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RESOURCE EXTRACTION PROJECTS 10-YEAR PROJECTION

2015 REPORT

AEDC

Anchorage Economic Development Corporation

RESEARCH PARTNER: *PETROLEUM NEWS*

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PREFACE

Welcome to the Anchorage Economic Development Corporation (AEDC) 2015 Resource Extraction Projects: 10-Year Projection Report, generously sponsored by Northrim Bank. This projection began in 2004 as a modest project to address a request to the Kenai Peninsula Borough (KPB) Oil & Gas office from the University of Alaska's Workforce Development Conference. The goal was to give a perspective on what the future might hold for resource extraction projects in Alaska and to identify the related workforce demands those projects could generate in the next decade.

While the first projection was very simplistic, it triggered a flood of requests for a more detailed version that could be updated annually. Over time, this projection changed in a number of ways, including improved project details, better modeling of project flow and ananualized workforce demands. In 2007, the projection migrated from the KPB Oil & Gas office to AEDC.

Then in 2009, a milestone was reached through an agreement between AEDC, Petroleum News (PN) and North of 60 Mining News (N60) publications. The two publications agreed to provide the factual research foundation upon which AEDC could develop its own perspectives and projections. At the same time, AEDC engaged the McDowell Group to provide help with the ratios needed in modeling workforce needs and project spending for the projects profiled.

When first developed, the projection was focused on providing perspectives in support of workforce training initiatives. For example, what projects were under development, when would they likely begin activities and how many workers in different skills categories would they need? It also underlined the need to be better prepared to support the projects through infrastructure improvements, as well as the potential social and economic impacts to communities.

From 2004 through 2008, this projection was driven by optimism for the future, and there was good reason for that optimism. The natural gas pipeline from the North Slope to the Lower 48 looked like a sure thing, the national political stars were aligned for the Arctic National Wildlife Refuge (ANWR), mining was seeing a resurgence of investment and the Pebble Mine was emerging as a world-class copper prospect that could become a new economic driver in a struggling region of rural Alaska. Alaska's economic future was bright and the early years of the resource extraction project projection reflected those dawning opportunities.

The goal was to give a perspective on what the future might hold for resource extraction projects in Alaska and to identify the related workforce demands those projects could generate in the next decade.

The 2009 projection, however, was a significant departure from the previous year's forecasts. While there were a large number of projects profiled that had the potential to move forward in the next 10 years, for the first time AEDC sounded a clear note of caution that forces were aligning against the successful launching of those projects. This growing sense of concern was driven in part by the global recession, but also by growing issues related to taxation, permitting, infrastructure and litigation.

In 2011, AEDC departed completely from past practice and did not offer "odds of success" for any projects included in the projection. The increasingly challenged investment environment in Alaska led AEDC to view the future as questionable for most of the projects addressed.

Issues such as permitting, litigation, critical habitat, public support, taxation, project economics and lack of key infrastructure challenged resource extraction projects in many ways. When combined, these problems created high levels of uncertainty, which negatively affected investment and diminished Alaska's competitiveness in the global marketplace. Since the 2011 report was issued, the situation has grown even worse in many instances, though there are a few glimmers of hope and progress that were noted in the 2012 report.

In 2013, with several new enhancements added, the report underscored a renewed, yet cautious, sense of optimism for some of the projects, particularly those in the Cook Inlet Basin. The report also noted some progress over the last year in addressing the many challenges that face the mining and oil and gas industries, mainly focused in the area of taxation and to a lesser degree permitting. However, the report still sounded a cautious alarm that Alaska's attractiveness to investment for major energy and mineral projects remained challenged.

Unfortunately, these challenges have persisted and in this report we continue to note the headwinds resource development projects are facing across the state. Uncertainty remains the norm for many projects and has slowed the pace of development in a number of places. While there are some impacts beyond our control, such as the highly volatile price of commodities and fluctuating demand, the financial standing of the state and the support it gives resource development industries deserve to be clearly addressed for the benefit of both the public and the companies working in Alaska. We remain hopeful that our state can find the social and political will to quickly and rationally implement new strategies that strengthen our economy in this time of change.

In many cases, the private sector has already responded to the new landscape in Alaskan resource development. Some, like Hilcorp, have moved their focus from exploration to acquisition to solidify the financial well-being of their holdings. Others have shifted their investments in other regions of the globe to proven resources in Alaska and are continuing to find value in improving existing wells and mines. In the near term, the strength and value of Alaska's mineral resources continues to support valuable jobs and investment here in our state. However, increasing risk due to uncertainty in the markets and Alaska's economic stability present a significant challenge to overcome. AEDC is confident that if all parties involved in Alaska's resource extraction industry strive to not let a good crisis go to waste, we can find ways to stabilize and grow this important business sector.

AEDC would like to thank Dan Dickinson for his contributions to the "2009 10-Year Resource Extraction Report Retrospective" article on page 15, as well as for his research and writing efforts on behalf of AEDC in the development of the oil and gas sections of this report. Additional thanks go to Steve Borell for his contribution to the mining narrative and AEDC Research Director James Starzec for the development of the mining sections. AEDC would also like to thank Petroleum News and the Alaska Miners Association for their ongoing support in providing research and review of the factual information contained in this report.

EXECUTIVE SUMMARY

This year, the resource extraction industry weathered a series of monumental changes that will likely reverberate for many years. Increased competition, both foreign and domestic, falling commodity prices and an unclear fiscal future for the state have resulted in a continuing shift of economic conditions that challenge the development of future mining and oil and gas projects. These changes, however, have also presented opportunities for companies to improve efficiencies and gain greater profits in their current operations. In this report, we've endeavored to examine the successes and setbacks for both current and proposed projects, and once again highlight the tremendous potential the resource extraction industry has to benefit Alaska and its economy.

With utility gas supply contracts in place through 2018 or 2019, producers are looking closely at developing new markets for their gas.

The Cook Inlet Basin continues to be a growing and profitable arena for both oil and natural gas producers. FY 2015 saw a 12.8 percent increase in oil production and a 15.9 percent growth in gas produced over the previous year. Continued exploration and investment is paying off for many of the smaller operators, particularly Hilcorp and Furie Operating Alaska, and are fueling interest in future prospects. With utility gas supply contracts in place through 2018 or 2019, producers are looking closely at developing new markets for their gas. Development of a liquefied natural gas (LNG) transmission pipeline in Cook Inlet would be a boon to both the producers and the many industries reliant on gas as a raw material, and as a low cost power alternative. The Agrium Corporation is exploring a restart of their fertilizer plant in Nikiski which would require large quantities of gas. Add to that the potential gas demand from developing projects, such as Donlin Gold Mine and the Fairbanks Interior Energy Project, and the outlook for Cook Inlet gas continues to be optimistic.

While the oil and gas and related support industry employment in the Cook Inlet region has been improving in recent years, the 2015 first quarter employment data is showing some reductions in the support industry's totals. Overall unemployment in the Kenai Borough remains low, however, which bodes well for the odds of future success for projects proposed for this region in the next decade. At the same time, a number of issues related to permitting, infrastructure, key industry support services and litigation still challenge these projects and could delay or derail many of these efforts.

On Alaska's North Slope, production from the Prudhoe Bay units continues to decline, dropping 13.8 percent in FY 2015 over FY 2014, while the remaining fields have seen a 2 percent drop in production over the same period. This has not dissuaded continued investment from the major producers. ConocoPhillips continues to pursue their National Petroleum Reserve-Alaska (NPR-A) developments and expects production at their Kuparuk unit, the second largest producing area behind Prudhoe Bay, to flatten out by 2017. Brooks Range Petroleum is pushing hard in the face of difficult economic conditions to bring the Mustang Pad to production. Additionally, ExxonMobil's Point Thomson gas project has moved closer to completion and could see first delivery of natural gas concentrate to Trans-Alaska Pipeline System (TAPS) in 2016. Optimism can also be found at some of the fields operated by the smaller North Slope operators. ENI has increased production at the Nikaitchuq unit by 34 percent from FY 2014 to FY 2015. Similarly, Caelus Energy LLC has improved production at the Oooguruk unit by 61.6 percent over this same period. While these established fields are showing increased development in the short term, stopping or even reversing the North Slope production decline will ultimately depend on bringing new fields on line soon.

Of all of the potential oil development projects in Alaska, Shell Oil Company's leases in the Chukchi Sea were thought to be the most promising, and the most challenging, even in today's climate of $50 per barrel oil. With an estimated 15.5 billion barrels of oil waiting to be recovered, Shell had invested over $7 billion on the unit so far

and conducted an exploratory drilling program this year. However, results from the test drilling were disappointing and in September, Shell announced that they would not be continuing development of the project and would be moving out of Alaska. Given the current negative economic conditions facing many oil companies, the prospects for additional exploratory projects on the North Slope in the next 12 months are unlikely.

An ever growing supply of oil from the shale plays in North Dakota, Pennsylvania and Oklahoma, among others, is also dampening enthusiasm for continued exploration in Alaska. According to the U.S. Energy Information Administration, oil production from shale resources have exceeded 4.5 million barrels per day during the 2015 year-to-date period and is only expected to increase in the near term. It is true that current low oil prices are impacting the shale industry's ability to grow, but, similar to their counterparts here in Alaska, producers in the Lower 48 have focused on improving the productivity and cost effectiveness of their current operations to weather the storm. Alaska oil will be competing against these resources, OPEC nations and quite possibly Iran for the foreseeable future, and growing the oil and gas industry in our state will take a considerable amount of ingenuity and determination from both the private and public sectors.

The mining sector in Alaska continues to see positive results from current operations, yet new developments are facing a myriad of challenges. Gold mines, such as Fort Knox and Kensington, have improved their recovery technologies and processes, successfully maintaining profitability. The same is true for silver mining at Greens Creek and zinc mining at the Red Dog mine. Usibelli's Healy coal mine, on the other hand, has faced a rapidly diminishing demand from foreign markets that is impacting their proposed Wishbone Hill project. Overall, current operations have stayed competitive and many operators are investing in expanding projects across Alaska.

Overall, current operations have stayed competitive and many operators are investing in expanding projects across Alaska.

Proposed projects in the mining industry vary widely in both their target commodities and in terms of their movement towards production. Demand for rare earth elements (REEs) and graphite for the ever expanding high-tech industry have bolstered the outlook for the Bokan Mountain REE project and Graphite Creek graphite prospect. Significant finds near the existing road infrastructure have made copper and zinc mining at the Palmer Project an attractive development as well. Infrastructure issues have been a factor in the speed of progress for a number of other significant mining projects. The Donlin and Livengood gold projects face extraordinary energy costs that negatively impact their economic feasibility. The Upper Kobuk Mineral Projects in the Ambler area are constrained by a lack of transportation options to and from the site. Other mining proposals, such as the Pebble and Chuitna Coal prospects, face continuing hurdles from both private and public entities, resulting in a much slower development process than expected. Much like the developing oil and gas projects, these mineral resources will need more than just private support to begin production. It is incumbent upon our state to work with the companies investing in our mining industry to find new and mutually beneficial solutions to bring these mine prospects to operational status.

While it was stated in the 2014 report, it bears repeating: Alaska's competitiveness in the global oil and gas and mineral markets remains challenged in many ways. Several related issues continue to diminish Alaska's competitiveness. Growing uncertainty about the future of industry-supporting tax credit programs may create a chilling effect on investment plans. Issues surrounding social compacts, permitting, litigation, commodity pricing, high costs related to project development and access to needed infrastructure have reached what is effectively a point of gridlock for many proposed resource extraction projects. Compounding these challenges is a continuing lack of agreement among Alaskans on a common vision for Alaska's economic future.

Resource extraction projects developed in the next decade will be the foundation of a growing economy based on new jobs, new investment and potential for lower energy costs for more Alaskans. The wealth generated by these projects, combined with our existing industry base, will provide the needed capital to develop our economy through investments in education, infrastructure, community and economic development. If we are unable to develop even a minority of the projects described in this report, there is a growing likelihood that Alaska will face a period of economic stress which will result in stagnation and decline for many areas of Alaska.

For 2015, AEDC's updated projection shows Alaska has the potential to generate roughly 17,000 jobs at peak construction. These jobs would be created through over $76 billion of private sector investments in the 12 resource extraction projects highlighted in the following graphs.

These graphs provide views of the projects profiled in this projection, along with a historical representation of resource extraction job levels in Alaska over the last 10 years to provide context. The first three graphs present a combined view of oil and gas and mining projects from two perspectives.

Figure One shows the number of combined oil and gas and mining jobs in Alaska by quarter since 2005. Figure Two shows total jobs the proposed projects could create and when they would do so. Figure Three presents an overview of total spending on these projects and when that spending will take place. These projections reflect the earliest that these jobs/spending could occur and are based on favorable conditions.

Please note that all projection graphs are based on available information. In some cases, projects only offer jobs numbers or capital investment figures, not both, and will be excluded from either the jobs or investment graph. *It is inappropriate to interpret these graphs as firm commitments by the proposing companies.* As discussed at multiple points in this report, all of these projects face significant challenges that must be overcome to initiate actual construction and operations. Some start dates are AEDC estimates and are not intended to reflect a company's plans.

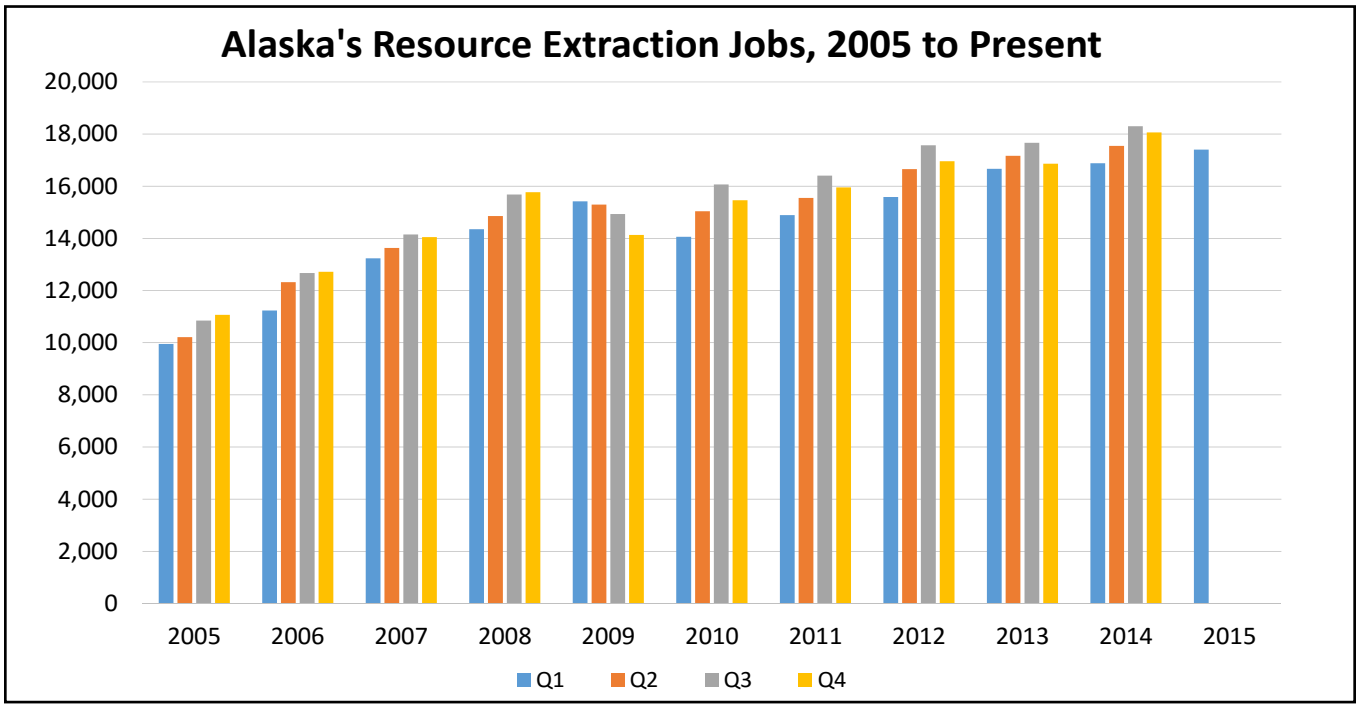


FIGURE 1. Alaska Resource Extraction Jobs. Number of combined oil and gas and mining jobs in Alaska, by quarter since 2005.

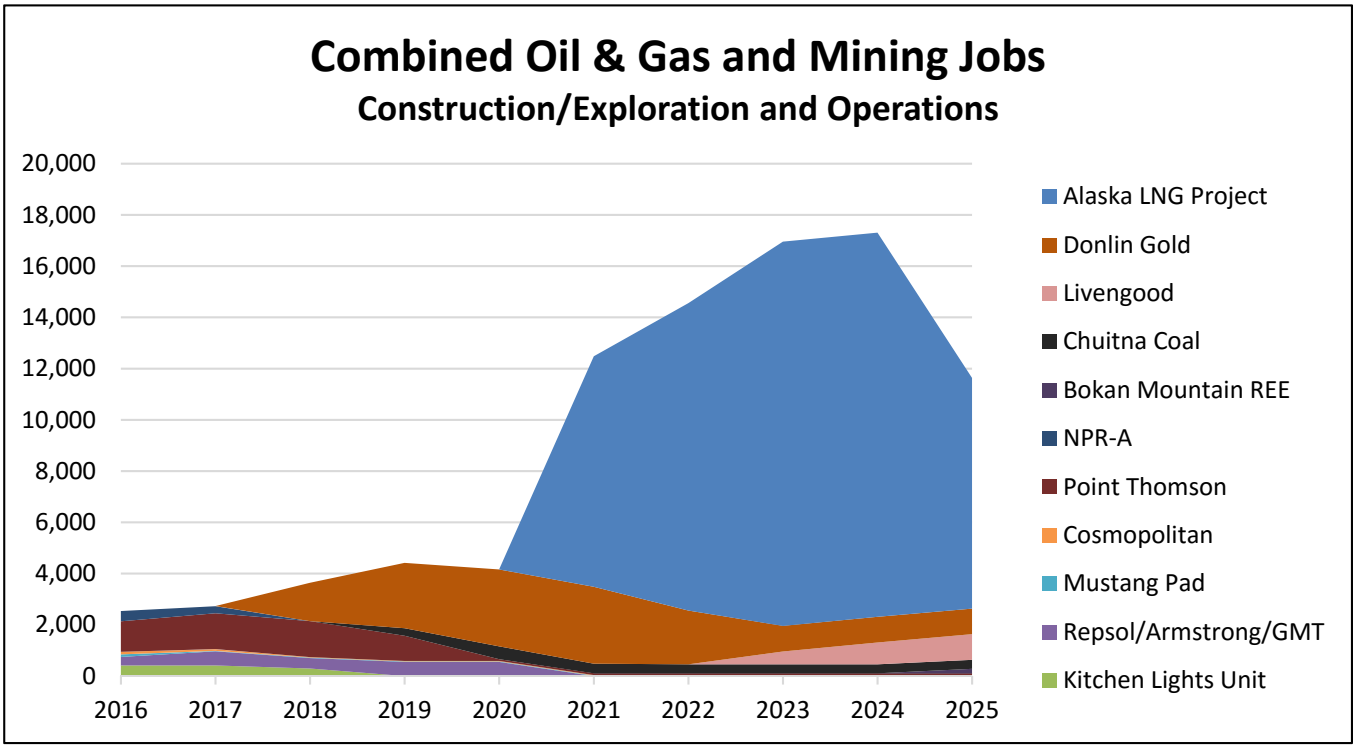


FIGURE 2. Combined Oil and Gas and Mining Jobs, Construction/Exploration and Operations. This graph represents the potential number of jobs in the oil and gas industry in Alaska over the next 10 years under ideal conditions.

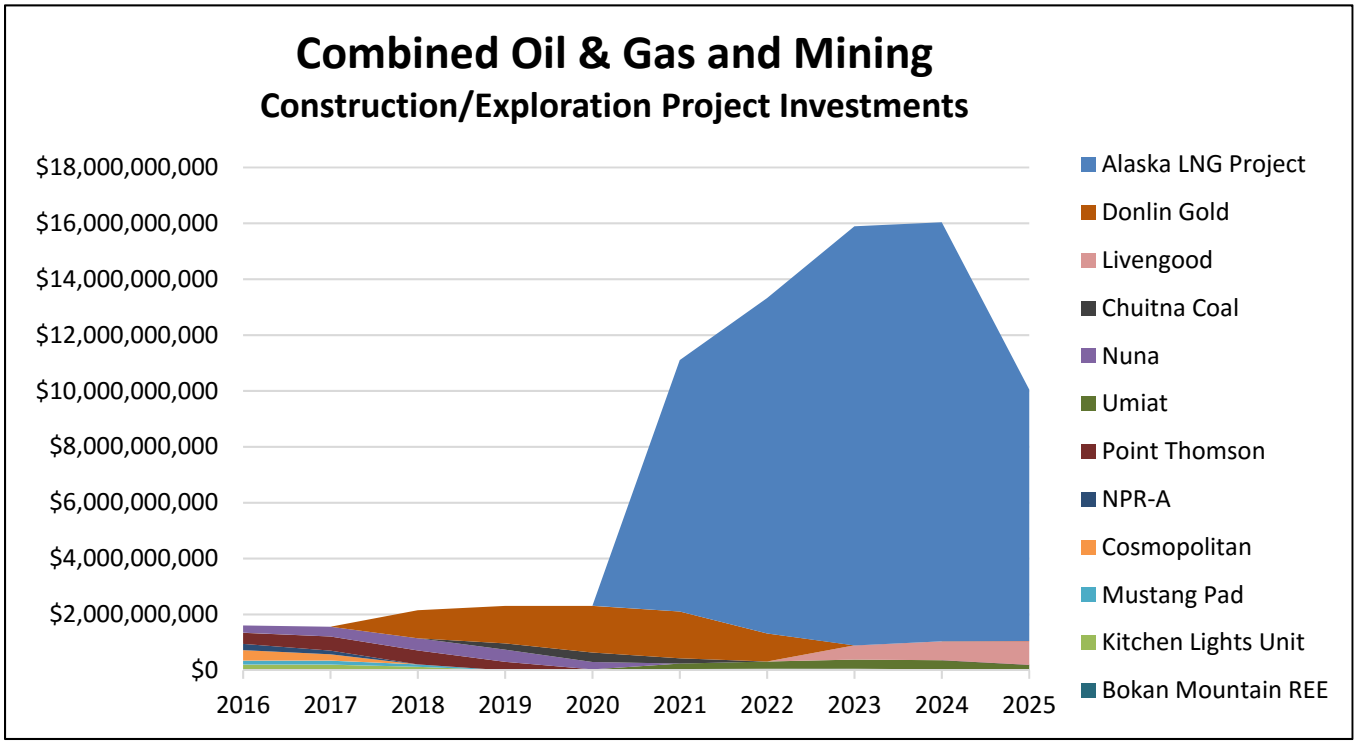


FIGURE 3. Combined Oil and Gas and Mining, Construction/Exploration Project Investments. An overview of potential total spending on these projects and when that spending might take place.

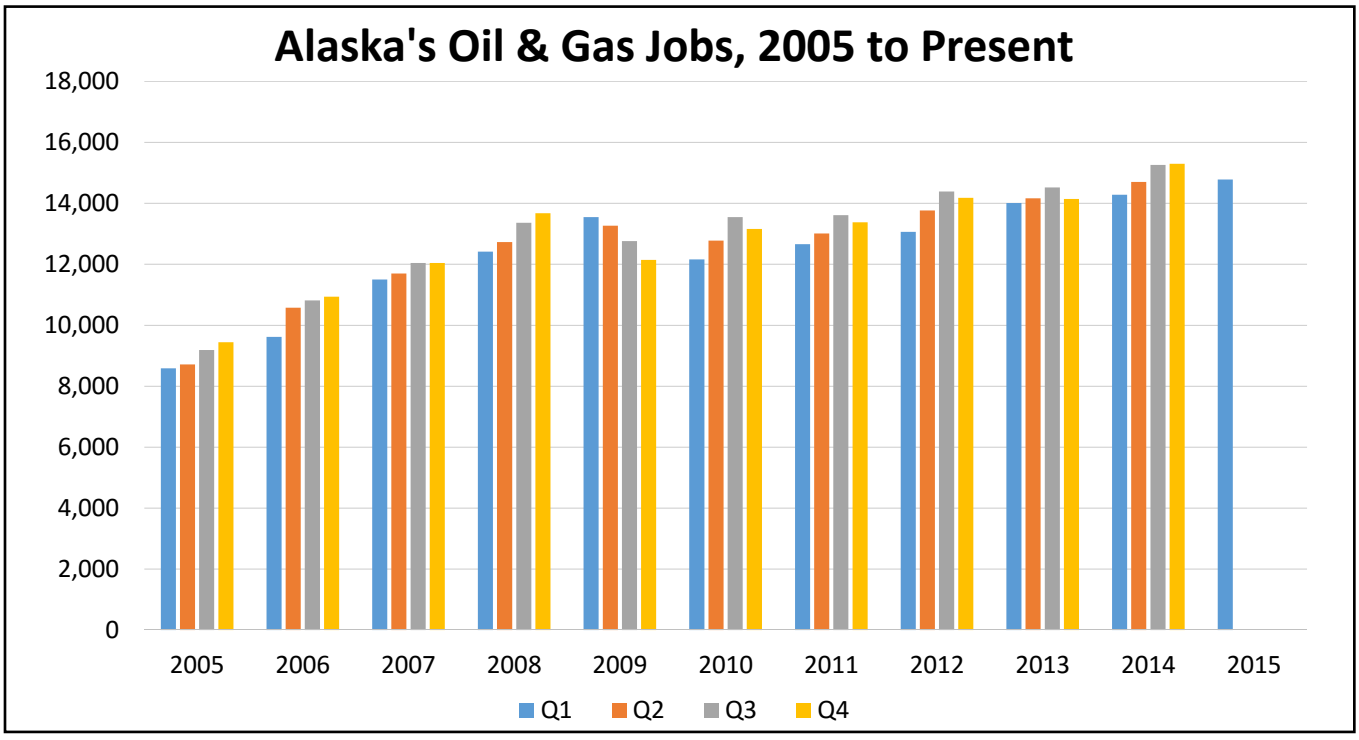


FIGURE 4. Alaska's Oil and Gas Jobs, 2005 to Present. Figure Four represents the number of jobs in the oil and gas industry in Alaska over the past 10 years. It includes jobs categorized as "Mining Support Activities," which are predominantly associated with oil and gas activities.

Figures Five and Six offer the narrow view of proposed oil and gas projects only and, again, address total jobs and spending related to those projects over the next decade.

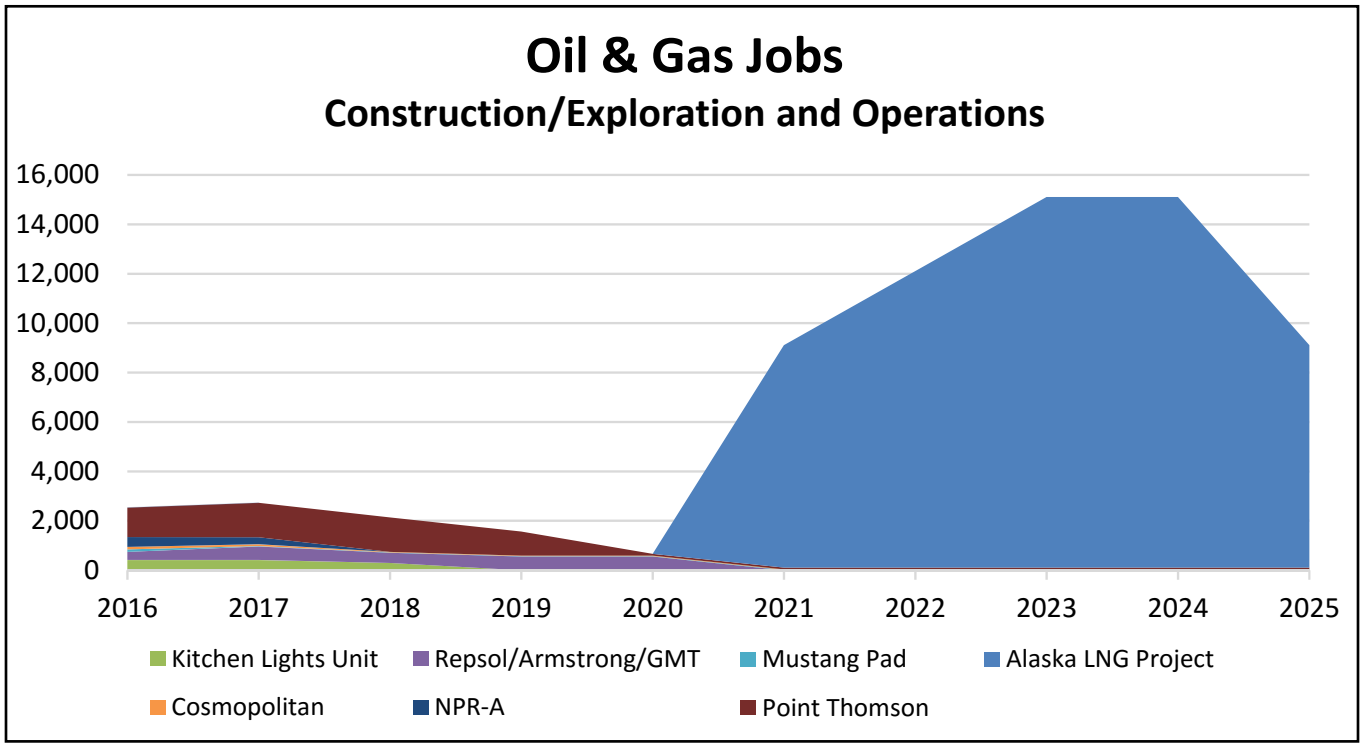


FIGURE 5. Oil and Gas Jobs, Exploration, Development and Operation. Total potential jobs related to proposed oil and gas projects over the next decade.

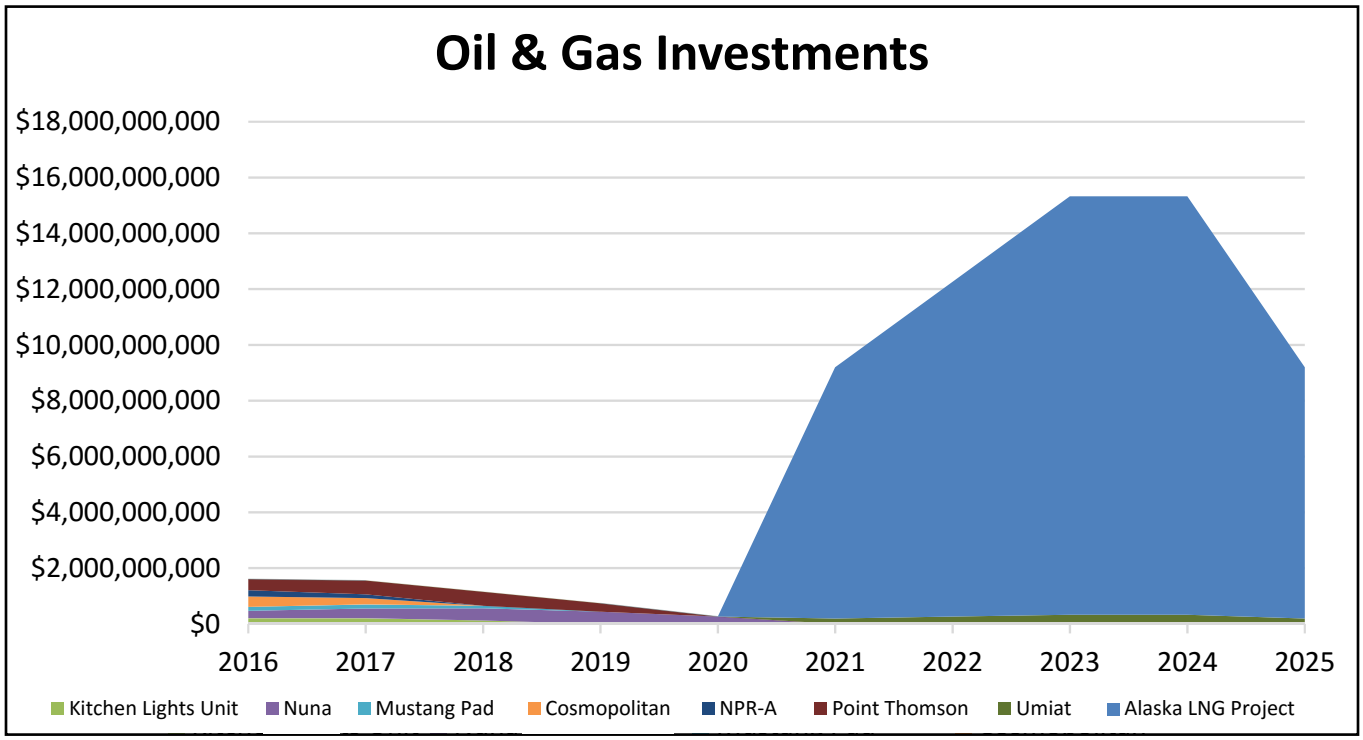


FIGURE 6. Oil and Gas Project Investments. Total potential spending related to proposed oil and gas projects over the next decade.

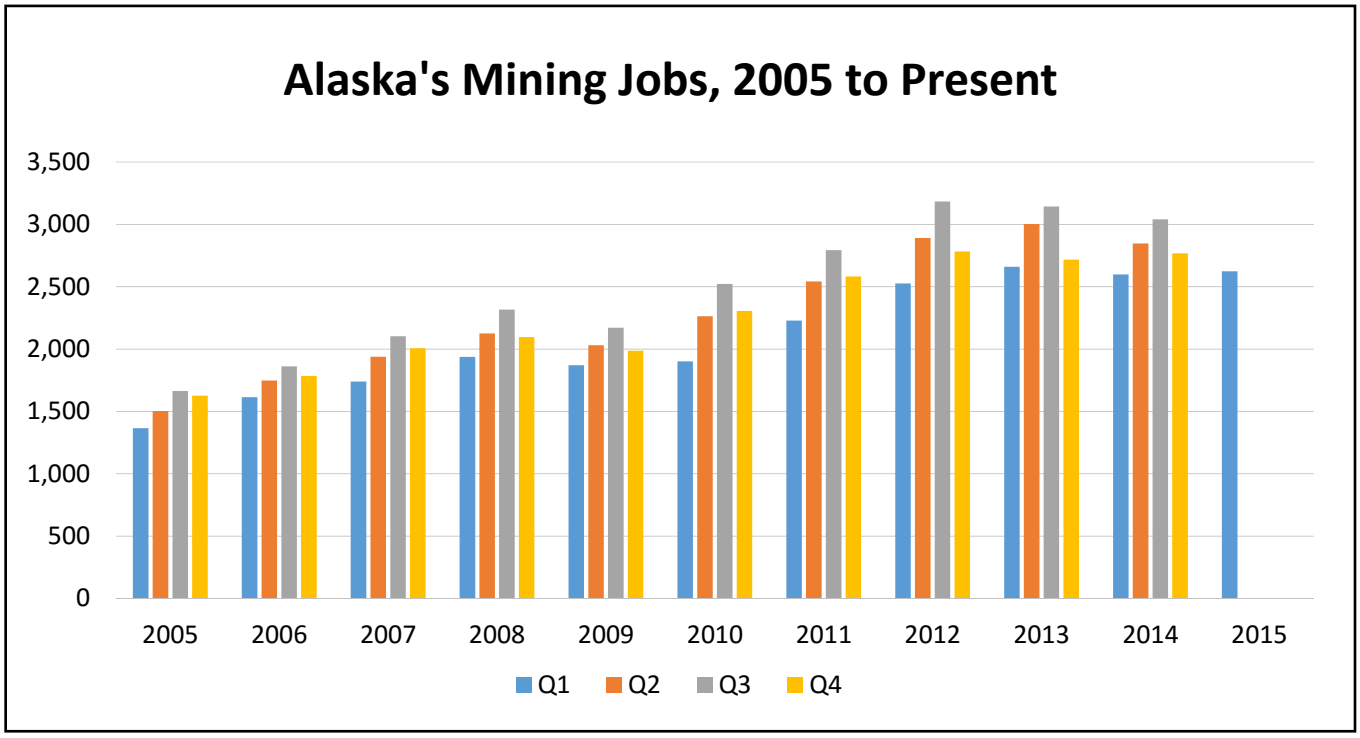


FIGURE 7. Alaska's Mining Jobs, 2005 to Present.

Figures Eight and Nine offer the narrow view of proposed mining projects only and, again, address potential total jobs and spending related to these projects over the next decade.

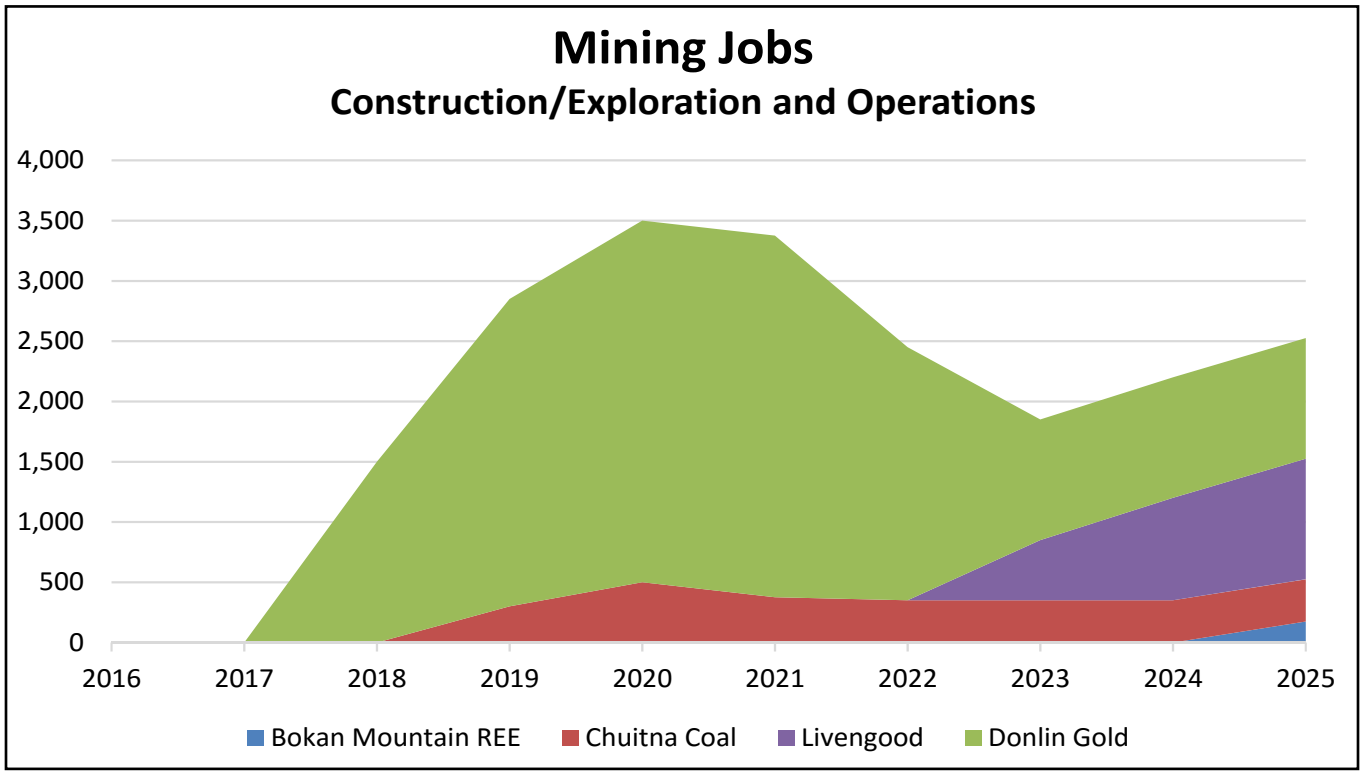


FIGURE 8. Mining Jobs, Construction/Exploration and Operations. Total potential jobs related to mining projects over the next decade.

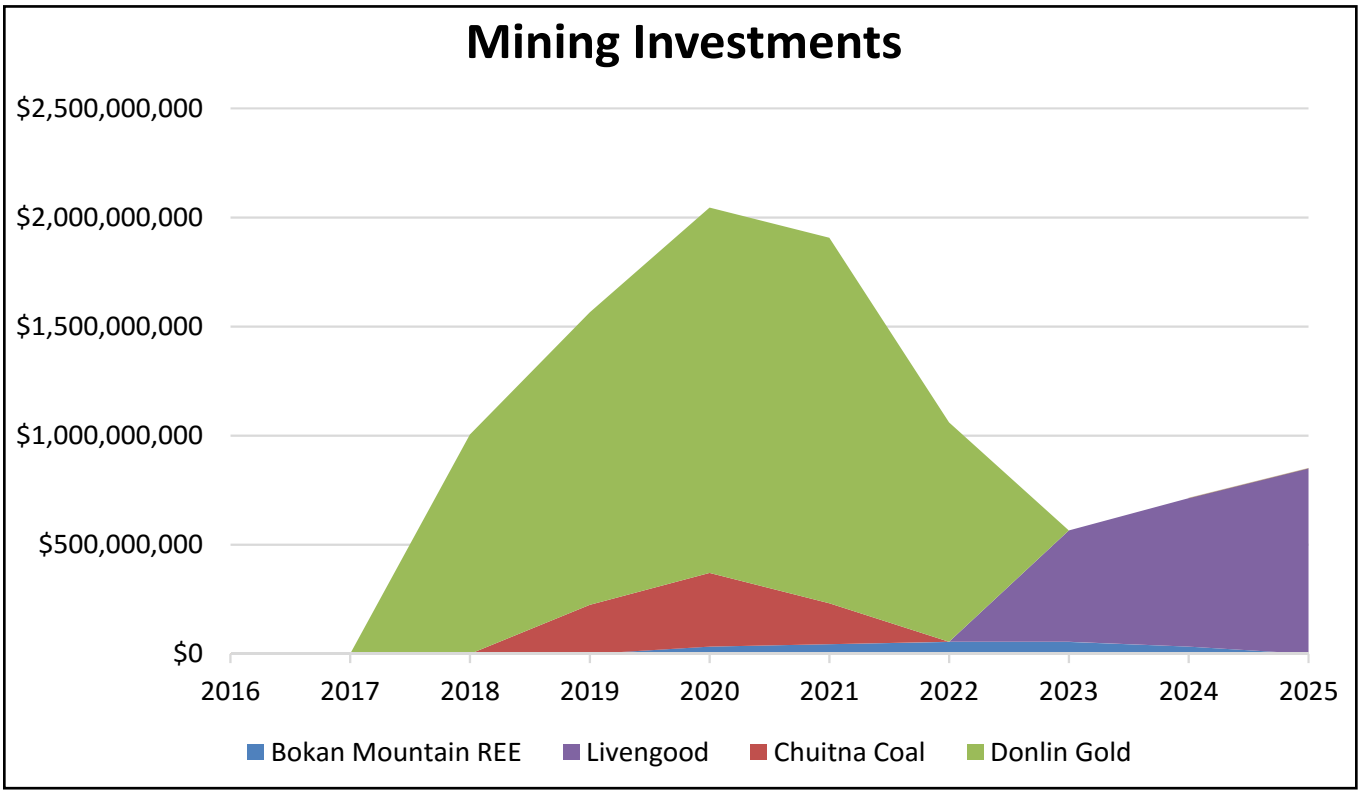


FIGURE 9. Mining Investments. Total potential spending related to mining projects over the next decade.

BACKGROUND INFORMATION OVERVIEW

In prior years, the Resource Extraction Projects Projection has presented oil and gas projects in various ways. We have looked at which projects could be considered far enough along to actually be considered "plans" and which were ideas to watch. We compared projects with a greater than 50 percent likelihood to those with less than a 50/50 chance. We assembled massive appendices detailing the latest information on various projects. In the 2013 edition, we moved away from classifying fields as proposed or to be watched, as this brought an element of picking winners and losers into the equation.

This report is divided into two sections, Oil & Gas and Mining, each beginning with an article of interest for the industry.

In previous reports, we wrote of the three steps required to bring about oil and gas production: exploration to find hydrocarbons, investments to develop a field (including required supporting infrastructure) and finally production. We now look at the world through these three phases and assign each oil and gas project to one of the three. Our goal is to provide summaries of recent activities to allow the reader to judge each project based on its merits. Of course, as a 10-year projection report, some prognostication is required and AEDC's perspective on job numbers and project investment levels is shown in the preceding graphs. The following sections contain the factual background information upon which these projections are based.

This report is divided into two sections, Oil & Gas and Mining, each beginning with an article of interest for the industry. Next, the oil and gas project overviews are presented in three groupings: producing units; active drilling and exploration; and other early stage projects. The mining section is presented in two parts, proposed projects and existing operations. At the end of each resource section, maps are provided to show the distribution of projects across Alaska.

2009 10-Year Resource Extraction Report Retrospective

By Dan Dickinson

Although there are earlier publications, the 2009 Resource Extraction Report was the first formal report on the subject. In it, AEDC focused on three categories of projects: 11 were detailed as having at least a 50 percent or better chance of actually coming to pass. Four more projects were discussed, even though they were viewed as having less than a 50 percent chance. The final category were projects in their early stages that might, with a little more work and definition, become projects about which actual odds could be expressed. This year, we will take a look at how these projects have fared over the last six years and some of the reasons why they did or did not succeed.

MOST LIKELY TO SUCCEED

Of the 11 projects, three were pipelines and eight were resource plays. As detailed below:

- Three have been placed in service and are producing or transporting oil and gas,
- Four are drilling away, with three anticipated to be placed in service in the near future, and
- Four are still largely on paper, although that doesn't mean there isn't a great amount of paper flowing.

The three projects from the 2009 report that have become a reality are the Nikaitchuq and North Fork plays and ENSTAR's Cook Inlet gas pipeline.

The Nikaitchuq and North Fork plays are now producing North Slope oil and Cook Inlet gas, respectively. ENI brought the Nikaitchuq field on line, which the 2009 report predicted would occur in December 2010; it actually occurred in January of 2011. Armstrong was an original owner in this property and brought ENI and the other working interest owners in. Armstrong developed the North Fork gas field on the Cook Inlet to production and later sold it to Cook Inlet Energy.

Finally, ENSTAR completed an extension to its pipeline on the west side of Cook Inlet that joined up with a pipeline built from the North Fork field. Soon after completing that extension, the State of Alaska paid most of the cost of extending the pipeline all the way to Homer and allowing the Kenai Peninsula's natural gas to be used there as a fuel.

Measured by drilling activity, four of the projects have definitely advanced since 2009. However, none have advanced to production, even though three of the four were predicted to be producing by 2015. ConocoPhillips (with partner Anadarko) is currently drilling production wells at CD-5, an extension of the Colville River (also referred to as Alpine) unit into the NPR-A. First oil is anticipated in 2015. In the 2009 report, that date was 2012.

ExxonMobil (with minority owners including ConocoPhillips, BP and a host of small entities that total less than 2 percent) is currently drilling the two wells that it will produce from when the Point Thomson project comes on line in 2016. Although not designated as a separate project, a pipeline connecting Point Thomson to the North Slope pipeline grid was recently completed. The 2009 report anticipated bringing the project on line in 2014.

ConocoPhillips (with partner Anadarko) has drilled exploration wells, most recently the Flattop and Rendezvous wells in 2013 and 2014, in the Greater Mooses Tooth unit in the NPR-A. ConocoPhillips has federal approval for its current plan of development, however, soon after receiving that approval the company announced it would "slow the pace of development" due to "permitting delays and requirements, as well as the current lower oil price environment."[1] In the 2009 report, first oil was anticipated in 2012.

[1] *ConocoPhillips Alaska. (Updated 2015, March 9).* Greater Mooses Tooth 1 (GMT1). Accessed at http://alaska.conocophillips.com/Documents/Fact_Sheet_GMT1_final.pdf

The fourth project in this category is what the 2009 report called the "Armstrong" North Slope projects, which can be found in this report as Repsol's exploration activity. Armstrong's business model was to evaluate and obtain leases, then bring in partners to finance and operate the projects through the development and production stages. In 2011, it sold their majority interests in a set of leases between the ConocoPhillips operated Kuparuk and Colville River fields to Repsol, while retaining a minority interest. Repsol has been exploring there for the last four years. While no specific results from the wells have been announced, a decision and plan on future development has long been expected. The 2009 report anticipated that Armstrong would continue to use its model and bring in other partners to develop this area; however, no specific date was anticipated. Current announcements by Repsol and Armstrong oil are that they are deferring their 2015/2016 drilling programs due to low oil prices and have put the timeline for future development of this prospect on hold, putting hundreds of contractor jobs at risk.

Although some procurement and field work has occurred, none of the four remaining projects have found sufficient shape or definition to actually proceed with construction or drilling. The first two projects are gas lines that would transport gas from the North Slope to market. In 2009, that was conceptualized as one in-state line to the Cook Inlet, and one export line to Alberta. In the plan's current iteration, the export option is now seen by many as a pipeline to Cook Inlet where the gas would be converted to LNG before being shipped to markets currently envisioned as in Asia. While current field work and pre-engineering work may be useful to any of the gas line projects, no actual construction has occurred on any of them.

The 2009 report's overview on BP's Liberty project is the third project in this category. In 2014, BP brought Hilcorp in as 50% owner and operator, and in 2015, Hilcorp submitted a plan of development which is now waiting for approval. The 1997 Liberty #1 well remains the last well drilled in this prospect.[2]

The final project judged as more likely than not to proceed was FEX's NPR-A exploration. At the time, the FEX project had already suspended exploratory drilling for three seasons while Calgary based Talisman, FEX's owner, evaluated next steps. Eventually Talisman announced it would wrap up its Alaska operations. By 2011, it plugged and abandoned the pre-2009 exploration wells it had drilled and closed its Alaska office. The project may yet have a chance at development however. While Talisman had turned away from Alaska, FEX's parent company Talisman was acquired by Repsol in 2015, which continues to actively explore in Alaska.

Even if Repsol chooses not to revisit Talisman's exploration program other companies might. The Petroleum News reported Alaska-based developer NordAq permitted an eight well program that was supposed to be drilled between 2013 and 2015, built around the FEX exploratory wells.[3] However, through September of 2015, none of those proposed wells have been drilled. Instead, in June of 2015, Caelus energy announced that it had acquired an interest in many of the same leases from Nordaq and would undertake a two well exploratory program at Tulimaniq in 2015-2016.[4] It remains to be seen if they will accomplish their goal.

[2] Hilcorp Alaska, LLC. (Revised 2015, September 6) Liberty Development Project Revision One. Accessed at http://www.boem.gov/Hilcorp-Liberty/

[3] Lidj, E. (2015, June 7). Explorers 2015: NordAq pursuing targets in two Alaska basins. *Petroleum News.* Accessed at http://www.petroleumnews.com/pntruncate/968097665.shtml

[4] Bradner, T. (2015, June 18). Caelus Expands North Slope Assets. *Alaska Journal of Commerce.* Accessed at http://www.alaskajournal.com/Alaska-Journal-of-Commerce/Breaking-News-2015/Caelus-expands-North-Slope-Assets/

THE OTHER PROJECTS

And what of the projects with less than a 50 percent chance? Four were listed and, again, the results are mixed. While none are yet producing, three remain active with some showing more life than their more favored 2009 counterparts.

Although Anadarko performed some non-rig tests on the Chandler #1 well in its Gubik prospect in 2012, no wells have been drilled there since 2009, and Anadarko has yet to announce further plans. What was referred to in 2009 as Pioneer's Cosmopolitan project is now BlueCrest's Cosmopolitan project. BlueCrest had drilled an additional offshore well and announced plans to develop the project from on-shore where a site has been cleared. First oil is hoped for in 2016. During the fall of 2015, Shell was back on site in the Outer Continental Shelf (OCS) drilling its long delayed exploration program. While Shell has accumulated over seven billion dollars of sunk costs so far, poor results from this year's drilling have led to a decision to halt development of their Chukchi Sea prospects and pull out of Alaska.

The final project ranked below 50 percent included up to 15 small North Slope developments built by independents. Only one example was given, Brooks Range Petroleum Corporation's (BRPC) Beechy Point. That may prove to be a prescient example. Although in a different field, BRPC is drilling or has completed several development wells in the Southern Miluveach unit. They are building production facilities and expect first oil in 2016. At the moment, that remains the only such independent drilling development well planning for first production in the region.

SIZE MATTERS

Are there any insights to be drawn from this varied history? One conclusion is that size does matter. Consider the 11 specific projects viewed as more likely than not. The three smallest, the Kenai Peninsula's gas fields and connecting pipeline, were all built. Costs were in the tens of millions of dollars. Translated into barrels per day, those three assets together deliver the barrel equivalent of 1,500 barrels of oil.

At the other extreme, the two megaprojects – the visions for transporting gas from the North Slope of Alaska to a market – remain largely on paper. Costs for the Alberta line were estimated to be up to three orders of magnitudes larger than the completed Kenai projects, in the realm of tens of billions of dollars. A project pegged at delivering 4.2 billion cubic feet of gas per day translates to roughly 700,000 barrels equivalents per day, also three orders of magnitude larger than North Fork.

Along a gradient of barrel equivalents and in between these two extremes are the other six oil-producing prospects. Again, the two largest projects are the least developed in some respects. The NPR-A is estimated of being capable of production of roughly 500,000 barrels (bbls) per day. Most of that potential is purely on paper. However, small pieces like CD-5 are actually coming to fruition. The Hilcorp/BP Liberty project is estimated to peak at 70,000 bbls per day but it is also largely still on paper.

The four remaining projects are all of a similar order of magnitude and are experiencing varying levels of success. The current phase of Exxon's Pt. Thomson project and ConocoPhillips' CD-5 development each anticipate around 10,000 bbls per day of production and are progressing steadily. Armstrong's North Slope prospects and FEX's plays, however, have not fared as well and have no development plans in the works.

So size matters, but how? Many small projects get built. Many megaprojects get proposed and some may even get billions of dollars of feasibility studies. But few get built. The projects most likely to get built are those that are "scalable." That is to say, while development of petroleum in the NPR-A is a megaproject, it will be made up of many smaller developments. A gas line from the North Slope to market is (after initial gated steps) pretty much an all or nothing proposition, making the process of bringing it to reality much more complex.

The lesson here may reflect another aspect of the current debates in our political life. Prudhoe Bay is a super-giant field, developing it was a megaproject and it happened. The effects on the state of Alaska were profound and pervasive. However, bringing such megaprojects to conclusion appears to be a relatively rare occurrence. This may be cause for concern for those hoping for the transformative effects of another Prudhoe Bay through a new a gas line, full NPR-A or OCS development. On the other hand, other projects, such as bringing a small gas field on line and building a pipeline to connect that gas to local consumers, contribute to our economy. Starting next year, three more fields will each add roughly 10,000 bbls to the Trans-Alaska Pipeline System. Smaller projects are being built; persevering through hurdles and coming on line, even if somewhat later than their original timetables. These are all good signs that should not be overshadowed by the lengthy development schedules and complications the transformative megaprojects.

Dan E. Dickinson is a certified public accountant in the Anchorage office of BDO USA LLP. Trained as a geologist at Brown University and currently holding a CPA license in Alaska, Dan has served in several state and municipal administrations, including serving as Director of Tax for the State of Alaska in the administrations of Governors Tony Knowles and Frank Murkowski. His practice concentrates on state and local taxes (SALT) with a focus on oil and gas. The spectrum of his work ranges from compliance and mechanics to long-range fiscal policy issues.

NORTH SLOPE DEVELOPMENTS

Alaska's North Slope oil production is mainly derived from the super-giant Prudhoe Bay field, with additional input from a handful of nearby fields, many of them giant fields.[5] Peak production of 2 million bbls per day and the subsequent years of decline are clearly illustrated in Figure 10.

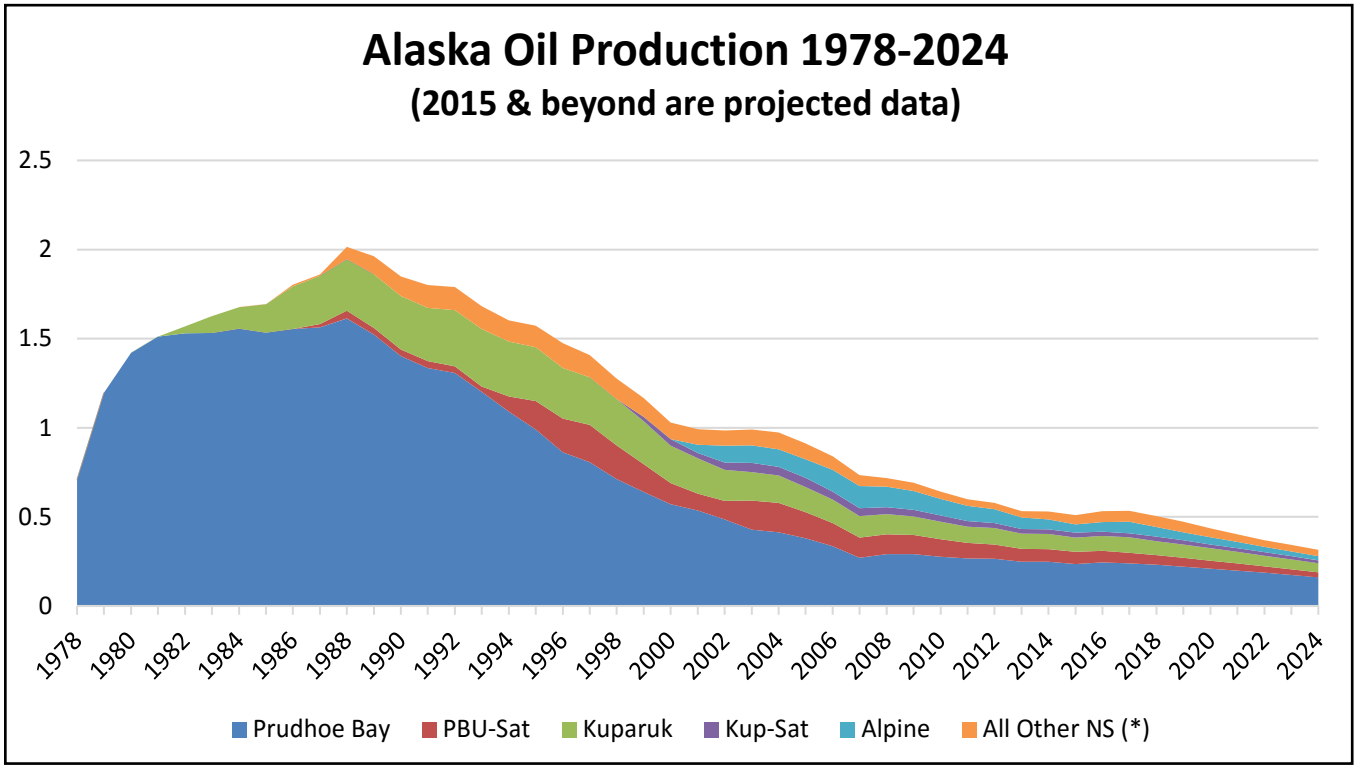


FIGURE 10. Alaska Oil Production 1978-2024 (2015 & beyond are project data). Alaska oil production from North Slope oil fields.

*"All Other NS" includes Endicott, NPR-A, Pt. Thomson, Northstar, Oooguruk, Nikaitchuq, and Liberty fields
Source: Alaska Department of Revenue, Fall 2014 Revenue Sources Book & earlier RSB, DNR 2007 Oil and Gas Report (projected out to 2025)

[5] Although no official definition exists, generally fields with over a half billion barrels are considered "giant" fields. Super-giants are an order of magnitude larger with over 5 billion barrels.

Resource development in the North Slope of Alaska repeats a pattern found around the world. Large fields typically have several owners and those owners hire someone, frequently one of the companies with a large ownership share, to be the operator and run the field according to the wishes of the other owners.

As we can see from Table One, there are three owners that own about 82 percent of the production. At the other extreme, the 10 companies with the smallest ownership shares own about three-tenths of one percent. There are five companies that have stakes in at least three of the producing fields. ConocoPhillips has the most production spread across four fields, about 40 percent of the total.

TABLE 1. Oil Production by Unit & Ownership, North Slope, FY 2015 (July 1, 2014 - June 30, 2015).

		OWNERS										
Unit	Production by Unit	Conoco Phillips	BP	Exxon Mobil	ENI	Anadarko	Chevron	Hilcorp	Pioneer/ Caelus[1]	Savant/ Miller[1]	ASRC	9 Others[2]
Badami	359,617									242,741	116,876	
Colville River	17,454,024	13,376,764				3,913,192						164,068
Endicott	2,613,204			647,029			515,063	1,385,521				65,591
Kuparuk River	38,528,606	20,809,300	14,756,456	1,055,684			1,907,166					
Milne Point	6,876,581		3,310,386		74,955			3,361,960				129,280
Nikaitchuq	8,817,188				8,817,188							
Northstar	3,248,772							3,248,772				
Oooguruk	4,773,837				1,305,644	18,141			3,403,746			46,306
Prudhoe Bay	83,817,493	30,241,351	22,094,291	30,509,567			972,283					
Totals	166,489,322	64,427,415	40,161,133	32,212,280	10,197,787	3,931,333	3,394,512	7,996,253	3,403,746	242,741	116,876	405,245
Barrels per Day (bbls)	456,135	176,513	110,031	88,253	27,939	10,771	9,300	21,908	9,325	665	320	1,110
Percentage of Total	-	38.7%	24.1%	19.3%	6.1%	2.4%	2.0%	4.8%	2.0%	0.1%	0.1%	0.2%

Totals include royalty barrels owned by the State of Alaska

[1] During 2014, Caelus Energy LLC took over Pioneer's Units, while Cook Inlet Energy/Miller Energy acquired Savant's.

[2] The "9 Other" owners are George Alan Joyce, Jr., Herbaly Exploration LLC, Kerr-McGee Oil & Gas Corp., Murphy Exploration (Alaska), Inc., NANA Regional Corp., Inc., Petro-Hunt, LLC, Phillips Alaska, Inc., Rosewood Resources, Inc. & XH, LLC. The largest of these producers averaged less than 500 bbls.

Sources: Alaska Oil and Gas Conservation Commission, Alaska Department of Natural Resources

Each unit has an operator in charge of the day-to-day operations and infrastructure needed for extraction. BP's operations produce the most oil, around 60 percent of the North Slope total, mostly coming from the Prudhoe Bay unit. For the first 30 years of North Slope extraction operations, BP and ConocoPhillips (or it predecessor ARCO) were the only operators of producing fields. Since 2008, however, ENI, Caelus, Hilcorp and Savant have become production operators in the region, soon to be joined by ExxonMobil (which operates all over the world) and Brooks Range Petroleum Corporation (which does not.)

TABLE 2. Oil Production by Unit & Operator. North Slope, FY 2015 (July 1, 2014 - June 30, 2015). Unit owner's oil production by barrel per day.

		UNIT OPERATOR				
Unit	Production by Unit	Conoco Phillips	BP	ENI	Pioneer/ Caelus[1]	Savant/ Miller[1]
Badami	359,617					359,617
Colville River	17,454,024	17,454,024				
Endicott	2,613,204		2,613,204			
Kuparuk River	38,528,606	38,528,606				
Milne Point	6,876,581		6,876,581			
Nikaitchuq	8,817,188			8,817,188		
Northstar	3,248,772		3,248,772			
Oooguruk	4,773,837				4,773,837	
Prudhoe Bay	83,817,493		83,817,493			
Totals	166,489,322	55,982,630	96,556,050	8,817,188	4,773,837	359,617
Barrels per Day (bbls)	456,135	153,377	264,537	24,157	13,079	985
Percentage of Total	-	33.6%	58.0%	5.3%	2.9%	0.2%

[1] During 2014, Caelus Energy LLC took over Pioneer's Units, while Cook Inlet Energy/Miller Energy acquired Savant's.

Sources: Alaska Oil and Gas Conservation Commission, Alaska Department of Natural Resources

COOK INLET DEVELOPMENTS

Table Three presents the oil production from the Cook Inlet. Cook Inlet accounts for roughly 4 percent of the oil produced in Alaska. Here the producer story is the exact opposite from the North Slope. As recently as 2010, there were more than six companies producing oil in the Cook Inlet. However, most of them were acquired by Hilcorp between in 2011 and 2012. Now there are only three and Hilcorp has announced that it has agreed to buy out one of those: XTO. Miller Energy Resources (Miller Energy), the owner of Cook Inlet Energy, has announced it has filed for bankruptcy protection and is selling non-core assets, however it is not clear whether those might include its Cook Inlet oil production.

TABLE 3. Oil Production by Unit and Ownership, Cook Inlet, FY 2015 (July 1, 2014 - June 30, 2015). Cook Inlet gas producing units.

		OWNERS		
Unit	Production by Unit	Hilcorp	Cook Inlet Energy	XTO Energy Inc.[1]
Swanson River	902,569	902,569		
Beaver Creek	43,209	43,209		
Reboubt Shoal	358,635		358,635	
W. McArthur River	546,304		546,304	
Trading Bay	1,102,273	1,102,273		
Granite Point	968,471	968,471		
Middle Ground Shoal	706,621	161,958		544,663
McArthur River	2,037,649	2,037,649		
Totals	6,665,731	5,216,129	904,939	544,663
Barrels per Day	18,262	14,291	2,479	1,492
Percentage of Total	-	78.3%	13.6%	8.2%

[1] In FY 2015, Hilcorp bought out XTO's interests in Cook Inlet.

Sources: Alaska Oil and Gas Conservation Commission, Alaska Department of Natural Resources

The Cook Inlet field is also a gas producer, producing some gas that is exported as liquefied natural gas, but the majority of it is utilized by Alaska consumers. While the North Slope also has sizable gas resources, most of it is used to power the operations that produce oil, or it is re-injected into the field to help produce the oil. There is some of re-injection done in the Cook Inlet as well.

TABLE 4. Natural Gas Production by Field & Owner, Cook Inlet, FY 2015 (July 1, 2014 - June 30, 2015). Ownership of Cook Inlet producing units.

		OWNERS							
Field	Total Gas Produced	Hilcorp	ConocoPhillips Entities	Municipality of Anchorage	Buccaneer/ AIX Energy[1]	Cook Inlet Energy	Aurora Gas, LLC	XTO Energy Inc.	Uncommited
Albert Kaloa	5,604						5,604		
Beaver Creek	6,073,720	6,073,720							
Beluga River	24,197,743	4,033,764	12,098,872	8,065,108					
Deep Creek	2,707,032	2,702,159							4,873
Granite Point	820,847	820,847							
Ivan River	561,561	561,561							
Kasilof	0	0							
Kenai	24,080,508	24,080,508							
Kenai C.L.U.	3,021,730	3,004,204							17,526
Kenai Loop	3,347,229				3,347,229				
Lewis River	380,408	380,408							
Lone Creek	492,298						492,298		
McArthur River	11,927,805	11,927,805							
Middle Ground Shoal	269,450	61,758						207,692	
Moquawkie	75,772						75,772		
Nicolai Creek	397,049						397,049		
Nikolaevsk	90,300	90,300							
Ninilchik	14,536,079	14,044,760							491,319
North Cook Inlet	7,550,474		7,550,474						
North Fork*	3,319,051					3,319,051			
Pretty Creek	568	568							
Redoubt Shoal	97,682	97,682							
Sterling	738	737							1
Swanson River	3,376,096	3,376,096							
Three Mile Creek	72,781					21,834	50,947		
West Forelands	67,119	53,695	13,424						
West Fork	48,391	48,391							
West McArthur River	170,589					170,589			
Total	107,688,624	71,358,963	19,662,770	8,065,108	3,347,229	3,511,474	1,021,670	207,692	513,719
1,000 Cubic Feet/Day	295,037	195,504	53,871	22,096	9,170	9,620	2,799	569	1,407
Percentage		66.3%	18.3%	7.5%	3.1%	3.3%	0.9%	0.2%	0.5%
Cumulative Percentage		66.3%	84.5%	92.0%	95.1%	98.4%	99.3%	99.5%	100.0%

[1] In late 2014, AIX Energy acquired Buccaneer's assets out of bankruptcy.

* Effective February 2014, Cook Inlet Energy owns 100% of the North Fork Field. Previously, the ownership was split between Dale Resources Alaska, LLC (35%), GMT Exploration Co. LLC (30%), Armstrong Cook Inlet, LLC (20%), Jonah Gas Co., LLC (7.5%) and Nerd Gas Co., LLC (7.5%).

Sources: Alaska Oil and Gas Conservation Commission, Alaska Department of Natural Resources

As these tables indicate, there are nine operators active in Alaska.

- BP operates the largest field, Prudhoe Bay, on the North Slope.
- ConocoPhillips has the most production, though only around half of it comes from the two North Slope fields it operates, the Kuparuk and Colville River units, as well as gas fields in the Cook Inlet.
- Hilcorp, which operates most of the fields in the Cook Inlet, acquired all of BP's interests in Endicott and Northstar and half of BP's interests in both Milne Point and Liberty in 2014.
- Cook Inlet Energy, which operates oil and gas fields in the Cook Inlet, and Savant Alaska, the operator of Badami on the North Slope, are both wholly owned by Miller Energy.
- ENI operates one North Slope field.
- Caelus operates the Oooguruk unit on the North Slope.
- XTO, a wholly owned subsidiary of Exxon, operates two producing platforms in the Cook Inlet. They have announced the sale of those properties to Hilcorp.
- Aurora operates several Cook Inlet gas fields.
- As of 2015, AIX operates one Cook Inlet gas field. It was acquired from Buccaneer, the previous operator, as part of the latter's bankruptcy.

A year ago we predicted that no less than three and possibly more companies would bring projects in the development section to completion sometime within the next two years, with those three entities to be added to the list of operators. A year later, we still expect Exxon, Furie and Brooks Range Petroleum to become operators of producing properties in 2016.

PRODUCING UNIT OVERVIEWS

AURORA GAS COOK INLET PRODUCING PROPERTIES

Overview

Aurora Gas is the smallest of the Cook Inlet operators. It operates five gas fields on the west side of the Cook Inlet. In 2015, they began permitting additional west side wells as well as two east side wells. During the summer of 2015, Aurora applied for permits to do exploratory drilling in six prospect, four on the west side of Cook Inlet and two on the Kenai Peninsula. Additionally, in September, permitting for two exploration wells at Theodore River began.

Start Date: Currently in Production
Duration of Project: Unknown
Job: Unknown
Total Project Costs: Unknown

BADAMI PRODUCING UNIT

Overview

The Badami unit is located on the eastern North Slope, onshore and offshore between Endicott and Point Thompson fields. BP brought Badami on line in 1998, however it has only been producing intermittently. Savant became the unit operator in January 2012, and drilled the Red Wolf No. 2 exploration well which proved to be a dry hole. In 2014, Miller Energy acquired Savant's share of Badami. Although aggressive expansion plans were initially laid out for 2015, Miller Energy recently filed for bankruptcy protection and is considering selling its stake in this unit. Badami produces less than 1,000 bbls a day of oil.

Start Date: Currently in production
Duration of Project: Unknown
Jobs: Savant had 55 contractors and employees working at Badami
Total Project Costs: Unknown

COLVILLE RIVER PRODUCING UNIT AND THE CD-5 EXPANSION IN THE NPR-A

Overview

Located about 40 miles west of the Kuparuk River unit, the Colville River unit came on line in 2000, and including satellite production, has produced over 489 million barrels (gross) through June 2015. Peak production of 123,000 bbls per day occurred in 2006, before three satellites were added. The unit abuts the Colville River, which generally divides state-selected lands on the North Slope from the federally owned NPR-A. It took over seven years for operator ConocoPhillips to receive approval for its CD-5 satellite development five miles to the west in the NPR-A. In September of 2015, development drilling began and first oil is expected to be produced by the end of the year. The project is expected to eventually produce 16,000 bbls per day.

Start Date: Colville River currently in production, as well as satellites Fiord, Nanuq and Qannik. CD-5 construction started 2014, first oil anticipated late 2015

Duration of Project: Unknown
Jobs: Total unknown: Estimated 700 jobs (direct and indirect) during peak construction
Total Project Costs: (CD-5) $1 billion (gross)

COOK INLET ACQUISITIONS BY HILCORP ENERGY

Overview

The first commercially produced oil in Alaska was produced from the Swanson River field in the Cook Inlet. Although gas now dominates its hydrocarbon production, at its height in the early seventies, Cook Inlet oil production peaked at over 200,000 bbls per day. The gas production from this area once fed a large fertilizer plant and an active LNG export facility, but as of 2012, most of the gas produced is used in the railbelt of Alaska. In 2011 and 2012, Hilcorp acquired the assets of the largest Cook Inlet producers, Marathon and Chevron, as well some other smaller assets. Hilcorp has also announced that it is acquiring XTO's Cook Inlet producing assets: the "A" and "C" platforms. Hilcorp has announced investments of several hundred million dollars over the next several years which would include bringing four new rigs into the inlet. While its acquisitions have been dramatic, its approach to development is to make marginal improvements in existing assets. In 2013, President Greg Lalicker stated that Hilcorp's approach to Cook Inlet would be "what we specialize in as a company: lots of little things." By the summer of 2015, the Cook Inlet was producing over twice the amount of oil every day that it had been in 2008, the nadir year for Cook Inlet oil production, with most of the production coming from Hilcorp operated properties. Hilcorp is also pursuing two exploration projects. At Ninilchik, it completed the Fall Creek #6 well in 2014. To date, Ninilchik has not shown any evidence of the hoped for commercial oil plays, however the unsuccessful oil wells have proved to be successful gas producers. In September of 2015, Hilcorp began the permitting process for a new drilling pad at their Deep Creek unit in support of a two well natural gas exploration program at the site. The first test well is scheduled to be drilled over the winter.

Start Date: Currently in production
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Total unknown, roughly $300 to $350 million a year in investment

KENAI LOOP PROJECT, COOK INLET

Overview

This project moved into the producing category when Buccaneer Alaska found gas with its Kenai Loop #1 well in 2011, and began production in 2012. Before declaring bankruptcy in 2014, Buccaneer had drilled additional wells. AIX purchased the properties, and managed to settle the outstanding legal questions as to whose leases were being drained. AIX has not detailed its future plans.

Start Date: In progress
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

KUPARUK RIVER PRODUCING UNIT

Overview

The Kuparuk River unit was discovered in 1969, around 40 miles west of Prudhoe Bay. First oil was produced in 1981, with peak production of 340,000 bbls per day occurring in 1992. Total oil produced through June of 2015, exceeded 2.6 billion barrels with over 500 producing wells. Since production began, the Kuparuk owners have spent more than $5.6 billion to develop and implement programs to optimize oil recovery at the unit. Kuparuk, operated by ConocoPhillips, is the second largest oil field on the North Slope. Current infield expansion includes the development of drill site 2S. In October 2015, production began at the 2S site and it is expected to add 8,000 bbls to TAPS at peak production.

Start Date: Currently in production, 2S construction began in 2014
Duration of Project: Unknown, first oil from 2S began in October 2015
Jobs: Unknown, 230 peak construction jobs estimated for 2S.
Total Project Costs: Unknown, 2S costs estimated at $600 million (gross)

MILNE POINT, ENDICOTT, NORTHSTAR

Overview

Milne Point, Endicott and Northstar are a trio of North Slope fields that include both onshore and offshore production. Through June of 2015, these fields had a cumulative production since startup of about 1 billion barrels of oil. Hilcorp operates all three units, and in 2014, they acquired BP's interest in the Endicott and Northstar oilfields, as well as a 50 percent interest in the Milne Point producing field. Milne Point was the site of the Cold Heavy Oil Production with Sand (CHOPS) pilot project, originally developed to discover ways to produce cold and heavy oil. BP started up a $150 million heavy oil pilot program on the Milne Point S-Pad in 2007, in an effort to find an economical way to extract Ugnu heavy oil. Although initial results were encouraging, in 2013, the four wells in this program produced until they developed mechanical problems and were shut down, bringing a close to the CHOPS project.

Start Date: Currently in production
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

NIKAITCHUQ PRODUCING UNIT

Overview

The Nikaitchuq producing unit, operated by Eni Petroleum, is located immediately north of the Kuparuk unit and northeast of the Oooguruk unit. Shown as a "planned project" in the 2010 report, Eni produced first oil from the unit in January 2011. As of the end of 2014, Eni has drilled most of the 55 extended reach wells initially planned for full development. These include 28 producing wells, 22 water injection wells, three water source wells and two disposal wells. With that drilling, Eni has attained production of 25,000 bbls per day. Eni is currently evaluating both infield and geographic expansion, aiming to add "N" sands contingent resources to its reserves base.

Start Date: Currently in production
Duration of Project: At least 30 years
Jobs: 650 jobs created during construction through 2011, 200 jobs created during development drilling from

2011-2014, and 60 jobs created during field operation from 2015, until the end of production
Total Project Costs: Around $2 billion

NORTH FORK UNIT

Overview

The North Fork unit was designated a project to watch in earlier resource extraction reports until 2011, when it began producing gas and graduated to a producing Cook Inlet unit. Armstrong believed the prospect, originally discovered back in the sixties, was far from fully delineated, but said early results suggest a field between 7.5 billion and 12.5 billion cubic feet of gas, with the possibility of as much as 20 billion to 60 billion. In early 2014, the field and associated infrastructure were acquired by Cook Inlet Energy, a subsidiary of Miller Energy which drilled three wells there in 2014 and early 2015. Further expansion of North Fork production operations remains uncertain due to Miller Energy's bankruptcy announcement. Cook Inlet Energy also produces oil and gas from onshore and offshore properties on the west side of Cook Inlet.

Start Date: In production
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

OOOGURUK PRODUCING UNIT

Overview

The Oooguruk producing unit is located northwest of Oliktok in the Beaufort Sea's Harrison Bay, northwest of the Kuparuk unit. In 2008, Pioneer Natural Resources, Alaska became the first operator independent of the big three to operate a producing field on Alaska's North Slope. Crude is processed at the Kuparuk River unit (KRU) under a facility sharing agreement with KRU. There are an estimated 120-150 million barrels of oil equivalent (boe) in recoverable reserves, resulting in an estimated 30-year commercial life from start-up for the unit, not including liquids from the Nuna project (see Nuna Project overview). In 2014, Pioneer's share as well as operator responsibilities were acquired by Caelus Energy Alaska, LLC.

Start Date: In production
Duration of Project: 30 years from start-up
Jobs: Unknown
Total Project Costs: Approximately $1 billion to date

GREATER PRUDHOE BAY UNIT

Overview

The Prudhoe Bay unit is located on the North Slope. Oil was discovered in the Prudhoe Bay reservoir in 1968, and came on line in 1977. Production averaged more than 1.5 million barrels of oil and natural gas liquids per day for more than a decade. By June of 2015, more than 12.6 billion barrels had been produced from the Prudhoe reservoir, including associated satellite fields Orion, Polaris, Aurora, Midnight Sun, Borealis, Lisburne,

Point McIntyre and Niakuk. Over time, production from Prudhoe Bay has accounted for about 70 percent of all the oil produced in Alaska. Early estimates were 25 billion barrels of oil in place in the Greater Prudhoe Bay area, excluding heavy oil. Initially, engineers thought they could recover 40 percent, but new technologies and techniques increased that estimate to over 60 percent. In 2014, when operator BP announced the sale of four other North Slope assets, part of its rationale was its ability to "play to two of [its] great strengths, managing giant fields and gas value chains," both of which suggest a focus on Prudhoe Bay. For the giant Prudhoe field, BP Alaska president Janet Weiss outlined a multi-year plan with the potential of adding 40,000 bbls per day in production for development of the west end of Prudhoe Bay. It will require investment of $3 billion, and result in more than 130 new wells. BP is already adding two drilling rigs at Prudhoe Bay, one rig by 2015, and a second in 2016, for a total incremental $1 billion investment over five years. As to the gas value chain in the context of rising hopes for a project to move North Slope gas to market, the vast majority of that gas would come from Prudhoe Bay. Perhaps most shocking, but a clear result of the "shale revolution" and other technologies convulsing Lower 48 markets that we reported on at length in the 2013 report, Prudhoe Bay fell to number three in the U.S. Energy Information Agency ranking of the most prolific oil fields in the U.S.[6]

Start Date: Currently in production
Duration of Project: Some estimates as high as decades from now
Jobs: Over 2,000 full-time jobs and 6,300 contractors
Total Project Costs: Over $40 billion to date, which includes development and transportation infrastructure

[6] U.S. Energy Information Administration (EIA). (2015, March). Top 100 U.S. Oil and Gas Fields. Washington, DC. Accessed at http://www.eia.gov/naturalgas/crudeoilreserves/top100/pdf/top100.pdf

ACTIVE DRILLING & EXPLORATION, OIL & GAS

One way of measuring recent progress on oil and gas projects is to review recent drilling, but it is not a perfect measure. As the NPR-A section demonstrates, there are projects first drilled in the 1940s which found hydrocarbons but which have still not been produced. However, drilling is an important step in the development process and a review of the year's activity helps to illustrate producers' interest in particular prospects.

The Alaska Oil and Gas Conservation Commission (AOGCC) is charged with regulating wells in the state and it publishes statistics on wells completed and permitted. For the June 2014 – June 2015 period, the AOGCC published data showing 176 wells completed and 226 permits issued.[7] While drillers are sometimes late in reporting wells to the AOGCC, for the most part this imbalance can be explained by the fact that while every drilled well received a permit, not every permit resulted in a drilled well. One well was drilled in Middle Earth (a widely used name for the region between the North Slope and Cook Inlet), 37 were drilled in the Cook Inlet and 138 were drilled on the North Slope according to AOGCC statistics. Of those North Slope wells, only one was for exploration.

TABLE 5. Oil & Gas Wells Completed in FY 2015, (July 1, 2014 - June 30, 2015), by Operator and Area.

	Development & Service Wells		Exploratory Wells		
	North Slope	Cook Inlet	North Slope	Cook Inlet	Other
BP Exploration (Alaska) Inc.	56				
ConocoPhillips Alaska, Inc.	66				
ENI US Operating Co. Inc.	10				
Caelus Natural Resources Alaska, LLC	4				
Brooks Range Petroleum	1				
Hilcorp Alaska, LLC		30			
Cook Inlet Energy, LLC		5		1	
Repsol E&P USA, Inc.			1		
Furie Operation Alaska, LLC				1	
Usibelli Coal Mine					1
Grand Total:	137	35	1	2	1

Source: AOGCC

[7] Please note that these figures are reflective of the State's Fiscal Year (July 1, 2014 – June 30, 2015). Therefore, they will differ slightly from AOGCC's published statistics which cover the calendar year of 2015.

The vast majority of the wells (172) in Table Five were service or development wells. For the most part, these wells were drilled by operators BP and ConocoPhillips as part of ongoing development of the larger North Slope units or Hilcorp in its Cook Inlet properties. Development wells will be used to actually produce oil while the service wells, including injection wells, are used to support production. ENI and Caelus also drilled service and development wells as part of their respective North Slope unit operations.

In addition, the AOGCC data base shows 226 additional permits were issued in FY 2015. Table Six breaks those permits out by month. Some of those wells were begun in 2015, however, they have not been reported as being completed.

TABLE 6. Well Permits Issued in FY 2015, (July 1, 2014 - June 30, 2015), by Month and Region. Well permits issued to North Slope and Cook Inlet producers in FY 2015.

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Grand Total
Cook Inlet													30
Development & Service Wells													28
Cook Inlet Energy, LLC			1		2	1			2				6
Hilcorp Alaska, LLC	6	4	1	1	3	1		2	2			2	22
Exploratory Wells													2
NordAq Energy, Inc.			1										1
Cook Inlet Energy, LLC		1											1
North Slope													195
Development & Service Wells													188
BP Exploration (Alaska) Inc.	7	8	3	5	3	11	3	7	11	8	7	6	79
ConocoPhillips Alaska Inc.	5	8	7	19	1	6	9	4	13	1	6	6	85
Exxon Mobil Corp.								1					1
ENI US Operating Co. Inc.	3	1		1	1	1	2		2	2	1	1	15
Brooks Range Petroleum					1			1		2			4
Caelus Natural Resources Alaska, LLC			1			1			1			1	4
Exploratory Wells													7
Repsol E&P USA, Inc.							3			1			4
Great Bear Petroleum Operating, LLC							1			1			2
NordAq Energy, Inc.								1					1
Other Areas													1
Exploratory Wells													1
Usibelli Coal Mine		1											1
Grand Total	21	23	14	26	11	21	18	16	31	15	14	16	226

Source: AOGCC

Most of the drilling in the state is in already producing oil and gas fields (there is an old oil patch saying, "the best place to find oil and gas is where you have oil and gas.") There are, however, other exploration projects with active drilling as seen in Table Six and the project overviews throughout this report. Another way of exploring is through seismic exploration, either 3-D or 2-D. Quite a bit of exploration is going on this way.

For example:

- Global Geophysical shot 3-D in the Kadleroshilik River area
- BP has shot 3-D within the Prudhoe Bay unit
- Apache continues to work on seismic shots in the Cook Inlet
- Great Bear used Geokinetics to shoot a 3-D seismic program surrounding its earlier wells
- Caelus used Geokinetics to shoot 3-D seismic in the vicinity of its Oooguruk project
- Seismic exploration was done in the Colville River area
- Ahtna commissioned Global Geophysical to shoot 2-D seismic in the Glenallen area
- SAE was contracted to shoot seismic in the vicinity of the Kitchen Lights unit

ACTIVE DRILLING & EXPLORATION PROJECT OVERVIEWS

COOK INLET ENERGY'S COOK INLET PROSPECTS

Overview

In late 2009, Cook Inlet Energy was acquired by Miller Energy and began to ramp up both its exploratory and developmental well drilling. While it reported one exploration well and five service wells being finished in this period to the AOGCC, they were mostly completed in late 2014.

However, in late 2014 through 2015, filings with the SEC have indicated the company has seen several changes in its upper management and charges of accounting fraud leveled against then current and former corporate officers by the SEC, resulting in the company being delisted from the New York Stock Exchange. Its rigs are no longer active and recent SEC filings indicated that "there is substantial doubt about its ability to continue."[8] As of the company's last financial statement, its debts exceeded the book value of all of its assets. Miller Energy had announced its major focus for the near future to be sale of the company rigs, pursuing private financing to pay down their existing debt of $165 million and selling the company's stake in Badami and possibly other non-core oil and gas assets, among other things. However, these actions have not occurred soon enough and in October, Miller Energy filed for bankruptcy protection. As of October, production has continued at Cook Inlet Energy's wells and Miller Energy expects to keep the well online for the foreseeable future..

Start Date: Started 2010
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

KITCHEN LIGHTS UNIT

Overview

The Kitchen Lights unit (KLU) is located in the Upper Cook Inlet and is operated by Furie Operating Alaska. In 2011, Furie brought the first jack-up rig to the Cook Inlet in almost 20 years. Drilling only during the months that ice conditions allowed in 2011 through 2014, Kitchen Lights #1, #2, #2A, #3, #4 and #5 wells were drilled or begun. Although the well data remains confidential, Furie announced a major gas find as the 2011 drilling season ended. The only other prospect in the unit that has been previously drilled is Corsair where Shell, Phillips and ARCO drilled a total of five exploration wells between 1962 and 1993. These wells all had gas shows and some also tested for small quantities of oil. In 2012, Furie began the process of putting together the first new Cook Inlet platform and accompanying subsea pipelines since 2000. The platform was completed in 2015, and onshore facilities have been installed. In September of 2015, Kitchen Lights Unit #3 was designated as a discovery well by the Alaska Division of Oil and Gas, meaning that the natural gas pools found were previously undiscovered and are capable of producing in paying quantities. Furie expects production to begin by January 2016.

[8] Miller Energy Resources (2015, September 10). Notice under Rule 12b25 of inability to timely file all or part of a form 10 Q or 10 QSB. Accessed Sept. 14, 2015 at ir.millerenergyresources.com/all-sec-filings#

Start Date: Underway (first gas as early as 2015)
Duration of Project: 30 years
Jobs: 412 exploration/drilling
Total Project Costs: $810 million

NUNA PROJECT

Overview

The Nuna Project aims to access the Torok formation, a predominantly shale formation partially off-shore and inside the Oooguruk unit, from two on-shore drill sites, one outside the unit boundary and one just inside. In 2014, it was acquired from Pioneer Resources by Caelus, which intends to proceed with a 31 well program leading to production of between 15,000 to 20,000 bbls per day. Part of the project will be constructing a pipeline to send the well fluids from these new onshore drill sites to the Kuparuk Production facilities where the oil will be produced.

Start Date: Could begin production as early as 2016
Duration of Project: 30 years from start-up
Jobs: Unknown
Total Project Costs: Estimated between $1.5 and $2 billion

REPSOL/ARMSTRONG/GMT EXPLORATION (GMT) PROSPECTS

Overview

The Repsol/Armstrong/GMT prospects are located on 494,211 acres of Alaska's North Slope and nearshore Beaufort Sea, including large chunks near the Kuparuk River and Oooguruk units. The companies have stated that about $1 billion have been invested in their three-year drilling program. Two wells were drilled 2012, three in 2013, two in 2014 and one (the Qugruk #9) was the only North Slope exploration well of 2015. Repsol has announced positive results, formed the Qugruk unit in 2011, and the Pikka unit in 2015. In October of 2015, Repsol and Armstrong restructured their operations agreement at this prospect, which has added more uncertainty to its development schedule.

Start Date: Multi-year exploration drilling program began in 2011-2012, development plan not yet announced
Duration of Project: Unknown
Jobs: Although no field development plan has been announced, direct jobs expected during the exploration phase are estimated at 550, with 400-700 jobs per year for two years each during peak development drilling and construction investment periods
Total Project Costs: Unknown

SOUTH MILUVEACH UNIT, MUSTANG PAD (FORMERLY NORTH TARN) DEVELOPMENT

Overview

The Mustang Pad is located on the North Slope adjacent to the west side of the Kuparuk River unit, just north of the Alpine pipeline and west of Kuparuk River unit drill site 2M. BRPC has formed the Southern Miluveach unit covering 8,960 acres over leases held by its joint venture partners (other parts of this prospect were assigned to the Kachemack unit). BRPC drilled the first well in March 2011, resulting in a discovery of oil. An innovative financing

structure with the Alaska Industrial Development and Export Authority (AIDEA) was used to build an access road and production pad, and is now being used to construct $200 million plus production facilities which will incorporate extra capacity for future discoveries or finds by other explorers. Development wells are being drilled with the Southern Miluveach #3 service well reported as completed in the AOGCC database. Focused on bringing the unit on line, BRPC has not drilled any wells outside of the Miluveach since 2010.

Start Date: Currently under construction, first oil in 2016
Duration of Project: 20 years
Jobs: 100 construction, 100 drilling, 16 operation
Total Project Costs: $580 million

COSMOPOLITAN PROSPECT OFFSHORE SOUTHERN COOK INLET

Overview

What is now the Cosmopolitan prospect was first explored by Pennzoil in the sixties from an offshore jack up rig in the Cook Inlet. Subsequent exploration by predecessors of ConocoPhillips and Pioneer Natural Resources occurred onshore. Ft. Worth-based BlueCrest Energy, the current operator and sole owner of the leases, has used the Endeavour jack up rig to drill one offshore well and anticipates several more, focusing on gas which will be produced through offshore monopod platforms. Meanwhile, they are in the process of acquiring a land-based rig for further exploration and development of the oil reserves from onshore. Prior owner/operator Buccaneer has released estimated proven and probable (2P) reserve figures of 90 billions of cubic feet (bcf) of gas and 44 million bbls of oil.

Start Date: Drilling began in 2013
Duration of Project: Unknown
Jobs: Total of 100 jobs estimated to be created during development and construction phase and 20 jobs to be created by production operations
Total Project Costs: Unknown, up to $1.5 billion

KALDACHABUNA WELL & APACHE'S 3-D COOK INLET SURVEY

Overview

In 2011, Apache began a multi-year 3-D seismic program in the Cook Inlet, using a cutting edge wireless nodal technology. They acquired roughly 800,000 acres through state exploration lease sales and arrangements with private landowners. Although the U.S. Geological Survey's (USGS) estimate of Cook Inlet reserves is around 600 million barrels, Apache geologists are seeing evidence of figures around twice that size. The seismic program, although slowed by permitting issues, is proceeding. In 2013, Apache added the Kaldachabuna #2 well to its exploration mix, but has subsequently not permitted or drilled any additional wells.

Start Date: 2011 for the seismic phase
Duration of Project: Unknown
Jobs: Total of 100 jobs estimated to be created during development and construction phase and 20 jobs to be created by production operations
Total Project Costs: Unknown

NATIONAL PETROLEUM RESERVE-ALASKA

Overview

Although the NPR-A was created on account of its projected oil reserves, as of 2012, there was still no commercial production from the area. There are about 180 legacy wells drilled by the federal Department of the Interior, left over from the early years of the reserve. Several public lease sales were held in the early eighties, though all those leases eventually expired. Finally in 1999, a more regular pattern of sales was established, including at least one sale each year since 2010. There are concerns that these sales have not covered NPR-A's most prospective areas for oil and gas. However, in 2010, a revised assessment from the USGS slashed the estimate of undiscovered, technically recoverable oil in the reserve by roughly an order of magnitude from 10.5 billion barrels to just 896 million barrels. The data indicate an abrupt change from oil prone to more gas prone resources just 15 to 20 miles west of the Colville River oil field. USGS scientists think oil plays analogous to the Colville River field in NPR-A likely contain very little oil west of the area that ConocoPhillips and Anadarko have been exploring. (See the discussion of the Colville units western expansion for more information on what is likely to be the first NPR-A production.)

Following CD-5, the next production from NPR-A might be from the other prospect that has formed a unit: the Greater Mooses Tooth unit (formerly known as the Lookout prospect). In 2013, seismic was shot over the area. In its planning documents, ConocoPhillips anticipates production could be 30,000 bbls per day. In October of 2015, the BLM approved a drilling permit and a right-of-way grant at the Mooses Tooth unit, moving the project a significant step closer to production. This year, ConocoPhillips drilled no exploration wells in the NPR-A. However, this summer they began development drilling at CD-5.

Repsol subsidiary FEX drilled four wells in 2006-2007 and conducted extensive seismic work. However, in 2008, it turned its focus elsewhere and eventually gave up its NPR-A leases. Independent NordAq Energy Inc. has announced plans for follow up drilling in some of those areas. In the November 2014 lease sale, NordAq acquired five tracts in the area of FEX's prior exploration efforts.

Start Date: Greater Mooses Tooth: preliminary work has begun, aiming for first oil in 2017
Duration of Project: Unknown
Jobs: 400 positions at peak
Total Project Costs: $890 Million

POINT THOMSON UNIT

Overview

The Point Thomson unit is located on state acreage along the remote Beaufort Sea shoreline, 60 miles east of Prudhoe Bay and 60 miles to the west of the village of Kaktovik. The total estimated recoverable reserves are 8 trillion cubic feet of gas, about 25 percent of the North Slope's gas reserves, and over 200 million barrels of condensate. In 2012, operator ExxonMobil and its partners announced an agreement with the state setting forth work commitments that would allow the owners to retain their leases and bring the unit into development. The settlement agreement requires the owners to construct an "Initial Production System" (IPS) to include a pipeline to connect Point Thomson to the existing pipeline infrastructure and gas cycling facilities capable of cycling 200 million cubic feet of gas per day while extracting 10,000 bbls per day of condensate for delivery to TAPS. As of the summer of 2015, Exxon has completed PTU-15 and PTU-16, which will serve as injector wells. There will be

one producing well, PTU-17 which will be drilled this fall. The pipeline connecting Point Thomson to Badami, from where oil can be transported on to TAPS, has been completed.

Subsequent development could include full-field cycling, enhanced hydrocarbon recovery and/or, if the infrastructure to access markets is achieved, natural gas sales. Point Thomson could become, according to ExxonMobil, the highest-pressure gas cycling operation in the world.

Start Date: Ongoing IPS work remains on schedule with first production anticipated in 2016
Duration of Project: 30 years
Jobs: 1,200 peak construction, 200 development drilling and 60-80 operation
Total Project Costs: Over $2 billion has been spent to date with another $2 billion anticipated to achieve the IPS goal of 10,000 bbls per day of condensate to TAPS in 2016; full field gas development could take another $6 to $8 billion in investment

UMIAT PROSPECT

Overview

The Umiat prospect, originally discovered by the U.S. Navy in the 1940s, is located in the foothills of the Brooks Range Mountains. Australia's Linc Energy acquired the prospect from Renaissance Alaska LLC in July 2011, signed for a rig and announced plans for an exploration program. While several wells have been drilled, the last was in early 2014. The prospect has estimated oil reserves of 250 million barrels and an anticipated peak production rate of 50,000 bbls of oil per day. To commercialize any discovery, Linc would need to build oil processing facilities and a 110-mile buried pipeline. It has yet to announce full-field development specifics or continued drilling plans. However, in 2014 – 2015, it was evaluating an "unsolicited expression of interest" to purchase key assets including the Umiat prospect.

Start Date: Drilling began 2013 (first oil has been announced for several dates)
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: $45 million for appraisal phase, $1.3 billion for development phase

USIBILLI'S MIDDLE EARTH PROSPECT

Overview

Every other project listed in this report is either on the North Slope or in the Cook Inlet sedimentary basin. In the 2014 report, we summarized Doyon's exploration wells in this part of the state south of the North Slope and North of the Cook Inlet, usually called Middle Earth. In the fall of 2015, Usibelli Coal Mine drilled the Healy Creek #1 exploration well as part of its exploration license program. It has permitted four wells in areas previously mined for coal, seeking coal–bed methane and other shallow gas prospects. Although primarily supplying fuel for its nearby coal mining operations, if the exploration program is successful, gas could also be sold commercially. Usibelli has not announced the next steps.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

OTHER EARLY-STAGE PROJECTS

Before a hopeful explorer can even drill, it must take the first step of acquiring the right to explore (and/or produce) oil and gas from land. There are a handful of land owners in the state who also own the mineral rights underneath their land. However, in Alaska and off its shores, the state and federal governments generally own the rights to develop the oil and gas. There are several programs, such as the State's exploration license program, which don't involve competitive bidding. However, the way state and federal governments typically get this land into the hands of prospective explorers is by holding lease sales. There bidders vie for the right to acquire leases which give them a certain number of years to explore for oil and gas and, if they find it, to hold on to those leases while they develop and produce the oil and gas. Acquired acreage is another good measure of a project.

There are three sets of lease sales in two regions pertinent to Alaska. These regions are the OCS, which starts three miles offshore, and all federal land within Alaska, which are under the control of the U.S. Department of Interior. Within that department, the Bureau of Land Management (BLM) administers the land based lease sales while the Bureau of Ocean Energy (BOEM)[9] has jurisdiction over the offshore (OCS) lease sales.

For the last decade, the BLM has held a sale offering leases in the NPR-A almost every year. In that last sale in 2014, there were two bidders that obtained NPR-A acreage. The activities of the two bidders spending the most were profiled in the NPR-A section above.

TABLE 7. 2014 NPR-A Lease Sales. Winning bids for 2014 NPR-A lease sales.

Winning Bidder	Leases	Dollars	Acres
ConocoPhillips Alaska, Inc.	1	$158,425	5,763
ConocoPhillips Alaska, Inc./ Anadarko E&P Onshore LLC	1	$206,201	3,842
NORDAQ Energy, Inc.	5	$294,352	57,045

Source: U.S. Department of Interior, Bureau of Land Management

[9] Many people may be more familiar with the Minerals Management Service (MMS) which existed from 1982 to 2010: the BOEM was created when MMS was split into several pieces.

The BOEM OCS lease sale picture is more complex, as Table Eight shows: In fact, the last such event was Lease Sale 193 held in 2008. BOEM's next scheduled sales are for 2016.

TABLE 8. Recent & Upcoming BOEM OCS Area Lease Sales in Alaska.

	Planning Area			
	Chukchi Sea	Beaufort Sea	Cook Inlet	North Aleutian Basin
Lease Sale 262	Scheduled for 2022			
Lease Sale 258			Scheduled for 2021	
Lease Sale 255		Scheduled for 2020		
Lease Sale 244			Scheduled for 2016	
Lease Sale 242		Scheduled for 2017		
Lease Sale 237	Scheduled for 2016			
Lease Sale 221	Scheduled for 2012 - Withdrawn			
Lease Sale 219			Scheduled for 2011 - Cancelled due to lack of industry interest	
Lease Sale 217		Scheduled for 2011 - Withdrawn		
Lease Sale 214				Scheduled for 2010, but withdrawn until 2017
Lease Sale 212	Scheduled for 2010 - Withdrawn			
Lease Sale 211			Scheduled for 2009 - Cancelled due to lack of industry interest	
Lease Sale 209		Scheduled for 2010 - Withdrawn		
Lease Sale 202		Held April 2007		
Lease Sale 195		Held Mar 2005		
Lease Sale 193	Held Feb 2008			
Lease Sale 191			Held 2004 - No bids received	

BOEM Bureau of Ocean Management - Created as successor in 2010 to: MMS - Minerals Management Service

Source: Bureau of Ocean Management

The Department of Natural Resources conducts annual lease sales on state land with active bidders in each of the areas of interest across the state. Bidders have shown little interest in the Alaska Peninsula (the same part of the state as the Federal North Aleutian Basin study area) since 2007. There were no bidders in the North Slope foothills area in 2010 and 2011 either. Other than those exceptions however, the state has had annual vigorous sales for its land in the Cook Inlet, on the North Slope and for the Beaufort Sea.[10]

[10] Note that for purposes of the State's leasing program the Beaufort Sea is the three mile strip of the Northern Coast of Alaska.

TABLE 9. 2013 & 2014 Alaska Department of Natural Resources Lease Sales. Total leases sales for the North Slope and Cook Inlet over the past two years.

Area	Date of Sale	Winning Bidder	Leases	Dollars	Acres
Alaska Peninsula	5/7/14	Novus Terra Limited	2	$44,068.45	8,813.69
Alaska Peninsula	5/7/14	Auxillium Alaska Inc.	1	$3,738.80	747.76
		Subtotal	3	$47,807.25	9,561.45
Beaufort Sea	11/6/13	70 & 148	2	$52,403.20	2,560.00
Beaufort Sea	11/19/14	Caelus Alaska Exploration	23	$2,261,690.40	59,120.00
Beaufort Sea	11/19/14	70 & 148	10	$1,181,693.20	26,280.00
Beaufort Sea	11/19/14	Alaska LLC/Paul Gavora	5	$124,292.80	11,860.00
Beaufort Sea	11/19/14	ConocoPhillips Alaska, Inc.	3	$1,357,901.96	7,396.31
Beaufort Sea	11/19/14	Hilcorp Alaska, LLC	1	$71,481.26	2,533.00
		Subtotal	44	$5,049,462.82	109,749.31
Cook Inlet	5/8/13	Hilcorp Alaska, LLC	16	$1,570,846.96	60,758.55
Cook Inlet	5/8/13	Cook Inlet Energy, LLC	5	$849,678.17	28,074.12
Cook Inlet	5/8/13	Aurora Gas, LLC	1	$144,859.77	4,449.01
Cook Inlet	5/8/13	NordAq Energy Inc.	1	$201,152.00	3,200.00
Cook Inlet	5/8/13	Woodstone Resources LLC	1	$314,880.00	3,840.00
Cook Inlet	5/7/14	Hilcorp Alaska, LLC	13	$1,160,956.78	33,220.03
Cook Inlet	5/7/14	Apache Alaska Corporation	7	$1,918,245.59	30,103.00
Cook Inlet	5/7/14	Cook Inlet Energy, LLC	4	$763,315.20	23,040.00
Cook Inlet	5/7/14	NordAq Energy Inc.	4	$314,470.40	10,240.00
Cook Inlet	5/7/14	Woodstone Resources LLC	2	$783,360.00	5,120.00
Cook Inlet	5/7/14	W.J. Kennedy	1	$237,715.20	5,760.00
		Subtotal	55	$8,259,480.07	207,804.71
North Slope	11/6/13	NordAq Energy Inc.	52	$2,302,272.32	74,667.00
North Slope	11/6/13	ConocoPhillips Alaska, Inc.	14	$945,589.40	35,754.00
North Slope	11/6/13	Great Bear Petroleum Ventures II, LLC	12	$761,966.73	30,321.00
North Slope	11/6/13	70 & 148, LLC	5	$229,209.59	8,237.00
North Slope	11/6/13	AVCG, LLC	3	$765,648.00	5,040.00
North Slope	11/6/13	Burgundy Xploration LLC	2	$97,070.40	2,880.00
North Slope	11/6/13	Savant Alaska LLC	1	$15,383.70	802.07
North Slope	11/19/14	Caelus Alaska Exploration	103	$12,773,510.20	263,675.00
North Slope	11/19/14	70 & 148	80	$35,811,539.04	150,992.00
North Slope	11/19/14	Burgundy Xploration LLC	63	$2,593,872.00	90,720.00
North Slope	11/19/14	Great Bear Petroleum Ventures II, LLC	4	$1,220,256.00	5,760.00
North Slope	11/19/14	Woodstone Resources LLC	2	$259,840.00	8,120.00
North Slope	11/19/14	ConocoPhillips Alaska, Inc./ BP Exploration/ExxonMobil Alaska	1	$640,000.00	2,560.00
North Slope	11/19/14	ConocoPhillips Alaska, Inc./ Anadarko E&P	1	$1,272,908.80	2,560.00
		Subtotal	343	$59,689,066.18	682,088.07
North Slope Foothills	11/19/14	R3 Exploration Corp.	2	$147,014.40	10,120.00
		Subtotal	2	$147,014.40	10,120.00
		Total State Lease Sales	447	$73,192,830.72	1,019,323.54

Source: DNR

EARLY-STAGE PROJECT OVERVIEWS

The remaining projects monitored here are all ones where the project sponsor has acquired land this year, or through prior lease sales. Many of these projects have been drilled in the past, though not in the past year.

ANADARKO PETROLEUM'S GUBIK COMPLEX

Overview

The Gubik Complex is near Umiat in the gas-prone Brooks Range Foothills. Originally explored by the U.S. Navy in the forties and fifties, it consists of a series of natural gas prospects and known but undeveloped natural gas fields including Gubik, Chandler and Wolf Creek. The first exploration program for natural gas in northern Alaska, Gubik Complex exploration and delineation wells were drilled in the winters of 2008 and 2009. Results of the first well were made public by Petro-Canada which reported tested rates of up to 15 million cubic feet per day. However, projects to move North Slope gas to markets have not advanced as anticipated postponing further development. In 2012, Anadarko returned to the well for additional testing, though results have not been announced publicly. Anadarko has not announced any further development plans for Gubik.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Based on the entire $4 to $6 billion range, total jobs for the exploration phase were estimated at 560; total estimated development and construction phase jobs: 2,400; total jobs estimated for production operations: 3,300
Total Project Costs: $4 to $6 billion

BEECHEY POINT UNIT

Overview

The Beechey Point unit is located in Gwydyr Bay at the Kuparuk River delta, north of the Prudhoe Bay unit. The operator, BRPC, has drilled four wells in the area. The development program includes total construction and drilling costs estimated to be $200 million (excluding what has already been spent to date) with a total of 100 drilling and 100 construction jobs created. Exploration drilling on the property began with the Hamilton Brothers Point Storkersen No. 1 well in 1969. Currently the operator is focused on bringing its Mustang prospect on line and has announced no further development plans for Beechey Point.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Estimated 100 drilling and 100 construction jobs
Total Project Costs: More than $200 million over expenitures to date

DEWLINE UNIT

Overview

The Dewline unit is wedged along the coastline, just west of the Prudhoe Bay Point McIntyre unit and north of the Midnight Sun Oil Pool. The first well in the area was the 1969 Hamilton Brothers Pt. Storkersen #1 well. Since forming the unit, operator Ultrastar drilled one 9,900 foot vertical well targeting oil in the Ivishak formation in 2009. No recent drilling or development plans have been announced.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Estimate 150 jobs for the drilling of second well, 150 for third well drilling and 100 for road and pipeline construction when development proceeds
Total Project Costs: Unknown

GREAT BEAR PETROLEUM

Overview

Great Bear Petroleum's source rock oil development is located south of the Kuparuk and Prudhoe units, bracketing the Dalton Highway and the trans-Alaska oil pipeline. Great Bear Petroleum is proposing to develop "source-reservoired oil" from its 500,000-acre lease position. In the summer of 2012, Great Bear was able to drill two wells. A multi-well program was permitted for the winter of 2014 – 2015, however only the Alkaid#1 well was drilled (though it does not show up on the AOGCC data base). Great Bear has also undertaken several extension seismic studies which are being analyzed. Amid senior management changes no specifics plans for further drilling or development have been announced recently.

Start Date: Underway (first oil unknown)
Duration of Project: Roughly 80 years
Jobs: Unknown
Total Project Costs: Unknown: $2 billion a year during development

HEMI SPRINGS PROSPECT

Overview

The Hemi Springs prospect is composed of 16 leases located just south of the Prudhoe Bay unit. The prospect overlaps or is contiguous to acreage that once was either part of ARCO's Hemi Springs unit, ENI's RockFlour unit, Pioneer's NE Storms unit or Alaska Crude's Artic Fortitude unit. The Donkel/Cade group assembled leases over a number of years and in early 2013, the 40,698 acre package was acquired by Polar Petroleum. Polar estimates that the project could yield up to a half billion barrels of oil. At least one ARCO well drilled in the vicinity in the eighties was certified as having found paying quantities of hydrocarbons. Polar has not drilled any wells or announced any future drilling plans.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

LIBERTY DEVELOPMENT

Overview

The Liberty Development is located six miles offshore in the Beaufort Sea OCS, 15 miles east of Prudhoe Bay. Shell drilled two wells in 1982, and one in 1987, within the Liberty prospect area. Although it found evidence of hydrocarbons in the 1987 well, Shell subsequently dropped the lease. In 1997, operator BP discovered the Liberty accumulation while drilling an exploration well from the Tern gravel island. It has proposed a number of ways of reaching the accumulation. In 2014, Hilcorp became a 50 percent owner of the Liberty field and filed their first Development and Production Plan with the federal regulators. That plan envisions constructing an artificial island starting in 2017, and then drilling off that island for two years with first production potentially by 2019.

Start Date: 2017
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

OUTER CONTINENTAL SHELF/CHUKCHI AND BEAUFORT SEAS

Overview

The OCS waters off of Alaska's northern coastline encompass the Chukchi Sea and the Beaufort Sea. Resource estimates by the Bureau of Ocean Management's predecessor, the U.S. Minerals Management Service, projected a mean estimate of up to 15.5 billion barrels of oil and 50 trillion cubic feet of natural gas economically recoverable in this region. In February 2008, Shell successfully bid $2.1 billion to acquire 275 lease blocks in the Chukchi Sea, in addition to their $44 million bid in 2005, for 84 leases in the Beaufort Sea. Since then, Shell has encountered a number of obstacles including a shifting permitting process, as regulators reacted to the Moncando disaster in the Gulf Coast, litigation, weather delays and simply bad luck. As of the summer of 2015, only two "top holes" for wells had been drilled, one each in the Chukchi and Beaufort prospects. In mid-August, with its drilling fleet fully mobilized to the Chukchi Sea, Shell was granted permission to drill. Unfortunately, results from the drilling program were deemed insufficient to continue, and Shell announced they would be ending their exploration activities in the OCS. Both Norway's Statoil and ConocoPhillips announced over three years ago that they are deferring any work on their respective Alaska OCS leases and have not subsequently announced any further drilling plans. Additionally, Shell has not announced any further plans for its Beaufort Sea leases. Many of these companies' leases were acquired in a 2008 sale and are valid until 2018, when they expire.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown: Shell has been quoted as having spent $7 billion to date, including lease acquisition

SHADURA PROJECT

Overview

NordAq completed its first well, the Shadura No. #1 well, on the east side of the Cook Inlet in 2011, followed by the drilling of the Tiger Eye prospect on the west side of the Cook Inlet in 2012. In the fall of 2014, NordAq announced it had arranged financing to proceed with a second Shadura well, although such drilling has not yet taken place.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

STINSON PROSPECT, OFFSHORE WESTERN NORTH SLOPE

Overview

The Stinson prospect is composed of 10 leases located on 35,434 acres north of ANWR's 1002 area in Camden Bay directly west of Point Thomson. Early in 2011, the DNR chose not to unitize the prospect and owners Donkel/Cade lost some leases. Those investors were able to reacquire much of the acreage in a December 2011 lease sale. The current lessees have not drilled on the property to date, but the Stinson #1 well ARCO drilled on the property in 1991, is certified as capable of producing in paying quantities. There are an estimated 150 million barrels in the tertiary horizon within a single 100-foot sand. Once the property has reached the development stage, the sponsor would need to construct a pipeline tie-in to Badami or, if it's developed by then, Point Thomson. However, no specific development or drilling plans have been announced.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

TOFKAT (FORMERLY TITANIA) PROSPECT

Overview

The Tofkat prospect is located east and south of Nuiqsut, southwest of the Kuparuk River unit near the Colville River. To keep the leases in the Tofkat unit, operator BRPC will need to drill additional exploration wells in the future. Currently the operator is focused on bringing its Mustang prospect on line and no further drilling or development plans have been announced.

Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

VISCOUS & HEAVY OIL

Overview

With its emphasis on heavy oil, this section is included among the projects that have not been drilled recently. Crude oil ranges from light (most of what has been produced on the North Slope) to heavy, with viscous oil in between. Viscous oil production from Alaska's North Slope is currently around 40,000 bbls per day. Production is drawn from an estimated 6 billion barrels of in-place viscous oil located within currently producing North Slope units, including the West Sak sands/Schrader Bluff formation in the Prudhoe Bay, Milne Point and Kuparuk River units, as well as the Nikaitchuq and Oooguruk units. Another 4-6 billion barrels of undeveloped in-place resource is estimated to be present close to existing infrastructure. In 2011, with achievable technological

advancements, BP Alaska's former President John Minge said that he believes it is possible to develop 2 billion barrels of gross viscous oil on the North Slope. Hitting that target would require around 2,000 additional wells on 50 pads in addition to a new gathering center and a hundred miles of new pipeline. This development would cost an estimated $30 billion and would provide roughly 3,500 jobs per year in the first 10 years. Meanwhile, ConocoPhillips is focusing a $450 million expansion of the 1H pad to produce up to an additional 9,000 bbls per day of viscous oil from the West Sak development.

While not currently in production, heavy oil represents a significantly larger prize. There are perhaps 20 billion barrels of heavy oil in place near existing infrastructure in the Ugnu formation. The estimated cost of developing this oil is $30 billion, with a minimum of 3,500 jobs per year for the first 10 years of development. In its 2012 Fact Book, ConocoPhillips designated Ugnu as a "project in appraisal," with an anticipated gross peak production between 20,000 and 30,000 barrels of oil per day.

One entrepreneur has suggested using heavy duty tunnel boring machines widely used for transportation tunnels. Tunnels could be excavated and then several heavy oil drill techniques, likely to prove too destructive if employed from the surface, could be used, including drilling up from the roof of the tunnel and then using gravity drainage to collect the oil.[11]

Start Date: Unknown.
Duration of Project: Unknown
Jobs: 3,500 per year for first 10 years for viscous oil production plus an additional 3,500 per year for first 10 years of heavy oil production
Total Project Costs: $30 billion for viscous oil production, $30 billion for heavy oil production

YUKON GOLD

Overview

The Yukon Gold prospect is located around 50 miles east of Prudhoe Bay. The Yukon Gold #1 well drilled by BP in the nineties confirmed the presence of hydrocarbons in the area: there are an estimated 120 million barrels of recoverable reserves with an expected peak production of 50,000 barrels of oil per day. Development of this prospect is expected to cost $450 million, a figure that does not include construction of a necessary pipeline to nearby Point Thomson. An estimated 300 to 400 jobs would be expected during the development drilling and pipeline construction phase of this project. The prospect was acquired by Miller Energy in 2014, and no additional plans for development or drilling have been announced.

Start Date: Unknown: Dependent on construction of pipeline to Point Thomson
Duration of Project: Unknown
Jobs: 400 expected during development drilling and pipeline construction phase
Total Project Costs: $450 million (does not include cost of pipeline to Point Thomson necessary for project development)

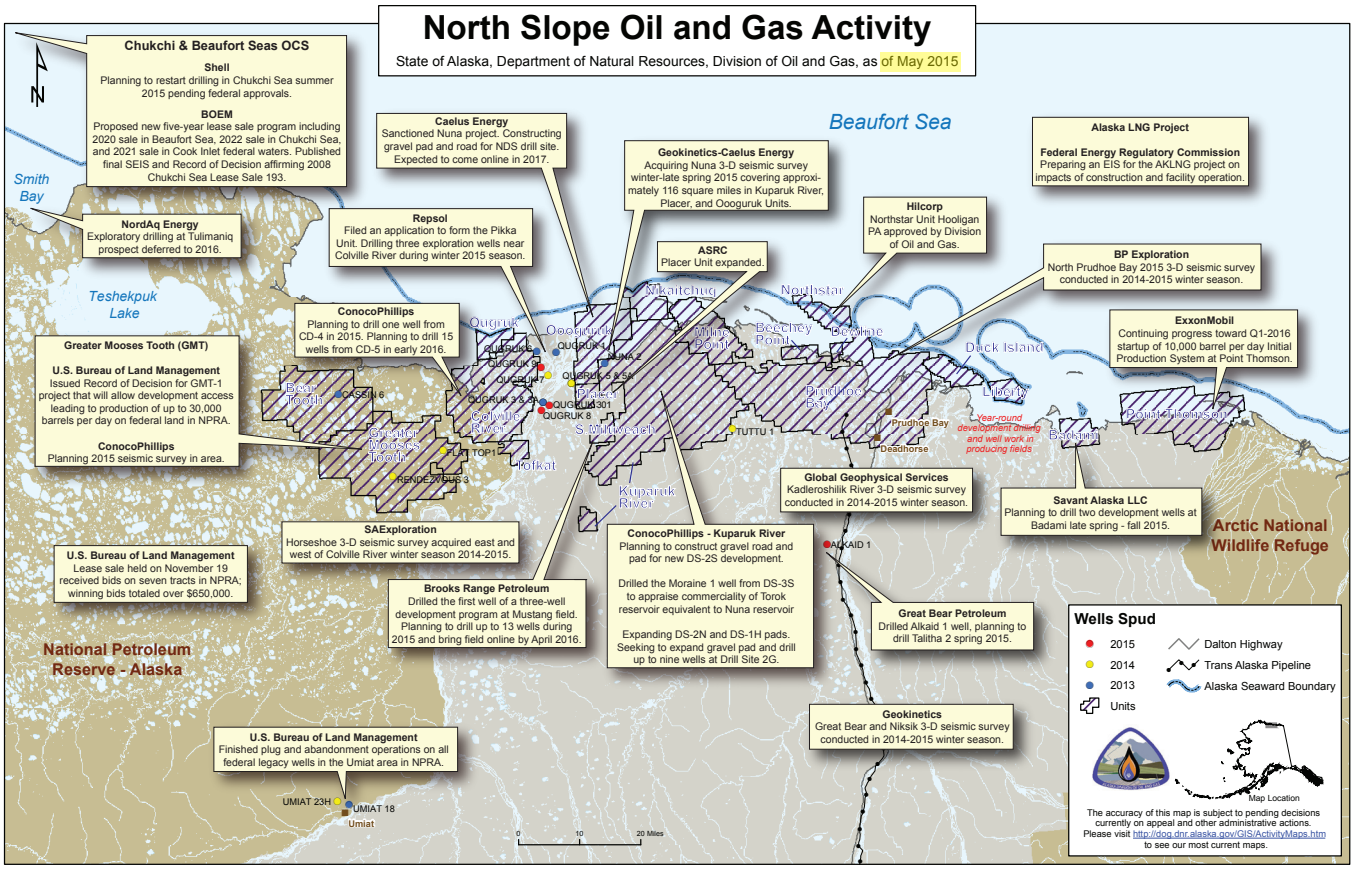
[11] West, C. (2015, January 8). *Heavy Oil: Unlocking Alaska's 30 Billion Barrels*, presentation to the Alaska Chapter of the Society of Petroleum Engineers.

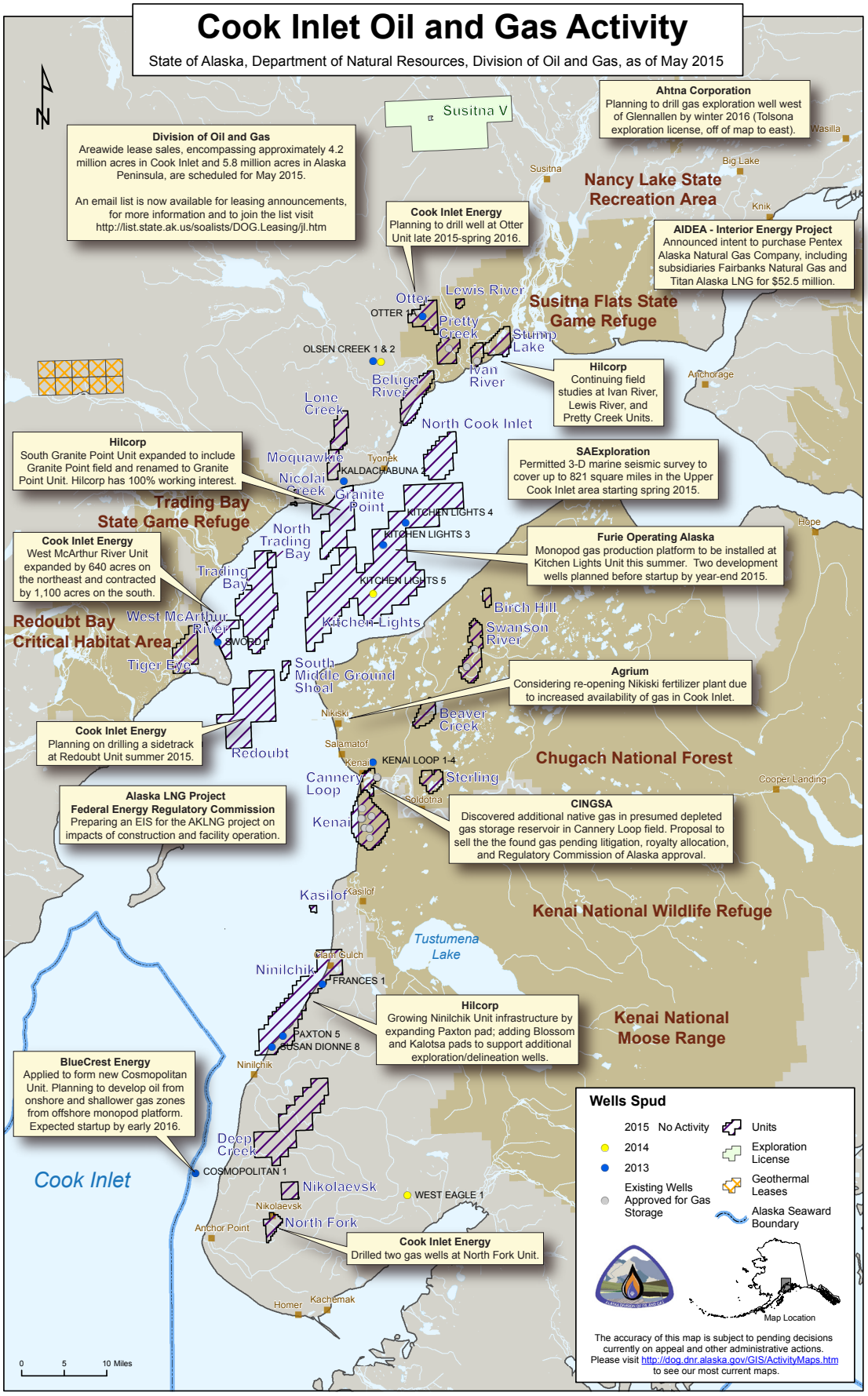
A GAS LINE PROJECT

In the 2014 report, AEDC set out the extended history of the various projects that the state or producers have entertained to monetize the immense gas resource on the North Slope. Always a controversial topic, last year it spilled over into politics and became one of the major themes of Governor Bill Walker's successful election campaign. Since taking office, Governor Walker has pushed to change the size, location, financing and ownership of a North Slope gas project. As the Governor candidly summed it up earlier this year, he perceived a "lack of urgency" on the part of the producers to respond to his proposed changes to the plan developed in the prior administration.

What should be clear about the large LNG export project (and perhaps many of the other projects discussed in this report) is that descriptions of costs are preliminary in nature and subject to change, especially if size and location are still not decided on. The figures we reproduce below are used by the all the parties involved in describing the staggeringly large scope of this project during the pre-Front End Engineering and Design (FEED) stage and will probably continue to be used until a new set, driven by better data, informs the decision to move (or not to move) on to FEED.

Start Date: Pre-FEED work is going on now.
Duration of Project: Sticking to an aggressive schedule would have first gas within a decade from the start date followed by at least 35 years of production, though it could be longer if additional gas is discovered.
Jobs: Between 9,000 to 15,000 during peak construction; Alaska operational jobs: around 1,000
Total Project Costs: $45 to $65 billion




Cook Inlet Oil and Gas Activity
State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of May 2015
N
Division of Oil and Gas
Areawide lease sales, encompassing approximately 4.2 million acres in Cook Inlet and 5.8 million acres in Alaska Peninsula, are scheduled for May 2015.
An email list is now available for leasing announcements, for more information and to join the list visit http://list.state.ak.us/soalists/DOG.Leasing/jl.htm
Susitna V
Ahtna Corporation
Planning to drill gas exploration well west of Glennallen by winter 2016 (Tolsona exploration license, off of map to east).
Wasilla
Susitna
Big Lake
Nancy Lake State Recreation Area
Knik
Cook Inlet Energy
Planning to drill well at Otter Unit late 2015-spring 2016.
AIDEA - Interior Energy Project
Announced intent to purchase Pentex Alaska Natural Gas Company, including subsidiaries Fairbanks Natural Gas and Titan Alaska LNG for $52.5 million.
Otter
OTTER
Lewis River
Susitna Flats State Game Refuge
Pretty Creek
Stump Lake
OLSEN CREEK 1 & 2
Ivan River
Hilcorp
Continuing field studies at Ivan River, Lewis River, and Pretty Creek Units.
Anchorage
Beluga River
Lone Creek
North Cook Inlet
Hilcorp
South Granite Point Unit expanded to include Granite Point field and renamed to Granite Point Unit. Hilcorp has 100% working interest.
Moquawkie
Tyonek
KALDACHABUNA 2
Nicolai Creek
Granite Point
SAExploration
Permitted 3-D marine seismic survey to cover up to 821 square miles in the Upper Cook Inlet area starting spring 2015.
Trading Bay State Game Refuge
KITCHEN LIGHTS 4
KITCHEN LIGHTS 3
North Trading Bay
Hope
Cook Inlet Energy
West McArthur River Unit expanded by 640 acres on the northeast and contracted by 1,100 acres on the south.
Furie Operating Alaska
Monopod gas production platform to be installed at Kitchen Lights Unit this summer. Two development wells planned before startup by year-end 2015.
Trading Bay
KITCHEN LIGHTS 5
Redoubt Bay Critical Habitat Area
West McArthur River
Kitchen Lights
Birch Hill
Swanson River
SWOPOR
Tiger Eye
South Middle Ground Shoal
Agrium
Considering re-opening Nikiski fertilizer plant due to increased availability of gas in Cook Inlet.
Nikiski
Beaver Creek
Cook Inlet Energy
Planning on drilling a sidetrack at Redoubt Unit summer 2015.
Salamatof
Redoubt
Kenai
KENAI LOOP 1-4
Chugach National Forest
Cannery Loop
Sterling
Cooper Landing
Alaska LNG Project
Federal Energy Regulatory Commission
Preparing an EIS for the AKLNG project on impacts of construction and facility operation.
Soldotna
CINGSA
Discovered additional native gas in presumed depleted gas storage reservoir in Cannery Loop field. Proposal to sell the the found gas pending litigation, royalty allocation, and Regulatory Commission of Alaska approval.
Kenai
Kasilof
Kasilof
Kenai National Wildlife Refuge
Tustumena Lake
Clam Gulch
Ninilchik
FRANCES 1
Hilcorp
Growing Ninilchik Unit infrastructure by expanding Paxton pad; adding Blossom and Kalotsa pads to support additional exploration/delineation wells.
Kenai National Moose Range
PAXTON 5
SUSAN DIONNE 8
Ninilchik
BlueCrest Energy
Applied to form new Cosmopolitan Unit. Planning to develop oil from onshore and shallower gas zones from offshore monopod platform. Expected startup by early 2016.
Deep Creek
COSMOPOLITAN 1
Cook Inlet
Nikolaevsk
WEST EAGLE 1
Nikolaevsk
North Fork
Anchor Point
Cook Inlet Energy
Drilled two gas wells at North Fork Unit.
Homer
Kachemak
0 5 10 Miles
Wells Spud
2015 No Activity
2014
2013
Existing Wells Approved for Gas Storage
Units
Exploration License
Geothermal Leases
Alaska Seaward Boundary
Map Location
The accuracy of this map is subject to pending decisions currently on appeal and other administrative actions.
Please visit http://dog.dnr.alaska.gov/GIS/ActivityMaps.htm to see our most current maps.

Foreign Mining Investments in Alaska

By Steve Borell

Foreign investments have been and continue to be important for resource development in Alaska, including minerals. Oil and gas, fish processing, forest products and mineral development all depend on foreign investments in many instances.

Mineral development has historically been a global industry. The engineers and geologists that developed the A-J and Treadwell mines at Juneau in the late 1800s, before discovery of the Klondike, and the Kennecott mines in the early 1900s, worked at various places around the world. They applied knowledge and expertise from mines in other countries and elsewhere in the U.S. to find and build mines here in Alaska.

Whereas U.S.-based companies have led the world in oil and gas investment and development, many international companies have joined U.S. companies in hardrock mineral development. Oftentimes, companies headquartered outside the U.S. have a large percentage of their shares held by persons and investment firms in the U.S. Several years ago, I inquired about the ownership profile of a large international mining company that was exploring in Alaska and headquartered in Vancouver, B.C. I learned that approximately 60 percent of that company's stock was actually held by U.S. entities.

Today, three of the six large mines in Alaska were built by and are operated by foreign companies. The Red Dog mine on NANA land north of Kotzebue is operated by Teck Resources, a company headquartered in Canada. Similarly, the Fort Knox mine near Fairbanks is owned and operated by Kinross which is headquartered in Canada. The third is the Pogo mine near Delta Junction which is owned and operated by two Sumitomo companies with their ultimate parent company headquartered in Japan. These three mines are some of the best employers in the state and provide approximately 1,500 of the highest paying, skilled, year-around jobs here. They also pay taxes and royalties to the state and contribute to the diversification of the state's economy. The other three mines are owned by U.S. companies. The reality is we need foreign investment. There simply is not enough domestic capital or mining companies to go around.

Modern large-scale mining is highly technical, using the latest computer design and control systems. These systems are used for specialized exploration, environmental monitoring, mine design, equipment scheduling, maintenance monitoring and scheduling, etc. Advances in each of these areas occur on a continuous basis from companies all around the world. When foreign companies come to Alaska they bring this expertise with them.

Much of the mineral exploration work done in Alaska is by companies headquartered in Canada. Indeed, Canada provides a large portion of exploration financing and expertise for projects throughout the world. There are several reasons for this. The Canadian cities of Toronto and Vancouver have all three of the pieces necessary for strong and effective mineral investing: a large number of entrepreneurial companies with exploration expertise; legal and financial institutions and major investors that understand the minerals business; and numerous consulting firms involved in finding and developing mines.

Further to this last point, the independent consultants and the geological and engineering firms are used by the exploration companies to add expertise to the search for mineral deposits. These firms are also used by the financial institutions to evaluate the thousands of projects worldwide where they can invest. The synergy of these three pieces being located together adds greatly to the value of each part. While the money comes through the Canadian venture capital markets, the funding source is often from the U.S., Europe, the Middle-East or Asia.

Also, on a broader national scale, Canada recognizes that its future and economy depend on the production of natural resources. This helps ensure that reasonable/workable regulations are enacted, including regulations over financial institutions and investing. In stark contrast to this, in the U.S., the Security and Exchange Commission (SEC)

requirements are very onerous and make it nearly impossible for entrepreneurial startup exploration companies to raise funds through the public money markets and stock exchanges.

Investing in mineral exploration is high risk. It has often been said that for every 1,000 prospects evaluated, only one becomes a mine. But exploration can also result in high rewards if what was formerly moose pasture is found to have a valuable mineral deposit that can survive the permitting process and become a mine. Oftentimes it is the "junior" exploration companies that make the initial discoveries which are then sold to the large mining companies. These junior companies are typically listed on the TSX Venture Exchange (TSX:V). I estimate that there are more than 50 of these junior exploration companies that now have projects in Alaska. That number has fluctuated and the specific companies have varied but this has been fairly consistent over the past two decades.

At this time, nearly all mining and exploration companies are having a very difficult time. Metal prices are down, largely due to decreased demand for metals from China and India. Over the past four years, the valuations of the world's five largest mining companies have decreased by a combined $540 billion. Low metal prices have forced companies to sell or close mines and projects that are under performing and focus on only the very best performers. The effect on exploration is twofold. To reduce cash outflow, these large companies have curtailed much of their in-house exploration and they are not investing in the junior exploration companies, even those that have excellent prospects.

For Alaska this means a tremendous slowdown in grassroots exploration. The junior exploration companies and independent prospectors are in a tough situation. And because stock prices for the junior companies are now often at all-time lows, they cannot issue more stock without diluting their existing shareholders. However, irrespective of the demand for metals, the juniors and independent prospectors must still pay the escalating holding fees to just maintain their rights to those claims. These costs must now come out of their own pockets at a time when there is little or no cash inflow.

What I have summarized above is a pretty bleak picture. However, we know that mineral development is cyclic and there are signs that things are about to improve. One such sign is that recently, some major investors have been investing heavily in the mining industry. They see low stock prices as an opportunity to position themselves for commodity price increases. The price increases for precious metals (gold, silver, platinum) will likely be driven by uncertainty due to the financial indebtedness of a growing number of countries, ISIS and political unrest that continues to grow in the world. The prices for base metals (copper, zinc, lead, nickel, iron) may take longer to improve but these will be driven by the millions of people in the world that are moving into the middle class, especially in China and India.

Through all this Alaska continues to be a destination of interest for many mineral investors. Alaska has the mineral endowment, it has a transparent and rigorous yet fair permitting system and it is in need of diversifying its economy. Alaska depends on resource development for its economic base. These aspects work to encourage more foreign investment in the state. The only way Alaska will continue to enjoy a great standard of living is to actively encourage domestic and foreign investment alike.

Steve Borell is a consulting engineer focused on encouraging investment in mineral projects in Alaska. From 1989 through 2011, he was the executive director of the Alaska Miners Association. He has more than 41 years of experience in mining exploration, construction and operations in coal, placer and hardrock metal mining in various western and mid-western states, Canada and South America. Before that he was a facilities management and construction officer in the United States Air Force with assignments in Texas, Minnesota and remote Alaska. He is a registered professional engineer in Alaska, Colorado and North Dakota.

PROPOSED PROJECTS

BOKAN MOUNTAIN RARE EARTH ELEMENTS PROJECT

Overview

Bokan Mountain is a rare earth element project located within the Tongass National Forest on Prince of Wales Island some 35 miles southwest of Ketchikan. Rare earths are key ingredients of a number of military, high-tech and green technology applications. China, which currently supplies between 90 and 95 percent of the world's rare earth oxides, has dialed back their exports over recent years. The strategic and economic importance of rare earth elements coupled with restrained and unreliable supply of these elements has resulted in support for the development of the Bokan Mountain project on both the state and federal government levels.

In 2015, owner/operator Ucore published the mineral resources at Bokan to be at 4.79 million metric tons averaging 0.6 percent (63.54 million pounds) total rare earth oxides (TREO) in the indicated category and 1.05 million metric tons of inferred resource averaging 0.6 percent (13.96 million lbs.) TREOs in the inferred category. A preliminary economic assessment released by Ucore projects that it will cost $221 million to develop a project at Bokan, including a separation plant capable of producing 2,500 metric tons of market-ready rare earth oxides per year during the first five years of full production. Annual output is anticipated to be 95 metric tons of dysprosium oxide, 14 metric tons of terbium oxide, and 515 metric tons of yttrium oxide. The total worth of the deposit at Bokan Mountain is estimated to be $577 million. Ucore expects to have a plan of operations for the project submitted to the state by early 2016.

Permitting and feasibility level studies began in 2013, and Ucore was busy throughout the summer of 2014, conducting sampling, drilling and testwork activities at the project site. In 2014, their $2.5 million exploration plan included 5,000 meter diamond drilling program to collect data for a feasibility study due out in late 2015. One major ongoing development project at the site is Ucore's testing of a Molecular Recognition Technology (MRT) to produce highly purified concentrates of heavy rare earth elements, which could feasibly be the end product from the project. The MRT process is considered to be one of the most advanced and environmentally friendly extraction processes for rare earth elements and its successful implementation at the project is seen as a significant step towards bringing the Bokan Mountain project on line. A pilot plant utilizing this technology has been commissioned for construction in Utah and is expected to be completed by the end of 2015.

Legislative support from both the state and federal governments has also been forthcoming. In June of 2014, then-Governor Sean Parnell signed into law legislation authorizing the AIDEA to provide up to $145 million in financing for infrastructure and construction costs on the project. Statements from Ucore have indicated that this greatly improves the project's economics in both the short and long-term and is a good sign that the project will continue to move forward. At the federal level, Senator Lisa Murkowski introduced U.S. Senate Bill 883, "The American Mineral Security Act of 2015," designed to reduce the permitting timeline for critical mineral development projects, which the Bokan Mountain project may be considered as. As of March 2015, this bill remains in the Senate Energy and Natural Resources Committee, but is expected to advance out of committee at some point.

Commodities: Yttrium, dysprosium, terbium, and other rare earth elements
Start Date: Unknown, but production is expected to begin three years from initiation
Duration of Project: 11 years
Jobs: Approximately 175 during operation

Total Project Costs: $221 million for development

CHUITNA COAL PROJECT

Overview

The Chuitna Coal project is a surface coal mining and export development proposal designed by PacRim Coal, LP for an ultra-low-sulfur, low mercury sub-bituminous coal resource located in the Beluga coal field of Southcentral Alaska, roughly 45 miles west of Anchorage. The proposed project includes a surface coal mine and associated support facilities, a mine access road, a coal transport conveyor, personnel housing, air strip facility, a logistic center and a coal export terminal which would include a 10,000 foot elevated conveyor constructed into Cook Inlet for the loading of ocean going coal transport ships. The proposed mine is slated to produce roughly 242 million metric tons of coal over a 25-year mine-life. Landownership in the project area consists of a combination of public and private entities including the State of Alaska, Mental Health Trust, Kenai Peninsula Borough and Tyonek Native Corporation.

The project design was evaluated in an Environmental Impact Statement (EIS) and permitted by most of the applicable state and federal regulatory agencies in the late eighties and into the early nineties. Some of these authorizations were challenged in court and upheld, but the project never proceeded to development. PacRim sought to re-permit the project in 2005, in response to a projected upturn in the thermal coal export market. Since the previous approvals occurred, there have been substantial changes to the project's design to reduce potential environmental impacts. The U.S. Environmental Protection Agency required the project to prepare a comprehensive, stand-alone Supplemental EIS (SEIS) following the receipt of a new water discharge permit application in March of 2006. In 2010, the U.S. Army Corp of Engineers took over as the lead federal agency and a revised project description was submitted to incorporate additional design changes. The SEIS and permitting process is expected to be completed in late 2016 or early 2017. PacRim has submitted all primary permit application documents to the state and federal agencies.

Progress has been challenged by an application by the Chuitna Citizens Coalition (CCC), a group of Tyonek and Beluga citizens concerned about the mine's environmental impact, to establish a water reservation in the area which could potentially prohibit mining at the site. A decision on the application by Department of Natural Resources authorities is expected in October 2015. The same group filed a Lands Unsuitable for Mining Petition in 2009, which was denied and CCC did not appeal that decision.

Commodity: Coal
Start Date: Construction will last approximately two years, with the earliest start date estimated to be 2018 Production would commence immediately afterwards
Duration of Project: Current predictions a minimum of 25-year mine life
Jobs: About 500 during construction and 350 employees during operations
Total Project Costs: More than $750 million over the first three years

DONLIN GOLD PROJECT

Overview

The Donlin Gold project, located 280 miles northwest of Anchorage, is situated on Alaska Native lands owned by the Kuskokwim Corporation (surface) and Calista Corporation (subsurface). The refractory gold deposit at Donlin has estimated reserves of 33.85 million ounces of proven and probable reserves averaging 2.09 grams of gold per metric ton. Additionally, the project contains 5.16 million ounces of gold in the measured and indicated resource category

and 5.99 million ounces of gold in the inferred resource category. It is estimated that the mine could produce over 1 million ounces of gold annually. A feasibility study, completed in 2011, estimates the capital costs of developing a mine at Donlin, including a natural gas pipeline stretching from Cook Inlet some 310 miles northwest to the Kuskokwim region project, will be roughly $6.7 billion and would be profitable at $1,200 per ounce gold.

Donlin Gold LLC, a partnership owned equally by NovaGold Resources Ltd. and Barrick Gold Corp., initiated the permitting process for its Donlin Gold project in August of 2012, and is about halfway through their permitting timeline. In May 2014, a significant permit application was filed to lease the right-of-way for a $1 billion LNG pipeline to the site for power generation purposes. Additionally, the U.S. Corp of Engineers is currently preparing an environmental impact statement for Donlin's plans with a final report expected in 2017. Donlin Gold has also put a large amount of resources towards community outreach in order to increase public acceptance of the project. In 2014, nearly $27.8 million was spent advancing this project. It is expected to take four years to develop Donlin once the permits are in place.

Commodity: Gold
Start Date: Construction is anticipated to begin in 2017, if market conditions are favorable, with operations projected to start by 2021
Duration of Project: 27-year mine life based on current reserves
Jobs: 3,000 construction jobs for 3.5-year construction period, about 1,000 workers during operations
Total Project Costs: $6.7 billion

GRAPHITE CREEK PROJECT

Overview

The Graphite Creek project consists of 165 mineral claims across 18,000 acres of land 50 miles north of Nome. Mining for graphite has occurred in the area since the late 1800s and roughly 580 tons have been extracted during this time. Graphite One Resources, Inc. began their interest in the mine in 2012, with the first drill testing ever done on the mine to delineate the resource. So far, 17.95 million metric tons of indicated resources grading 6.3 percent graphitic carbon and 154.36 metric tons of inferred resources at 5.7 percent graphitic carbon have been identified. Drilling programs have been ongoing since then and all indications point to the resource being one of the largest graphite deposits in the world.

While graphite is not considered a precious metal, it is a critical component for high tech products. Graphite is used as anode material in lithium-ion batteries and has been identified as a critical mineral for the U.S. military. High quality, large flake graphite is the most highly sought after form of graphite, which the Graphite Creek resource has in large quantities. Currently, the U.S. is importing 100 percent of the graphite used in the country, with roughly 45 percent of its supply coming from China since 2010. The vastness of the Graphite Creek deposit, as well as its proximity to a deep water port being developed in Nome, have greatly increased the likelihood of this mine becoming the first graphite producing site in the U.S. since 1991.

Since 2012, Graphite One has been working continuously to delineate the resource and create an economically viable extraction plan. The company is developing a concentration and leaching process to produce the ultra-high purity graphite products necessary for high tech manufacturing. They are expecting to complete a preliminary economic assessment of the mine in late 2015, and will continue with an exploration program budgeted at $9.1

million for the year.

Commodity: Graphite
Start Date: Unknown
Duration of Project: With an annual production estimated at 50,000 tons, the mine has enough resources to last centuries
Jobs: Unknown
Total Project Costs: Unknown

LIVENGOOD GOLD PROJECT

Overview

The Livengood project, located adjacent to the Elliot Highway about 70 miles north of Fairbanks, is being advanced toward development by International Tower Hill Mines Ltd. The Money Knob deposit at Livengood has an estimated 20.6 million ounces of gold resources. According to preliminary economic assessment completed in 2011, building a mine that would produce 91,000 metric tons per day at Livengood would cost roughly $2.8 billion, with an additional $667 million in mine life sustaining capital costs. Based on current reserves, the mine outlined in their 2013 feasibility study would produce an average of 577,600 ounces of gold per year over a 12-year mine life, or about 8.1 million ounces of gold.

This feasibility study also indicated that under current designs and gold prices, the project does not appear to be economically feasible. This was based on an assumption that production would be estimated to cost $1,474 per ounce of gold. Tower Hill is currently investigating ways to reduce the project's costs, including alterations to the mine design and ore management strategies. Energy costs are a significant barrier to development, and there is some hope that the Alaska LNG project, designed to encourage construction of a natural gas distribution system in the Railbelt, may help alleviate some of these costs and make the Livengood project more viable. Tower Hill's primary goals at this time are to continue baseline environmental work and to secure a partner with adequate funding. In 2014, roughly $8 million was spent on project reviews, baseline environmental work and other activities to advance the Livengood prospect. Overall, Tower Hill has invested roughly $220 million so far in exploration, engineering and other development work. Plans for 2015, included additional metallurgical tests and engineering, including confirmation of the flow sheet and optimizing the operating costs.

Commodity: Gold
Start Date: Unknown
Duration of Project: 12 years
Jobs: Approximately 1,000 workers during construction and roughly 500 workers during operation (depending on final mine design)
Total Project Costs: Estimated at $3.4 billion

PALMER PROJECT

Overview

The Palmer Project is a volcanogenic massive sulphide (VMS) type deposit that is located approximately 35 miles from Haines, but only two miles away from the Haines Highway. As a deposit class, VMS are attractive for being polymetallic (multi-metal) and having high dollar value per ton. The site consists of 340 federal lode mining claims on 6,765 acres, 63 state mineral claims over 9,200 acres and the subsurface mineral estate of the Haines Block, a set of

parcels owned by the Alaska Mental Health Trust. In all, the claims cover approximately 108,000 acres and are being developed by a joint venture between Constantine Metal Resources, LTD and Dowa Metals & Mining Alaska LTD. In 2015, the inferred mineral resource for the project was updated to be 8.1 million tons grading 1.41 percent copper, 5.25 percent zinc, 83,600 ounces of gold and 8.3 million ounces of silver.

Constantine spent C$7.13 million during their 2014 drilling program, which consisted of 9,796 meters of drilling in 17 holes and provided significant resource delineation. The 2015 exploration program plan includes $5 million for approximately 6,000 meters of diamond drilling, to be completed with two drill rigs, focused on resource growth. Additionally, geophysical surveys and environmental and geotechnical studies are also planned for 2015.

Commodity: Copper, zinc, gold and silver
Start Date: Unknown
Duration of Project: Unknown
Jobs: Unknown
Total Project Costs: Unknown

PEBBLE COPPER-GOLD-MOLYBDENUM PROJECT

Overview

The Pebble Project is a copper-gold-molybdenum porphyry deposit located in the Bristol Bay region of Southwest Alaska, 17 miles northwest of the community of Iliamna. The reserves for the Pebble Project are estimated to be 80.6 billion pounds of copper, 107.4 million ounces of gold, and 5.6 billion pounds of molybdenum as well as silver, rhenium and palladium. Assuming the total resource was mined at a rate of 220,000 metric tons per day, a mine at Pebble would be in operation for more than 100 years. There have been several political and public relations campaigns for and against the Pebble Project, which has been a hot button issue for both environmentalists and resource development proponents. Due to the sensitive nature of the project, Pebble has been reluctant to issue a timeline for completion of the mine plan and feasibility study currently underway. The project description is expected to include details of the Pebble mine plan, including a transportation corridor linking the deposit and Cook Inlet some 85 miles to the east, a deep-water port-site at Cook Inlet and a facility to generate the some 400 megawatts of electricity expected to be needed to power the mill and other facilities at the enormous copper project. Early estimates project it will cost $4.7 billion to develop the Pebble mine site and $1.3 billion will be needed for infrastructure costs. Twenty-one hundred (2,100) people are expected to be employed over the four year construction period and 1,000 people will be necessary for the operations workforce.

While the project has faced a number of setbacks which have greatly reduced the chances that development of the mine will commence anytime in the near future, mine proponents remain optimistic about the project. The federal Environmental Protection Agency's (EPA) Bristol Bay Assessment, ostensibly a non-project specific overview of the impacts of large scale mining in the region, was released in January of 2014. Summarized by EPA Region 10 Administrator Dennis McLearran, the EPA has concluded that "large-scale mining in the Bristol Bay watershed poses significant near and long-term risks to salmon, wildlife and native Alaskan cultures." While not specifically addressing the Pebble Project, the EPA has claimed that it justifies a review process through provisions in the federal Clean Water Act that could result in a preemptive ban on the permits needed to move the mine development forward. In response, the Pebble Limited Partnership, in May 2014, filed suit in U.S. District Court for Alaska seeking an injunction to halt this process. A preliminary injunction was issued in November of 2014, until the case is ultimately settled. Additionally, the partnership filed another suit against the EPA in September of 2014. This alleges that EPA officials, specifically Phillip North, garnered advice from anti-mine activists to develop

strategies to block development, including the drafting of the EPA's Bristol Bay Assessment document. Mr. North has been unavailable for comment and is currently living in Australia. In August of 2015, a federal court issued a subpoena to Mr. North compelling him to provide testimony at a deposition in Anchorage on November 12.

The Pebble Project has also suffered from a number of organizational changes in recent years. In September of 2013, Anglo American plc withdrew from the Pebble Limited Partnership. This left Northern Dynasty Minerals, Ltd. as the sole owner of the mining claim and they are currently seeking another partner. Leadership at the Pebble Limited Partnership has recently changed as well. John Shively, the Partnership's CEO since 2008, assumed the role of Chairman of the Board of Directors for the Pebble Project and appointed Tom Collier as the new CEO.

Commodity: Copper, gold, molybdenum, silver, rhenium and palladium
Start Date: Unknown
Duration of Project: The project would likely be permitted for a 20-30 year mine life
Jobs: 2,100 during the four-year construction phase, 1,000 during operations
Total Project Costs: Estimated at $6 billion

UPPER KOBUK MINERAL PROJECTS (UKMP)

Overview

The Upper Kobuk Mineral Projects (UKMP) refers to a collection of land holdings located in the Ambler mining district of northwest Alaska. The mineral district is held by two entities, NovaCopper and NANA Regional Corporation Inc. who have signed an agreement to consolidate their land holdings in the district. The area of interest spans 353,000 acres and contains two unique mineralized belts; the Ambler Schist Belt and the Bornite carbonate sequence. The potential mineable minerals in both of these belts consist mainly of copper, but also include zinc, lead, gold silver and cobalt.

In July of 2013, NovaCopper released a Preliminary Economic Assessment (PEA) of the Arctic Deposit within the Ambler Schist Belt, which estimated an annual payable metal production of 125 million pounds of copper, 152 million pounds of zinc, 24 million pounds of lead, 29,000 ounces of gold and 2.5 million ounces of silver over a minimum 12-year mine-life. As of March 2014, Bornite is reported to have indicated in-pit resources of 334 million pounds of copper and an inferred in-pit resources of 2,259 billion pounds of copper, plus an additional inferred below-pit (potentially underground mineable) resources of 3.437 billion pounds of copper.

In 2014, the company expended $2.7 million re-examining and re-assaying historical drill core from drill programs conducted mostly in the sixties, seventies and eighties. In June of 2015, NovaCopper closed on a corporate transaction that added an additional $20 million to the company's balance sheet. In July of 2015, the company announced a $5.5 million exploration plan that included 3,000 meters of in-fill drilling at the Arctic Deposit along with geotechnical and hydrology studies. Additionally, site engineering work is underway, along with extensive waste rock characterization work (acid-base accounting), wetlands delineation and a detailed Lidar survey over the project area. All of this work will be used to complete a pre-feasibility study in 2016.

Due to the remoteness of the Ambler mining district, development of either site is predicated on the construction of a proposed Ambler Mining District Industrial Access Road, a 211-mile long road extending west from the Dalton Highway. Studies on the feasibility of this road have been ongoing since 2009, and are now led by the AIDEA. NovaCopper entered into a memorandum of understanding with AIDEA in 2012, so the two groups could cooperate and share information related to the proposed road. AIDEA has completed extensive environmental studies along the road corridor and is in a position to table a permitting document. AIDEA is also exploring ways to fund the

construction and maintenance of the road and to create an outline for NovaCopper to repay the investment.

In April of 2014, AIDEA's board of directors gave approval to begin the permitting process and preparation of an environmental impact statement. However, the current state budget added no funding to the road project, which will need approximately $6.8 million over the next two years to accomplish its goals. AIDEA has asked the governor and legislators if it should proceed with permitting in 2015, delay the project or scrap it all together and is waiting for a response. Construction of the road is estimated to cost between $200 to $300 million.

Commodity: Copper
Start Date: Unknown
Duration of Project: 12 years (Arctic Deposit only)
Jobs: 400 to 500 year-round jobs while in operation
Total Project Costs: For the Arctic Deposit, the initial capital expenditure is estimated at $717.7 million and sustaining capital is estimated at $164.4, for a total capital expenditure of $882.1 million over the estimated 12-year mine-life; in addition, closure and reclamation costs are estimated at $81.6 million

WISHBONE HILL COAL PROJECT

Overview

The Wishbone Hill coal prospect is owned by the Usibelli Coal Mine Inc. and is located ten miles northeast of Palmer. Estimated reserves are 14 million tons of bituminous coal. About 6 million tons are currently being considered for mining, which would provide for a potential commercial life of 12 years from start of production. If Usibelli decides to proceed with the development of Wishbone Hill, some 500,000 tons of bituminous coal will be shipped overseas to Japan via a newly constructed loading facility at Port MacKenzie on the west side of Upper Cook Inlet across from Anchorage. An Institute of Social and Economic Research (ISER) study estimated the number of jobs potentially created by the mine at 90 people.

Start Date: Unknown
Duration of Project: 12 years based on current reserves estimates
Jobs: 75 – 125 based on an ISER socioeconomic study
Total Project Costs: Unknown

EXISTING OPERATIONS

FORT KNOX GOLD MINE

Overview

The Fort Knox mine is an open-pit gold mine located on State of Alaska and Alaska Mental Health Trust lands, approximately 26 miles northeast of Fairbanks. The mine was originally permitted in 1994, and in 2014, produced 379,453 gold equivalent ounces. For the first half of 2015, production has been reported at 198,734 gold equivalent ounces and may finish the year at over 400,000 ounces. Between 1997, when production began and 2014, over 6.3 million ounces of gold have been extracted from the mine.

In 2014, production costs were at $712 per ounce, up nearly 25 percent from costs of $569 per ounce in 2013. The increased costs were due to mining activities in areas of low grade ore, higher labor costs, increased consumption of reagents and a decrease in tons placed on the heap leach pads. Production costs for the second quarter of 2015, went down considerably and were reported at $606 per ounce. Fort Knox continues to be one of the lowest cost open pit mines in Kinross' portfolio.

Kinross Gold Corporation, owner and operator of Fort Knox, has made considerable investments in the mine to prolong its working life. In 2009, they completed construction of a heap leach facility and expansion of the existing mine. The heap leach facility, which can economically process low-grade material, is extending the life of Fort Knox and contributing to increased gold production at the mine. Over the last six years, 601,885 ounces of gold have been produced from this facility and additional heap leach pads have been developed. Production from this operation is estimated to be 158,087 for 2015. Kinross projects there are enough ore reserves in place to continue mill operations until 2017, and to continue heap leaching operation through 2027.

Kinross is currently reviewing several options to further extend the life of the Fort Knox mine. This includes mining material in the Phase 8 area directly adjacent to the existing open-pit mine. This rock is approximately 20 percent lower grade than the ore recovered from the current operations and would likely be processed on the heap leach pad. Measured and indicated resources from this addition show a potential for 910,000 ounces of gold. Another prospect for Kinross is the Gil gold property, situated roughly five miles east of the mine. After purchasing the land in 2011, extensive exploration work has been completed and the site has measured and indicated resources of 532,700 ounces of gold.

Going into 2014, the Fort Knox area had 2.4 million ounces of gold in reserves. An additional 1.6 million ounces of gold in the lower-confidence resource category and other nearby deposits are expected to add to the life of the mine.

Commodity: Gold
Start Date: 1997
Duration of Project: Current projections; mill operating until 2017, and heap leach into 2027
Jobs: 660 employees

Total Project Costs: Unknown

GREENS CREEK MINE

Overview

The Greens Creek Mine, 100 percent owned and operated by the Hecla Mining Company, is located within the Admiralty Island National Monument, an environmentally sensitive area of Southeast Alaska. The land comprising the Greens Creek mine, inclusive of all Admiralty Island facilities, consists of both publicly and privately owned land. The Greens Creek Project includes 639 unpatented lode mining claims, 58 unpatented mill site claims, 17 patented lode claims, one patented millsite and other fee lands, notably the Hawk Inlet historic cannery site. Hecla also holds title to mineral rights on 7,301 acres of federal monument land acquired through a land exchange with the U.S. Forest Service. Hecla leases parcels from the United States on both the monument and non-monument lands. Hecla uses other public lands pursuant to special use permits issued by the USFS and leases issued by the State of Alaska. The land exchange confers restricted surface usage rights.

The mine and concentrator are accessible via passenger ferry originating from Auke Bay, Juneau, to Young Bay on Admiralty Island, and then by private road. A marine terminal is located on the island at Hawk Inlet for supplies and concentrates load-out. Seaplane service is available from the Juneau airport to Hawk Inlet. Key project infrastructure consists of the mine, a processing plant, dry stack tailings facility, a ship-loading facility, camp facilities and a ferry dock.

The Greens Creek Mine opened in 1989, with enough reserves to support a seven-year mine-life. Subsequent exploration has expanded on those estimates and the mine is expected to continue operations for some time. Proven and probable reserves for silver are 94.0 million ounces and 738,700 ounces of gold. There are 240,850 tons of lead and 639,930 tons of zinc in proven and probable reserves as well. In 2014, the mine produced 7.83 million ounces of silver, 58,753 ounces of gold and 59,810 short tons of zinc and 20,151 short tons of lead. At the beginning of 2015, Hecla estimated silver production to be 7.3 million ounces, but first half recoveries of 3.9 million ounces have outperformed expectations and they are now expecting Greens Creek to produce 7.7 to 7.8 million ounces in 2015.

The mine is considered to be one of the largest and lowest-cost primary silver mines in the world and in recent years has been the primary source of revenue for Hecla. In 2014, their cash cost per ounce of silver in was $2.89 per ounce, versus $4.42 per ounce in 2013. The company has been aggressively investigating options for expanding their operations at Green Creek, continuing exploration drilling has resulted in the discovery of additional mineral veins in the Killer Creek area, less than a mile from the current mine site, and in the Deep 200 South ore trend. In 2015, the company had planned to invest $8.2 million on exploration and definition drilling activities throughout their property. A $44 million expansion of the mine's dry stack tailings storage facility is underway and should be operational in 2017.

Commodities: Silver, gold, zinc and lead
Start Date: 1989
Duration of Project: Current reserves to last until 2024
Jobs: About 415 workers

Total Project Costs: Unknown

KENSINGTON GOLD MINE

Overview

The Kensington Gold mine is located in southeast Alaska roughly 45 miles northwest of Juneau and is owned and operated by Coeur Alaska, Inc, a wholly-owned subsidiary of Coeur Mining. Major permitting for the mine was completed in 2005, and the construction of the mine and mill facilities started immediately. In 2009, the U.S. Supreme Court affirmed the Kensington 404 Permit for tailings placement allowing construction to proceed. It was Alaska's sixth major mine when it began production on July 3, 2010.

The main deposit at Kensington has 629,000 ounces of gold in proven and probable reserves, while the adjacent Jualin Mine has inferred resources of 179,000 ounces of gold. In 2014, the mine produced 117,823 ounces of gold, beating the company's expectation of 107,000 – 112,000 ounces from the beginning of the year. The cost per ounce of gold produced in 2014, was $951 per ounce. In 2015, Coeur began the year expecting to recover 118,000 ounces of gold, however, the production of 63,754 ounces in the first six months has revised their estimate up to between 115,000 and 125,000 ounces of gold. Cost per ounce estimates for this year has also improved over last year and should be between $850 to $900 per ounce.

Exploratory spending at Kensington was budgeted at $9.1 million. These projects, along with previous discoveries, have resulted in a number of positive results. Drilling at two sites within the mine area, zones 10 and 20, has uncovered excellent high-grade ore which Coeur is expected to begin mining in 2016. A second source of high-grade ore has been confirmed at the adjacent Jualin Mine. Coeur has applied for the necessary permits to re-open this historic mine for underground drilling and development. Initial production from the Vein 4 section of this mine is expected to begin in 2017. These resources are thought to be of significant enough quantities to boost production to 149,000 ounces in 2018, 137,000 ounces in 2019, and 123,000 in 2020. Exploration continued in 2015, Coeur invested $1.7 million during the first three months alone drilling.

Coeur is also utilizing state of the art technology at Kensington to improve their profitability. An ore sorting technology utilizing x-ray transmission was used in a pilot program in 2013, which has enabled the mine to recover high-grade pebbles from the mine's tailings. This sorter will increase Kensington's gold recoveries from 96 to 98 percent. The success of this program has led to Coeur investing in a full-scale ore sorter which is slated to be fully integrated into the mine's recovery circuit by 2016. The fully automated system is expected to add an additional 2,800 ounces of gold each year with almost no additional operational costs.

Commodity: Gold
Start Date: 2010
Duration of Project: Through 2022, based on current reserves
Jobs: 328

Total Project Costs: Unknown

POGO GOLD MINE

Overview

The Pogo gold mine is located 110 miles southeast of Fairbanks and is the first overseas mine operated by Tokyo-based Sumitomo Metal Mining. The operation at Pogo includes an underground mine that feeds gold ore to a mill at a rate of roughly 2,500 tons per day. Approximately 344,000 ounces of gold were produced in 2014. There remains 2.4 million ounces of gold in reserves and another 2.4 million ounces in resources.

Sumitomo spent $347 million on start-up costs for the mine including the cost of infrastructure, electrical transmission and transportation construction costs. The facilities include an underground cut and fill mine with conveyor access to the surface, a surface ore mill, tailings preparations facilities, a 249 person upper camp and 126 person lower camp, a transmission line and onsite electrical distribution system, a 49 mile all season road and a water management system.

Two new zones of gold mineralization, North and East Deep, have been discovered adjacent to the Liese zone currently being mined at Pogo. Since 2012, Sumitomo has done a considerable amount of drilling to delineate these prospects. Sumitomo has reported that together, the Liese and East Deep zones have a combined 1.9 million ounces in gold reserves and an additional 2.7 million ounces in resources. The mine's operators budgeted $17 million in 2014, to continuing development and exploration at the mine, predominantly in the two prospects. Preliminary reports suggest another $15 million has been budgeted for their 2015 exploration program as well.

Commodity: Gold
Start Date: 2007
Duration of Project: Through 2019 (this is expected to be extended by at least 10 years based on recent discoveries)
Jobs: 329
Total Project Costs: $347 million start-up, $255.3 million in 2012

RED DOG MINE

Overview

The Red Dog zinc-lead mine, located roughly 82 miles north of Kotzebue, is the second largest zinc producer in the world. It currently supplies 4 percent of the world's zinc needs. This northwest Alaska mine is an open-pit truck-and-loader operation that uses conventional drill and blast mining methods. The mineral processing facilities use grinding and sulfide flotation methods to produce zinc and lead concentrates. Developed under an agreement between NANA Regional Corporation and Teck Alaska Incorporated, Red Dog began mining in 1989, with an initial mine-life of roughly 20 years. Through continuous investment and exploration, however, the mine celebrated 25 years of operation in 2014. At the beginning of 2014, the mine had an estimated 45.4 million metric tons of reserves averaging 15.8 percent zinc, 4.1 percent lead and 72.6 grams per ton silver, enough ore to sustain the operation for another dozen years. In 2013, the mine produced 551,300 metric tons of zinc. At the end of the 2014 shipping season, more than 1 million dry metric tons of zinc and about 205,000 dry metric tons of lead concentrate had left the mine, amounting to 596,000 tons of zinc production. The forecast for 2015 production has been set at 540,000 to 565,000 metric tons of zinc and 90,000 – 95,000 metric tons of lead.

Anarraaq-Aktigiruq, a deep zinc-rich prospect that lies about eight miles northwest of the current operation, is shaping up to be another massive zinc deposit with grades comparable to those currently being mined at Red Dog. Teck discovered Anarraaq in 1999, subsequently establishing an inferred resource of about 19 million metric tons, grading 15.8 percent zinc, 4.8 percent lead and 2.1 ounces per ton silver. Teck is also examining expanded operations in two other areas adjacent to Red Dog. The most promising prospect is the Qanaiyaq zone, a near-surface deposit with an indicated resource of 8.3 million tons and an average grade of 25.7 percent zinc, 6.9 percent lead and 3.99 ounces per ton silver. A second region, the Paalaaq, is also being considered, but resource estimates have not yet been released. These and other nearby deposits have the potential to extend the mine-life of Red Dog well into 21st Century.

Since its beginning, the Red Dog mine has been a significant economic driver of the Northwest Arctic Borough. Through 2013, the NANA Regional Corporation has netted $1 billion in proceeds from Red Dog which has been distributed in the community in many ways. During this time, $617 million has been shared with other Alaska Native Corporations, $199 million has been paid in dividends to its shareholders and another $116 million has gone to the borough as payment in lieu of taxes. In 2013 alone, NANA made $143 million in net profits at the mine. In that same year, Teck reported paying close to $54.7 million in wages to its 450 employees at Red Dog. Fifty-two percent of employees at the mine are NANA shareholders. Additionally, in 2014, 47 percent of the spending done at Red Dog was with suppliers self-identifying as Indigenous people.

Commodities: Zinc, lead and silver
Start Date: 1989
Duration of Project: Through 2031
Jobs: 432 in 2014
Total Project Costs: Unknown

USIBELLI COAL MINE (HEALY OPERATIONS)

Overview

Usibelli Coal's Healy operation, located about 100 miles south of Fairbanks, is Alaska's longest lived large-scale mine, having been in continuous operation since 1943. The mine historically produces roughly 2 million tons of coal per year, with around 1 million tons delivered to six power plants in Interior Alaska and the balance shipped overseas. In 2014, coal production was 1.5 million tons, with 513,000 tons of that going overseas. However, a downturn in demand from international customers has resulted in only 150,000 tons being exported to Japan in 2015, with no other contracts for shipments overseas scheduled. As a result, Usibelli announced in September that the mine will be put on idle for the remainder of the year. This will also require the Seward coal loading facility to temporarily close and be a significant negative impact for the Alaska Railroad. During peak operations, the mine provides 140 direct jobs and has a projected commercial life of 350 years based on current production rates and reserve estimates of around 700 million tons of coal in the Healy area.

Usibelli Coal is a major employer and taxpayer in Interior Alaska. The mine pays $3 million every year in state rents and royalties, $618,000 annually to the Alaska Permanent Fund and $130,000 per year to seven local and borough governments. Total wages to their direct employees totaled $14.7 million in 2013, with an additional $16 million in indirect and induced wages. Spending with Usibelli's 360 Alaska-based vendors totaled $40.7 million that year as well. Additionally, the export of coal from Usibelli contributes about 20 percent of the Alaska Railroad's

freight revenues. The million tons of coal used for local power production goes to six coal-fired plants generating electricity at about 5 cents per kilowatt-hour, about half the cost of natural gas fired power.

In December of 2013, Golden Valley Electric finalized its purchase of the Healy Clean Coal Power Plant for roughly $44 million and has invested $93 million to retrofit the plant with the latest emission controls. This plant, renamed Healy Unit 2, will be supplied by Usibelli coal and is expected to add 50 megawatts of power to the Alaska Railbelt grid sometime in late 2015.

Start Date: 1943
Duration of Project: 350 years at current production rates and reserve estimates
Jobs: 140
Total Project Costs: Unknown

Source: Alaska Miners Association

APPENDIX A – 2014 RESOURCE EXTRACTION EXECUTIVE SUMMARY

This year was a year of significant change in Alaska's resource extraction industry. From both the business and governmental perspective, economic conditions shifted dramatically, but have ultimately resulted in more clarity of future conditions. It is the hope of many that Alaska's increasingly stable tax and regulatory environment will result in more projects moving from concept to reality. In this report, we highlight a number of projects that are in the planning stage which could have great benefit to the state and its economy.

The optimism noted in this report last year for the Cook Inlet Basin proved to be with merit, as 2014 saw a great deal of investment and increased production. According to the State of Alaska, Cook Inlet oil producers have boosted output 25 percent in the last year and production has essentially doubled in Cook Inlet since fiscal year 2010, increasing from 8,900 barrels per day in fiscal year 2010 to 16,288 barrels per day presently. The region has proven to be an attractive investment for independent oil and gas explorers and has thrived on this new energy.

Oil and gas and related support industry employment in the Cook Inlet region continues to grow and has been a substantial contribution to the sustained drop in unemployment rates, particularly within the Kenai Peninsula Borough. This bodes well for the odds of future success for projects proposed for this region in the next decade. At the same time, a number of challenges related to permitting, infrastructure, key industry support services and litigation, to name a few, could delay or derail many of these efforts.

Alaska's North Slope may see similar results in the coming decade with many of the field's major investors indicating a renewed interest in forwarding projects. For the most part, the dust has settled on the state's oil tax system that had recently caused much uncertainty in development plans. Long term expectations for the industry's investment climate has stabilized and there is new hope that the North Slope oil production curve may flatten out. However, tax policy alone will not lead to another "Oil Boom" as was seen in the early days of the Prudhoe Bay discovery. Progress in stemming declines in North Slope oil production will likely be measured in inches in the next few years as proposed investments ramp up, projects are designed, permits are developed, litigation is overcome, drilling is completed, facilities are built or revamped, and actual new production is brought on line as a result.

While established fields are expected to see increased development in the near term, plans for new areas of exploration, particularly in the federal waters of the Outer Continental Shelf (OCS), have stalled. A lengthy wait for new federal regulations involving drilling in the Arctic region have put a number of exploration projects on hold. Shell Oil Company has maintained throughout the process a goal of continuing their drilling program in 2015, but given current conditions, their plans will not result in increased oil production in the near term. Alaska has reached a point where the average project timeline is measured in decades, and given the rapidly changing marketplace Alaska finds itself doing business in, time is not Alaska's friend.

In just five years global oil and gas markets, particularly in the Lower 48, have become ever more competitive thanks to new technological innovations. Hydraulic fracturing and horizontal drilling have changed the face of U.S. energy markets. According to the U.S. Energy Information Administration projections, within the next 20 years the United States could reach a point of balance in the amount of energy it consumes as a nation versus the amount of energy it produces domestically, meaning the United States will no longer reliant on imported crude oil.

This is a game changer for energy markets, regional economies and the global trade in oil and natural gas. These new technologies are driving down the costs and time required for exploration, development and production of oil and natural gas with resulting regional supply overbalances that are driving down prices as new reserves of oil and natural gas flood U.S. markets. Technology is making Alaska's already challenging cost and time environment even less competitive as it becomes cheaper to explore for and produce oil and natural gas in the Lower 48 and Canada.

In the mining sector, recent developments have clarified the future of a number of projects. Near record highs of gold production in the state have been a boon for existing operations, but the dramatic decline in the commodity's price

has stifled new investment and has priced out some prospects. The Pebble Project, an extraordinary development that has seen years of planning, incurred major disruptions in the past year and uncertainty in its future has become more prevalent. On the more positive side, recent developments in both state and federal mining support has bolstered the development schedule for two sizable mining projects, Bokan Mountain and Donlin Gold. As history has shown, mining development in Alaska is a moving target, and today's super project can quickly become yesterday's shelved plan. We are cautiously optimistic that the momentum behind these two sites will bring new investment and opportunity to Alaska.

Influencing all of these projects is the ongoing effort to bring North Slope natural gas to market. A cheap, reliable source of energy greatly reduces costs for many of the potential projects outlined in this report and may spur the development of even more prospects. This multi-billion dollar project will itself be a major source of jobs and investment that will bolster the state's economy. In the oil and gas section of this report, we have produced an overview of the current status of the many moving parts to this transformative development. It is encouraging to see the high level or coordination between the private and public interests in the Alaska LNG project, and the significant investments put forth in the last year have sent a strong signal that this opportunity may be realized within the next decade.

Alaska's competitiveness in the global markets remains challenged in many ways. Several related issues continue to diminish Alaska's competitiveness. Issues based in social compacts, taxation, permitting, litigation, commodity pricing, high costs related to project development and access to needed infrastructure have reached a point of, what is effectively, gridlock for many proposed projects. Compounding these challenges is a continuing lack of agreement among Alaskans on a common vision for Alaska's economic future.

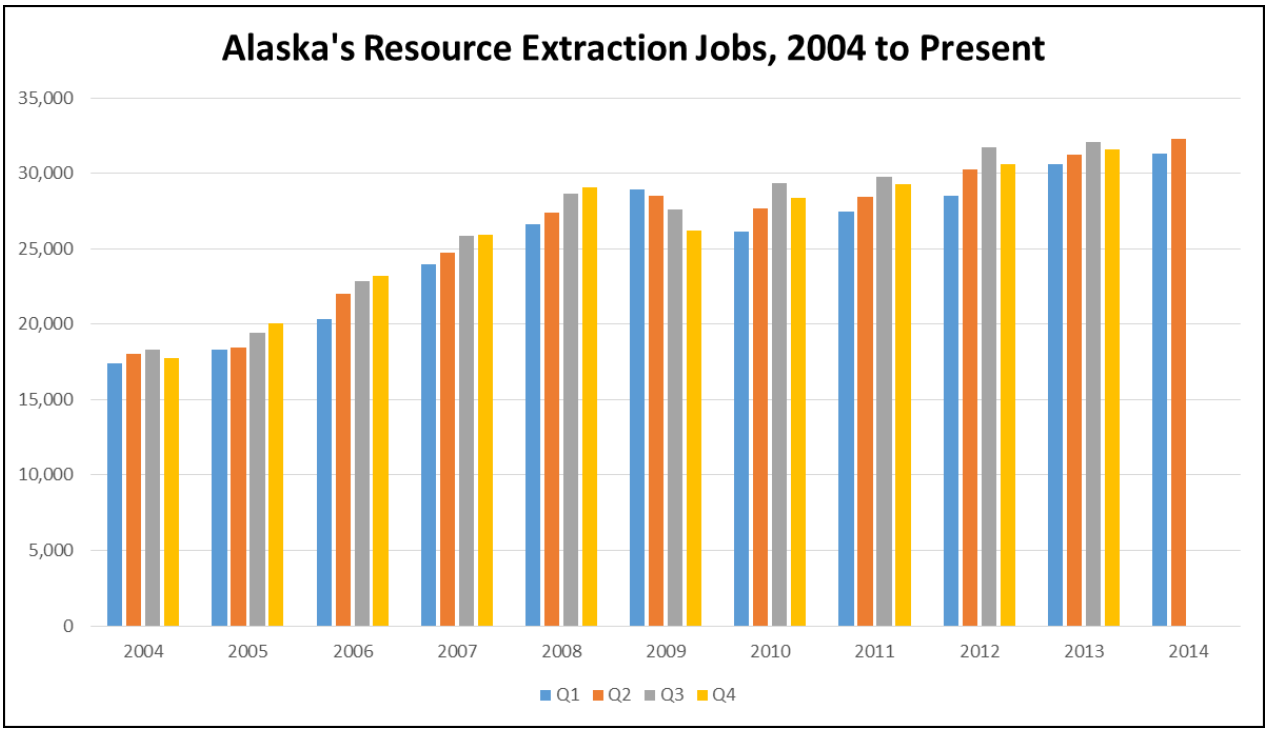
Resource extraction projects developed in the next seven to 10 years will be the foundation of a growing, more diversified economy based on new jobs, new investment and potential for lower energy costs for more Alaskans. The wealth generated by these projects, combined with our existing industry base, will provide the needed capital to broaden our economy though investments in education, infrastructure, community and economic development. If we are unable to develop even a minority of the projects described in this report, there is a growing likelihood that Alaska will face a period of economic stress which will result in a growing trend of economic stagnation and decline for many areas of Alaska.

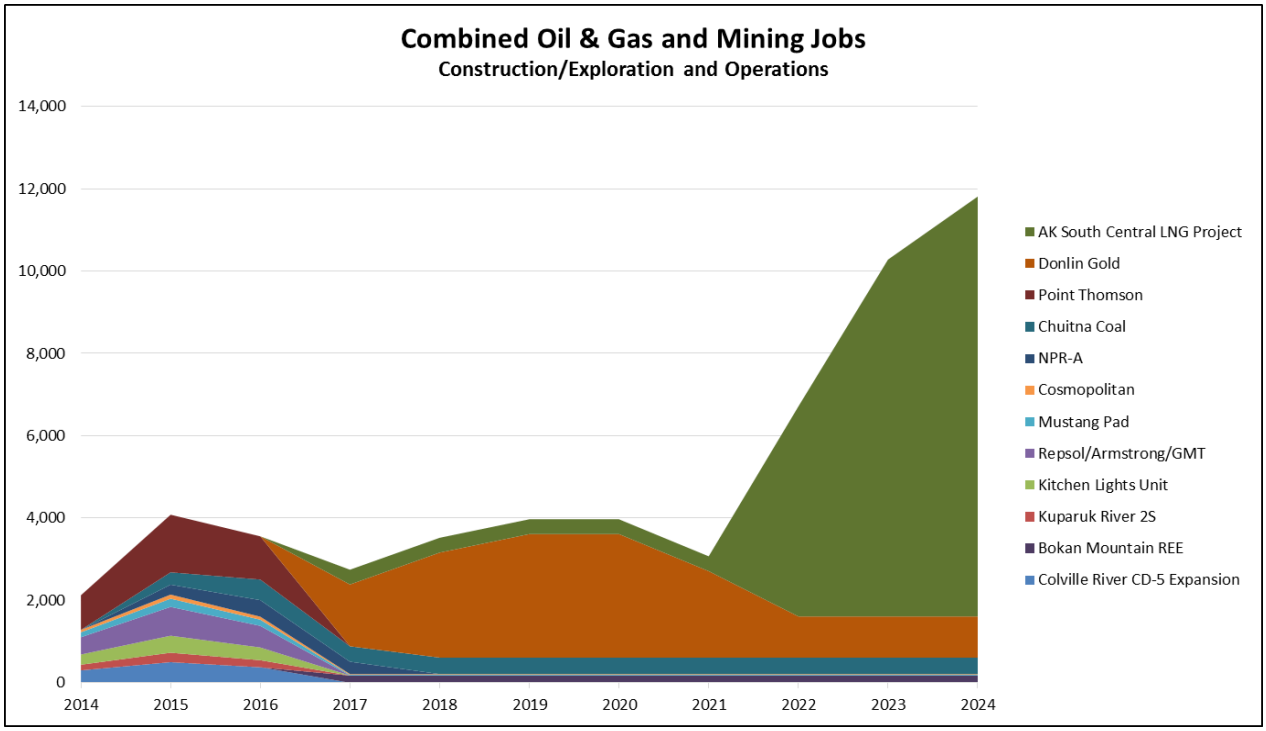
So what is the outlook for proposed projects in the next decade? For 2014, AEDC's updated projection shows Alaska has the potential to generate roughly 20,000 jobs at peak construction and that would be created through $68 billion of private sector investments in 14 resource extraction projects that are proposed for development within our state in the next decade.

The following are the graphed views of the projects profiled in this projection, along with a historical representation of resource extraction job levels in Alaska over the last 11 years to provide context. The first three graphs present a combined view of oil and gas and mining projects from two perspectives.

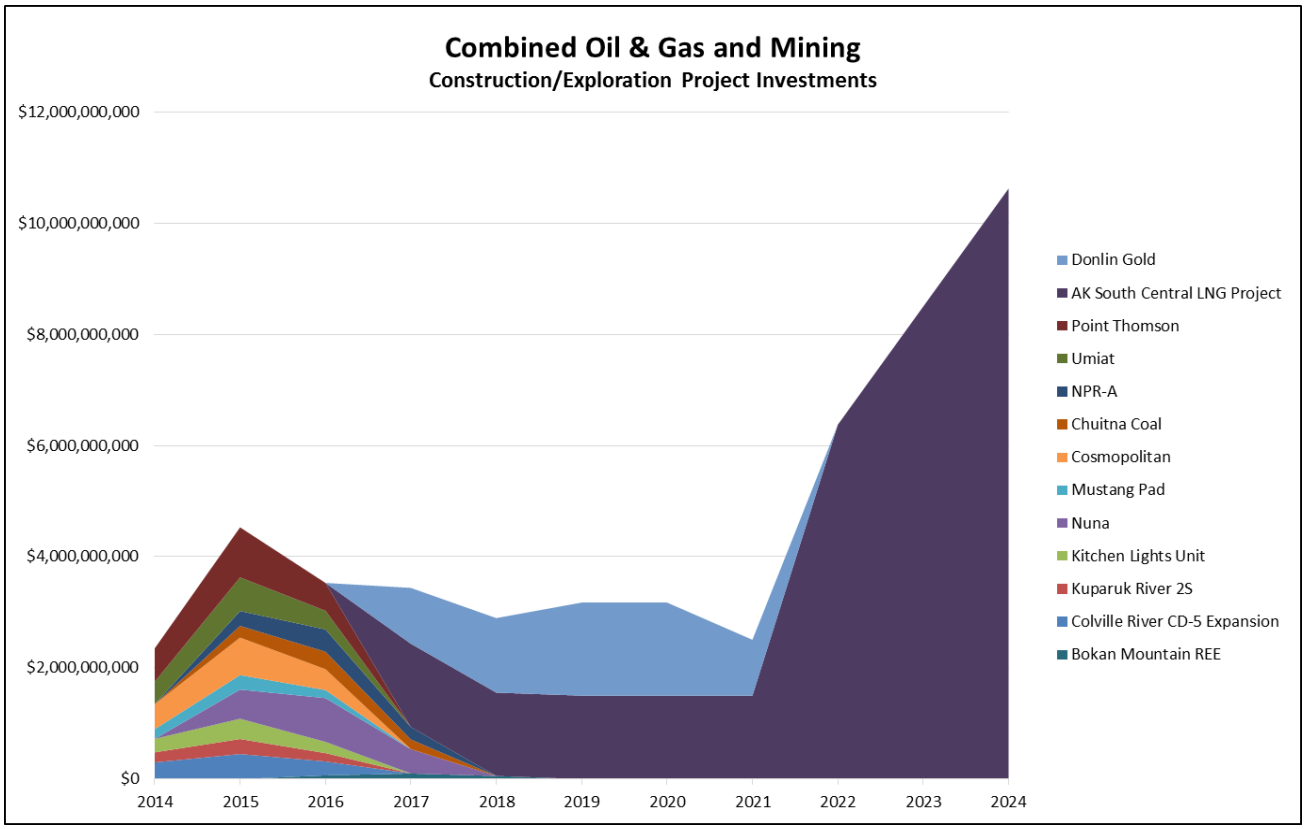
The first shows the number of resource extraction jobs in Alaska by quarter since 2004. Next is the view of total jobs the proposed projects in this report could create and when. The third graph presents an overview of total spending on these projects and when that spending will take place. This is the earliest that these jobs/spending could occur and are based on favorable conditions.

Please note that all graphs are based on available information and in some cases, projects only offer jobs numbers or capital investment figures, not both, and will be excluded from either the jobs or investment graph. It is inappropriate to interpret these graphs as firm commitments by the proposing companies. As discussed at multiple points in this report, all of these projects face significant challenges that must be overcome to initiate actual construction and operations.



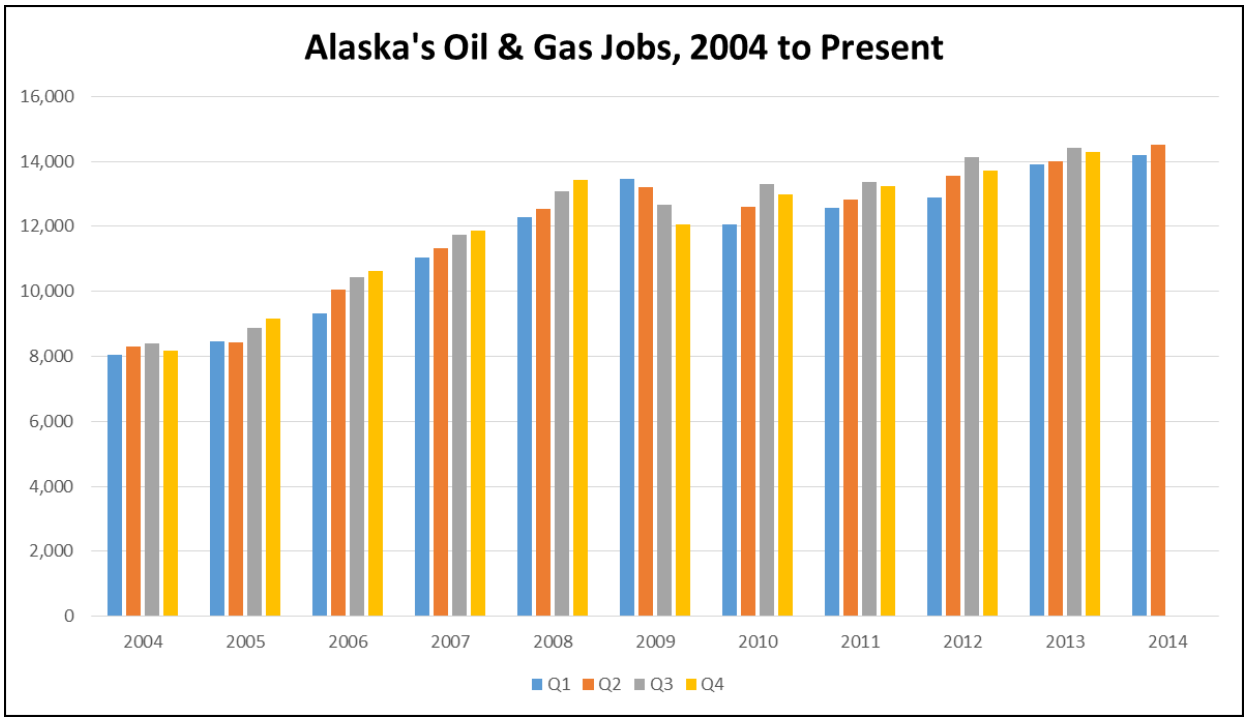


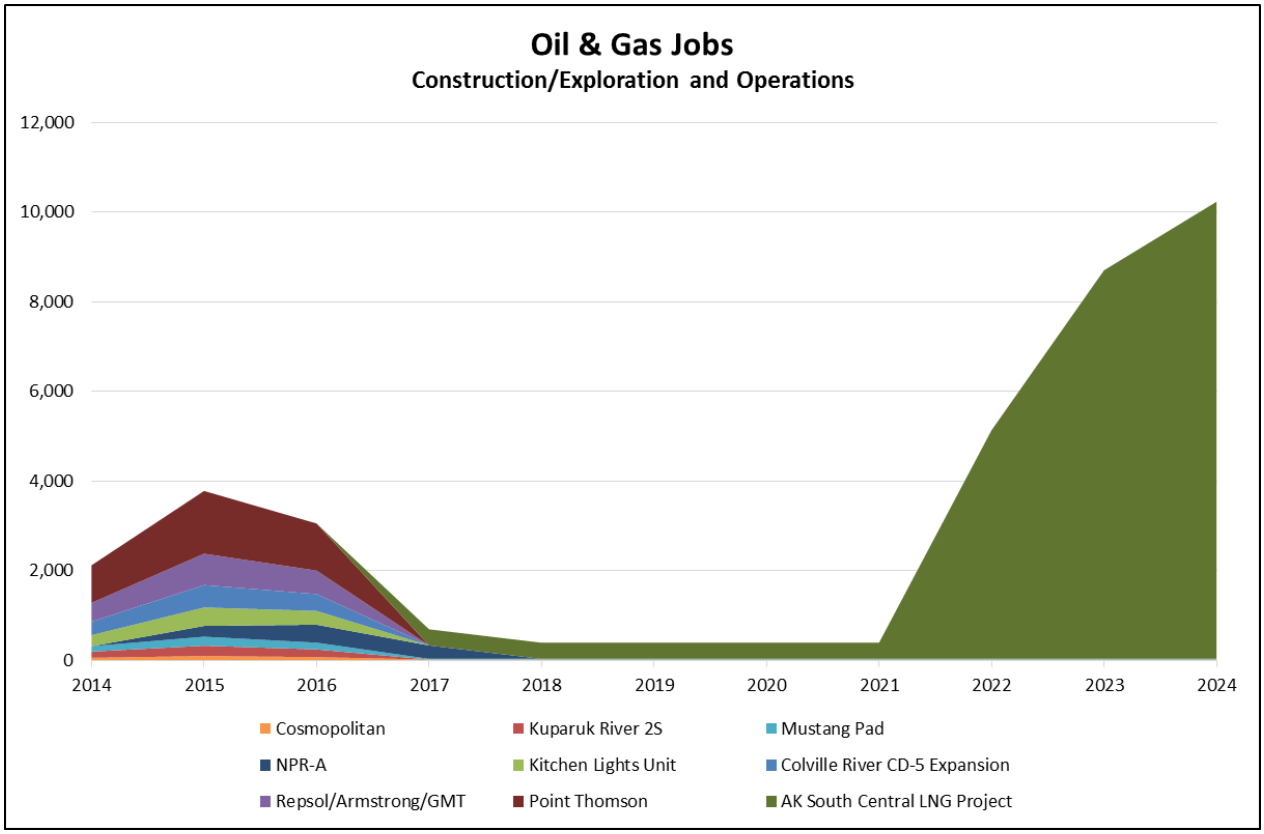
Note: Many of these projects are reported without data regarding jobs during production periods, which results in an under-reporting of potential jobs after 2017.



This graph represents the number of jobs in the oil and gas industry in Alaska over the last eleven years.

The next two graphs offer the narrow view of proposed oil and gas projects only, and again address total jobs and spending related to those projects over the next decade.





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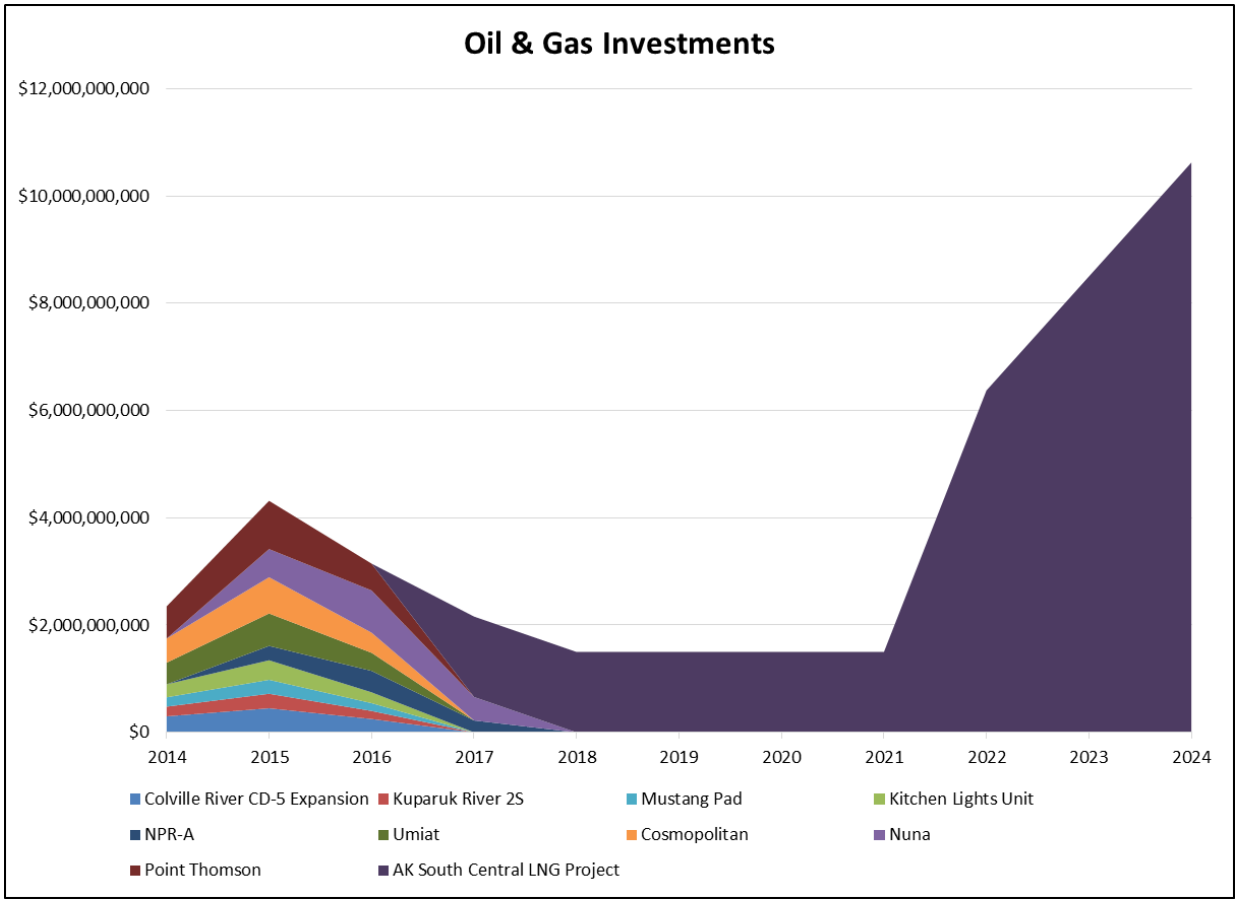
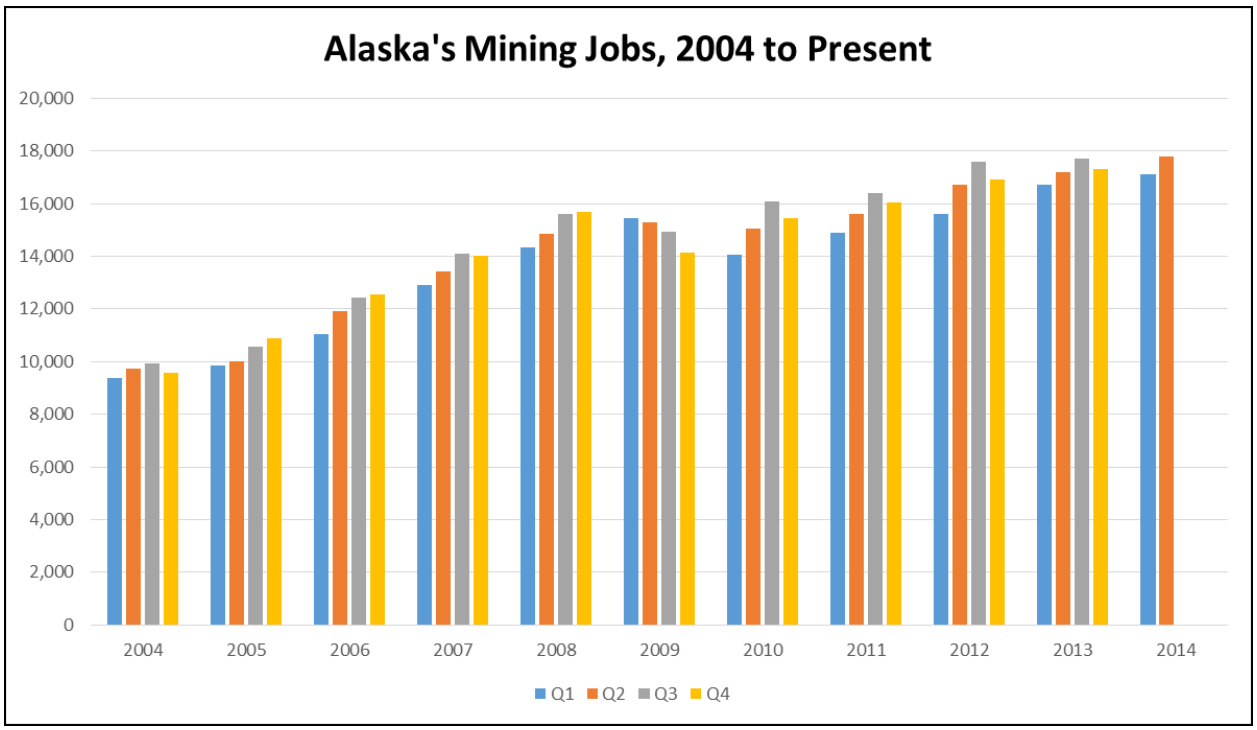
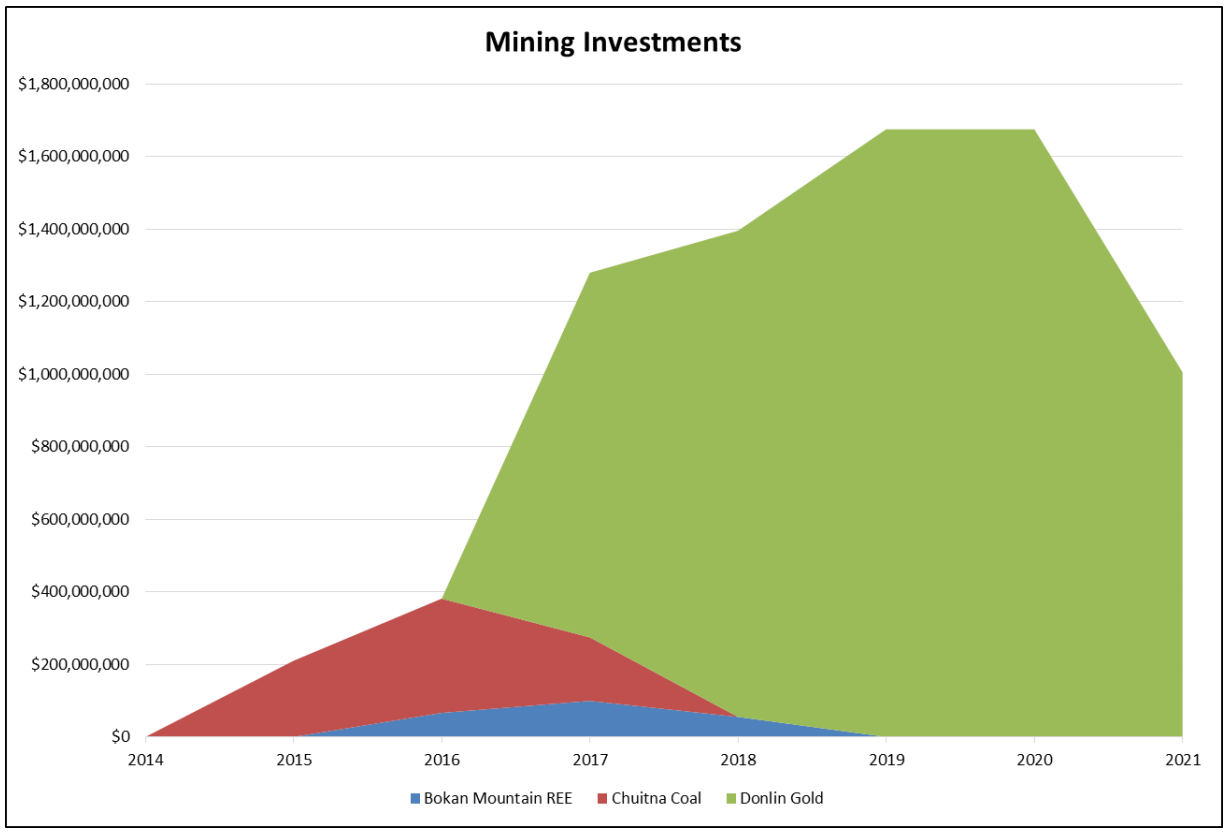
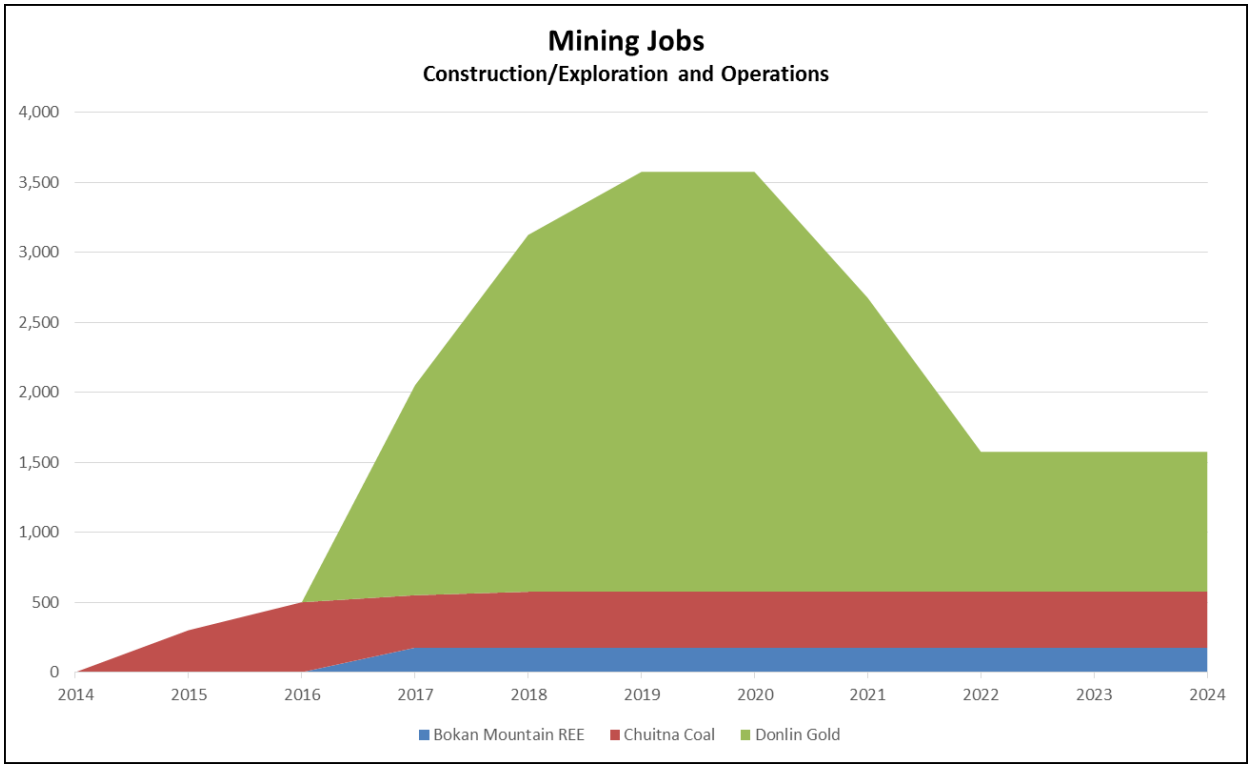


This graph represents the number of jobs in the mining industry in Alaska over the last eleven years.


Alaska's Mining Jobs, 2004 to Present
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Q1
Q2
Q3
Q4

The final two graphs offer the narrow view of proposed mining projects only and again address total jobs and spending related to these projects over the next decade.




Mining Jobs
Construction/Exploration and Operations
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Bokan Mountain REE
Chuitna Coal
Donlin Gold

APPENDIX B – 2013 RESOURCE EXTRACTION EXECUTIVE SUMMARY

In this year's report, unlike recent past editions, there is some optimism to our projection. That optimism is tempered by the many challenges that still face proposed mining and oil and gas projects in our state.

On the optimistic side, the Cook Inlet Basin has seen what is being touted by many regional industry leaders as a renaissance in investment and activity. Estimates by many observers peg 2012 capital expenditures in the basin at nearly $500 million with estimates for 2013 topping $600 million in potential new spending. This renaissance is driven by both very favorable market conditions for crude oil and natural gas in the Railbelt region, combined with extremely favorable tax policies by the State of Alaska that have demonstrated a high level of attractiveness to smaller independent oil and gas explorers.

Oil and gas and related support industry employment in the Cook Inlet region have seen significant increases in the last 18 months, with a corresponding significant drop in the unemployment rates, particularly within the Kenai Peninsula Borough. This bodes well for the odds of future success for projects proposed for this region in the next decade; a number of challenges related to permitting, infrastructure, key industry support services and litigation – to name a few – could delay or derail many of these efforts.

Alaska's North Slope may see similar results in the coming decade, though this view is tempered to a significant degree as it is still too soon to judge the effect that recent passage of oil tax reduction legislation by the Alaska State Legislature. Opponents of the legislation are engaging in a repeal petition effort to place the tax reduction legislation on the ballot in August 2014, leaving the question of oil and gas taxation still not fully resolved. This continuing tax policy debate will maintain a level of uncertainty that could adversely affect industry investment if not resolved.

Even if this legislation ultimately withstands this potential vote to repeal, expectations must be controlled. Tax policy alone will not lead to another "Oil Boom" as was seen in the early days of the Prudhoe Bay discovery. Progress in stemming declines in North Slope oil production will likely be measured in inches in the next few years as proposed investments ramp up, projects are designed, permits are developed, litigation is overcome, drilling is completed, facilities are built or revamped, and actual new production is brought on line as a result.

It should be noted that in the last 12 months some permitting issues were addressed to varying degrees. Some progress was made in the effort to make permitting in Alaska more timely at the State level and Federal permitting has seen some administrative improvements in coordination between agencies. But the panoply of federal permitting regimes still remains a significant barrier to reasonable timeliness in obtaining vital federal permits, as does the seemingly endless litigation processes most projects face in federal courts.

If production declines are actually halted, longer term new production growth will require even larger investments, with all the same challenges but on a bigger scale. New technologies in exploration and drilling will be vital to bring about new production increases. Alaska resource development will likely be dependent on new technologies like those that have created the boom in natural gas and oil production in the Lower 48 states. Again, expectations must be tempered by the fact that we must change more than tax policy in Alaska if we are to remain competitive in our quest for new investment that will bring about increases in oil production.

As demonstrated by the historical and current resource data upgrades in this year's report, with the exception of ANWR, the odds of another Prudhoe Bay super field being discovered in the North Slope area are slim given our history of smaller new oil discoveries over the last 40 years. There is, however a massive known resource in the form of heavy oil that is measured in the billions of barrels that could be developed within the existing Greater Prudhoe Bay Field. But again, this requires new drilling and recovery technologies to make this massive resource viable. Tight oil prospects, similar in some aspects to those found in North Dakota, will also require new investments in new technologies if they are ever to be successfully developed.

The odds for a new super field being discovered improve in the offshore regions of northern Alaska, particularly in the federal waters of the Outer Continental Shelf (OCS). But as was clearly demonstrated by the challenges and misfortunes suffered by Shell in their efforts to drill in the Chukchi Sea in 2012, drilling and developing oil and natural gas resources in the OCS is a long-term effort that could take a decade or more to deliver the first barrel of oil to market.

Given current conditions, there are no likely short-term project opportunities in Alaska. Alaska has reached a point where the average project timeline is measured in decades. Given the rapidly changing marketplace Alaska finds itself doing business in, time is not Alaska's friend.

In just five years global oil and gas markets, particularly in the Lower 48, have become ever more competitive thanks to new technological innovations. Hydraulic fracturing and horizontal drilling have changed the face of U.S. energy markets. According to the U.S. Energy Information Administration projections, within the next 20 years the United States could reach a point of balance in the amount of energy it consumes as a nation versus the amount of energy it produces domestically, meaning the United States will no longer reliant on imported crude oil.

This is a game changer for energy markets, regional economies and the global trade in oil and natural gas. These new technologies are driving down the costs and time required for exploration, development and production of oil and natural gas with resulting regional supply overbalances that are driving down prices as new reserves of oil and natural gas flood U.S. markets. Technology is making Alaska's already challenging cost and time environment even less competitive as it becomes cheaper to explore for and produce oil and natural gas in the Lower 48 and Canada.

In the mining sector, the momentum that Alaska seemed to have prior to 2009 in new projects being developed has slowed dramatically. Global economic demands for key mineral resources have changed significantly in the last year. The Gold market appears to be moving into a declining "Bear" cycle, resulting in dramatic declines in the commodity price for gold.

This trend has dried up much of the investment flows into new mine development. There has also been a sea change in corporate leadership over the last 18 months that has seen new CEO's installed at almost every major global mining company. Mining company shareholders have demanded that CEO strategies should shift from new project investments and growth seen in the last decade to strategies focused on dividends and cash returns to investors.

Most companies are now waiting for improved global economic stability before contemplating investments in new mine projects. In effect, venture capital in the global mining industry is significantly constrained at this time, creating serious headwinds for proposed projects. The net result is that projects in development before this shift in the global mining markets are still moving forward, but much more slowly. Brand new project proposals will likely be few and far between in the next couple of years until global market conditions improve.

Alaska is lucky that it has several projects already proposed that were well into the long-term development process. Projects are now estimated to take seven to 10 years to permit with a long-term outlook of 10 to 15 years from beginning proposal to first production. But like the oil and gas industry, these timelines are significantly out of line with timelines required in other regions of the world, including our neighbors in Canada. Again, Alaska is losing its competitive edge.

Why should Alaskans care about these issues? In the 2011 edition of the projection, AEDC described the current economic foundations of Alaska, the existing resource extraction based projects in place, the proposed resource

extraction projects and the growing list of challenges those projects faced that made their development highly unlikely within the next 10 years. In the following 2012 edition, very little changed that mitigated those challenges. That story still holds true today.

As was the case in 2012, AEDC's perspective on the outlook for the majority of these projects is not optimistic. Alaska's competitiveness in the global markets remains challenged in many ways. Several related issues continue to diminish Alaska's competitiveness. Issues based in social compacts, taxation, permitting, litigation, commodity pricing, high costs related to project development and access to needed infrastructure have reached a point of, what is effectively, gridlock for many proposed projects. Compounding these challenges is a continuing lack of agreement among Alaskans on a common vision for Alaska's economic future.

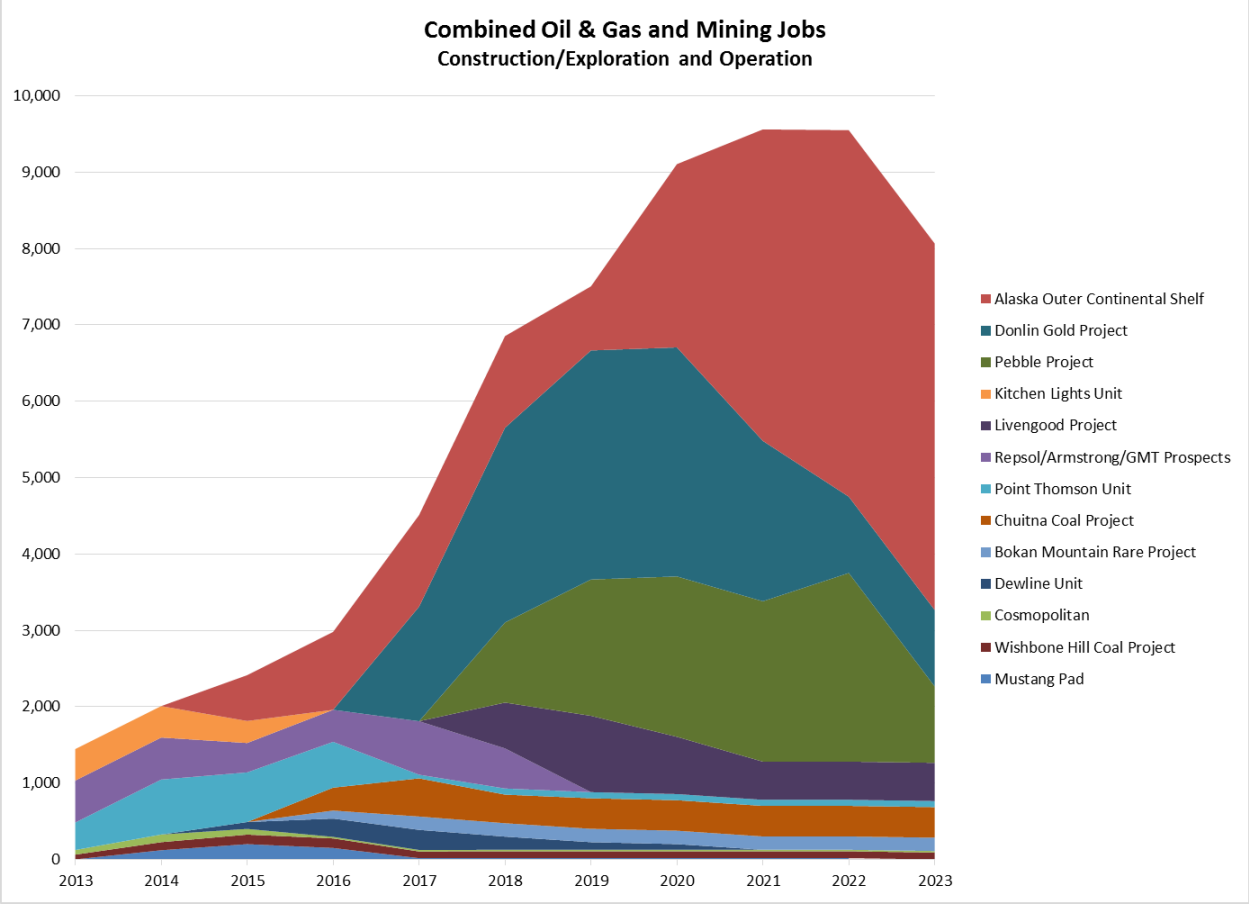
Resource extraction projects developed in the next seven to 10 years will be the foundation of a growing, more diversified economy based on new jobs and a lower cost of energy for all Alaskans. The wealth generated by these projects, combined with our existing industry base, will provide the needed capital to broaden our economy though investments in education, infrastructure, community and economic development. If we are unable to develop even a minority of the projects described in this report, there is a growing likelihood that Alaska will face a period of economic stress which will result in a growing trend of economic stagnation and decline for many areas of Alaska.

So what is the outlook for proposed projects in the next decade? For 2013, AEDC's updated projection shows Alaska has the potential to generate as many as 14,362 jobs at peak construction that would be created through $24.6 billion of private sector investments in 18 resource extraction projects that are proposed for development within our state in the next decade.

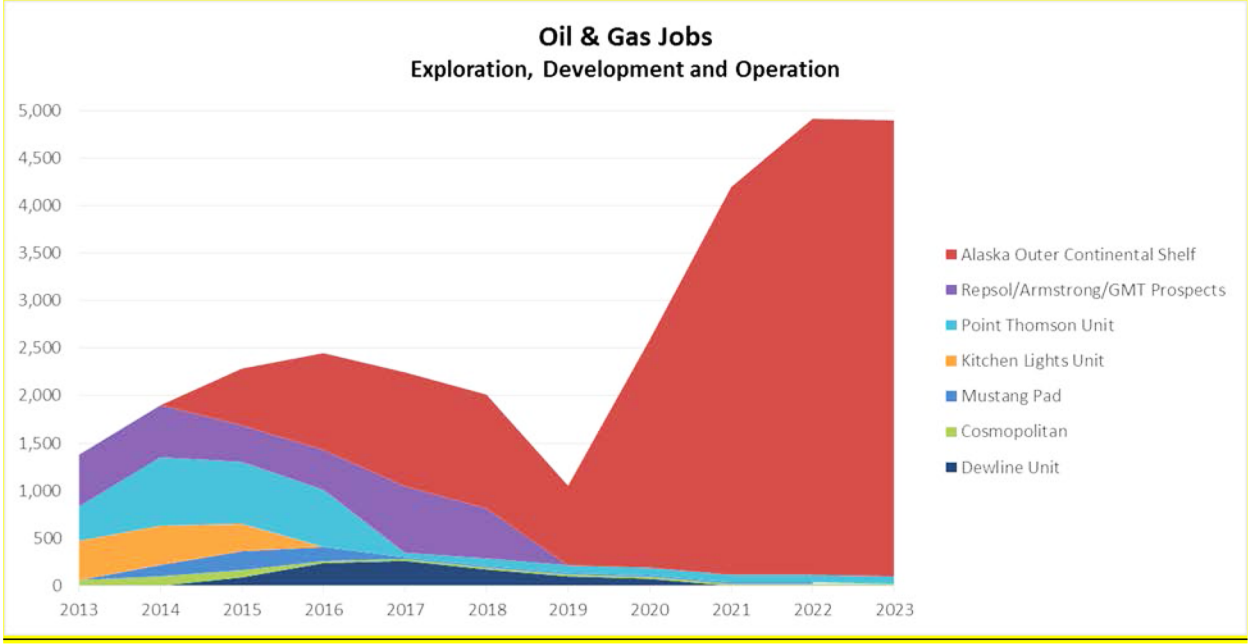
The following are the graphed views of the projects profiled in this projection, along with a historical representation of resource extraction job levels in Alaska over the last 11 years to provide context. The first three graphs present a combined view of oil and gas and mining projects from two perspectives. The first shows the number of resource extraction jobs in Alaska by quarter since 2002. Next is the view of total jobs the proposed projects in this report could create and when. This is the earliest that these jobs/spending could occur and are based on favorable conditions. The third graph presents an overview of total spending on these projects and when that spending will take place.

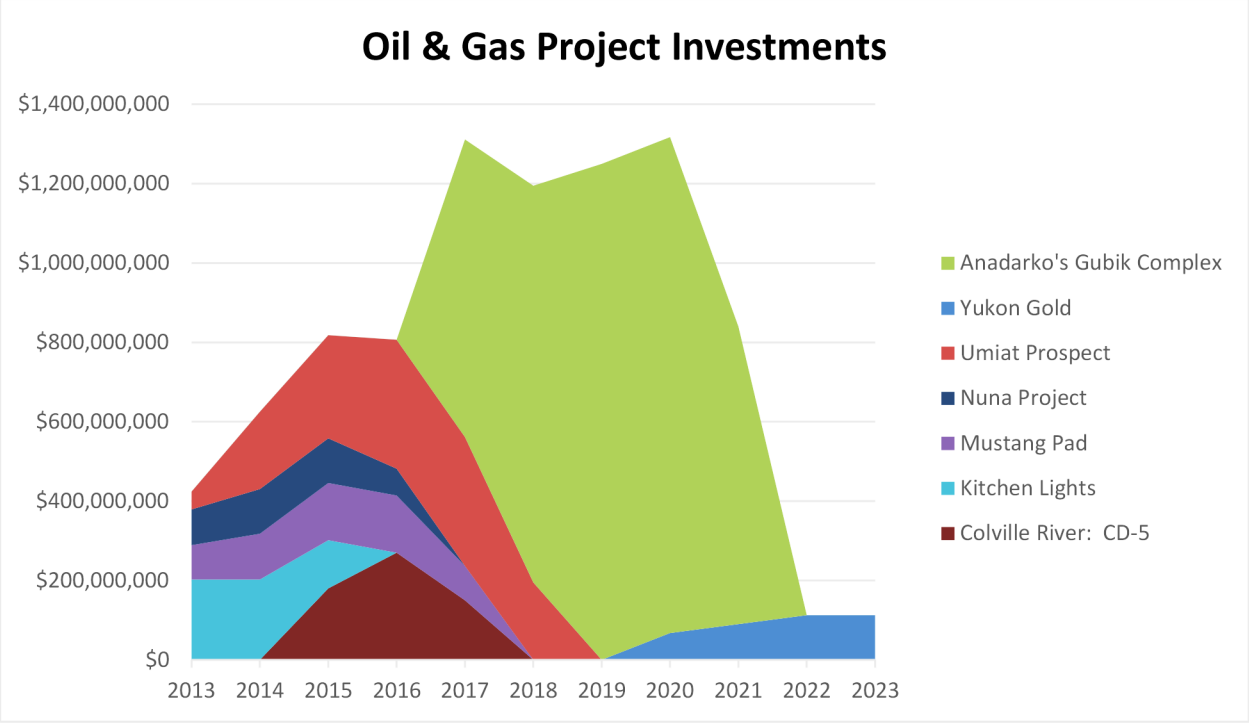
Please note that all graphs are based on available information and in some cases, projects only offer jobs numbers or capital investment figures, not both, and will be excluded from either the jobs or investment graph. It is inappropriate to interpret these graphs as firm commitments by the proposing companies. As discussed at multiple points in this report, all of these projects face significant challenges that must be overcome to initiate actual construction and operations.

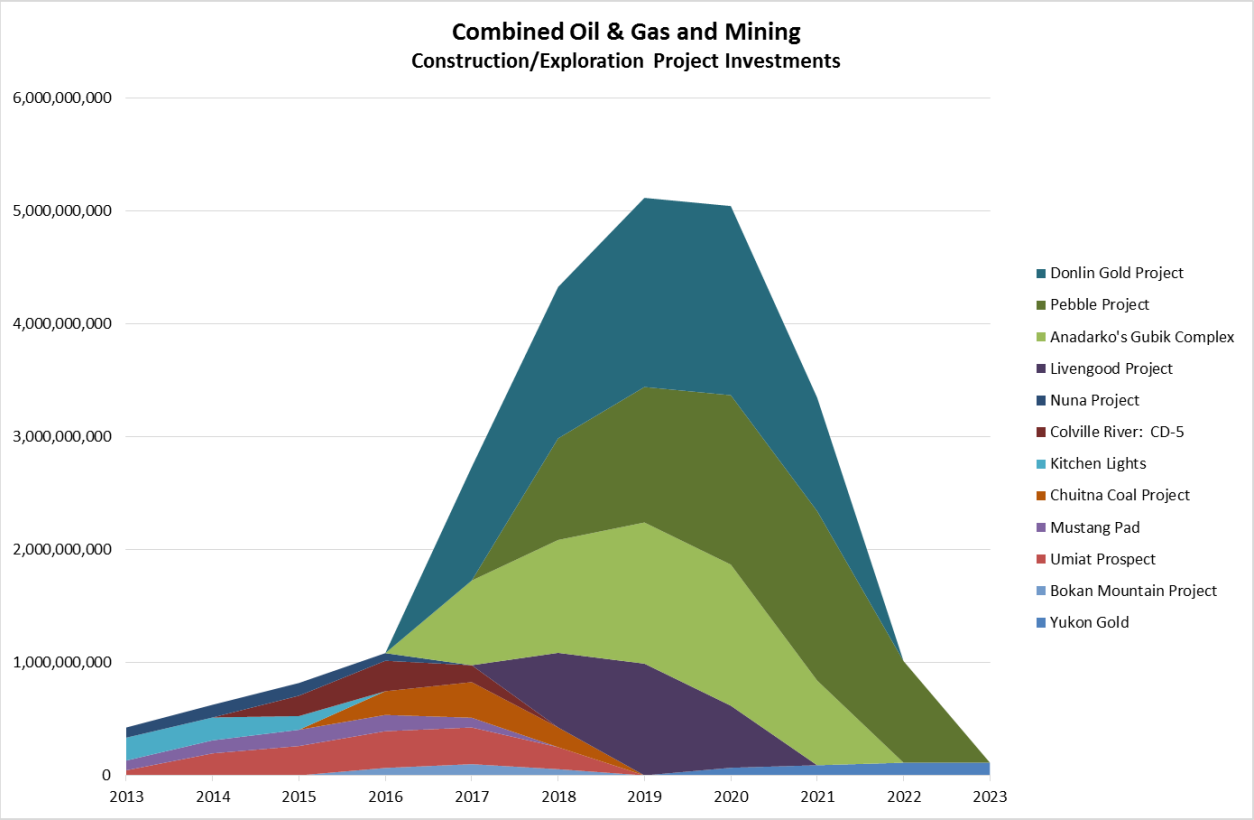

Alaska's Resource Extraction Jobs,
2002 to Present
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Q1
Q2
Q3
Q4


Combined Oil & Gas and Mining Jobs
Construction/Exploration and Operation
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Alaska Outer Continental Shelf
Donlin Gold Project
Pebble Project
Kitchen Lights Unit
Livengood Project
Repsol/Armstrong/GMT Prospects
Point Thomson Unit
Chuitna Coal Project
Bokan Mountain Rare Project
Dewline Unit
Cosmopolitan
Wishbone Hill Coal Project
Mustang Pad

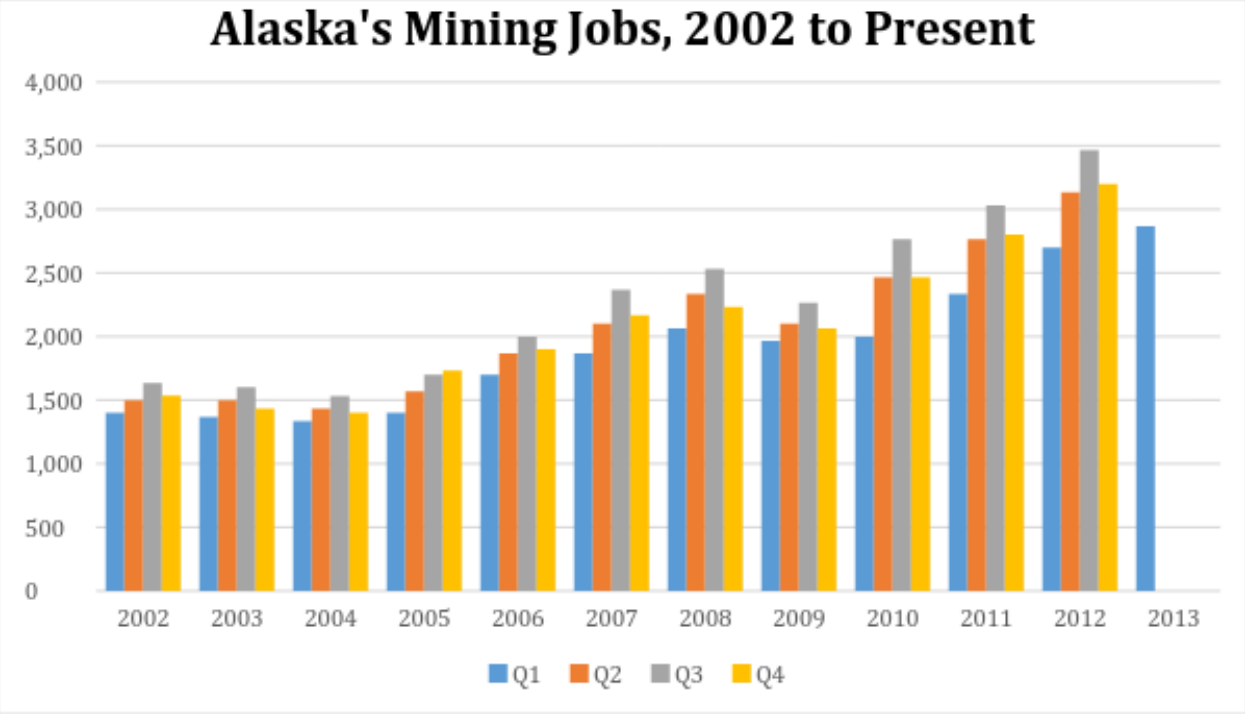
THE FINAL TWO GRAPHS OFFER THE NARROW VIEW OF PROPOSED OIL & GAS PROJECTS ONLY – AND AGAIN ADDRESS TOTAL JOBS AND SPENDING RELATED TO THOSE PROJECTS OVER THE NEXT DECADE.



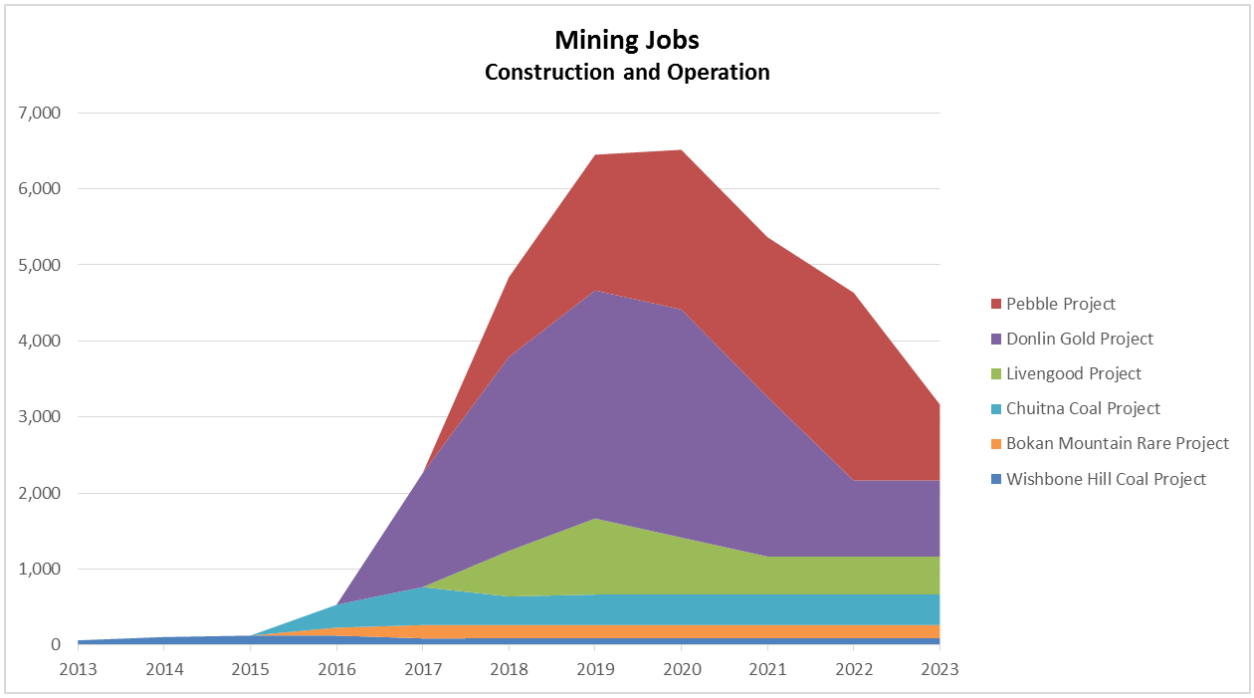


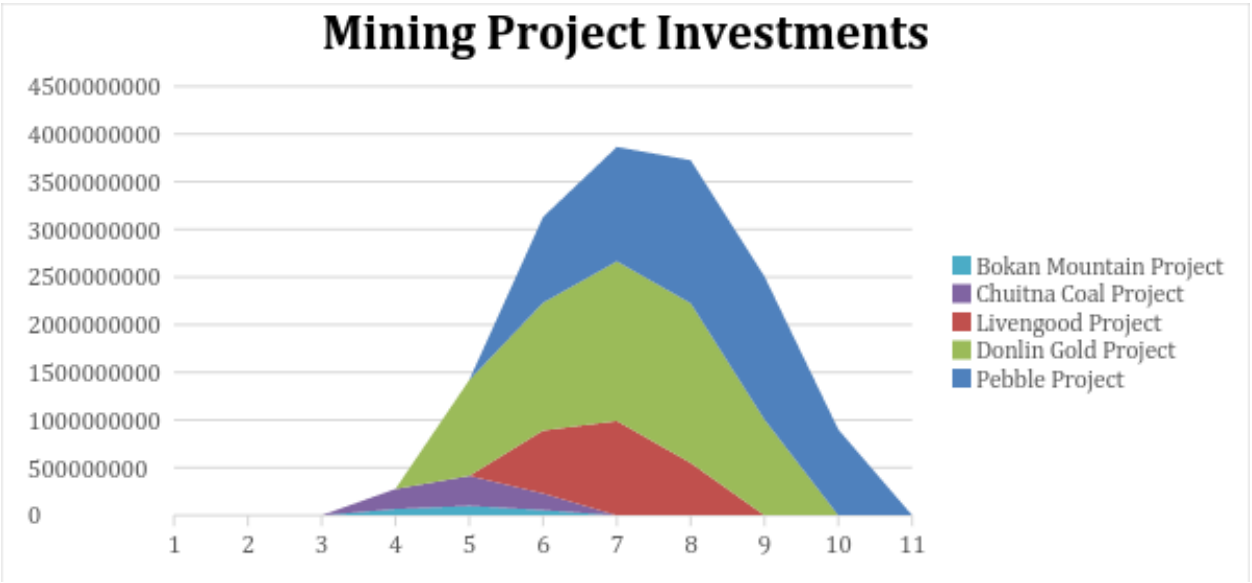


This graph represents the number of jobs in the mining industry in Alaska over the last eleven years.

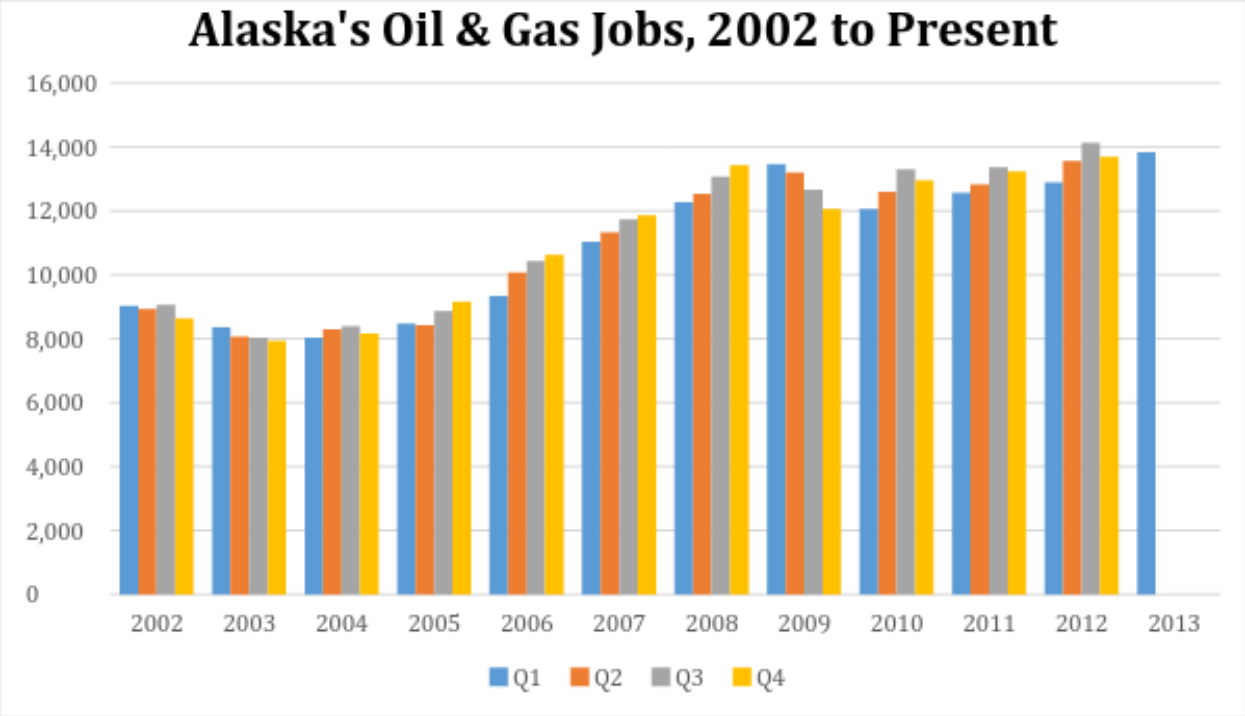


The next two graphs offer the narrow view of proposed mining projects only, and again address total jobs and spending related to those projects over the next decade.

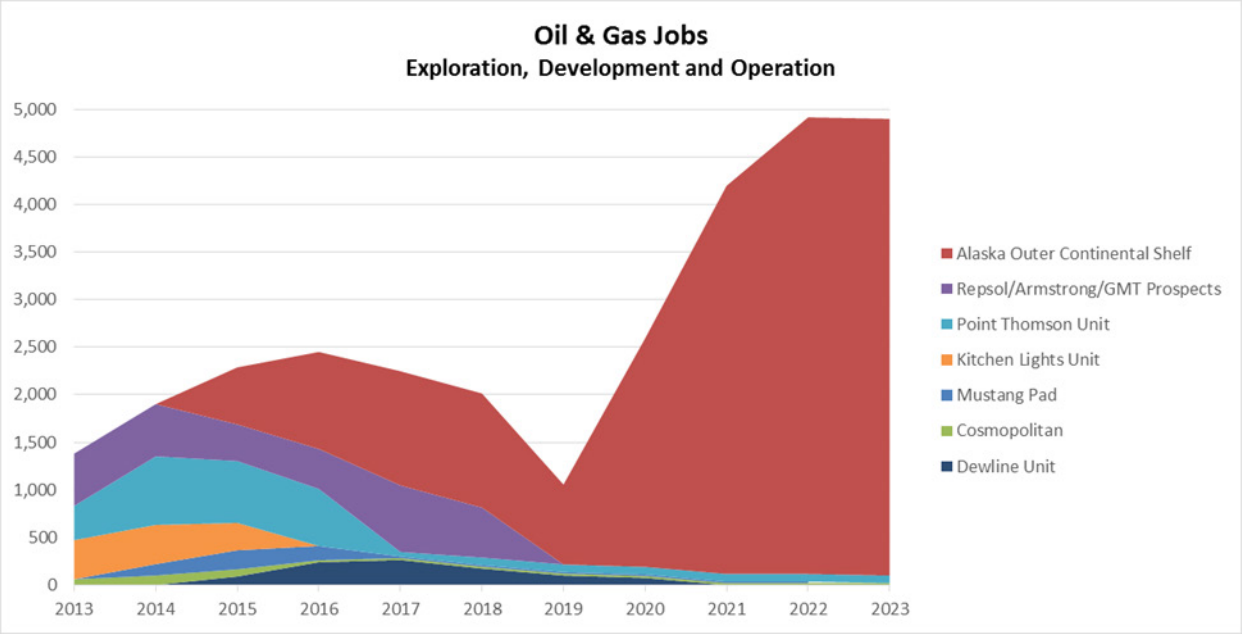


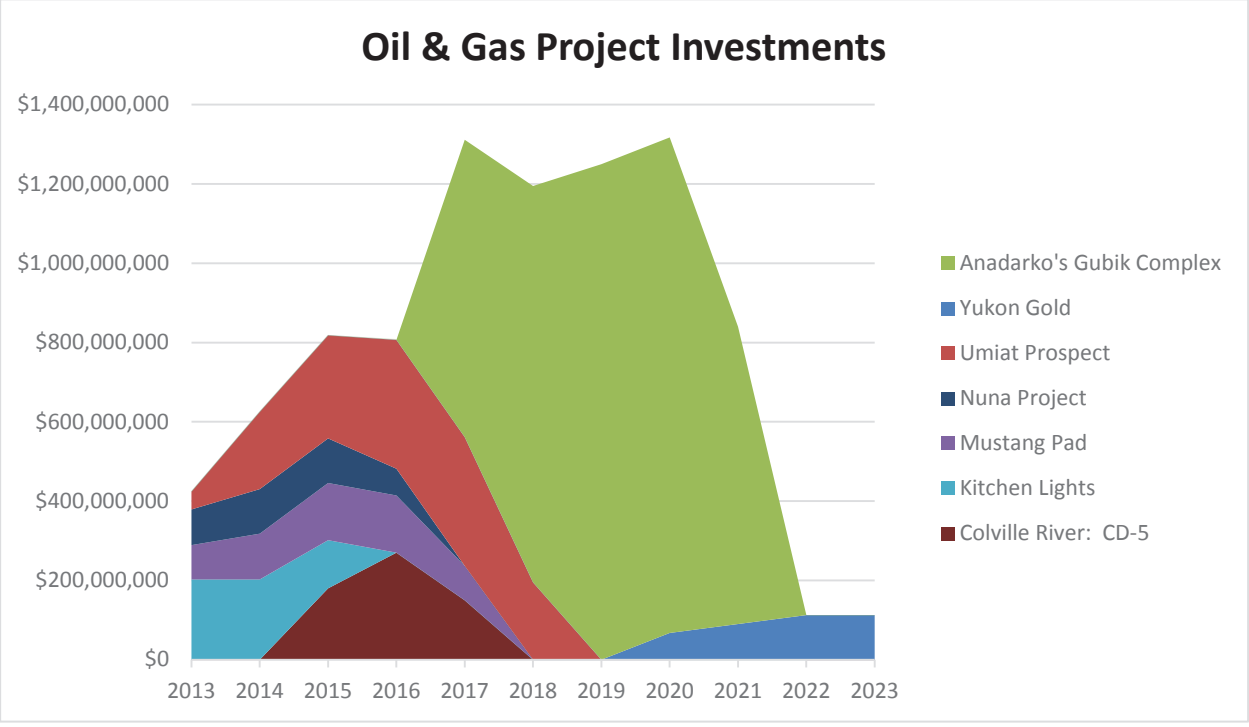


This graph represents the number of jobs in the mining industry in Alaska over the last eleven years.



The final two graphs offer the narrow view of proposed oil & gas projects only – and again address total jobs and spending related to those projects over the next decade.





Why are these projects so important? Aren't we doing just fine as an economy? The 2009 global recession hardly hurt our economy, so that means we have nothing to worry about, right? From AEDC's perspective, we have a lot to worry about. While the current economic trends appear to be positive for Alaska's economy over the next few years, there are definite storm clouds on the horizon that we must begin now to steer a course around if we are avoid the worst of the looming economic tempest Alaska could be caught up within by the end of this decade, if not sooner.

As we noted in last year's report, to understand our concerns, one need only examine the basics of Alaska's economy. We are a young state with a small population of 730,000 spread out over a vast geographic region. Our entire state population could fit within the boundaries of any number of mid-size cities in the Lower 48 and still have room left over. This small population base does not lend itself to the vision we all share of a more fully diversified economy. It will likely be decades before our population, infrastructure, and general economic conditions mature enough to realize this more diversified vision. This leaves us more vulnerable to large swings in the economy created by changes in our key economic components.

Alaska's economy is fundamentally based on three relatively equal valued broad components. Oil revenues, government spending and everything else. In terms of jobs, a recent study by the UAA Institute for Social and Economic Research noted that, out of an average 357,000 total jobs in Alaska between 2004 and 2006, the petroleum sector generated 31 percent of all jobs in Alaska, while the federal government accounted for 35 percent of Alaska jobs. All other industry sectors, including tourism, fishing, mining, retail, health care, etc. combined generated the remaining 34 percent of jobs in Alaska.

If Alaska is to mitigate the looming cuts in federal spending, it must choose those strategies and efforts that focus on opportunities Alaska has the most control over. The development of oil, natural gas and mineral resources offer the only opportunities of a significant order of magnitude to not only offset federal spending cuts, but to actually grow the Alaska economy even in the face of declining federal spending. Given the continued decline in oil production from state lands, time is running out to embrace new development strategies.

As was noted in last year's projection, resource extraction projects in Alaska face an ever-growing list of individual challenges that, when combined to varying degrees are delaying or stifling many of the projects described in this year's projection. Those challenges and issues continue to include:

- Timely permitting reviews and awards
- Nonstop litigation
- Lack of key infrastructure such as roads, ports, communications and power
- Lack of social compacts with communities affected by proposed projects
- Taxation
- Commodity markets
- High costs associated with Alaska projects
- Lack of agreement among Alaskans on a vision for Alaska's economic future
- Time as a cost due to delays in development timelines caused by any combination of the challenges listed above

But when taken as a whole, most of the projects AEDC profiled in last year's projection made very little headway in the face of the numerous challenges they continue to face. In the view of AEDC, these are all lost or delayed opportunities to address Alaska's looming economic challenges. Some steps have already been taken by state government to reduce permitting delays and to more aggressively market Alaska's mineral and energy resources for development. There have been some victories on the federal side of government permitting and regulation. But more must be done. Alaska has resource development opportunities that most other states, regions and even countries can only dream of having. As a state, we have the ability to embrace these projects in order and move as many of them forward as reasonably possible. We need to seek ways to shorten the time it takes to develop these projects while protecting the interests of Alaskans to provide more certainty to energy and mining companies so that a decision can be made within a finite time period on whether or not they will be able to move their project forward. If even 25 percent of the projects described in this projection were to move forward and be developed as proposed, Alaska would see a period of investment and corresponding jobs growth not seen since the 1970s.

Ultimately, we as Alaskans must continue to seek common ground to the greatest degree possible on these proposed projects, as well as the existing oil and gas and mining projects in our state. Until we can reach common ground on how to develop any of these projects, Alaska's opportunities for future economic growth will continue to be one more year away.

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510 L Street, Suite 603, Anchorage, Alaska 99502 • (907) 258-3700 • www.AEDCweb.com