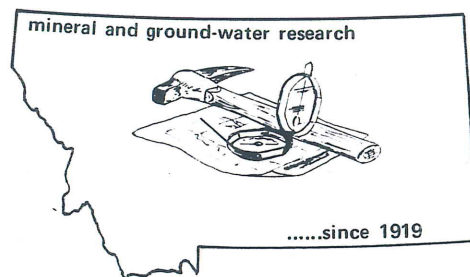


**MBMG 241**

**MINING AND MINERAL DEVELOPMENTS  
IN MONTANA—1991**

by  
**Robin McCulloch**



**MONTANA BUREAU OF MINES AND GEOLOGY**

**1991**

Major programs continued at New World (near Cooke City) with Noranda Minerals (Hemlo Gold), Miller Mountain (east of Helena) with Pegasus Gold, McDonald Meadows (east of Lincoln) with Canyon Resources/Phelps Dodge, Emigrant Creek (south of Livingston) with Pegasus Gold, Garnet/Coloma (east of Missoula) with Pegasus Gold, and Montanore (south of Libby) with Montana Resources/Noranda Minerals.

New World and Montanore are both expected to be in production prior to 1995. The other companies are expected to make announcements within the next two years.

Exploration took a downturn with activity confined to later stage projects and grassroot activities substantially reduced. In the absence of the major companies, individuals and small companies continued work on their properties but at a much reduced financial level.

The reason for the reduction is possibly a combination of three items: (1) the overall recession of the general economy, which (2) has in turn reduced commodity prices to near breakeven points for production, and (3) after three years of drilling and exploration many properties are available at prices below the cost of exploration. This has resulted in a reduction of staff and placed the companies in a property acquisition or sales position. We can expect this slump to last at least one to two years with the future controlled largely by the economy.

The primary exploration target was still gold, however, interest is starting to build for copper and massive sulfide deposits of lead and zinc. By November 1991, 194 plans of operation had been filed with the U.S. Forest Service for Montana compared with 339 for 1990. The distribution of these plans of operation by the ten National Forests in Montana and comparisons with 1988, 1989, 1990 and 1991 are as follows:

Claims patented, shown in Table 3, show the bottom of a declining trend of previous years. Although interest in patenting claims has increased due to speculation on changes in the 1872 Mining Law, the process is difficult and takes up to five years on the average. Effects of proposed changes in the Mining Law will not be completely apparent until 1995 or 1996.

In fiscal year 1991 (October 1, 1990 to September 30, 1991), the Federal Government paid the State \$23,218,465.26 for the State's share of the mineral leases and right-of-way funds.

Table 4 shows increasing revenues since 1989 when a reduction of nearly \$6.5 million was seen. Higher revenues for last year may reflect higher oil prices during the "Gulf War".

Table 4

Government payments to the State (Bureau of Land Management)

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
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Mineral leases and right of ways	\$26,317,769	\$19,871,031	\$20,318,356.41	\$23,218,465.26
Oil & Gas Lease county payments	unknown	unknown	\$ 259,833*	\$ 232,542.17

\* overpayment of \$200,000 occurred in 1990 thus number shown here reflects the correct payment



As shown in Table 6, license tax revenues from metalliferous mines have shown a slight increase from fiscal year 1990. This is due partly to an increase in production as the commodity prices have remained depressed through the year. Coal taxes took more than a \$17 million cut as the severance tax decreased to 15% to be more in line with the tax levels of competitive coal producing states. Cement and gypsum taxes decreased slightly and reflect commodity price and production changes. Micaceous mineral taxes dropped by nearly 50% and reflect the closure of W. R. Grace's vermiculite mine in Libby. Those taxes are expected to further decline in future years as the last of the stock piles are shipped. Oil and gas severance taxes increased by more than \$4 million and reflect increased prices during the Gulf conflict and tax breaks which were lost when oil prices exceeded \$25/barrel. The Resource Indemnity Trust tax (RITT) decreased by more than \$2.5 million. Part of this change is due to a change in the law where money from the metalliferous portion of the tax is redirected to the counties annually instead of the state.

### Metals

Metal mining activity in the state has reached a plateau for the next few years. Lower commodity prices have negatively affected exploration and production. Although a few mines are exceeding proposed production, many have decreased production and are completing development work in anticipation of increased prices in the future. Lower prices have also triggered layoffs as companies have stripped unnecessary expenditures from their budgets which have also decreased their production capabilities. Gross production value of metallic and nonmetallic minerals in Montana is:

<u>Mine Commodity</u>	<u>Gross Value per Calendar Year</u>			
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Coal	406,985,744	429,088,977	365,146,698	394,213,258
Metal Ores	262,179,011	424,693,471	339,820,036	407,776,029
Industrial Minerals	43,651,088	29,582,910	31,934,528	29,212,555

### Mining, Mineral Development, And Exploration Activities

#### Western Region

#### Metal Mining and Development (Figure 1)

Production continued at Asarco's Troy mine in excess of 8,500 tons per day (tpd). The room and pillar, mechanized, copper-silver mine completed another year of production in spite of dismal silver prices. Asarco has reduced their staff through attrition and changed from 8 hour shifts to 12 hour shifts, (four crews work 3.5 days per week at significantly increased productivity). Employment has been steady with no inclination toward unionization of the mine.

Continuing exploration around the mine has established low grade resource blocks but not reserves. The drilling program is expected to continue.

Standard Creek Mining produced from the Mustang Mine in the Fisher River drainage again this summer. Poor recoveries from the mobile mill during the previous operating season prompted the company to change their operating philosophy. The production rate increased slightly while the ore was screened to minus 3/4 inch material and transported to a stockpile for temporary storage. The company was negotiating with various other mining and milling companies for a

processing contract. Operators indicated ore grade was usually above .75 oz Au/ton but production was limited due to a lack of equipment.

Progress continued on the Noranda/Montana Reserves' Montanore Mine decline. The previous year started with problems due to ground water volumes and pressures. By July, the rock had started to tighten up and wet intercepts were minimal. The rate of advance by November 1 was 29 ft per day with the length of the adit at 13,377 ft. The final target for this stage of the operation is 16,140 ft and at a 1,000 ft/month rate of advance. The company expects to reach it by early February. That target will provide drill stations and a bulk sample for further analysis of the ore body.

In their present task of securing permits, the company submitted a Draft Environmental Impact Statement (DEIS) last spring, and a supplemental to the DEIS in October. A final EIS is expected by the summer of 1992 with permits in the later portion of 1992 or early 1993.

The deposit is expected to contain 220 million ounces of silver and 1.5 billion pounds of copper. Exploration and predevelopment costs are expected at \$25 million with the cost of the entire project estimated at \$250 million. Production is still anticipated prior to 1995.

Montana Reserves is still looking for a buyer for all or part of their share of the project.

Asarco's Rock Creek Project, another project under the Cabinet Mountains Wilderness, appears to be on the move again. A draft EIS can be expected on the project by midsummer of 1992. The proposed project is expected to produce up to 10,000 tpd for 30 years and employ approximately 355 with an estimated annual payroll of \$12.5 million. Increased silver prices would certainly increase the interest in this project.

Production continued at the same small scale at the Walnut Placer east of Trout Creek. Located downstream from Lyons Gulch, the property has operated seasonally for many years on gravels in the flood plain of the Vermillion River.



North of Avon, in Ophir Creek, small placer operations (mostly hand work) washed gravel intermittently and recovered some nice nuggets.

### Exploration (Figure 2)

North of Libby, along the U.S.-Canadian border, Cominco American Resources proposed a drilling program in the Hawkens Creek drainage for their ongoing lead-zinc exploration program.

North of Troy, near Yaak Falls, there is a placer testing program with a few trenches. South of Troy, near the Troy mine and Mt. Vernon, Asarco drilled 14 diamond drill holes in their attempt to enlarge the reserve base for the Troy operation. South of Asarco's operation, in Star Creek, another placer trenching program was planned.

South of Libby, U.S.M.X. drilled 16 reverse circulation (RVC) holes and excavated 1,000 ft of trench on their Libby Gold project. The project was previously run by Orvana and is located between Flower and Granite Creeks. George Shaw worked in the Snowshoe drainage driving drifts on the Raven property. Newmont Exploration drilled 7 holes on their Tip Top project in the Bramlet drainage near the Branigan property. In the Libby Creek drainage, Henry Skranak continued placer exploration on the Lost Grouse property. A. C. Lewis proposed to reopen portals on the Midas property in lower Standard Creek. Sidney Switzer explored gold mineralization in Flower Creek and Cedar Creek with a shaft and drift. Hardrock Mining Co. continued exploration of a vein system in Houghton Creek which has demonstrated some interesting gold values.

East of Libby, Nugget Nevada Inc. continued development and production of stone along the Kootenai River.

South of Troy, Kennecott drilled 2 holes on their Snake project which is located in the East Fork Bull River drainage near Snake Creek Pass.

In the Trout Creek area, Asarco Inc. deepened old drill holes on properties in Rock Creek, Trout Creek and Miners Gulch of the Vermillion River.

In the Hog Heaven district northwest of Polson, Dorothy Davis drilled 4 diamond drill holes on the Star Meadow project in Griffon Creek.

West of Rollins and Flathead Lake, Gerald Hefner and Earnest Learn drifted on their Jumbo Mines copper project.

South of Plains, Cominco drilled one helicopter supported diamond drill hole in the Sheep Creek drainage.

Exploration in Mineral County was nonexistent on public land. Rumors indicated interest along the Idaho border but depressed metal prices eliminated expenditures for ground disturbing activities.

In the Ninemile Drainage, Magellan Resources continued exploration on the Ninemile lode. Exploration has delineated a wide structure the company has probed with 12 RVC and 12 diamond drill holes.

Mineral activity in Ravalli County has been confined largely to the Hughs Creek area, southwest of Darby. Montana Logging and Mining Co. trenched and did some drifting on lode and placer deposits in Mine Creek. Intermittent placer exploration continued in Rob Gulch.

East of Missoula in the Garnet Mountains, Newmont Exploration drilled 13 RVC and 2 diamond drill holes on their Copper Cliff project in Union Creek. Pegasus continued to drill holes and trench along the trend between Garnet and Coloma. Ralph Smith continued bulk testing of placer deposits along Deep Creek while Day Creek Resources carried on similar activities in Day Creek. On Elk Creek, John Dorazi continued placer testing on the Rat project.

South of the Garnets, American Gold Resources Corp and FMC completed 4 trenches in Upper Willow Creek and Miners Gulch. In the same area, Everett Miller and Yellow Eagle Mining evaluated the placer potential of those drainages. FMC continued exploration on their property in Brewster Creek with 20 RVC holes and 500 ft of new road. In Stoney Creek, FMC drilled 6 RVC holes and put in 2,000 ft of new road.

South of Maxville and northeast of Philipsburg, Comeco dug 6 trenches and drilled 9 RVC holes on the U.S.F.S. portion of their Londonderry project (former Westgold project). Additional work was done on the Conn Ranch.

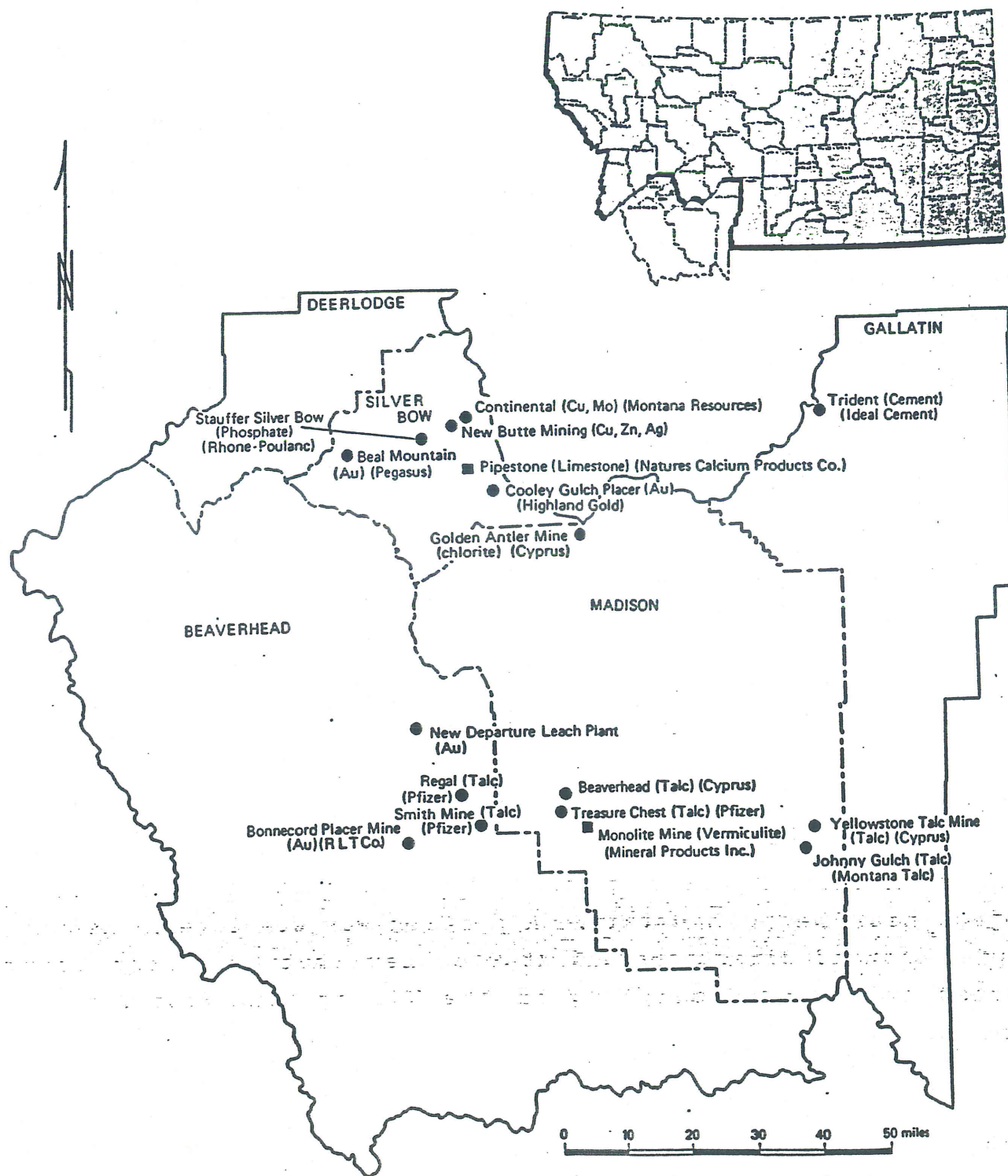


Figure 3. Mines and mineral development in the Butte-Anaconda region.



exploration activities of last year. The company is currently going through reorganization.

In Beaverhead County, the custom vat leach operation at the New Departure Mine (west of Dillon) continued to process mine dumps from the Bannock area. Production capability remained at 700 tons/month.

RLTCO mined placer deposits downstream from Bannock on Grasshopper Creek this spring and then optioned the property to Del Rio Corporation of Helena. Production has continued on a sporadic basis.

In Madison County, Chicago Mining Corporation worked through road permitting with the federal regulatory agencies. Company plans included hauling mineralized rock from the Atlantic-Pacific Mine to their mill in Pony.

#### Exploration (Figure 4)

In Deer Lodge County, west of Anaconda, Magellan Resources (North Lilly) drilled 6 diamond drill holes on their ongoing project at the Southern Cross Mine. Cable Mountain Mining did some trenching at the Cable Mountain Mine and continued interest in the placer deposit below the lode.

Activity in Silver Bow County was confined to an adit rehabilitation project on Negro Mountain, which is on the divide between McLean Creek and Moose Creek and Jess Smith's evaluation of placer gravels on Beefstraight Creek south of Fairmont.

In Beaverhead County, southwest of Wisdom, Swansea Gold Mines explored placer deposits on Ruby Creek. According to company data the overburden appears to be about 15 feet thick and pay averages 18 inches to 5 feet thick. The grade appears to average \$18-19/yd<sup>3</sup>, while selected runs exceeded \$40/yd<sup>3</sup>. All of the activity was on private land between Nugget and Pioneer creeks. West of Jackson, Earl Flaherty tested placer gravels along Rock Creek. South of Argenta, Scott Gaffri and Charles Kern tested gravels near the Ermont Mine. West of Argenta, Joseph Wellhorn continued work in the Ermont property. In the Dyce Creek area, near the Old Faithful property, Cyprus Metals conducted a trenching and drilling program, while John

Atkins tested placer ground in adjacent sections. North of there, Tom Sarantos continued exploration on his Garrett Hill project in the Scudder Creek drainage.

Southwest of Bannack, Phelps Dodge drilled near China Town on Jeff Davis Creek.

In Madison County, Phelps Dodge drilled in the Rochester Basin near Twin Bridges. John Coleman trenched and sampled a property near Dougherty Butte. Goldenrod Mining Company trenched near the Iron Rod Mine in the Silver Star District. Cominco American Resources trenched a property south of Rochester Basin on Nez Perce Creek.

On the west side of the Tobacco Root Mountains, Reynolds and Compass Metals drilled on the Smith claims east of Twin Bridges. Hal Dale and Mark Raffanelli proposed a multiple hole diamond drill program near the Strawn Mine in Beal Creek. Golden Chalice Inc. drove drift on the Heliose claim near Tom Graham Pass on the Noble Fork. Koval drilled a single hole on the Uncle Sam property in Mill Creek. Tom Green continued driving drift on the Paymaster Heir in Bivens Creek. H & H Gold collected bulk samples from the Bins Mine at the head of California Creek. Burt Hunt planned 5 diamond drill holes on the Missouri-McKee property in South Meadow Creek, but did not start the project.

West of Virginia City, Battle Mountain Exploration drilled the Pacific Mine at the head of Browns Gulch. David Hanson tested placer gravels in Browns Gulch west of Nevada City, as did Bruce Scharf.

On the east side of the Tobacco Root Mountains, Gene Nellis trenched and reopened adits on the Strawberry Ridge project northwest of Pony. Pathfinder Gold continued work on the Mammoth, Boss Tweed and Clipper mines. However, most of the activity was geologic as the company is seeking a joint venture partner to continue the drilling program.

West of Pony, Tobacco Mountain Gold got a late start but still completed their road improvements and drove 148 feet of LHD drift to start their evaluation of the property. Some dump material was transported to the Pony mill for processing.

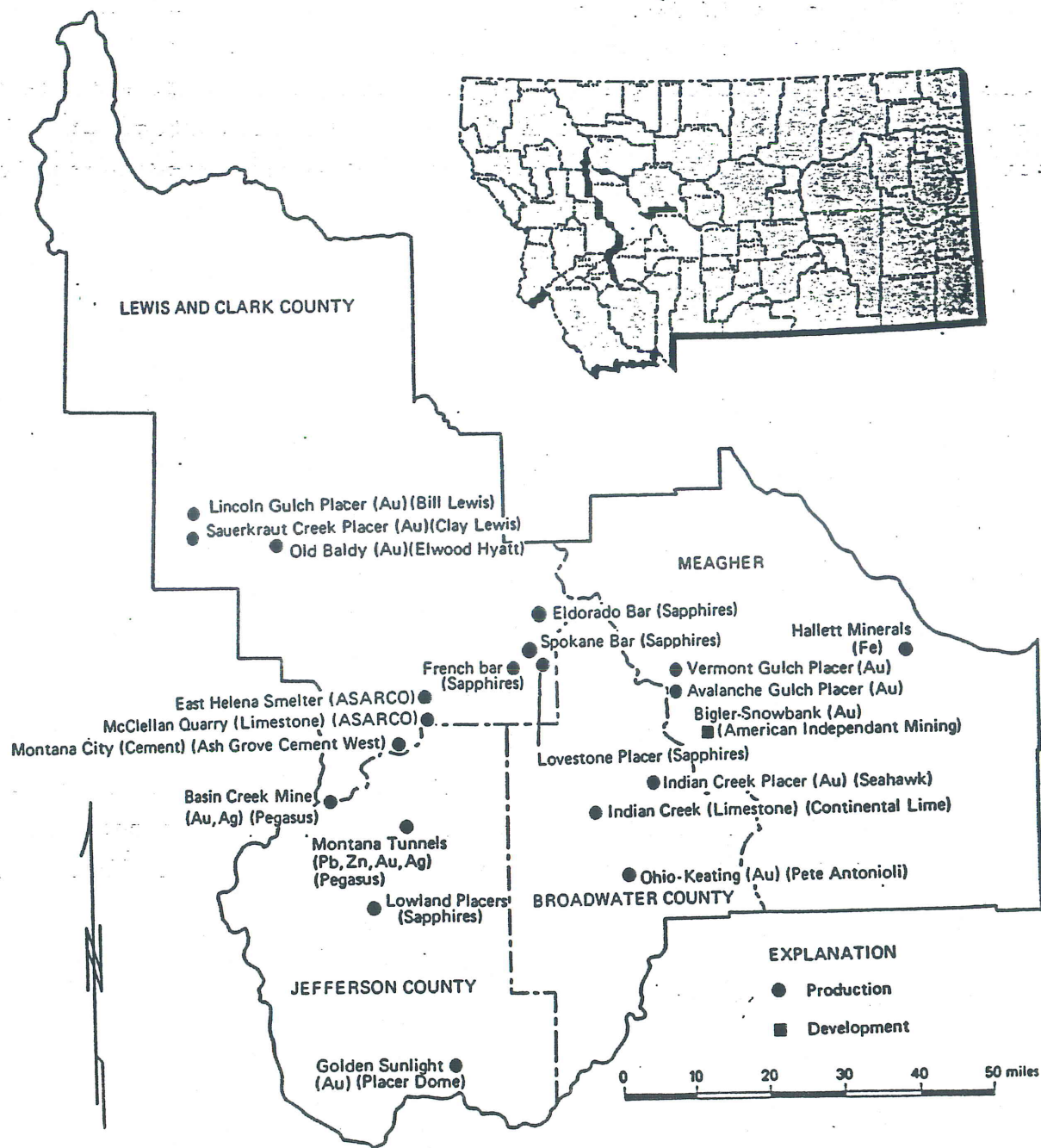


Figure 5. Mines and mineral development in the Helena region.



the Rattlesnake Bar. The only significant production on the west side of the Big Belts was Steve Adams' operation in upper Avalanche Gulch. Steve is mining a remnant terrace or bench above the main creek. Reserves are available to possibly carry him through 1992 dependent on grade and gold prices. Cherhill Resources Ltd. mined placer gravels briefly in Oregon Gulch before running out of reserves.

On the east side of the Big Belt Mountains, Harvey McConnell continued placer mining in upper Vermont Gulch. Although his production was somewhat reduced due to weather, reclamation of last year's operations, and moving his facilities, the mine was in full production by October.

Many of the east side drainages had small weekend placer operations that operated intermittently. Don Shearer operated one of these in Thompson Gulch.

American Independent Mining purchased the Bigler and Snowbank mines west of White Sulphur Springs. The company spent the summer advancing the haulageway and developing a mining method to compensate for "air slacking" problems inherent to the sedimentary back in the stopes.

The company hopes to build a small gravity mill on the property to reduce operating costs related to transportation and custom milling costs.

#### Exploration (Figure 6)

East of Lincoln, Phelps Dodge continued exploration on the 7-Up Pete and McDonald projects. A joint venture with Canyon Resources Corp., the 7-Up Pete deposit is reported to contain 9.4 million tons at 0.06 oz Au/ton. The McDonald Meadows property had preliminary reserves this spring of 18 million tons at 0.027 oz. Au/ton. Phelps Dodge drilled numerous holes on both properties with the majority of activity on the McDonald Meadows project which has resulted in combined geologic reserves of 200 million tons grading .03 oz Au/ton (gold equivalent). The McDonald Meadows portion of that is 185 million tons grading .028 oz. Au/ton.

Future activity is expected to continue to the west in the Keep Cool area following a small drilling program completed this year.

Nearby, Phelps Dodge also drilled 6 RVC holes in Ethel Gulch.

Northwest of Rogers Pass, Leonard Orr drilled four RVC holes in the Alice Creek drainage. Asarco drilled one hole on their Heddleston project, southwest of the pass.

West of Helena, Gary Murdock had a small scale placer operation in Faith Gulch, as did Marvin Ratcliff in Uncle Ben Gulch. Mr. Murdock had a similar operation in Hope Gulch.

South of Helena, in the Elkhorns, Pathfinder Gold drilled numerous holes to verify Goldfields results on the Sourdough and adjacent properties. The drilling program did not discover any additional reserves nor was it designed to. At the end of the summer, Pathfinders dropped their option and the property is available.

East of that project, Newmont Exploration Ltd. constructed 15 drill pads and 7,000 feet of new road on and near the old Mountain West and Homestake properties near the town of Elkhorn.

East of Helena, Independence Mining continued a 6 hole RVC drilling program in Bar Gulch. Dick Shreves tested placer gravels in the Butcherknife drainage.

West of Townsend, Mining Inc. reopened tunnels on the Iron Mask property in preparation for underground drilling and sampling. George Levingood and Mike Powers reopened an adit on the Silverwave property in upper Indian Creek. Pegasus Gold drilled a few holes on the Diamond/Giant Hill property. United Minerals drilled two holes at the Graphite Mine which is also located in Indian Creek.

West of Radersburg, Placer Dome drilled 6 RVC holes in Keating and Charity Gulches.

Northeast of Townsend, on the west side of Big Belt Mountains, RLTCO tested gravels on the Rattlesnake Bar which consist of elevated bench gravels in Confederate Gulch.

Noranda Exploration drilled one diamond drill hole in upper Cement Gulch (Confederate drainage). North of there, Pegasus Gold drilled 80

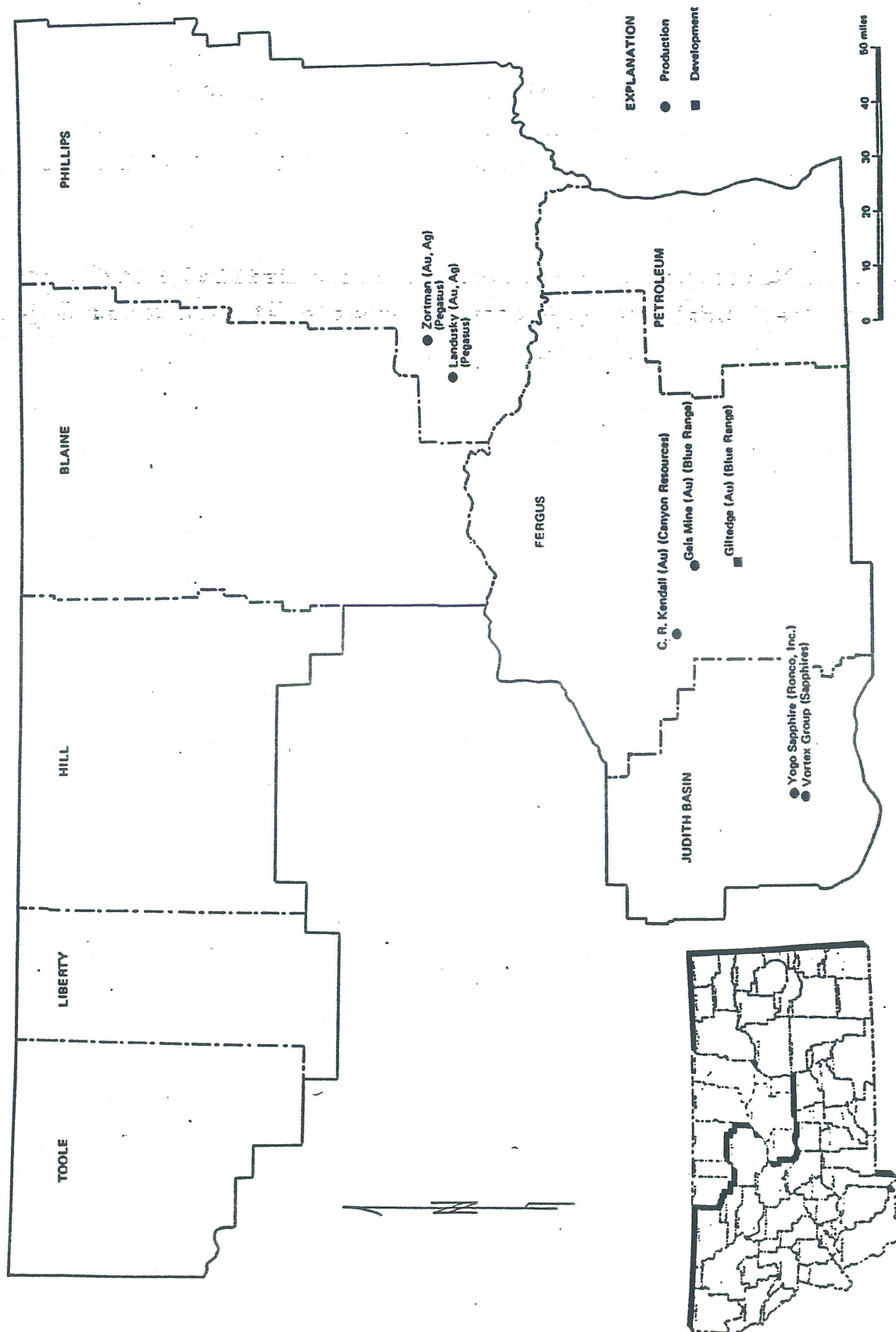


Figure 7. Mines and mineral development in the north central region.



A fatality at the mine triggered new concerns with regard to old workings. An operator of one of the drills stepped off of his work station onto the pit floor which, in turn, collapsed into old underground workings. The company initiated a research program utilizing ground penetrating radar to predict high risk areas concerning old workings in hopes of minimized risk to employees. The results of this activity may establish standards of safety for the industry in surface operations over old workings.

#### Exploration (Figure 8)

C.R. Kendall dominated the exploration of the region with projects in most of the known mineralized areas. Many of the drilling projects are scattered over sections indicating broad spectrum exploration as yet lacking specific focus. Near the mine, C.R. Kendall drilled 6 RVC holes in the Plum Creek drainage and 13 RVC holes approximately 2 miles east of there. Another 25 RVC holes were drilled in the Judith Mountains scattered between T16N, R19E and T16N, R20E.

Vince Carp and Charles Collier reopened adits at the Tailholt Mine, near Maiden. Further work was done on the Linster Peak project by Metallic Ventures. The company indicated an interest in developing the mineralized quartz leads discovered by Amax.

Pegasus Gold continued exploration in the Little Rockies. Drill holes were concentrated in T25N, R24E and T25N, R25E. Further exploration is on hold pending the Interior Board of Land Appeals decision on permitting further activity at the present mining operations.

#### Park Region

##### Mining and Development (Figure 9)

The Mineral Hill Mine (a joint venture of TVX Mineral Hill Inc. and Homestake Mining), located east of Jardine, had a good year with a number of improvements. Standard annual operations consists of a tailings liner expansion which was completed as scheduled. However, difficulties had occurred in the past in maintaining minimum moisture levels in the "dry" tailings system. The new disk filter system installed this year in the mill came a long way in eliminating that problem. A number of minor adjustments and improvements to the mill have smoothed operations and improved productivity.

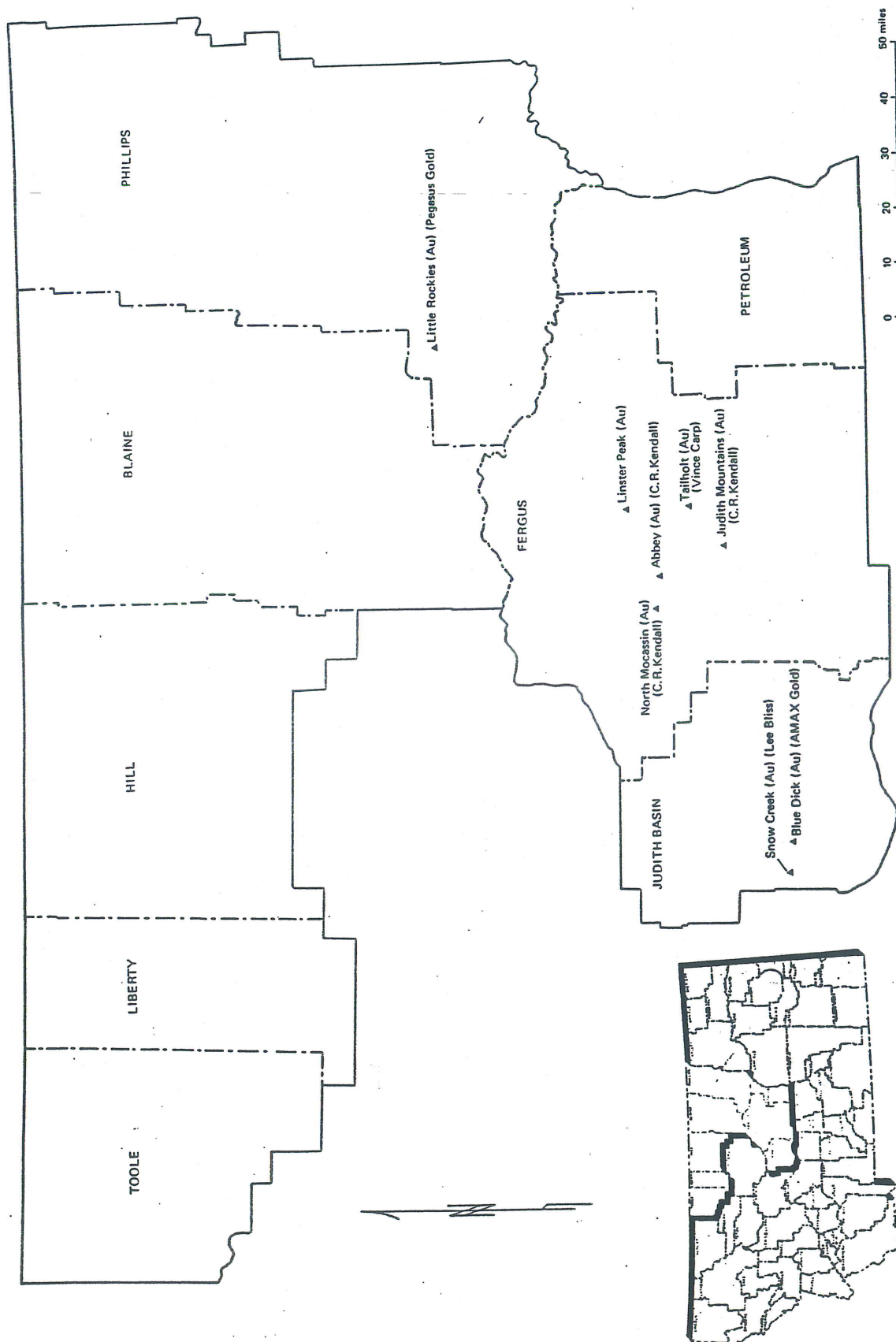


Figure 8. Exploration projects in the north-central region.

Present operations have reduced costs and fine tuned the mine to the most efficient operation possible in the face of depressed metal prices.

The small smelter constructed last year has worked well despite minor difficulties common with all new projects. The scrubber system on the stack is working very well as is the TBRC.

The concentrator at the mine is maintaining recoveries of up to 93%.

#### **Exploration (Figure 10)**

Much of the activity south of Livingston is concentrated in the Emigrant Creek drainage. Harrison Western and Montana Mining and Reclamation evaluated placer gravels with 10 sonic drill holes. Pegasus Gold drilled a number of holes on the north slope of the drainages in the evaluation of a gold target. A number of helicopter supported diamond drill holes were completed, as well as RVC holes. The program is part of a joint venture with Fisher Watt.

East of Jardine, in the Crevasse district, American Copper and Nickel Corporation and the Jardine Joint Venture drilled 7 holes on National Forest land, as well as some on the patented land. This program is a continuation of a long term exploration program on ground held by the Jardine Joint Venture.

South of Big Timber, in the Boulder River drainage, Pathfinder Gold and Pegasus Gold completed geophysical surveys in the Independence Mining district.

In Stillwater, Sweetgrass and Park counties, Stillwater PGM Resources conducted an extensive drilling program of 10 Winkie drill holes and 7 diamond drill holes. The program was part of the patenting process for the 25 mile trend of PGM mineralization.

Keith Martin and Dave Russel drilled one diamond drill hole in the Pickett Pin drainage near Nye. East of Nye, Chrome Corporation of America drilled a diamond drill hole at the Benbow.

Near Cooke City, Crown Butte Resources, LTD. and Noranda Minerals continued reserve development at the New World Project. The drilling



program has annually increased reserves and grade; this year was no exception. By October, the preliminary geologic reserves were increased to 10.4 million tons containing over 2.2 million ounces of gold which is an average grade of 0.21 oz Au/ton.

Drilling has revealed boundaries on the Homestake deposit to the northwest and northeast edges. The other boundaries of the deposit are unknown. Targets remain for the company to explore in addition to discovering the limitations to the Homestake.

The companies have renovated the Gold Dust Adit, under the Homestake deposit, and are cutting drill stations. During the winter months they plan to keep 2 diamond drills operating; further defining the geology and ore reserves.

### Industrial Minerals

Activity remained steady in the industrial minerals sector. The demand for cement and limestone remained steady, however the talc market softened and competition has increased.

### Barite

Rocky Mountain Minerals (Dillon Exploration, Inc.) produced high grade barite from their Elk Creek property (Figure 1) and transported the ore to Lethbridge, Alberta, Canada. Used mainly as a high brightness additive, the market further degenerated from already dismal commodity prices.

Production is expected to continue one more year on the property and then change to the Coloma property. Present production will be curtailed as the barite deposit transitions to pyritic quartz in the lower levels.

### Garnets

Cominco American Resources has completed a preliminary feasibility study for the development of garnet resources in the dredge tails of Alder Gulch. The project is a joint venture with Sunwest Abrasives of Colorado and is confined to selected portions of the dredge tails, although gold and garnets exist in available, unmined ground. The anticipated mine life is 30 to 40 years.

Calcium Products Company produces 3,000 TPY separated with a screen plant in four product sizes (+6", -3" + 3/4", -3/4" + 4 mesh, and -4 mesh + 400 mesh).

### Phosphate

The state has two phosphate operations--one processing and one mining. Rhone-Poulanc's Stauffer Silver Bow plant (Figure 3) operated at capacity during 1991 with ore mined at the Rasmussen Ridge Mine in Idaho. The plant produces elemental grade phosphorus.

Cominco American Resources continued production at their Warm Springs Creek property (Figure 1). Demand for production is established by the sulfuric acid production rate at the Trail, British Columbia smelter; also owned by Cominco. Mine activities included development of a new portal in section 11, while the majority of production was confined to the South Luke area.

Demand by the smelter was down this year because of problems encountered with new equipment and smelting methods. The mine spent the year working on increased development preparing for the time when the smelter is up to its projected demand for phosphate rock.

### Sapphires

The sapphire industry in Montana can be divided into two separate segments which include commercial production and hobby (recreation) activities. The various mines around the state produce, for the most part, under both categories. Montana sapphires have started to draw the attention of the Japanese now that heat treating has eliminated cloudiness and defined color in the stones. The Gem Mountain Mine (Figure 1) produces bulk concentrate, as well as cut stones, for over-the-counter sales. Recreational activities include prescreened buckets of dirt ready for sorting by the customers. Cutting and polishing services are available on site.

A little farther upstream, on the West Fork of Rock Creek, the Skalkaho Grazing Association Sapphire Mine has assembled a floating wash plant capable of processing a few hundred cubic yards of gravel per hour. The plant has operated on a test run, but has not operated in full production status.



Cyprus Industrial Minerals has continued to streamline operations and cut costs at the Yellowstone Mine. A new participatory management system which allows more employee input was initiated last year. After a full year of working with the system, substantial cost savings have been realized.

When operations identified under utilized-equipment and possible layoffs, an effort was directed toward securing outside contracts to increase the use of the equipment and maintain the workforce during the lean times.

At the Yellowstone Mine, Cyprus continued development of their new ore body. They purchased a new \$650,000 O & K shovel and maintained production with no lost time accidents in over a year. The company has continued backfilling the south main pit and stockpiling top soil for future reclamation. Exploration was concentrated in Johnny Gulch above the Montana Talc operation and near their office.

The Beaverhead Mine continued production and transitioned into a year-round operation. The company has changed from a cut and fill method to an underhand method, utilizing cemented borrow material which has resulted in significant cost savings.

Near the Beaverhead, the company may open their M.P. property next year as a small open pit operation.

The Antler Chlorite Mine is now operating on a 12 month schedule. The company expanded their reserve base through exploration in Cottonwood Canyon. Research on uses of the chlorite indicates a potential for expanding markets.

Montana Talc continued to improve both their mine operation at the Johnny Gulch Mine and their processing facilities at Sappington. Mine operations continued to strip waste off reserves discovered by Pegasus Gold two years ago while the company changed technique and policy to increase productivity. Present operations dedicate priority status to quality of product produced.



The draft EIS for the Stansbury Vermiculite Mine (Figure 1) near Hamilton is complete, however a release date has not been announced.

East of Dillon, on the Sweetwater Road, Mineral Products, Inc. has completed a new road to the Monolite Mine and has started construction on the mill. Although the production is still quite limited, market opportunities appear to be favorable.

#### **Coal Development (Figure 11)**

Coal finally slipped to second place of minerals produced in the state during the 1990 calendar year (gross value = 394,213,258). Long-term contracts have become a thing of the past and, as prices soften, competition for each ton of coal sold will become more and more intense. The future of Montana coal production was assisted by the reduction of the state severance tax. However, Wyoming still possesses better quality coal, available at lower production costs and at a lower severance tax.

With the passing of the Clean Air Act, many companies have been shipping test lots to utility companies. Results of those tests may increase sales in future years, but at present have not significantly changed the industry.

Western Energy has started construction of a new processing facility at Colstrip. The \$30 million coal-drying facility will increase the BTU-sulfur ratio and decrease moisture of the coal which will make it more attractive to utilities.

Production from the 8 remaining mines (Figure 11) is:

Table 7

\* 1990 Coal Production for Montana

<u>Company</u>	<u>Mine Name</u>	<u>Tons Produced</u>
Decker Coal	East Decker	2,595,829
Decker Coal	West Decker	6,602,744
Western Energy	Rosebud	12,800,898
Peabody Coal	Big Sky	3,602,851
Westmoreland Resources	Absaloka	4,471,345
NERCO, Inc.	Spring Creek	7,133,285
P.M. Coal Company	P.M.	14,307
Knife River Coal	Savage	234,010
Total		37,455,269

\* Calendar Year

Development of Meridian Minerals' Bull Mountains coal near Roundup is still in the permitting stage.

#### Oil and Gas

Oil and gas exploration remained constant to slightly decreasing. Ten drill rigs were operating in the state a year ago, while seven were operating during the survey period in October.

The price increase above \$25/barrel of oil during the Gulf War eliminated all incentives for exploration. Due to the language with those incentives, they were not replaced when the prices collapsed. Proposed rules and bonding changes are anticipated to further depress any future interest in oil and gas in the State.

Current exploration activity was primarily for gas in the Sweetgrass Hills and oil in the Williston Basin. Pennzoil and Meridian each have tested horizontal drilling in the Basin with as yet unannounced results. Other horizontal drilling was conducted in the Delphia field near Roundup.

All significant activity is confined to known fields. Wildcat wells are few in number and may disappear entirely in the near future without an increase in oil prices and a change in tax structure.