

ALASKA

LEGEND

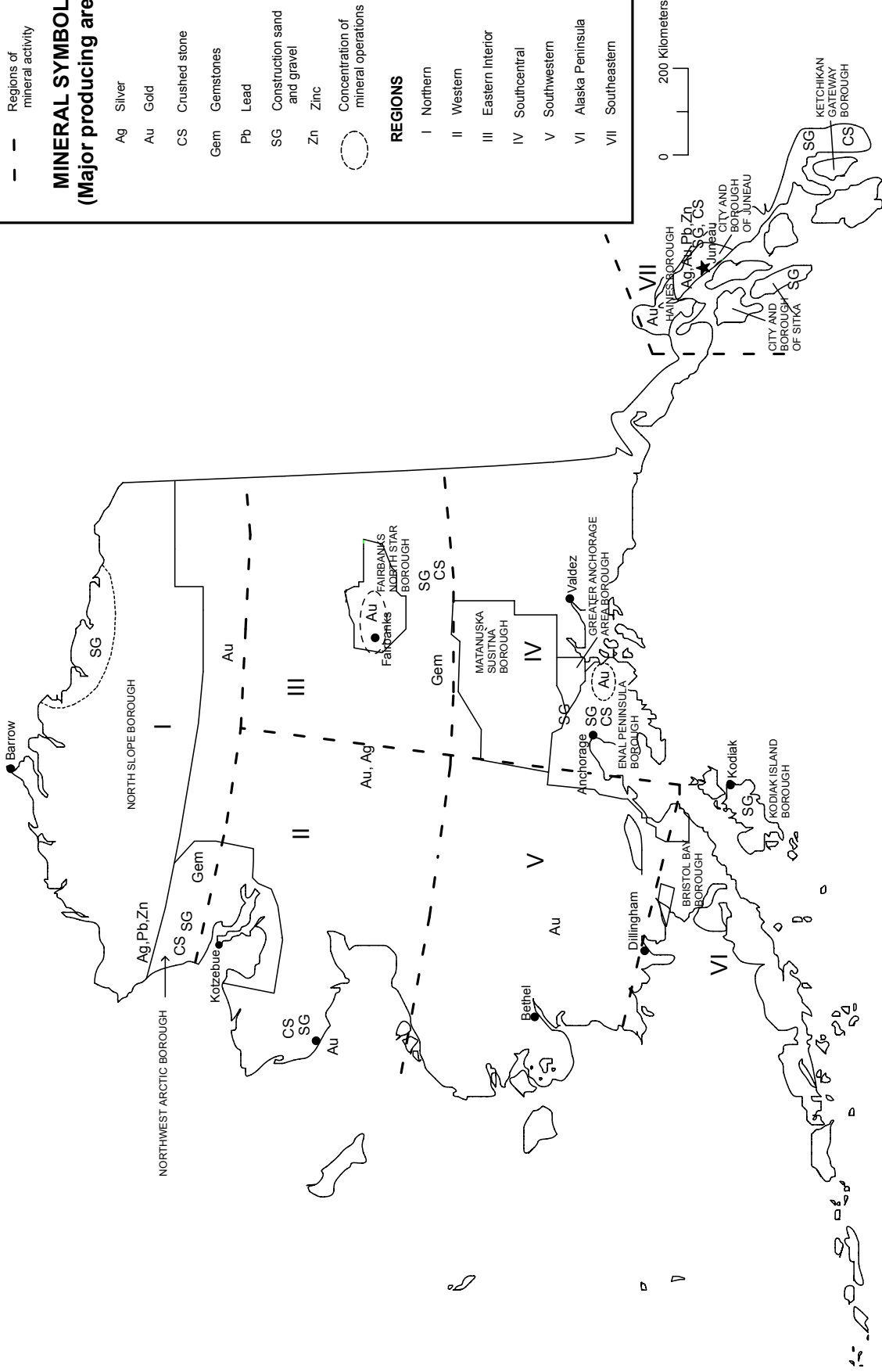
- Borough boundary
- ★ Capital
- City
- - Regions of mineral activity

**MINERAL SYMBOLS
(Major producing areas)**

- Ag Silver
- Au Gold
- CS Crushed stone
- Gem Gemstones
- Pb Lead
- SG Construction sand and gravel
- Zn Zinc
- Concentration of mineral operations

REGIONS

- I Northern
- II Western
- III Eastern Interior
- IV Southcentral
- V Southwestern
- VI Alaska Peninsula
- VII Southeastern



THE MINERAL INDUSTRY OF ALASKA

In 2003, the estimated value¹ of nonfuel mineral production for Alaska was about \$1.06 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was a 1% increase from that of 2002² and followed a 6.8 % increase from 2001 to 2002. The State continued to rank 12th among the 50 States in total nonfuel mineral production value and accounted for nearly 3% of the U.S. total.

During 2003, metallic minerals accounted for nearly 91% of the total value of Alaska's nonfuel mineral production. A large majority of the value was the result of zinc, lead, and silver production (descending order of value) from (1) Teck Cominco Alaska Inc.'s Red Dog Mine near Kotzebue in northwestern Alaska and the Greens Creek Mine (a joint venture of Kennecott Mineral Co. and Hecla Mining Co. in southeastern Alaska southwest of Juneau) and (2) gold production from the Kinross Gold Corp.'s Fort Knox Mine near Fairbanks in east-central Alaska and from the Greens Creek Mine. Although the production levels of gold and silver were down somewhat from 2002, increases in the production and values of lead (up \$13 million) and zinc, and increases in the values of silver and gold contributed to the State's increase in total nonfuel mineral value for 2003 (table 1).

In 2002, nearly all nonfuel minerals showed increases in value except for that of zinc; although production of this base metal significantly increased, the value dropped by about \$9 million because of low prices. The value of construction sand and gravel was up nearly \$28 million owing to increases in production. The value of gold increased by \$24 million, and lead, by \$15 million; silver also showed a significant increase in value. The value of crushed stone declined slightly owing to decreased production (table 1).

Based upon USGS estimates of the quantities produced in the 50 States during 2003, Alaska continued to rank first in the production of zinc and silver and second in lead; it also ranked second in the quantity of gold produced among 10 gold-producing States.³ Production of peat in Alaska was not

reported to the USGS partly because of reporting difficulties associated with the seasonal, intermittent nature of peat mining in the State. The Alaska Department of Natural Resources (ADNR), Division of Geological and Geophysical Surveys (DGGs), estimated peat production to be about 22,900 cubic meters for an estimated value of about \$175,000. Additionally, the DGGs reported production of jade and soapstone combined to be about 1.8 metric tons (t) for an estimated value of \$25,000 (Szumigala and Harris, 2004).

The DGGs provided the following narrative information;⁴ the data therein are those of the DGGs, based upon that agency's surveys and estimates.

Exploration, Development, and Drilling Activities

Estimated exploration expenditures during 2003 were about \$27.6 million, which was a \$1.1 million increase compared with expenditures of \$26.5 million in 2002; this was the second year in a row that exploration funding increased (Szumigala and Harris, 2004). The investment in mineral exploration was still low compared to spending levels of the late 1980s through the late 1990s. Exploration during 2003 took place across most regions of the State with the exception of the Alaska Peninsula region (see map), in which there was no known mineral exploration. Several large projects accounted for most of the exploration expenditures and drill footage. They were the Donlin Creek gold project (which was operated by Placer Dome Inc.), Fairbanks mining district gold projects (Kinross Gold Corp.), Greens Creek Mine exploration (a 70-30 joint-venture operation of Kennecott Minerals Co. and Hecla Mining Co.), Nixon Fork gold-copper mine project (St. Andrew Goldfields Ltd.), Pebble copper-gold project (Northern Dynasty Minerals Ltd.), Tintina Gold belt projects (Anglo Alaska Gold Corp.), and Union Bay platinum-nickel-copper project (Lonmin PLC/Pacific North West Capital Corp./Freegold Ventures Ltd.). About 41% of the 2003 Alaska exploration expenditures were spent in the

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2003 USGS mineral production data published in this chapter are preliminary estimates as of July 2004 and are expected to change. Construction sand and gravel and crushed stone estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Values, percentage calculations, and rankings for 2002 may differ from the Minerals Yearbook, Area Reports: Domestic 2002, Volume II, owing to the revision of preliminary 2002 to final 2002 data. Data for 2003 are preliminary and are expected to change; related rankings also may change.

³Gold figures in table 1, as reported to the USGS, may differ with estimates made by the Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGs). The canvassing of gold placer mineral production was discontinued by the U.S. Bureau of Mines (the Federal agency responsible for U.S. nonfuel mineral production data collection from 1924-95) in 1994. Gold production and value data in table 1 contain data that will be further estimated by the USGS in cooperation with the DGGs. Current estimates based on data collected by the DGGs indicate the production quantity in 2001, 17,100 kg valued at \$149 million; in 2002, 17,500 kg valued at \$174 million; and in 2003, 16,400 kg (hardrock gold 15,700 kg, placer gold 700 kg) valued at \$192 million (Swainbank and Harris, 2004). The USGS final 2001-03 total gold production and value data for Alaska, done in collaboration with the DGGs, will be published in the Gold chapter in Volume I of the 2003 USGS Minerals Yearbook.

⁴Richard H. Harris and Richard A. Hughes, both of the Alaska Department of Commerce's Office of Economic Development, and David J. Szumigala, Senior Mineral Geologist with the Alaska Department of Natural Resources' Division of Geological and Geophysical Surveys, authored the text of State mineral industry information provided by that State agency. As of November 2004, Mr. Hughes had replaced Mr. Harris.

southwestern region, and about 26%, in the eastern interior region of the State. Exploration activity increased in the eastern interior region, while exploration in the Seward Peninsula (western region) dropped from 2002 levels. Gold remained the major exploration target, with more than \$19 million spent on precious-metal exploration in 2003; polymetallic and platinum-group-element exploration, however, also increased from recent levels. Platinum-group-element exploration increased to almost four times the 2002 level. Base-metal exploration in 2003 was at a historic low, reflecting continued low zinc and lead prices during much of the year. Higher metal prices during the latter part of 2003 significantly extended Alaska's field season; as a result, several large projects were begun during the normally waning part of the exploration season. Large staking programs near Lake Iliamna continued through the winter and into 2004. As in years past, most exploration funds (more than 68%) were derived from Canadian sources. About 9% of the exploration funds were from non-U.S. and non-Canadian sources.

About 2,440 new State mining claims [120,000 hectares (ha)], 92 new State prospecting sites (5,960 ha), and 676 new Federal claims (595 lode and 81 placer for a total of 5,470 ha) were staked in 2003. State claim staking increased dramatically from 2002 levels, while the number of new Federal mining claims almost tripled from 2002 levels and reached staking levels not seen since 1997. The amount of land in Alaska under claim increased from 2002 to 2003, with approximately 1.2 million ha of land covered by claims or prospecting sites in 2003. This was an increase of 11% from 2002 levels, but still 22% less than the 1.5 million ha under mining claim in 1999. Alaska had 8,424 active Federal claims in early 2004.

The largest groups of claims (mostly State claims) in Alaska were in the Fairbanks, Pogo, Pebble, and Tangle Lakes (Denali Block) areas. Mining claims in the Fairbanks area covered 54,000 ha. Placer claims accounted for 25% of the total claim area in the Fairbanks area. Claims in the Pogo area covered more than 131,000 ha. Mining claims in the Tangle Lakes area near the Fish Lake ultramafic complex covered more than 88,600 ha. On-Line Exploration Services Inc., which was acting as an agent for Northern Dynasty, staked 111 65-ha (160-acre) State mining claims that covered 7,380 ha near the Pebble property. In December, Avalon Inc., which was acting as an agent for Big Chunk Corp., staked 981 65-ha State mining claims that covered 61,400 ha in December northwest of the Pebble copper-gold porphyry property. This latter claim may be the largest single-claim block staked at one time in Alaska history. The Big Chunk property was acquired by Liberty Star Gold Corp. in 2004. Claims in the Pebble area encompassed more than 146,000 ha.

Increased claim staking activity pointed to increased mineral investment in Alaska. The increase in claim staking suggested that exploration activity would increase in Alaska during 2004 as companies evaluated their land holdings with field investigations.

Reported and estimated 2003 mine development expenditures totaled \$39.2 million, which was a slight increase of \$5.7 million from that reported for 2002. Significant development activity was reported at the Fairbanks district placers, Fort Knox, Kensington, Nolan Creek, Nome placers, Pogo, and Rock

Creek projects. Moderate expenditures were reported at several other lode and placer properties in the State. No development activity was reported for Red Dog or Greens Creek Mines.

Significant blasthole drilling took place at Alaska's lode mines, specifically, the Fort Knox Mine complex (Fort Knox and True North Mines), Red Dog Mine, and Greens Creek Mine. The eastern interior region accounted for the most drilling of all Alaska regions, with 37% of the total for 2003. The southeastern region accounted for 28% of the drilling, followed by the southwestern region with 21%. Major drilling programs were conducted by AngloGold Inc. at several properties in the eastern interior region: Bravo Venture Group Inc./Olympic Resources Group LLC on Woewodski Island; Freegold Ventures Ltd./Lonmin PLC/Pacific North West Capital Corp. at the Union Bay property; Geocom Resources Inc. at the Iliamna property; Kennecott Minerals Co. at the Greens Creek Mine; Kinross Gold Corp. in the Fairbanks mining district, which included the Fort Knox and True North Mines; Northern Dynasty Minerals Ltd. at the Pebble property; NovaGold Resources Inc. at the Rock Creek deposit; Western Warrior Resources Inc. at the Cliff Mine; and Ventures Resource Alaska Corp./WGM Inc. at the Flat property. The largest reported placer drilling operations in Alaska during 2003 were conducted by Tri-Valley Corp. at First Chance Creek in the Richardson property and Earth Movers of Fairbanks Inc. in the Fairbanks area.

Drilling was conducted during all phases of mining (exploration, development, and production) on various projects across Alaska during 2003. Drilling totals for 2003 were 82,400 meters (m) of hard-rock core drilling (sometimes referred to as hard-rock diamond drilling), approximately 70% of the 117,000 m reported drilled in 2002, and 30,500 m of reverse-circulation drilling, approximately 3% of the 31,600 m reported drilled in 2002. Hard-rock core drilling for 2003 was approximately 40% less than the average core drilling reported in Alaska from 1996 to 2002. Reverse-circulation drilling for 2003 was 6% less than the average reverse-circulation drilling from 1996 to 2002. Drilling at placer mines was largely unreported for 2003, with 3,080 m reported to date. The only coal drilling in Alaska took place at Usibelli Coal Mine.

Commodity Review

The production estimates included in this report (Szumigala and Harris, 2004) were from 103 questionnaires returned by miners, Alaskan Native corporations, agencies, and municipalities, which were supplemented by well more than 100 telephone surveys and nearly the same number of e-mail messages sent to probable producers. Additional information was derived from annual placer mining applications submitted to the Division of Mining, Land, and Water. Because of an inability to contact a substantial number of placer miners and a lack of response from a large number of sand, gravel, rock, and peat producers, production data in the text that follows has, in part, been estimated and likely is somewhat conservative for these mineral commodities.

Mining employment decreased to 1,906 people in 2003, a decline of 33% in just 1 year. The largest employment

decreases were in gold lode mining, which decreased from 413 to 325; base-metal mining, from 580 to 388; and sand and gravel mining, from 702 to 349.

Industrial Minerals

Crushed Rock and Sand and Gravel.—Production of sand and gravel in 2003 was about 10.8 million metric tons (Mt), which was a sharp decline from the 18.4 Mt produced in 2002. Rock production in 2003 was 781,000 t, which also reflected a marked reduction from the 2.9 Mt produced in 2002 (Szumigala, Hughes, and Harris, 2004⁵).

In the southcentral region, sand, gravel, and rock (aggregate) production was about one-half that of 2002 from about one-half as many reporting operations as in 2002; nevertheless, the region was the leading producing region in 2003. About 3.8 Mt was produced from 16 reporting operations. In the eastern interior region, the State's second highest aggregate-producing region with about 3.2 Mt of production, Alaska Department of Transportation and Public Facilities (DOT&PF) projects requiring large amounts of sand and gravel included the Badger Road interchange on the Richardson Highway and a new access route to Tanana Loop on the University of Alaska Fairbanks campus that was named Thompson Drive. About 1.7 Mt of sand and gravel produced in the northern region went for oilfield-related use on the North Slope; slightly more than one-half of that quantity of rock also was produced in this region. Only about 1.3 Mt of sand and gravel production took place in the next highest producing region, the southwestern region. In the southeastern region, slightly more than 1 Mt of rock, sand, and gravel was produced. More than 600,000 t of aggregate were produced in the western region. In the Alaska Peninsula region, a small amount of sand and gravel was produced from Bristol Bay Borough lands.

Metals

Gold.—Gold production was reported from Illinois Creek, Fort Knox, Greens Creek, and more than 60 placer mines. Silver was produced at Red Dog and Greens Creek Mines, which were also the primary producers of zinc and lead concentrates.

Hard-rock (lode) gold production decreased from 16,800 kilograms (kg) in 2002 to 15,700 kg in 2003. Placer production increased slightly from 696 kg in 2002 to 734 kg in 2003. The slight decrease in hard-rock production principally reflected a lower output from Fort Knox. Production was expected to increase in 2004 or in the immediate years thereafter with new production from the Pogo, possibly Kensington, and Rock Creek Mines.

Placer gold production was reported from six placer mines in the northern region, most of which were in the Koyukuk drainage around Wiseman. The Nolan Mine of Silverado Green Fuels Inc., which was the largest mine in the area, sluiced during its development exercise in 2003; 14 kg of gold was recovered from this effort. During the summer, Silverado processed approximately 14,900 loose cubic meters of gravel from

underground work and an additional 15,200 loose cubic meters of gravel mined from surface locations; namely, Mary's Bench, upper Nolan Creek, and Wooll Bench.

American Reclamation Group LLC in the western region continued leaching for gold at the Illinois Creek Mine; however, the Mine was reported to be in active reclamation status at the time of reporting. Employment fell from 53 during 2002 to an average of 9 during 2003.

The eastern interior region continued to host the largest number of placer mines in the State. About 39 mines reported placer gold production. Total employment for the placer mines in the region was estimated to be 26 full-time jobs. In the southcentral region, six small operations reported placer gold production from the region for 2003. Similarly, in the southwestern region, six operations reported placer gold production.

In the eastern interior region, Fairbanks Gold Mining Inc. (FGMI) (a wholly owned subsidiary of Kinross Gold Corp.) operated the Fort Knox Mine and the satellite True North Mine, which was about 40 kilometers (km) north of Fairbanks. FGMI recovered 12,200 kg of gold during 2003, which was down nearly 600 kg from that of 2002. The shortfall was due primarily to lower gold recovery caused by slightly refractory sulfidic material from deeper, less oxidized zones at True North. Mill throughput was 13.7 Mt in 2003, with an average head grade of gold of 1.1 per metric ton (g/t). Total mined tonnage for 2003 amounted to 39.3 Mt. Employment averaged 316 persons during the year.

Zinc, Lead, and Silver.—The Red Dog Mine is the world's leading producer of zinc concentrate (Teck Cominco Ltd, 2004⁵). It is 100% owned and operated by Teck Cominco Ltd. under a development agreement with NANA Regional Corporation, Inc., an Alaskan Native corporation; the mine is in the DeLong Mountains of Alaska's Brooks Range. The remote site is approximately 144 km north of Kotzebue and 88 km from the Chukchi Sea.

In 1982, Cominco American signed an agreement with NANA, regarding development of the deposit. Initial mine development began in 1986, and by November 1989, construction was complete. Operations and production began in December 1989. Facilities were expanded in 1998 and again in 2001.

The increase in the London Metal Exchange cash average price of zinc from \$0.353 per pound in 2002 to \$0.376 per pound in 2003 had a positive influence on the profitability of the Red Dog and Greens Creek Mines (Plachy, 2004). All precious-metal producers benefited from the increase in gold and silver prices, which rose from an average of \$311 per troy ounce and \$4.62 per troy ounce, respectively, in 2002, to \$350 per troy ounce and \$4.91 per troy ounce, respectively, in 2003 (Amey, 2004; Hilliard, 2004).

Teck Cominco Ltd.-NANA Regional Corp.'s Red Dog Mine near Kotzebue in northwestern Alaska milled 3.15 Mt of ore in 2003, which was a decrease of 11,700 t compared with 2002. Owing to a slightly higher grade of feed, however, metal production was higher in 2003 than in 2002, and recoveries were equal to or better than in 2002. The mine produced

⁵References that include a section mark (§) are found in the Internet References Cited section.

125,000 t of lead, 240,000 kg of silver, and 579,000 t of zinc, with an ore grade of 21.7% zinc, 6.2% lead, and 106 g/t silver. The higher grade of ore and the average increased price of zinc in 2003 provided Teck Cominco with a \$50 million operating profit for 2003. Employment was reduced from 560 in 2002 to 388 in 2003 in an effort to reduce costs and improve efficiency. More than 56% of the employees at the mine were NANA shareholders.

In the southeastern region near Juneau, the Greens Creek Mine reported a recordbreaking mill throughput of 709,000 t. This was 43,300 t more than the 2002 production level, which was also a record in the history of production from the mine. The head grade of the ore was 12.3% zinc, 4.6% lead, 675 g/t silver, and 7 g/t gold. The concentrates contained 69,100 t of zinc, 22,500 t of lead, 364,000 kg of silver, and 3,080 kg of gold. Employment averaged 259 full-time jobs compared with 262 for 2002.

Kennecott Minerals and Hecla Mining proposed to expand Greens Creek Mine's tailing disposal site from the current permitted area of 12 ha to 25 ha, thereby increasing its use from 2 years to 25 years based on current extraction rates. In 2003, the mine had announced a 9-year life. A draft environmental impact statement (EIS) released in April concluded that the expansion might need the addition of carbon to the tailings to reduce acid drainage. Completion of the EIS and supporting State and Federal permit requirements for the Greens Creek tailings expansion could allow continuation of operations at this world-class mine for many more years.

Currently, production at the Greens Creek Mine is approximately 2,000 metric tons of ore per day underground from the 200 South, Southwest, and West ore zones. Ore from the underground trackless mine was milled at the mine site. The mill produced silver and gold doré and lead, zinc, and bulk concentrates. The doré was marketed to a precious-metal refiner, and the three concentrate products were sold predominantly to a number of major smelters worldwide. Concentrates were shipped from a marine terminal that is on Admiralty Island about 14 km from the mine site. The Greens Creek unit used electrical power provided by onsite diesel-powered generators. Mill recoveries were expected to be 81% for zinc, 74% for silver, 69% for lead, and 64% for gold.

Government Programs, Activities, and Reclamation Awards

A five-person team from the Minerals Section of the DGGS conducted a 20-day geologic mapping project near Livengood, which is 121 km northwest of Fairbanks. Geochemical results from this work were released in January 2004. A one-inch-to-one-mile-scale geologic map of the 32,100-ha field area was scheduled for publication in May 2004. The DGGS also released a preliminary geologic map of work conducted in the Salcha River-Pogo geophysical tract within the Big Delta Quadrangle from 2000 to 2002. Geologic mapping and geochemical sampling were conducted across an area from the Salcha River near Caribou Creek to the Goodpaster River drainage near the Pogo gold property.

The DGGS released maps and results from a 160,000-ha geophysical survey in the Council area of the Seward Peninsula.

Fieldwork, which would include geologic mapping and geochemical sampling, was planned for a portion of the survey area during 2004.

Geophysical surveys funded by the U.S. Bureau of Land Management (BLM) and managed by DGGS were released for the Delta River area (portion of the Denali Block) west of Paxson and in the Sleetmute area of southwestern Alaska. Existing company aeromagnetic data that covered 64,700 ha were incorporated into the 155,000-ha Delta River survey. The 2003 Sleetmute total field magnetic and electromagnetic survey covers 166,000 ha and is adjacent to the 2000 Aniak geophysical survey. The BLM conducted extensive mining district studies in regions in and surrounding the survey areas.

During 2003, changes to the State permitting process were made with the transfer of the Alaska Coastal Management Program and Division of Habitat to the ADNDR. ADNDR will continue to coordinate the permitting of all mine projects, large and small, and was expected to continue to improve the cooperative permitting environment.

The DNR issued the final State permits needed for Teck-Pogo Inc.'s Pogo Mine project on December 18, 2003. Teck-Pogo (a wholly owned subsidiary of Teck Cominco Ltd.) requested that the State of Alaska authorize the development of the Pogo Mine project. Teck-Pogo was authorized to begin construction and to use the Shaw Creek and Goodpaster winter trails immediately to mobilize equipment and supplies. Because the project required a water discharge permit from the U.S. Environmental Protection Agency (EPA) and a wetlands fill permit from the U.S. Army Corps of Engineers, a Federal EIS was completed. The State of Alaska was a cooperating agency in the EIS process and used the EIS to assist in decisionmaking for its authorizations. State agencies involved in these efforts included the ADNDR and the Departments of Environmental Conservation, Fish and Game, Law, and Transportation. A large mine project team was established with representatives from these departments to coordinate State permitting activities for the Pogo gold project.

ADNDR also began to work as a cooperating agency with the U.S. Department of Agriculture's Forest Service and EPA on the necessary permits for the expansion of the Greens Creek tailings facility in southeastern Alaska. This expansion would require the approval of a revised solid waste permit from the Department of Environmental Conservation as well as additional revisions to the financial assurances. Work was also in progress to update permits for the Red Dog zinc mine.

On August 6, 2003, ADNDR and the BLM approved a new cooperative agreement to allow mining operators on Federal lands to continue to use the Alaska Bond Pool. The cost and application process remained the same and miners may use the State's annual placer mining application form to apply for Pool coverage. The cooperative agreement does not have an expiration date, but ADNDR or BLM can cancel it with a 90-day notice, and then operators will retain bond coverage through the term of the approved reclamation plan. The Pool was not available for operations that use cyanide or other chemical leachate. New operations may participate in the Pool for a disturbance up to 16 ha; however, a larger disturbance

is allowed after providing calculations showing that the reclamation liability will not exceed 33% of the unrestricted assets of the Pool.

ADNR gave reclamation awards to several mining operations in 2003. An individual was recognized for outstanding reclamation of 6 years of placer operations on 7 ha of ground on Tripple Creek in the Nome Mining District. The ADNR recognized reclamation work completed on Pete's, Bird, and Upper Cache Creeks near Petersville in the Yentna Mining District. These placer miners completed reclamation work on State mining claims that had not been performed by the previous claim owners. Reclamation work included disposing of, by means of burial, several thousand tons of abandoned mining equipment, which included large empty fuel tanks and camp structures. Several tons of scrap metal and usable equipment were removed and salvaged. The willingness of these miners to work with agency personnel and their actions in removing and disposing of the abandoned hazards was extremely helpful to the State of Alaska. An individual operated a placer mine on patented mining claims along Specimen Gulch in the Nome Mining District for 13 years and completed reclamation work on 12 ha of ground. Once mining was completed, the stream channel was reconstructed, and the disturbed land was recontoured. Beyond the minimum reclamation standards, the land was hand seeded and fertilized and planted with willow stakes with willow bundles.

The Alaska Railroad Corp., a State-owned railroad, made a \$14.5 million profit in 2003 on revenue that rose more than 20% to \$127 million. The railroad earned most of its revenue from hauling coal, gravel, and other natural-resource freight. The resumption of coal shipments by Usibelli Coal Mine from Healy, a road-construction project near Anchorage at Bird Creek, and greater-than-anticipated deliveries of naphtha from North Pole to the Port of Anchorage were the major factors for the increased revenue. Continued development in the southcentral region of Alaska led to a higher demand for gravel, and the railroad had a 5.3% increase in total gravel shipments in 2003.

A \$9.6 million Federal congressional appropriation was obtained for the Alaska Railroad Corp. to purchase the coal-loading facility and terminal in Seward. The terminal will be purchased for \$8 million; the Alaska Industrial Development and Export Authority will receive \$5.5 million for its 49% ownership of the terminal, and Hyundai Merchant Marine will receive \$2.5 million. The remaining \$1.6 million of the Federal appropriation will be used to upgrade the terminal's loader so that larger ships can use the facilities.

The conveyance of the eastern portion of the Denali Block from the Federal Government to State ownership was completed in January. This area, near the junction of the Denali and Richardson highways, had high potential for the occurrence of platinum-group metals and other valuable mineral resources.

The DOT&PF continued to plan for roads and other infrastructure across the State. The Industrial Roads Program was studying, planning, and building roads to resources. The

Glacier Creek road near the Rock Creek gold property was slated for realignment and upgrading as a Federal aid project in the Alaska Highway System program. The 8-mile-long project was expected to cost between \$6 million and \$8 million; in addition, a new 3-mile-long road would replace and provide access to the proposed Rock Creek Mine, other nearby mining properties, and subsistence uses. Another proposed road project was the Crooked Creek Road, a 12- to 14-mile project from the village of Crooked Creek on the Kuskokwim River to the proposed Donlin Creek gold mine. DOT&PF has allocated \$4 million for design and construction of this road and has estimated that an additional \$15 million to \$18 million investment would be needed before final construction was complete. DOT&PF was also planning other roads, which included connecting the Yukon and Kuskokwim Rivers and rehabilitating the 15-mile Williamsport-Pile Bay Road near Lake Iliamna and the Pebble copper-gold deposit.

The USGS, in cooperation with other agencies, initiated a 5-year project entitled "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 and included geologic mapping, baseline geochemistry, and biogeochemistry studies.

The USGS and BLM continued a number of cooperative projects under the Minerals Data and Information Rescue in Alaska (MDIRA) program. The USGS continued to compile nonrock and lithochemical data scheduled for release in late 2003. The USGS and DGGs continued work on the Alaska Resource Database Files project. Other DGGs-managed, MDIRA-funded projects included compilation of Alaskan bedrock and surficial geology map index project, compilation of DGGs lithochemical data, scanning of USGS bulletins and professional papers that deal with Alaska and providing versions of those documents for public access on the Internet, and the building of a comprehensive database system at DGGs. Other MDIRA-funded projects were in progress at other divisions of ADNR, the University of Alaska Fairbanks, and private contractors.

The BLM conducted an extensive field program in the Delta River mining districts of eastern and southcentral Alaska. Lode, placer, industrial, and coal sites were visited, geochemical samples were collected, and the analytical results were published. BLM planned to conduct another year of fieldwork and possibly to acquire more airborne geophysical data in this area.

The mineral industry paid a total of \$16.4 million to the State of Alaska and Alaskan municipalities in 2003. These payments increased by more than 8%, or \$1.2 million, of 2002 values. Mining license taxes more than doubled from 2002 largely owing to the profitability of the Red Dog Mine. Mining companies were the highest taxpayers in the City and Borough of Juneau and the Fairbanks North Star, Denali, and Northwest Arctic Boroughs and accounted for total payments of more than \$10.5 million.

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN ALASKA^{1,2}

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2001		2002		2003 ^P	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones	NA	12	NA	12	NA	12
Gold ^{3,4} kilograms	16,700	146,000	16,900	170,000	15,200	171,000
Sand and gravel, construction	11,300	65,600	16,300	93,400	16,300	93,700
Silver ³ kilograms	W	W	559,000	83,100	W	W
Stone, crushed ⁵	1,450 ^r	8,000 ^r	1,280	6,960	1,300	7,150
Combined values of copper, lead, stone (crushed dolomite and limestone), zinc, and values indicated by symbol W	XX	763,000	XX	695,000	XX	789,000
Total	XX	983,000	XX	1,050,000	XX	1,060,000

^PPreliminary. ^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Recoverable content of ores, etc.

⁴Data collected by the State.

⁵Excludes certain stones; kind and value included with "Combined values" data.

TABLE 2
ALASKA: CRUSHED STONE SOLD OR USED, BY KIND^{1,2}

Kind	2001				2002			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone-dolomite	1	W	W	W	1	W	W	W
Marble	1	45	\$533	\$11.84	--	--	--	--
Granite	2	(3)	(3)	8.00	2	(3)	(3)	\$7.46
Traprock	3 ^r	(3)	(3)	4.08 ^r	3	(3)	(3)	4.30
Shell	1	1	4	4.00	1	1	\$3	3.00
Miscellaneous stone	6	(3)	(3)	5.46	7	(3)	(3)	5.46
Total or average	XX	1,450 ^r	8,000 ^r	5.50 ^r	XX	1,280	6,960	5.42

^rRevised. W Withheld from total to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Data derived, in part, from information obtained from the Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys.

³Withheld to avoid disclosing company proprietary data; included in "Total."

TABLE 3
ALASKA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE^{1,2}

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch), riprap and jetty stone	29	\$184	\$6.34
Coarse aggregate, graded, railroad ballast	W	W	5.33
Fine aggregate (-3/8 inch), other fine aggregate	1	6	6.00
Coarse and fine aggregates:			
Graded road base or subbase	(3)	(3)	3.45
Unpaved road surfacing	(3)	(3)	3.65
Crusher run (select material or fill)	(3)	(3)	2.00
Total or average	80	289	3.61
Other miscellaneous uses not listed	3	19	6.33
Unspecified:⁴			
Reported	932	5,140	5.51
Estimated	230	1,300	5.43
Total or average	1,160	6,400	5.52
Grand total or average	1,280	6,960	5.42

W Withheld to avoid disclosing company proprietary data; included in "Grand."

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Data derived, in part, from information obtained from the Alaska Department Natural Resources, Division of Geological and Geophysical Surveys.

³Withheld to avoid disclosing company proprietary data; included in "Total."

⁴Reported and estimated production without a breakdown by end use.

TABLE 4
ALASKA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products	1,490	\$8,300	\$5.59
Asphaltic concrete aggregates and other bituminous mixtures	151	1,110	7.35
Road base and coverings ²	362	2,060	2.96
Fill	125	494	3.95
Other miscellaneous uses ³	52	356	2.96
Unspecified:⁴			
Reported	9,450	51,700	5.47
Estimated	4,700	29,000	6.17
Total or average	16,300	93,400	5.73

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes road and other stabilization (cement and lime).

³Includes railroad ballast and snow and ice control.

⁴Reported and estimated production without a breakdown by end use.