

# ALASKA'S MINERAL INDUSTRY

## 2004: A SUMMARY

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*A floating dredge used by Exclusive Landscaping & Paving Inc. to extract sand and gravel. The 2004 diesel Marlin dredge has a 16-inch cutter head that can produce 500 to 1,000 tons of material per hour and can dig to a 100-foot depth. A two-man crew operates the dredge, which was commissioned at Exclusive's pit in the Fairbanks area during 2004. Photo provided by Exclusive Landscaping & Paving Inc.*

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by  
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### INTRODUCTION

This summary of Alaska's mineral industry activity for 2004 is made possible by information provided through press releases, annual reports, phone interviews, and replies to questionnaires mailed by the Alaska Division of Geological & Geophysical Surveys (DGGS). The final report will be available later in the year after further compilation of information, particularly for placer mining and industrial minerals. This report is part of a cooperative venture between DGGS and the Division of Mining, Land & Water (DMLW) in the Department of Natural Resources (DNR) and the Office of Economic Development, Department of Commerce, Community and Economic Development (Commerce). The estimates used in this summary are generally conservative due to incomplete data. This summary and data contained within it will be superceded by DGGS Special Report 59 to be published later in 2005.

The total value of the Alaska mineral industry is expected to be approximately \$1.40 billion for 2004, the ninth straight year topping \$1 billion. Table 1 shows the estimated value of the mineral industry in Alaska per year between 1981 and 2004, as divided between exploration and development investments, and the gross value of the mineral products. These preliminary combined values total \$1.40 billion in 2004.

Preliminary exploration expenditures in Alaska were more than \$64 million, about a 240 percent increase from 2002 and 2003 values. Exploration occurred across Alaska, but \$38 million (or 59 percent of the exploration funds) were spent in southwestern Alaska. Fifteen exploration projects had budgets greater than \$1 million. Several large projects, notably Northern Dynasty Minerals Ltd.'s Pebble copper-gold project in southwestern Alaska, Kinross Gold Corp.'s Fairbanks mining district projects in the Interior, and Freegold Ventures Limited-Pacific North West Capital Corp.-Lonmin PLC's Union Bay platinum-nickel-copper project in southeastern Alaska accounted for most of the exploration expenditures and drill footage. Advanced exploration projects include Placer Dome Inc.-NovaGold Resources Inc.-Calista

Corp.'s 23-million-ounce Donlin Creek intrusion-hosted gold project and Northern Dynasty's Pebble copper-gold porphyry project in southwestern Alaska, with announced resources of 26.5 million ounces of gold and 16.5 billion pounds of copper.

Development investment amounting to \$165.6 million for 2004 showed a significant increase over 2003; the 2003 investment was \$39.3 million. The increase is primarily due to construction at the Teck Pogo project, which was fully permitted in mid-2004. Other significant investments are noted

Table 1. *Total value of the mineral industry in Alaska by year (in millions of dollars U.S.)*

	Exploration (expenditure)	Development (expenditure)	Production (value)	Total (calculated)
1981	76.3	24.7	188.6	289.6
1982	45.6	41.6	196.4	283.7
1983	34.1	27.9	212.4	274.4
1984	22.3	53.4	199.4	275.1
1985	9.2	34.1	226.6	269.9
1986	8.9	24.3	198.5	231.7
1987	15.7	100.3	202.4	318.4
1988	45.5	275.0	232.2	552.6
1989	47.8	134.3	277.0	459.0
1990	63.3	14.3	533.0	610.6
1991	39.9	25.6	546.5	612.0
1992	30.2	29.6	560.8	620.6
1993	30.3	27.7	448.7	506.7
1994	31.1	45.0	507.5	583.6
1995	34.3	148.6	537.2	720.1
1996	44.7	394.0	590.4	1,029.1
1997	57.8	168.4	936.2	1,162.4
1998	57.3	55.4	921.2	1,033.9
1999	52.3	33.8	1,032.9	1,119.0
2000	34.9	141.7	1,106.4	1,283.0
2001	23.8	81.2	917.3	1,022.3
2002	26.5	34.0	1,012.8	1,073.3
2003	27.6	39.2	1,000.7	1,067.4
2004	64.4	165.6	1,180.3	1,410.3
<b>TOTAL</b>	<b>\$923.8</b>	<b>\$2,119.7</b>	<b>\$13,765.4</b>	<b>\$16,808.7</b>

Source: Alaska's Mineral Industry reports published annually by DGGS/Commerce.

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at Ft. Knox Mine, Greens Creek Mine, Kensington Project, Usibelli Coal Mine, and in the sand and gravel industry. Teck Pogo Inc. began construction at the Pogo project after receiving its final permits; the all-weather 50-mile road was completed between the Richardson Highway and the project site; the power transmission line from Golden Valley Electric Association facilities near the Richardson Highway was constructed, with power due to be delivered in early 2006; and mill and infrastructure facilities were partially constructed. Fairbanks Gold Mining Inc. acquired capital equipment and undertook advanced stripping at the Ft. Knox Mine. Coeur Alaska Inc. continued development investment at Kensington Project in anticipation of permit appeal resolution in early 2005. The U.S. Forest Service record of decision was issued on December 17 but appealed by the Southeast Alaska Conservation Council (SEACC), which filed an appeal on the last day of the appeal process. Greens Creek Mine Co. undertook tailings storage improvements and investments in underground development during the year. Usibelli Coal Mine Inc. invested in equipment and advanced stripping. The acquisition of a large cutter-head floating dredge by a Fairbanks gravel producer was a highlight for the sand and gravel industry.

Production values amounting to \$1,180.2 million for 2004 also increased significantly over the 2003 value of \$1,000.7 million. The increase is due to improved metal prices, which are up significantly over 2003. Production volumes were down compared to 2003 for all materials except placer gold; however, metal price improvements clearly overcame production shortfalls. Gold prices were 12.75 percent higher in 2004 at \$409.72 per ounce, silver 36.68 percent higher at \$6.67 per ounce, lead 5.26 percent higher at \$0.40 per pound,

and zinc 23.68 percent higher at \$0.47 per pound. Hard rock metal production values were down for all commodities; placer gold production appears to be up by about 1,000 ounces, with reporting shortfalls yet to be received. Hard rock metals production shortfalls follow: Gold, 73,511 ounces; silver, 1,642,000 ounces; lead, 11,683 tons; and zinc, 34,754 tons. Fairbanks Gold reported the most significant gold production shortfall due to delaying mining at True North to facilitate stripping at Ft. Knox. Ore grades at both Red Dog and Greens Creek mines were down slightly, thereby affecting lead, zinc, and silver values. The rock, sand, and gravel industry's reporting is very much behind schedule and accounts for most of the shortfall.

## EMPLOYMENT

Table 2 lists estimated employment in the Alaska minerals industry for the past 8 years. The total minerals industry employment in 2004 is estimated to be 2,081 full-time-equivalent jobs, an increase of 175 jobs from the estimated 2003 total of 1,906 jobs. With more complete data, especially for the sand and gravel and placer gold mining sectors, the number of 2004 jobs will likely rise and approach the 2002 value. Most of the increase was in the exploration and development sectors. It is expected that the number of jobs in the development sector will increase for 2005 as more large mining projects transition into the construction phase. Higher metal prices may also spur more placer gold mining.

## EXPLORATION

Exploration expenditures in Alaska during 2004 were at least \$64 million, more than double the \$27.6 million spent in 2003. At least 15 projects had exploration expenditures

Table 2. *Estimated Alaska mine employment, 1997–2004<sup>a</sup>*

	1997	1998	1999	2000	2001	2002	2003	2004
Gold/silver mining								
Placer	780	710	591	470	176	148	82	37
Lode	415	345	296	274	337	413	325	433
Polymetallic	230	275	275	275	275	262	295	265
Base metals	478	466	549	556	559	580	388	288
Recreational	270	255	240	250	210	180	175	175
Sand and gravel	700	658	590	603	556	702	349	235
Rock	123	121	128	150	137	177	35	108
Coal	118	128	121	121	121	100	65	90
Peat	42	40	38	36	32	21	20	20
Tin, jade, soapstone, ceramics, platinum	20	20	20	20	20	20	20	0
Mineral development	409	177	135	345	333	135	64	274
Mineral exploration	277	282	183	83	79	86	88	156
<b>TOTAL</b>	<b>3,862</b>	<b>3,477</b>	<b>3,166</b>	<b>3,183</b>	<b>2,835</b>	<b>2,824</b>	<b>1,906</b>	<b>2,081</b>

<sup>a</sup>Calculated on a 260-day work year



of \$1 million or more and these projects spanned across Alaska. As in years past, most exploration funds (more than 70 percent) were derived from Canadian sources. Exploration was conducted throughout Alaska, but the largest projects were located in southwestern Alaska, eastern Interior Alaska, and southeastern Alaska. Several large projects, notably Northern Dynasty Minerals Ltd.'s Pebble copper–gold project in southwestern Alaska, Kinross Gold Corp.'s Fairbanks mining district projects in the Interior, and Freegold Ventures Limited–Pacific North West Capital Corp.–Lonmin PLC's Union Bay platinum–nickel–copper project in southeastern Alaska, accounted for most of the exploration expenditures and drill footage. Advanced exploration projects include Placer Dome Inc.–NovaGold Resources Inc.–Calista Corp.'s 23-million-ounce Donlin Creek intrusion-hosted gold project and Northern Dynasty's Pebble copper–gold porphyry project in southwestern Alaska, with announced resources of 26.5 million ounces of gold and 16.5 billion pounds of copper. Announced resources for the Pebble project spurred a mining claim staking rush late in 2003, with more than 300 square miles staked and subsequently explored for copper–gold porphyries during 2004. Continued exploration around the Fort Knox and Greens Creek mines made significant discoveries that extended mine resources. AngloGold Ashanti led exploration for intrusion-related gold deposits in Interior Alaska with projects in the Livengood and Goodpaster districts, and several companies continued projects in the Fairbanks district. Base-metal exploration was led by NovaGold Resources Inc.'s exploration of the Arctic volcanogenic massive sulfide (VMS) deposit in the Brooks Range. Platinum and associated metals exploration contin-

ued at the MAN project in the Alaska Range by Anglo American Exploration Ltd. and Nevada Star Resource Corp., and at Union Bay in southeastern Alaska by Lonmin, Pacific North West Capital and Freegold Ventures.

Increased exploration expenditures in Alaska mirror mineral exploration budget increases worldwide. The increases in worldwide exploration expenditures were due to a combination of increased spending by major mining companies, a significant reduction in the negative influence of industry consolidation from peak years 2000 and 2001, and higher spending by junior mining companies in response to stronger gold and base-metal prices. The stronger Canadian dollar and attractive tax incentives for investors in Canada-based projects likely limited even more investment in Alaska.

Figure 1 shows the location of the most significant exploration projects in Alaska during 2004. Gold remained a major exploration commodity, but exploration for copper–gold porphyry systems (grouped with polymetallic deposits) was the major exploration target in 2004 (table 3). Base metal exploration expenditures increased significantly from 2003 levels. Platinum-group-element exploration remained steady. Table 3 lists exploration expenditures by commodity.

### Northern Region

NovaGold Resources Inc. completed extensive structural mapping, along with re-logging and resampling of the existing historic core to update and refine the three-dimensional model of the Arctic deposit in the Ambler massive-sulfide district of the western Brooks Range. The Ambler volcanogenic massive sulfide belt has been largely

Figure 1. Projects shown on this map represent \$62.2 million of the \$64.4 million spent on exploration in Alaska during 2004.

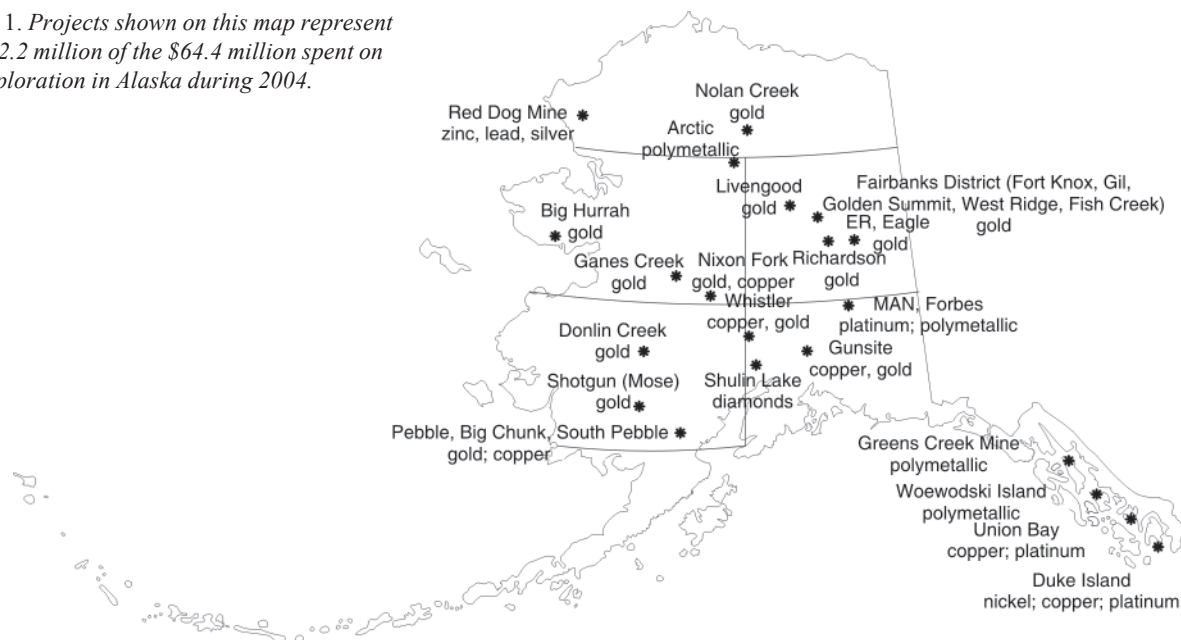


Table 3. Reported exploration expenditures in Alaska by commodity, 1982–2004

	Base metals	Polymetallic <sup>a</sup>	Precious metals	Industrial minerals	Coal and peat	Other <sup>b</sup>	Total
1982	\$31,757,900	\$ N/A	\$ 10,944,100	\$ --	\$ 2,900,000	\$ 15,300	\$ 45,617,300
1983	9,758,760	N/A	20,897,555	2,068,300	1,338,454	70,000	34,133,069
1984	4,720,596	N/A	14,948,554	270,000	2,065,000	279,500	22,283,650
1985	2,397,600	N/A	6,482,400	--	270,000	--	9,150,000
1986	1,847,660	N/A	6,107,084	170,000	790,000	--	8,914,744
1987	2,523,350	N/A	11,743,711	286,000	1,150,000	31,000	15,734,061
1988	1,208,000	N/A	41,370,600	160,200	2,730,000	--	45,468,800
1989	3,503,000	N/A	43,205,300	125,000	924,296	5,000	47,762,596
1990	5,282,200	N/A	57,185,394	370,000	321,000	97,000	63,255,594
1991	4,789,500	N/A	34,422,039	92,000	603,000	2,000	39,908,539
1992	1,116,000	3,560,000	25,083,000	25,000	425,000	--	30,209,000
1993	910,000	5,676,743	23,382,246	163,500	--	125,000	30,257,489
1994	600,000	8,099,054	18,815,560	225,000	2,554,000	810,000	31,103,614
1995	2,770,000	10,550,000	20,883,100	100,000	--	3,000	34,306,100
1996	1,100,000	11,983,364	31,238,600	400,000	--	--	44,721,964
1997	1,700,000	22,347,000	32,960,500	80,000	720,000	--	57,807,500
1998	1,000,000	13,727,000	42,441,000	12,000	87,000	--	57,267,000
1999	3,869,000	3,168,000	44,891,000	1,000	--	410,000	52,339,000
2000	8,545,000	3,933,000	21,579,000	58,500	--	736,100	34,851,600
2001	4,810,000	1,977,000	15,820,000	50,000	10,000	1,106,000	23,773,000
2002	1,700,000	5,162,000	17,342,000	185,000	--	2,113,000	26,502,000
2003	262,000	7,081,000	19,726,000	--	W	533,000	27,602,000
2004	3,100,000	36,826,000	24,108,000 <sup>b</sup>	213,000	50,000	100,000	64,397,000
<b>TOTAL</b>	<b>\$99,270,566</b>	<b>\$134,090,161</b>	<b>\$585,576,743</b>	<b>\$5,054,500</b>	<b>\$16,937,750</b>	<b>\$6,435,900</b>	<b>\$847,365,620</b>

<sup>a</sup>Polymetallic deposits considered as a separate category for the first time in 1992.

<sup>b</sup>Includes diamonds and tantalum.

<sup>c</sup>Approximately \$3.3 million spent on platinum-group-element exploration during 2004 (\$2.4 million in 2003, \$650,000 in 2002, \$2 million in 2001 ).

N/A = Not available.

-- Not reported.

W - Withheld, data included in other

unexplored since the early 1980s. NovaGold is acquiring a 51 percent interest in the Ambler property, which contains all the currently reported resources, through an option agreement with subsidiaries of Rio Tinto PLC. Under the terms of the agreement, NovaGold can earn a 51 percent interest by matching Kennecott's expenditures on the property totaling \$20 million before 2016. NovaGold, through its option agreement with Rio Tinto PLC, controls the claims covering the majority of the prospective belt. NovaGold's recent work included: Defining the structural framework of the mineralization; better determining the precious metal distribution and zonation patterns, and defining the mineralized and alteration packages, particularly quantifying the alteration associated with the higher grade mineralization. Ongoing modeling suggests that the deposit occurs as at least two extensive and continuous ore horizons along both limbs of a relatively flat-lying fold. The mineralized horizons in the upper limb of the fold crop out just below a prominent topographic ridge on the east side of the de-

posit and roughly parallel that surface, dipping to the west at about 500-foot depth. Mineralization has been intercepted over a 0.36-square-mile area and remains open toward the south and east on the lower side of the fold. NovaGold drilled 9,768 feet of core in 11 holes on the Arctic deposit. Drill holes AR04-78, AR04-79 and AR04-83 intersected particularly wide intervals of high-grade mineralization. Drill results include: Drill hole AR04-78 intersected two high-grade massive-sulfide horizons with a composite mineralized interval totaling 85.3 feet of 8.0 percent copper equivalent. Drill hole AR04-79 intersected four high-grade massive-sulfide horizons with composite mineralized intervals totaling 159.5 feet of 8.9 percent copper equivalent, including a 90.5-foot intercept grading 0.07 ounces of gold per ton, 2.31 ounces of silver per ton, 5.5 percent copper, 7.9 percent zinc, and 1.3 percent lead, equaling 11.6 percent copper equivalent. Drill hole AR04-82 intersected two massive-sulfide intervals with composite mineralized intervals totaling 37.4 feet of 6.9 percent copper equivalent and drill

hole AR04-83 intersected two massive-sulfide horizons with composite mineralized intervals totaling 60.7 feet of 9.4 percent copper equivalent. Four of five initial drill holes intersected the mineralized horizon, confirming the geologic model for the deposit. Drill hole AR04-81 did not intercept any significant mineralization due to a likely fault offset of the zone.

Teck Cominco restarted drilling for extensions of the Red Dog and associated sedimentary-exhalative zinc–lead–silver deposits in northwestern Alaska. Previous drilling had discovered rich zinc–lead–silver deposits north–northwest of the Red Dog Mine coincident with gravity anomalies. No results were announced from the 7-hole program.

Little Squaw Gold Mining Co. explored its wholly owned gold mining claims at Chandalar, Alaska. The Company expanded its mining claims position from 8,550 acres to 9,830 acres (15.4 square miles), largely to cover important outlying gold prospects. The Company completed an initial structural geology study of the Chandalar district using high altitude aerial photography. Numerous pronounced linears interpreted to represent deep-seated faults were identified. Some typify block faulting, forming horst and graben-like features. Major structural intersections are believed to be a controlling factor in the emplacement of the Chandalar district gold mineralization. Fifty-nine such sites were identified, and ten were selected for priority field examination. A recent grab sample from the Mikado mine dump assayed more than 20 ounces gold per ton. Several prospects of previously unevaluated or unknown gold mineralization have been found, with the most significant prospects being the Pioneer and the Rock Glacier prospects. At the Pioneer prospect, channel sampling of a quartz vein partially exposed in an old working yielded an assay of 2.30 ounces per ton of gold over a width of 2.5 feet. A second sample 15 feet away consisting of grabs of quartz vein float assayed 2.16 ounces of gold per ton. This prospect contains very high-grade gold values of unknown extent, and it is also associated with a major shear zone at least 3 miles long. The Rock Glacier prospect is a previously unreported area of widespread quartz in debris of a large rock glacier. Random chip samples of cobbles of vein quartz are highly anomalous in gold with assays up to 6.51 parts per million (ppm) gold. Some of the quartz boulders are up to three by nine feet in size. Stream-sediment samples from the stream draining the rock glacier are also highly anomalous in gold, assaying 0.442 ppm gold. The rock glacier covers a portion of the strike length of the Eneveloe shear zone, and the rock glacier may cover a significant zone of gold mineralization.

### **Western Region**

The Seward Peninsula was the center of activity for the western region of Alaska. NovaGold Resources continued advanced exploration on the Rock Creek gold property

near Nome and is currently studying taking this project to the development phase. NovaGold also conducted trenching and drilling at the historic Big Hurrah Mine in the Solomon mining district east of Nome. DGGS conducted geologic mapping and geochemical sampling around the Big Hurrah area and in the Council area as part of an integrated program following up the airborne geophysical survey results released by DGGS in 2003.

St. Andrews Goldfields Ltd., in a joint venture agreement with Mystery Creek Mining, continued exploration work on the historic Nixon Fork gold–copper mine near McGrath. Work included drilling to explore and expand known gold resources at the mine, exploration drifting and other studies to reopen this mine, possibly in late 2005. Aeroquest Ltd. completed a 700-line-mile time-domain aeromagnetic and electromagnetic geophysical survey over the Nixon Fork area. Results of this survey will be incorporated into the existing Geoinformatics three-dimensional database and three-dimensional models of the area and the targets generated will form part of an expanded exploration program for 2005. Drilling continued on the C3300 Chute Zone, further increasing the dimensions of mineralization beyond those previously anticipated. Some highlights of the drilling include 5 feet of 1.20 ounces of gold per ton in hole DH-92, 10.5 feet of 1.29 ounces of gold per ton in hole DH-109, and 11.1 feet of 0.67 ounces of gold per ton in hole DH-12. Drilling commenced on the new target zones C3004, C2200 and C3550, which lie in close proximity to the C3000 and C3300 Zones. Existing infrastructure is providing access to these new target areas. Drilling of the Whalen area was completed at the end of September and assay results are pending. Roscoe Postle Associates Inc. of Toronto is preparing an updated reserve and resource statement that will incorporate the exploration drilling results obtained in 2004. St. Andrews planned to continue the underground drilling program through the winter.

### **Eastern Interior Region**

Kinross Gold Corp. continued exploration in the Fairbanks mining district with extensive drilling around the Fort Knox and True North gold deposits, focused on the conversion of resources to reserves and to outline the limits of gold mineralization. Kinross continued to find additional mineralization below the current Fort Knox pit. For example, hole FC-716 drilled in the east-central portion of the pit to test the extension of mineralization beneath the current ultimate pit, cut two strong zones of mineralization grading 0.316 ounces of gold per ton over 65 feet followed by 0.273 ounces of gold per ton over 35 feet. Kinross also conducted exploration elsewhere in the Fairbanks mining district.

The Kinross/Teryl Resource Corp. Gil Joint Venture exploration program consisted of geologic mapping, excavating four trenches totaling 1,020 feet, drilling

18 reverse-circulation drill holes totaling 4,175 feet, and collecting more than 1,000 rock and soil samples for assays. Work at the Gil property, held jointly with Teryl Resources Corp., also was designed to gauge the feasibility of mining this gold resource as another satellite deposit for the Fort Knox Mine Complex.

Teryl Resources Corp. worked on several projects in the Fairbanks mining district. Teryl collected a total of 161 power auger soil samples and 14 shovel samples on a small grid over the southern part of the West Ridge claims adjacent to and within the one-quarter mile square block of State Trust land leased last year. Sample results included anomalous gold (greater than 100 parts per billion gold) associated with elevated arsenic, antimony, lead, bismuth, and tungsten levels. The soil grid was extended onto the northwestern portion of the Fox Creek claims after interpretation of the geochemical results. Teryl drilled two reverse-circulation drill holes for a total of 587 feet of drilling. The holes were largely drilled through quartzite and quartz-mica schist, with short intervals of granite and hornfels. Hole FC04-02 had two 5-foot intervals of anomalous gold mineralization: 0.037 ounces of gold per ton from 30 to 35 feet and 0.072 ounces of gold per ton from 180 to 185 feet. Both gold-bearing intervals were hosted in altered metasediments containing minor quartz veinlets. Elevated gold values were associated with anomalous arsenic (up to 0.57 percent), molybdenum (up to 82 parts per million) and tungsten (up to 40 parts per million). On the Fish Creek property, a 50 percent option from Linux Wizardry Systems Inc., a total of 20 placer holes, shallow, larger diameter reverse-circulation holes, were completed and two deeper reverse-circulation holes were drilled to test a gold target in a granite body.

Freegold Ventures Limited (Freegold), in a joint venture agreement with Meridian Gold Inc., continued exploration on the Golden Summit project on Cleary Summit in the Fairbanks mining district. Six core holes were drilled to confirm both the structural and grade continuity of a portion of the Cleary Hill vein system. Gold mineralization in the 2004 drill holes consisted of fine-grained and visible free gold associated with quartz veins, stockworks and quartz-rich shear zones containing 1–3 percent pyrite, arsenopyrite and jamesonite. The core sample results confirm that the old mine drawings from the 1940s accurately portray the trend of high-grade mineralization associated with the Bankers Stope chute on the Cleary Hill vein. These cross section drawings also indicate several other mineralized vein systems.

Freegold concluded an agreement with Nautilus Alaska Inc. in mid-year to acquire Nautilus's rights to a 20-year lease on the Tolovana gold property on Cleary Summit. Freegold's Tolovana program consisted of 3,584 feet of diamond core drilling in seven holes completed in November that was designed to follow up promising geochemical

results of 1,760 feet of trenching and sampling completed during August. Stockwork vein mineralization is known within the granodiorite intrusion, immediately south of the Tolovana Vein where previous drilling intersected high-grade gold values. The 2004 drill results from the Tolovana prospect suggest that high grade mineralization hosted in metamorphic rocks is concentrated on the eastern side of the vein system (holes TLD0401 and TLD0402) while mineralization on the central and western portions of the prospect are closely associated with or hosted by mid-Cretaceous granodiorite of the Dolphin stock. Mineralization at Dolphin remains open to the southwest and at depth. Mineralization along the Tolovana vein system remains open at depth and along strike, particularly to the east where the intersection of the Tolovana and Cleary Hill veins should occur.

AngloGold USA Exploration Inc. (AngloGold) and partner Rimfire Minerals Corp. conducted exploration on the ER, Eagle, and Beverly gold projects in the Goodpaster area just west of the Pogo gold property. AngloGold, the operator of all three projects, conducted diamond drilling and groundwork at the ER and Eagle joint ventures and soil geochemical sampling at the Beverly project. At the ER property, 20.3 line miles of natural source audio magneto tellurics (NSAMT) ground geophysical surveys, 234 soil samples and three diamond drill holes totaling 3,271 feet were completed. Two drill holes intersected numerous gold-bearing quartz veins. At the Eagle property, AngloGold collected 485 soil geochemical samples, conducted electromagnetic and radiometric geophysical surveys, and drilled nine diamond drill holes totaling 9,115 feet. Drilling found a total of 26 intersections from 0.65 to 5 feet in width, assaying from 0.03 to 0.41 ounces of gold per ton and results indicate widespread intrusion-hosted stockwork mineralization. Stream-sediment sampling and soil geochemical sampling at the Beverly project had discouraging results and the property was dropped.

AngloGold USA Exploration Inc. also conducted exploration, including drilling, on the Livengood project centered on Money Knob near Livengood. AngloGold has drilled 12 holes totaling 10,000 feet over the past 2 years, focused on high-grade gold structures in a Cretaceous intrusion. Drilling results to date confirm the presence of a large, low-grade, intrusion-related gold system with bonanza gold potential.

St. Andrews Goldfield Ltd. continued data analysis at the Uncle Sam project in the Richardson district. Gold mineralization is predominantly shear hosted in the metamorphic country rock with additional local zones of hydrothermal breccia and sulfide veining. Tri-Valley Corp. continued exploration on the Democrat property in the Richardson mining district. Tri-Valley Corp.'s mining subsidiary, Select Resources Corp., acquired a 34-square-mile area of interest on several gold, silver and copper mineral-



ization anomalies surrounding Shorty Creek near Livengood in early 2005.

Golden Spirit Mining Ltd. worked on the 4-square-mile Ester Creek property on the south flank of Ester Dome, including sampling and mapping altered bedrock fragments and intrusions. Golden Spirit discovered a strongly altered, sheared, and crushed quartz vein zone associated with an altered felsic dike in an area of old prospect trenches. Sample results across 10.5 feet of the structure returned a weighted average of 2.11 ounces of gold per ton.

Numerous placer miners across the Interior conducted minor exploration for placer gold. Most of the exploration was done on actively producing properties and most of the work was in the Fairbanks mining district.

Usibelli Coal Mine Inc. explored their coal leases on Jumbo Dome, approximately 9 miles north of the Two Bull Ridge Mine. Usibelli opened two large trenches and took two large bulk samples of coal from three coal seams. Analyses of the coal indicated very good quality, with approximately 4 percent ash content and 0.11 percent sulfur. These results are encouraging for the proposed Emma Creek Energy Project, a mine-mouth coal-fueled power plant envisioned in the Jumbo Dome area.

### **Southcentral Region**

Nevada Star Resource Corp focused its exploration work in 2004 on the northern sections of the MAN property in the Delta River mining district. In particular, exploration work focused on the Canwell, Rainy, Eureka (includes Telephone Hill), and Broxson (includes Ghezzi and Broxson Gulch) areas. Work included 3D mag-inversion, UTEM data interpretation, gravity work, min/max electromagnetic studies, and rock and soil sampling. The results from this and other data were used to identify four primary drill targets. Soil sampling along with 14.3 line miles of Max-Min geophysics and 7 line miles of ground magnetics over the Canwell prospect revealed a +5 line-mile-long Max-Min conductor along the eastern margin of the Canwell mafic-ultramafic complex. This anomaly extends north of the Odie showing. Nevada Star completed a six-hole, 2,275-foot reverse-circulation drilling program on the Canwell intrusion (area 4) of the MAN property in the Delta River mining district. The drilling program targeted several conductors identified from exploration work completed on the Canwell intrusion earlier this summer. Drilling intercepted variably serpentinized gabbro, pyroxenite, and dunite in the Canwell complex and younger intermediate intrusions on the eastern margin of the Canwell complex. Platinum and palladium values ranged from less than detection limits to highs of 174 and 128 parts per billion, respectively. Copper values ranged from 8 to 1,795 ppm (0.0008 to 0.18 percent), while nickel values ranged from 9 to 6,220 ppm (0.0009 to 0.62 percent). Platinum and palladium strongly correlate with each other and with nickel.

Elevated platinum and palladium values are preferentially hosted in dunite-rich rock units while more differentiated gabbroic rock units contain only background levels of platinum and palladium.

Limited rock sampling at the Ghezzi copper-gold prospect on the MAN property confirmed and expanded past trench samples, with samples of leucogabbro, basalt, and limestone containing up to 4.2 percent copper and 0.06 ounces of gold per ton. High-grade copper and/or gold values at the Ghezzi prospect have now been identified over an area measuring 2,757 feet by 3,282 feet. Geologic mapping and rock and soil sampling were also conducted in 2004 on the Broxson Gulch prospect in the north-central part of the project. Work focused on a prominent ridge northwest of the old Broxson Gulch placer gold workings and revealed the presence of widespread anomalous gold, arsenic, and copper with sporadic anomalous silver, lead, and zinc. Rock samples collected in 2004 returned anomalous copper (high of 2.7 percent, average of 287 ppm [0.029 percent]), gold (high of 0.17 ounces of gold per ton, average of 94 ppb [0.0027 ounces of gold per ton] and arsenic (high of 1,285 ppm [0.13 percent], average of 45 ppm [0.0045 percent]). Higher metal values were associated with feldspar porphyry, hornfels, and calc-silicate rocks. A total of 1.7 line miles of Max-Min geophysics were completed on the Rainy prospect and rock samples were collected, including a magnetite-bearing dunite with anomalous gold, platinum, and palladium values. Exploration efforts at the Telephone Hill prospect consisted entirely of ground geophysics, including 4.9 line miles of Max-Min geophysics, 5.3 line miles of ground magnetics and .8 line miles of gravity surveys.

The southern section of the Alaska MAN property is under joint venture with Anglo American Exploration (Canada) Ltd. (AAEC), which began its own exploration program in the spring, pursuant to its agreement with Nevada Star. AAEC is a wholly owned indirect subsidiary of Anglo American PLC, a global leader in the mining and natural resource sector. Under the terms of the joint venture agreement, AAEC can earn a 51 percent interest in the southern portion of the MAN property by spending a total of \$12 million over a 5-year earn-in period. AAEC has the right to increase its interest by an additional 19 percent by completing a feasibility study, and an additional 5 percent by arranging production financing for both AAEC and Nevada Star. Anglo American's exploration program included a 1,550 line mile airborne magnetic and electromagnetic survey with Anglo's proprietary Spectrem technology, geologic mapping, prospecting, geochemical sampling including 2,626 soil sample sites and ground geophysics. Data from the airborne geophysical survey was combined with existing data from previous exploration programs and used to guide the ground program with the goal of identifying drill targets for a winter drilling program.

A recent re-evaluation of the airborne magnetic survey flown over the Shulin Lake diamond property revealed numerous intrusive-style magnetic anomalies, both small stocks or pipes and dikes. Hole 22, drilled in March, was situated at the rim of one of these pipe-like features as outlined by the magnetic survey. Material from this hole recovered three micro diamonds in a 21.4-pound sample. Further samples from this hole (DSL 22) and the two nearest holes (DSL 17 and DSL 20) have been sent for caustic dissolution and diamond testing. Results are expected in early January 2005. Purple and orange garnets were observed while inspecting the fusion residues from the samples submitted for micro diamond testing, and were sent to R.L. Barnett, Geological Consulting Inc., for microprobe analysis. Five purple garnets submitted were G-9 garnets and 12 orange garnets were high magnesium pyrope (19–20% MgO), with high titanium content indicating a strong eclogitic component. Of particular importance is that a low manganese content shows that these fall into the field of diamond-associated garnets (diamond-associated garnets are those included in diamonds, occurring in diamond-bearing samples, or occurring inside the diamond stability field). Also, the calcium/chrome ratio is that of garnets associated with diamonds and not with graphite. The geochemistry of the garnets compares well with other eclogitic-dominated diamond systems. Although diamond inclusion chromites and other indicator minerals had been detected by microprobe before, this is the first time that pyrope garnets have been found on the Shulin Lake property. More drilling was expected at Shulin Lake in early February.

Exploration was also conducted on Full Metal Minerals Ltd's Gunsite copper–gold porphyry prospect located in the Talkeetna Mountains approximately 89 miles north of Anchorage, within 1.5 miles of an all-weather road. Underlain by a Cretaceous dioritic batholith, the property hosts high-grade intrusive-hosted copper–gold mineralization in subhorizontal fractures and veins over a 4-square-mile area. Mineralization consists of both structurally controlled and disseminated porphyry-type copper–gold styles. Four areas of high-grade copper–gold mineralization are present on the property. Full Metal completed a six-hole, 2,408-foot diamond-drilling program. Drilling intersected local zones of copper–gold mineralization, including 19 feet of 0.06 ounces of gold per ton, 0.22 ounces of silver per ton, and 1.82 percent copper. Several of the drill holes intersected an extensive east–west-trending fault zone running parallel with the surface exposure, which appears to truncate the mineralized zones.

Kennecott Exploration Co. explored the Whistler copper–gold porphyry prospect near Rainy Pass. Fine-grained feldspar–hornblende porphyritic Tertiary/Cretaceous andesite intrudes sedimentary rocks of the Mesozoic Kahiltna terrane at this prospect. Cominco Inc. previously

identified mineralization as stockwork chalcopyrite–magnetite quartz veinlets with elevated gold values; vein- and joint-controlled sulfide–barite–quartz mineralization; and chalcopyrite with minor sphalerite in silicified andesite. Kennecott's 2004 work included staking mining claims, geochemical sampling, geologic mapping, and geophysics. Kennecott drilled 6,570 feet of core, but results were not available.

### Southwestern Region

The Donlin Creek gold project near Aniak dominated Alaska's exploration sector over the past several years and is now in the advanced exploration or early feasibility (development) phase. A new resource announced in late 2002 increased inferred gold resources by nearly 40 percent to 14.8 million ounces grading 0.102 ounces per ton, with a measured and indicated resource of 8.3 million ounces of gold grading 0.102 ounces per ton, using a 0.058 ounces per ton gold cut-off grade. The Donlin Creek deposit is currently thought to be ranked as the 22nd largest gold deposit in the world, with 23 million ounces of gold resources. Placer Dome Inc. exercised its back-in right to earn a 70 percent ownership of the Donlin Creek project and feasibility–engineering studies are underway. Other joint-venture owners are NovaGold Resources Inc. and Calista Corp. The current timetable, assuming a positive feasibility study, would have production begin in 2009 or 2010. The greatest challenge to this project is the requirement for 60 to 80 megawatts of electrical power needed to process the sulfide-rich ore and other mining facilities. A port on the Kuskokwim River and a 15-mile road connecting the port to the mine site will also be required. Work in 2004 consisted of a preliminary assessment on the viability and economics of the project. Based on this work, Placer Dome is committing \$11 million to the development of the project in 2005. About half of the funds will be used for drilling to reclassify a portion of the inferred gold mineral resource to a measured and indicated gold mineral resource. Work on design concepts, infrastructure planning, power supply, and geotechnical requirements are also ongoing. Baseline environmental studies are being completed in order to begin the permitting process in 2005.

Northern Dynasty Minerals Ltd.'s Pebble property near Iliamna in southwestern Alaska was Alaska's largest exploration project in 2004. Based on an independent mineral resource estimate by Norwest Corp., Northern Dynasty announced in January 2004 that the Pebble deposit contains 26.5 million ounces of gold and 16.5 billion pounds of copper in 3.02 billion tons of ore grading 0.55 percent copper-equivalent. By one estimate this would make the Pebble deposit the largest gold resource and the second largest copper resource in North America, and the fifth largest copper porphyry deposit in the world. Northern Dynasty's 2004 exploration program included comprehensive drilling

to upgrade the Pebble resource to measured and indicated categories, baseline environmental and socioeconomic studies to support state and federal project permit applications, as well as site testing and engineering studies directed toward completion of a bankable feasibility study in 2005. In-fill drilling was designed to upgrade resources to measured and indicated categories to finalize open pit mine planning. More exploration drilling was designed to further define the extent of the deposit and its higher-grade areas; Northern Dynasty Minerals completed more than 157,614 feet of core drilling in 227 holes during 2004 on this copper–gold–molybdenum porphyry deposit hosted in granitic rocks. In-fill drilling totaled 101,539 feet in 122 holes, metallurgical and process design drilling totaled 21,335 feet in 26 holes, geotechnical drilling totaled 32,502 feet in 70 holes, and exploration drilling totaled 13,815 feet in 9 holes. This year's work resulted in the discovery of a potential second mineralized granite body beyond the previously known porphyry system to the east into the exploration lands that surround the resource lands. In addition, geotechnical drilling tested sites for tailings impoundment, surface facilities, and open-pit mine design. Extensive large diameter core drilling collected larger composite samples for metallurgical and process testing. More than a dozen consulting firms, multiple helicopters, and seven drill rigs operated at the Pebble property over the past summer. At the peak of activity, about 100 people were working on the project, 70 of them residents of Alaska. Northern Dynasty also opened an office in Anchorage last summer. Roscoe Postle and Associates Inc are currently undertaking a new resource estimate for the Pebble deposit. As currently defined, the Pebble deposit is open to the east, west and to depth, with higher-grade mineralization open to the south and southeast. Current assessments of the optimal milling capacity for the Pebble project range from 100,000 to 200,000 tons per day over a 30- to 60-year mine life.

A preliminary assessment report was prepared in order to quantify the Pebble project's cost parameters and to provide guidance for the ongoing engineering work that will ultimately define the optimal scale of production. Preliminary forecasts and estimates in the report were developed to an order of magnitude level and are not based on systematic engineering studies. The preliminary assessment report indicates that the Pebble gold–copper–molybdenum porphyry deposit would be developed by conventional, large-scale, open-pit mining methods. Four open-pit stages were designed using the block model established by Norwest Corp. for the February 2004 inferred mineral resource estimate of the Pebble deposit.

Processing of mill feed from the open pit will produce a flotation copper sulfide concentrate with gold and silver values as well as a separate molybdenum sulfide concentrate. Estimated metal recoveries of 88 percent for copper,

76 percent for gold and silver, and 60 percent for molybdenum were utilized in the financial modeling. The preliminary assessment report examined three production rate scenarios: 110,000 tons per day, 220,000 tons per day, and a phased expansion from 110,000 tons per day to 220,000 tons per day in year six. These analyses show that at the lowest production rate considered, the Pebble project would produce an annual average of 256 million pounds of copper, 365,000 ounces of gold, 8 million pounds of molybdenum, and 1.4 million ounces of silver during the first 10 years of a 62-year mine life. At the largest scale studied, the project would produce an annual average of 470 million pounds of copper, 674,000 ounces of gold, 15 million pounds of molybdenum, and 2.5 million ounces of silver during the first 10 years of a 31-year mine life. Capital cost estimates range from \$1.0 billion for a 110,000-tons-per-day facility to \$1.5 billion for a 220,000-tons-per-day facility. Life of mine-sustaining capital estimates range from a total of \$276 million for a 110,000-tons-per-day project to a total of \$197 million for a 220,000-tons-per-day project.

A number of options for the provision of electric power to the project and neighboring villages have been identified and are currently being evaluated. These options include connection to the State's existing power transmission grid, either through a 41-mile submarine connection to the Kenai Peninsula or an overland route on the west side of Cook Inlet. An alternative to a transmission grid connection would involve the establishment of new generation facilities close to the mine or port area.

Northern Dynasty exercised its option to acquire 80 percent of the resource lands from Teck Cominco American Inc. in late 2004. In addition, Northern Dynasty exercised its option to acquire up to a 50 percent interest in the extensive surrounding exploration lands. Teck Cominco has a 90-day right to form a 50 percent joint venture on the exploration lands or sell its 50 percent interest in the exploration lands to Northern Dynasty for \$4 million, in cash or shares at Northern Dynasty's election, and it will then retain a 5 percent after-payback net profits interest. As a consequence of exercising the Teck Cominco options, Northern Dynasty also has a 90-day period to elect whether to also acquire the 20 percent carried interest in the Pebble Project, held by a related party, for share consideration equal to the independently appraised value of the 20 percent interest. By exercising all of its options the company can acquire up to a 100 percent interest in the resource lands (with no back-in right or royalty) and up to a 50 percent interest in the surrounding exploration lands.

The Alaska Department of Transportation & Public Facilities (DOT) is investigating potential port sites at Iniskin Bay and Iliamna Bay on Cook Inlet, to facilitate shipping of copper–gold–silver and molybdenum concentrates to offshore smelters from the Pebble area. These port sites are approximately 65 miles from the Pebble de-

posit. Various road corridor options leading from the potential port sites to the Pebble deposit, with connections to local villages, are also under active evaluation. A report outlining the findings and recommending the preferred port site and road corridor was prepared in 2004 as part of the State of Alaska's Southwest Regional Transportation Plan. After the port site and road route have been selected, the State will commission more detailed studies to facilitate design, engineering, permitting, and construction.

The extensive work at the Pebble property during the past several years and the announced discoveries in 2003 spurred a mining claim staking rush late in 2003, with more than 300 square miles staked around Pebble. Some of the land staked was subsequently explored during 2004 for copper-gold porphyry deposits.

Liberty Star Gold Corp., a newly formed exploration company, explored their large claim block, with 981 mineral claims, spanning 237 square miles, composing the Big Chunk group. The Big Chunk claims adjoin Northern Dynasty's Pebble Project on the north border, forming a large donut shape and adjoining their border to the southeast. The claims were staked based on a caldera model for the Pebble mineralization. Liberty Star Gold completed a detailed airborne magnetic survey covering 1,402 square miles of their claim block (12,500 flight line miles at a terrain clearance of 295 feet and a line spacing of six lines per mile with a fixed-wing aircraft) prior to fieldwork by a crew of 15 geologists. Geologic, geostructural, space imagery, and detailed aeromagnetic studies resulted in the identification of 21 anomalies representing potential mineral centers. Field crews collected approximately 8,434 samples of various types including soil, vegetation, stream sediments and water. Zonge Engineering and Research Organization Inc. completed an Induced Polarization (IP) electrical survey over selected areas of the property. White Sox, a significant IP anomaly found in the northern portion of the Big Chunk property, about 9 miles northeast of the Pebble project, was the target of a four-hole, 1,329-foot diamond drill program. Altered and mineralized sedimentary rocks cut by porphyry dikes and quartz veins were intersected in the drilling. Copper and molybdenum sulfides were visible in some intervals of the core. All holes intercepted measurable but low grade gold ranging up to 0.00013 ounces of gold per ton in BC-1; copper ranged from 0.0048 percent to about 0.06 percent in drill hole BC-3; molybdenum ranged from (0.000038 percent in BC-1 to about 0.03 percent in BC-3. Drill hole BC-3 (closer to the mineral center) had about 0.05 percent copper over 26.6 feet between 232 and 259 feet, and about 0.06 percent copper over 9.8 feet at a depth of 138 feet. Liberty Star concluded that holes BC-1 and BC-4 are in the low copper-molybdenum pyrite halo and holes BC-2 and BC-3 are in the propylitic-phyllitic alteration boundary and outer metal halo and closer to the porphyry center.

Geocom Resources Inc. completed a detailed geophysi-

cal survey over the H claim block of the Iliamna Project. The survey consisted of a three-dimensional induced polarization-resistivity study of the area drilled in 2003 by Geocom. Twenty-eight miles of grid were surveyed, encompassing the area surrounding the two discovery diamond drill holes completed in 2003. The survey successfully delineated several anomalies considered to reflect sulfide mineral concentrations and potential drill targets. Geocom drilled approximately 3,300 feet of core at four locations on the H claim block. Two of the target areas are adjacent to drill holes completed in 2003, and two additional targets identified in the geophysical study will be evaluated during this drill campaign. Geologic logs show that pyrite-chalcopryite-pyrrhotite-molybdenum mineralization was intersected in all four widely spaced holes. In conjunction with the two holes drilled in 2003, the mineralized area now covers a minimum of 2,296 feet by 4,921 feet. Disseminated porphyry-style and fracture-controlled copper-gold mineralization were intersected in both a granodiorite intrusive rock and the enclosing metamorphic country rocks. At the D claim block of the Iliamna Project, Geocom intended to conduct additional geophysical studies after freeze-up to better delineate drill targets and a reliable estimate of depth to bedrock. Drilling on the D claims was planned for the 2005 field season.

TNR Gold Corp. explored on the Shotgun project and focused on areas with geology and geochemistry similar to that of the area now called the Main Shotgun Zone. This exploration resulted in the acquisition of 14,080 acres of new mineral claims. The new areas follow a north-south trend from the Main Shotgun Zone and are called the Shot, King and Winchester Areas. Like the Main Shotgun Zone, all contain intrusions hosted in hornfelsed Kuskokwim Group graywacke and shale. Geochemical characterization of these areas based on samples collected this season is underway. Follow-up exploration on the new properties identified new drill targets for the 2005 exploration season in addition to extension drilling on the Main Shotgun Zone. Drilling is expected to commence in early summer 2005.

Full Metal Minerals Ltd. completed an exploration program at the Pebble South property. At Pebble South, more than 1,400 samples (944 soil, 316 stream, and 211 rock) were collected, 50 line-kilometers of 2D-IP (Induced Polarization) were completed and 20 line miles of ground magnetics were completed on the property. Mineralized areas along the Pebble Copper trend are often found in valley lowlands veneered by glacial cover. Due to the overburden cover, IP geophysics was selected as the best method for identifying mineralized zones in covered areas. During this work, at least 11 significant IP chargeability anomalies were identified. Two high-priority drill targets include the BOO prospect and the TYP prospect. The BOO prospect, with two zones of high chargeability coupled with moderate to low resistivity, lies along the extension of the southwest-



trending Pebble IP anomalies. At the TYP prospect, 8 miles north of the BOO prospect, a 3.6-mile-long zone of moderately high chargeability was identified at the western margin of the Kaskanak Batholith. Exposures of rhyolite and mineralized granodiorite occur within a 1-mile-long by 0.5-mile-wide copper–molybdenum–gold geochemical anomaly at the TYP prospect. Geologic mapping of rubbrecrop southwest of the TYP prospect identified Kaskanak Batholith-marginal phases of potassium-flooded quartz monzonite porphyry. This is a similar geological setting to the Pebble deposit found 10 miles east along the Kaskanak Batholith's eastern margin where a 3.6-mile-long IP anomaly was detected proximal to the porphyry.

Calista Corp. sampled the Wallace gold prospect in the Nyac mining district. Rock samples of quartz–chlorite–calcite-veined, sericitically altered granodiorite porphyry dikes contain up to 7 ounces of gold per ton and anomalous soil samples in the same area range from 0.001 to 0.01 ounces of gold per ton. The veins occasionally contain blebs and crystals of native gold, tellurobismuthite and tetradymite.

### **Alaska Peninsula Region**

A letter of intent dated July 13, 2004, between Full Metal Minerals Ltd. and Alaska Earth Resources Inc. (AERI) granted Full Metal an option to acquire a 100 percent interest in the Port Moller Property. Full Metal paid to AERI the sum of \$10,000 (first signature payment) upon execution, and will pay the sum of \$10,000 (second signature payment) upon either the signing of Full Metal's Exploration Agreement and Surface Access Agreement with the Aleut Corp. and the Shumagin Corp. respectively, or March 31, 2005, whichever occurs first. Full Metal shall pay an annual fee of \$20,000 to AERI for each of the first four project years. Full Metal will issue 200,000 shares to AERI, (50,000 first year, upon signing an exploration and development lease with the Aleut Corp. and Shumagin Corp., respectively), and incur \$525,000 in exploration expenditures (\$75,000 in the first year). Through this agreement, Full Metal has an exclusive option with the Aleut Corp., a Native-owned Alaskan corporation, to explore Native-owned lands in the Port Moller Quadrangle, encompassing the western Alaskan Peninsula and the eastern Aleutian Islands. Additionally, Shumagin Village Corp., the owner of surface rights in certain areas of the Port Moller region, has granted permission for trespass and exploration on their lands. The two most advanced epithermal gold projects in the Port Moller Quadrangle include Centennial, on Popov Island adjacent to Sand Point, with 7 million tons averaging about 0.04 ounces of gold per ton in an intermediate sulfidation system occurring as quartz stockworks with pyrite and rare visible gold located below a capping basalt; and the Shumagin and Apollo low-sulfidation, epithermal gold prospects on Unga Island. At the Apollo mine, approximately 145,000 ounces of gold were mined from ore

averaging 0.29 ounces of gold per ton from 1891 to 1904. The area also includes the Pyramid porphyry project with 19 historic shallow drill holes (5,563 feet total) identifying a near-surface zone of copper and molybdenum mineralization consisting largely of chalcocite-enriched rock.

### **Southeastern Region**

In southeastern Alaska, Pacific North West Capital, Freegold Ventures, and Lonmin PLC explored the Union Bay project near Ketchikan. The 2004 fieldwork program consisted of further reconnaissance rock chip sampling, 1,200 line miles of combined airborne magnetic and multi-frequency electromagnetic surveys, and 5,973 feet of diamond core drilling in 10 holes. Exploration work focused on the Continental zone where rock cut samples returned encouraging results in 2003. Initial 2004 field work returned significant platinum values from grab samples of ultramafic rock units located along strike of the PGE-bearing rocks on the Continental zone. Initial reconnaissance efforts traced the prospective magmatic units that are favorable for PGE mineralization over a composite strike length of approximately 3.5 miles. These units remain open along strike and at depth. Drilling results at the Continental zone indicate the favorable magmatic horizon can be traced chemically and physically. The favorable magmatic unit consists of mixed pyroxenite and wehrlite containing variable amounts of magnetite. Similar conclusions were drawn from surface sampling at Continental in 2003. A Phase 2 program followed the earlier drilling and included additional drilling on targets generated from the airborne magnetic surveys and ground follow-up.

Kennecott Minerals Co. continued exploration to expand ore zones at the Greens Creek Mine. Exploration drilling and drifting continues to evaluate targets to the west of the known ore bodies on the west side of the Gallagher fault. Underground drilling targeted the mineralization intersected west of the Gallagher fault in early 2004. Nine holes were drilled and all intersected significant mineralization. Two zones of mineralization were intersected in a number of the holes, with the longest continuous intercept of mineralization being more than 280 feet in length. Assay results for the holes are still pending, however the sections have coarse-grain galena, sphalerite, and, rarely, ruby silver, - as well as electrum and acanthite, which is usually an indication of promising metal grades. Drift access, which will establish a new exploration platform to test this significant new target area, is being developed and should be completed early next year. Additional surface exploration, including geochemical soil sampling and surface geophysics along new gridlines in two prospects, and continued detailed geologic mapping and sampling of all active prospects, was also completed.

Bravo Venture Group, in a joint-venture agreement with property owner Olympic Resources Group, continued

volcanogenic massive sulfide (VMS) lead–zinc–silver–copper mineralization exploration and drilling at the Mad Dog and Brushy Creek prospects on Woewodski Island. Exploration has drill tested only four of 13 VMS and gold prospects on the property. Higher grade intercepts of drill holes MD04-05 and MD04-07 at the Mad Dog prospect include 9.3 feet of 0.064 ounces of gold per ton, 3.27 ounces of silver per ton, and 10.6 percent zinc; and 5.9 feet of 5.16 ounces of silver per ton, 1.13 percent lead, and 7.97 percent zinc. Interlayered fine-grained tuffs, sulfides, and cherty argillites were intersected in both drill holes at the Brushy Creek prospect and the best drill intercept was 6.0 feet of 0.60 ounces of silver per ton, 0.16 percent lead, and 0.73 percent zinc from drill hole BR04-01. Thick intervals of high-grade zinc and silver mineralization identified at the Mad Dog prospect highlight the exploration potential of the VMS stratigraphy throughout the island. Multiple targets remain along strike from zones of known massive-sulfide mineralization at the Lost Lake, East Lake, and Brushy Creek prospects. New gold-bearing quartz vein occurrences were identified in the southwestern part of the island. The quartz veins are hosted in multiple widely spaced, east–north-east-trending sub-parallel structures, up to 30 feet wide, which can be traced in outcrop, float, and soil anomalies for up to 1,600 feet along a north–northeast trend. Two of the four gold occurrences now known were previously unrecognized and rock samples from outcrops contain up to 2.02 ounces of gold per ton.

Snow Lion Mining Co. brought a track excavator via helicopter onto their Nugget Hill property on Porcupine Creek near Haines. The partners excavated along an intersection of faults to expose gold mineralization within a breccia pipe. Samples were collected for geochemical testing.

## DEVELOPMENT

Reported and estimated 2004 mine development expenditures amounting to \$165.6 million increased significantly over 2003; the 2003 investment was \$39.3 million. The increase is primarily due to construction at the Teck Pogo project, which was fully permitted in mid-2004. Other significant investments are noted at Ft. Knox Mine, Greens Creek Mine, Kensington Project, Usibelli Coal Mine, and in the sand and gravel industry.

The highlight of this sector was the construct at the Pogo project by Teck-Cominco Inc. and Sumitomo Metal Mining Co. Teck Pogo's discharge permit was challenged by the Northern Alaska Environmental Center shortly after being received; this led to project construction stoppage while the appeal process was started. Public, State administrative, and legislative reaction to the appeal led to withdrawal with minor concessions by the company. Construction work was re-commissioned by mid-year. The 50-mile all-season access road was completed between the Richardson Highway and the project site. The transmis-

sion line and sub-station were nearly completed, with power to be provided by early 2005. The mill building was constructed and enclosed. Significant improvements were made to the infrastructure. Underground development efforts were started. Total construction costs are forecast to be \$285 million with completion expected in late 2005 or early 2006, at which time production will be commissioned. Teck Pogo has a reserve of 7.7 million mineable tons of ore with a grade of slightly less than 0.5 ounces per ton. Mining will be conducted by the "drift and fill" method; a large drift is driven in the ore, then filled with cemented tailings when the drift is no longer needed for access and production, ventilation, or other uses. The mill treatment rate will be 2,500 tons/day with about half of the tailings returned to the mine for backfill; the remaining tailings will be dry stacked on the surface. Milling will incorporate grinding, gravity concentration, flotation, cyanide leaching of the concentrate, and tailings dewatering. Annual gold production is forecast to be 400,000–500,000 ounces. Teck-Pogo is a subsidiary of Teck Cominco Ltd., which owns a 40 percent interest in the Pogo deposit. Co-owners are Sumitomo Metal Mining Co. Ltd. which owns a 51 percent interest and Sumitomo Corp., which holds 9 percent interest in the mine.

Fairbanks Gold Mining Co. Inc. undertook expenditures to ensure continued economic mining. Capitalized mining equipment and advanced stripping were undertaken in the Ft. Knox pit. Mining at True North was put on hold for a portion of the year to provide for stripping at Ft. Knox. True North was put on hold for an indefinite period at the end of the year.

Kennecott Minerals Co. undertook tailings storage expansion at Greens Creek Mine to accommodate ongoing production. In addition they invested in underground development to facilitate future mining efforts.

Coeur Alaska Inc. continued feasibility studies and project maintenance in anticipation of permit approvals. Although the U.S. Forest Service Record of Decision was received on December 17, the Southeast Alaska Conservation Council environmental group (SEACC) filed an appeal on the last day of the appeal period. This will have to run its course before project construction is started. The Kensington deposit contains 1.0 million ounces of gold contained in 7.4 million tons of ore with a grade of 0.16 ounces per ton. Coeur plans a production rate of 100,000 ounces per year at a cash operating cost of \$195 per ounce. The capital cost estimate is \$75 million. The milling process will involve treatment of approximately 2,000 tons of ore per day. The process will involve primary crushing, SAG mill grinding, gravity, and flotation concentration with about 40 percent of the tailings returned to the mine for backfill; the remaining tailings will be sent to the Lower Slate Lake tailings storage facility. Concentrates will be packaged and shipped off site for final gold recovery.

Usibelli Coal Mine Inc. invested in equipment and advanced stripping to facilitate efficient mining. Usibelli is mining at its new site on Two Bull Ridge.

The rock, sand, and gravel industry is credited with a development expenditure of \$3.84 million. This is believed to be a very conservative number due to shortfalls in reporting. Exclusive Landscaping and Paving Inc. acquired a Dredging Supply, Marlin, floating, cutter-head dredge during the year. The dredge will be used at its Fairbanks pit for sand and gravel production. The dredge is capable of producing 500–1,000 tons per hour. A two-man crew is used for operation.

NovaGold Resources Inc. continued the final feasibility study at its Rock Creek project using the services of the independent engineering firm Norwest Corp. The company is completing additional in-fill drilling and metallurgical test work as part of the final feasibility study. The budget of \$4 million is planned for the development work in 2005 with the objective of the program to advance Rock Creek to a stage of being fully permitted and ready to construct. A further \$1.75 million is anticipated to be expended, mainly on drilling at the Big Hurrah project, located 45 miles from Rock Creek.

## PRODUCTION

A preliminary estimate for the value of mineral production in Alaska during 2004 is \$1,180.3 million. Reporting shortfalls are noted in the placer and industrial minerals sectors; when final totals are determined, the numbers are expected to increase somewhat. Metals (gold, silver, lead and zinc) account for \$1,058.5 million, coal and peat for \$51 million, and industrial minerals for \$71 million. The estimate represents an increase in value of nearly 18 percent over 2003. Volumes of production are down in all metal sectors: Gold production is down by 13.9 percent, silver is down by 8.8 percent, lead is down by 7.2 percent, and zinc is down by 4.86 percent; industrial minerals shows a mixed report to this point – sand and gravel is down by 13.43 percent, but rock production is up by 198 percent. Table 4 shows the estimated mineral production for 2002 through 2004. Significant production sites are shown in figure 2.

Teck Cominco–NANA's Red Dog Mine near Kotzebue in northwestern Alaska dominated Alaska's mineral production value. Red Dog Mine, the largest zinc producer in the world, accounts for well over 50 percent of the annual value of Alaska's mineral industry for the year. The mill

Table 4. *Estimated mineral production in Alaska, 2002–2004<sup>a</sup>*

Metals	Quantity			Estimated Values <sup>b</sup>		
	2002	2003	2004	2002	2003	2004
Gold (ounces) <sup>c</sup>	562,094	528,191	454,680	174,283,000	191,934,000	185,641,389
Silver (ounces)	17,858,183	18,589,100	16,947,270	82,326,000	95,300,000	113,056,930
Copper (tons) <sup>d</sup>	1,600	0	0	2,272,000	0	0
Lead (tons)	146,462	162,479	150,796	61,514,000	64,279,000	120,636,822
Zinc (tons)	718,106	714,769	680,015	502,674,000	536,348,000	639,214,196
<b>Subtotal</b>				<b>\$823,069,000</b>	<b>\$887,861,000</b>	<b>\$1,058,549,338</b>
<b>Industrial Minerals</b>						
Jade and soapstone (tons) <sup>e</sup>	2.0	0.0	0.0	25,000	0	0
Sand and gravel (million tons)	22.4	11.9	9.9	120,698,000	64,140,000	44,757,783
Rock (million tons)	3.2	0.9	2.5	31,442,000	10,406,000	26,242,228
<b>Subtotal</b>				<b>\$152,165,000</b>	<b>\$74,546,000</b>	<b>\$71,242,228</b>
Coal (tons)	1,158,000	1,088,000	1,450,000	37,400,000	38,080,000	50,750,000
Peat (cubic yards)	35,000	35,000 <sup>f</sup>	35,000 <sup>f</sup>	175,000	175,000	175,000
<b>Subtotal</b>				<b>\$37,575,000</b>	<b>\$38,255,000</b>	<b>\$50,900,000</b>
<b>TOTAL</b>				<b>\$1,012,809,000</b>	<b>\$1,000,662,000</b>	<b>\$1,180,229,348</b>

<sup>a</sup>Production data from DGGs questionnaires, phone interviews with mine and quarry operators, DOT&PF, and municipalities, regional Native corporations, and federal land management agencies.

<sup>b</sup>Values for selected metal production were based on average prices for each year; for 2004, gold \$409.72, other values were provided by the operator, silver \$6.67/oz, lead \$0.40/lb, zinc \$0.47/lb, rounded to nearest \$1,000.

<sup>c</sup>Hardrock gold, 430,100 ounces; placer gold, 24,659 ounces.

<sup>d</sup>Greens Creek has historically been credited with a small amount of copper concentrate production; no credit was experienced for 2003 and 2004.

<sup>e</sup>Jade and soapstone credit has been dropped.

<sup>f</sup>Projected only; no reports from producers.



Figure 2. *Selected significant production sites in Alaska, 2004.*

processed 3,250,000 tons with an average grade of 22.0 percent zinc. Sulfide concentrates contained 610,900 tons of zinc, 128,970 tons of lead, and an estimated 7,222,270 ounces of silver. Red Dog reported an operating profit of \$207 million compared to \$42 million for 2003 (2003 numbers have been restated due to new accounting standards by Teck Cominco). The improved results are attributed to higher average zinc prices (\$0.47 vs \$0.38 per pound).

Greens Creek Mine, a Kennecott Minerals Co.–Hecla Mining Inc. joint venture in southeastern Alaska, is a polymetallic mine (silver, zinc, gold, lead, and copper) and one of the largest silver producers in the world. It produces a silver–gold dore and sulfide concentrates containing zinc, lead, and minor copper; copper is no longer reported. The mine achieved another record year, milling 805,789 tons of ore, a 3.14 percent increase over 2003. The average silver head grade was 19.70 ounces per ton. Metal production totaled 9,707,000 ounces of silver, 86,000 ounces of gold, 69,115 tons of zinc, and 21,826 tons of lead.

Fairbanks Gold Mining Co. Inc., operating the two current hard rock gold mines in the state, produced about 338,334 ounces of gold in 2004, or about 13.7 percent less than 2003. The shortfall was due primarily to lower gold ore grade. True North mining was suspended for a portion of the year to concentrate on stripping at Ft. Knox. Production from True North was put on hold indefinitely at the end of the year. FGMI mined 18,900,000 tons of ore, 1,300,000 tons from True North and 17,600,000 tons from Ft. Knox. Stripping volumes were 2,500,000 tons at True North and 24,000,000 tons at Ft. Knox. Mill throughput

amounted to 14,600,000 tons at a calculated grade of 0.0233 oz/ton gold. Average employment was 427 jobs.

Usibelli Coal Mine Inc. increased production for 2004 from its Two Bull Ridge pit with an output of 1,450,000 tons of coal, an increase over 2003 at 1,088,000 tons. Korean shipments continued, with 496,040 tons being sent to that destination via the Alaska Railroad to the Seward coal terminal and by ship from that point. Two test shipments totaling 104,720 tons of coal were shipped to Chile with sales through Glencore Ltd. The shipments went to a port 600 miles from Santiago and the coal was tested in two 120-megawatt plants. The mine also supplies six power plants in interior Alaska with approximately 800,000 tons per year. Mining was on Two Bull Ridge and included development effort as noted above. Usibelli employed 90 Alaskans in 2004.

Placer gold production reports are limited but reflect an increase in production, now at 24,659 ounces. Additional reporting is expected to increase this number by about 2,000 ounces. The 2003 reported production was 23,600 ounces.

Sand and gravel production numbers are down from last year, but reflect a serious shortfall in reporting, rather than an actual production deficit. Efforts are ongoing to elicit reports. Sand and gravel volumes for the year stand at 10,275,000 tons compared to 11,868,000 tons for 2003. Rock production was 2,563,000 tons for 2004 compared to 861,000 tons for 2003. Employment in both sectors was at 345 compared to 385 for 2003. The total value of production now stands at \$71,000,000.



## DRILLING

Tables 5 and 6 summarize the drilling activity in the state during 2004 by region and type of drilling. Drilling was conducted during all phases of mining (exploration, development, and production) on various projects across Alaska during 2004. Preliminary drilling totals for 2004 are 328,882 feet of core drilling, 24,624 feet of reverse-circulation drilling, and 2,500 feet of placer auger/churn drilling.

There was no drilling reported for coal operations. The drilling results are considered incomplete at this time.

Major drill programs were conducted by Northern Dynasty Minerals Ltd. at the Pebble property, by Kinross Gold Corp. (Fairbanks Gold Mining Inc.) in the Fairbanks mining district including Fort Knox and True North mines, by AngloGold USA Exploration Inc. at several properties near Livengood and Pogo, by Kennecott Minerals Co. at

Table 5. *Drilling footage by region in Alaska, 2004*

Type of drilling	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	TOTAL
<b>Placer subtotal</b>	—	<b>0</b>	<b>2,500</b>	—	—	—	<b>2,500</b>
<b>Coal subtotal</b>	—	—	—	—	—	—	<b>0</b>
Hardrock core	29,168	59,887	49,033	8,978	158,943	22,873	328,882
Hardrock rotary	0	6,332	14,017	4,275	0	0	24,624
<b>Hardrock subtotal</b>	<b>29,168</b>	<b>66,219</b>	<b>63,050</b>	<b>13,253</b>	<b>158,943</b>	<b>22,873</b>	<b>353,506</b>
<b>TOTAL (feet)</b>	<b>29,168</b>	<b>66,219</b>	<b>65,550</b>	<b>13,253</b>	<b>158,943</b>	<b>22,873</b>	<b>356,006</b>

— = Not reported.

Drilling footages do not include sand and gravel drilling.

Table 6. *Drilling footage reported in Alaska, 1982–2004*

Year	Placer Exploration	Placer Thawing	TOTAL PLACER	TOTAL COAL	TOTAL HARDROCK	Hardrock Core <sup>a</sup>	Hardrock Rotary <sup>a</sup>	TOTAL FEET
1982	30,000	94,000	124,000	80,000	200,000	--	--	404,000
1983	23,000	30,000	53,000	12,000	180,500	--	--	245,500
1984	31,000	98,000	129,000	25,700	176,000	--	--	330,700
1985	46,000	34,000	80,000	8,700	131,700	--	--	220,400
1986	32,400	227,000	259,400	28,800	50,200	--	--	338,400
1987	50,250	130,000	180,250	19,900	115,100	95,600	19,500	315,250
1988	152,000	300,000	452,000	26,150	353,860	223,630	130,230	832,010
1989	97,250	210,000	307,250	38,670	332,230	242,440	89,790	678,150
1990	78,930	105,000	183,930	18,195	760,955	648,600	112,355	963,080
1991	51,247	130,000	181,247	16,894	316,655	205,805	110,850	514,796
1992	6,740	65,000	71,740	12,875	359,834	211,812	148,022	444,449
1993	25,216	--	25,216	--	252,315	124,325	127,990	277,531
1994	21,000	--	21,000	8,168	438,710	347,018	91,692	467,878
1995	27,570	--	27,570	--	415,485	363,690	51,795	443,055
1996	61,780	--	61,780	8,500	658,857	524,330	134,527	729,137
1997	38,980	--	38,980	13,998	704,510	523,676	180,834	757,488
1998	33,250	--	33,250	2,300	549,618	505,408	45,670	585,168
1999	6,727	--	6,727	--	448,797	369,863	78,934	455,524
2000	15,480	--	15,480	--	546,268	418,630	127,638	561,748
2001	1,100	--	1,100	36,151	316,068	240,318	75,750	353,319
2002	1,250	--	1,250	--	488,902	385,290	103,612	490,152
2003	10,108	--	10,108	2,000	370,634	270,456	100,178	382,742
<b>2004</b>	<b>2,500</b>	<b>--</b>	<b>2,500</b>	<b>--</b>	<b>353,506</b>	<b>328,882</b>	<b>24,642</b>	<b>356,006</b>

<sup>a</sup>Core and rotary drilling not differentiated prior to 1987.

-- = Not reported.

Note: 2.6M feet of blasthole drilling reported for 2003 (incomplete).

Greens Creek Mine, by Meridian Gold Inc./Freegold Ventures Ltd. on the Golden Summit property, by NovaGold Resources Inc. at the Rock Creek, Big Hurrah, and Arctic properties, by Teck Cominco Alaska Inc. in the Red Dog area, by Kennecott Exploration Co. at the Whistler property, by Freegold Ventures Ltd./Pacific North West Capital Corp./Lonmin PLC at the Union Bay property, and by St. Andrew Goldfields Ltd./Mystery Creek Resources Inc. at the Nixon Fork property.

## GOVERNMENT ACTIONS

The Alaska Division of Geological & Geophysical Surveys (DGGS) conducted geologic mapping and geochemical sampling around the Big Hurrah area and in the Council area as part of an integrated program following up the airborne geophysical survey results previously released by DGGS in 2003. DGGS also contracted for and worked on a 210-square-mile airborne magnetic and electromagnetic geophysical survey in the southern Goodpaster region of the Big Delta Quadrangle. The data from this survey will be released in early 2005.

DGGS released new trace-element geochemical data and whole-rock geochemical data for surface rock samples collected over 130 square miles of the central Livengood Quadrangle in 2001 and 2003. One highly anomalous sample from a known prospect yielded slightly more than 1 ounce per ton gold. DGGS also released new 1:50,000-scale geologic maps of the Livengood area as part of an integrated program following up the airborne geophysical survey results previously released by DGGS in 1999.

DGGS also released a new bedrock geologic map of the Salcha River–Pogo area, located in the central Big Delta Quadrangle of Alaska. The 1:63,360-scale bedrock geologic map, which covers approximately 435 square miles within parts of the Fairbanks and Goodpaster mining districts, provides ground-truth geologic mapping of the southern portion of the Salcha River–Pogo airborne geophysical survey (helicopter-based aeromagnetic, radiometric, and electromagnetic data) released by DGGS in 2000 as part of the State-funded Alaska Airborne Geophysical/Geological Mineral Inventory Program. The bedrock geologic map contains information derived from fieldwork conducted during the summers of 2000–2002 by mineral-resource personnel from DGGS and the University of Alaska Fairbanks.

Jerry Birch and Kevin Greenfield of Taiga Mining Co. Inc. were awarded the 2004 annual state reclamation award by the Alaska Department of Natural Resources (DNR) in recognition of Taiga's excellent reclamation work on Bear Creek and its tributaries Ida and Dry creeks. The U.S. Bureau of Land Management (BLM) recommended Taiga Mining based on Taiga's mining and reclamation plans that have created stream valleys with adequate floodplain widths and channel locations such that streams were re-established with uniform slopes and appropriate widths

and depths. These efforts have reduced the stream head-cutting, lateral migration and subsequent sedimentation typical of new channels. The establishment of riparian vegetation within the active floodplain of Ida Creek is indicative of this channel's stability. Taiga Mining Co. Inc. has been mining in the Bear Creek Watershed for more than the last decade. To date, approximately 200 acres have been mined and reclaimed. Bear Creek is located within BLM's Hogatza River Area of Critical Environmental Concern, a special management area created for its exceptional summer-run chum salmon spawning habitat.

DNR released "LAS Mapper," an Internet mapping service. This mapping tool allows access to the Land Administration System (LAS) spatial and tabular data via an interactive map-based interface. DNR adjudicators have maintained a case file-based system within the Land Administration System for nearly 20 years. The LAS Mapper uses the latest Internet mapping technology, allowing a person to view directly the database of permits, leases, land sales, and other land status information used to create Land Status Plats.

DNR continued working as a cooperating agency with the U.S. Forest Service and U.S. Environmental Protection Agency on the necessary permits for the expansion of the Greens Creek tailings facility in southeastern Alaska. This successful expansion required the approval of a revised solid waste permit from DEC as well as additional revisions to the financial assurances. Work is also in progress to update permits for the Red Dog zinc mine. DNR worked with the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers on permitting issues for Coeur Alaska Inc.'s Kensington Project, including preparing draft decisions on several state leases and permits related to the project.

The U.S. Geological Survey (USGS), in cooperation with other agencies, continued a 5-year project titled "Tintina metallogenic province integrated studies on geological framework, mineral resources, and environmental signatures." Fieldwork began with studies of the Black Mountain–Tibbs Creek area of the Big Delta B-1 Quadrangle, including geologic mapping, and baseline geochemistry and biogeochemistry studies. The USGS continued compiling non-rock and lithochemical data scheduled for release in late 2003.

The USGS, DGGS, and BLM continued a number of cooperative projects under the Minerals Data and Information Rescue in Alaska (MDIRA) program. DGGS continued work on the Alaska Resource Database Files (ARDF) project. Other DGGS-managed, MDIRA-funded projects include compilation of Alaskan bedrock and surficial geology map index project, compilation of DGGS lithochemical data, and building a comprehensive database system at DGGS. Other MDIRA-funded projects are in progress at other divisions of DNR, the University of

Alaska Fairbanks, and with private contractors.

Another significant Minerals Data and Information Rescue in Alaska (MDIRA) milestone was achieved with virtually all U.S. Geological Survey Bulletins and Professional Papers for Alaska now viewable and retrievable online through the DGGS web site. The collection includes about 700 text reports, consisting of approximately 55,000 pages of text, photographs, data tables, and small (page-sized or up to 11 x 17 inch) illustrations. DGGS has begun a similar project that will include Alaska-related USGS Open-File Reports, Miscellaneous Field Studies, Geologic Quadrangle Maps, Miscellaneous Investigations/Geologic Investigations, Mineral Investigations Resources Maps, and various other short-series USGS publications.

The Bureau of Land Management conducted the last year of an extensive field program in the Delta River mining district of eastern and southcentral Alaska. Lode, placer, industrial, and coal sites were visited, geochemical samples were collected, and the analytical results were published. Results from this work are expected to be published in 2005. Fieldwork on the Aniak mining district study consisted of a five-week field season, focusing on property examinations and sample collection in the central one-third of the district. BLM geologists succeeded in visiting 86 mineral occurrences in the central part of the study area and collected 287 samples. Work began around the historic mining town of Flat, proceeded south through Granite Creek and Julian Creek areas, then to the vicinity of Donlin Creek. The district evaluation then concentrated on the Red Devil Area mercury deposits. The gold and mercury occurrences in west-central Sleetmute Quadrangle (Kolmakof, Mountain Top, Gold Run, and Murray Gulch) were then evaluated. A small crew was able to visit the Forty-Seven Creek and the Taylor Mountain area, extending this summer's fieldwork to the southern district boundary. Summaries of the field work and analytical results were published in early 2005.

In July 2004 the Governor's Office formed several subcabinets to allow commissioners to deal with issues or to push for process improvements. A Natural Resources Development Policy subcabinet, comprising DNR (as lead), Department of Environmental Conservation (DEC), Department of Transportation & Public Facilities (DOT), Department of Law (DOL), Department of Fish & Game (ADF&G), Department of Commerce, Community, & Economic Development (Commerce), Department of Labor (Labor), and the Governor's D.C. Office has been formed to promote resource development.

Alaska House Bill 556, by the House State Affairs committee, gave the Alaska Industrial Development and Export Authority (AIDEA) authorization to issue up to \$20 million in debt for facilities to support the development of the Kensington mine near Juneau. The tax-exempt bonds will help reduce construction costs of a port development

project at Slate Creek Cove and Cascade Point on Lynn Canal.

Alaska Senate Bill 295 extended the termination date of the Navigable Waters Commission for Alaska until September 18, 2006. The commission is charged with expediting the process of settling title to the state's submerged lands. However, it is composed of state and federal members, and requires authorization by both the State and U.S. Congress. Alaska Senate Bill 305 asserted the state's title to submerged lands in three ways: it gives general notice that the State of Alaska claims title to navigable waters in Alaska; it provides authority for the state to identify, in accordance with applicable federal and state laws, which waterbodies are navigable and which are not; and it requires the commissioner of natural resources to notify Native corporations that they can obtain non-submerged acreage for submerged lands they may have received under the Alaska Native Claims Settlement Act.

The State of Alaska filed 13 applications covering 31 waterbodies for Recordable Disclaimers of Interest with the U.S. Bureau of Land Management. To date, BLM has issued a disclaimer for portions of the Black River and four of its tributaries, the Klutina River, Klutina Lake, Kvichak Lake, and Lake Iliamna. These are the first three disclaimers in the United States to be issued. A Disclaimer of Interest is a document issued by the federal government that confirms there is no federal ownership of certain lands. In this case, the federal government agrees there is no interest in the beds of these navigable rivers and lakes.

The state reviewed and accepted TransCanada Corp.'s application in June 2004 under the Stranded Gas Development Act, making it the third such application being negotiated with companies interested in building a pipeline to move Alaska's North Slope gas to market. Calgary-based pipeline operator TransCanada and its wholly owned subsidiary, Alaskan Northwest Natural Gas Transportation Co., propose negotiating a contract covering a 48-inch steel pipeline from the North Slope to the Alaska-Yukon Territory border, where 4.5 billion cubic feet per day of gas would feed into the Canadian portion of the project for distribution across North America. In addition to TransCanada, the state is actively negotiating with two other sponsor groups, including the three major North Slope producers (BP, ConocoPhillips, and Exxon Mobil), and Enbridge, another Canadian pipeline company.

Governor Frank H. Murkowski was appointed chairman of the National Governors' Association Committee on Natural Resources. The Committee on Natural Resources is one of the organization's four standing committees and has jurisdiction over agriculture, energy, the environment, and natural resource issues. Key issues the committee will focus on include the Clean Air Act, clean and safe drinking water, ocean policy, electric industry restructuring, energy issues, and the Endangered Species Act.

Governor Murkowski signed a Memorandum of Understanding (MOU) in September with high-ranking representatives of Taiwan's government to jump-start development of Alaska's vast Cook Inlet coal deposits. Taiwan's state energy utility, Taipower, could use up to 4 million tons per year of processed coal, while other coal users like China Steel and private companies like Formosa Plastics could have significant additional requirements for Alaska coal, according to information from the Taiwan delegation. The construction of a mine, dock, and processing plant required west of Anchorage would be an estimated \$1 billion construction project, generating more than 600 construction jobs and 250 permanent jobs. The governor, along with the Alaska Support Industry Alliance, also signed a second MOU with Taiwan that establishes a Taiwan-Alaska Trade and Investment Cooperation Council. The Council will focus on the areas of energy, fisheries, tourism, and agriculture. Each side will have two representatives—one from the private sector and another from the government—to serve as the council's co-chairs. The 14-member delegation was headed by Ning-Hsiang Kang, Senior Advisor to the President of Taiwan, and visited Alaska for five days.

The State of Alaska received a proposal in December from BP, ConocoPhillips, and Exxon to construct a gas pipeline from the North Slope to southern markets. On October 29, the state presented its comprehensive proposal for the gas pipeline project to the three major oil producers. The producers came back with a comprehensive, joint response to the state's proposal on Wednesday, December 15. Earlier this year, Governor Murkowski had announced his support for the concept of the state taking an equity ownership share of the gas pipeline and sharing in the shippers' risk in the project. The state's current Stranded Gas negotiations involve those key elements. Equity ownership could mean billions of dollars more to the state.

The Alaska Coastal Management Program was moved to DNR in 2004 to streamline its procedures and make them more objective and accountable. The program, as revised by state regulations, has been submitted to the U.S. National Oceanographic and Atmospheric Administration (NOAA), the Office of Oceans and Coastal Resource Management, for program approval on or before June 30, 2005.

DNR revised financial assurance requirements for large mine operators, to allow sinking trust funds to be established and to require total financial assurance in the amount needed to reclaim a large lode mine site, rather than the previous \$750 per acre rule (this amount still holds for placer mines).

More than 6.4 million acres (in excess of 10,000 square miles) of Alaska burned during 2004. Wildfires threatened communities and mining operations across the state and particularly in the Eastern Interior region. The National Guard was mobilized to assist federal and state firefighters.

No serious accidents resulted from the fires, but several mining projects were partially to completely burned. All fire policies are currently under review.

The State of Alaska is working to finalize land transfers from the federal government to Alaska Native allottees, Alaska Native corporations, the State of Alaska, municipalities, the Alaska Mental Health Land Trust, and the University of Alaska. Federal legislation, Senate Bill 1466, proposes changes for streamlining steps in the land transfer process, that have proven over time to be problematic or inefficient. The state's BLM Conveyance Project is working to accelerate the remaining land transfers, in order of priority of entitlement, to individual Alaska Native allottees, Alaska Native corporations, and then to the State of Alaska by 2009, the 50th anniversary of Alaska statehood.

## 2005 OUTLOOK

The 2005 outlook is positive for Alaska's mining industry. Increased metal prices will continue to improve the bottom line for Alaska's metal producers and increase funds available for exploration. Exploration and development expenditures are expected to increase fairly significantly. Although no significant increase in production volumes are expected, the value of production should improve with continued metal price increases.

Exploration is expected to continue at levels similar to those in 2004. Alaska has world-class mineral deposits and Alaska's major mines are showcase examples of modern mining.

Construction for the Pogo project by Teck Cominco Ltd., should be completed by the end of the year with production expected to begin at that time or early in 2006. Coeur Alaska should receive permits to begin construction at the Kensington project at Berner's Bay north of Juneau. It is not certain at this time whether construction will be started in 2005; the permit appeal process will have to be resolved. Ongoing feasibility studies by NovaGold Resources should lead to a development decision at Rock Creek. Fairbanks Gold will continue stripping of Ft. Knox to provide for mining higher grade ores.

The outlook for increasing production amounts is not significantly improved for 2005. However continued improvements in metal prices, as a result of China's high consumption, should result in continued improvements in the value of production. Precious metal prices are expected to continue a moderate improvement.





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