pipeline economies of scale and a spur pipeline supplying in-state needs would be gas delivered to Alaskans at the lowest cost while also producing much greater tax and royalty revenue. Under the state's existing tax and royalty structure, public revenues would be **seven times higher** under such a combination than from a stand-alone, smaller in-state gas line.

There also are questions with even partial state ownership of a gas line: Is it a conflict for the state to be both an owner and a regulator? Would politics interfere with pipeline business decisions? Worth asking and worthy of debate.

3. Defer or amend property taxes

The most straightforward of pipeline incentives, and one often discussed in the past, would be to defer or eliminate the substantial property taxes assessed on the project during construction. Property taxes are estimated at $1.1 billion (2010 dollars) during the years of construction, before the pipeline generates any revenue. In addition, under the current property tax structure, construction cost overruns will add to the tax bill — adding up to more cash outflow for shippers.

Past proposals were designed to help project economics by eliminating the heavy front-end loading effect of the state's property tax structure. Because property taxes are paid through the pipeline tariff, any property tax relief will benefit shippers and boost the value of the gas. That's a plus for the project, which needs to attract shippers. Most property tax revenue goes to municipalities, however, so the state likely would need to consider providing offsetting aid to municipalities to cover their actual costs of public services during construction.[5]

In addition to considering tax deferrals during construction, the state could look for a solution to annual battles over what is the taxable value of the pipeline — battles that have consumed millions of dollars and decades of legal fights over the taxable value of the trans-Alaska oil pipeline. For example, rather than assessing the replacement cost or depreciated value of the gas line each year, the state could look at assessing property taxes on the basis of flow down the line. Less flow, less value, less in taxes; or, as long as the line stays full, the taxes stay full, too (perhaps with an inflation escalator). Under the current system, even if the line stays full it would drop in value over the years, knocking down municipal property tax revenues.

4. Defer production taxes

Besides taxing the actual pipeline's value, the state levies taxes on gas production. The state take from its current profits-based production tax on natural gas is expected to be lower than its tax revenue from oil — natural gas is less profitable per Btu than crude oil, after deducting transportation costs. But the

State options

1. Provide direct subsidies
2. Make equity investment
3. Defer or amend property taxes
4. Defer production taxes
5. Modify rules on royalty switching
6. Add to federal loan guarantee
7. Finance construction overruns
8. Take share of shipping commitments

[5] See Information Insights Inc., "*Stranded Gas Development Act Municipal Impact Analysis.*" Prepared for the *Alaska* Department of Revenue, November 2004.

production tax on gas still would be significant for a 4.5 bcf/day pipeline (hundreds of millions of dollars a year, or even a billion-plus, depending on gas prices) and, in fact, would exceed the state's royalty take from gas production. The major North Slope producers, even if they do not own the pipeline, would provide the financing through the tariff they would pay for moving their gas down the line. Any deferral of production taxes during the early years of the project would allow the producers quicker recovery of their investment, thereby lessening their risk if gas prices are depressed at the outset of deliveries. Less risk makes a project more attractive to them. Similarly, back-end loading of tax rates would allow the companies to recover their investment in the early years, with the state waiting for its bigger payday in later years. If the state expects to be cash rich with oil dollars when the gas line starts flowing, Alaska may be in a good position to defer its gas production tax receipts until later.

5. Modify rules on royalty switching

Royalty rates and terms are set by contract when a company and the state sign an oil and gas lease. One term that producers have expressed concerns about is the state's ability to switch frequently and with short notice between taking its royalty share of production in kind (actual ownership of the gas) or in value (letting the producer sell the gas and send a check to the state). The producers believe that could create problems if pipeline capacity does not accompany the switch. They worry that they, as pipeline capacity holders, might not have gas to move when a switch occurs or, alternatively, that they could have state royalty gas to move but lack sufficient capacity rights to transport the gas. This is addressed, in part, in the Alaska Gasline Inducement Act, but may require further consideration to reduce the misalignment risk to producers, which could mean the state taking on some of the risk — trying to lessen the risk to investors to entice them to commit to the project.

6. Add to federal loan guarantee

Congress in 2004 authorized an $18 billion loan guarantee for an out-of-state line. Indexed for inflation to 2011, that guarantee could backstop almost $21 billion of debt.[6] Back in 2004, the amount looked adequate to cover the entire amount a pipeline owner would borrow for construction. That no longer is the case. The pipeline's estimated cost has escalated, and now the guarantee might cover just two-thirds of the debt.

An additional loan guarantee by the state could raise the total to cover the higher construction cost estimate. Whether that would make *the* difference, given the unfavorable gas market, is not clear. But it would further lessen the risk to investors and lower the pipeline tariff, making the project more attractive to shippers and the gas more valuable to the state.

7. Finance construction overruns

Cost-overrun financing by the state (such as a "soft-second" mortgage) is another option.

The risk of construction overruns on such a massive project is real, and the threat to project economics is just as real. The profit left for producers after paying transportation costs could be thin, especially in the early years. Adding the cost of construction overruns to the initial tariff would hurt, and that worries the companies that must sign 20-year binding contracts to ship gas down the line regardless of market conditions.

The problem of paying for potential overruns has hung over a North Slope gas line for decades. One option would be for the state to step in and offer financing to cover some or all of any overruns, structuring the debt to be repaid only after the first lenders are paid (much like a soft-second mortgage on a home gets repaid only after the homeowner pays off the first mortgage, thereby avoiding two payments at the same time). While such a financing plan would stretch out debt payments on the project, that may be preferable to crushing debt payments in the early years. The state could lend money directly for the construction costs, or guarantee the debt taken on by other lenders.

8. Take share of shipping commitments

Signing a firm transportation shipping commitment is another option for the state.

Open seasons, like the one held last year by TransCanada/ExxonMobil, are designed to elicit interest from potential gas shippers that would later commit to firm transportation shipping contracts.

[6] Bill White, "Federal loan guarantee helps pipeline finances," Office of the Federal Coordinator, May 22, 2011. http://www.arcticgas.gov/federal-loan-guarantee-helps-pipeline-finances

Under the contracts, the shipper commits to pay the tariff regardless whether it ships the gas or can sell it downstream for enough to cover the tariff and other costs. The shipping contract is a key element in assuring lenders that their money will be paid back even if market conditions or gas supplies don't materialize as expected.

As a royalty owner of approximately one-eighth of North Slope gas, and as the recipient of production tax revenue, the state could consider taking its royalty gas in kind and also taking its production tax in kind (instead of a check from the producers) and signing shipping commitments equal to its share of the gas flow. This would clearly transfer risk (commodity price and project cost-overrun risk) from the producers to the state. How big a risk would the state be taking if it did that, and could such a commitment make a difference in getting a line built? The answers are unknown at this time, but it would boost the producers' expected rate of return by lowering their liability for having to cover all of the shipping costs. That could help tip the balance on a pipeline.

ALASKA PipelineProject

TransCanada ExxonMobil

ALASKA GASLINE DEVELOPMENT CORP. GAS FOR ALASKANS

Alaska Gasline PORT AUTHORITY

Issues of risk

Given the longstanding concern over the state's unbalanced and unsustainable economy, why hasn't Alaska chosen to invest more of its oil revenue in long-term, productive assets to take up the slack when the state feels the pinch from declining oil? The question is important because the risks of shifting resources to infrastructure and the historical impediments to making such a shift are likely to come up as Alaskans consider whether to provide state assistance to a gas line.

Competition for state funds

A decision to assist a gas line will mean less money is available for other state spending. But many constituencies that depend on state funding worry that throttled-down state spending is imminent anyway, caused by declining oil production. Other big infrastructure projects also could compete with a gas line for state financial assistance. For example, supporters of state assistance for the proposed Kink Arm crossing want the state to guarantee funding that would enable private investors to meet bond payments even if toll revenues fall short of expectations.

Some recipients of state money are likely to view even a highly contingent, potential future commitment of state gas line assistance as a potential threat to their funding — the state has only so much cash and credit to go around.

Doubts about success

Is there any assurance that state assistance will achieve its intended result? Critics of the state's promise to provide assistance to TransCanada under AGIA say the project is uneconomic and assert that reimbursing TransCanada for the remainder of the state's $500 million obligation won't be enough to get the project built. Why throw more money at the project when there is no hope, they say.

The honest answer is that no such assurance is possible. This concern can be allayed if the assistance is structured so that potential costs to the state come late in the project, after major risks are past. Unfortunately, state assistance is likely to have the greatest leverage on a project if it comes early, when risks are greatest.

Doubts about need

Underlying the doubts about success are doubts about need. The current abundance of shale gas in North American markets and the significant build-up of new liquefaction projects to serve the Asia-Pacific LNG market suggest that conditions in 2011 are not favorable for an immediate project commitment on a $30 billion to $50 billion capital investment. However, any number of plausible developments could quickly and substantially improve the economic prospects for a gas line project.

Doubts about the need for assistance can be allayed, however, if the state financial involvement — be it a loan, loan guarantee, equity investment or tax deferral

— includes contingent provisions to recapture the value of state assistance. The owners profit, the state profits, and everyone should try to live happily ever after.

Regional balance

State assistance, if successful in getting the project(s) built, would add a stream of natural gas revenue to the state treasury, improve the prospect for finding additional oil and gas resources, and likely prolong the life of the trans-Alaska oil pipeline. These outcomes benefit every state resident more or less equally, but other benefits, including reduced energy costs and construction employment, would be concentrated in areas along the pipeline route. Achieving political and popular consensus on state assistance may require inducements, such as investments for regions distant from the pipeline project.

Bill Egan, the state's first governor, proposed creation of a state ferry system principally to serve the Southeast Panhandle, but he was careful build support for this idea by linking it to a proposal for a smaller ferry system to serve Southcentral ports and, most importantly, for the state's first four-lane, limited-access freeways to reduce traffic congestion in Anchorage and Fairbanks.

Why is it important?

Alaska is in the envious position of having the cash and solid credit rating that other states — and the federal government — lack. Congress likely has done all it will do to help the gas line, and it's not surprising that even global oil and gas companies are hesitant about signing binding contracts that put them on the collective hook to pay $150 billion or more to ship gas 10, 20, 30 years into the future when natural gas prices are unpredictable.

Accepting the premise that a large out-of-state natural gas pipeline and an in-state line would be good for Alaska, the question is: Can the state help make it happen and, if so, what could the state do to help?

The best answer would be state financial participation that tips the scale toward construction of a large gas line out of state along with an in-state delivery system to help meet Alaskans' energy needs for decades to come.

For more information, please visit our website: www.arcticgas.gov

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Anchorage, AK 99503
(907) 271-5209

Compare Bullet Line To Spur Line

Cook Inlet Retail Gas Price --- $/mmbtu in 2011 dollars

In-State Flowrate (mmscfpd)	ASAP Bullet Line and Alberta Line ($/mmbtu)	Spur Off Alberta Line @ Delta Junction ($/mmbtu)	Spur Off Valdez Line @ Glennallen ($/mmbtu)
500	$12.61	$10.35	$11.13
250	$16.82	$11.66	$11.70
167	$21.03	$12.95	$12.27

Netbacks from Alberta and Korea @ WTI = $80/bbl

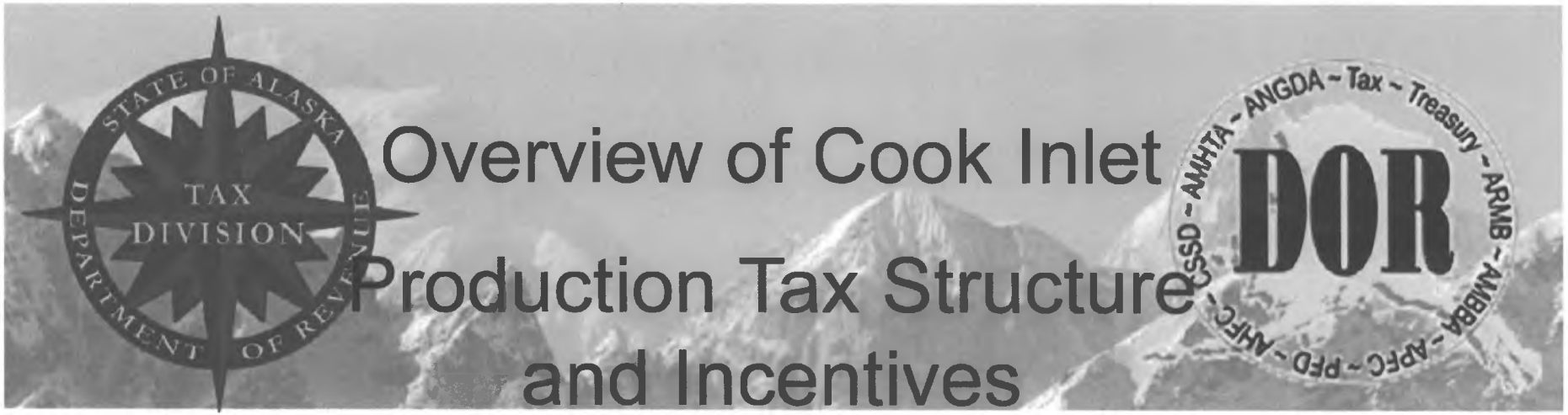
Compare Bullet Line To LNG Import

Cook Inlet Retail Gas Price --- $/mmbtu in 2011 dollars

ASAP Flowrate (mmscfpd)	AGDC Assumed $2/mmbtu @ Wellhead ($/mmbtu)	July 2011 Wellhead of $5/mmbtu ($/mmbtu)	Royalty Settlement Formula For Gas @ ANS = $100/bbl ($/mmbtu)	Pacific LNG Delivered Into Cook Inlet @ WTI = $80/bbl ($/mmbtu)
500	$9.63	$12.63	$12.27	$14.54
250	$15.26	$18.26	$17.90	$14.54
167	$20.89	$23.89	$23.53	$14.54

Avg CI Gas = $8.85/mmbtu *CI Gas Pricing Formulas = $10.00/mmbtu*

White Birch = $12.32/mmbtu *Fuel Oil = $25.81/mmbtu*



Presentation to the
Senate Resources Committee
October 20, 2011
Alaska Department of Revenue

Cook Inlet Production Tax Structure

- **Production Tax is lower of ACES and ELF**
  - **ELF ceiling limits production tax liability**
  - **ELF on oil production is zero, so no production tax paid on oil**
  - **ELF ceiling generally limits tax on gas to an average of $0.177 per mcf**

Sample Tax Calculation on Cook Inlet Gas

ACES TAX CALCULATION	
Taxable mcf/day	20,000
Days per month	30
Total taxable mcf	600,000
Wellhead value in $/mcf	$5
Wellhead value in $/month	$3,000,000
Total opex	$125,000
Total capex	$20,000
Production tax value (PTV)	$2,855,000
Taxable gas in BTU eq barrels	100,000
PTV per BTU eq barrel	$28.6
Base tax rate	25%
Progressive tax rate	0
ACES tax before credits	**$713,750**

ELF TAX CEILING CALCULATION	
Taxable mcf/day	20,000
Days per month	30
Total taxable mcf	600,000
ELF tax limit per mcf	$0.177
ELF tax ceiling	**$106,200**

Production Tax Payable is Lower of ACES tax and ELF tax ceiling - ELF Tax ceiling provides tax benefit of more than $600,000!!

Cook Inlet Oil and Gas Incentives

- **Production Tax Credits**
  - **Qualified capital expenditure credit**
  - **Carry-forward loss credit**
  - **Well lease expenditure credit**
  - **Small Producer credit**
  - **Alternative credit for exploration**
  - **Jack-up rig credit**
  - **Gas storage facility credit**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.55.023**
  - **Section (a)(1) 20% credit for qualified capital expenditures (excluding well lease expenditures)**
  - **Section (a)(2) 20% for qualified capital expenditures (except for well lease expenditures) incurred in connection with G&G exploration or exploration well, requires data**
  - **Section (b) 25% carried forward annual loss credit.**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.55.023 (cont'd)**
  - **Section (l)(1) 40% credit for well lease expenditures which are intangible drilling costs.**
  - **Section (l)(2) 40% for well lease expenditures incurred in connection with G&G exploration or exploration well**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.55.024**
  - **Section (c) Small Producer Credit**
  - **Up to $12 million based on average daily production.**
  - **Production under 50 mbd, eligible for 100% pro-rated to zero from 50 to 100 mbd.**
  - **Credit can only be applied against tax liability.**
  - **Cannot be carried forward**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.55.025**
  - **Alternative tax credit for oil and gas exploration commonly referred to as "Exploration tax Credit"**
  - **30% or 40% credit for G&G exploration or drilling an exploration well based on certain conditions**
  - **Requires data be given to DNR**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.55.025**
  - **Section (l) Cook inlet Jack-up Rig credit**
  - **Eligible to the first three unaffiliated persons using the same jack-up rig that drill an offshore exploration well**
  - **Credit of 100% / 90% / 80% respectively of up to $25 million of exploration expenditures**
  - **50% of credit to be repaid if exploration activity credited results in sustained production**

Cook Inlet Oil and Gas Incentives

- **Credits under AS 43.20.046**
  - **Cook Inlet Gas Storage credit applicable against the State Corporate Income Tax**
  - **Credit equal to $1.50 per mcf of working gas storage capacity up to lesser of $15 million or 25% of start-up**
  - **Storage facility must have working gas storage capacity of at least 500 million cubic feet and withdrawal capacity of 10 million cubic feet per day**

Overview of Cook Inlet Production Tax Structure and Incentives

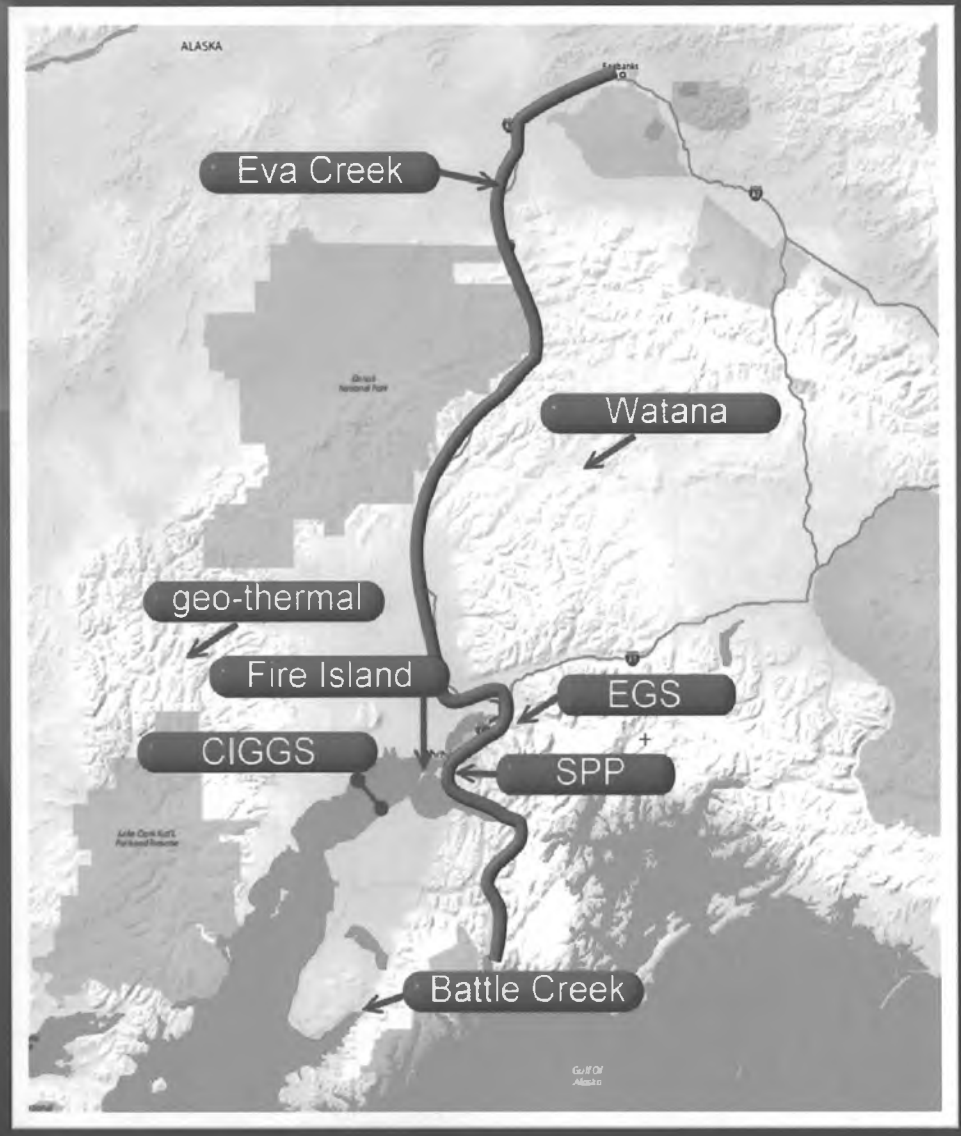
Questions?

ARCTEC UPDATE

Joe Griffith, President, ARCTEC
October 20, 2011

Railbelt Energy Plan

- Southcentral Power Project
- Eklutna Generation Station
- Battle Creek
- Tx projects
- Geo thermal
- Wind
  - Fire Island
  - Eva Creek
- CIGGS remodel
- LNG import/N. Slope
- Watana hydro



Working Together In The Railbelt

- ARCTEC
- Intertie Management Committee
- Alaska Energy Authority
- Bradley Lake Project Management Committee
- Eklutna Operating Committee
- Alaska Intertie Agreement
- Legislative efforts
- Independent gas explorers
- Enstar
  - Cook Inlet Natural Gas Storage Alaska
- LNG importation
- Crisis plans & exercises

ARCTEC
ALASKA RAILBELT COOPERATIVE TRANSMISSION & ELECTRIC COMPANY

Fuel Situation Alternatives

- Cook Inlet exploration
- AGIA spur
- Bullet line
- LNG import, foreign or N. Slope supply
- Propane
- Diesel – last resort

ARCTEC
ALASKA RAILBELT COOPERATIVE TRANSMISSION & ELECTRIC COMPANY

Gas Situation – Electric Utility Viewpoint

- Important to our members
  - Our members take the hit
  - Gas Shortage = rolling blackouts
  - Electricity runs everything
    - Grease for the economy
    - Heat for businesses and homes
    - Gas station fuel pumps (no fuel for generators)
    - Traffic control
    - Communication systems
    - And so much more…

ARCTEC
ALASKA RAILBELT COOPERATIVE TRANSMISSION & ELECTRIC COMPANY

Gas Situation – Electric Utility Viewpoint

- Challenge different than that of Enstar
- A quick solution is needed
- Can't wait on $7-$10B ASAP line
  - Without export – Electrics and Enstar are the market
- Cook Inlet supply preferred
  - We need to drill
  - Permits must be issued
  - Least expensive option
- LNG importation will happen

ARCTEC
ALASKA RAILBELT COOPERATIVE TRANSMISSION & ELECTRIC COMPANY

Fuel Situation

Comparison of Cook Inlet Retail Energy Prices ($/mmbtu)			
ASAP Flowrate (mmscfpd)	500	250	167
ASAP Bullet Line tariff	$9.63	$15.26	$20.89
Current Cook Inlet Gas Cost	$6.84		
Fuel Oil	$26.58		
White Birch ($250/cord)	$12.32		
LNG Import			
From Sakhalin	$16		
From Canada	$13 - $15		
From North Slope	$12		
$80/bbl WTI Oil Price Assumed For Comparison		*Heinze ANGDA 08/09/11*	

Questions & discussion

ARCTEC
ALASKA RAILBELT COOPERATIVE TRANSMISSION & ELECTRIC COMPANY

Alaska Senate Resources: Cook Inlet Meeting

October 20th, 2011

Marathon Oil

Marathon Oil – A Strong New E&P Company

Marathon has a rich history

1887

TODAY

Marathon Oil Corporation

- New Logo – Same Commitment to Safe, Clean, Responsible Operations
- Marathon E&P in Alaska since 1955 (Pre-Statehood)

Marathon Oil

Recent Positive Actions for Oil & Gas Development in CI

- Cook Inlet Tax Incentives
- RCA Process Improvements
- Regulatory Permitting Streamlining
- SE Alaska Gas Market Conditions

Marathon Oil

Current Activities & Investments

- Primary objective is meeting our contractual gas sales commitments
  - Requires high reliability of production
  - Firm plans for investment in maintenance and new equipment
- Recognize future opportunity to capture additional resource & sales
  - Plan to invest in existing well inventory
  - Plan to invest in new wells to test deeper and unproven targets
- Gas Storage
  - Investments in gas storage at our Kenai Gas Field since 2004
  - Plan to continue investing in and utilizing this asset

Marathon Oil

Other Investments

- People
  - > 90% of Alaska based staff are Alaskans
  - Current openings for several technical professionals
- Safety & Environmental
- Community
  - Continue active investment and engagement in our local community

Marathon Oil

ASAP Project Implications

- Need to Strike a Balance between 2 Key Objectives
  - Meet SE Alaska Energy Demand
  - Encourage a vibrant Cook Inlet (CI) Exploration & Production Environment
- Investment in Exploration & Development require Certainty of Market
- ASAP Implications / Uncertainties for CI E&P
  - Impact on current local consumption market (~90 BCF/yr)
    - Line requires long term gas sales contracts
    - These contracts could tie up all the un-contracted future local market
  - Will the small envisioned capacity of ASAP limit potential industrial gas market?
  - What impact will ASAP have in market price for gas in the CI?
  - A lack of a robust industrial gas market coupled with a tied-up local gas market will provide a low incentive for meaningful CI Natural Gas E&P investment

Marathon Oil

Apache

Introduction

APACHE CORPORATION

October 20, 2011

APACHE: STRONG AND INDEPENDENT

APACHE IS ONE THE LARGEST INDEPENDENT PRODUCERS WITH OPERATIONS IN SIX NATIONS ACROSS FIVE CONTINENTS

- YE 2010 proved reserves: 3 billion barrels of oil equivalent
- 1Q2011 production of 732,000 boe/day
- 4,500 employees worldwide
- US$45 billion market capitalization
- Member S&P 100, S&P 500
- No. 206 in Fortune 500

Apache

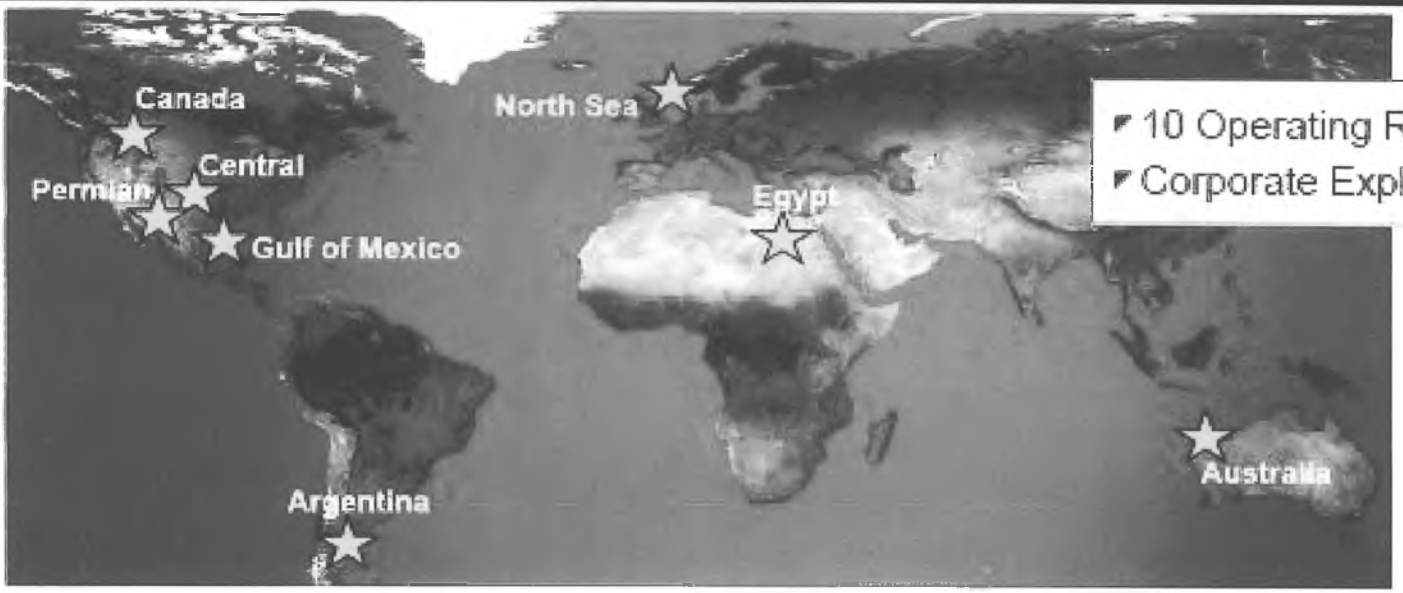
SIGNIFICANT POSITION IN EACH FOCUS AREA

- Largest producer in Egypt's Western Desert
- Apache-EnCana joint venture is largest producer in Canada's Horn River Basin
- 4th-largest producer in Gulf of Mexico; No. 1 in shallow water
- 2nd-largest producer in Texas
- 7th-largest in Argentina
- 3rd-largest in UK North Sea
- 3rd-largest in Australia's Carnarvon Basin

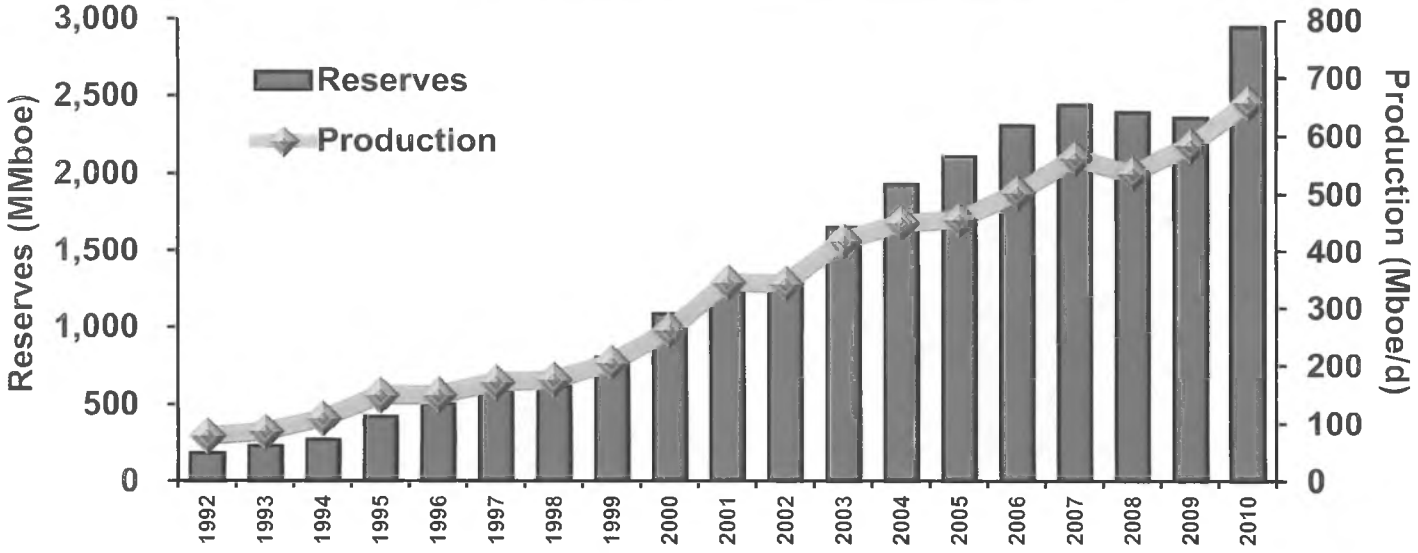
MISSION AND CORE STRATEGIES

- Apache's mission is to grow a profitable global exploration and production company in a safe and environmentally responsible manner for the long-term benefit of our shareholders
- Our core strategies support this mission:
  - *Portfolio of core areas that provide geological and geographical diversity and a balanced commodity mix*
  - *Decentralized decision-making with centralized management and incentive systems – reward performance*
  - *Specialized technical support for regional units*
  - *Global exploration group assessing potential new core areas*
  - *Conservative capital structure*
  - *Rate of return focus*
  - *Innovative, value-driven approach to growth opportunities*

Apache 56 Years of Growth

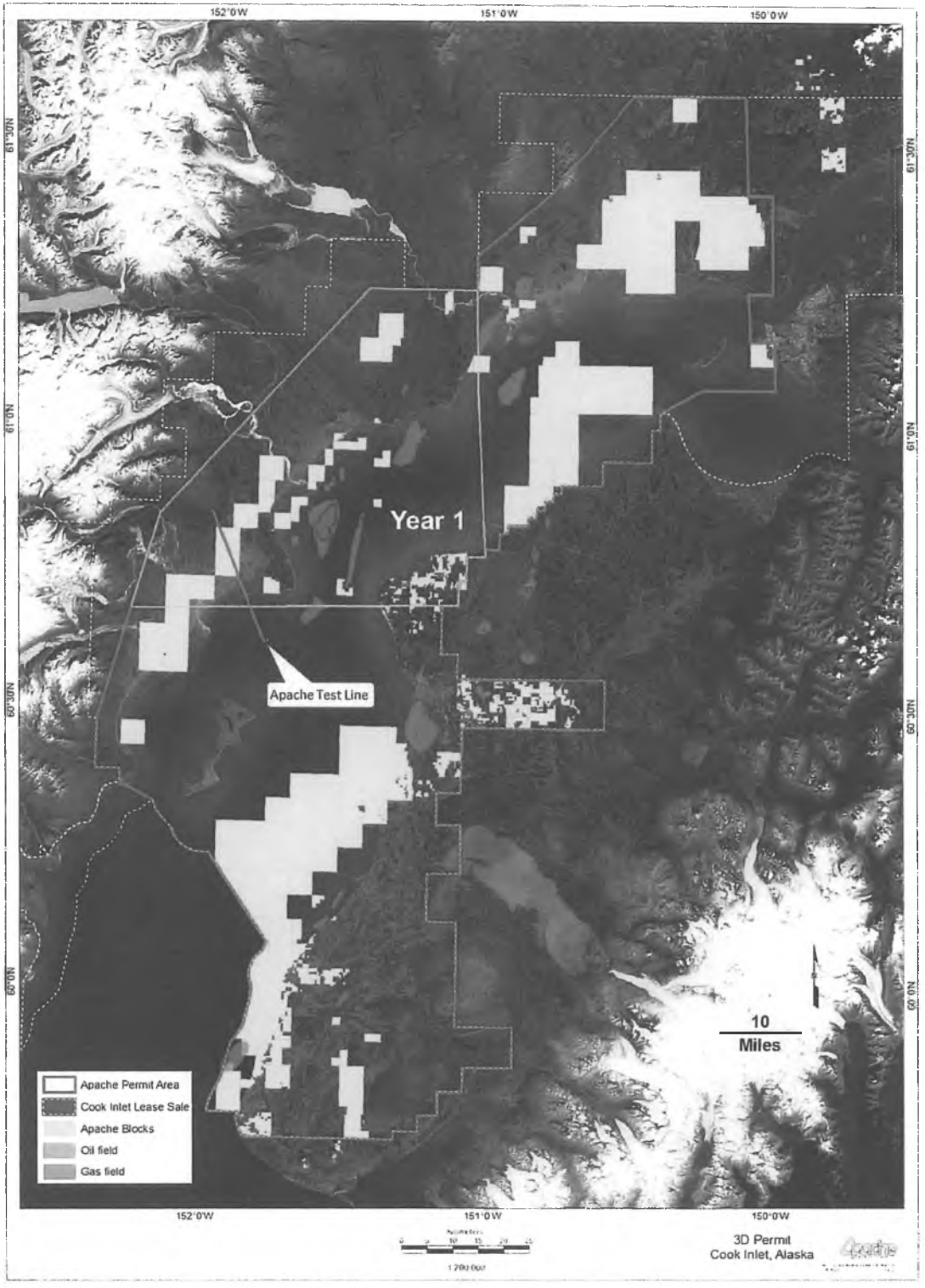


- 10 Operating Regions
- Corporate Exploration Team

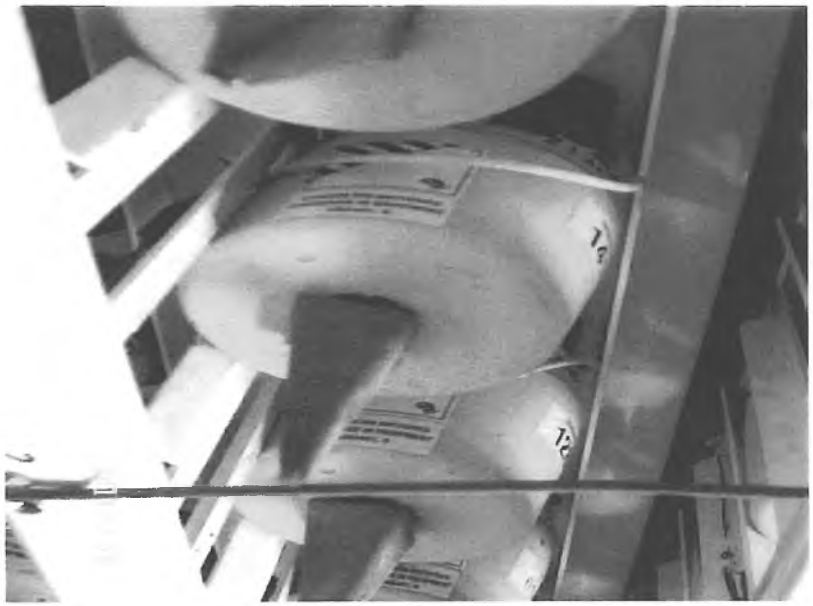


NEW VENTURES: COOK INLET

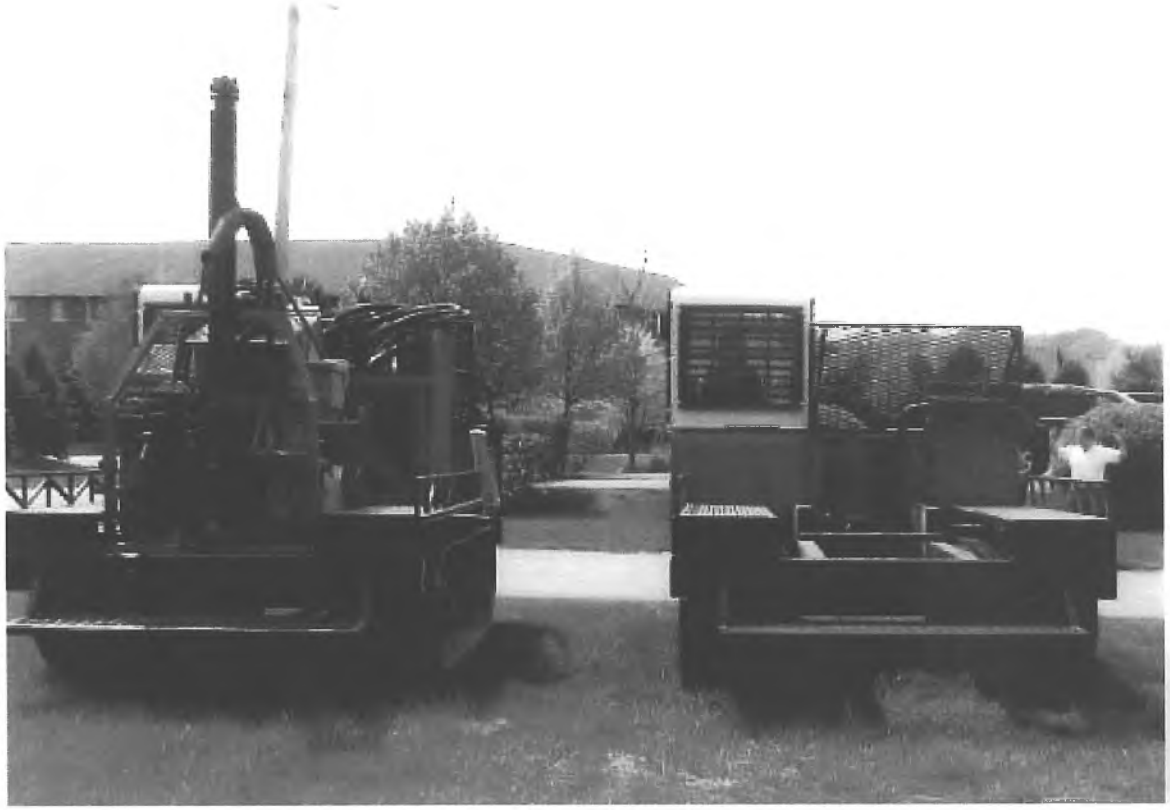
- Apache has become the largest acreage holder in Cook Inlet with more than 800,000 acres
- Oil targets focus
- Limited 3D seismic in the Basin to date
- Extensive 3D seismic survey to commence 2011
- Multi-year Program for 3D seismic; plan to operate year round
- Covers both onshore and offshore acreage
- Cook Inlet is a primary focus for Apache with plans to operate for many years


152°0W
151°0W
150°0W
61°30N
61°0N
60°30N
60°0N
Year 1
Apache Test Line
10
Miles
Apache Permit Area
Cook Inlet Lease Sale
Apache Blocks
Oil field
Gas field
3D Permit
Cook Inlet, Alaska

Onshore & Offshore Seismic Nodes



Seismic Drill Equipment



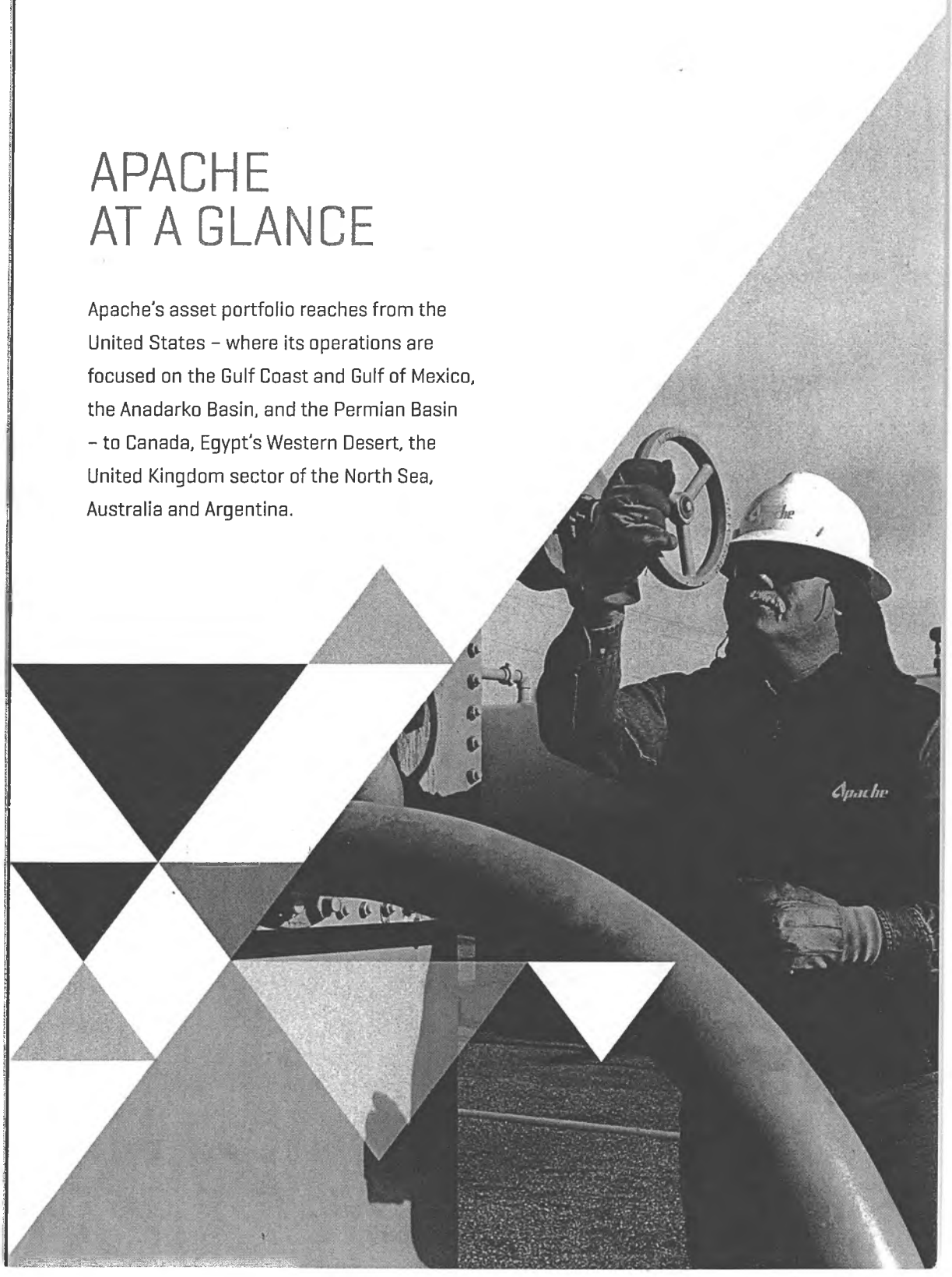
Approvals PERMIT	APPROVAL AGENCY
FEDERAL	
Incidental Harassment Authorization (IHA) for Marine Mammals	National Marine Fisheries Service
Nationwide 6 Permit	US Corps of Army Engineers
STATE	
Geophysical Land Use Permit	Alaska Department of Natural Resources Division of Oil and Gas
Fish Habitat Permit ("Title 16 permit")	Alaska Department of Fish and Game
Letter of Concurrence	State of Historic Preservation Office
Land Use Permit	Mental Health Trust
Special Area Permit	Alaska Department of Fish and Game
LOCAL	
Land Use Permit	Kenai Peninsula Borough
Land Use Permit	Tyonek Native Corporation
Land Use Permit	Cook Inlet Regional Corporation
Land Use Permit	Salamatof Native Corporation
Revocable Use Permit (Private Native Allotments)	Bureau of Indian Affairs
OTHER	
Letters of Non-Objection	Affected lease owners
Private Permits	Landowners

THANK YOU.

QUESTIONS?

APACHE AT A GLANCE

Apache's asset portfolio reaches from the United States – where its operations are focused on the Gulf Coast and Gulf of Mexico, the Anadarko Basin, and the Permian Basin – to Canada, Egypt's Western Desert, the United Kingdom sector of the North Sea, Australia and Argentina.

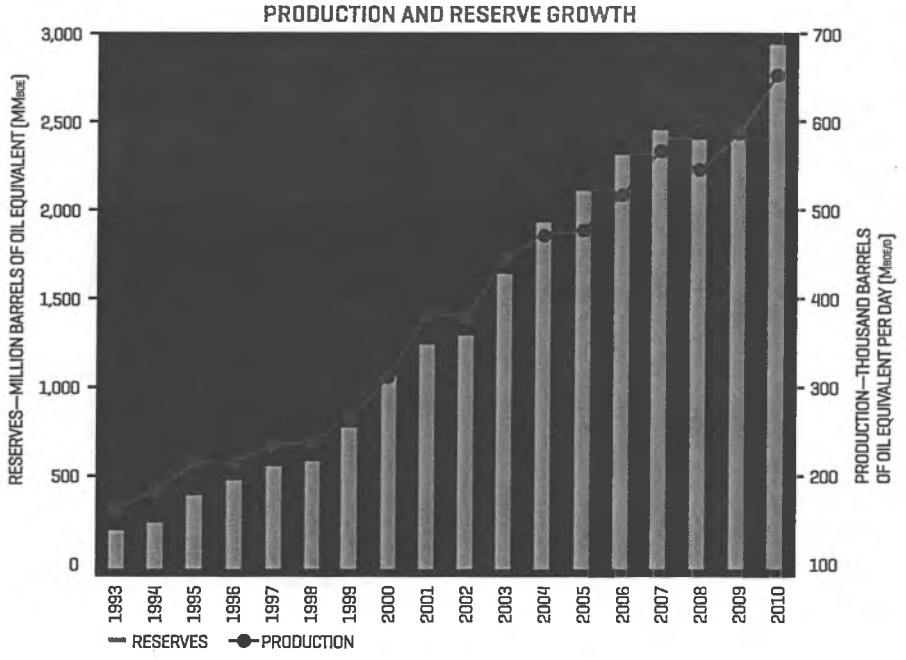


PERFORMANCE HIGHLIGHTS

Apache is a growth company and believes it can grow economically through acquisitions or drilling.

Apache's portfolio strategy has enabled the company to continue to grow throughout commodity cycles. During the past 10 years, the company has invested nearly US$57 billion, approximately 64 percent on exploration and development and 36 percent on acquisitions that enhance critical mass in core areas or establish new operating regions. These investments fueled an 11 percent compounded annual growth rate for reserves and 10 percent for production over the past decade. Apache currently has an inventory of discoveries that will deliver significant future growth, including the Horn River shale gas development in Canada and the Julimar and Reindeer discoveries in Australia.

Apache's strong balance sheet and cash-flow generating capability provide flexibility to further growth from its core drilling program, pursue larger exploration prospects and execute opportunistic acquisitions. Apache's cash flow is underpinned by balanced oil and natural gas production because experience shows that prices for the two commodities rarely move in parallel.



2010 ACQUISITIONS

In 2010, Apache strengthened its global portfolio through a series of transactions that provided additional production and reserves and – more important – significant running room for future growth.

- Apache added quality assets in the Permian Basin and the Gulf of Mexico shelf and gained a strong foothold in the GoM deepwater through the Mariner Energy merger. A separate transaction with Devon Energy Corporation brought additional acreage, infrastructure and production in the Gulf shelf.
- With the acquisition of BP's oil and gas operations in the Permian Basin, Apache solidified its position among the largest producers in one of North America's leading oil-producing regions.
- The company acquired essentially all of BP's upstream natural gas business in western Alberta and British Columbia.
- Apache purchased four under-worked development leases and one exploration concession in Egypt's Western Desert from BP.

DIVERSE OPERATING CAPABILITIES

Apache's global portfolio requires the capacity to operate on a large scale in a range of environments.

The environments where Apache thrives include harsh winters in northern British Columbia and Alberta; searing deserts of Egypt; severe summers in West Texas; offshore in the Gulf of Mexico, the North Sea and Western Australia; and environmentally sensitive areas such as coastal wetlands in Louisiana and marine sanctuaries offshore Australia.

Apache operates significant assets in all areas, including the Forties Field in the North Sea with production of up to 60,000 barrels of oil per day; the Qasr Field in Egypt's Western Desert with gross daily output of 540 million cubic feet of gas and 22,000 barrels of oil; the Permian Basin with net daily output of 66,000 barrels of oil equivalent; and the Van Gogh oil field in Australia, with a floating production, storage and offloading vessel with capacity to process 60,000 barrels of oil per day. Apache is operator of the proposed Kitimat liquefied natural gas project in British Columbia with first production targeted for 2015.

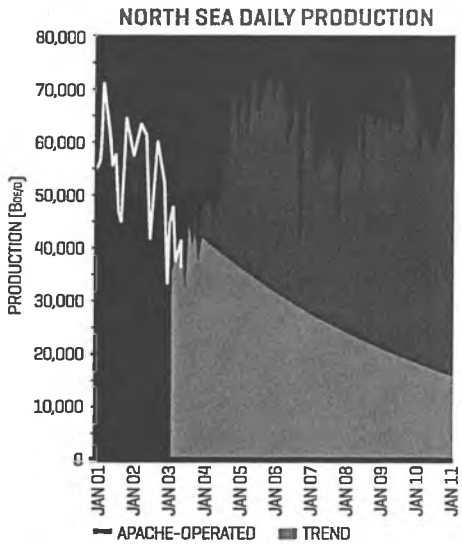
CASE STUDY: NORTH SEA FORTIES FIELD—MATURE ASSET MANAGEMENT

STRATEGY

- Increase production and reduce per-unit operating costs by upgrading facilities to remove production bottlenecks and reduce field downtime.
- Increase production output by drilling new wells identified with 4-D seismic.

RESULTS AFTER EIGHT YEARS OF OWNERSHIP

- Invested US$3.2 billion to upgrade facilities and drill new wells.
- Increased production and maintained output at levels 100 percent above trend expected at time of acquisition.
- Lifting cost declined 39% to US$8.03 per barrel.



CASE STUDY: UNCONVENTIONAL RESOURCES FUEL GROWTH IN ARGENTINA

STRATEGY

- Employ advanced seismic, drilling and well completion technologies to develop abundant resources across 5 million acres in Austral, Neuquén, Cuyo and Noroeste basins.
- Focus on opportunities in unconventional reservoirs eligible for higher Gas Plus pricing.

RESULTS AND PROSPECTS

- 72 Neuquén Basin wells producing approximately 85 MMcf per day under the Gas Plus program with average price approaching $5 per Mcf.
- Drilling South America's first horizontal well targeting shale formations.
- First modern 3-D seismic identified previously untapped structures in Cuyo Basin, a proven oil-producing province.

CULTURE OF RESPONSIBILITY

Individual initiative and sense of responsibility drive Apache's operations; they also infuse our environmental, health and safety programs.

Apache is committed to being a good corporate citizen by operating in a safe and environmentally responsible manner throughout the world and by building enduring relationships with the communities where it operates through commitments to education, civic improvement and rewarding careers.

HEALTH AND SAFETY

Apache employees understand their personal responsibility for ensuring safe and environmentally responsible operations. The company has established high standards to assure workers have the knowledge to do their jobs correctly, as well as comply with regulations and take environmental considerations into account. The company also makes sure that facilities are designed properly and well maintained, and develops plans to respond to extraordinary events.

IN THE COMMUNITY

Apache builds enduring relationships with the communities in which we operate through our commitments to environmental stewardship, sustainable development, education and civic improvement. Our emphasis on education is reflected in support for Fund for Teachers, which has enabled more than 4,000 teachers to travel the world to enrich the experiences they bring to their classrooms; Ucross Foundation, an artist-in-residence program in Wyoming; and Springboard — Educating the Future, which funded construction of 201 schools for young girls in poor rural villages in Egypt. We support important cancer research in the United States, the United Kingdom and Australia.

APACHE-FUNDED SCHOOL FOR YOUNG GIRLS IN RURAL EGYPT

CASE STUDY: RESPONSIBLE SHALE DEVELOPMENT IN CANADA

CHALLENGE

How to tap natural gas from the abundant deep shale reservoir of the Horn River Basin in British Columbia while sustaining the fragile ecosystem.

STRATEGY

Apache develops new and improved methods for drilling and hydraulic fracturing. Multi-well drilling pads permit Apache to drill up to 16 horizontal wells tapping as many as 2,000 acres of a deep shale reservoir from a single surface location, vastly minimizing the impact to the surrounding environment. The Debolt Water Treatment Plant enables Apache to extract saltwater from formations well below drinking water aquifers for use in hydraulic fracturing in shale formations. Water is recovered and reused in a sustainable cycle that minimizes the use of surface water.

RESULTS

Apache is substantially reducing its environmental footprint on the pristine wilderness of the Horn River Basin. By operating in a safe and environmentally responsible manner, the company is protecting the area's delicate ecosystem and fresh water supplies.

Apache's experience in Horn River and unconventional plays in the United States provide the technical foundation for operations in emerging unconventional plays in Argentina's Neuquén province.

AT A GLANCE

Established in 1954, Apache Corporation has grown to become one of the world's top independent oil and gas exploration and production companies with US$43 billion in total assets as of year-end 2010.

Apache's growth and progress results from a diverse team of committed people who share Apache's values of integrity, hard work and respect for others. The company provides its employees with the latest technology and empowers them to make the decisions to fuel its growth. Apache stretches the limits of what's possible through determination, adaptability, discipline, a sense of urgency and a long-term perspective.

Apache's critical mass of exploration acreage, cash-generating production and financial flexibility enables the company to explore for new resources, acquire properties with upside potential and exploit mature fields with new investment and more efficient operations to facilitate future growth.

As Apache has grown, it has continued its commitment to the highest standards of safe and environmentally responsible operations. The company participates in many programs that improve the quality of life in our communities and foster creativity.

ESTABLISHED

1954

REVENUE—2010

$12.1 BILLION

TOTAL ASSETS

$43.4 BILLION

TOTAL ACREAGE (GROSS)

47.5 MILLION

TOTAL EMPLOYEES

4,449

TICKER SYMBOL (NYSE, NASDAQ)

APA

AUSTRALIA

2010 NATURAL GAS PRODUCTION
200 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
45,908 BARRELS/DAY

PROVED RESERVES
314 MMBOE

GROSS ACREAGE
12.2 MILLION

EGYPT

2010 NATURAL GAS PRODUCTION
375 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
99,204 BARRELS/DAY

PROVED RESERVES
307 MMBOE

GROSS ACREAGE
11.3 MILLION

NORTH SEA

2010 NATURAL GAS PRODUCTION
2 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
56,791 BARRELS/DAY

PROVED RESERVES
155 MMBOE

GROSS ACREAGE
822,000

ARGENTINA

2010 NATURAL GAS PRODUCTION
185 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
13,136 BARRELS/DAY

PROVED RESERVES
116 MMBOE

GROSS ACREAGE
3.4 MILLION

CANADA

2010 NATURAL GAS PRODUCTION
396 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
17,465 BARRELS/DAY

PROVED RESERVES
757 MMBOE

GROSS ACREAGE
8.4 MILLION

UNITED STATES

2010 NATURAL GAS PRODUCTION
731 MMCF/DAY

2010 LIQUID HYDROCARBON PRODUCTION
110,353 BARRELS/DAY

PROVED RESERVES
1,304 MMBOE

GROSS ACREAGE
9.8 MILLION

APACHE CORPORATION
2000 POST OAK BOULEVARD, SUITE 100
HOUSTON, TEXAS 77056-4400
713.296.6000
WWW.APACHECORP.COM

Kitchen Development Scenarios

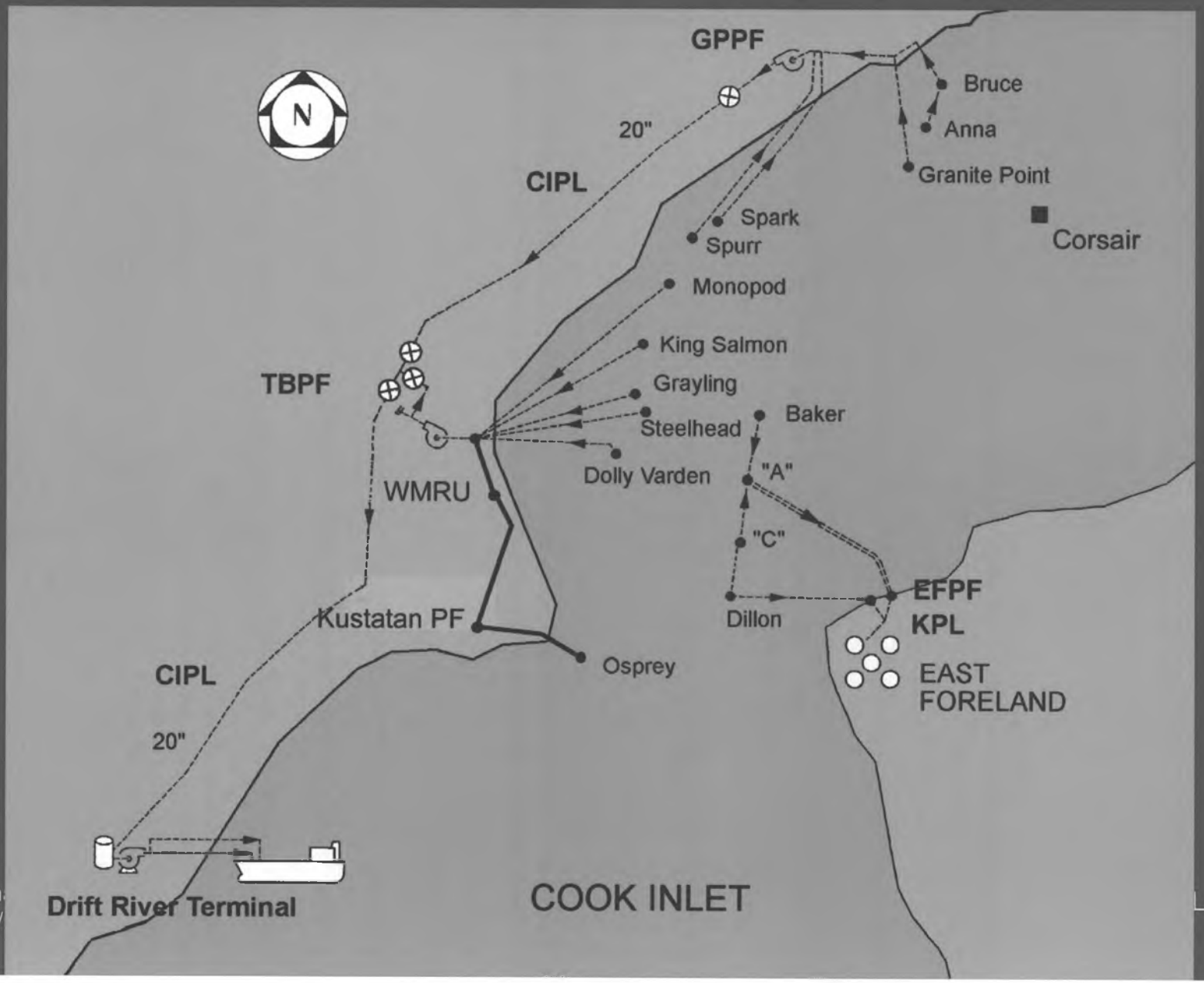
Escopeta Oil Co.

Bruce - Vladimir

Gas Development Presentation

- **Cook Inlet Background**
- **Cook Inlet Design Criteria**
- **Development Options**
  - Outrigger Caisson
  - Subsea
  - Two-Deck Platform
  - Three-Deck Platform
- **Pipelines**
- **Economics**

KLU #1 Location



Environmental Conditions

- **Waterdepth MLLW:** 100 feet
- **Tides:** 30 feet
- **Surface current*:** 10.5 feet per second
- **Bottom current:** 5.3 feet per second
- **Ice thickness*:** 34-inch
- **Wave height*:** 28 feet
- **Earthquake:** API RP2A Zone 4
- **Temperature - air:** minus 40º F (minimum)
- **Temperature – water:** 28 º F (minimum)

* One hundred-year occurrence

Field Development Assumptions

If Gas Only

- Gas Wells: 5
- Initial Production Rate: 50 MMCF/d

If Oil and Gas

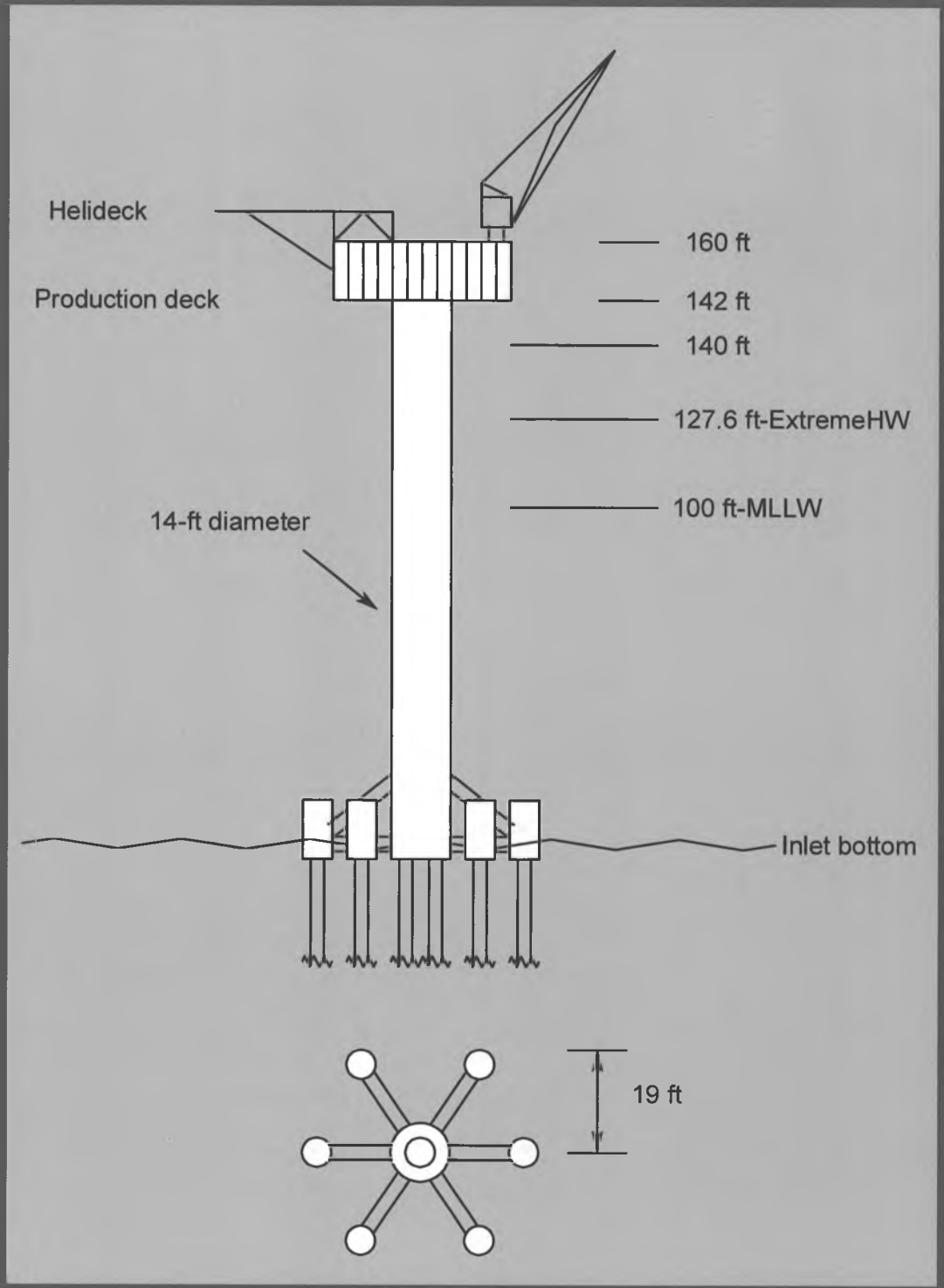
- Gas Wells: 5 Oil Wells : 12
- Initial Production Rate:
- 50 MMCF/d and 12,000 BOPD

Development Options

1. Outrigger Caisson
2. Subsea
3. Two-Deck Platform
4. Three-Deck Platform

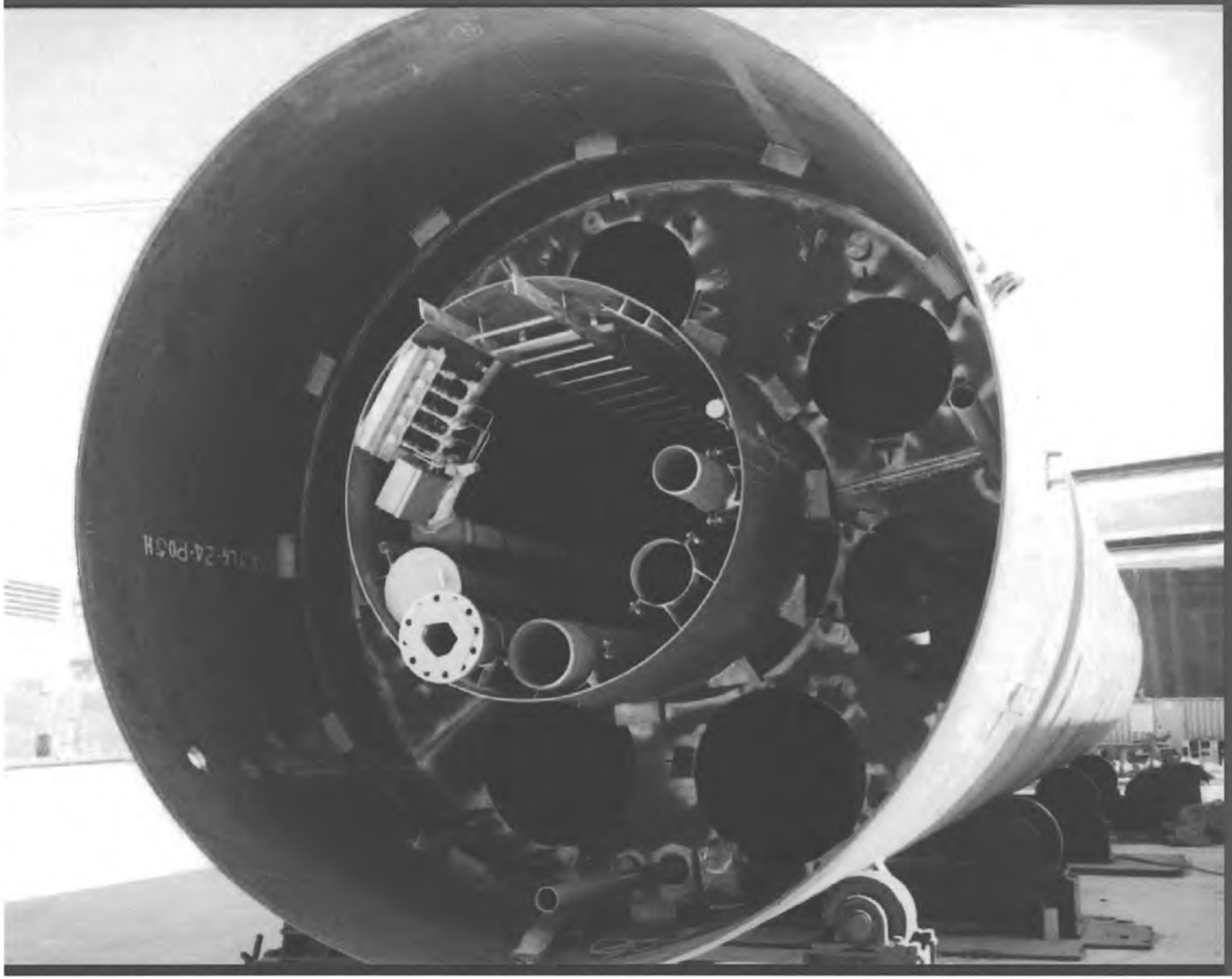
KLU #1
Caisson Platform Development

- **Outrigger caisson platform**
  - Six well capability
  - Deck with heliport
  - Emergency quarters
- **Pipeline to Tyonek Platform or to shore**
  - Single 10-inch gas pipeline
- **Umbilical to Kitchen Lights**
  - Power, methanol and controls



Self-installing outrigger caisson platform concept for six wells

Cross-Section of Platform Osprey Leg

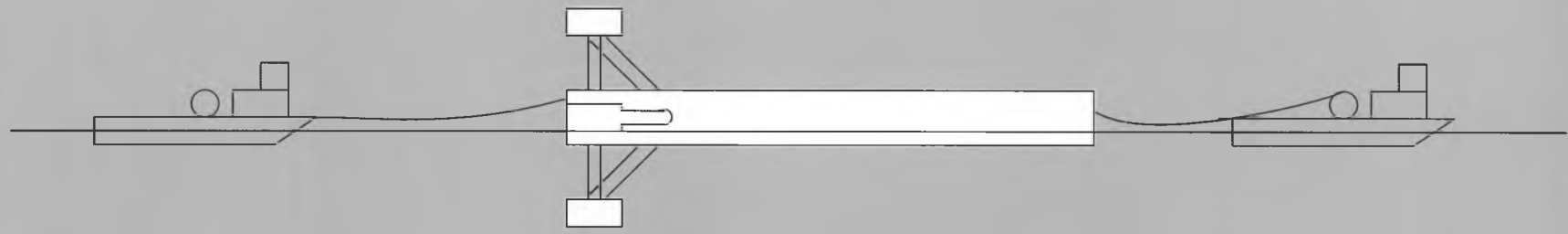


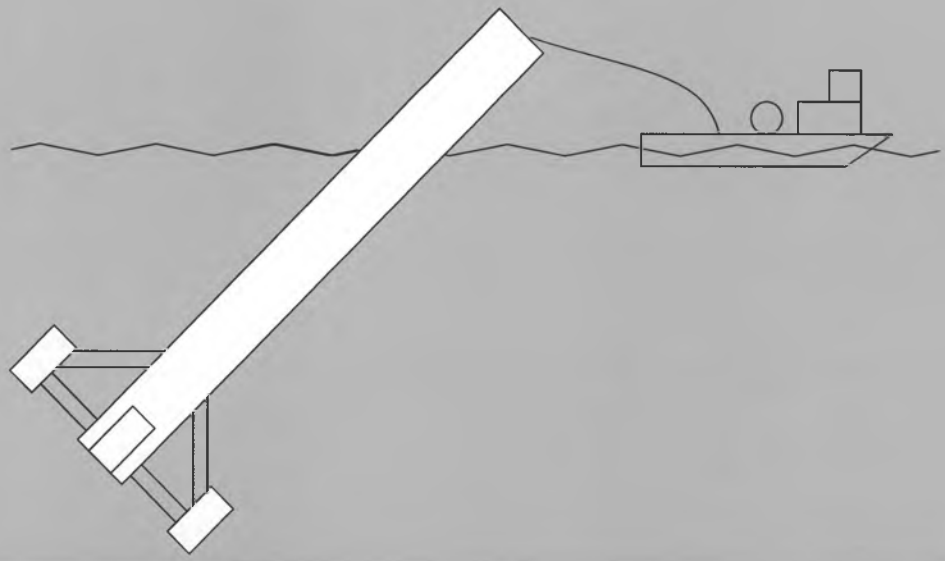
Kitchen Lights caisson will be identical to Cook Inlet platform legs

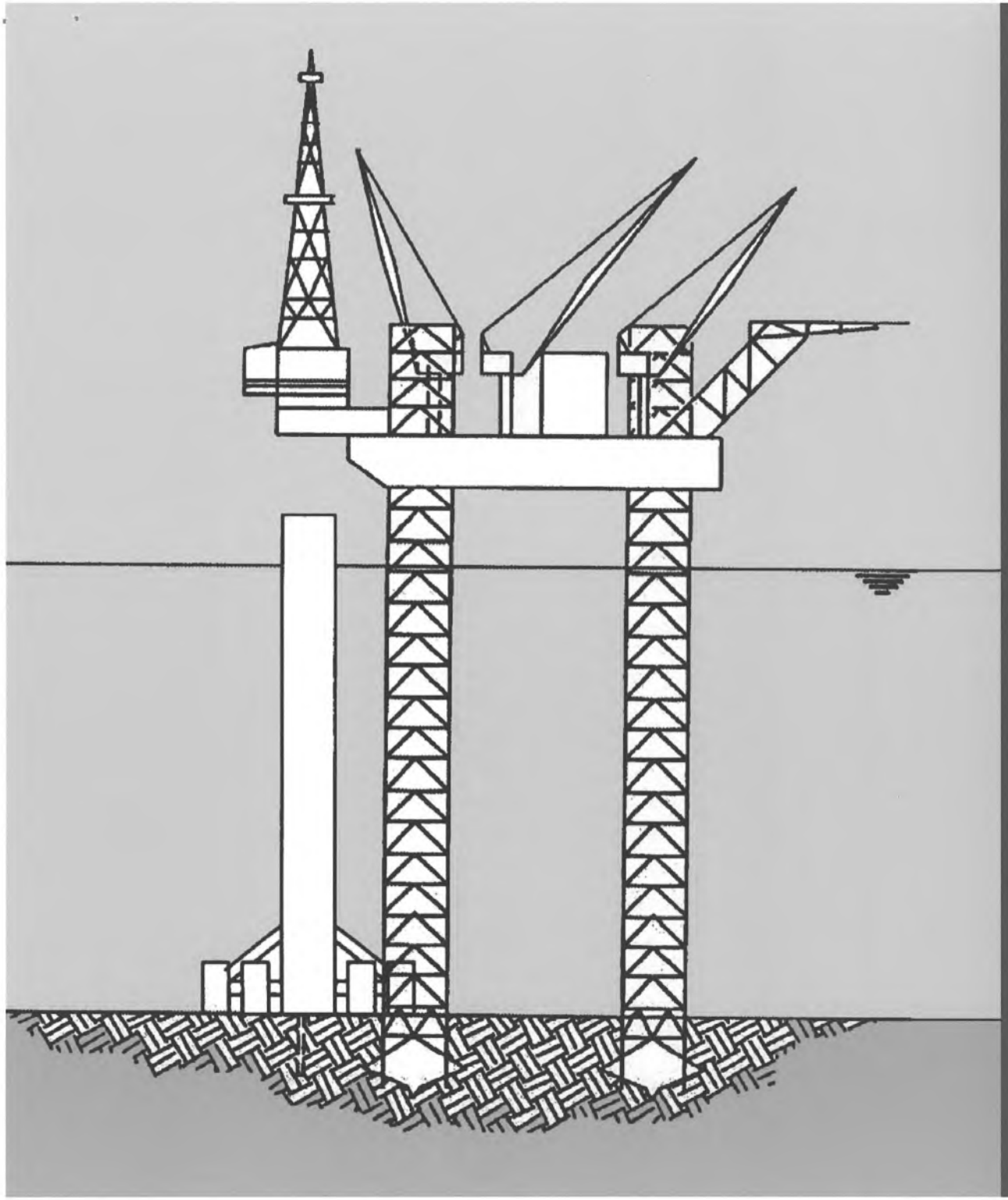
Fabrication & Transportation

- **Fabricate caisson structure**
  - Anchorage
  - Vancouver, Washington
  - SF Bay area
- **Tow caisson to Cook Inlet**

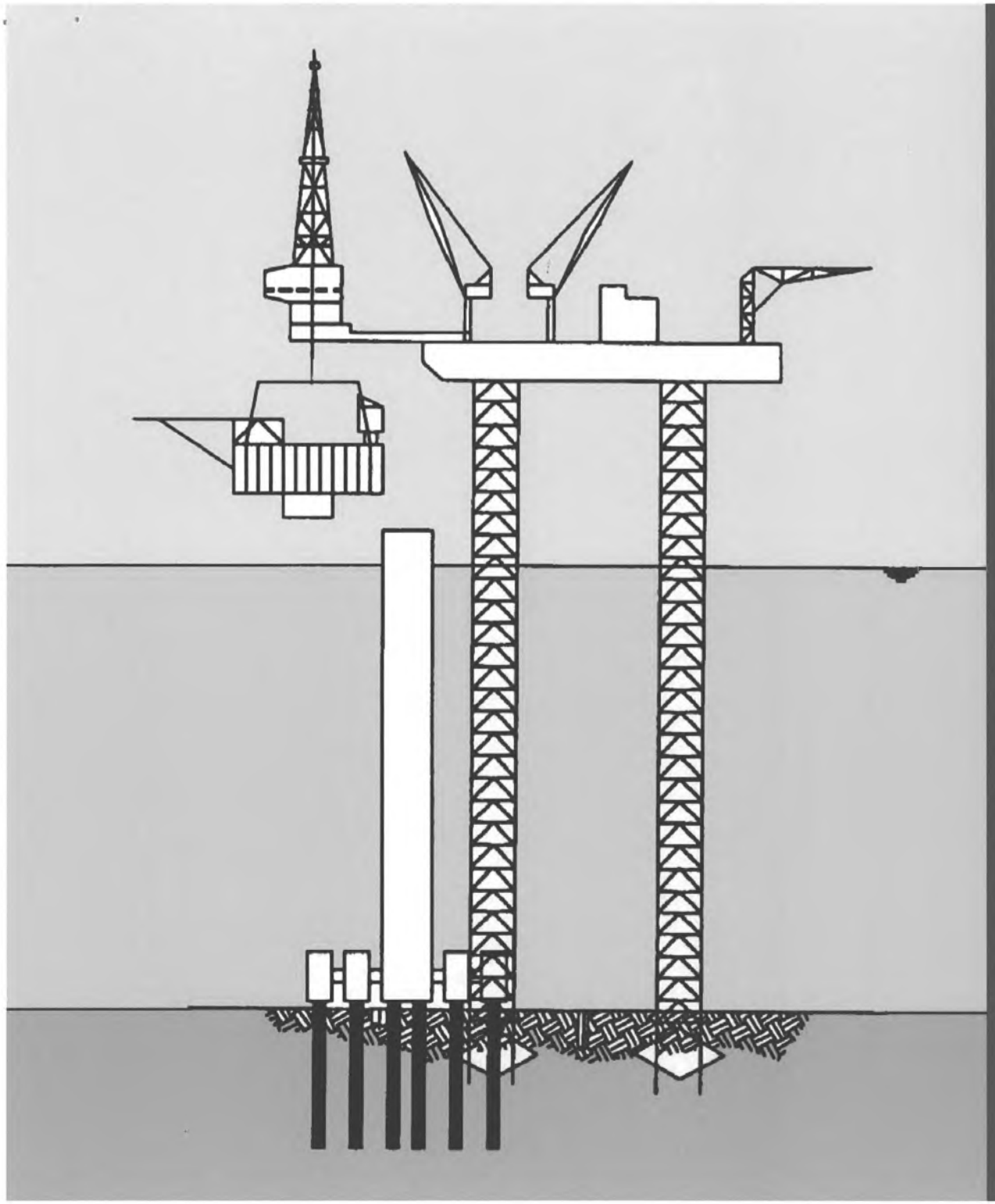
Installation Procedure







After upending the caisson is set on bottom and jack-up drilling unit moves onto location



Assuming the well is successful the jack-up unit is used to drive piles and install the deck .

Annulus of caisson is filled with grout

Outrigger Caisson Platform

- **Advantages**
  - No derrick barge needed for installation
  - Minimum cost
  - Short timeline to production
- **Disadvantages**
  - Has not been done in Cook Inlet
  - Jack-up needed for well intervention (summer)

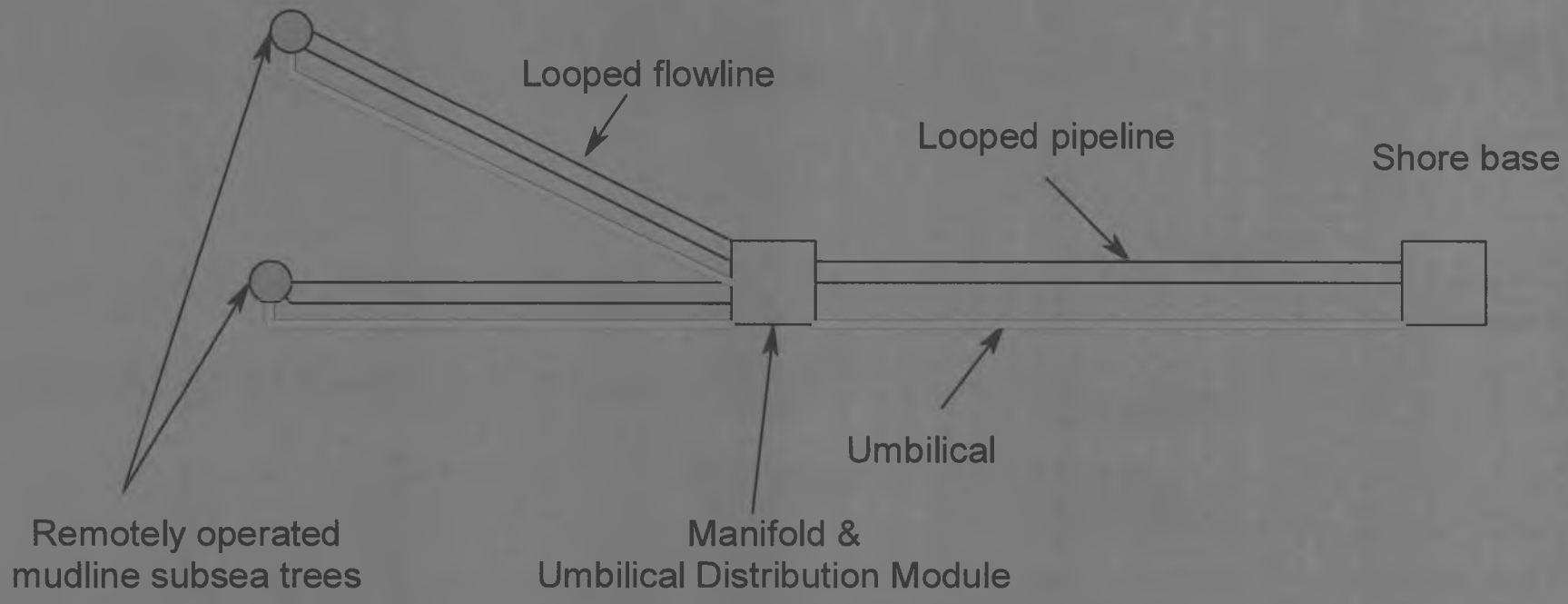
Development Options

1. Outrigger Caisson
2. **Subsea**
3. Two-Deck Platform
4. Three-Deck Platform

Kitchen
Subsea Development

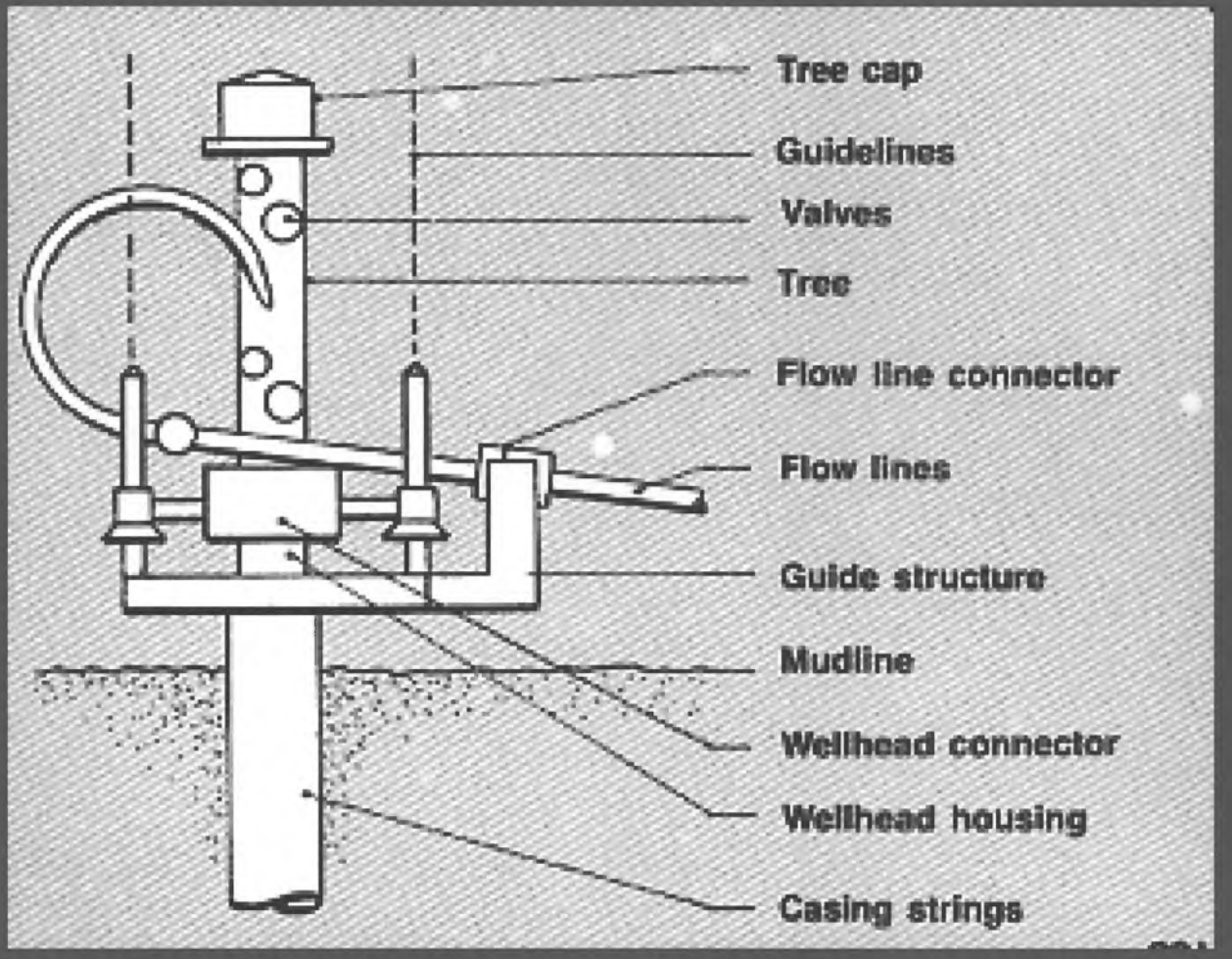
- **Subsea Wells**
  - Individual wells with flowlines to subsea manifold, or,
  - Six well template
- **Pipelines to Tyonek Platform or to East Forelands Prod. Facility**
  - Dual pipelines (for pigging)
- **Umbilical to Kitchen Lights**
  - Power, methanol and controls

Multiple Individual Wells



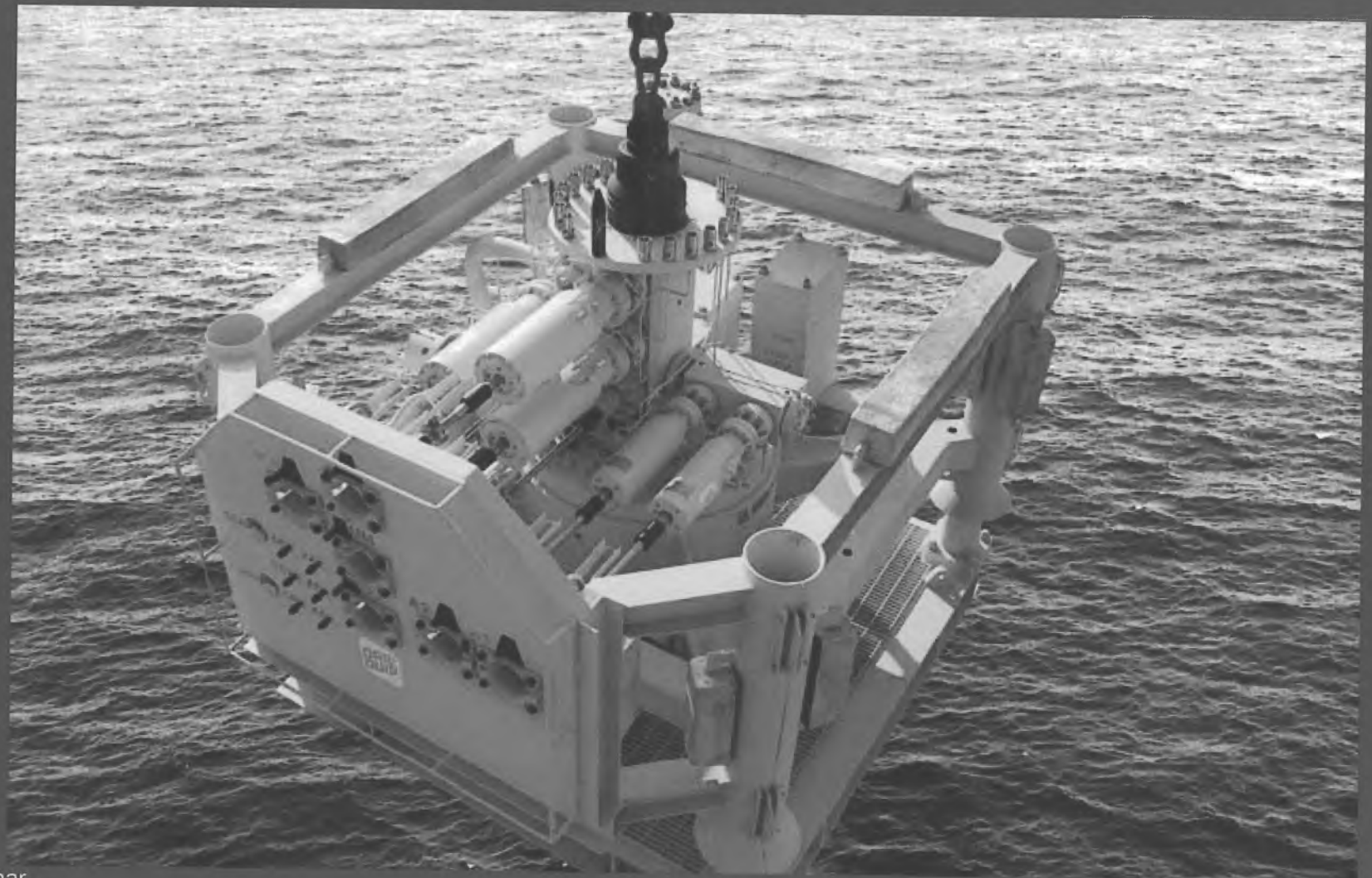
Multiple subsea wells schematic

Individual Subsea Well Completions

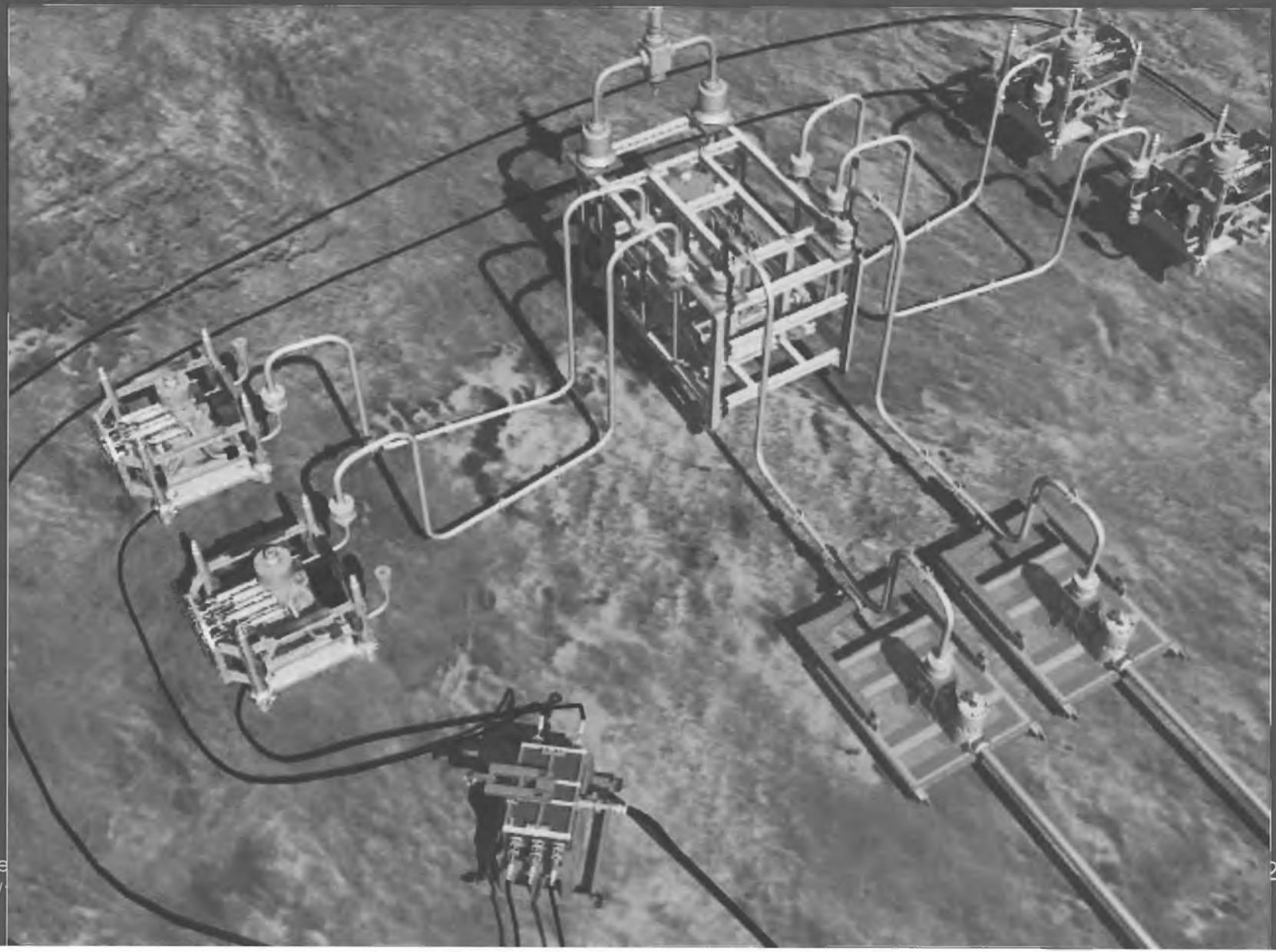


Subsea hookup performed by divers and/or guideline system

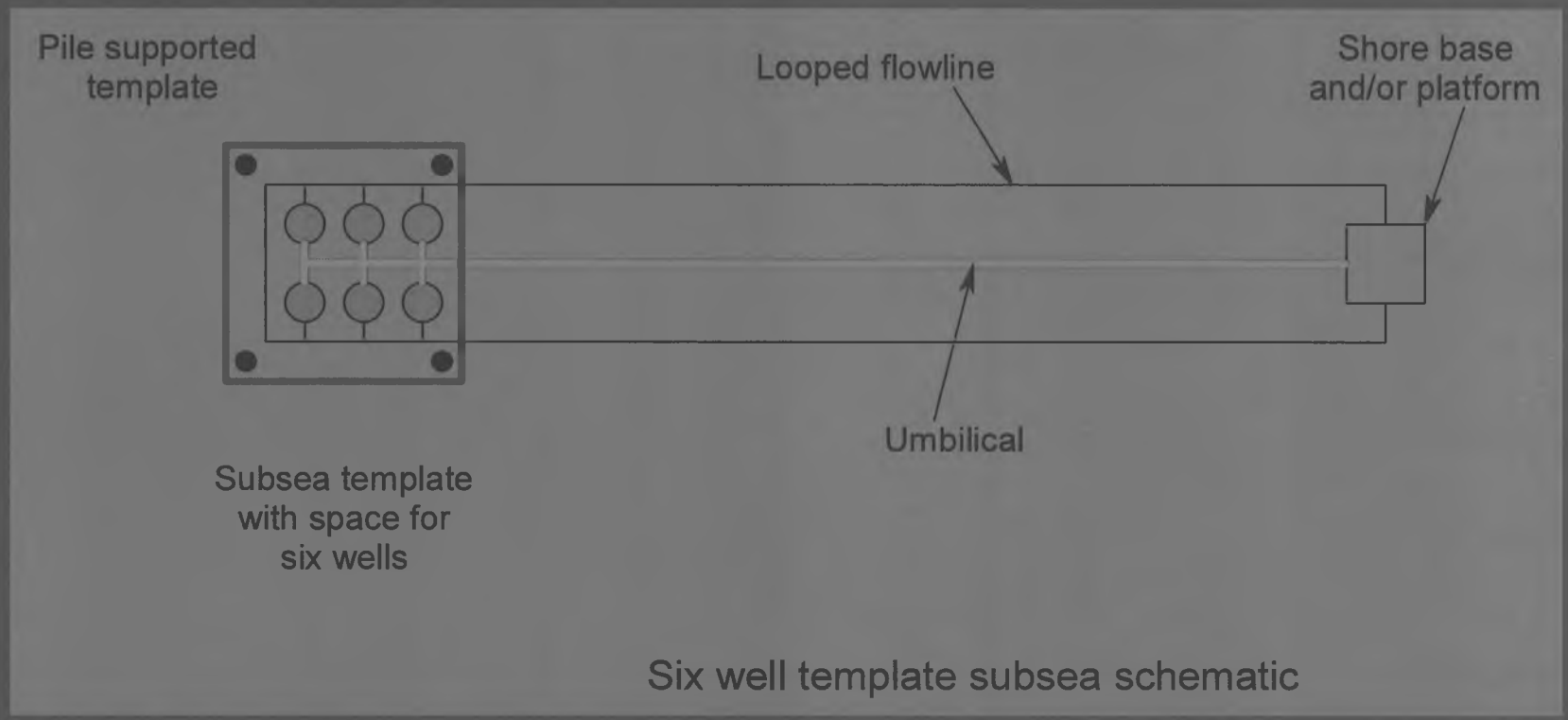
Wellhead Example



Tree and Manifold Layout

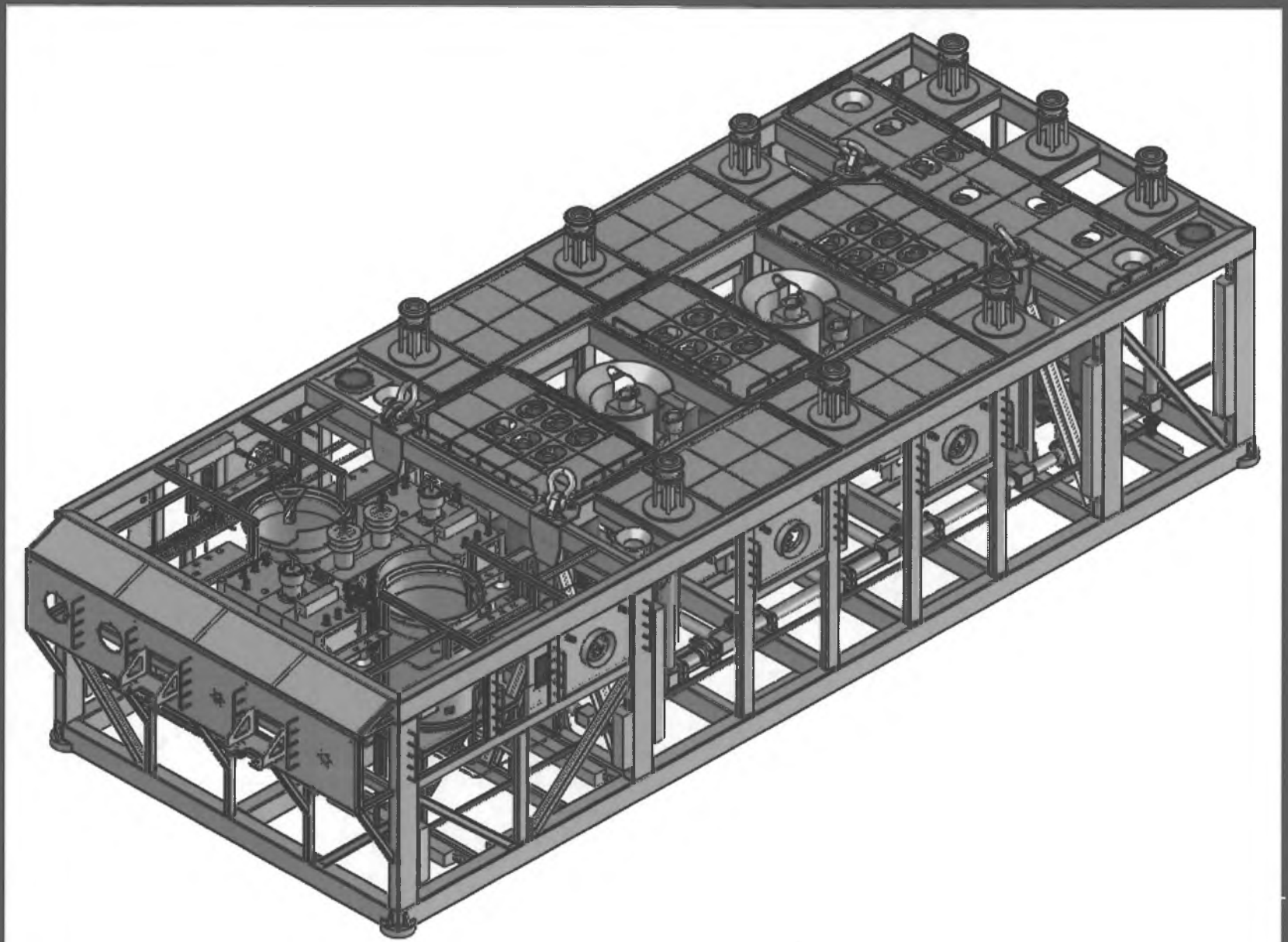


Six Well Subsea Template

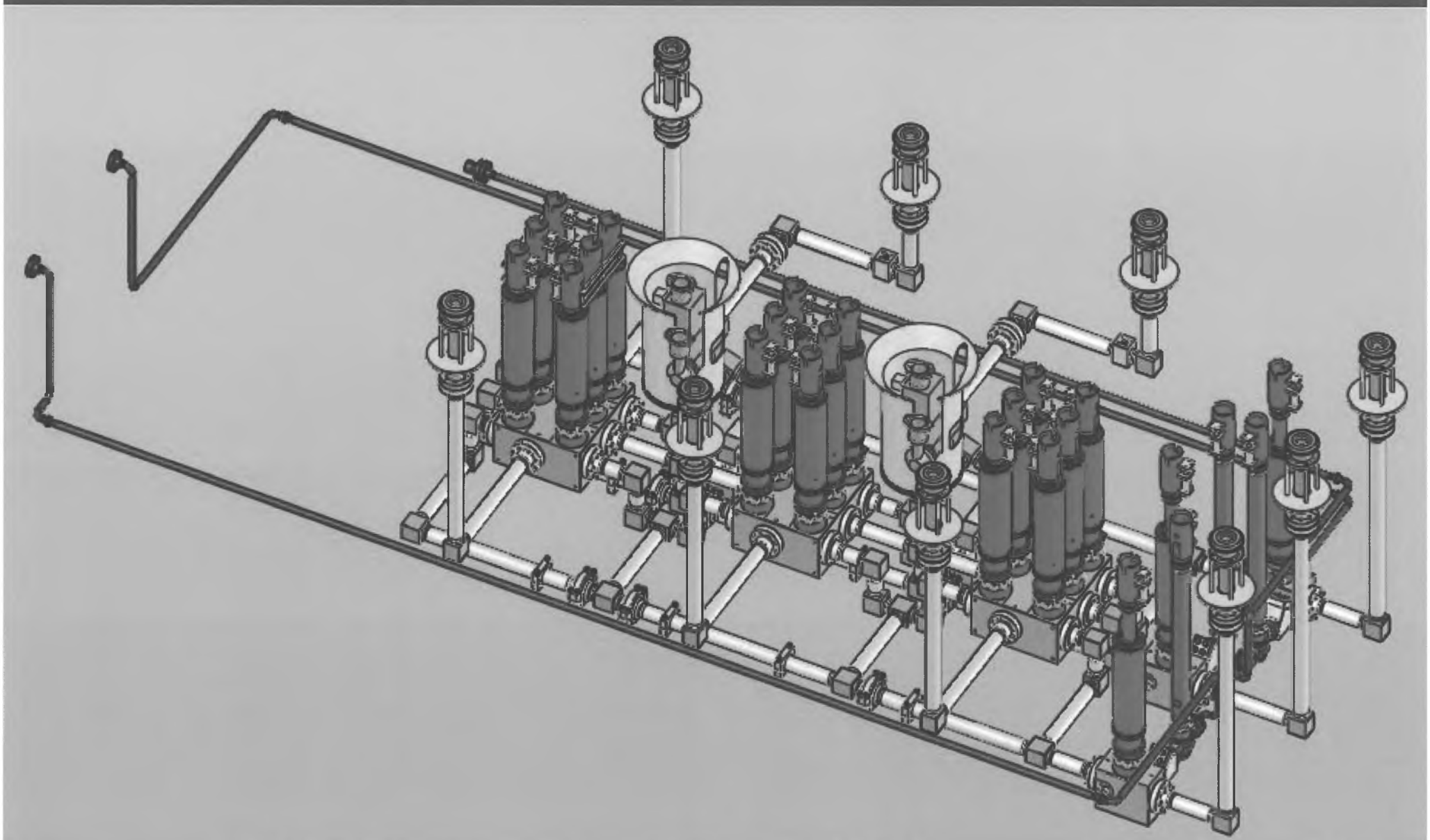


Six well template subsea schematic

Six-Well Tempalte Example



Template Example Schematic



Subsea Development

- **Advantages**
  - No derrick barge needed for installation
  - Short timeline to production
- **Disadvantages**
  - Has not been done in Cook Inlet
  - Complicated hook-up using divers
  - Jack-up needed for well intervention (summer)

Development Options

1. Outrigger Caisson
2. Subsea
3. **Two-Deck Platform**
4. Three-Deck Platform

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3/12/08

Escopeta KLU - 26

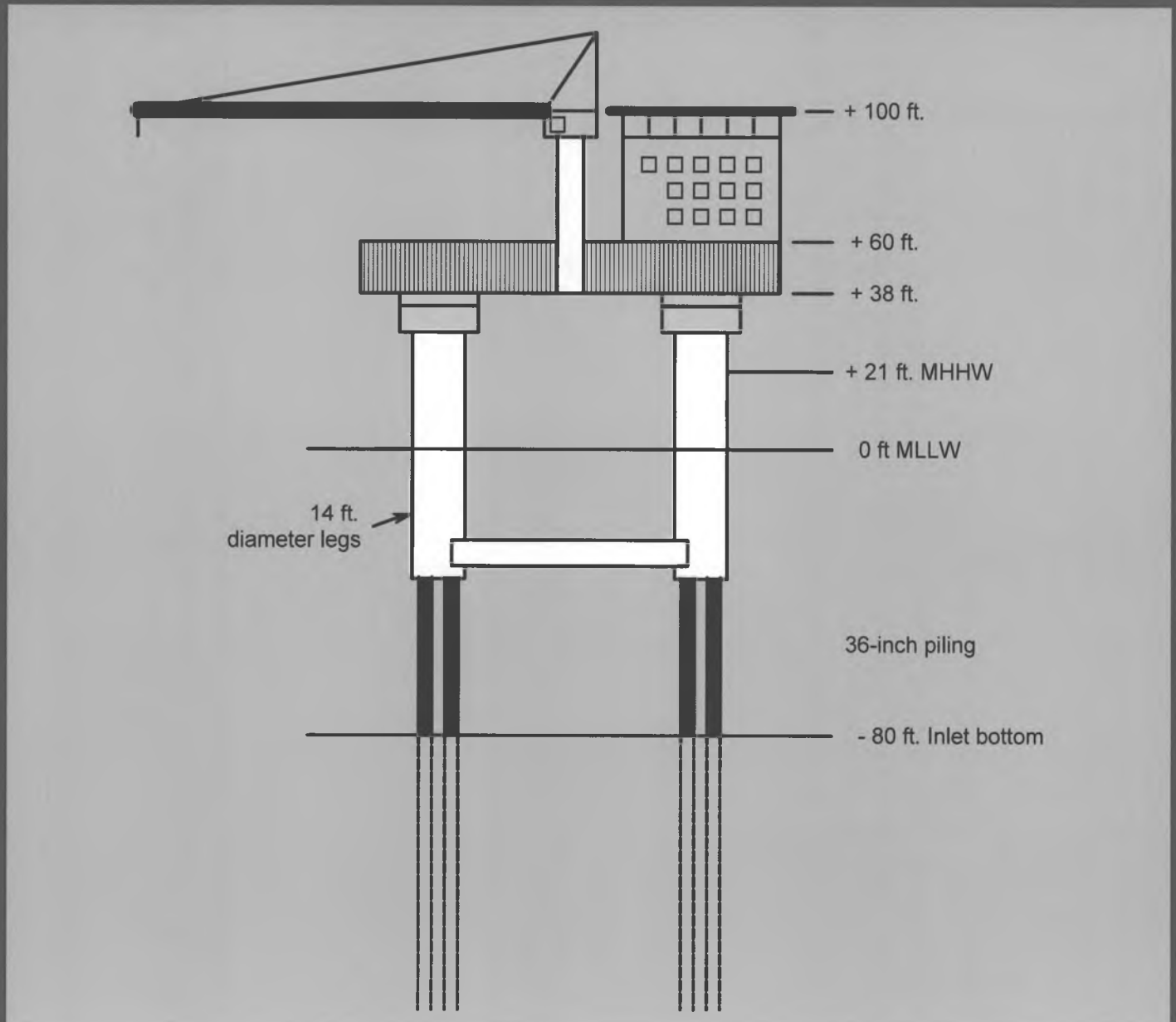
Kitchen
Two-Deck Development

- **Platform**
  - 28-well capacity
- **Pipelines to East Forelands Prod. Fac.**
  - Wet oil and gas pipelines
- **Water Injection Pipeline from EFPF**
  - Produced water and make-up water
- **Umbilical cable from EFPF**
  - Power, methanol and controls

Kitchen Application

- **Osprey Concept Limitation**
  - Tower floatation requirement
- **Deeper Water Concept**
  - Columns only needed in tidal (ice) zone
  - Different installation method

"Deep" Water Two-Deck Platform



Two-Deck Platform

- **Advantages**
  - No derrick barge needed for installation
- **Disadvantages**
  - Has not been done in this water depth in Cook Inlet
  - No space for production facilities
  - Cost

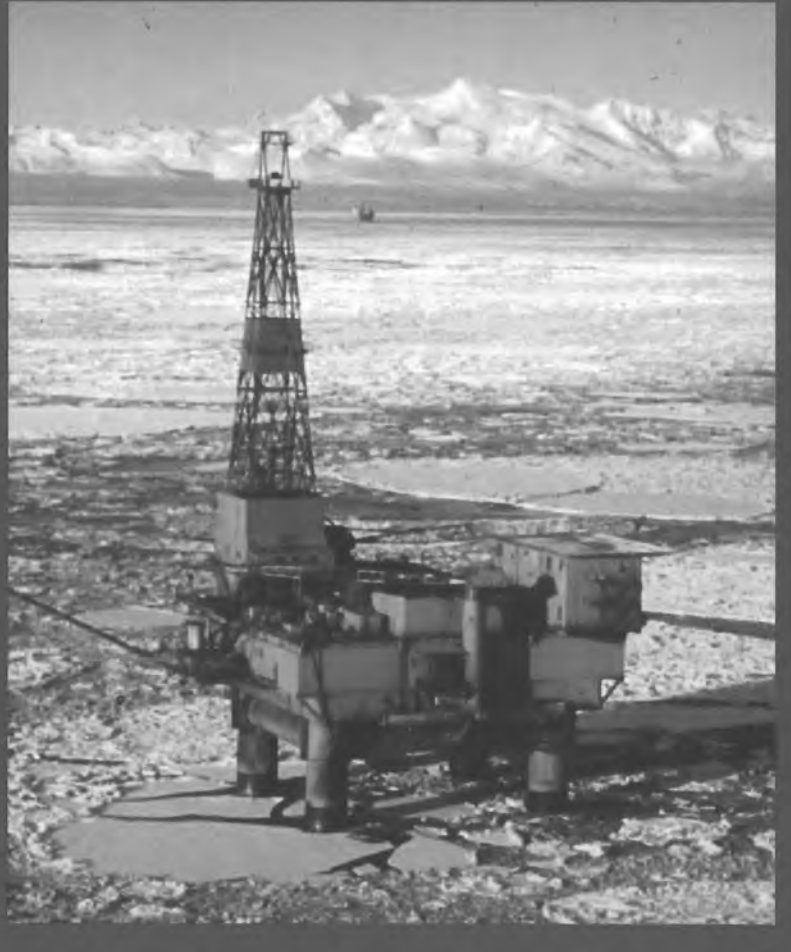
Development Options

1. Outrigger Caisson
2. Subsea
3. Two-Deck Platform
4. Three-Deck Platform

Kitchen
Three-Deck Development

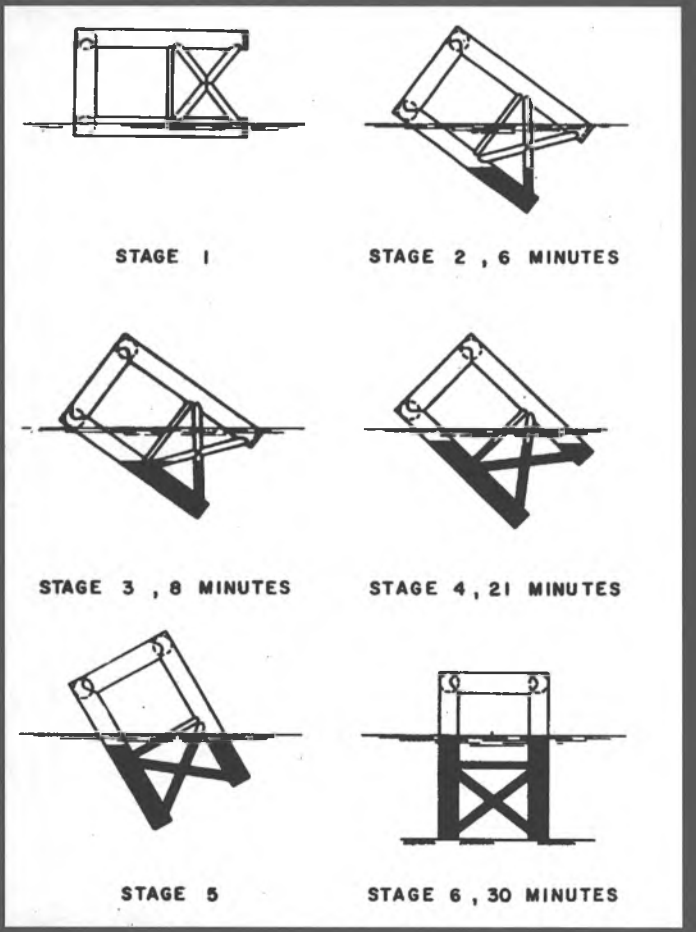
- **Platform**
  - 32-well capacity
- **Pipelines to East Forelands Prod. Fac.**
  - Clean oil and treated gas pipelines
- **Umbilical cable from EFPF**
  - Power, methanol and controls

Three-Deck Cook Inlet Platform



- Platform “C”
- Installed 1967
- 68 ft MLLW
- 32 well capacity
- Leg diameter – 15.5 ft
- Tower – 1,450 ton
- Deck – 2,000 ton
- Piling – 2,200 ton

Upending, April 1967



Installing Decks

Three-Deck Cook Inlet platform

- **Advantages**
  - Proven design
  - Design adaptable to size requirements
  - Space for production and water injection equipment
- **Disadvantages**
  - Requires derrick barge for installation
  - Expensive

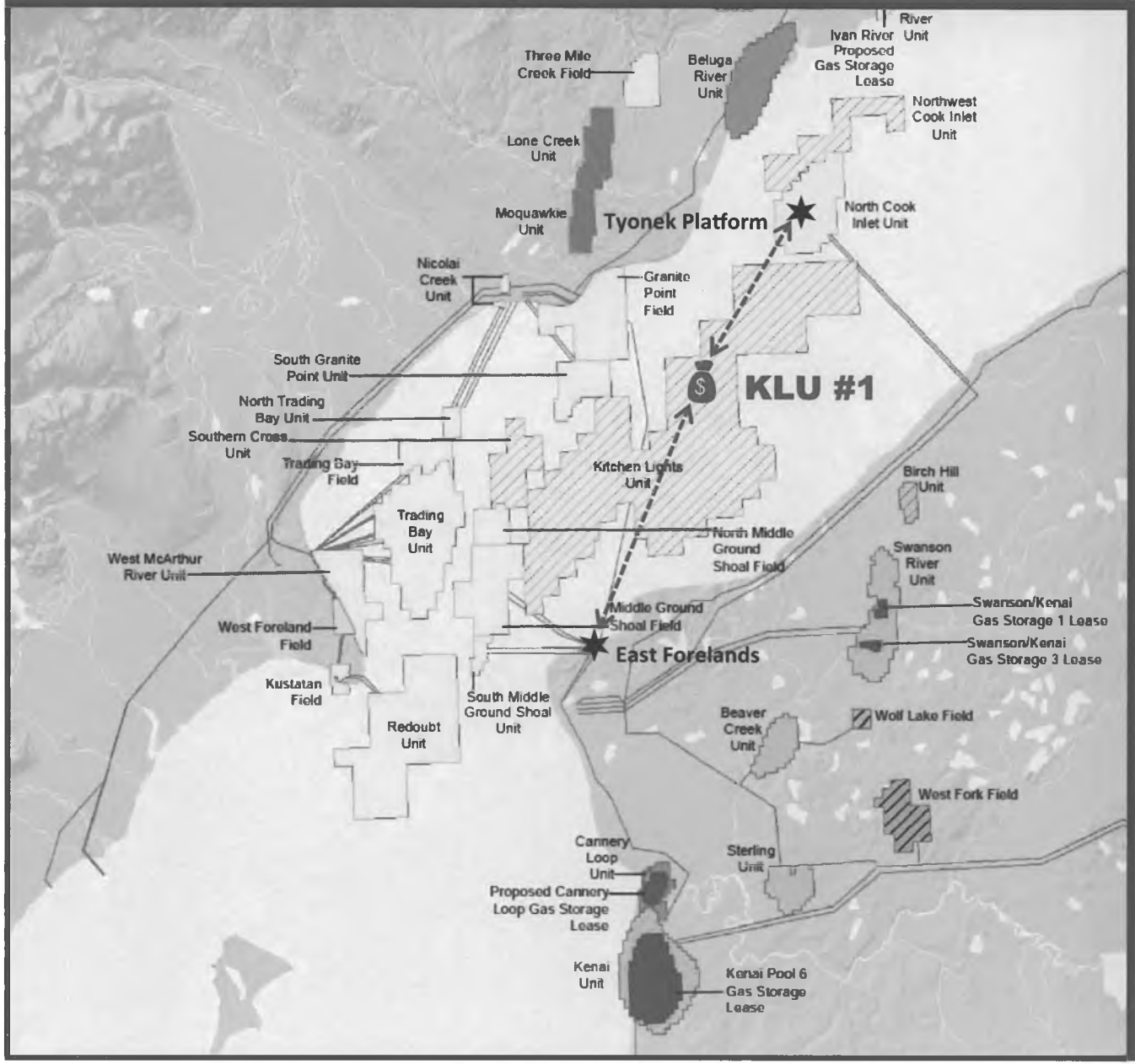
Gas Development Pipeline(s)

- **Gas pipeline, 10-inch, from Kitchen Lights to:**
  - Tyonek platform (about 12 miles), or to
  - East Forelands Production Facility (about 15 miles)
  - Anticipated production 50 MMCF per day
  - Dual and looped pipelines are needed for the subsea case to provide pigging capability
- **Umbilical to Kitchen Lights Unit**
  - Power
  - Methanol
  - Controls

Gas & Oil Development Pipelines

- **Gas and oil pipelines, 10 and 8-inch, from Kitchen to:**
  - New Shore Facility (about 8 miles), or to
  - East Forelands Production Facility (about 15 miles)
  - Anticipated production 50 MMCF/d and 12,000 BOPD
  - Dual and looped pipelines are needed for the subsea case to provide pigging capability
- **Umbilical to Kitchen Lights**
  - Power
  - Methanol
  - Controls

Gas Pipeline Route Options



In this option Kitchen gas will be transported to the Tyonek Platform or the EFPF

Umbilical cable is routed to the Kitchen Lights

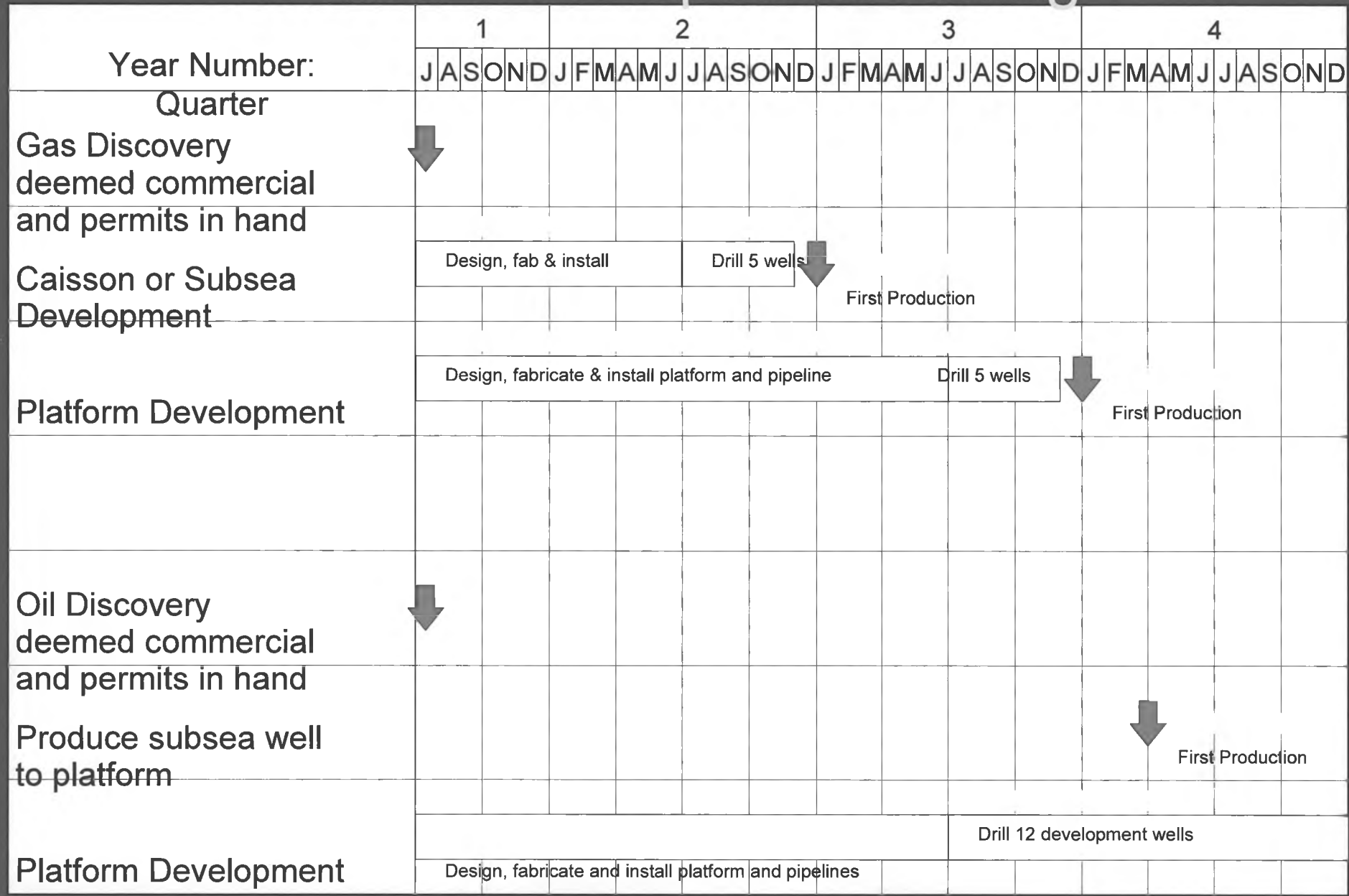
Capital Costs
(based on five gas wells and pipeline option 2)

Development Option	Capital Cost (includes wells, structure, pipelines and facilities) $ Millions
Outrigger Caisson	134
Subsea Template	173
Two-Deck Platform	168
Three-Deck Platform	210

Capital Costs
(based on five gas and twelve oil wells)

Development Option	Capital Cost (includes wells, structure, pipelines and facilities) $ Millions
Outrigger Caisson	**NA**
Subsea Template	**NA**
Two-Deck Platform	**422**
Three-Deck Platform	**426**

Kitchen Development Timing

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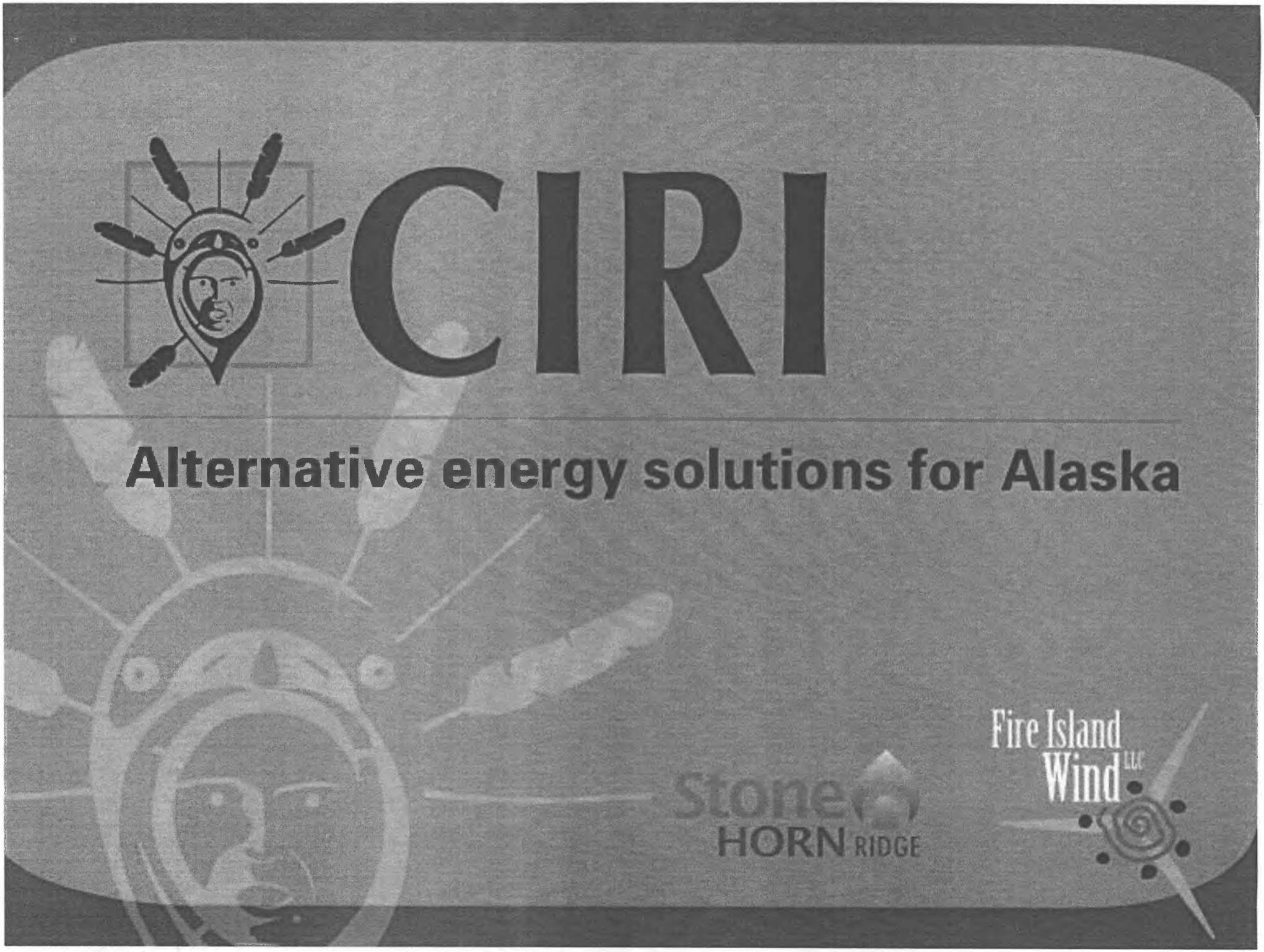
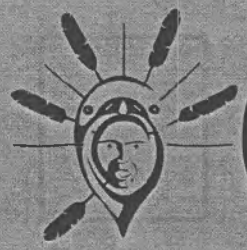
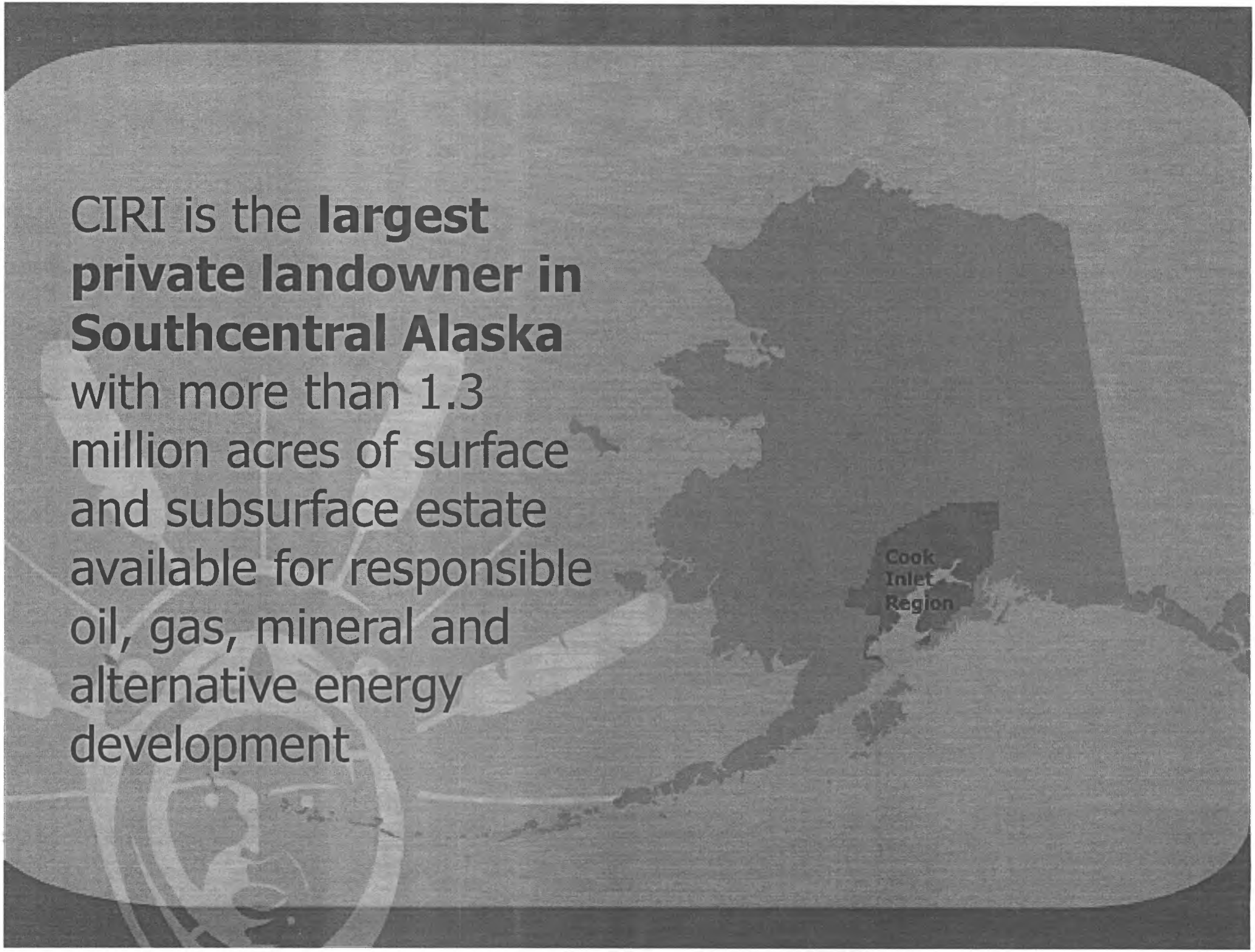

CIRI
Alternative energy solutions for Alaska
Stone
HORN RIDGE
Fire Island
Wind LLC

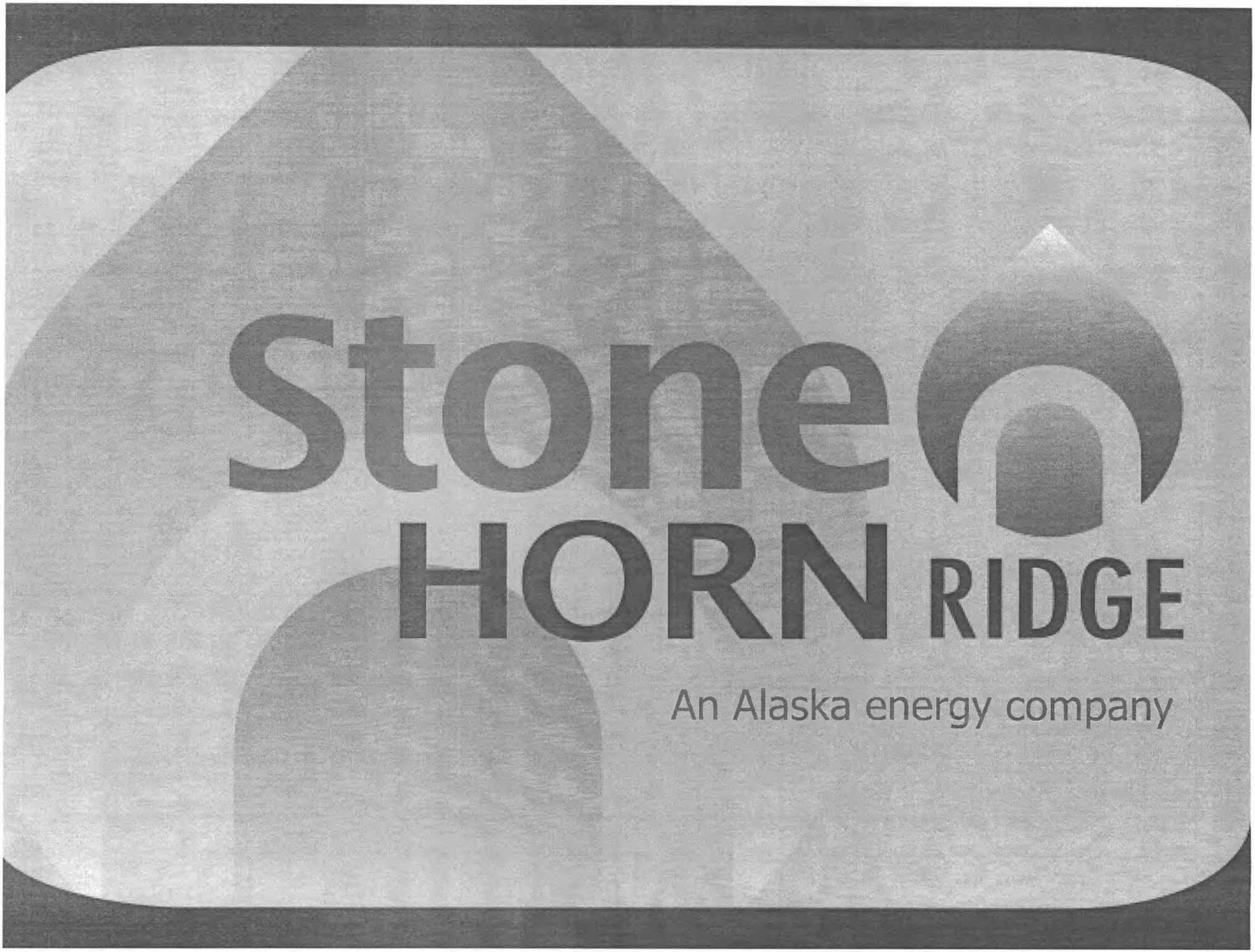


CIRI

An Alaska Native corporation with diverse business interests:

- Energy and resource development
- Oilfield and heavy construction services
- Real estate development and management
- Environmental remediation services
- Tourism and hospitality


CIRI is the **largest private landowner in Southcentral Alaska** with more than 1.3 million acres of surface and subsurface estate available for responsible oil, gas, mineral and alternative energy development
Cook Inlet Region


Stone
HORN RIDGE
An Alaska energy company

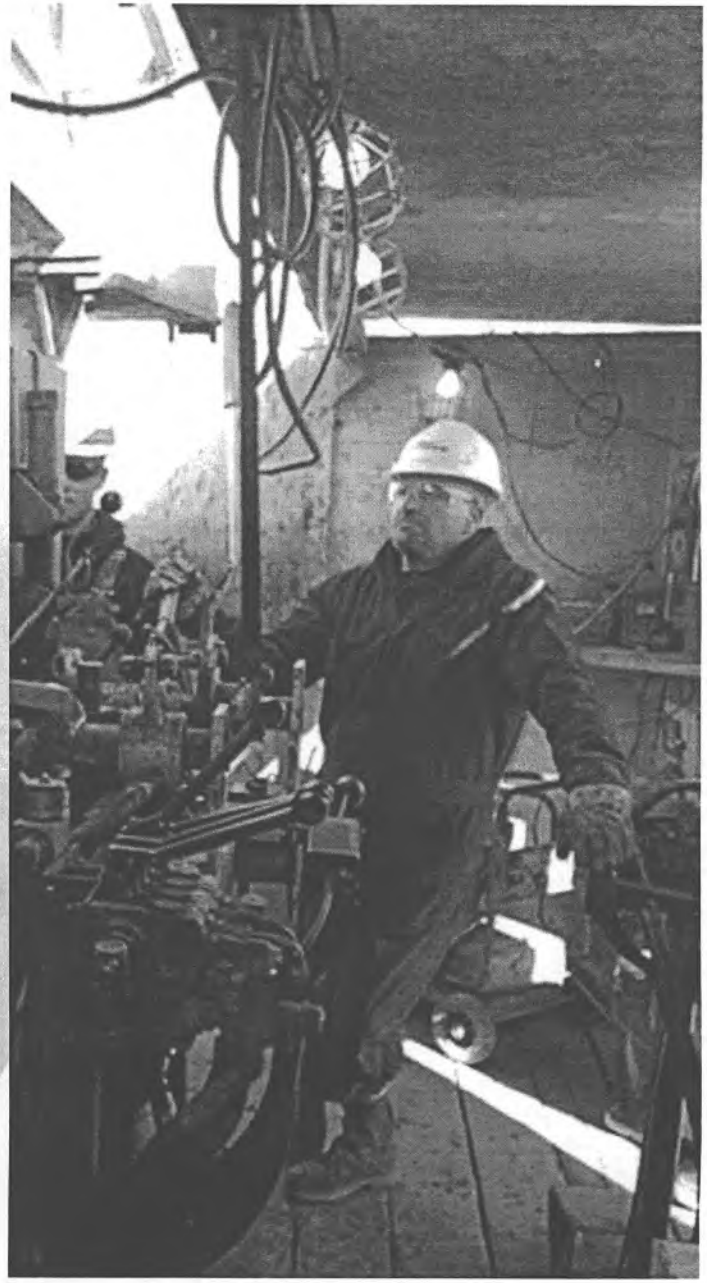
Stone Horn Ridge

- Alaska energy company developing underground coal gasification (UCG) project
- Joint venture of CIRI and Laurus Energy, a Houston-based UCG technology company
- UCG technology provided by license from Ergo Exergy

Stone HORN RIDGE

UCG: Proven, Clean Technology

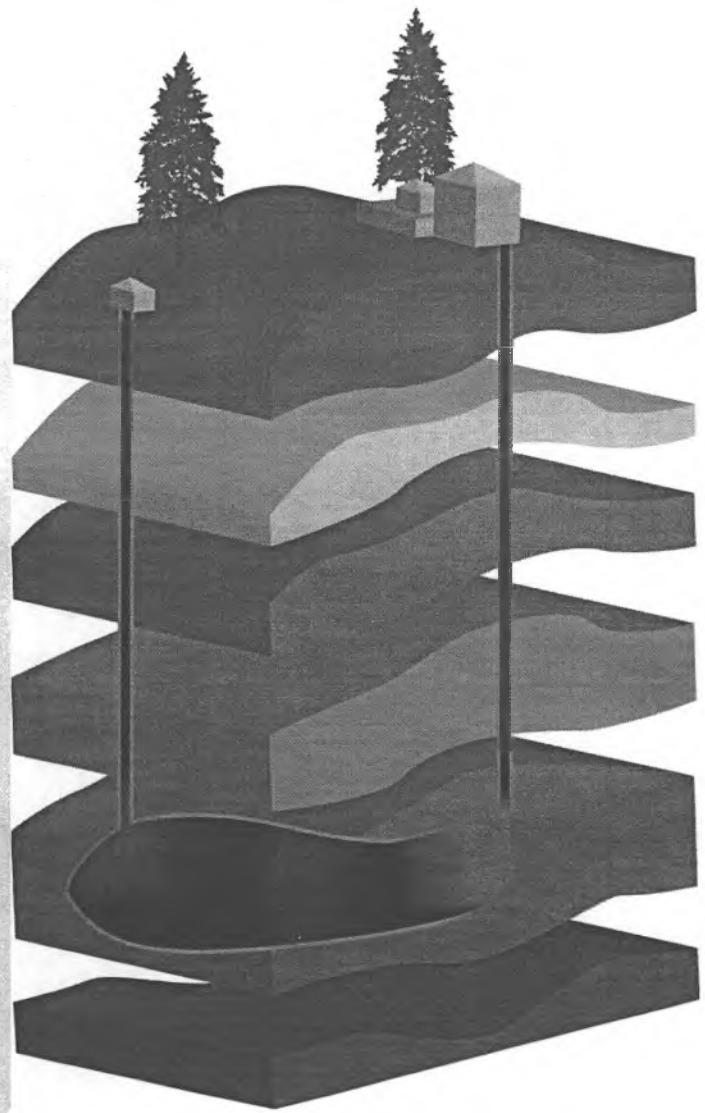
- UCG is a proven technology that converts coal "in situ" to produce syngas
- Process occurs below impermeable rock layers isolated from freshwater aquifers
- Eliminates most environmental and safety risks associated with conventional coal mining, handling, transport and waste
- More than 50 test and commercial projects completed worldwide



Stone HORN RIDGE

UCG Process

- Drill two wells and create a connection between the wells
- At one well, inject an oxidant such as air or oxygen
- Start a combustion reaction
- Heat and pressure gasify coal and drive other reactions
- Second well produces syngas to surface for cleanup and use



Stone HORN RIDGE

Southcentral Alaska Energy

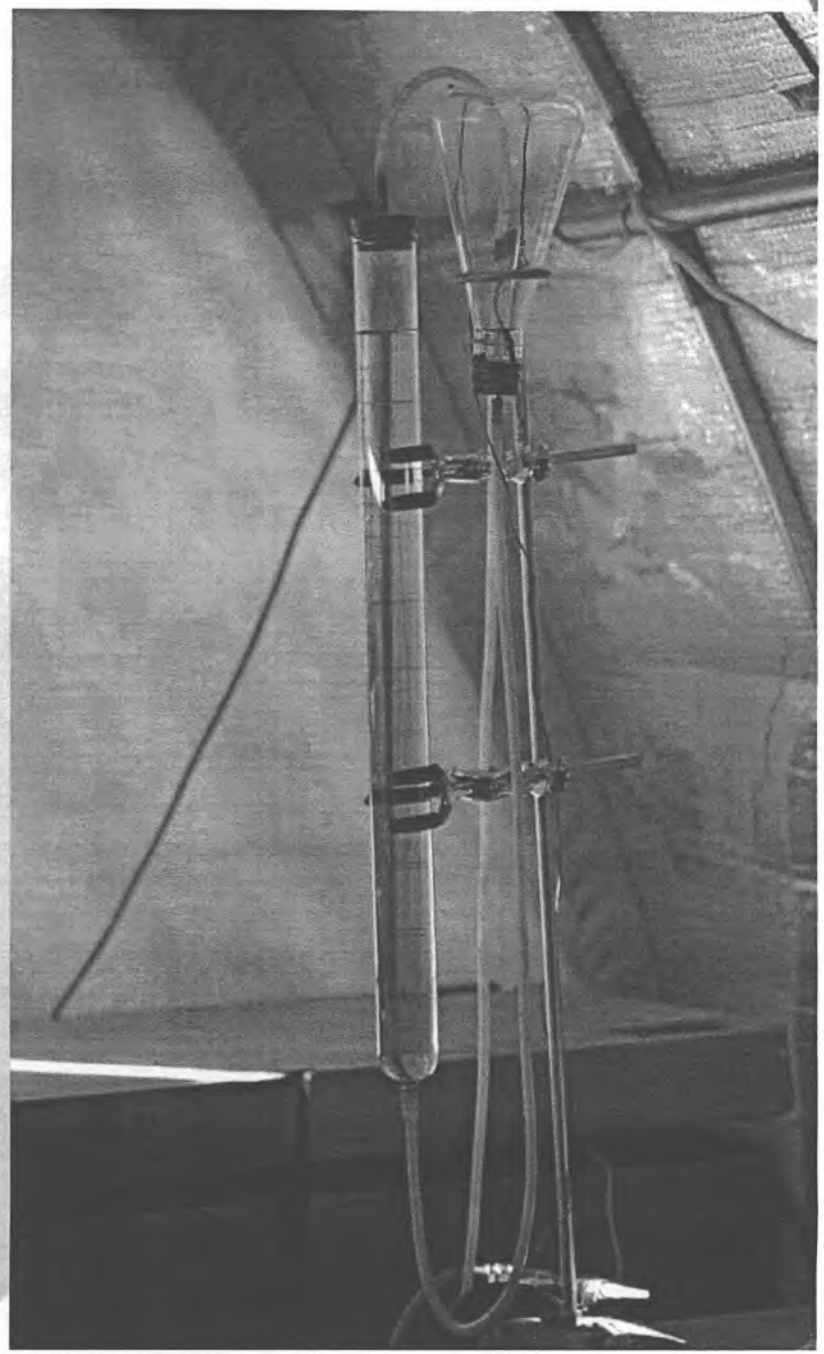
- Produce energy for local use and export
- CIRI core drilling confirmed significant commercial coal reserves
- Favorable geology for UCG development
- Global-scale coal resource
- Tidewater location
- Local energy market need

Stone HORN RIDGE

Uses for Syngas

UCG-produced syngas can be:

- Used to generate electricity
- Upgraded via methanation into synthetic natural gas (methane) for local use and export
- Used as feedstock to produce:
  - clean liquid fuels
  - fertilizer
  - other petrochemical products



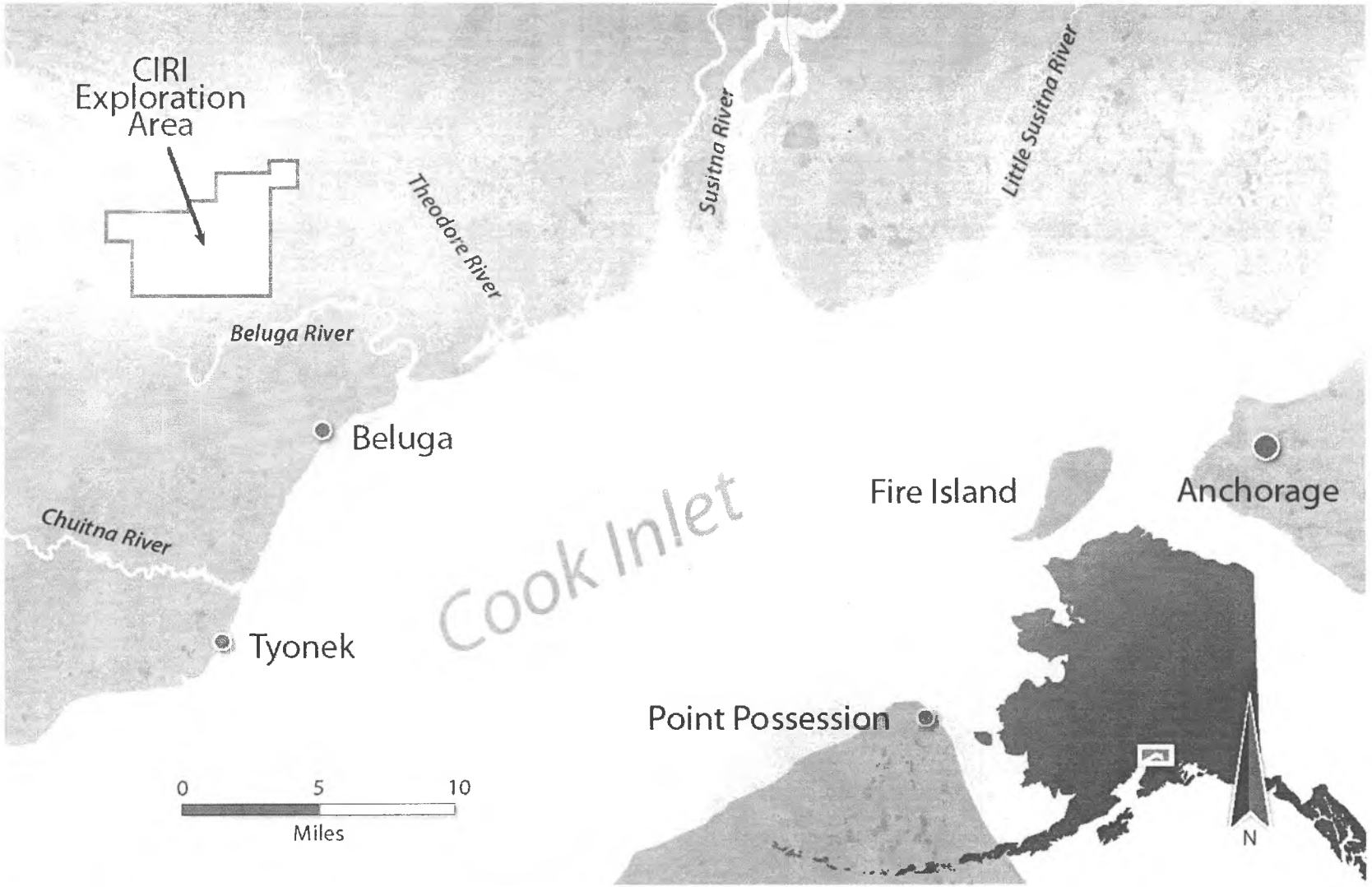
Stone HORN RIDGE

Stone Horn Ridge Project

- Project located on CIRI land
- significant commercial coal reserves confirmed
- Multiple coal seams confirmed more than 650 feet deep, below impermeable rock layers and isolated from freshwater aquifer
- Ongoing study, modeling, testing and monitoring

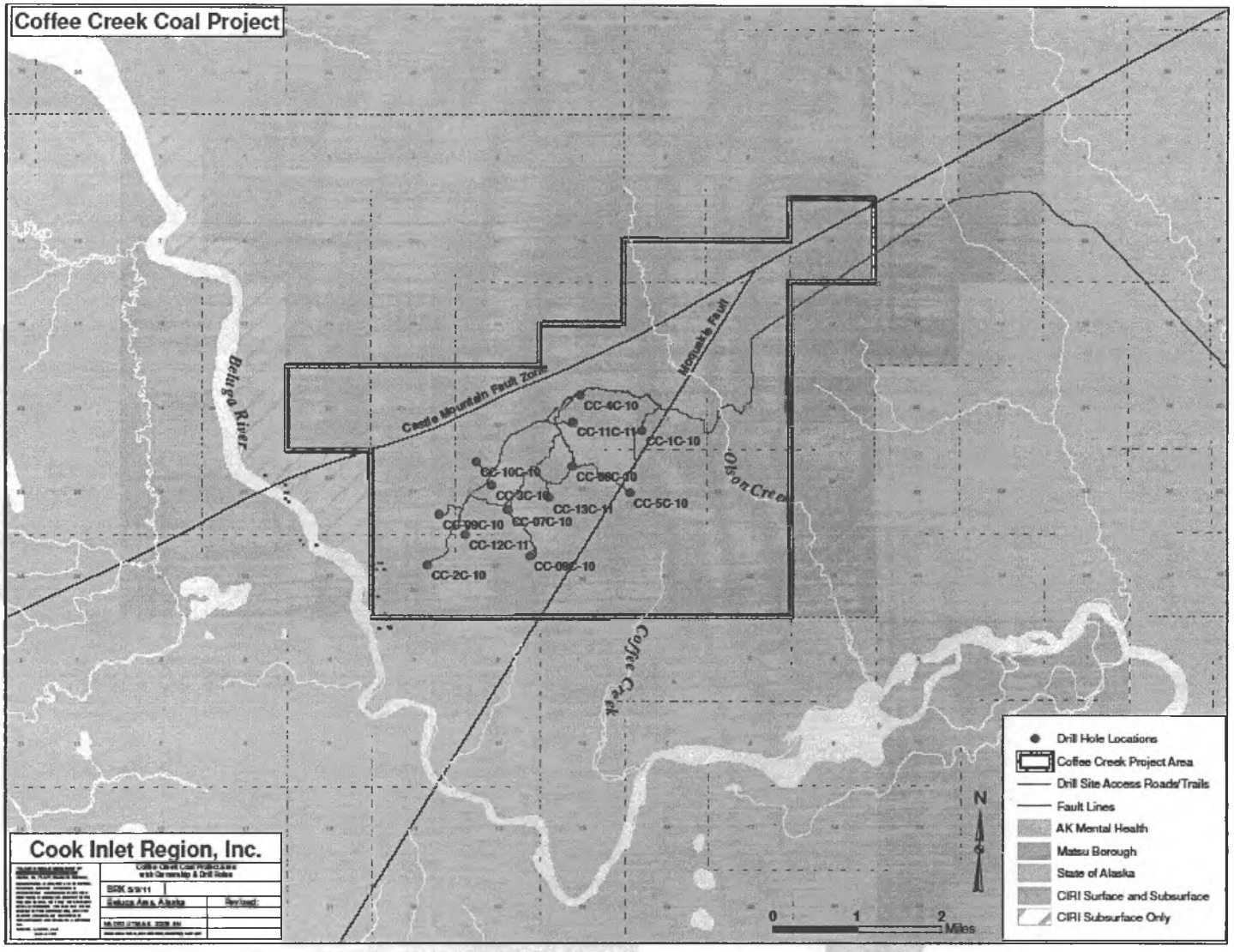
Stone HORN RIDGE

Stone Horn Ridge site



Stone HORN RIDGE

Stone Horn Ridge site



Stone HORN RIDGE

Stone Horn Ridge Project History

- UCG resource and geological evaluation of CIRI lands
- 13-hole core drilling and wire line data program
- Formed Stone Horn Ridge LLC
- Preliminarily validated commercial UCG resource and appropriate geology for development
- Concept engineering and costing of large scale surface facility
- Geological, rock mechanics and hydrogeological modeling

Stone Horn Ridge

Responsible Development

Stone Horn Ridge will only develop a UCG facility after a deliberate, thoughtful process

- Performing all due diligence, environmental risk assessment and necessary permitting
- Committed to developing carbon capture and management program
- Consistently seeking input from community, environmental and technical interests

Stone HORN RIDGE

Project Updates

Next Steps

- Shallow, high-resolution seismic
- Complete model of underground geology
- Initiate permitting process and baseline environmental data collection
- Design site characterization drilling program
- Initiate commercial operations and syngas production as soon as 2015

Stone HORN RIDGE


CIRI.COM

Mary Jackson

From: Paul Thomsen <pthomsen@ormat.com>
Sent: Wednesday, October 19, 2011 5:26 PM
To: Mary Jackson
Cc: Bob Evans; Rahm Orenstein
Subject: RE: Mt Spurr presentation to Senate Resources Committee 20-Oct-11 rev0.pptx

Also presenting tomorrow will be:

Paul Thomsen, Director of Policy and Business Development & Rahm Orenstein, Director of Business Development and project lead for Mt. Spurr.

Best Regards,

Paul

****
Paul A. Thomsen
Ormat Technologies
775.313.6569

From: Paul Thomsen
Sent: Wednesday, October 19, 2011 6:23 PM
To: 'mary_jackson@legis.state.ak.us'
Cc: Bob Evans; Rahm Orenstein
Subject: FW: Mt Spurr presentation to Senate Resources Committee 20-Oct-11 rev0.pptx
Importance: High

Mary,

Attached you will find Ormat's presentation for tomorrow. Thank you for putting up with our tardiness.

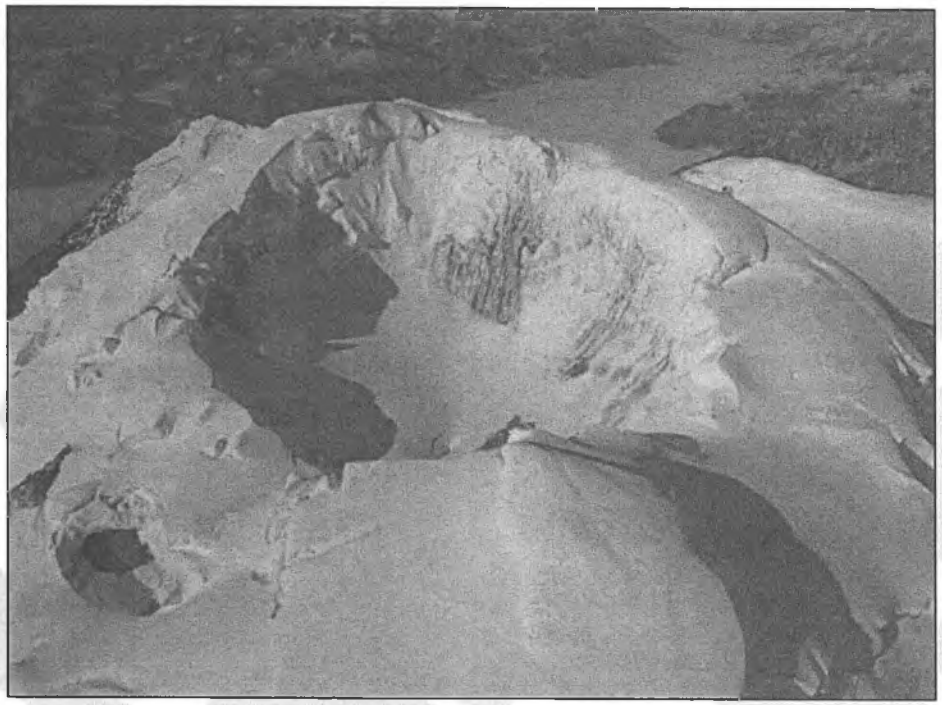
Best Regards,

Paul

****
Paul A. Thomsen
Ormat Technologies
775.313.6569

From: Rahm Orenstein
Sent: Wednesday, October 19, 2011 5:54 PM
To: Paul Thomsen
Subject: Mt Spurr presentation to Senate Resources Committee 20-Oct-11 rev0.pptx
Importance: High

The Mount Spurr Geothermal Project



Senate Resources Committee Meeting
October 20, 2011
Kenai, AK

Paul Thomsen (pthomsen@ormat.com)
Ormat Technologies, Inc.
www.ormat.com

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GREEN ENERGY you can rely on

Disclaimer

Statements in this presentation including information provided in slides 14, 15, 19 and 20 as well as oral statements made by the officers or directors of Ormat Technologies, Inc., its advisors, affiliates or subsidiaries often will contain "forward-looking statements." Whenever you read or hear a statement that is not simply a statement of historical fact (such as when we describe what we "believe", "expect" or "anticipate" will occur, and other similar statements), you must remember that our expectations may not be correct, even though we believe they are reasonable. You should read and listen to these statements completely and with the understanding that actual future results may be materially different from what we expect, as a result of certain risks and uncertainties. For a complete discussion of the risks and uncertainties relating to the forward-looking statements in this presentation, please see "Risk Factors" as described in the Annual Report on Form 10-K report filed with the Securities and Exchange Commission on February 28, 2011.

We will not update these forward-looking statements, even though our situation will change in the future.

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Outline

- Introduction to:
  - Ormat Technology, Inc
  - Geothermal power
  - The Mt. Spurr geothermal project
- Project status and timeline
- Costs, matching funds and overall funding plan
- Local support
- Amount and cost of power supplied to Railbelt
- Economic and environmental impact

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Ormat Brings Credibility

- A leader in geothermal power
- Owns and operates 553* MW worldwide
- Supplied approximately 1,370 MW to 24 countries
- Vertically integrated:
  - Explores, develops, engineers, manufactures, constructs, operates
- Employs approx. 500 people in the U.S. ; >1,100 worldwide
- Publicly traded on the NYSE ("ORA")

* Including the 50 MW of North Brawley in California, which operates at approx. 30 MW

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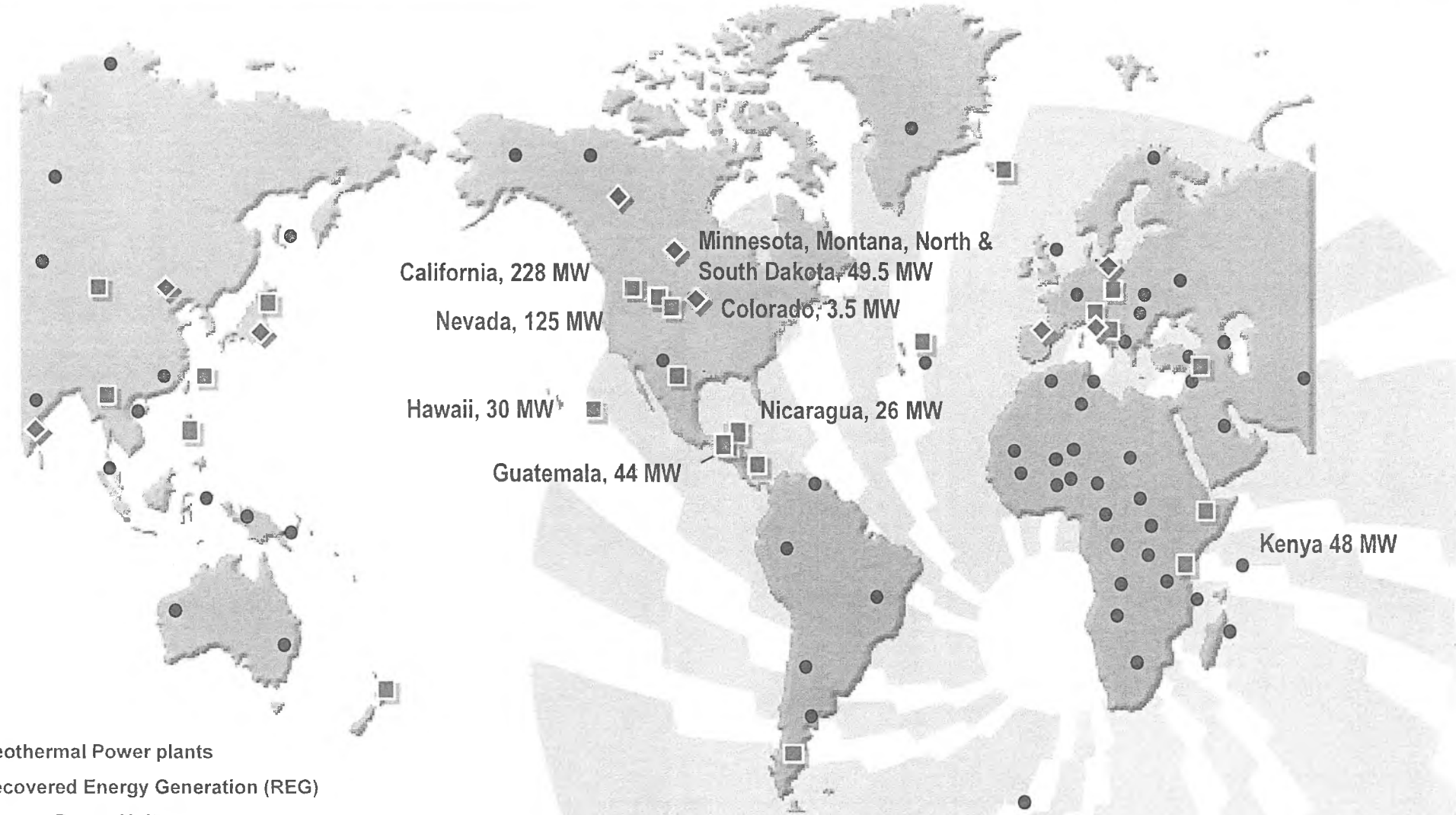
Global Presence
Meeting the Needs of Customers in 71 Countries



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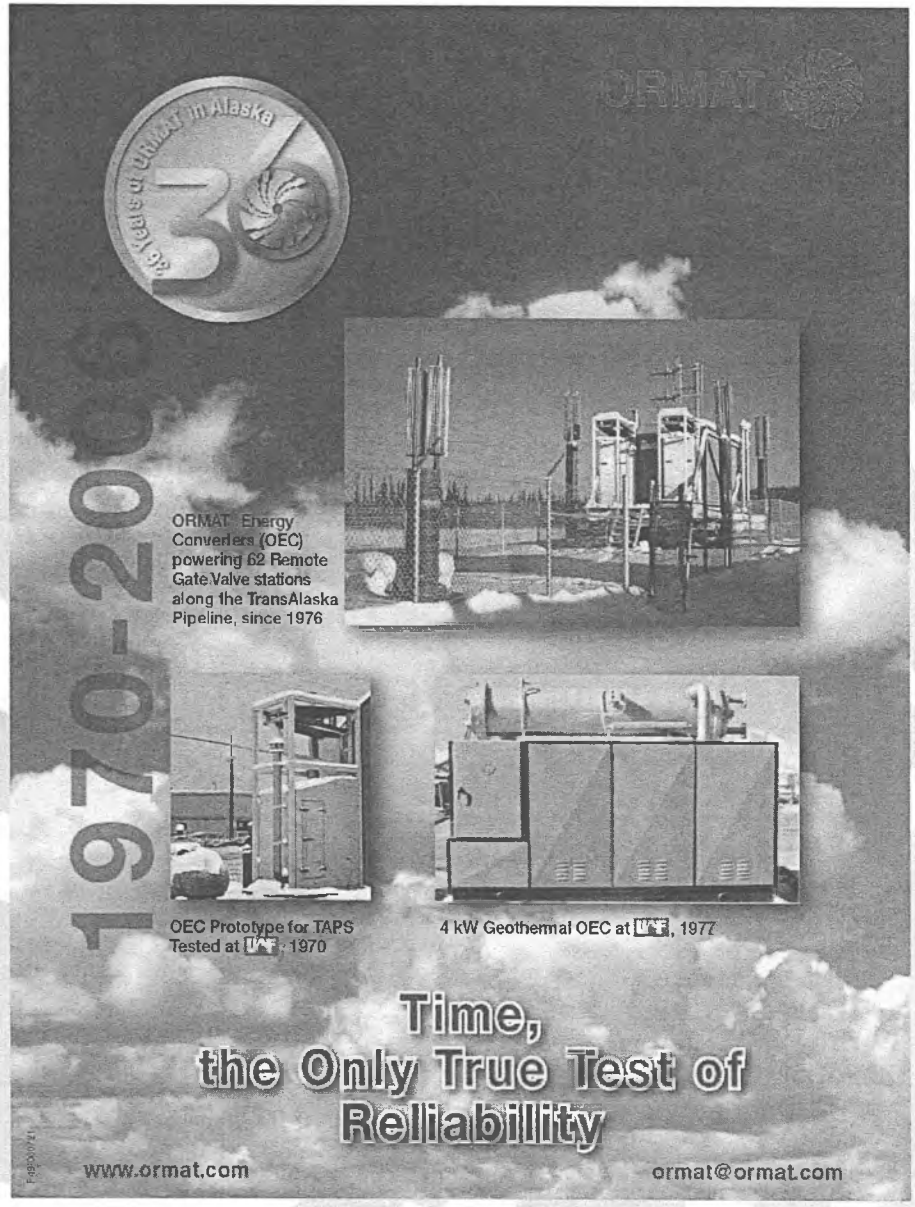
Ormat's Commitment to Alaska

- >100 Remote Power Units
  - Serving remote gate valves
  - TransAlaska Pipeline
  - Since 1975
- First geothermal unit
  - Tested in 1979
  - University of Alaska Fairbanks
  - At Manley Hot Springs
- Approx. $5 million of Ormat equity invested in Mt. Spurr to date



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Geothermal – Key Attributes

- Utilities' renewable energy of choice:
  - Base-load generation
  - Cost-competitive
  - Highly reliable; >95% availability
  - Proven technology: ~11,000 MW deployed worldwide
- No fuel cost risk; Fixed long-term pricing
- Sustainable & environmentally friendly
  - Closed loop system with near zero emissions
  - No water consumption [Mt. Spurr plant will be air-cooled]
  - Minimal surface and visual impact
- Creates long-term, high-quality jobs

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Geothermal – Development Inhibitors

- Resources are scarce
- High upfront CAPEX and risk required in order to discover and confirm the resource

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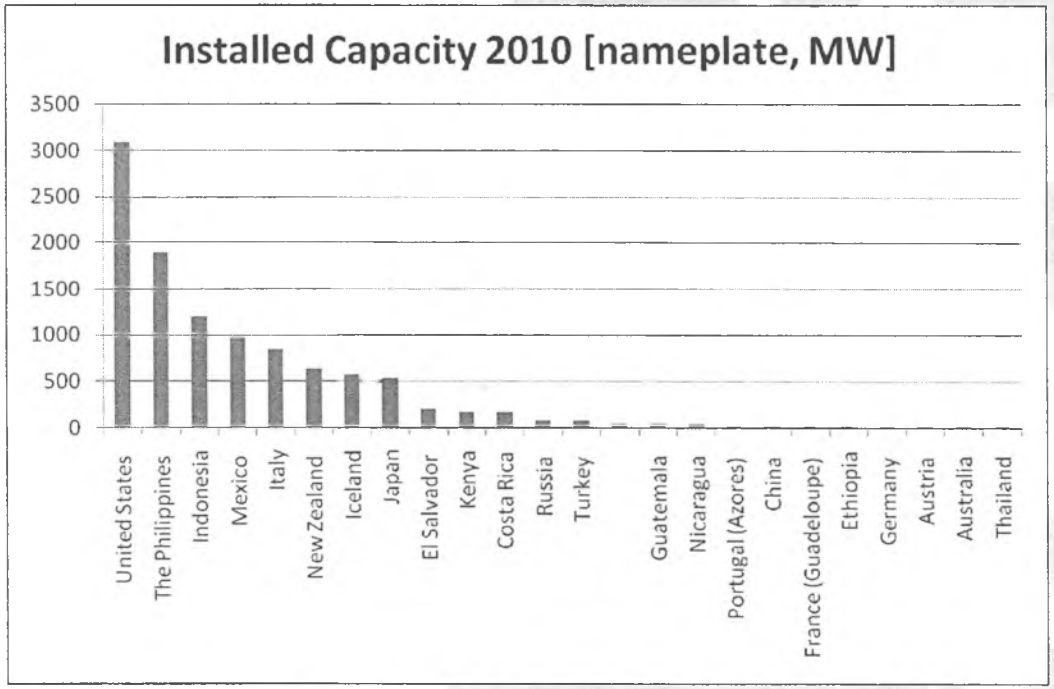
Worldwide Geothermal Deployment

- Approximately 11,000 MW deployed world-wide
- 24 nations have utility-scale geothermal generation
  - US is the world leader, with plants in CA, NV, HI, UT, ID
- Supportive policies have been key to success in all nations



Source: International Geothermal Association

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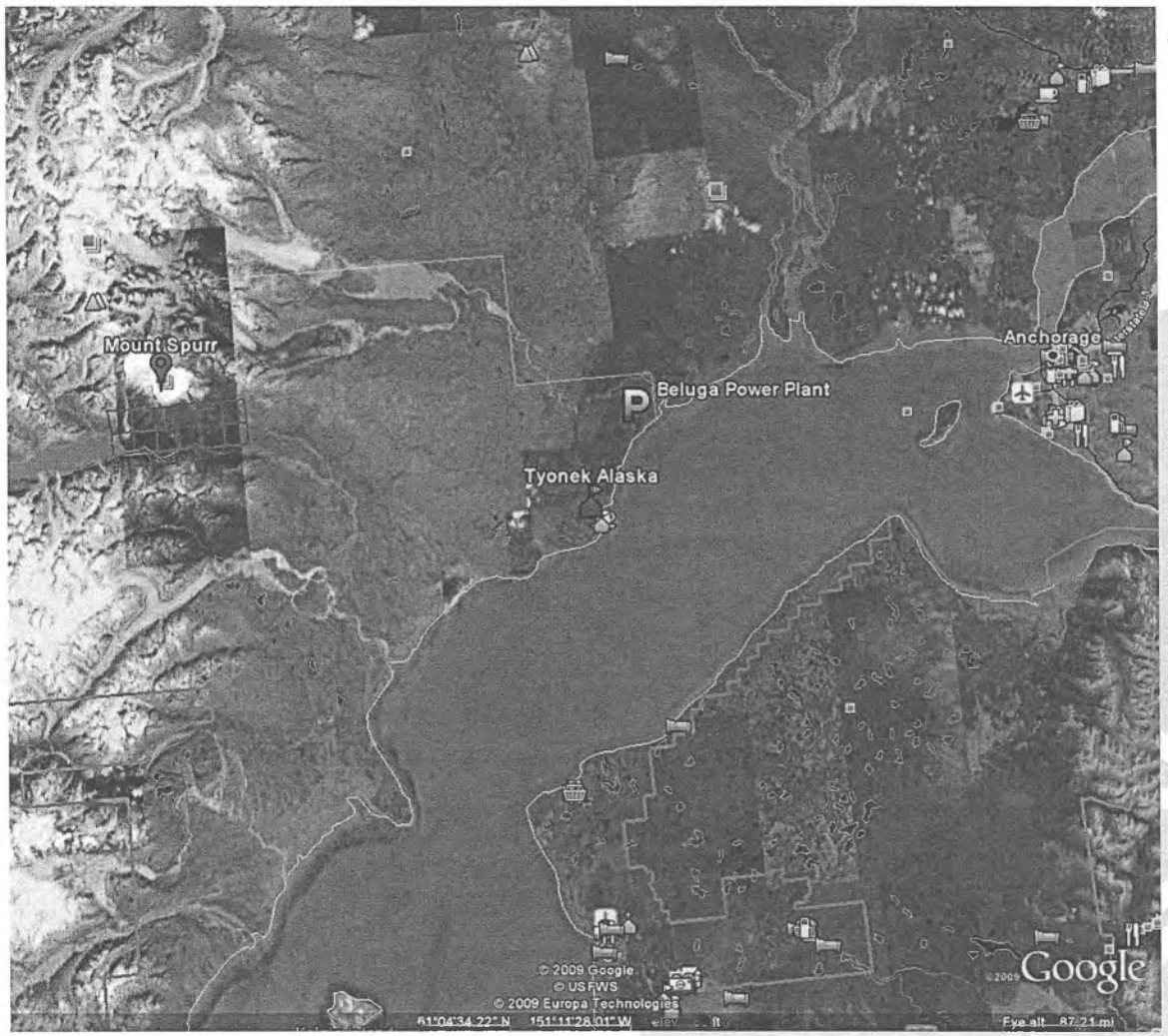
Project Location



West Cook Inlet

~75 miles west of Anchorage

Source: GoogleEarth

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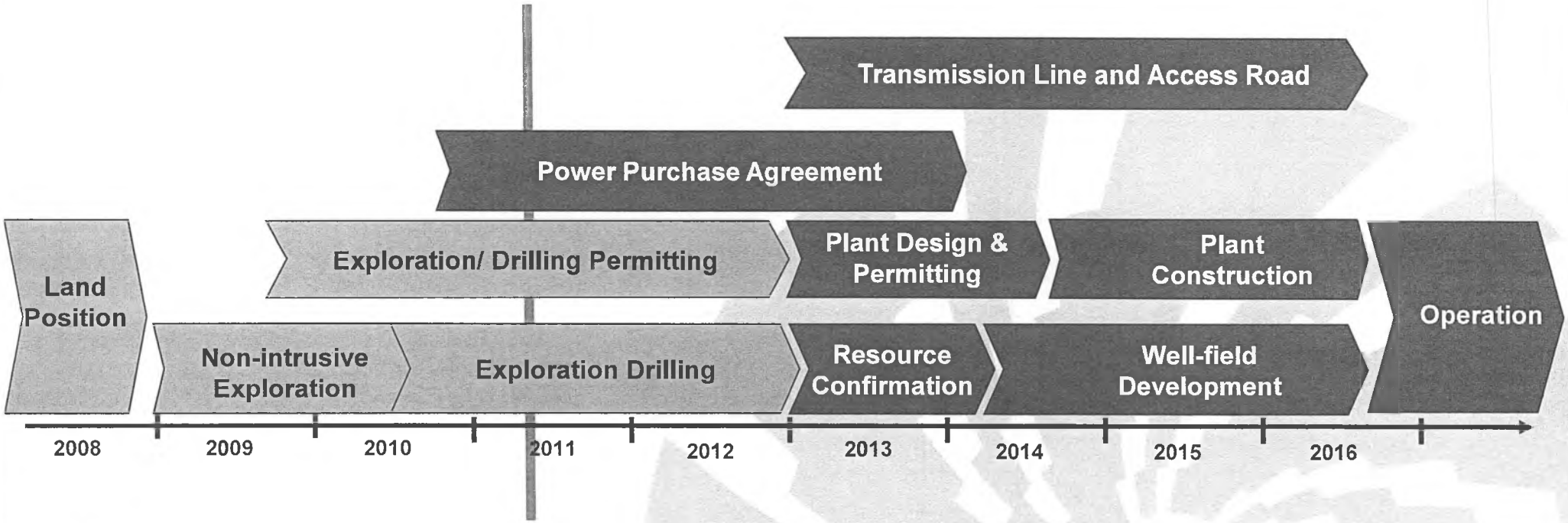
Mt. Spurr – Status & Estimated Timeline



- 36,000 acres of state lands leased from DNR in October 2008
- Non-intrusive exploration conducted summer of 2009 and of 2010
- Two exploration core holes (~1,000 ft) drilled in September 2010
- One deep exploration core hole (~4,000 ft) drilled during summer of 2011

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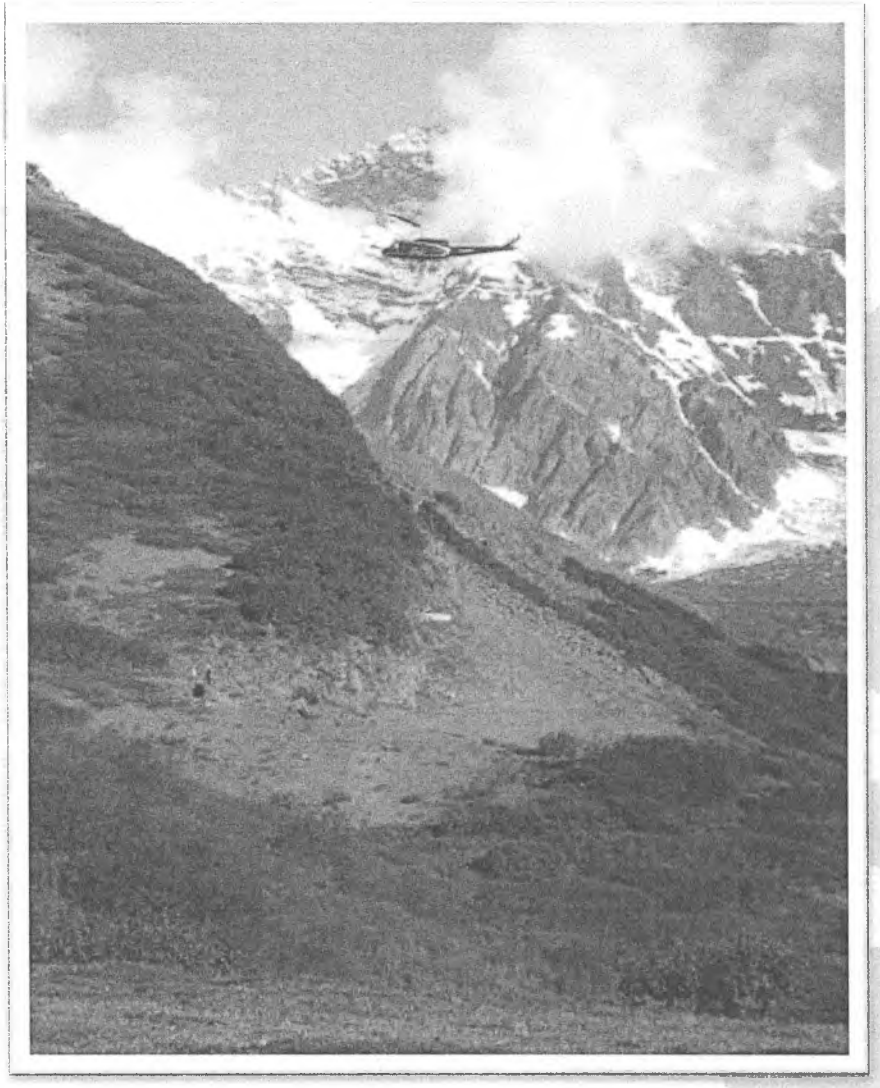
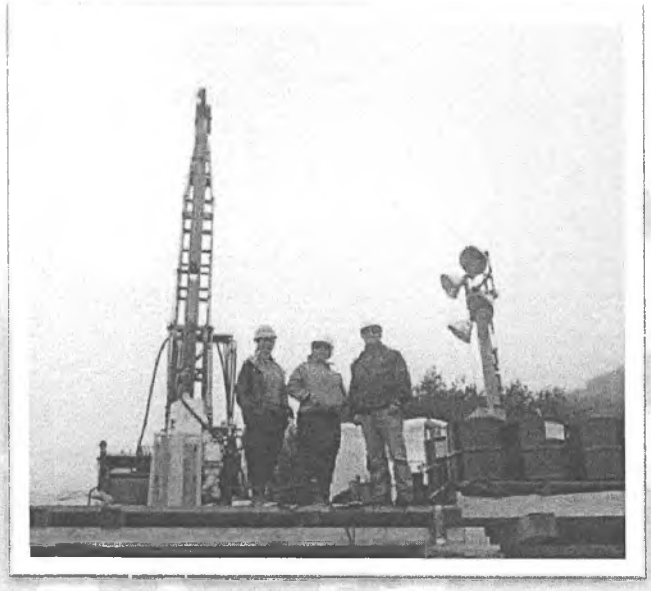
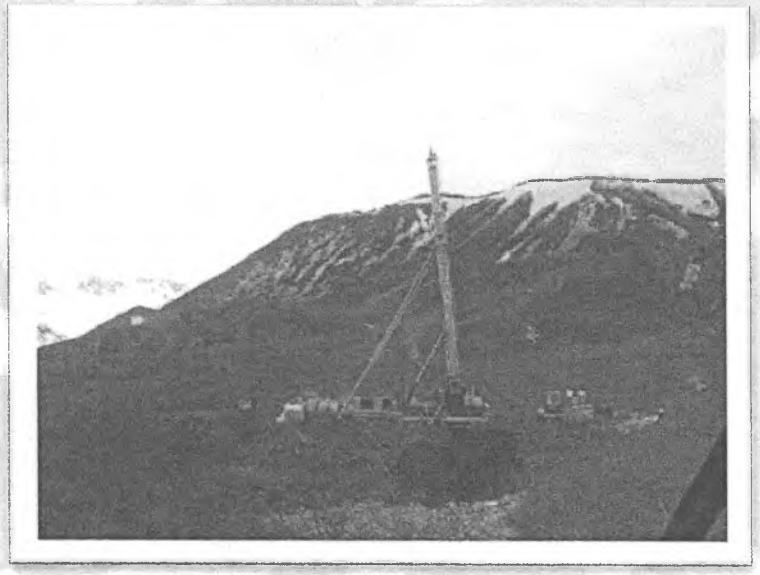
Core Drilling in 2010 and 2011







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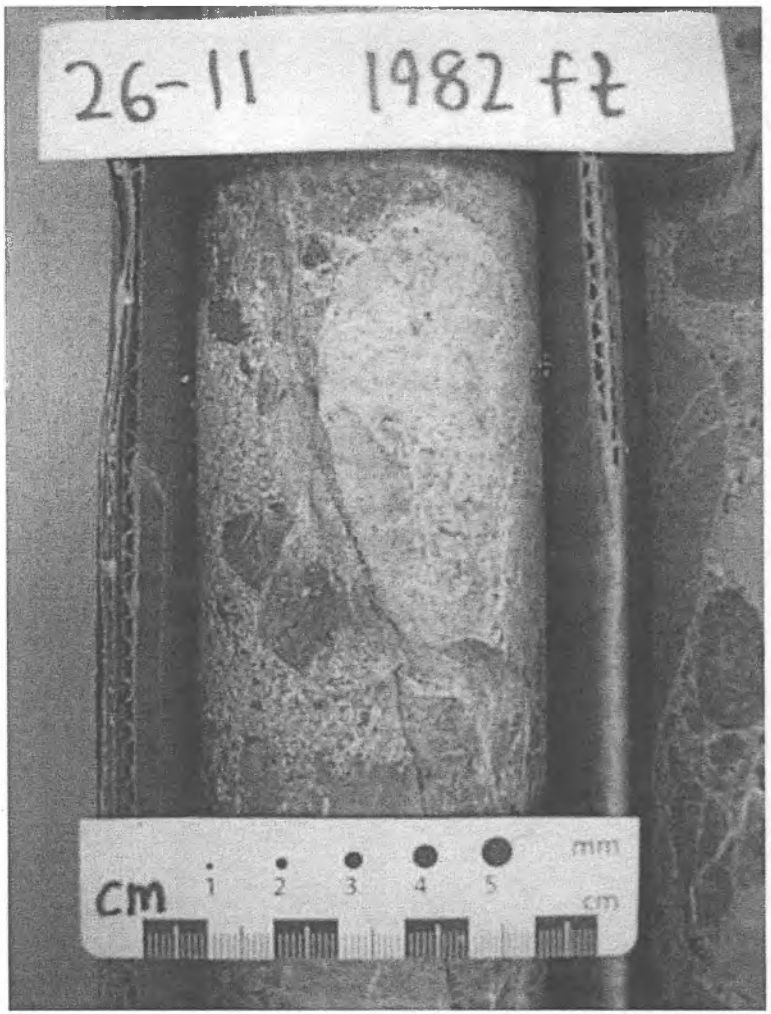
Core Collected – Donated to DNR/DGGS



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Results to Date

- Results from the 2009-2010 exploration and drilling work were encouraging as to the potential existence of a geothermal resource at commercial depths

- Results from the 2011 deep core hole were less encouraging, as the rock type encountered was not a good reservoir rock and the temperatures measured were colder than expected

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Status and Next Steps

- Ormat is currently analyzing the results and updating the 3-D geological model
- All data is being shared with the State (DNR/DGGS, AOGCC) and Ormat is in discussion with these agencies to get thoughts and ideas
- Next step is to update the exploration plan, and may include recommendation to rotary drill a deeper exploration well

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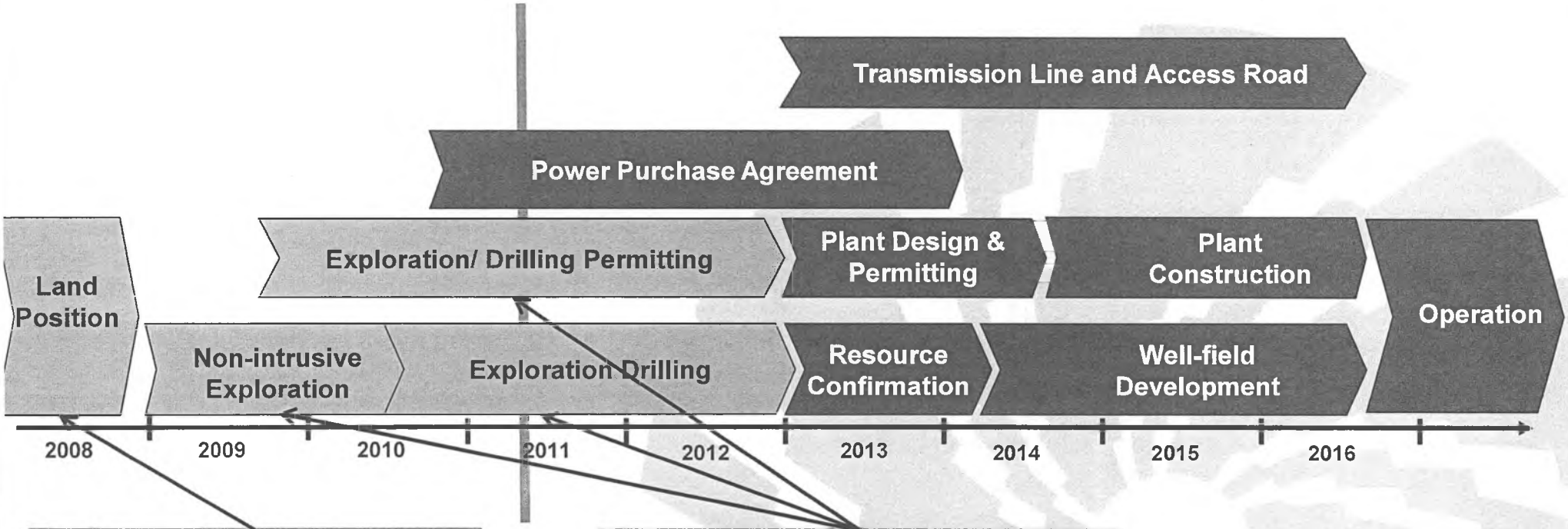
Sources of Funding So Far



Ormat

~$3.5 million bonus payment;
~$100,000 annual rent

Ormat and AEA (round III)

Ormat: ~ $3 million*
AEA: ~$2 million + 17 mil.

* $2.1 million as matching funds per the grant agreement and the rest outside it

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Energy to the Railbelt

- Capacity estimated at 50~100 MW net, average. Target is:
  - ~50 MW in 2016
  - Expand to ~100 MW in 2019
- Near-term solution, bridging the gap to longer-term mega-solutions, e.g. Suisitna/Watana hydro and/or gas pipeline
- At 95% availability: 416~832 GWh/year

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Cost of Power to Railbelt Utilities

- Estimated at ~12 c/kWh
- Fixed price, not coupled with fossil fuels
- Geothermal is a baseload 24/7 resource, therefore utilities will not incur any integration costs
- Price is higher than current avoided costs (5-10 c/kWh), however:
  - Is comparable to other alternatives, e.g. Suisitna/Watana
  - Railbelt utilities' avoided costs are likely to go up with the continued depletion of Cook Inlet gas reserves

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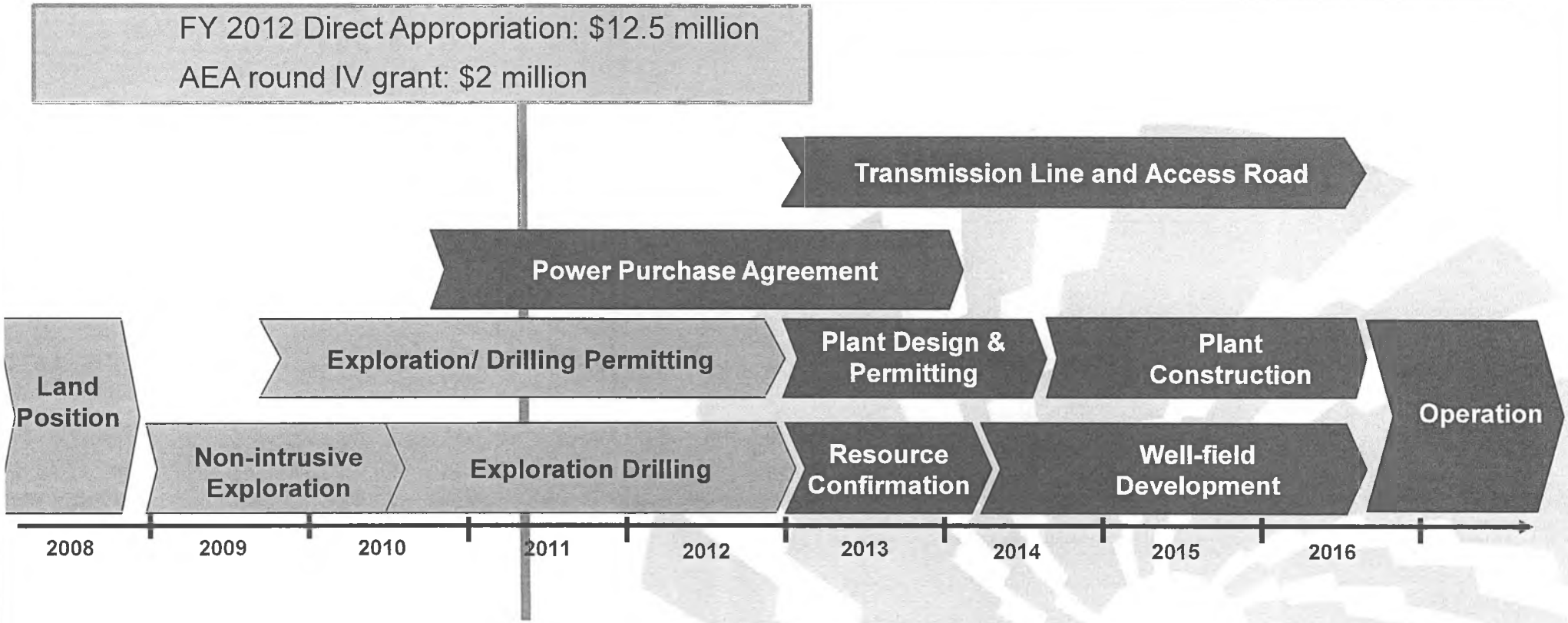
Additional Appropriated Funds



- We will be working with AEA and DNR on updating the scope of work once a new recommended plan of exploration is ready

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Local Support

- From nearest communities:
  - Tyonek:
    - Cooperative agreement with Tyonek Native Corporation (TNC) in place
    - TNC provided Ormat with letters of recommendation
  - Kenai Peninsula Borough
    - Mayor provided Ormat with letters of recommendation
  - Anchorage
    - Mayor provided Ormat with letters of recommendation

- Environmental and renewable energy communities:
  - Cook Inletkeeper
  - Renewable Energy Alaska Project (REAP)

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Regional Priority and AEA Vetting

- Project supported by all 6 Railbelt utilities, separately and via ARCTEC, as a potentially viable near term solution
- Identified by the AEA-sponsored 2010 Railbelt Integrated Resource Plan as a beneficial component in the Railbelt's generation portfolio
- Selected by AEA for round III and IV of the Renewable Energy Fund Grant (REFG)

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Economic Impact

- Alaska's 100 MW of geothermal power could:
  - Provide 50 long term high paying jobs
  - Provide more than 100 construction jobs
  - Impact >200 local vendors
  - Fuel local economy with >$850 million over 30 years

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Environmental Impact

- Alaska's 100 MW of geothermal power could annually:
  - Save ~6,000,000 MMBTU of depleting Cook Inlet natural gas
  - That's roughly the equivalent of Anchorage's entire residential heating consumption
  - Avoid emission of ~320,000 tons of CO_2*

*Calculated for natural gas, assuming 53 Kg of CO_2 per MMBtu (DOE/EIA http://www.eia.doe.gov/oiaf/1605/coefficients.html)

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Summary – Mt Spurr Benefits

- Clean, reliable, field-proven, base-load power to the Railbelt
- Significant relief in Cook Inlet natural gas consumption
- Significant contributor towards 50% renewables by 2025
- Provides long-term price stability
- Near-term solution, bridging the gap to longer-term mega-solutions, e.g. Suisitna hydro and/or gas pipeline
- Provides high quality, long term green jobs

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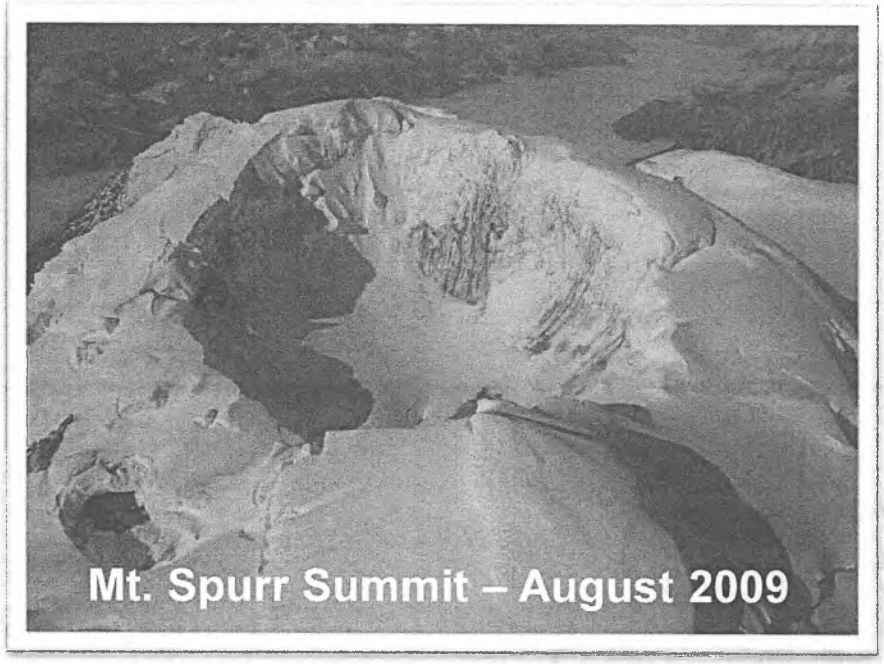
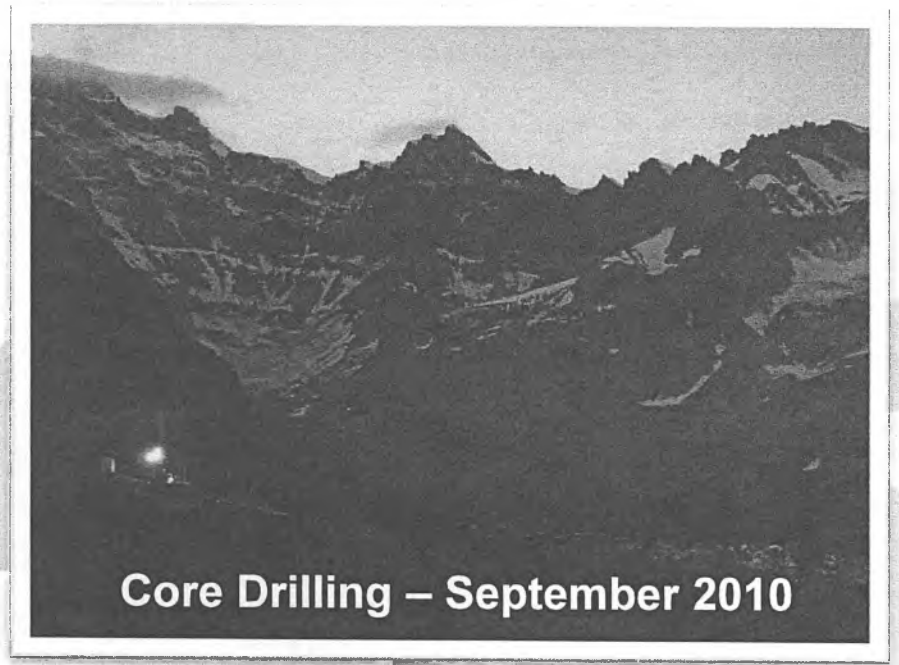
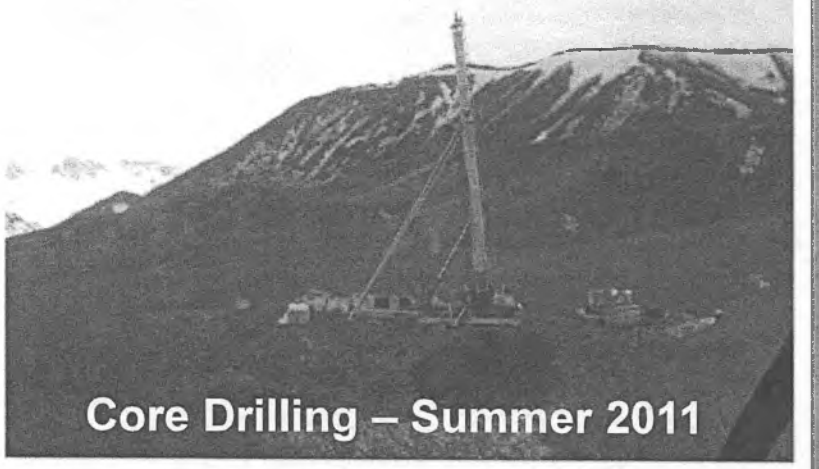
Thank You!


Mt. Spurr Summit – August 2009


Core Drilling – September 2010


Core Drilling – Summer 2011

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BUCCANEER ENERGY

Alaska Senate Resources Committee

Jim Watt

OPERATING PLATFORM COOK INLET, ALASKA

BUCCANEER ENERGY

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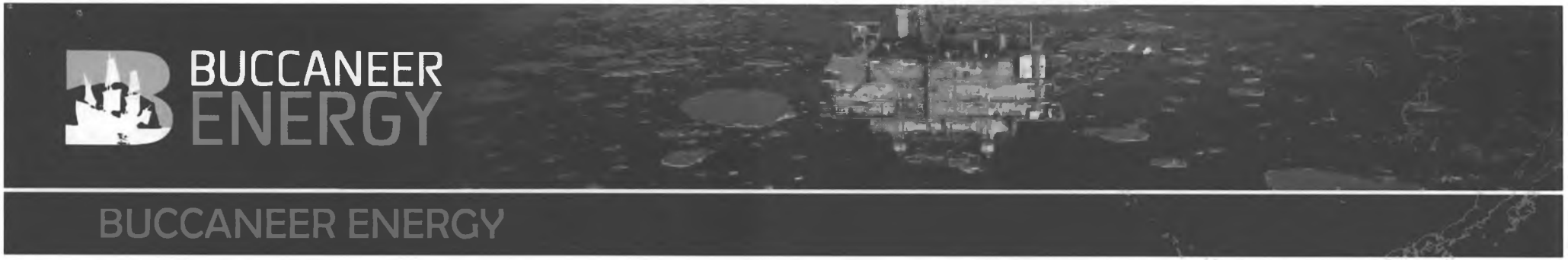
- **Securities Disclaimer**
  This presentation is for informational purposes only and does not constitute an offer or sell, or solicitation to purchase, any securities. Such Offer can be made only through proper subscription documentation and only to investors meeting strict suitability requirements. Any failure to comply with these restrictions may constitute a violation of applicable securities laws.

- **Forward Looking Statements**
  Various statements in this presentation constitute statements relating to intentions, future acts and events. Such statements are generally classified as "forward looking statements" and involve known and unknown risks, uncertainties and other important factors that could cause those future acts, events and circumstances to differ materially from what is presented or implicitly portrayed herein. The company gives no assurances that the anticipated results, performance or achievements expressed or implied in these forward looking statements will be achieved.

- **Reserves and Values**
  All reserves and valuations are presented for informational purposes and are not guaranteed or warranted by Buccaneer in any way. Anyone interested in a purchase or transaction involving one of the subject properties is encouraged to obtain independent professional verification and base their purchase decisions on their own analysis and their 3rd party input.

- **Competent Persons Statement**
  Information pertaining to Lee County project contained in this report were compiled by Gary Rinehart, BS in Geology from University of Oklahoma and who has had more than 35 years experience in petroleum geology. Mr Rinehart has consented to the inclusion in this report of the technical matters and information herein in the form and context in which it appears.
  Information contained in this report pertaining to the Alaskan projects was reviewed by Dr. Vijay Bangia, PhD in Petroleum Engineering from the University of Tulsa, who has over 30 years experience including employment by Shell Oil Company, Union Texas Petroleum, Burlington Resources and Renaissance Alaska. Dr. Bangia has approved the inclusion in this report of the technical matters and information herein in the form and context in which it appears.



Buccaneer was founded on two core principles:

- Minimize risk
  - Enlisting local talent
  - Acquiring majority positions in projects
  - Managing all operations
  - No "Big E" – stacked pay
- Maximize opportunity
  - Fast track development opportunities
  - Special incentives
    - ✓ Favorable regulatory environment
    - ✓ Strong commodity market

BUCCANEER ENERGY

BUCCANEER - OPERATING OVERVIEW & CORE FOCUS

Alaska
Unique Environment & Opportunity

- Alaska is energy-friendly and in great need of a supply solution
- Cook Inlet: One of the last under-explored frontiers in US
- Unique local fiscal regime with tremendous economic incentive for exploration

Alaska - Onshore

- Kenai Loop development -- Establish production & Cash flow (December 2011); 3P reserves: 51.6BCF
- Firm off-take agreement with Enstar for 31BCF (as of April 2012)
- West Nikolai Creek and West Eagle prospects onshore gas weighted prospects

Alaska - Offshore

- Leases in Cook Inlet Alaska State waters
- Southern Cross 2P Reserves: 12.7 MMBOE (78% oil) + P50 Resource: 14.7 MMBOE (75% oil)
- North West Cook Inlet P50 resource: 49.4 MMBOE

Endeavour
Jack-Up Rig

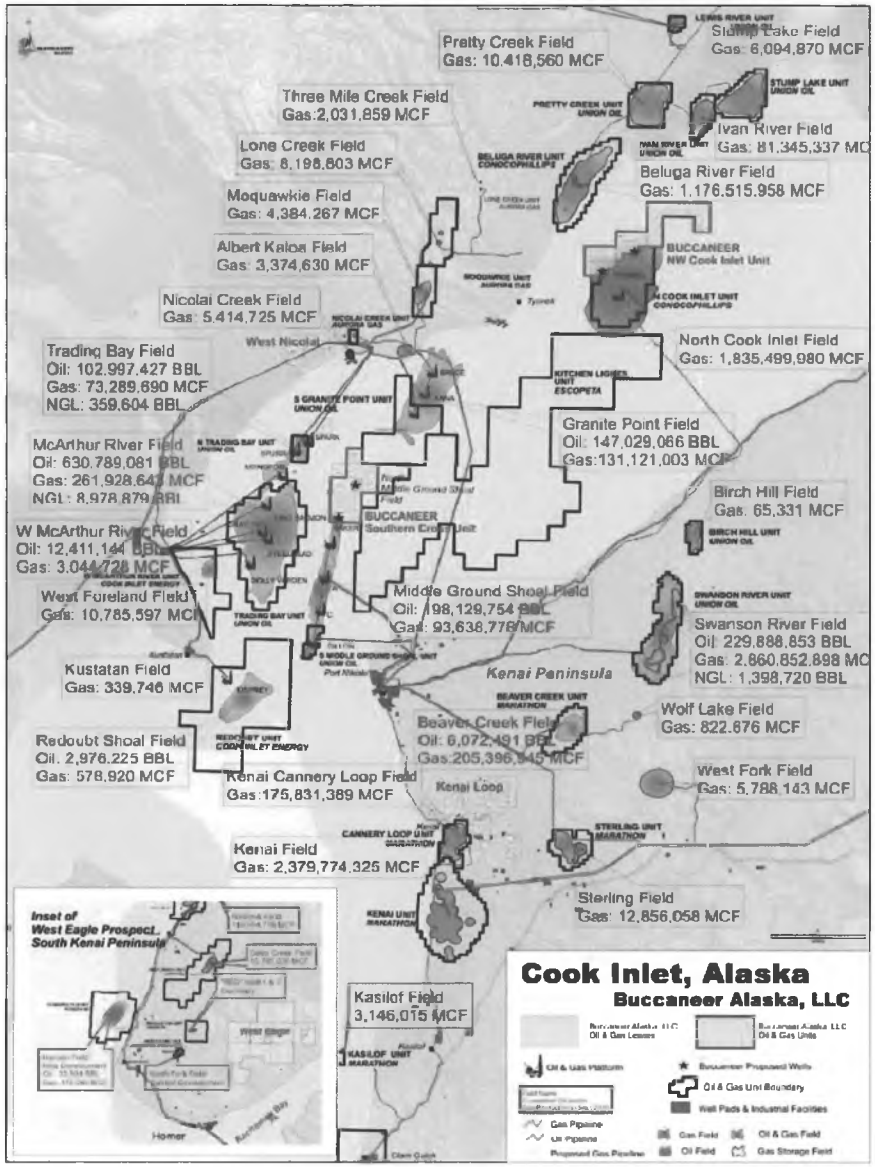
- Strategic asset for Cook Inlet that unlocks Alaskan offshore value by giving ability to access recently unreachable assets
- Agreements executed / finalizing acquisition (Projected 11/2011)

U.S. - Lower 48

- GoM shallow-water gas: Pompano, Swordfish & Big Fish Package -- high potential reserves
- Lee County, Central TX – onshore oil
- Potential near term cash flow

BUCCANEER ENERGY

WHY ALASKA & THE COOK INLET?



- Majors out / Independents In
  - Buccaneer (April 2010)
  - Apache (June 2011)
  - Hilcorp (July 2011)
- Local gas shortage
  - Brownout warnings
  - Plans to import LNG
- Under-explored basin (USGS study)
  - Estimated 600 MMBO & 19 TCF gas
  - Last major gas discovery: 1979
- Cash incentives (ACES)
  - 45% - 65% tax rebates
  - Special Jack-Up Rig rebates
- Premium Natural Gas Prices
  - 50-100% premium to Lower 48
  - Negotiated directly with end users

BUCCANEER ENERGY

LOW HANGING FRUIT

The Cook Inlet has a long and successful history of exploration and production, but much remains untapped

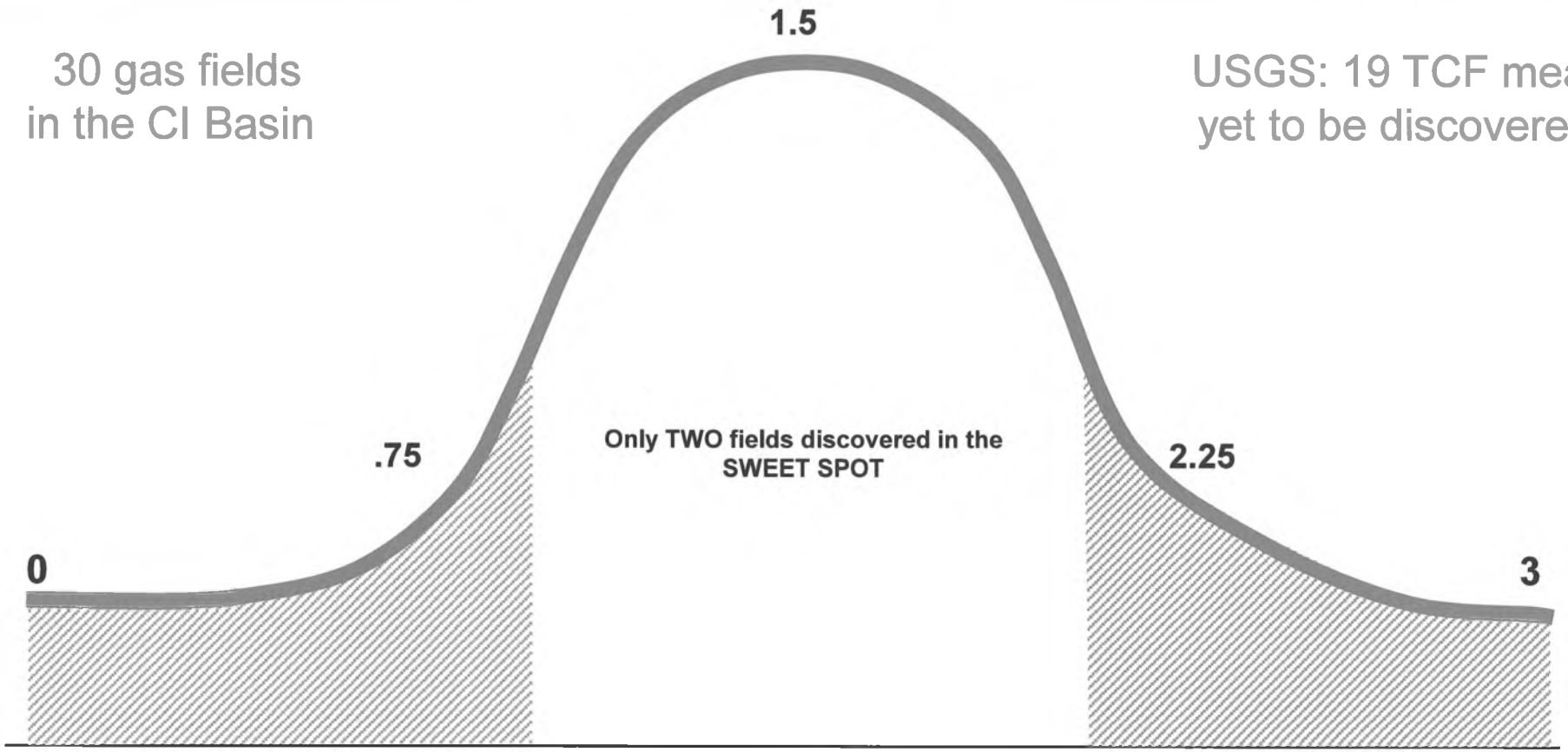
- First gas discovery in Cook Inlet Basin: 1958 – since then, 7.8 TCF of gas produced
- Gas was first encountered in the Cook Inlet basin during exploration for oil in 1950s, then considered stranded
- 1995 USGS study: estimate mean of 2.14 TCF of gas
- 2011 USGS study: estimate 19 TCF of gas and 600 MMBO – includes undiscovered, technically recoverable gas resources, and includes both unconventional and conventional resources
- 1994 was the last time a Jack-Up Rig was in the Cook Inlet
- Last major gas discovery date in Cook Inlet basin, prior to Buccaneer Kenai Loop #1, was over 10 years ago

BUCCANEER ENERGY

THE SWEET SPOT – COOK INLET GAS FIELDS

30 gas fields in the CI Basin

USGS: 19 TCF mean yet to be discovered



Cumulative Production - TCF

BUCCANEER ENERGY

BUCCANEER'S PROVEN SUCCESS – KENAI LOOP / ONSHORE

HIGHLIGHTS – KENAI LOOP #1 WELL

- Leased, permitted and successfully drilled within 9 months
- 100% working interest / 82.0% Net Royalty Interest (NRI); 9,308 Acres
- Adjacent to Marathon's Cannery Loop Field - 175 BCF Produced (22 MMBOE)
- Pipeline construction begins October 2011; production to commence December 2011

GAS SALES CONTRACT APPROVED – ENSTAR

- Firm price and minimum volume of 5.0 MMCFD commences April 2012
- Annual net weighted average price of $6.24 / MCF
- Deliverability of up to 15.0 MMCFD

KENAI LOOP – DRILLING & DEVELOPMENT COSTS		
	GROSS – US$	NET of ACES Rebate
Total Cost to Production KL # 1	$12.4 MM	$5.0 MM
Additional Wells Cost to Production	$10.5 MM	$4.2 MM

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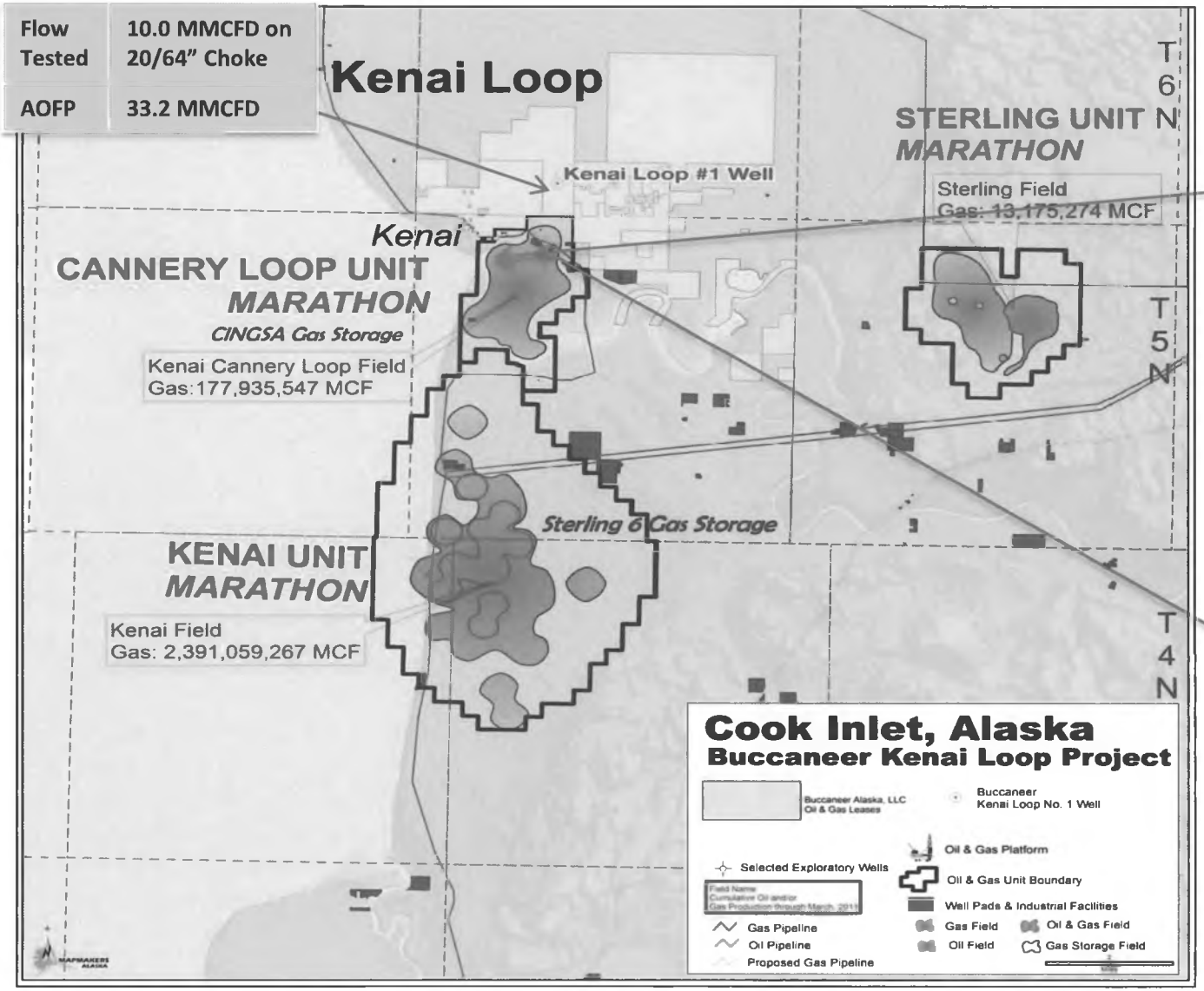
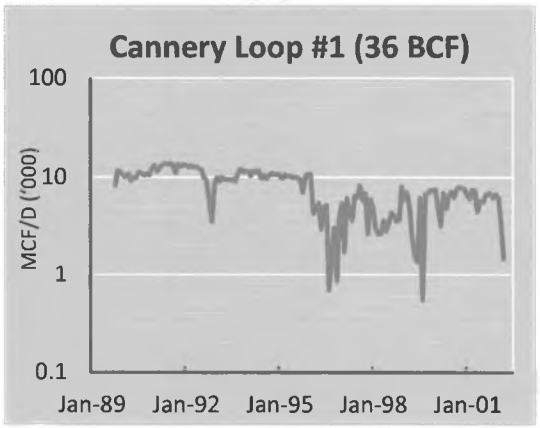
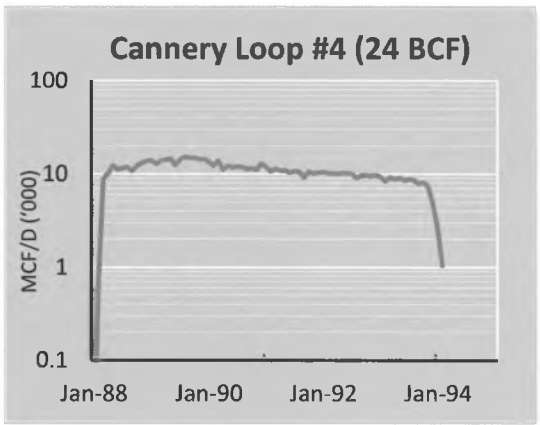
PROVEN SUCCESS – KENAI LOOP / ONSHORE

Flow Tested	10.0 MMCFD on 20/64" Choke
AOFP	33.2 MMCFD







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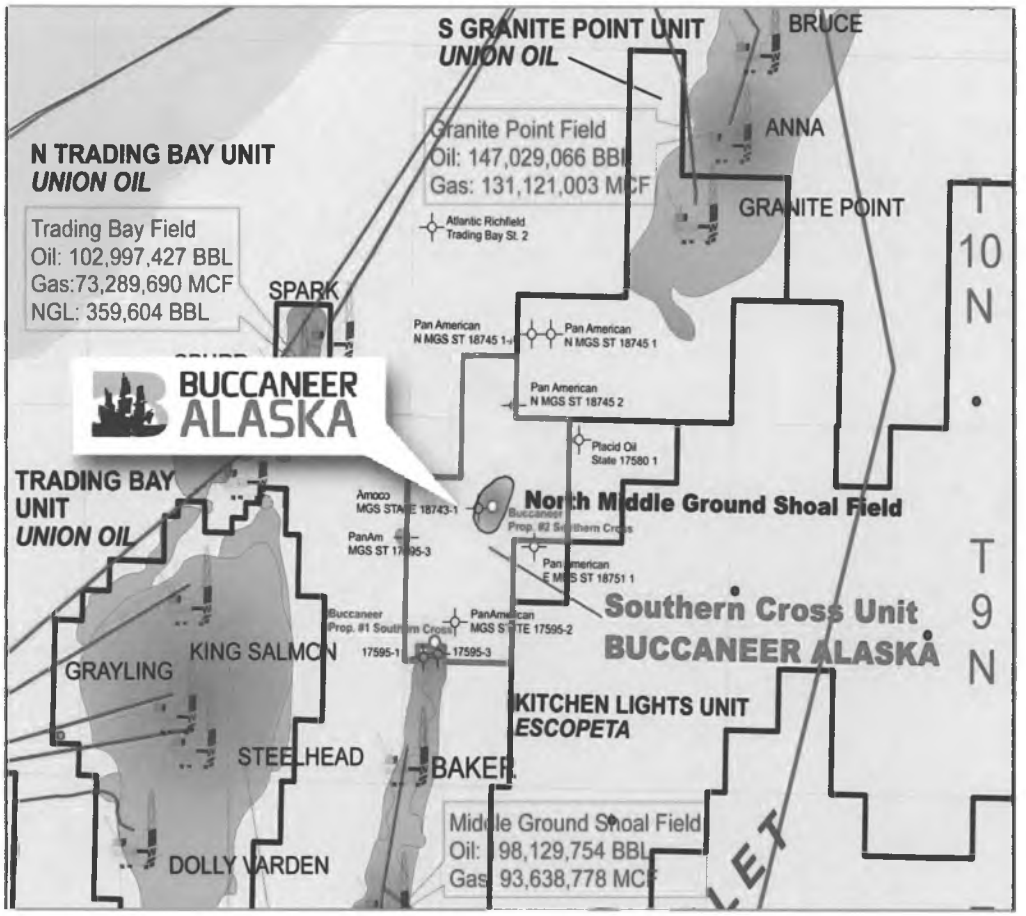
SOUTHERN CROSS / OFFSHORE

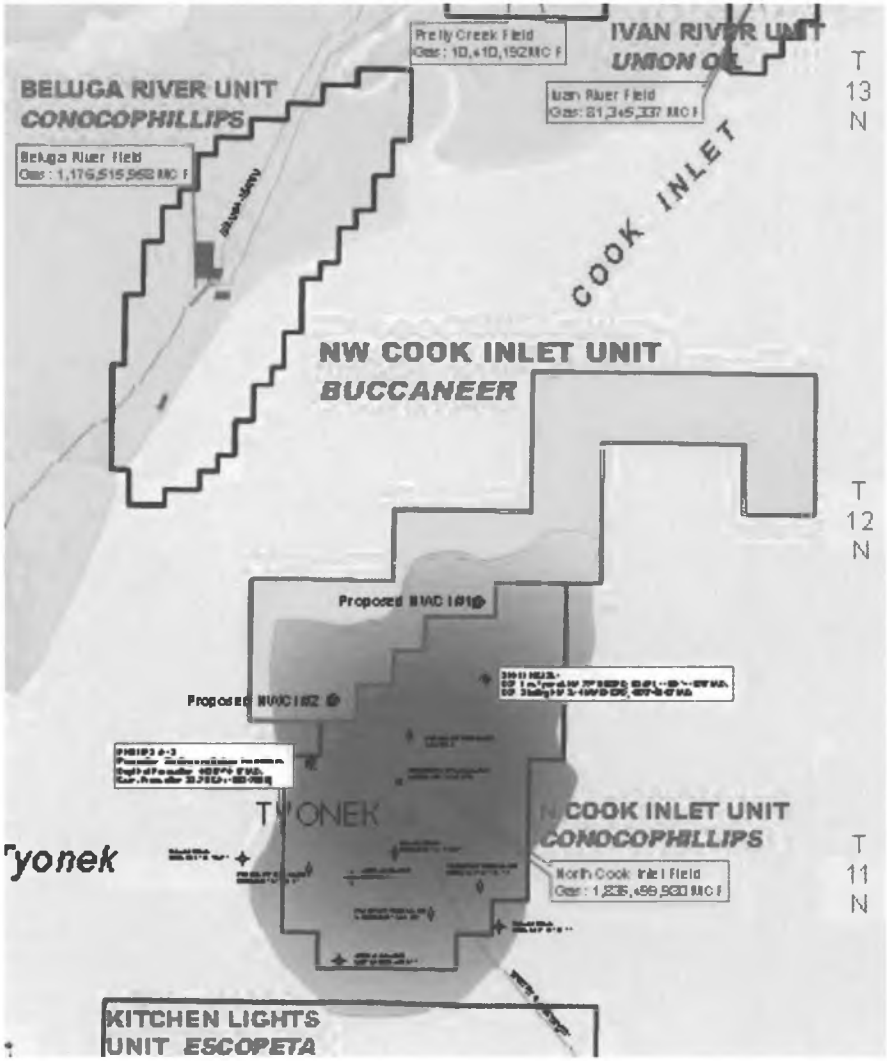


SOUTHERN CROSS UNIT

- 100% working interest/80.0% NRI
- Netherland Sewell booked reserves & resource
- 2P Reserves: 12.7 MMBOE (78% oil) + P50 Resource: 14.7 MMBOE (75% oil)
- Multiple pay sands and on Structure twin historical well which tested gas; was not developed
- Deeper Tyonek and Hemlock oil potential - 90' Drill Stem Test in 1960's well
- Chevron's (Hilcorp) Baker Platform ~ 1.5 miles south
- Projected Ops Costs < $10.00 / BOE

BUCCANEER ENERGY

NORTH WEST COOK INLET / OFFSHORE

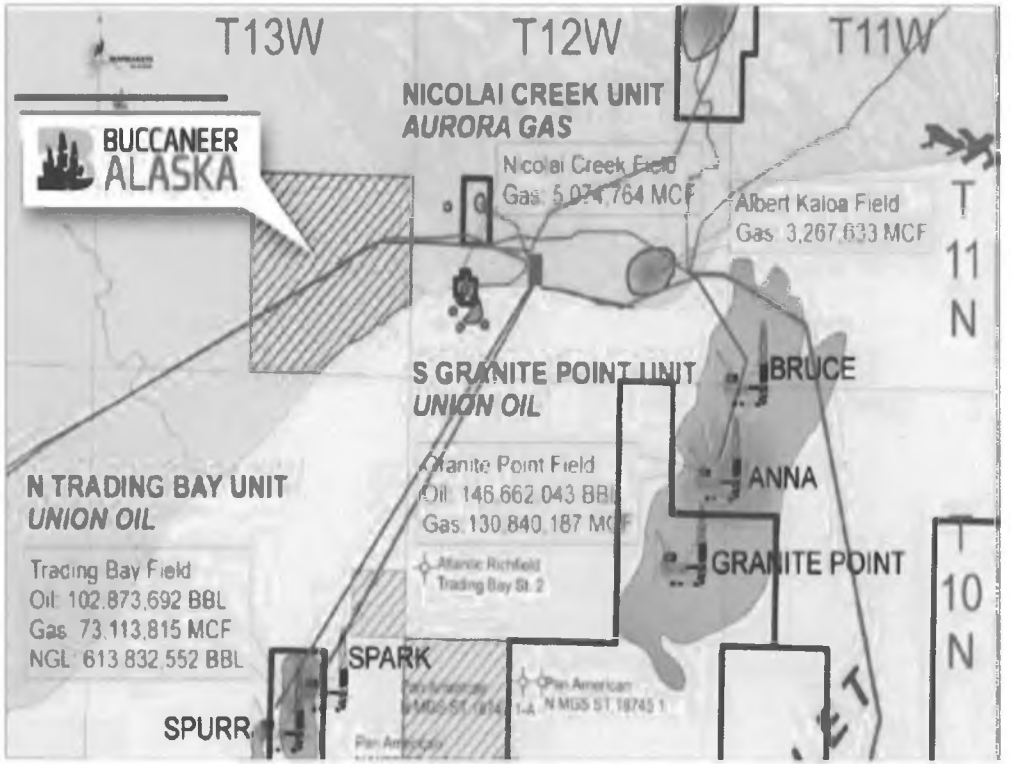


NORTH WEST COOK INLET

- 98.0% working interest/79.0% NRI
- Netherland Sewell P50 resource 49.4 MMBOE
- Adjoins ConocoPhillips field that has produced 1.8 TCF (225 MMBOE)
- Well drilled < 1 mile from lease boundary produced 88 BCF 11 MMBOE) (Phillips # A-13)
- Deeper oil opportunity 5 previous wells tested oil in Lower Tyonek & Hemlock which were never produced
- Shell well most northerly, tested at 2,270 BOPD from Lower Tyonek ~1 mile from lease boundary

BUCCANEER ENERGY

W. NICOLAI / ONSHORE

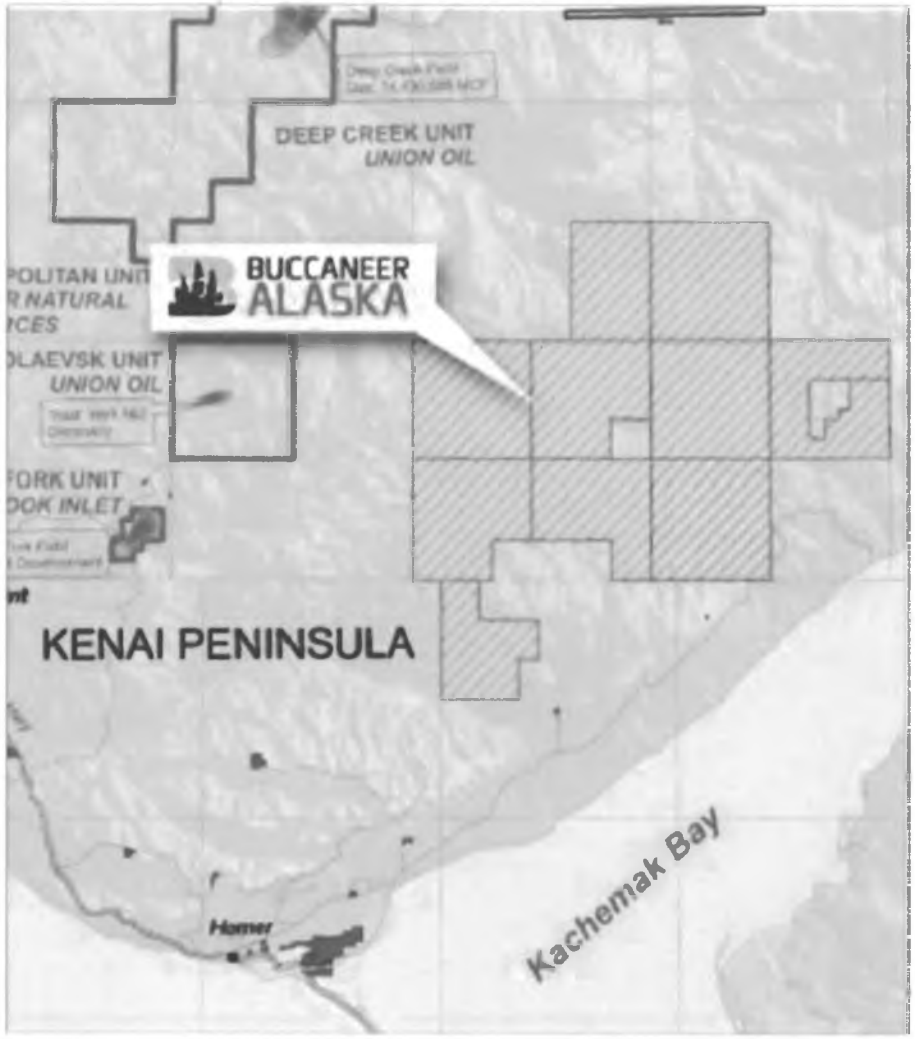


W. NICOLAI

- 4,952 acres; 100% working interest/84.5% NRI
- Shallow multiple stacked pay zones
- Defined gas prospect
- Roads, pipeline and infrastructure approx. 2 miles away – tie into existing sales line
- Acquiring seismic & reprocessing

BUCCANEER ENERGY

WEST EAGLE / ONSHORE



WEST EAGLE

- 49,808 acres; 100% working interest/80% NRI
- Down structure wells had gas & oil pay
- Infrastructure being built to area by Armstrong
- Acquiring seismic & reprocessing

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DEVELOPMENT SCHEDULE

	2H 2011	1H 2012	2H 2012	1H 2013	2H 2013	1H 2014	2H 2014
Kenai Loop - Gas	Pipeline Facilities Commence Production	3D Seismic Development Drilling Production		Production			
Southern Cross – Gas/Oil		Drilling			Pipeline Facilities		Commence Production
Northwest Cook Inlet – Gas/Oil			Drilling		Drilling Pipeline Facilities		Commence Production
W. Nicolai - Gas			Drilling		Commence Production		
W. Eagle – Gas/Oil			Drilling		Commence Production		

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EXTRACTING THE VALUE: JACK – UP RIG ACQUISITION

Kenai Offshore Ventures (KOV) Ownership & Partners

- 50/50 JV with Ezion Holdings (Singapore listed)
- AIDEA owns 100% Preferred Equity
- $86.5 million to acquire, modify & mobilize
- Purchase Agreement executed with Transocean to acquire Endeavour

Acquisition Status

- Joint Ownership Agreement with AIDEA executed
- Senior Debt Facility Term Sheet Executed – Moving To Final Documentation
- Finalizing modification budgets and scheduling with Asian shipyard

Endeavour
The Spirit of Independence

BUCCANEER ENERGY

SELECTING THE RIG CONTRACTOR

Archer Drilling, LLC

- Project manage the shipyard modifications to the jack-up rig
- Manage the mobilization process from Singapore to the Cook Inlet
- Operate and market the rig in the Cook Inlet and the Chukchi Sea

Why Archer?

- Currently operating over 100 rigs globally
- Extensive experience operating in harsh environments
- Extensive engineering capabilities
- Very familiar with the LeTourneau 116 Class jack-up rig
- Excellent safety record

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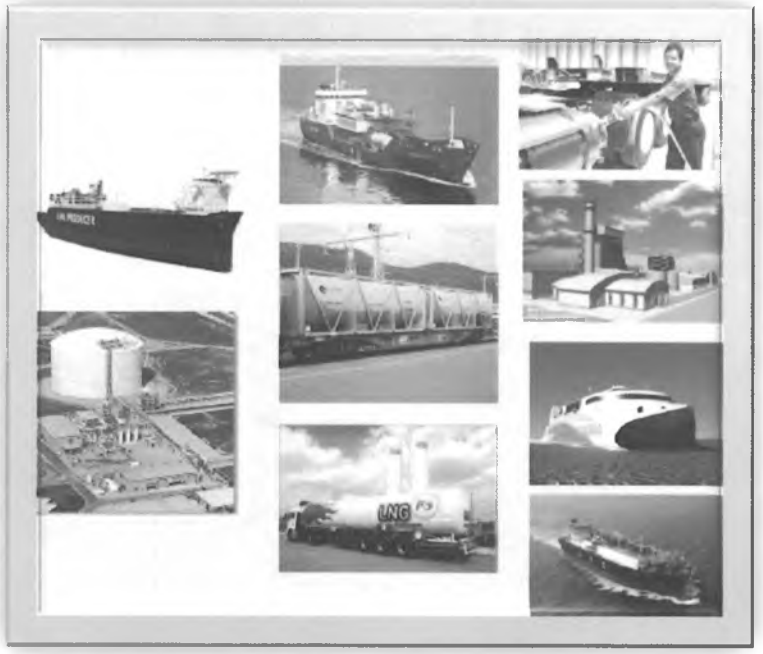
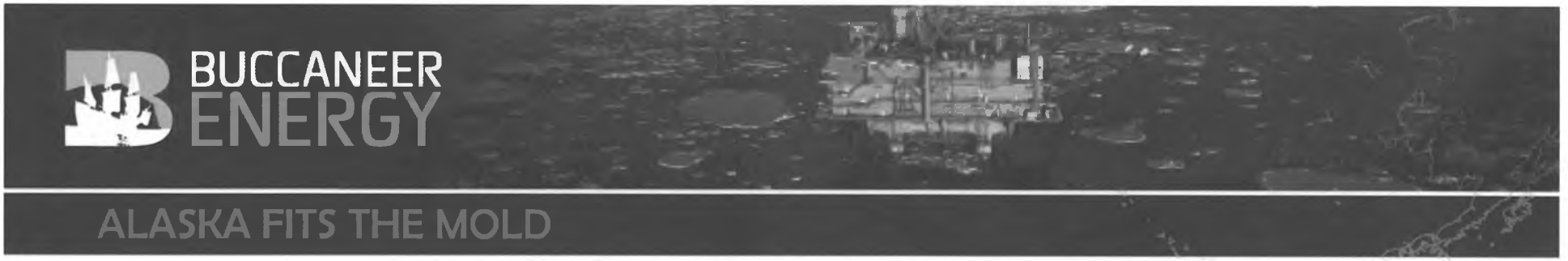
MARKET EXPANSION

- Increased drilling in the Cook Inlet will increase:
  - Gas reserves
  - Gas production in the near term
- Increasing the gas market in Alaska will fuel enthusiasm for continued drilling.
- LNG increasing role in various applications to expand the gas market.

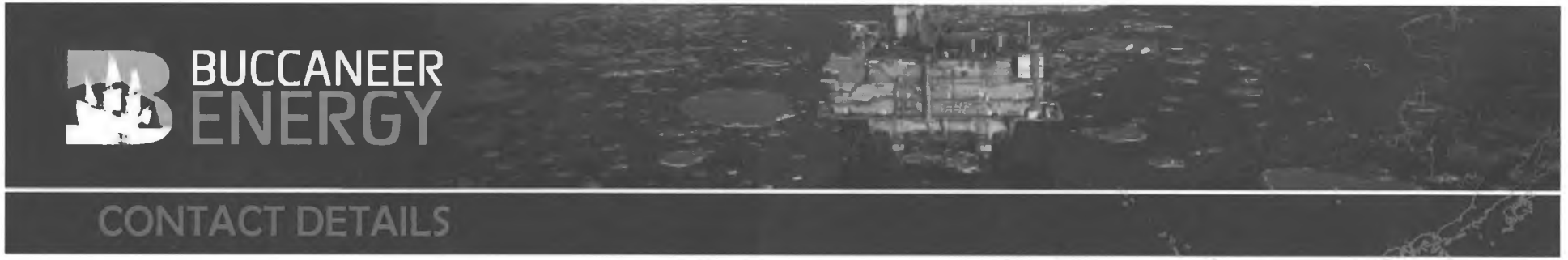




Back to the founding principles:

- Minimize risk
  - Enlisted local talent: Stellar management and assets
  - Acquired majority positions in projects: Kenai Loop
  - Managing operational control: Buccaneer Alaska
  - No "Big E" – stacked pay: Cook Inlet

- Maximize opportunity
  - Fast tracked development opportunities: Kenai Loop #1 – from permitting to production in 9 months
  - Benefited from special incentive: Favorable regulatory environment; strong commodity market; ACES incentives



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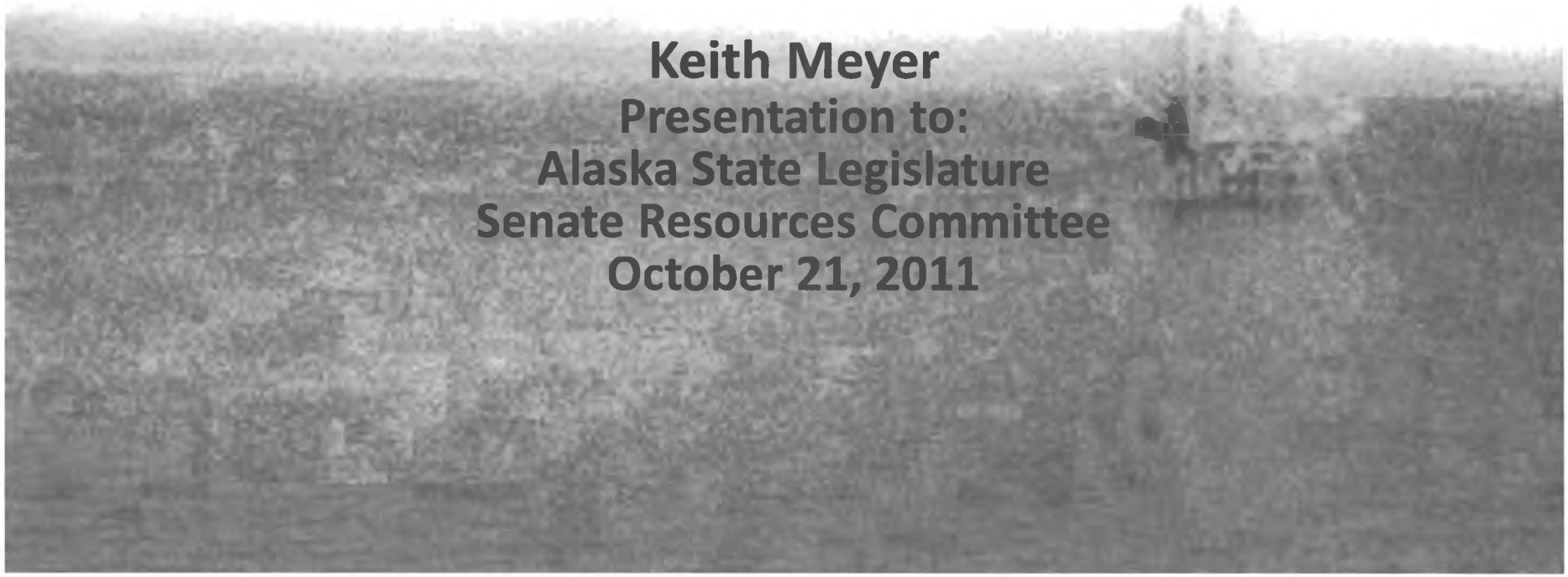
LNG Alaska



Keith Meyer
Presentation to:
Alaska State Legislature
Senate Resources Committee
October 21, 2011

Overview

- Introduction
- Perspective on Cook Inlet gas supply
- Supply push/demand pull
- Changing LNG industry
- Three strategic pillars
- Employment and Trade
- Conclusion

Introduction

LNG Alaska

- **LNG Alaska is an alliance** between LNG Central and Buccaneer Alaska.
- **Objective:** To increase the market reach of Alaskan natural gas through improved LNG production and delivery infrastructure.

Perspective on Cook Inlet Gas

- The decline of Cook Inlet gas has become the scape goat for justifying many alternative energy projects.
  - ***"WHEREAS supplies of natural gas are precipitously declining in Cook Inlet…"*** (ARCTEC resolution authorizing participation in pipeline open season from the north.)
  - ***"Limited and declining Cook Inlet gas deliverability"*** (Black & Veatch study supporting the hydro project.)
  - ***"Our only option to solve with certainty our gas supply needs is through the importation of LNG and we see no way around that,"*** Dan Helmick, manager of regulatory affairs for Anchorage Municipal Light & Power.
- Implications:
  - Cook Inlet gas is **starting from a point of negative public perception**.
  - Somewhat of a self-fulfilling prophecy – fear of no gas chases demand away, which leads to lack of interest to develop more gas.
  - Increased demand will bring supply development.

Supply Push/Demand Pull

- Cook Inlet gas producers will commit supply to a market expansion program.
- Creating sustainable demand will sustain new supply development in the Cook Inlet.
- Enabling Solution: **LNG Alaska**
  - New, efficient, modular liquefaction.
  - Expanded LNG use within the state.
    - ✓ Trucks, rail, and barge deliveries.
    - ✓ Remote storage and revaporization at select locations.
    - ✓ Fuel terminals for truck and marine use.
  - Continued potential for LNG exports.
  - Option for LNG imports.

LNG Alaska is Infrastructure

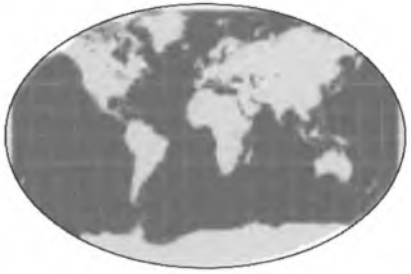
LNG Alaska is infrastructure - capable of liquefying natural gas (LNG), transporting the LNG to in-state markets, and providing export for access to global markets.

LNG Alaska

LNG Production **LNG Transport** **LNG Delivery**

Changing LNG Industry

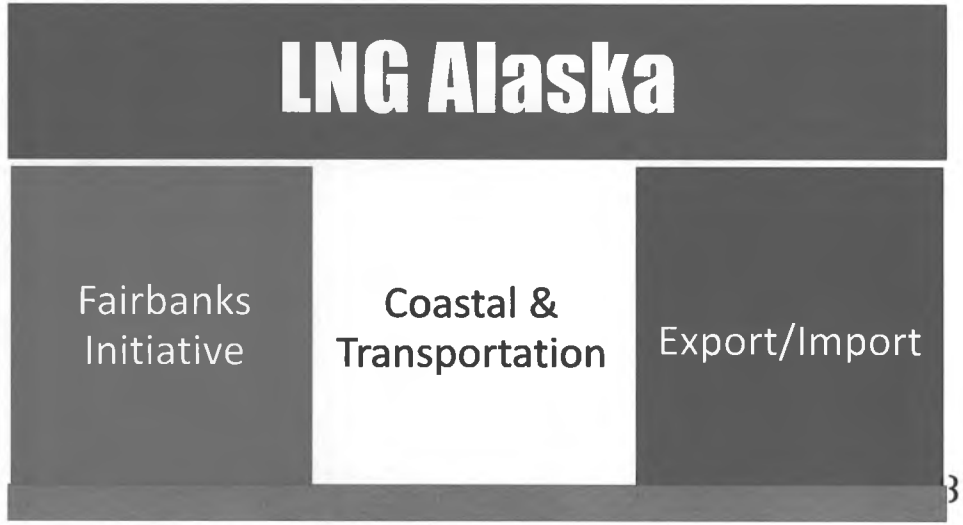
- 22 nations now import LNG – double from just 10 years ago; 30 floating regas facilities planned.
- "Mid-scale" LNG facilities (the size of Kenai, at 1.6 Million tons per year) are now modular and manufactured in factories – including fully contained units in a floating application.
- LNG is now being used as a transportation fuel in road, off-road, and marine applications.
  - Emission reduction and cost savings.
  - Norway shifting to gas fueled transportation.
  - Cruise ships and freighters adding LNG fuel capability.



Three Strategic Pillars

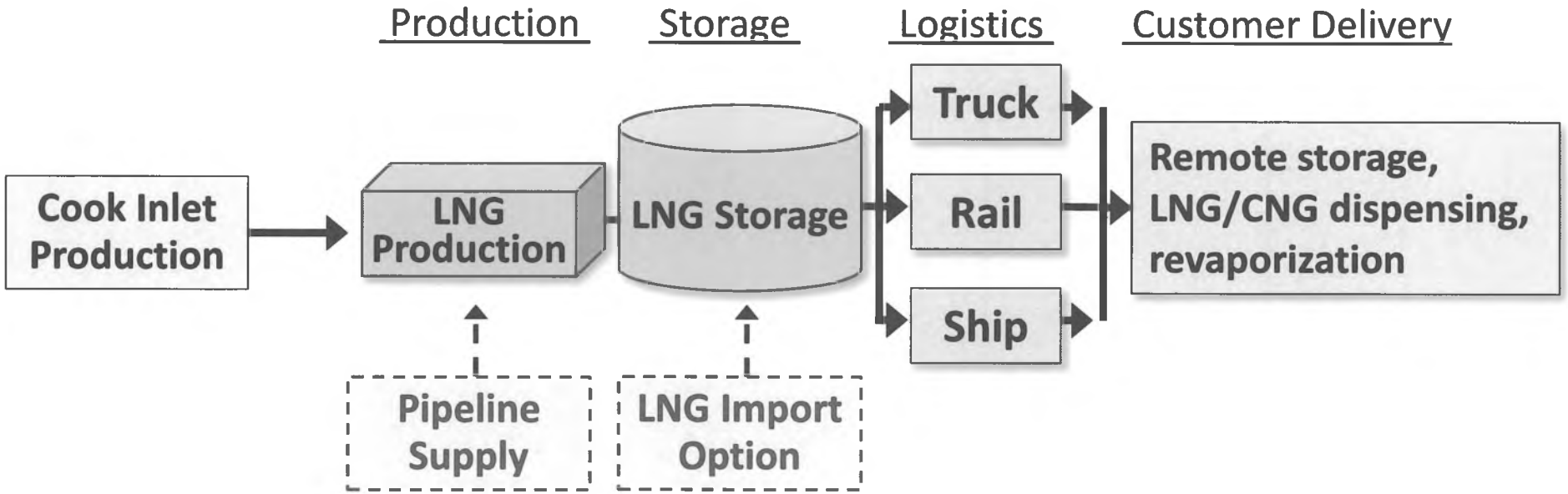
- The **LNG Alaska** program is built on a foundation of three strategic pillars:
  - **1. Fairbanks Initiative** - LNG from the south for power generation and fuel oil displacement.
  - **2. Coastal and Transportation Initiative** - LNG by barge to select coastal towns as a cheaper and cleaner replacement for diesel fuel; fuel for the Alaskan Marine Highway and other transportation markets.
  - **3. Export/import Initiative** - exports of LNG as well as imports if needed.

Although each of the pillars has viability on a stand-alone basis, together they form a stronger and complimentary foundation.



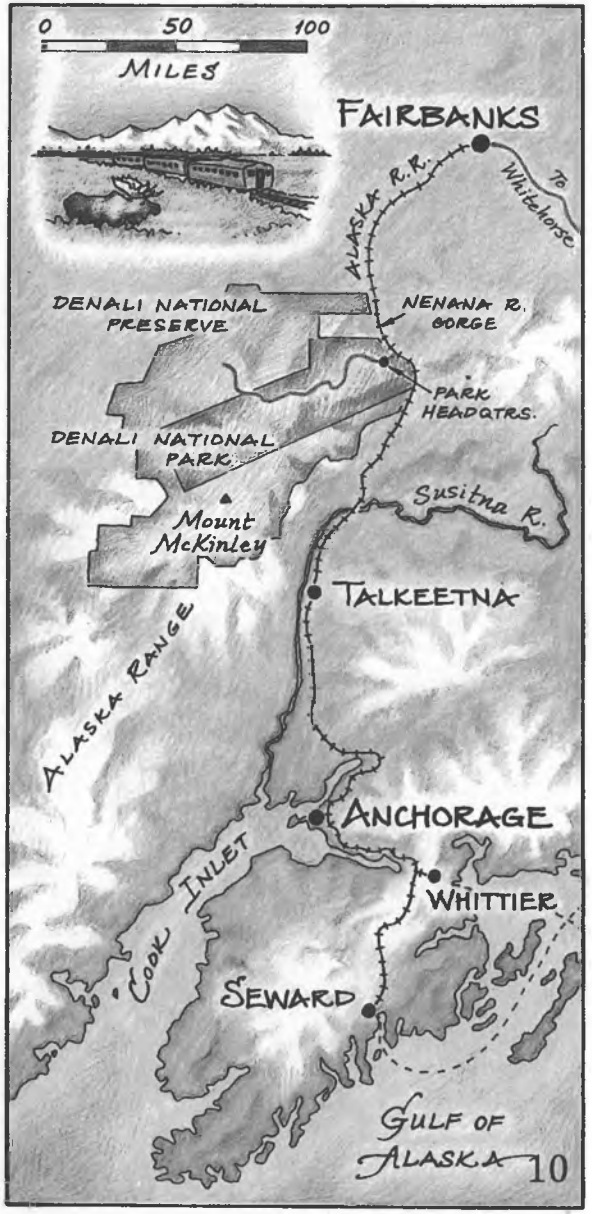
Reliable Infrastructure

- Cook Inlet production is liquefied and stored, then moved by truck, rail, and ship to customer delivery points for use as LNG or revaporized to natural gas.
- The infrastructure investment can be used with pipeline supply or even imported LNG for **long term reliability**.



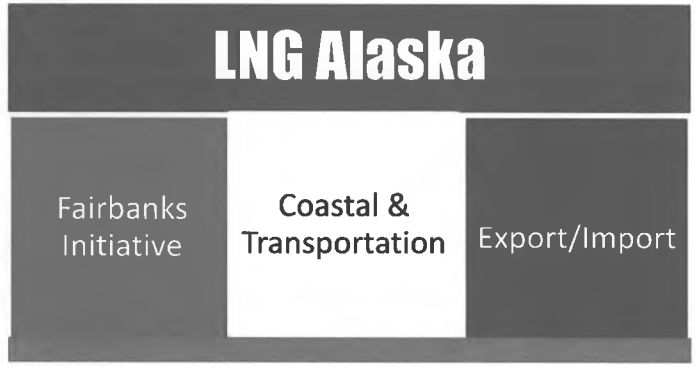
Fairbanks Initiative

- Fairbanks and the Railbelt Region is an important market for the **LNG Alaska** plan.
- Railbelt Region is considering multiple options to address energy supplies and costs.
- **LNG Alaska** can deliver LNG to Fairbanks cheaper and more reliably than a northern alternative.
- A mid-scale LNG facility in the south can be built and operated at a lower cost than in the north; delivery costs are less and more reliable (road and/or rail);
- Supporting legislation has been enacted (such as Senate Bill 42 establishing the Railbelt Energy Fund to help with studies and grants for power projects).



Coastal & Transportation

- The Coastal region has two primary target markets for an LNG/gas market expansion program:

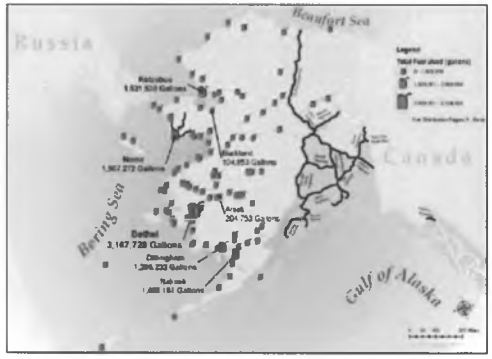


- Power generation:
  - Target diesel fired power plants on coastal cities accessible by barge.
  - Seven to ten cities with power demand large enough to justify effort.
  - Some potential for the Denali Commission to assist with studies and potentially funding. (Federal-State partnership for cost shared infrastructure.)
- Transportation Fuel
  - Initial focus on large marine market, then large trucks
  - Primary target: Alaska Marine Highway System

Coastal: Power Generation

- Power generation in coastal and rural Alaska is largely fueled by local and imported diesel fuel.
- The high price of fuel ($30/MMBtu) and power has been a contentious issue for western Alaskans.
- The Norwegian conversion from oil to gas is a good example applicable to Alaskan coastal towns.

	Gallons/yr (MM's)		Gal/d	Gas Equivalent	
Target Towns	Diesel	LNG	000's	Bcf	MMcf/d
Bethel	7	12	33.1	0.905	2.48
Kotzebue (Red dog mine)	16	28	75.6	2.069	5.67
Other	10	17	47.2	1.293	3.54
	33	57	155.9	4.3	11.7



Source: Map developed by Alaska Map Company with 2006 PCE information on utility fuel consumption

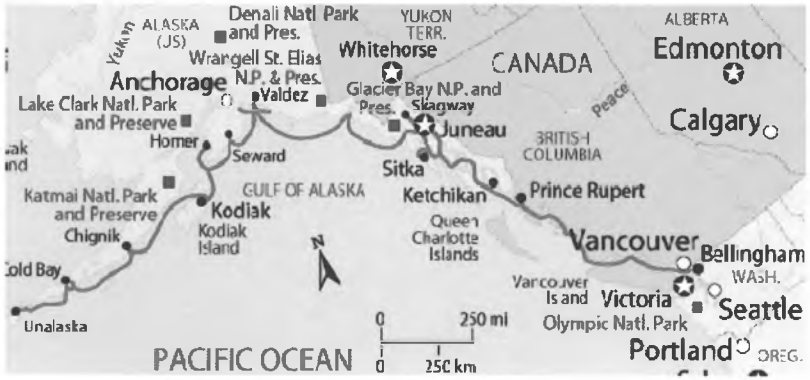
Target: Transportation

- LNG is a growing transportation fuel for on-road, off-road, and marine use.
- On road users are typically large trucks; off-road markets are typically mining vehicles.
- Marine applications include tugboats, workboats, and ferries.
- **The Alaska Marine Highway System would be an ideal demand because of its large load and scheduled route.**

Source: Map developed by Alaska Map Company with data from USGS and Alaska DNR.

Alaska Marine Highway

- Alaska Marine Highway fleet is old.
- State commissioned study to design fuel-efficient vessels to replace aging fleet.
- Dual fueled diesel/LNG marine engines have been in operations for years and meet 2014 emissions requirements (mandatory for U.S. and Canada).
- **Perfect opportunity** for the State of Alaska to use dual-fueled LNG vessels as the new class of clean, energy efficient, Alaska class ferries for the modern Alaska Marine Highway.



Export/Import Potential

- Modularized LNG allows expansion of the facility to fit market demands.
- The existing export facility at Kenai would make a good "staging area" for the **LNG Alaska** plan, but may not be readily available.
- An alternative site with marine access will be investigated.
- The marine jetty and storage tanks can be used for imports for supply reliability.

LNG Alaska

Fairbanks Initiative	Coastal & Transportation	Export/Import

Kenai Export Terminal, Alaska
Photo courtesy of CH-IV International. http://ch-IV.com

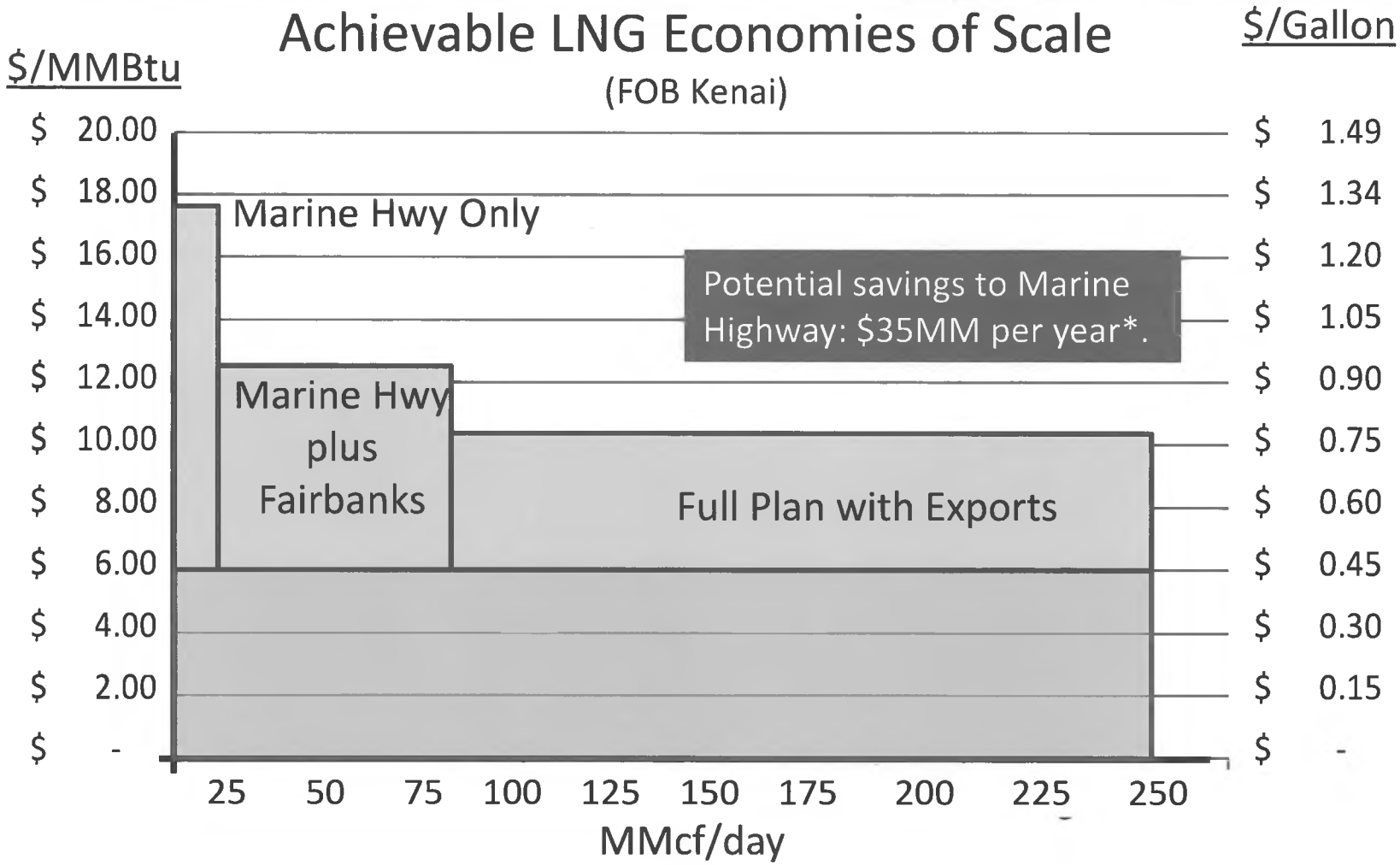
Employment & Trade

- **LNG Alaska** will help create jobs in the energy sector:
  - Increased Cook Inlet natural gas production activities.
  - LNG delivery operations.
  - LNG vehicle conversions and maintenance facilities.
  - Expanded natural gas distribution facilities.
- **LNG Alaska** will be beneficial from a trade standpoint.
  - Reduce imports of refined products.
  - Continued/increased international exports.



Economies of Scale

The **LNG Alaska** plan can result in significant fuel cost savings for Alaska customers.



*Based on Alaska Marine Hwy Annual report stating 25 MM gal diesel at $100 MM cost.

Conclusion

- Alaska has significant gas potential in the Cook Inlet.
- Creating natural gas demand and market access will encourage gas production activities.
- Alaska's domestic gas reserves can be used to displace imported refined products, reduce pollution, and reduce the cost of energy to consumers.
- The **LNG Alaska** program will expand the gas market, help create jobs in the energy sector, and be beneficial to trade.
- Alaska has the necessary legislation and incentives in place to help accelerate the **LNG Alaska** program.
- **LNG Alaska** is ready to work with the state to implement a clean, and reliable natural gas expansion program.

Questions?

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Appendix - LNG Experience

Keith Meyer receiving the industry's first "LNG Company of the Year Award" in Rome, Italy 2007.

- Keith Meyer, LNG Central CEO.
- 30 years experience in international energy development, including gas pipelines, gas storage, power generation, LNG, petrochemicals, biofuels; international LNG and gas sales.
- Former Chairman Flex LNG; floating liquefaction.
- Former President Cheniere LNG, developer largest LNG receiving terminal in western hemisphere.
- Originator and co-patent holder of electronic LNG cargo slot bidding system (lnggateway.com).
- Former Vice President Trunkline LNG, receiver of Nigeria's first LNG cargo delivered; largest U.S. spot cargo importer.
- Rice University course instructor; frequent guest speaker and advocate to reduce gas flaring