The Economic Impact of Alaska’s Mining Industry

Prepared for:
Alaska Miners Association
3305 Arctic Blvd, Suite 105
Anchorage, Alaska 99503
(907) 563-9229
www.alaskaminers.org

Prepared by:

McDowell Group
Juneau Office
PO Box 21009
Juneau, Alaska 99801
(907) 586-6126

Anchorage Office
1400 West Benson Blvd, Suite 350
Anchorage, Alaska 99503
(907) 274-3200

www.mcdowellgroup.net
info@mcdowellgroup.net

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Cover photos, top to bottom:
Rock Creek Development Project, courtesy of NovaGold Resources
Fort Knox Mine, courtesy of Tom Millington
Greens Creek underground drill rig, courtesy of Kennecott Greens Creek Mine
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The purpose of this study was to measure the economic impact of the mining industry on Alaska. Alaska’s mining industry includes exploration activity, mine development and mineral production. The industry produces zinc, lead, gold, silver, coal, as well as construction materials, such as sand, gravel and rock. This study examines the direct and indirect economic impacts of the mining industry, primarily focused on 2004 impacts.

The study highlights some prominent themes about the mining industry in Alaska, such as:

- Mining offers some of the highest paying occupations in Alaska.
- Mining projects provide jobs in rural areas, where there are few other private sector jobs available.
- Mines make significant local government tax payments.
- Native corporations receive benefits from mining activity on their land, both in jobs for shareholders and revenue.

Alaska’s mining industry is poised for additional growth. However, the industry faces high-risk, long development periods, and high development costs. A stable and equitable tax environment is necessary for Alaska to realize the greatest potential economic benefit from mineral development.

Key study findings are summarized below. A map of Alaska’s major mining and exploration projects is provided at the end of this chapter.

Mining Industry Expenditures

**Exploration**

- Exploration expenditures in Alaska in 2004 totaled **$71 million** (2005 expenditures are over $95 million). From 1981 to 2005, mining and mineral exploration companies have spent $1 billion in Alaska on exploration programs.
- In 2004, there were **26 significant exploration projects** in Alaska, including 15 with expenditures for the year of over a million dollars. Many of these projects provide employment for residents of rural Alaska.
- The preliminary estimate for 2005 exploration expenditures is **$95 million**, an increase of 33 percent over 2004 expenditures.

**Development**

- In 2004, mine development investment in Alaska totaled an estimated **$209 million**. Since 1981, mining companies have invested **$2.5 billion** on development of Alaska mining projects.
- The preliminary estimate for 2005 development spending is **$294 million, up 41 percent** from 2004.

**Operations**

- Approximately 73 open-pit, underground, mechanical placer, and suction dredge mines were in production in Alaska in 2004.
- In addition there are at least 37 rock quarries and 71 active sand and gravel operations within Alaska.
- Alaska’s three largest metal mines, Red Dog, Fort Knox, and Greens Creek, spend approximately **$170 million** annually in Alaska in support of their operations, including payroll and in-state purchases of goods and services.

Mining Industry Employment

- Direct mining industry employment in Alaska totaled approximately **2,900 jobs** in 2004, accounting for **$194 million** in payroll. This employment includes workers engaged in production (metals, coal and construction materials), exploration or mine development during 2004.
- Including direct, indirect and induced employment, Alaska’s mining industry accounted for approximately **5,100 jobs** and **$280 million** in annual payroll in 2004.
Alaska’s metallic mineral mines reported annual average employment of **1,130 workers** in 2004. These workers earned a total of $80 million in payroll, with an average annual wage of $70,750.

The mining industry’s average wage is **83 percent** above the statewide average annual wage of $38,616.

Metal mining employment in Alaska is expected to increase by approximately **500 jobs** over the next two years as the Pogo and Kensington mines come on line. Direct mining industry payroll will increase by **$35 million**.

Development of the Chuitna coal project on the west side of Cook Inlet would add **300 to 350 jobs** to Alaska’s coal mining industry.

Development of the Pebble project in Southwest Alaska would require a construction labor force of **2,000 workers** and a permanent operations labor force of **1,000**.

### Alaska Resident and Contractor Hire

- The mining industry has a high Alaska resident hire rate. The industry actually has a higher resident hire rate, at **83 percent**, than the statewide average of 80 percent, and significantly higher rates than other key Alaska industries.
- Mine development projects employ Alaskans and support Alaskan businesses. Approximately 300 workers have been hired for the Pogo Mine construction project, located near Delta Junction. Pogo’s construction labor force is **85 percent Alaska resident**.
- Coeur Alaska’s Kensington Gold Project, located near Juneau, is under construction and has so far awarded $42 million in construction contracts, **85 percent to Alaskan companies**.
- At Placer Dome and NovaGold's Donlin Creek project, in 2005, Calista shareholders made up 94 percent (111 shareholder employees) of the 118 Donlin Creek direct and contract employees. Of this number, 70 shareholder employees have worked at Donlin Creek for at least five years and some have worked for nearly 10 years.
- In 2005, Northern Dynasty Minerals hired 45 consulting firms to conduct environmental baseline studies, planning and research on its Pebble Project. These firms employed 441 Alaskans who worked on some aspect of the project. Of the Alaska workforce, **21 percent were hired locally** from the Bristol Bay region and 26 percent were Alaska Native.
- Many of the jobs offered by the mining industry are rural-based, including those at Red Dog, Donlin Creek, Pogo, and Pebble. These jobs are offered where few if any other employment opportunities are available. They also offer transferable skills in a rapidly growing industry in Alaska and worldwide.

### Mining Industry Payments to Local and State Government

- Mining companies represent some of the most significant taxpayers in the Northwest Arctic Borough, Fairbanks North Star Borough, City & Borough of Juneau, and the City of Nome. In 2004:
  - Red Dog paid **$6.2 million** in payment in lieu of taxes (PILT) to the Northwest Arctic Borough.
  - Fort Knox/True North paid **$3.5 million** in property taxes to the Fairbanks North Star Borough.
  - Greens Creek Mine paid **$660,000** in property taxes to the City and Borough of Juneau.
  - Usibelli Coal Mine paid property taxes of **$125,000** to the Fairbanks North Star Borough and **$155,000** to the Matanuska-Susitna Borough, and **$75,000** in other taxes to the Denali Borough.
  - Alaska Gold Company paid **$53,300** in real property taxes to the City of Nome.
- The Red Dog Mine’s **$6.2 million PILT** to the Northwest Arctic Borough is the borough’s single most important source of revenue, representing three-fourths of its General Fund receipts.
- In a PILT agreement between the Pogo Mine and the City of Delta Junction, mine developers paid the city **$500,000** in 2005, will pay another **$500,000** in 2006, and another **$1,000,000** in 2007 (if a Borough has not yet been incorporated).
- The mining industry pays a wide variety of taxes, rent, royalties and fees to the State of Alaska. Mining license fees are the largest source of revenue, totaling **$10.3 million** in FY 2005. In total, the mining industry paid the State of Alaska **$15.8 million** in rents, royalties, and fees in 2004; a year when metal prices were just beginning to improve.
Mining is an important source of revenue for the Alaska Railroad (ARR). In FY 2004, the railroad earned approximately $17 million from movement of coal and gravel destined for Alaska or export markets (15 percent of ARR’s total operating revenue).

The Alaska Mental Health Trust earned $167,000 in rents and royalty payments from the mining industry in 2004. The Trust also earned $60,000 from construction material sales.

**Mining Industry Partnerships with ANCSA Corporations**

- Red Dog Mine is operated by Teck Cominco under an agreement with NANA Regional Corporation. NANA is the landowner and Teck Cominco is the operator. As part of a lease agreement, Teck Cominco pays a net smelter return royalty to NANA, which in 2004 was $10.9 million. Of the 2004 royalty payment, NANA deducted $250,000 for its scholarship program and other administrative costs, retained $3.1 million, and redistributed $5.9 million to the other 11 ANSCA regional corporations as part of its 7(i) payment requirement. Teck Cominco paid $90.1 million in total royalties to NANA from 1982 to 2004.

- Of the 480 employees at Red Dog, approximately 360 are employed directly by Teck Cominco, while most of the remaining employees are employed by NANA/Lynden (which provides concentration haulage from the mine to the port site) and NANA Management (which provides the meals and lodging for all mine employees).

- Teck Cominco has hired more than 1,000 NANA shareholders (nearly one-third of all Northwest Arctic Borough residents age 18 to 65) at Red Dog Mine since production began in 1989. This does not include many more who have worked as contractors at the mine. Of Teck Cominco’s direct jobs, 56 percent are held by NANA shareholders or spouses of shareholders, and a third of the people holding Red Dog jobs live in the villages of the Northwest Arctic Borough.

- Teck Cominco has provided 52 full college scholarships for NANA shareholders since 1996. Additionally, for the fall of 2004, $37,000 was provided to 23 students.

- Developers of the Donlin Creek project, Placer Dome and NovaGold, have entered into exploration and mining lease agreements with Calista Corporation and The Kuskokwim Corporation for mining and surface use, and are talking with Calista and Kuskokwim about opportunities for service contracts.

**Local Level Economic Impacts**

**In Juneau...**

- Greens Creek is Juneau’s largest private sector employer in terms of annual payroll.

- Greens Creek Mine’s 260 employees as a group are among the highest-paid workers in the community. Employees have average annual wages of nearly $79,000, almost triple the average $29,000 wage for Juneau private sector workers, and double the average state worker annual average wage of $40,000.

- Greens Creek Mine spent $20 million for goods and services purchased in Alaska, $17 million of which was spent in Juneau, in 2003.

- Greens Creek Mine households contributed $307,000 in residential real estate property tax in 2003 for the $26.4 million in assessed value of their homes.

- Greens Creek Mine contributes $50,000 annually to charitable organizations and pays employees for several hundred hours of community service work. Employees contributed in excess of $100,000 to local charitable organizations, and donated another $15,000 in goods and more than 4,000 hours of volunteer time to more than 50 charitable organizations, schools, and community organizations.

**In Fairbanks...**

- In 2004, Fort Knox was the second-largest private sector employer in the Fairbanks North Star Borough, with annual average employment of 411. It is the eighth largest among all 2,000 public and private sector employers in the borough.

- Fort Knox Mine employees’ average salary was 70 percent higher than the borough average.

- The Fort Knox Mine spent $70 million on goods and services in the Fairbanks North Star Borough in 2004 with over 500 different local businesses.
Because the Fort Knox Mine is a large purchaser of Golden Valley Electric Association power, other GVEA customers enjoy lower electric power rates — 7 percent lower for residential customers and 10 percent lower for large commercial customers, according to the most recent available data.

**In the Northwest Arctic Borough…**

- Including contract employment, the Red Dog Mine (with 480 workers) is the second largest employer (after Maniilaq Association) in the Northwest Arctic Borough. In terms of payroll, the mine is the largest employer in the borough. The mine generated $46 million in total wages in 2004.

- Red Dog accounted for 17 percent of all wage and salary employment in the Northwest Arctic Borough, and 30 percent of all private sector employment.

- Prior to Red Dog Mine’s opening, average income in the Borough was well below the statewide average. However, the median household income in the Northwest Arctic Borough grew by about 87 percent from 1979 to 1989 ($17,756 to $33,313) and by 38 percent from 1989 to 1999 ($33,313 to $45,976), largely as a result of new jobs associated with the mine. Annual wages at the mine are typically from $45,000 to $85,000 per year, plus benefits.

- According to a 2002 study, Red Dog accounted for one-third of the private sector jobs held by the residents of Buckland (33 percent), Kiana (36 percent), Kivalina (38 percent), Noorvik (33 percent), Selawik (34 percent), and Shungnak (32 percent). It accounted for 63 percent of the private sector jobs held by the residents of Noatak.

**Infrastructure Development**

- The mining industry has historically played a role in the development of important infrastructure in Alaska. For example, development of the Alaska Railroad, the Richardson Highway, and the settlement of Anchorage, Fairbanks, Juneau, Skagway and Nome are all linked with early mining industry activity.

- Mining industry development of Alaska infrastructure continues today. For example, in 2005, Alaska Electric Light and Power Company extended a transmission line from Juneau to the Greens Creek Mine. That extension may make it possible to transmit power to the small community of Hoonah, which now must rely on costly diesel power. Without the economies of scale offered by Greens Creek, the extension to Hoonah would not be economically feasible.

### Summary of the Mining Industry’s Statewide Economic Impact, 2004

<table>
<thead>
<tr>
<th>Direct Employment and Payroll</th>
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<tbody>
<tr>
<td>Average direct mining industry employment in Alaska, 2004</td>
<td>2,900</td>
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<td>Direct mining industry payroll in Alaska, 2004</td>
<td>$194 million</td>
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<table>
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<tr>
<th>Total Employment and Payroll (Including Direct and Indirect Impact)</th>
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<tr>
<td>Total employment attributable to the mining industry in Alaska, 2004</td>
<td>5,100</td>
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<td>Total payroll attributable to the mining industry in Alaska, 2004</td>
<td>$280 million</td>
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<th>Investment</th>
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<td>Total investment in Alaska mining exploration &amp; development, 1981–2005</td>
<td>$3.5 billion</td>
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<tr>
<td>Exploration and development expenditures, 2004</td>
<td>$280 million</td>
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<tr>
<td>Exploration expenditures in 2004</td>
<td>$71 million</td>
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<td>Mine development expenditures in 2004</td>
<td>$209 million</td>
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<th>Royalties, User Fees, and Tax Revenues</th>
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<td>Payments to state government, 2004</td>
<td>$15.8 million</td>
</tr>
<tr>
<td>Payments to local governments, 2004</td>
<td>$11.0 million</td>
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<tr>
<td>Payments to Native corporations, 2004</td>
<td>$11.1 million</td>
</tr>
<tr>
<td>Payments to the Alaska Railroad</td>
<td>$16.9 million</td>
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<tr>
<td>Payments to the Alaska Industrial Development &amp; Export Authority (AIDEA)</td>
<td>$17.7 million</td>
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Alaska’s Major Mining and Exploration Projects

Map by Ray Sterner, Johns Hopkins Applied Physics Laboratory, licensed to Northstar Science and Technology, LLC.
CHAPTER I: 
PROFILE OF THE MINING INDUSTRY

The mining industry, and the minerals and metals it produces, are an essential component of the average American's way of life. According to the Mineral Information Institute, nearly seven billion tons of minerals and energy fuels had to be produced in 2004 to supply the needs of the U.S., averaging 46,414 pounds of minerals per year for each American.\(^1\) For instance, based on statistics from the U.S. Geological Survey, for every American:

- 12,095 pounds of stone was used to make roads, buildings, bridges, and other construction uses;
- 9,134 pounds of sand and gravel was used to make concrete, asphalt, roads, blocks, and bricks;
- 20 pounds of copper was used in buildings, electrical and electronic parts, plumbing, and transportation;
- 11 pounds of lead was used for transportation, batteries, electrical, communications, and TV screens;
- 11 pounds of zinc were used to make metals rust resistant; paint, rubber, skin creams, health care, and nutrition; and,
- 7,423 pounds of coal were used to produce energy.\(^2\)

The mining industry is a multi-faceted and diverse part of Alaska's economy. More than just extracting mineral resources from the earth, it involves reconnaissance exploration, prospect assessment, advanced exploration, pre-development, mine construction, production, final reclamation and monitoring. This chapter describes the various phases of the mining “cycle” of activity.

The beginning of the mining cycle is exploration, or more specifically, reconnaissance exploration – typically a regional program aimed at discovering previously unrecognized mineral deposits with economic potential.

With discovery comes a more specific exploration effort, sometimes termed target exploration or advanced exploration. This is a process of prospect assessment, where the deposit is sampled to determine grade and tonnage and the feasibility of profitable mining. It is this stage of mineral development that is the most complex and most dynamic. Literally dozens of constantly changing economic, financial and technical forces influence mine feasibility. Low grades, small tonnages, or high costs may mean that a deposit never advances beyond the assessment stage, or it may sit idle for decades until rising metal prices or technological advances help turn the project into a profitable venture.

Many mineral prospects are drilled and sampled, but only one in a thousand ever becomes a mine. For those few prospects where detailed sampling indicates profit potential, the next step is mine development (construction). Here the ore body is prepared for mining, an ore processing mill is constructed and the support infrastructure developed. In large-scale mine development efforts, hundreds of millions of dollars are invested and hundreds of workers employed over a period of several years as the mine is readied for production.

Because mineral deposits are finite resources, mining companies are constantly active at all the different stages of the mineral cycle; performing reconnaissance exploration in one area, drilling and sampling a prospect in another area, maybe developing a new mine in yet another. When one deposit is depleted and the mine must close, the mining company must be prepared to begin production at another deposit in order to survive. This is the mineral cycle.

The following discussion is a more detailed description of mineral exploration, mine development and production.

Reconnaissance Exploration and Advanced Exploration

The business of mineral exploration has become increasingly sophisticated in recent years. Reconnaissance exploration programs often begin with analysis of satellite or high altitude aerial photographs covering hundreds of square miles. Depending on the target minerals, airborne geophysical surveys may also be employed over large tracts of land. Geochemistry plays an important role in mineral exploration today. Chemical analysis of stream sediment and soil samples allows mining companies to preliminarily test mineral potential without actually sampling the underlying bedrock.
With discovery comes the sometimes lengthy and very costly process of determining if a prospect can be profitably mined. Prospect drilling, sampling, and the whole process of property evaluation and mine feasibility analysis is, in the simplest of terms, an effort to determine if ore exists in sufficient quantity (tonnage) and quality (grade) to make profitable mining possible.

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Even after millions of dollars of investment and many years of effort, a project may never become a mine. These major Alaska projects were never developed:

- **Lost River** (tin, fluorite, tungsten deposit), $20 million invested (1964-1972)
- **Orange Hill** (copper), $30 million invested (1963-1980)
- **Bornite** (copper), $20+ million (1957-1972)
- **Quartz Hill** (largest molybdenum deposit in North America), $100 million invested (1974-1989)
- **AJ Mine** (gold), $80 million invested (1983-1995)
- **Brady Glacier Mine** (largest nickel deposit in Alaska, also copper and platinum), $8 million invested (1958-1972)

The process of mine construction involves construction of a mill or concentrating plant – a facility to separate the valuable metals from the uneconomic rock. These facilities typically include mechanical (crushing, grinding, gravity separation) and/or chemical processes to separate the metals from the rock. In some cases only a concentrate is produced at the mine. The concentrate is then shipped to a smelter where final processing occurs and a metal product is generated. The Greens Creek Mine, for example, produces three types of concentrates containing silver, gold, zinc, and lead. These concentrates are shipped to several smelters around the world for final processing. Other mines produce a final product on site.

The construction effort will also include support facilities, which may involve transportation infrastructure (roads, docks, or airstrips depending on the location of the mine), tailing disposal facilities, power generating facilities if no outside power source is available, and the office and lab facilities for the mine’s managers, engineers, and geologists. For remote mines, facilities are required to house and feed the mine’s workforce.

Mine development is the process of preparing the ore body for mining: for underground mines, driving tunnels from the surface (adits), sinking shafts, driving access and ventilation raises, and accessing ore blocks with crosscuts and other tunnels. For surface mines,
development may include stripping overburden and removing overlying waste rock. Mine development expenditures also include the purchase of mining equipment such as drills, loaders, trucks, etc.

Major mine development can be an extremely costly business and even more so in Alaska’s challenging environment. For example, nearly a billion dollars have been invested in initial and subsequent development of the Red Dog mine, including the transportation infrastructure. Half a billion has been invested in the Fort Knox Mine, near Fairbanks.

**Mine Operations**

With mine development and construction complete, production can begin. There are many different mining methods, though the two basic types of mines are open-pit and underground mines. Greens Creek is an underground mine. The Red Dog and Fort Knox mines are open-pit. Open-pit mining methods are usually employed when a mineral deposit is on or near the surface. Profitable mining of lower grade deposits often requires that huge volumes of ore be processed. The world’s largest open-pit mines move more than 100,000 tons of ore per day, far more than the typical underground mine. The Fort Knox pit is the U.S.’s twelfth largest open-pit metal mine in terms of tonnage mined per day.3

The production phase of the mineral cycle can last from a few years to several decades, depending on production rates, the size of the ore body and market conditions. For example, based on current market conditions, the Greens Creek Mine has a minimum life expectancy of about 12 more years.

The life of a mine can be longer or shorter than anticipated. Increasing metal prices, improved technology, lower costs of production factors such as fuel or electric power can all add years to the life of a mine. Conversely, technical difficulties, falling metal prices, or increasing production costs can force temporary closure or prematurely end the life of a mine.

The Fort Knox mine typifies the challenges facing the mining industry. The Fort Knox deposit was explored and evaluated in the late 1980’s and early 1990s, with mine development occurring in 1995 and 1996. The first gold was poured in December 1996. During the ten-year period from 1987 to 1996 – including the exploration and development period for Fort Knox – gold prices averaged $387 an ounce. Mine developers invested $373 million in the mine, preparing the ore body, building the mill and constructing ancillary facilities. With the expectation of cash operating costs averaging $245 an ounce, the mine had a bright future. However, in 1997, gold prices began to slide, averaging $331 an ounce for the year. In 1998, the average price slipped further, to $294 and then again to $279 in 1999.4

In 1998, as a result of low gold prices, Kinross wrote down $145 million of the $375 million value of mine. In 1999, the company again evaluated the property with the assumption of a lower gold price of $300 per ounce and wrote down an additional $109 million for the Fort Knox Mine. Today, the mine is profitable, with gold prices over $500 an ounce.

**Mine Closure and Reclamation**

Mine reclamation is the process of returning an area to a physically and chemically stable condition and converting mined or otherwise industrially developed land to some other useful function. In remote areas, the goal is most often to create productive ecosystems. In more urbanized areas, the goal might be to convert land to other industrial, commercial or recreational uses. The process of mine reclamation can include grading and stabilizing the landscape, placing topsoils, and generating re-vegetation. Mine reclamation can also involve long-term commitments by mining companies to monitor environmental conditions in the reclaimed areas.

In many mines, reclamation is an activity that occurs while the mine is in operation. For example, at the Usibelli Coal Mine near Healy, recontouring and replanting of mined-out areas is an on-going, routine part of the operations of the mine.

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3 Information provided by the Office of Mineral Development, Alaska Department of Commerce, Community, and Economic Development (January 3, 2006).

4 Source: World Gold Council/Kitco Gold
CHAPTER II: CURRENT MINING INDUSTRY ACTIVITY IN ALASKA

To appreciate the economic benefits of the mining industry in Alaska, it is important to have an understanding of the type and scale of mining-related activity in the state. This chapter summarizes exploration, development and mineral production in Alaska.

Exploration Programs

Each year, millions of dollars are spent in Alaska searching for and evaluating mineral deposits. According to the State of Alaska’s Division of Geological and Geophysical Surveys (DGGS), exploration expenditures in Alaska in 2004 totaled $71 million.\(^5\)

The preliminary estimate for 2005 exploration expenditures is $95 million, an increase of 33 percent over 2004 expenditures.\(^6\) Since 1981, mining and exploration companies have spent a billion dollars in Alaska on mineral exploration programs.

In 2004, there were 26 significant exploration projects in Alaska, including 15 with expenditures for the year of over a million dollars. Companies explored for gold, copper, nickel, silver, lead, zinc, platinum, diamonds, molybdenum, and coal (as well as construction minerals). There were 66 new federal mining claims and 6,965 new state mining claims recorded in 2004.\(^7\) In 2004, there were 141 new prospecting sites pushing the statewide total to 1,581 active prospecting sites.

Exploration occurred throughout Alaska, though most expenditures were focused on two Southwestern Alaska projects, the Pebble Project and the Donlin Creek Project (described in detail, below).

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\(^6\) Division of Geological and Geophysical Surveys, Alaska Department of Natural Resources.

\(^7\) Alaska Department of Natural Resources Land Records Information Section and U.S. Bureau of Land Management.
Key Alaska Exploration Projects

Exploration expenditures often have direct impacts on local and regional economies through spending made on local accommodations, camp services (including catering, housekeeping, and communications), air transportation and other forms of transportation and logistics, drilling labor, security, and environmental services (such as collecting information on water and air quality, as well as biological baseline research).

Following are brief profiles of several projects that are in the advanced exploration phase and have potential to become operating mines, and some examples of how their exploration expenditures impact the local, regional and Alaska economies. These projects are listed in order of potential timeline to development, with the Nixon Fork most likely to reach the mine development stage first.

**Nixon Fork**

Nixon Fork is located 35 miles northeast of McGrath in Interior Alaska. The deposit has been mined for many years, beginning with placer gold discovered in 1917 and lode gold in 1918. More recently, Nevada Gold Fields operated the mine in the 1995 to 1999 period. The project is now owned by Mystery Creek Resources, a company of St. Andrew Goldfields, Ltd. Resources are indicated at 76,000 tons at 0.95 ounces per ton gold with total resources amounting to 160,000 tons containing 136,300 ounces of gold. Efforts to permit and operate the mine, beginning with the treatment of existing tailings, are in progress. Start-up of production is projected by the summer of 2006.

**Rock Creek/Big Hurrah**

Rock Creek project is located seven miles north of Nome. Big Hurrah is located about 45 miles east of Nome. Both projects are owned by Alaska Gold Company, a subsidiary of NovaGold Resources Inc. Currently, both projects are in the feasibility and permitting stage and both are intended to be mined concurrently. The measured and indicated resources for Rock Creek are 7.4 million tonnes of ore at 1.36 grams of gold per tonne. Commissioning of production is forecasted for the first half of 2007 at a production rate of 7,000 tonnes a day producing approximately 100,000 ounces annually. Estimated construction costs are $58 million. When operational, the mines are expected to provide 130 year-round jobs and bring $30 million in annual expenditures (including $9.1 million in payroll) to the Nome area.8

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8 Information about Rock Creek and Big Hurrah was provided by, NovaGold Alaska/Alaska Gold Company (January 9, 2006).
Mineral exploration has a significant impact on local and regional economies in Alaska. An estimated $95 million was spent on Alaska mineral exploration in 2005. This spending is for a wide variety of goods and services provided by Alaska businesses. This spending also includes millions of dollars of payroll for Alaskans, including many rural Alaskans who have few, if any, other employment opportunities.

**Chuitna Coal**

The Beluga-Chuitna coal fields are located on the west side of Cook Inlet, 10 miles from Tyonek. The coal fields contain an estimated 1 billion tons of sub-bituminous, thermal coal, 700 million tons of proven reserves. Development of the mine could start as early as late 2007, with the first shipment of coal by 2010. Preliminary planning indicates that the coal mine could produce 10 to 15 million tons of coal annually, employing as many as 300 to 350 workers.9

**Donlin Creek**

Containing an estimated 25 million ounces of gold, Donlin Creek is a very large undeveloped gold deposit. Located near Crooked Creek, 12 miles north of the Kuskokwim River, the project is a joint venture between NovaGold and Placer Dome. Preliminary feasibility analyses indicate that an open-pit mine milling 30,000 to 40,000 tons of ore per day and producing 1 million ounces of gold per year may be economically feasible. Donlin Creek has an expected 15 to 20 year mine life. In 2004, the project had average annual employment of 39 direct workers.10 Placer Dome’s total 2004 exploration expenditures for Donlin Creek were about $7.2 million, of which approximately 65 percent was spent with Alaska companies. Placer Dome spending in 2005 totaled approximately $14 million.11

The Donlin Creek project is under lease agreements from Calista Corporation for the subsurface rights and The Kuskokwim Corporation for the surface rights.

**Pebble Project**

Since 2002, Northern Dynasty Minerals has spent $68 million on its Pebble Project exploration program in southwestern Alaska to explore and delineate the deposit (drilling), carry out baseline environmental and socio-economic studies, and perform geotechnical work and project engineering. Northern Dynasty, based in Vancouver, B.C., estimates the project contains 31 million ounces of gold and 19 billion pounds of copper. The project also contains silver and molybdenum. If Pebble is developed, it will be one of North America’s largest copper and gold mines, employing about 2,000 workers during the construction phase, and as many as 1,000 during production. The mine will likely require a capital investment of $2 billion or more.12 With new drilling to take place in 2006, it is anticipated that the resource could support a mine-life of 40 years.

In 2005, 45 consulting firms were hired, which employed 441 Alaskans. Of the Alaska workforce, 21 percent was hired locally from the Bristol Bay region and 26 percent were Alaska Native. About $2.8 million was spent in the Iliamna area alone.

**Mine Development in Alaska**

In 2004, mine development investment in Alaska totaled an estimated $209 million. Since 1981, mining companies have invested over $2.5 billion in development of Alaska mining projects. There were several peaks in development spending: 1987 to 1989 reflecting Greens Creek and Red Dog Mine construction; 1995 to 1997 for Fort Knox Mine construction; and, 2004 and 2005 construction spending for the Pogo and Kensington projects. The preliminary estimate for 2005 development spending is $294 million, up 41 percent over 2004.

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9 Comments by Bob Stiles, PacRim Coal, at the Alaska Miners Association Annual Conference, November 4, 2005.
10 According to data provided by the Alaska Department of Labor and Workforce Development.
11 Email correspondence with James Fueg, Placer Dome, December 6, 2005.
Mine Development Investment in Alaska, 1981-2005* ($Millions)


*Preliminary 2005 estimates provided by the Office of Mineral Development, Department of Commerce, Community and Economic Development.

Development Expenditures in Alaska, By Region, 2004

Mine development projects employ Alaskans and support Alaskan businesses. Approximately 300 workers have been hired for the Pogo Mine construction project, located near Delta Junction. The construction labor force is 85 percent Alaska residents. Coeur Alaska’s Kensington Gold Project, located near Juneau, is under construction and has so far awarded $42 million in construction contracts, 85 percent to Alaskan companies.

## Pogo Project

The Pogo project is jointly owned by Sumitomo Metals Mining Co., Ltd. (51 percent), Sumitomo Group (9 percent), and Teck Cominco (40 percent). Teck Cominco is the operator and developer of the Pogo gold property, which is located in the Delta Junction area. A 50-mile road connecting the mine site to the Richardson Highway is completed and a power transmission line constructed. Mill and infrastructure facilities are expected to be complete in early 2006. The mine will start up in the first quarter of 2006 and be operating at full capacity by the second quarter of 2006.

It was estimated that $127 million was spent on development in 2004, with total development costs eventually reaching $347 million by 2005. About 300 people have been hired for the construction of the mine, with 85 percent being Alaska residents.13

The underground gold mine and 2,500-ton per-day mill will produce an average of 400,000 ounces of gold per year over a 10-year mine life. The mine will employ approximately 240 full-time workers.

## Kensington Gold Project

In 2005, Coeur Alaska moved into the development stage for its Kensington Gold Project, located between Juneau and Haines. The mine site is within the City and Borough of Juneau. To date, Coeur has awarded $42 million in construction contracts, 85 percent of which have been awarded to Alaska companies. The total capital cost for the project is $105 million.

According to Coeur Alaska, there are 190 people actively working at the mine site.

Once production starts in early 2007, the mine is expected to produce approximately 2,000 tons of ore per day, resulting in gold production of 100,000 ounces annually, over an estimated 10-year mine life. The mine will employ 225 full-time, year-round workers and generate $16 million in annual payroll.

## Producing Mines in Alaska

Since 1981, minerals valued at $15.4 billion have been produced in Alaska, including $1.3 billion in 2004 and an estimated $1.5 billion in 2005, up 15 percent from 2004. (See chart, next page.) Approximately 73 open-pit, hard rock, underground, and suction dredge mines were in production in 2004.

With the addition of three large mining operations (Red Dog, Greens Creek, and Fort Knox), the production value of Alaska’s mining industry has grown over 500 percent since the late 1980s. Annual production values have averaged $1.1 billion a year over the past six years (1999 to 2004).

In 2004, zinc accounted for almost half (49 percent) of the total mineral production value in the state. Gold ranked second in terms of production, at 14 percent of the total. Lead and silver production each accounted for about 9 percent of the total Alaska minerals production value in 2004.14 All metals combined accounted for 80 percent ($1.1 billion) of the total $1.3 billion in mineral production in 2004.

In 2004, $505 million worth of minerals were exported to Canada, Europe, and Asia.15

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13 www.teckcominco.com/operations/pogo/articles.htm
14 Special Report 59, Alaska’s Mineral Industry 2004, p. 28
15 U.S. Census Bureau, Origin of Movement Series.
Mining Production Value in Alaska, 1981-2005* ($Millions)


*2005 estimates provided by the Office of Mineral Development, Department of Commerce, Community and Economic Development.

Alaska’s Metal Mines

**Greens Creek Mine**

Greens Creek is an underground silver, gold, lead, and zinc mine located on Admiralty Island 15 miles southwest of Juneau. The mine originally opened in 1989 but closed in 1993 because of low metal prices. With some improvement in prices and additional mine and mill development work, the mine reopened in 1996 and has been operating continuously since then. Greens Creek produced 9.7 million ounces of silver in 2004, making it the largest silver producer in North America and the fifth largest in the world. The mine also produced 86,000 ounces of gold in 2004. The Greens Creek mill produces three separate concentrates, which are shipped to various smelters around the world for further processing. Most of the gold and all of the silver is in the concentrate. The mine has sufficient reserves for at least 12 more years of operations. Most mine employees live in Juneau and commute via boat and bus to the mine on a daily basis. The Greens Creek Mine is a Joint Venture between Kennecott Minerals and Hecla Mining Company. The mine employed an average 260 workers in 2004. It is the largest private sector source of payroll in Juneau. A summary of the economic impacts of the Greens Creek Mine on Juneau is provided in a following chapter of this report.

**Red Dog Mine**

Red Dog Mine is the world's largest producer of zinc concentrates. It is an open-pit zinc, lead, and silver mine located in the DeLong Mountains of Alaska's Brooks Range, 90 miles north of Kotzebue and 55 miles from the Chukchi Sea. The mine produced 554,000 metric tonnes of zinc, 7.2 million ounces of silver, and 117,000 metric tons of lead in concentrates in 2004.\(^\text{16}\) Red Dog's proven and probable reserves total about 75 million metric tonnes, which are expected to keep the mine operating through to 2031.\(^\text{17}\)

Red Dog Mine represents a unique relationship between a private owner and operator, Native landholders, and state government. The Mine is owned and operated by Teck Cominco, and is

\(^{16}\) www.teckcominco.com/operations/redog/review.htm
located on property owned by NANA Regional Corporation, an Alaska Native corporation. The Red Dog deposit was discovered in the late 1960s. Construction of Red Dog began in 1986 with production commencing December 1989. The mine required construction of a 60-mile access road from a port site on the Chukchi Sea. The Alaska Industrial Development and Export Authority (AIDEA) financed and constructed the road and port with Red Dog paying user fees to repay AIDEA for its cost of capital plus a small return to the state. Teck Cominco guaranteed to pay back this cost even if the mine is not in operation. Red Dog is the most capital-intensive mining project in Alaska; its original construction costs and subsequent investments totaled between $500-$550 million. In addition, AIDEA has invested $270 million in the road and port.

While ore is mined year-round, the concentrate produced is stored for shipment at the port and shipped during the summer months when waters are ice-free and navigable.

**Fort Knox/True North Mines**

Fairbanks Gold Mining Inc. (a wholly-owned subsidiary of Kinross Gold Corporation) operates the Fort Knox Mine, which opened in 1996. Fairbanks Gold also mined the nearby True North deposit, from 2001 to 2004. Fort Knox is an open-pit gold mine located about 15 miles northwest of Fairbanks. It is Alaska’s largest gold mining operation. In 2004, 338,000 ounces of gold were recovered from the two deposits – 74 percent of all the gold mined in Alaska that year.

Construction of the Fort Knox mine and mill was completed in 1996 at a total cost of approximately $375 million. The True North property was developed at a cost of $30 million.

The company announced plans to spend $60 million on a three-year mine expansion project in 2004. In addition, the company invested $28 million in mining equipment, increasing capacity by 30 percent. Since initial mine development, half a billion dollars has been invested in the mining project.

Fort Knox had an annual average employment of 411 in 2004. It was 59th on the list of top 100 private sector employers in Alaska for 2004. A summary of the economic impacts of the Fort Knox Mine on the Fairbanks North Star Borough is provided in Chapter V.

**Placer Mining**

“Placer mining” is defined as a type of mining that removes valuable minerals such as gold, platinum, and precious stones from unconsolidated detrital material. Placer deposits are formed when the host rock is eroded over millions of years, and minerals are transported and deposited by rivers and streams.

Archaeological records have shown that Alaska Natives were the earliest miners in Alaska, mining native copper, marble and other materials. But placer mining is the oldest form of mining by Western inhabitants in Alaska. The first placer coal was mined on the Kenai Peninsula during the later 1840s and 1850s by the Russians. The earliest gold prospectors were placer miners from the California gold rush who moved north in the 1860s and 1870s. The first significant discovery of placer gold was near Juneau with later discoveries along the Yukon River near Rampart, the Fortymile River, and Circle. At the turn of the 20th century, placer deposits were discovered at Nome and Fairbanks. With the introduction of large-scale cold water thawing, hydraulic stripping, and mechanized excavation, Alaska became a leading gold producing state with a yield of nearly 750,000 ounces of gold in 1940, most of which came from placer mines. However, gold mining was effectively shut down during World War II by Presidential Order. After the war, the industry failed to recover due to rising operating costs and fixed gold prices. Most placer mining was discontinued by the 1960s. With the lifting of gold ownership restrictions and abandoning of a fixed price in the 1970s, gold production rose dramatically. By 1982, there were

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19 “Fort Knox Moves Forward to Keep Production on Target,” *Alaska Business Monthly*, November 2004, p. 34.
Coal has the potential to play a much greater role in the Alaska economy. Alaska coal reserves total approximately 174 billion tons, 40 percent of the U.S. total. Plans for a coal gasification plant on the Kenai Peninsula to supply Agrium’s ammonia and urea production facility could increase the importance of coal in the Alaska economy in the near term.

Rock, Sand and Gravel

Rock, sand and gravel deposits are being mined in most Alaska communities, supporting road, air strip, and other commercial, industrial, and residential construction projects throughout Alaska. Some of the operations are quite small, ranging from small gravel pits serving village communities to large quarries and gravel pits found closer to the larger population centers along the Alaska Railbelt. For instance, some of the larger gravel pit operations are found in Anchorage, Palmer, Wasilla, and Fairbanks.

According to the Alaska Department of Commerce, Community and Economic Development, there are 37 rock quarries and 71 sand and gravel operations within Alaska. It is difficult, however, to know if this count is complete as many of the operations are small, unregulated, and infrequently operated. In 2004, approximately 20 million tons of sand and gravel were produced in Alaska. With an estimated average value of $5.19 per ton, the total value of this sand and gravel was $101 million.

Rock production in Alaska in 2004 was estimated to be 7.3 million tons. This includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone. With an estimated unit value of $14.51 per ton, the total value was estimated to be $106 million in 2004.

Annual rock, sand and gravel production is often a reflection of trends within the construction market. For example, production dipped in the mid-1980s and mid-1990s, and peaked in late 1990s, reflecting booms and declines in Alaska’s housing, industrial and commercial construction markets.

Coal

The Usibelli Coal Mine is the only operating coal mine in Alaska. The mine is located near Healy and has 200 million tons of proven coal reserves. In 2004, coal production totaled 1,450,000 tons, shipped to six Interior Alaska electrical generation power plants. Approximately 601,000 tons were exported to South Korea through a terminal in Seward, and two test shipments totaling 105,000 tons were made to Chile. Rail shipment of coal is an important source of revenue for the Alaska Railroad (ARR). Coal accounted for $10 million in revenues for ARR in FY 2004.

more than 500 placer mines statewide (including recreational mines) producing 174,900 ounces of gold worth $70 million. 22

The fluctuation of gold prices continues to affect the level of gold placer production in Alaska. For instance, gold prices saw a marked improvement in the late 70s peaking at over $800 per ounce in 1980, followed by a gradual but fluctuating decline to $256 per ounce in 2001. With the fall in prices, the number of operating mines dropped to 42. The price has been improving since that date with recent prices above $550 per ounce. By 2004, there were 68 Alaska placer mines recovering 28,074 ounces of gold.

Most of the state’s active placer mines are located in the Interior. The three largest placer mines accounted for over half of all placer production.

Alaska’s Non-Metal Mines

Rock, Sand and Gravel

Rock, sand and gravel deposits are being mined in most Alaska communities, supporting road, air strip, and other commercial, industrial, and residential construction projects throughout Alaska. Some of the operations are quite small, ranging from small gravel pits serving village communities to large quarries and gravel pits found closer to the larger population centers along the Alaska Railbelt. For instance, some of the larger gravel pit operations are found in Anchorage, Palmer, Wasilla, and Fairbanks.

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22 Ibid.
Recreational Mining in Alaska

“Recreational mining” is defined as amateur, casual, short-term mining for placer gold using non-mechanized equipment, such as a gold pan or a small, backpackable sluice box, metal detector or rocker-box. In specific areas, small suction dredges and/or metal detectors may be used. It is typically conducted on private and public properties designated for such purposes and may involve a fee. Recreational mining opportunities are expanding rapidly and are documented throughout most of Alaska. Generally, the visiting miners are allowed to keep the gold they find or participate in a venture where recovered gold is split equally amongst the participants.

Recreational mining operations range from gold-panning activities attracting several thousand tourists spending under $10 and a few hours to find some gold flakes to operations where a few hundred people spend as much as $2,500 per week (including equipment, room and board) for as long as two months looking for more significant rewards for their efforts.

Based upon interviews with recreational mine operators, at least 800 people traveled to Alaska to primarily participate in recreational mining, amounting to at least 1,000 miner-weeks of annual recreational mining at the remote pay-to-mine camps. Several thousand miner-weeks are also estimated to occur at highway accessible sites near Anchorage and Fairbanks. No attempt has been made to estimate the number of recreational miners visiting Federal and State designated gold panning areas, but it is likely to exceed the number visiting commercial sites.

Though no specific data is available, the total economic impact of recreational mining in Alaska likely exceeds several million dollars, including payments to private owners and spending on transportation, accommodations, food, services and supplies.

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23 The Recreational Miners Association website at www.recminer.com includes information for 16 recreational mining sites in Alaska. Several of these are free sites located on State and Federal lands withdrawn from mineral entry (claim staking) and available for recreational use while the others are commercial locations located on private property or permitted mining claims that charge for the right to mine.
CHAPTER III:
EMPLOYMENT AND PAYROLL IN ALASKA’S MINING INDUSTRY

The mining industry directly or indirectly creates thousands of jobs and millions of dollars in payroll throughout the Alaska economy. These jobs and payroll occur in the following sectors of the mining industry:

- Production
  - Metals
  - Coal
  - Construction materials
- Exploration
- Development
- Other (government, recreational, etc.)

In addition to jobs in these key segments of the industry, mining also indirectly creates employment and income in the state. As mining-related businesses and their employees purchase goods and services in Alaska, additional jobs and income are created. This analysis of employment and payroll in Alaska’s mining industry begins with an overview of available employment data for the industry. Following that is an analysis of the indirect impacts of the mining industry. Including direct, indirect and induced employment, it is estimated that the mining industry accounts for over 5,000 jobs in Alaska.

Sources of Employment Data

There are two sources of mining industry employment data for Alaska: the Alaska Department of Labor and Workforce Development (DOLWD) and an annual report produced by the state Division of Geological and Geophysical Surveys (DGGS) and the Office of Mineral Development, Department of Commerce, Community and Economic Development (DCCED). DOLWD collects employment data from all Alaska employers, drawn from quarterly employment security “ES 202” forms. Employers are required by law to submit these forms, providing a count of all workers employed each month, as well as their total quarterly wages. In the DOLWD data, there is no distinction between full-time and part-time employment.

DOLWD categorizes employment according to the North American Industry Classification System (NAICS). Industry sectors that encompass the mining industry include:

- Coal
- Metal Ore
  - Metal ores mining
  - Gold ore and silver ore mining
  - Lead ore and zinc ore mining
  - All other metal ore mining
- Non-metallic Mineral, Quarrying
  - Crushed and broken limestone mining and quarrying
  - Other crushed and broken stone mining and quarrying
  - Construction sand and gravel mining
  - All other non-metallic mineral mining
- Mining Support Activities
  - Metal mine drilling
  - Non-metallic mine drilling

Mining-related activity falls into several other NAICS categories as well, though it is combined with non-mining employment. This includes the professional services sector, where a number of mineral exploration firms are classified. These firms typically work under contract for mining companies, therefore their employment could be considered indirect. The mining industry creates jobs indirectly in many sectors of the economy, as described in the following section of this report.

There is also mining industry employment that is not captured at all in DOLWD data. DOLWD data does not include self-employed “proprietors.” In the mining industry this could include small-scale placer mining operations. It could also include any individual working under contract, such as an exploration geologist.

DGGS/DCCED provides a broader measure of mining industry employment in Alaska. In its 2004 report, Alaska’s Mineral Industry 2004, DGGS/DCCED estimated mining industry employment at 3,048 full-time equivalent jobs.24 This estimate includes both direct and indirect employment, as conventionally defined. It is based on survey data collected from approximately 100 businesses in Alaska that are engaged in some aspect of mining in the state. The DGGS/DCCED estimate includes production employment such as that reported by DOLWD as well as a broad range of contract employment in drilling, camp support services, and other professional and trade services. The

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24 Reported man-days are calculated on a 260-day work year to obtain average annual employment unless average annual employment numbers are provided.
The Economic Impacts of Alaska’s Mining Industry  McDowell Group, Inc. •  Page 19

DGGS/DCCED estimate also includes construction materials handling employment that is likely captured by DOLWD in the construction sector rather than in the mining sector. Finally, it includes the smaller operations, including many placer operations, which do not report employment to the DOLWD.

The following text draws employment data from both DOLWD and DGGS/DCCED to present a complete picture of mining industry employment. An assessment of the “multiplier” affects of mining industry activity follows.

Mineral Production Employment in Alaska

This section summarizes employment and payroll in the production segment of Alaska’s mining industry. Payroll data is not available for certain categories due to confidentiality restrictions.

Metal Mining

Based on DOLWD data, there were 27 metal mining sector employers that reported annual average total employment of 1,130 employees. These employees earned a total of $80 million in payroll in 2004, with an average monthly wage of $5,896. The mining industry’s average monthly earnings are 83 percent above the statewide average monthly wage of $3,218.

The metal production side of the mining industry provides a consistent level of year-round employment. Three mines, Fort Knox, Greens Creek, and Red Dog, accounted for 75 percent of all mine production employment in Alaska in 2004. Monthly employment data for these three mines illustrates that there is virtually no seasonal variation in employment at the mines.

| Monthly Employment with Alaska’s Largest Mining Operations, 2004 |
|-------------------|-------------------|-------------------|-------------------|
|                   | Fort Knox | Greens Creek | Red Dog | Total     |
| January           | 405       | 257           | 372     | 1,034     |
| February          | 401       | 260           | 375     | 1,036     |
| March             | 401       | 261           | 374     | 1,036     |
| April             | 395       | 259           | 378     | 1,032     |
| May               | 391       | 256           | 372     | 1,019     |
| June              | 391       | 265           | 380     | 1,036     |
| July              | 391       | 260           | 383     | 1,034     |
| August            | 403       | 260           | 398     | 1,061     |
| September         | 426       | 259           | 380     | 1,065     |
| October           | 438       | 260           | 380     | 1,078     |
| November          | 444       | 261           | 380     | 1,085     |
| December          | 451       | 258           | 391     | 1,100     |
| Average           | 411       | 260           | 360     | 1,051     |

Source: Alaska Department of Labor and Workforce Development. Red Dog employment for Sept. – Nov. are McDowell Group estimates. This data includes only direct production employment.

Metal mining employment that is not captured in DOLWD data includes small-scale placer mining, as well as some small scale lode mining. DGGS/DCCED data indicates that this employment averaged 140 jobs in 2004 (measured in annual average, full-time equivalents). Earnings data is not available for these miners; however, applying the metal mining industry average monthly earnings ($5,896/month) provides an order of magnitude estimate. Based on an estimate of annual earnings of $70,750, income to workers in this segment of the mining industry is estimated at $10 million.

Coal Mining

Alaska’s only operating coal mine, the Usibelli Coal Mine located in Healy, employed an average of 92 workers in 2004, according to DOLWD. Payroll data for these employees is not available from DOLWD due to confidentiality restrictions; however, based on available data, payroll likely totaled $6 million. As illustrated in the following table, employment at the coal mine is steady throughout the year.
Coal Mining Monthly Employment at Usibelli Mine
Monthly and Annual Average, 2004

<table>
<thead>
<tr>
<th>Month</th>
<th>Employment</th>
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</thead>
<tbody>
<tr>
<td>January</td>
<td>89</td>
</tr>
<tr>
<td>February</td>
<td>89</td>
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<tr>
<td>March</td>
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<td>October</td>
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<tr>
<td>November</td>
<td>95</td>
</tr>
<tr>
<td>December</td>
<td>95</td>
</tr>
<tr>
<td>Average</td>
<td>92</td>
</tr>
</tbody>
</table>

Source: Alaska Department of Labor and Workforce Development. Includes direct employment only.

Development of the PACRIM coal mine on the west side of Cook Inlet would add 300 to 350 jobs to Alaska's coal mining industry.

Construction Materials Mining

A third segment of Alaska's mineral production sector is in the mining of sand, gravel and rock. DOLWD data indicates that an average of 136 workers were employed in this activity in 2004, with a seasonal peak of 197 workers during the summer construction season.

<table>
<thead>
<tr>
<th>Month</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>81</td>
</tr>
<tr>
<td>February</td>
<td>80</td>
</tr>
<tr>
<td>March</td>
<td>95</td>
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<td>April</td>
<td>131</td>
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<td>May</td>
<td>169</td>
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<td>June</td>
<td>197</td>
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<td>July</td>
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<td>August</td>
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<td>September</td>
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<td>October</td>
<td>165</td>
</tr>
<tr>
<td>November</td>
<td>108</td>
</tr>
<tr>
<td>December</td>
<td>83</td>
</tr>
<tr>
<td>Average</td>
<td>136</td>
</tr>
</tbody>
</table>

Source: Alaska Department of Labor and Workforce Development. Includes direct employment only.

DOLWD data does not capture all construction-related mining employment in Alaska. Many companies that mine and transport sand, gravel and rock are classified in the construction sector rather than the mining sector. Based on its survey of companies, the DGGS/DCCED reported full-time, annual average employment in construction-related mining at 1,042 jobs in 2004. Total annual payroll for these jobs is estimated at $63 million. It is quite likely that a portion of this employment and payroll is related to transporting construction materials from quarries to construction sites and as such might be considered an indirect impact.

Exploration Employment

According to DGGS data, mineral exploration firms spent $71 million in Alaska exploration programs in 2004. Approximately $41 million of that was spent on two major projects in Southwest Alaska, the Pebble and Donlin Creek projects.

There are no comprehensive measures of exploration employment in Alaska from DOLWD because businesses that participate in exploration programs are scattered across many sectors of the Alaska economy. Some of the types of businesses and professionals engaged in exploration programs (including advanced exploration programs which can involve baseline environmental research) include:

- Geological exploration services
- Drilling services
- Camp support services
- Helicopter support services
- Construction services
- Scientific and other professional research services.

Among these sources of employment, DOLWD provides mining-specific data only for drilling services. Approximately 15 companies provided drilling services representing an annual average of 55 employees. This is only a partial measure of drilling employment, as other drilling jobs are likely included in the construction sector.

The best comprehensive estimate available for exploration program employment in Alaska is provided by DGGS/DCCED. In the DGGS/DCCED report, exploration employment is estimated at 184 annual average, full-time equivalents. Though data is not available, peak employment is clearly much higher, as most exploration activity occurs during the summer.
Exploration-related payroll data is unavailable from any source. However, by applying industry average wage rates to exploration-related jobs, it is possible to make reasonable estimates. For example, annualized earnings for drillers were $77,700 in 2004. Commercial pilots averaged $76,850; geoscientists, $108,000; and heavy construction workers, $74,800. There is no data available on wage rates for camp support personnel, but there is related data, such as wage rates for “institutional” cooks, which averaged $38,400 in 2004.

Clearly, there is a broad range of salaries paid to exploration program personnel. However, if it assumed that for each of the 184 full-time, annual average equivalent jobs recorded by DGGS, annual earnings average $75,000, total exploration program payroll in 2004 would be approximately $14 million. This estimate appears conservative, given that total exploration program expenditures were $71 million (meaning payroll accounted for 20 percent of total exploration expenditures).

**Mine Development Employment**

Spending on mine development can vary significantly from year to year, depending on the number and scale of mines under construction. In 2004, mine developers spent $209 million in Alaska. Construction activity at the Pogo project accounted for about 61 percent of all development expenditures in the state.

Mine development employment is concentrated in sectors other than the mining sector. Much of the development employment is found in the construction sector, though other employment is generated in transportation (i.e., air and water transportation), services (i.e., engineers) and a number of other sectors (i.e., housekeepers and caterers).

In the DGGS/DCCED report, development-related employment is estimated at 284 annual average full-time equivalents in 2004. Peak employment is, of course, much higher. Approximately 300 workers have been hired on the Pogo project alone.

By applying the statewide “heavy” construction industry average annual salary to the DGGS/DCCED employment figure, it is possible to estimate mine-development-related payroll. At the annual average of $74,800, the 2004 payroll total would be $21 million. This is likely a conservative estimate as remote construction projects, such as Pogo, are more likely to include overtime wages than urban construction projects, due to the cost of transporting workers to and from a remote mine site.

**Other Mining-Related Employment in Alaska**

There are a wide variety of other jobs indirectly linked to Alaska’s mining industry. For example, there are regulatory and research jobs in state and federal government that serve the mining industry. These include jobs with the US Bureau of Land Management, the US Geological Survey, and the USDA Forest Service. In State government, there are personnel within the Department of Natural Resources tasked with conducting mining industry-related research. The University of Alaska’s Mineral Industry Research Laboratory conducts basic and applied research to facilitate the development of Alaska’s mineral and energy resources. The UA College of Engineering and Mines in the Department of Mining and Geological Engineering has a staff of seven. Mining industry-related employment in Alaska includes jobs at miner training centers such the Delta Mine Training Center. In this study, these jobs are assumed to be included in the mining industry’s indirect employment, which is discussed below.

**Assessment of Total Mining-Related Employment in Alaska**

To summarize, the preceding analysis identified just under 2,900 direct jobs and $194 million in direct payroll attributable to the mining industry in Alaska, engaged in mining, exploration or mine development during 2004. Metal mining is the largest source of employment and payroll, followed by construction materials mining. (See table below.)

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25 According to DOLWD data, the average monthly earnings for workers in the heavy construction sector was $6,237 in 2004.
Direct Mining Industry Employment in Alaska, 2004

<table>
<thead>
<tr>
<th>Employment</th>
<th>Payroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Mining</td>
<td>1,270</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>92</td>
</tr>
<tr>
<td>Construction Materials Mining</td>
<td>1,042</td>
</tr>
<tr>
<td>Mineral Exploration</td>
<td>184</td>
</tr>
<tr>
<td>Mine Development</td>
<td>284</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,872</strong></td>
</tr>
</tbody>
</table>

Source: Employment data are from DOLWD (metal mining and coal mining) and DGGS. Payroll figures are McDowell Group estimates.

These figures do not, however, include all of the jobs in Alaska that are linked to mining. Many additional jobs are created in Alaska’s service and supply sectors as a result of mining company spending and the expenditure of mining industry payroll dollars. The “multiplier effects” are spread throughout the Alaska economy and are an important part of the industry’s role in local, regional, and statewide economies.

Multiplier Effects

When considering the multiplier effects of mining activity, it is helpful to have a conceptual understanding of how economists typically describe the impact of an industry or a particular project on local, regional, or statewide economies. In this regard there are three categories of employment. With respect to the mining industry, they are:

- Direct employment and income
  - Includes employees of mining and exploration companies
- Indirect employment and income
  - Includes employees of businesses which provide goods and services to mining and exploration companies
- Induced employment and income.
  - Includes jobs created as a result of spending of direct and indirect mining industry-related income.

In the mining industry (as in some other industries) there is no clear line between direct and indirect employment. For example, Teck Cominco employment at the Red Dog Mine averaged 360 workers in 2004, according to DOLWD data. However, total permanent employment at the mine actually averaged 480 workers, including 120 employees of NANA/Lynden and NANA Management who provide transportation services from the mine to the port site and meals and lodging for all mine employees. Strictly speaking, because NANA/Lynden and NANA Management provide services to the mine under contract, that employment is indirect. However, those transportation and camp support jobs are an integral part of the day-to-day operations of the mine and could rightly be considered direct employment.

Precisely measuring the indirect and induced impacts of a project or an industry is complex and can require a major investment in research (including tracking how every dollar from every mining-related project is spent). However, through the use of multipliers it is possible to generate reasonable estimates. A multiplier is a single number that, when applied to a direct effect such as employment, captures direct, indirect and induced effects of industry activity.

The geographic area of interest in the multiplier assessment is also important. The multiplier for Red Dog for the Northwest Arctic Borough will be smaller than the statewide multiplier. This is because not all the Alaska purchases of goods and services are made by the mine in the borough. In other words, the larger the geographic area being considered, the larger the multiplier.
Other factors affecting the multiplier are wage rates (higher wages can mean more local spending) and the residency of the labor force (high non-resident participation can mean higher leakage of payroll dollars from the local economy).

A range of multipliers has been applied to help understand the full effects of mining activity in Alaska. Employment multipliers applied to specific mining projects have ranged from 1.76 in the Alaska Juneau Mine environmental impact statement (EIS) to as high as 3.2 in the Kensington Mine EIS.\textsuperscript{26,27}

Input-output (I/O) models also provide industry multipliers. For example, the IMPLAN model generates I/O multipliers for approximately 500 industry sectors (fewer for Alaska’s small economy). IMPLAN is widely used nationally to predict the economic impact of business or industrial development projects. IMPLAN produces multipliers in the several mining and mining-related sectors, as illustrated in the following table.

**IMPLAN 2002 Employment Multipliers for the Alaska Mining Industry**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Employment Multiplier</th>
<th>Payroll Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal mining</td>
<td>1.89</td>
<td>1.46</td>
</tr>
<tr>
<td>Lead and zinc mining</td>
<td>2.03</td>
<td>1.62</td>
</tr>
<tr>
<td>Gold and silver mining</td>
<td>1.78</td>
<td>1.48</td>
</tr>
<tr>
<td>Rock quarrying</td>
<td>1.65</td>
<td>1.43</td>
</tr>
<tr>
<td>Sand and gravel mining</td>
<td>1.3</td>
<td>1.32</td>
</tr>
<tr>
<td>Mining support services</td>
<td>2.44</td>
<td>1.55</td>
</tr>
<tr>
<td>Construction of industrial buildings</td>
<td>1.51</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Though IMPLAN is best suited for predicting the regional economic impact of changes in activity in a particular sector (the impact of a new mine, for example) rather than measuring the role of an industry in a regional or statewide economy, it provides some guidance on the range of multipliers potentially applicable to the mining industry in Alaska.

The federal Bureau of Economic Analysis (BEA) also publishes multipliers for Alaska industries. For 2003, BEA calculates an employment multiplier of 2.05 for Alaska’s mining industry (metals and coal combined). BEA’s earnings multiplier for Alaska’s mining industry is 1.61.\textsuperscript{28} BEA has an employment multiplier of 2.61 for “support activities for mining,” however this multiplier includes support services to the oil and gas industry (as does the IMPLAN multiplier for mining support services) therefore likely overstates the multiplier effects of mining industry support services.

Fort Knox Mine

The table on the following page summarizes the mining industry’s estimated direct, indirect and induced employment impacts in Alaska. Multipliers used are a blend of IMPLAN and BEA data.

In summary, this analysis indicates that Alaska’s mining industry accounts for approximately 5,100 jobs and $280 million in annual payroll. (See table on next page.)

**Share of Total Alaska Employment and Payroll**

Based on the estimated 5,100 direct, indirect and induced jobs measured in this study, the mining industry accounted for 1.7 percent of Alaska’s 301,000 non-agricultural wage and salary jobs in 2004.

The $280 million in annual income attributable to the mining industry accounted for 2.4 percent of total wage and salary payroll in 2004.


\textsuperscript{27} Kensington Gold Project Final Supplemental Environmental Impact Statement, Tetra Tech, Inc. for the USDA Forest Service, December 2004.

\textsuperscript{28} Bureau of Economic Analysis, RIMS II multipliers, 2003.
<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Direct Employment</th>
<th>Multiplier</th>
<th>Total Employment</th>
<th>Direct Income</th>
<th>Multiplier</th>
<th>Total Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Mining</td>
<td>1,270</td>
<td>2.0</td>
<td>2,540</td>
<td>$90,000,000</td>
<td>1.6</td>
<td>$144,000,000</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>92</td>
<td>1.9</td>
<td>175</td>
<td>6,000,000</td>
<td>1.5</td>
<td>9,000,000</td>
</tr>
<tr>
<td>Construction Materials Mining</td>
<td>1,042</td>
<td>1.5</td>
<td>1,563</td>
<td>63,000,000</td>
<td>1.3</td>
<td>81,900,000</td>
</tr>
<tr>
<td>Mineral Exploration</td>
<td>184</td>
<td>2.0</td>
<td>368</td>
<td>14,000,000</td>
<td>1.3</td>
<td>18,200,000</td>
</tr>
<tr>
<td>Mine Development</td>
<td>284</td>
<td>1.5</td>
<td>426</td>
<td>21,000,000</td>
<td>1.3</td>
<td>27,300,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,872</td>
<td></td>
<td>5,072</td>
<td>$194,000,000</td>
<td></td>
<td>$280,400,000</td>
</tr>
</tbody>
</table>

Source: McDowell Group estimates based on Department of Labor and Workforce Development and Division of Geology and Geography surveys.

### Alaska Resident Hire in the Mining Industry

The mining industry has some of the highest Alaska resident hire rates among all of Alaska key basic industries.

Calista Corporation and Placer Dome’s exploration shareholder hire agreement (signed in 1995) is a case study in the benefits of resident hire during the exploration phase. While no specific goals were laid out, Calista shareholders and their descendents were given a hiring preference for the Donlin Creek project. This policy has been successful. By 2005, Calista shareholders made up 94 percent (111 shareholder employees) of the 118 Donlin Creek employees. Of this number, 70 shareholder employees have worked at Donlin Creek for at least five years and some have worked for nearly 10 years.29

### Alaska Resident Hire, by Key Industry, 2003

<table>
<thead>
<tr>
<th>Industry</th>
<th>Resident Workers</th>
<th>Non-Resident Workers</th>
<th>Percent Non-Resident Workers</th>
<th>Percent Alaska Resident Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>1,651</td>
<td>342</td>
<td>17.2%</td>
<td>82.8%</td>
</tr>
<tr>
<td>Construction</td>
<td>22,619</td>
<td>5,627</td>
<td>19.9%</td>
<td>80.1%</td>
</tr>
<tr>
<td>Oil and Gas Extraction</td>
<td>2,464</td>
<td>722</td>
<td>22.7%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Accommodations and Food Services</td>
<td>28,487</td>
<td>10,485</td>
<td>26.9%</td>
<td>73.1%</td>
</tr>
<tr>
<td>Seafood Processing</td>
<td>5,622</td>
<td>13,858</td>
<td>71.1%</td>
<td>28.9%</td>
</tr>
<tr>
<td>All Industries</td>
<td>309,468</td>
<td>68,305</td>
<td>18.1%</td>
<td>81.9%</td>
</tr>
</tbody>
</table>

Source: Alaska Department of Labor and Workforce Development. Includes only reported metal, coal and construction materials mining employment. Does not include mine development, exploration or unreported construction materials employment.

Based on DOLWD data, the industry actually has a higher resident hire rate, at 83 percent, than the statewide average, and significantly higher rates than other key Alaska industries. The preceding table compares mining to other key sectors of the state’s economy.

Alaska’s commercial fishing industry also has higher non-resident participation than the mining industry. According to the Alaska Commercial Fisheries Entry Commission (CFEC), approximately one-quarter (27 percent) of active permit holders are non-resident. Further, non-residents captured 57 percent of value of Alaska’s commercial harvest (measure in terms of ex-vessel value).

Alaska’s largest mining employers have very high percentages of residents in their work forces. The following table provides Alaska resident employment rates for the Greens Creek, Red Dog, Fort Knox and Usibelli Coal mines.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Total Workers</th>
<th>Total Residents</th>
<th>Total Non-Residents</th>
<th>% Alaska Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teck Cominco (Red Dog)</td>
<td>490</td>
<td>396</td>
<td>94</td>
<td>80.8%</td>
</tr>
<tr>
<td>Fairbanks Gold (Fort Knox)</td>
<td>536</td>
<td>479</td>
<td>57</td>
<td>89.4%</td>
</tr>
<tr>
<td>Greens Creek</td>
<td>306</td>
<td>234</td>
<td>72</td>
<td>76.5%</td>
</tr>
<tr>
<td>Usibelli</td>
<td>97</td>
<td>95</td>
<td>2</td>
<td>97.9%</td>
</tr>
</tbody>
</table>

Source: DOLWD, Residency Analysis of Alaska’s Workers by Firm, 2003. Employment figures presented in this table are total number of employees, rather than annual averages.

29 Placer Dome, Donlin Creek “From the Ground Up” Project Update, Fall 2005, p. 6.
Seven out of the eight supervisors at Donlin Creek are Calista shareholders. They also made up 75 percent of the drillers and drilling helpers. This number could have been 100 percent, but several of the drillers from the region were working on other Alaska projects like Greens Creek Mine and Nixon Fork Mine.30

The Donlin Creek example helps to demonstrate that a key benefit of mining is that it often happens in remote areas where employment opportunities are very limited.

30 Ibid., p. 7.
CHAPTER IV: OTHER ECONOMIC BENEFITS OF THE MINING INDUSTRY

The mining industry has a broad range of economic impacts in addition to jobs and income. The industry generates revenue for state and local governments. It generates revenue for other public and private landowners and business interests in the state. It offers training and skill development for Alaskans that can have lifetime benefits within the industry and in other sectors of the economy. Mining helps build infrastructure that can support communities and other industries. These and other benefits are described below.

Mining Industry Payments to the State of Alaska

The mining industry generates revenues to the State of Alaska through a number of mechanisms, such as license fees, rental, royalties, material sales, and others. The mining industry is also an important source of revenue to quasi-government organizations such as the Alaska Railroad and the Alaska Industrial Development and Export Authority. These revenues are described below.

Mining License Tax — The state collected $10,317,238 in mining license tax in fiscal year 2005. The amount collected through this tax is expected to increase in fiscal year 2006 as world metal and mineral prices improve. This is a tax on the net income of all mining property in the state irrespective of land ownership status, capping at 7 percent, less exploration and other credits. Except for sand and gravel operations, new mining operations are exempt from the mining license tax for a period of 3.5 years after production begins.

Annual Claim Rental — In 2004, the mining industry paid $2.7 million in annual claim rentals.

The Annual Rental law (AS 38.05.211) requires locators and holders of State mining locations to pay an annual cash rental. The requirement applies to mining claims, leasehold mining leases, offshore mining leases and prospecting sites on State land. For all traditional mining claims (40 acres), the annual rental amount is $25 per year for the first five years, $55 per year for the second five years, and $130 per year thereafter. For all section locations (160 acres), the annual rental amount is $100 per year for the first five years, $220 per year for the second five years, and $520 per year thereafter. For all leases, the annual rent is $.66 per acre per year for the first five years, $1.32 per acre for the second five years, and $3.30 per acre per year thereafter. For prospecting sites, there is a one-time upfront requirement of $200, which covers the two-year term of the site.

Production Royalty — In 2004, the production royalty payment from minerals was $162,367. The majority of this payment came from royalty interest holders at True North (Fort Knox Mine) and the remainder came from individual placer miners. No other mining production occurred on state land in 2004. As world mineral prices improve, it is anticipated that production royalties will increase in fiscal year 2006.

The Production Royalty law (AS 38.05.212) requires holders of state mining locations to pay a production royalty on all revenues received from minerals produced on state land. The production royalty is 3 percent of net income as determined under the Mining License Tax Law (AS 43.65), and regulations (15 AAC 65). A production royalty return must be filed and all required royalty payments must be made by anyone: 1) owning, leasing, and operating a mining property; 2) owning a mining property and receiving lease fees, royalty payments based on production, or a combination of lease fees and royalty payments from the property; 3) leasing a mining property from another person and operating the property; and 4) possessing a mineral interest, whether an economic or production interest, in a producing property, including royalty, receiving lease fees, working or operating interests, net profits, overriding royalties, carried interests in, and production payments.

Annual Labor — The 2004 payment in lieu of annual labor from mining and exploration companies was $226,191.

The payment in lieu of annual labor is based upon the premise that when prospecting and the discovery of a locatable mineral, and the staking of a mineral location, annual labor must be performed each year in the further development of the locatable minerals so that it can be mined. Every year, a minimum of $100 or $400 worth of labor or improvements must be performed on or for the benefit or development of each mining claim leasehold location on State land. Further, $100 worth of labor or improvements must be performed on each partial or whole 40 acres of each mining lease. The holder of a mining claim, leasehold location, or mining lease may make a cash payment to the State equal to the value of labor required ($100 or $400 per claim). In 2004, while True North is on state land, Fort Knox is on Alaska Mental Health Trust land.
the state collected $226,191 in payments in lieu of annual labor.

Coal Rents and Royalties — The State received $1,475,789 in rents and royalties from coal mining in Alaska in 2004. The standard rate for coal royalties on state lands for new leases is 5 percent of gross value. For coal leases in existence on Juneau 18, 1982, the royalty rate at the next time of adjustment will be five percent of the adjusted gross value. This will allow for certain costs to be deducted.

Material Sales — In 2004, the state earned $579,407 from sales of sand, gravel, rip rap, rock, limestone, slate, peat, and any other substances mined from State of Alaska ground that are not applied for through the location (mining claim) system or leasing. Of this amount, $112,047 was paid by Alyeska Pipeline Service Company to the State Pipeline Coordinators Office for use of material along the Trans Alaska Pipeline System corridor. Much of the remaining sales are made in the North Slope region to support North Slope oil exploration and production development.

There are three types of materials sales from which the state receives payments: 1) Limited Material Permit, where there is no filing or application fee; 2) “Limited” and small “negotiated” sales where the price charged is set by the Alaska Department of Natural Resources based generally on the fair market sales price of material in the area; 3) “Negotiated” and “competitive” sales where the amount charged for larger material sales (>25,000 cubic feet) is based on a site-specific appraisal or an abbreviated appraisal. A “competitive” sale price is initially set by an appraisal, but may be raised during an auction if more than one person or company competes for the material.

Other State Mining Fees — In 2004, $93,102 was collected in various mining fees. These fees include filing, penalty, bond pool payment, surface mining application, and Annual Placer Mining application fees.

Corporate Net Income Tax — In FY 2005, the mining industry paid $242,490 to the State of Alaska in corporate net income tax.

All corporations doing business in Alaska must file a tax return. The corporate net income tax payment is a reflection of a corporation’s profitability.

The State of Alaska levies a corporate net income tax based on federal taxable income with certain Alaska adjustments. Multi-state corporations apportion income on a “water’s edge” basis using the standard apportionment formula of property, payroll, and sales. Tax rates are graduated from 1 to 9.4 percent in increments of $10,000 of taxable income. The maximum rate (9.4 percent) applies to taxable income of $90,000 and higher.

In summary, the mining industry paid approximately $15.8 million in taxes, rents, royalties, and fees to the State of Alaska in 2004.

State of Alaska Direct Revenue from Mining, 2004

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State mineral rents and royalties</strong></td>
<td></td>
</tr>
<tr>
<td>Annual claim rentals²</td>
<td>$2,657,939</td>
</tr>
<tr>
<td>Annual labor⁵</td>
<td>226,191</td>
</tr>
<tr>
<td>Production royalties</td>
<td>162,637</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td>$3,046,767</td>
</tr>
<tr>
<td><strong>State coal rents and royalties</strong></td>
<td></td>
</tr>
<tr>
<td>Royalties</td>
<td>$1,239,257</td>
</tr>
<tr>
<td>Rents</td>
<td>236,532</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td>$1,475,789</td>
</tr>
<tr>
<td><strong>State material sales</strong></td>
<td></td>
</tr>
<tr>
<td>Division of Land</td>
<td>$467,360</td>
</tr>
<tr>
<td>State Pipeline Coordinators Office</td>
<td>112,047</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td>$579,407</td>
</tr>
<tr>
<td><strong>State mining miscellaneous fees</strong></td>
<td></td>
</tr>
<tr>
<td>Bond pool payment</td>
<td>$35,426</td>
</tr>
<tr>
<td>Annual Placer Mining Application fees</td>
<td>27,150</td>
</tr>
<tr>
<td>Penalty fees</td>
<td>26,110</td>
</tr>
<tr>
<td>Surface coal mining application fee</td>
<td>3,116</td>
</tr>
<tr>
<td>Filing fees</td>
<td>1,300</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td>$93,102</td>
</tr>
<tr>
<td><strong>Mining license payments</strong></td>
<td></td>
</tr>
<tr>
<td>Mining license¹²³⁴</td>
<td>$10,317,238</td>
</tr>
<tr>
<td><strong>Income Tax payments</strong></td>
<td></td>
</tr>
<tr>
<td>Corporate net income tax¹</td>
<td>$242,490</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$15,754,793</td>
</tr>
</tbody>
</table>


1. Fiscal year 2005 figures
2. Includes upland lease and offshore lease rentals.
3. Includes metals, coal, and material.
4. Payments made in FY 2005 have not yet been adjusted for refunds; these refunds will be recorded in FY 2006, and may significantly reduce the totals recorded for FY 2005.
5. Payments in lieu of annual labor

The Alaska Railroad is owned by the State of Alaska. In FY 2004, 15 percent of the Alaska Railroad Corporation’s total operating revenue
were generated by movement of coal and gravel destined for Alaska or export markets.\(^{32}\)

### Alaska Railroad Operating Revenues from Mining, FY2001-2004 (Millions)

<table>
<thead>
<tr>
<th></th>
<th>Coal, Local</th>
<th>Coal, Export</th>
<th>Gravel</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2001</td>
<td>$5.0</td>
<td>$3.2</td>
<td>$7.5</td>
<td>$15.8</td>
</tr>
<tr>
<td>FY2002</td>
<td>5.4</td>
<td>1.6</td>
<td>7.9</td>
<td>14.9</td>
</tr>
<tr>
<td>FY2003</td>
<td>5.9</td>
<td>1.1</td>
<td>9.8</td>
<td>16.8</td>
</tr>
<tr>
<td>FY2004</td>
<td>7.3</td>
<td>2.9</td>
<td>6.7</td>
<td>16.9</td>
</tr>
</tbody>
</table>


Teck Cominco, as the operator of Red Dog Mine, also pays an annual user fee for use of the state-owned DeLong Mountain Regional Transportation System, the road and port that serve the Red Dog Mine. In FY 2005, Teck Cominco paid $17.7 million in user fees to Alaska Industrial Development and Export Authority (AIDEA). This payment goes to AIDEA’s general fund to repay the bonds issued for construction of the transportation system and provides a return on AIDEA’s equity investment in the port and road.

### Payments to Local Governments

The mining industry paid an estimated $11.1 million to local governments in 2004. There are several ways the mining industry provides direct payment to local governments, including property taxes, sales tax, severances taxes, payments in lieu of taxes (PILTs), and rents or production revenue from rock, sand, and gravel production on local government lands.

#### Property Tax

Mining companies represent some of the largest property taxpayers in the City & Borough of Juneau, Fairbanks North Star Borough, and the City of Nome. In 2004:

- Fort Knox/True North paid $3.5 million in property taxes to the Fairbanks North Star Borough. This mine is the Borough’s second largest property tax payer.
- Greens Creek Mine paid $660,000 in property taxes to the City and Borough of Juneau. The mine is the largest private property tax payer.
- Usibelli Coal Mine paid $155,000 in property taxes for its Wishbone Hill property to the Matanuska-Susitna Borough. It also paid $125,000 in property taxes to the Fairbanks North Star Borough.
- Alaska Gold Company paid $53,300 in real property taxes to the City of Nome. Alaska Gold Company was the fourth largest property tax payer in Nome.

These are direct payments by mines to these local governments. These figures do not include property tax payments made by mine employees. A 1999 study conducted by Information Insights and the McDowell Group for the Fairbanks North Star Borough found that the Fort Knox mine-related workforce paid $500,000 in property taxes. That figure is no doubt higher today as a result of increased assessments and an increase in the mine workforce.

#### Payment in Lieu of Taxes (PILT)

Local government payments can also include payment in lieu of taxes (PILT), such as that which is stipulated in an agreement between Teck Cominco (operator of the Red Dog Mine) and the Northwest Arctic Borough.\(^{33}\) In FY2005, Teck Cominco’s PILT payment to the Borough totaled $6,228,000, and represented 76 percent of the Borough’s total General Fund revenues.\(^{34}\) Teck Cominco is the Borough’s single most important source of revenue. The borough receives no sales tax or property tax revenues.

In November 2005, the City of Delta Junction and Teck-Pogo, Inc. also entered into a PILT agreement. As part of that agreement, Teck-Pogo paid the City of Delta Junction $500,000 in 2005; another $500,000 is to be paid in 2006 and $1,000,000 in 2007, if a Borough has not yet been incorporated.\(^{35}\)

#### Severance Tax

In the Denali Borough, Usibelli Coal Mine pays a severance tax of $0.05 per ton of coal. The Borough also receives other severance tax payments for sand and gravel operations. In 2004, mining companies paid $74,630 in severance taxes to the Denali Borough.\(^{36}\)

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33 AS 29.45.030 prohibits the Northwest Arctic Borough to assess a property tax on the value of Teck Cominco’s leasehold interest in the road and port system.
34 Northwest Arctic Borough Finance Department.
35 Section 3, Agreement for Payment in Lieu of Taxes Delta/Teck-Pogo signed October 14, 2005.
36 Figure provided by Usibelli Coal Mine.
Sales Tax

In certain jurisdictions, mining companies pay sales taxes on their local purchases of goods and services. For example, in Juneau, Greens Creek Mine paid an estimated $350,000 in sales taxes in 2003.37

Rock, Sand, and Gravel Production

Most local governments also receive payments for the production of locally-owned or leased rock quarries, and sand and gravel pits. There is no data available providing these revenues by community, but one estimate placed the statewide total at approximately $250,000 annually.38

State and Local Mining Taxation Policy Issues

The potential for the mining industry to generate revenues for state and local governments depends to a large degree on the location of the mine and the tax structure in local jurisdictions. The table on the following page outlines the land ownership and local jurisdiction for Alaska’s largest producing mines and potential mines.

While most mining projects pay either a property tax or a payment in lieu of taxes to a local government, most are on private or federal land and therefore not subject to state royalty payments. As described above, in addition to state royalties and property tax payments, a number of other fees and taxes are imposed on the mining industry. This includes mining license fees, annual mining claim rentals, severance taxes on coal produced from state land, severance taxes on gravel production, and others. Of course, mining firms also pay corporate income taxes to the State of Alaska.

As this report has described, the mining industry is unique in terms of its high risk, capital intensiveness and the uncertain, exhaustable, finite nature of the resource upon which it depends. As with any industry or business, paying appropriate taxes to compensate for the services provided by government is a necessary and responsible part of doing business in Alaska. However, it is important for local and state policy makers and others to understand that taxes can have unanticipated negative effects on mining operations and, further, can actually result in wasting of potentially valuable natural resources.39

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38 Estimate based on known rock, sand, and gravel production, and in consultation with Rich Hughes, Minerals Development Specialist, Alaska Department of Commerce, Community, and Economic Development.
39 A severance tax, for example, can be both inequitable and wasteful. It can be inequitable because it can place a much greater burden on high-cost mines than on low-cost mines (if based on production rate or gross value), or on high-grade mines compared to low-grade mines. A severance tax can be wasteful because it can force a mine to increase its cut-off grade and, as such, cause potential ore to be left in the ground and never produced.


### Land Ownership of Alaska’s Major Mines/Projects

<table>
<thead>
<tr>
<th>Mining Project</th>
<th>Land Owner</th>
<th>Subject to Mining License Tax</th>
<th>Subject to State Royalty</th>
<th>Local Tax Jurisdiction</th>
<th>Subject to Local Tax or PILT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usibelli Coal Mine</td>
<td>State</td>
<td>Yes</td>
<td>Yes</td>
<td>Denali Borough</td>
<td>Yes</td>
</tr>
<tr>
<td>Greens Creek Mine</td>
<td>Federal</td>
<td>Yes</td>
<td>No</td>
<td>City &amp; Borough of Juneau</td>
<td>Yes</td>
</tr>
<tr>
<td>Red Dog Mine</td>
<td>Private (ANSCA)**</td>
<td>Yes</td>
<td>No</td>
<td>Northwest Arctic Borough</td>
<td>Yes</td>
</tr>
<tr>
<td>Fort Knox Mine (including True North)</td>
<td>Alaska Mental Health Trust Authority/State</td>
<td>Yes</td>
<td>Yes*</td>
<td>Fairbanks North Star Borough</td>
<td>Yes</td>
</tr>
<tr>
<td>Pogo Project</td>
<td>State</td>
<td>Yes</td>
<td>Yes</td>
<td>City of Delta Junction</td>
<td>Yes</td>
</tr>
<tr>
<td>Nixon Fork</td>
<td>Federal</td>
<td>Yes</td>
<td>No</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>Rock Creek</td>
<td>Private and ANSCA**</td>
<td>Yes</td>
<td>No</td>
<td>City of Nome</td>
<td>Yes</td>
</tr>
<tr>
<td>Kensington Mine</td>
<td>Federal, Private</td>
<td>Yes</td>
<td>No</td>
<td>City &amp; Borough of Juneau</td>
<td>Yes</td>
</tr>
<tr>
<td>Donlin Creek</td>
<td>Private (ANSCA)**</td>
<td>Yes</td>
<td>No</td>
<td>None</td>
<td>No</td>
</tr>
<tr>
<td>Chuitna Coal</td>
<td>State</td>
<td>Yes</td>
<td>Yes</td>
<td>Kenai Peninsula Borough</td>
<td>Yes</td>
</tr>
<tr>
<td>Pebble Project</td>
<td>State</td>
<td>Yes</td>
<td>Yes</td>
<td>Lake &amp; Peninsula Borough</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Production royalties from True North leases.
** Royalties paid to private landowners.

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### Payments to ANCSA Corporations

Alaska Native Claims Settlement Act (ANCSA) corporations are major private holders of land and sub-surface mineral interests in Alaska. Much of these lands have significant mineral potential, including a number of historic mining districts, such as the Ambler district, numerous placer gold areas, and rock, sand, and gravel deposits.

ANCSA corporations can lease their land to mining companies. As part of some lease arrangements, the mining industry makes direct payments (royalties) to Native corporations.

Additionally, under a clause referred to as Section 7(i) in the 1971 Alaska Native Claims Settlement Act, ANSCA corporations are mandated to annually redistribute 70 percent of their net revenue earned on subsurface developments of lands given to them by the settlement among the 12 regional corporations (the 13th Region is not included) based on shareholder enrollment. Net revenue from rock, sand and gravel extractions is exempted from 7(i) payments. The purpose of this clause was to create an opportunity to share the wealth between those regions rich in natural resources and those which are not.

Teck Cominco’s Red Dog Mine exemplifies the potential of this broader relationship with ANCSA corporations. Red Dog Mine is operated by Teck Cominco Alaska, Inc. under an agreement with Northwest Arctic Native Association (NANA) Regional Corporation. NANA is the landowner and Teck Cominco is the operator. As part of the lease agreement, Teck Cominco pays a net smelter return royalty payment to NANA. In 2004, this payment was $10.9 million (up from $7.7 million paid in 2003). Of the 2004 royalty payment, NANA deducted $250,000 for its scholarship program and other allowable administrative costs, retained $3.1 million, and redistributed $5.9 million to the other 11 ANSCA corporations as part of its 7(i) payment requirements.

Placer Dome’s Donlin Creek is another example of mining’s relationship with ANCSA corporations. Placer Dome has entered into exploration and mining lease agreements with Calista Corporation.

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40 NANA Annual Report, 2004, p. 10
41 Telephone conversation with Kevin Thomas, CFO, NANA Regional Corporation (November 29, 2005).
for the sub-surface rights and The Kuskokwim Corporation for the surface rights. While some production royalties have been paid by Placer Dome to Calista and lease payments to The Kuskokwim Corporation, the major effort has been to collaborate with business development to utilize Calista’s and Kuskokwim’s business subsidiaries. Both organizations have or are in the process of negotiating contracts for construction, transportation, catering, and supply services.

Calista has other mineral development initiatives, including its Nyac gold property where Tonogold Resources Inc. has spent over $400,000 in the project so far, and is planning a $2 to $3 million drilling program for 2006. Calista also has two placer mine leases in operation. They continue to market other properties such as their Goodnews Bay platinum mining operation and the Stuyahok property.

In 2004, Calista’s mineral revenues totaled $258,000. In 2005, they totaled $465,000, including Donlin Creek and Nyac lode mineral agreements, and placer leases on Crooked Creek and the Tuluksak River.42

Alaska Gold Company has exploration and mining lease arrangements with Bering Straits Native Corporation and Sitnasuak Native Corporation for mining and surface use. Alaska Gold Company has committed to working with Bering Straits Native Corporation and Sitnasuak to explore business opportunities with the mine.

Payments to Alaska Mental Health Trust Authority

In 1956, the US Congress passed the Alaska Mental Health Enabling Act, transferring the responsibility of providing mental health services from the federal government to the Territory of Alaska. To establish the Alaska Mental Health Trust, the state selected a million acres of land to provide funds for the development of the mental health services. In 1994, a legal settlement reconstructed the Trust with 500,000 acres of original Trust lands and 500,000 acres of replacement land. The Trust contracts with the Alaska Department of Natural Resources to manage the Trust’s land. These lands are managed separately from other State of Alaska lands.

Most Trust lands are located in Interior and Southeast Alaska, with active exploration and mining occurring in the Interior. For example, Fort Knox Mine is located on Trust land and makes production royalties and rental payments to the Trust. The Trust is also encouraging exploration of its lands near Livengood, Salcha, McGrath, and Haines. The Trust is considering offering land for coal exploration and development in the Mat-Su Borough. In 2004, rents and royalty payments totaled $167,000.

Trust material sales currently take place in Southeast Alaska (such as Wrangell and Petersburg) and in the Interior (such as Fort Knox Mine). In 2004, these material sales totaled $60,000.

Alaska Mental Health Trust Revenue from Mining, 2004

<table>
<thead>
<tr>
<th>Type of Payment</th>
<th>Amount Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material sales (rock, sand and gravel)</td>
<td>$60,000</td>
</tr>
<tr>
<td>Annual rental payments (mining claims, lease payments, production royalties)</td>
<td>167,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$227,000</strong></td>
</tr>
</tbody>
</table>

Source: Mental Health Trust Lands Office, Alaska Department of Natural Resources.

Additional Mining Industry Benefits

Workforce Development

The mining industry can offer long-term, year-round employment. Many of the jobs are rural-based, offering transferable skills in a rapidly growing industry. Direct job training is available in management, engineering and science (geologists, metallurgists, environmental scientists, etc.); technical specialties (surveyors, drafters, computer technicians, instrumentation technologists, lab technicians, environmental, etc.); mine and mill work (millwrights, electricians, mechanics, plumbers, maintenance planners, metallurgical samplers, machinists, welders, industrial mechanics, operators, drillers, laborers, etc.); and administrative and support staff (accountants, purchasing agents, in-house trainers, employee relations personnel, payroll clerks, secretaries, health workers, cooks, security guards, warehouse workers, etc.).

There are a number of institutions and organizations in Alaska currently providing training support for and with the mining industry. These include:

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42 Email correspondences from Jeff Foley, Calista Corporation, December 5, 2005.
• Alaska Department of Commerce, Community, and Economic Development
• Alaska Department of Labor and Workforce Development
• Alaska Mineral and Energy Resource Education Foundation (AMEREF)
• Alaska Vocational and Technical Education Center (AVTEC)
• Bristol Bay Economic Development Corporation
• Delta Mine Training Center (DMTC)
• Kawerak, Inc.
• Kotzebue Technical Center
• Lake & Peninsula Borough
• Mining and Petroleum Training Service
• Mine Safety and Health Administration
• Nilavena Sub-Regional Health Clinic
• Southwest Alaska Vocational Technical Center
• Tribal organizations
• University of Alaska – Bristol Bay Campus
• UAF College of Engineering & Mines
• UAF College of Rural Alaska
• UAF Cooperative Extension Service
• UAS
• Works Alaska

The Delta Mine Training Center (DMTC), a non-profit organization located in Delta Junction, illustrates the role a training program can play in supporting local hire. The Center provides training courses for underground mining, including Drill Helper, Forklift, Hazcom, and Hazwaper Certification. They also offer surface mining training and CPR/First Aid/AED training. Since December 2002, there have been a total of 129 training classes for 1,053 students. Of these, 48 Alaska statewide business contractors were served and 309 of their employees were trained and certified.

The Center runs a unique model of an underground working mine. Underground, students learn about drilling, loading explosives, blocking, ground control, excavation (mucking), as well as installation of utilities, ventilation, communication, and electrical systems. Approximately four students run through each six-week program. These students are recruited, screened, and interviewed by a panel that includes the superintendent and human resources manager for Pogo Mine. Once these students complete their training, they are all guaranteed a position at Pogo Mine. These students are primarily prepared for entry-level jobs. Entry level jobs make up 25 percent of the employment opportunities for underground miners.

The Center also offers workshops for AMEREF, prospecting skills, navigation and GPS, outdoor safety and survival, rock and mineral identification, first aid, placer mining, and remote field skills. Since December 2002, there have been 37 workshops and 368 students enrolled. These workshops were offered throughout Alaska, including Anchorage, Aniak, Bethel, Delta, Dillingham, Fairbanks, Ketchikan, Kodiak, Kotzebue, Nome, Northway, Sitka, Tok, and Wrangell.

Infrastructure Development

Alaska’s mining industry has also played a historical role in the development of important infrastructure, including the development of the Alaska Railroad, Richardson Highway, Steese Highway, Hatcher Pass, the road through Denali National Park, and even the settlement of Anchorage. Though initially developed for mining-related purposes, this infrastructure now has obvious value to non-mining interests.

There are two recent examples of this in the Juneau area. In 2005, Alaska Electric Light and Power Company extended a transmission line to the Greens Creek Mine on Admiralty Island. That extension will ultimately make it possible to transmit power to the community of Hoonah on Chichagof Island, which now must rely on costly diesel power generation. Without the economies of scale offered by Greens Creek, it is unlikely that the extension to Hoonah would be economically feasible.

Also in the Juneau area, Goldbelt Corporation, Juneau’s urban ANCSA corporation, is building a marine terminal in the Berners Bay area north of Juneau. The terminal will initially be used to support operations of the Kensington mine. In the future, however, the facility is also expected to be used for a number of other transportation-related business ventures planned by Goldbelt, potentially serving the tourism and commercial fishing industries.

There are other examples of mining infrastructure serving other community, business and industrial interests. The Skagway ore terminal is now being used for cruise ship moorage during the summer visitor season.

43 Alaska Mineral and Energy Resource Education Fund is a non-profit Alaska specific resource education program created through the Alaska Department of Education and Early Development, and Alaska’s resource producing industries for use in Alaska’s elementary, middle, and high schools.
CHAPTER V: MINING IMPACT CASE STUDIES

Alaska’s three largest metal mines have come to play important – sometimes critically important – roles in local economies. This chapter describes the impacts mines are having on Alaska communities.

Local Mining Impact Case Studies

Red Dog Mine

NANA and Cominco (now Teck Cominco) joined forces in 1982 to create the world’s largest producer of zinc concentrates and provide employment opportunities for NANA shareholders. Under an agreement between Cominco and NANA, Cominco has the responsibility for training NANA shareholders, and giving first preference for all jobs at Red Dog to qualified Alaska Natives. Some key points related to Red Dog Mine’s impact on local and statewide economies are summarized below.

In 2004, Red Dog Mine reported 480 year-round workers (including contracted employment). Of the 480 employees reported at Red Dog, approximately 360 are employed directly by Teck Cominco, while most of the remaining employees are employed by NANA/Lynden (which provides the transportation from the mine to the port site) and NANA Management (which provides the meals and lodging for all mine employees).

Teck Cominco has hired more than 1,000 NANA shareholders at Red Dog Mine since production began in 1989, which does not include many more who have worked as contractors at the mine. Of Teck Cominco’s direct jobs, 56 percent are NANA shareholders or spouses of shareholders, and a third of the people holding Teck Cominco jobs live in the villages of the Northwest Arctic Borough. All of the clerical staff employed at the mine are shareholders, as are 75 percent of the equipment operators and 35 percent of the trades personnel (such as electricians).

Teck Cominco has provided 52 full college scholarships for NANA shareholders since 1996. For the fall of 2004, $37,000 was provided to 23 students.

Including contract employment, the Red Dog Mine (with 480 workers) is the second largest employer (after Maniilaq Association) in the Northwest Arctic Borough. In terms of payroll, the

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44 www.nwabor.org/edc/EDC%20CompPlan.htm
mine is the largest employer in the borough. The mine generated $46 million in total wages in 2004.

- Red Dog accounted for 17 percent of all wage and salary employment in the Northwest Arctic Borough, and 30 percent of all private sector employment.

- According to a 2002 study, Red Dog accounted for one-third of the private sector jobs held by the residents of Buckland (33%), Kiana (36%), Kivalina (38%), Noorvik (33%), Selawik (34%), and Shungnak (32%). It accounted for 63 percent of the private sector jobs held by the residents of Noatak.

- Prior to Red Dog Mine’s opening, wages in the Borough were well below the statewide average, but just one year after the mine became operational, the local average wage rose above that of the state. The median household income in the Northwest Arctic Borough grew by about 87 percent ($17,756 to $33,313) from 1979 to 1989 and by 38 percent from 1989 to 1999 ($33,313 to $45,976), according to US Census data. Annual wages at the mine are typically from $45,000 to $85,000 per year plus benefits.

- Teck Cominco has paid $90.1 million in total royalties to NANA from 1982 to 2004. In addition, payments in lieu of taxes to the Northwest Arctic Borough from 1988 to 2004 have been $44.3 million.

**Greens Creek Mine**

In 2004, McDowell Group produced a report of the socioeconomic impacts of Greens Creek Mine in Juneau. Key findings are summarized here.

- Greens Creek is Juneau’s largest private sector employer in terms of annual payroll.

- Greens Creek Mine’s 260 employees as a group are among the highest-paid workers in the community. Employees have average annual wages of nearly $79,000, almost triple the average $29,000 wage for Juneau private sector workers, and double the average state worker annual average wage of $40,000.

> Greens Creek Mine spent $20 million for goods and services purchased in Alaska, $17 million of which was spent in Juneau, in 2003.

> It employs a higher percentage of residents (89 percent at the time of the study) than the overall Juneau private and government entities combined (85 percent).

> Economic multiplier impacts add annual average employment of 273 and annual payroll of $8 million, totaling an average annual employment of 527 and payroll of $28 million.

> Greens Creek Mine households contributed $307,000 in residential real estate property tax in 2003 for the $26.4 million in assessed value of their homes.

> Greens Creek Mine contributes $50,000 annually to charitable organizations and pays employees for several hundred hours of community service work. Employees contributed in excess of $100,000 to local charitable organizations, and donated another $15,000 in goods and more than 4,000 hours of volunteer time to more than 50 charitable organizations, schools, and community organizations.

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47 www.nwabor.org/edc/EDC%20CompPlan.htm


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50 This estimate of resident employment is as of 2003 and is based on place of residency at the time of the study. This differs from ADOLWD residency data for Greens Creek, which is based on PFD application data.
Fort Knox Mine

A 1999 study prepared by Information Insights and the McDowell Group provides data on the economic impact of the Fort Knox mine in Fairbanks. Key findings from that study include (data has been updated where possible):

- In 2004, Fort Knox was the second-largest private sector employer in the North Star Borough, with annual average employment of 411. It is the eighth largest among all 2,000 public and private sector employers in the borough.

- Mine employees’ average salary was 70 percent higher than the borough average.

- The Fort Knox Mine spent $70 million in the Fairbanks North Star Borough in 2004, with 500 different businesses.

- Mine spending generated $100 million in direct and indirect impacts on the local economy in 1998.

- Fairbanks North Star Borough received $4.4 million in mine-related revenues in 1998. The mine is the second largest taxpayer in the borough.

- Because Fort Knox is a purchaser of Golden Valley Electric Association power ($14 million in 1998), other GVEA customers enjoy lower electric power rates – 7 percent for residential customers and 10 percent for large commercial customers.