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ITEM 19

MINERAL RESOURCES AND GEOLOGY OF THE **BRUNER PROJECT AREA** BRUNER - EASTGATE MINING DISTRICTS CHURCHILL, LANDER AND NYE COUNTIES NEVADA, USA

for

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EXECUTIVE SUMMARY

The Bruner and Eastgate mining districts (the Bruner project area) are located 12 miles north of Gabbs at the junction of Churchill, Lander, and Nye Counties, Nevada (see Figs. 1, 2, 3). The property (see Fig. 14) includes several past gold producers and prospects. Past production has been more than 110,000 tons, from which over $1.6 million worth of gold/silver were produced, at an average grade of 0.56 ounces per ton, gold equivalent (see section 5.1).

The Bruner gold-silver deposits are part of a Miocene (16 million year old) rhyolitic volcanic center ("vent complex") located at the intersection of several lineaments (major fault zones). These "zones of weakness" formed passageways along which magmas and mineralizing solutions could move upward toward the surface. The magma caused eruptions that formed dome-volcanos and spread volcanic ash over the surface; the mineral-bearing hydrothermal fluids formed thick quartz-adularia-silver-gold veins along faults, veinlets along fractures in the veins and wallrock, and disseminated mineralization in the porous Latite Crystal Tuff country-rock.

Miramar Mining Corp. optioned the property in April 1988, and in December 1988 concluded an agreement with Newmont Exploration Ltd. (NEL) under which NEL would conduct an extensive exploration program (see section 7). NEL mapped the geology, conducted magnetic and other geophysical surveys, a geochemical soil survey, surface and underground rock sampling, and drilled 74 approximately 500-foot exploratory holes.

NEL's initial drilling located 5 targets (see section 6.55) which they considered had open-pit potential. Exploration was then concentrated in the Duluth-target area (see section 6.5), but before the other targets could be tested NEL abruptly terminated its option, even though drilling results continued to be encouraging. Other, similar targets are known in the Eastgate district to the north of the Bruner district but will need additional exploratory work. A preliminary, resource-estimate was made of the Duluth target based on NEL's 37 drill-holes (see section 11.2): **15 million tons containing 385,000 ounces of gold at a grade of 0.026 oz Au/ton.** Because NEL's drilling does not completely outline the Duluth resource, it should be considered as the minimum tonnage available for open-pit, bulk mining (see section 11.12). Numerous other potentially mineable targets have been identified, but have not been drilled sufficiently to establish other resources.

In conclusion, **the Duluth-type targets in the Bruner/Eastgate area have significant potential** (see the 22 factors listed in section 11 and the summary section 11.3) **for open-pit, heap-leach gold-silver production**, but will require additional drilling and detailed geologic, geochemical, and geophysical surveys to prove up reserves. It is recommended that:
(1) the Duluth target be developed by reverse-circulation drilling of at least 18 hole.
(2) the other, Duluth-type, targets be explored by detailed mapping and additional drilling.
(See section 12 for more detailed recommendations).

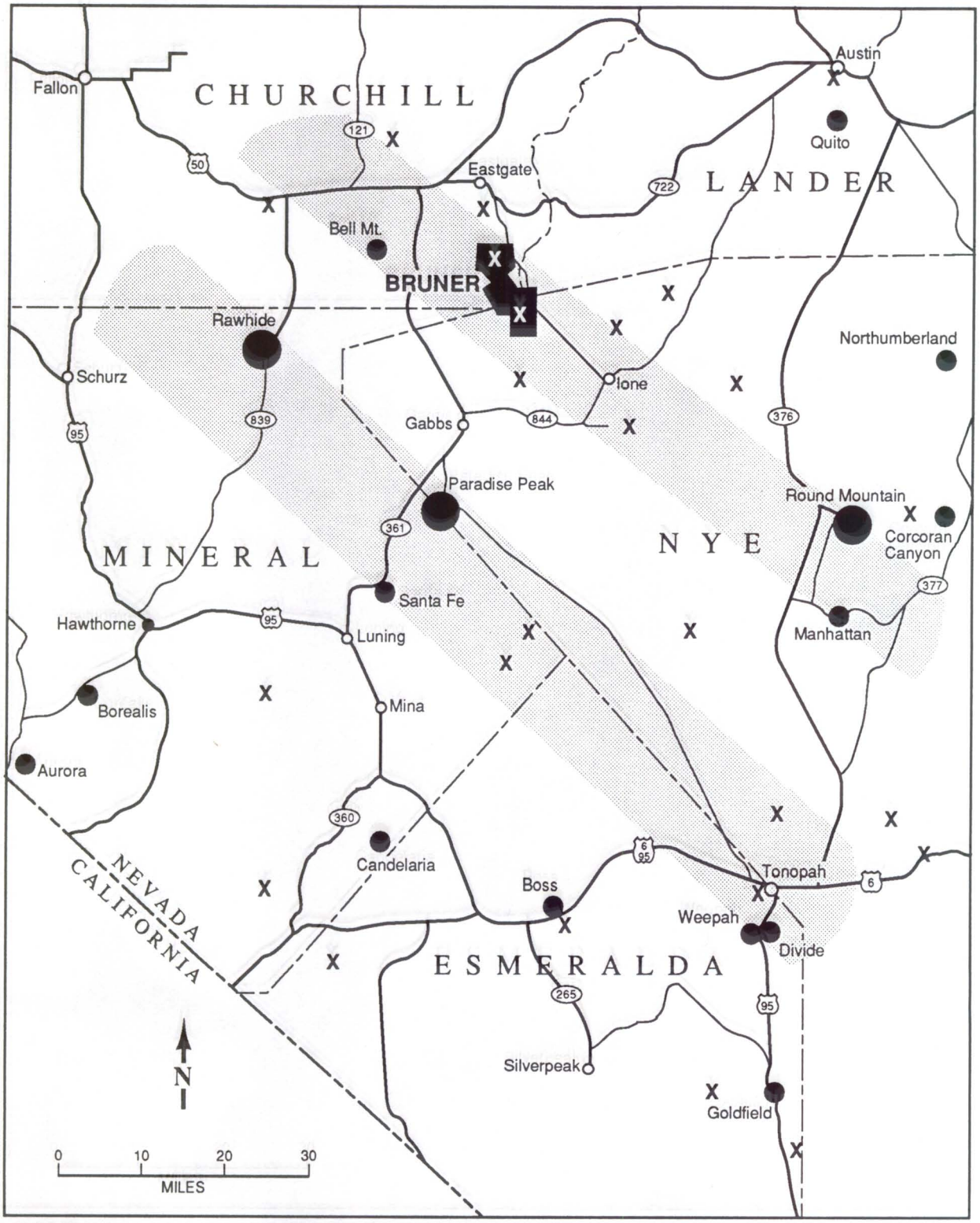

FIGURE 1. RELATION OF BRUNER PROPERTY TO OTHER GOLD DEPOSITS IN WEST CENTRAL NEVADA. Crosses indicate prospects or potential unknown. Big dots are deposits containing more than one million ounces gold; smaller dots deposits containing 100,000 - 1,000,000 ounces. Shaded bands are strands of the Fallon-Manhattan mineral belt.

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1. INTRODUCTION

This report has been compiled from published information, records made available to Miramar Mining Corporation by the property owners, and data provided by Newmont Exploration Ltd. (See Section 12. REFERENCES).

2. PURPOSE AND SCOPE

The report has been prepared at the request of Miramar Mining Corporation. It is a compilation and interpretation of existing geologic data and exploration, development, and mining in the Bruner-Eastgate Mining Districts, Churchill, Lander, and Nye counties, Nevada, USA. The report is intended to provide:

1) a description of the geology, mineral resources, and mining in the Bruner-Eastgate districts.

2) general conclusions about mining potential

3) specific recommendations for exploration of possible targets and known deposits.

3. METHODS OF INVESTIGATION

Existing maps, reports, and other data were first organized into categories (on file at the offices of Miramar Mining/American Eagle [702-324-0310] in Reno, Nevada. The REFERENCE section (12) of this report lists this data. The data was then used to prepare this report, using my general economic-geology expertise (more than 40 years), knowledge of Nevada (30 years), and the Bruner-Eastgate area. No fieldwork was done, although several brief, "orientation" visits were made.

4. GEOGRAPHIC FEATURES

4.1 LOCATION/ACCESS

The Bruner-Eastgate area is located in west-central Nevada, 130 miles east-southeast of the city of Reno (see Figure 2), and 25 miles north of the town of Gabbs. Gabbs is a small town that principally exists to service the nearby Paradise Peak gold-silver mine and Gabbs magnesite mine. The closest significant supply and service centers would be Fallon, 65 road-miles to the northwest, and Hawthorne, 60 road miles to the southwest. The Bruner district is located in

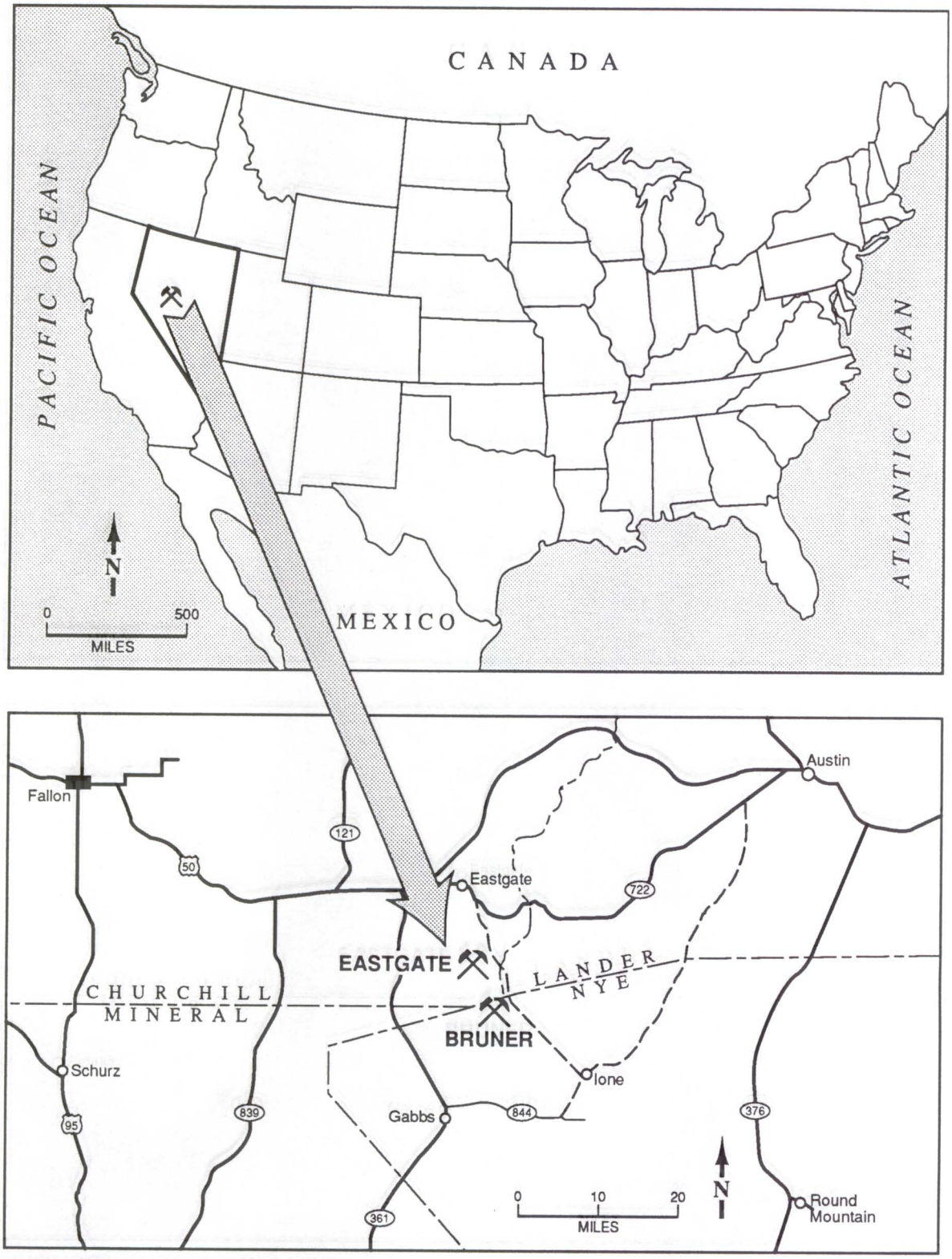

FIGURE 2. LOCATION MAPS

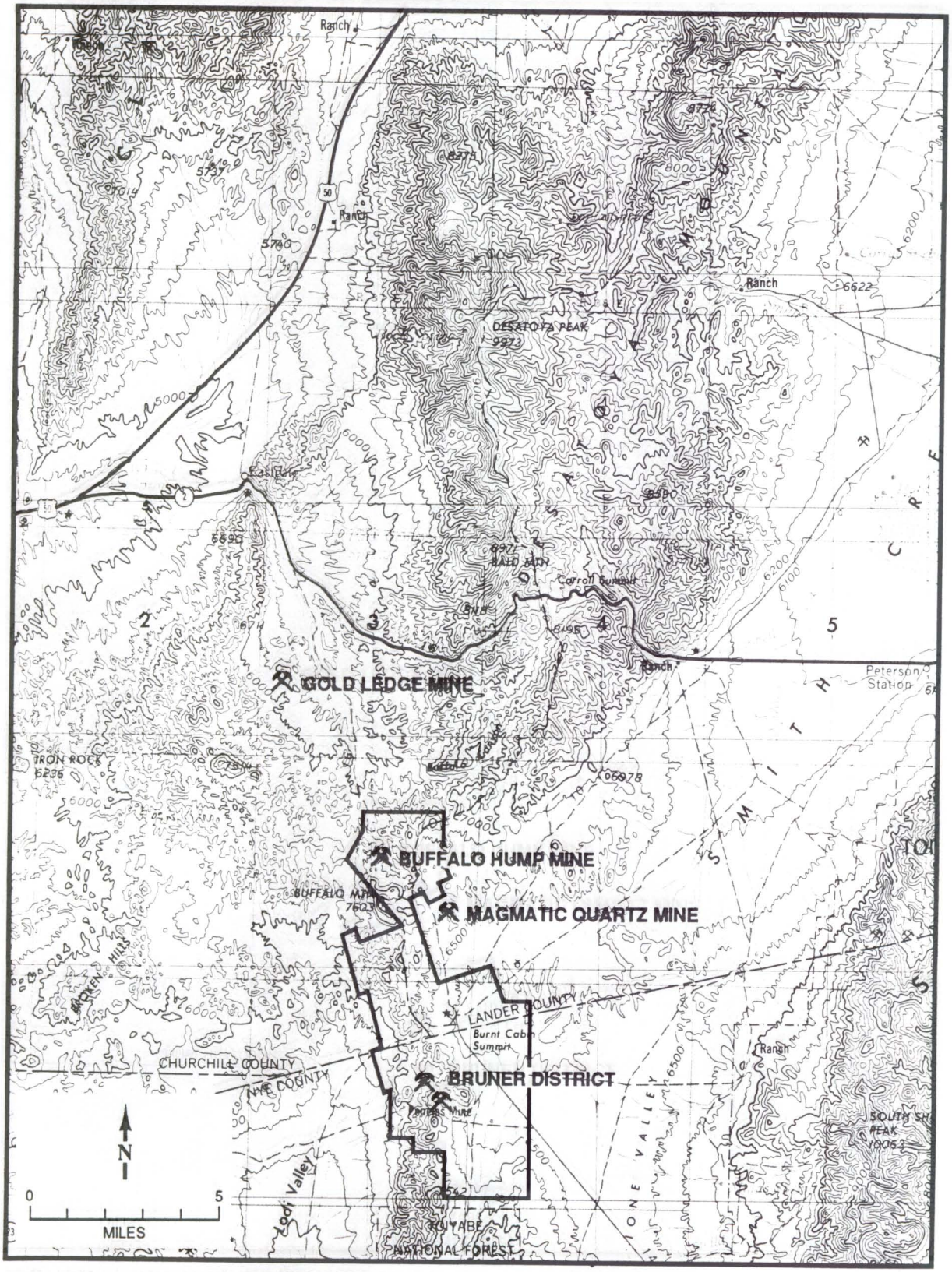

FIGURE 3. BRUNER-EASTGATE AREA. From U.S. Geological Survey Burnt Cabin Summit and Buffalo Summit 7 1/2 minute quadrangle maps. Miramar property outlined.

northwestern Nye County at a latitude of 39° 04' N and a longitude of 117° 46' W, on the U.S. Geological Survey Burnt Cabin Summit 7.5 - minute topographic quadrangle map. The majority of the claims lie in T14N, R37E, but extend into T14N, R36E, The key patented claims lie in Sections 13, 14, 23 and 24 of T14N, R37E; the Eastgate district is to the north in Churchill and Lander Counties, on the U.S. Geological Survey Buffalo Summit 7.5-minute topographic quadrangle map.

The Bruner and Eastgate districts may be reached by following U.S. Highway 50 east of Fallon, Nevada, for approximately 50 miles and then turning south on Nevada State Highway 361 to Gabbs, a distance of approximately 29 miles. Approximately 1 mile north of Gabbs, an unpaved, county-maintained road follows the Lodi Valley north towards Ione. At the 13 mile point, at a cross roads, an un-maintained dirt road turns east and leads to the Bruner property, a distance of 3 miles. Parts of the district may be inaccessible in the winter because of snow, although snow fall generally amounts to less than a foot in any one year.

4.2 CLIMATE

The climate is arid, with hot days and cool nights in the summer, and cold nights and cool days in the winter. Summer temperature may reach 100° F; winter lows may reach -20° F. Precipitation is less than 4 inches. Prevailing winds are from the west and range from calm to windy as fronts pass through the area. Up-slope winds occur during the day as the sun warms up the air; down-slope winds can be quite strong in the evening as the sun sets and temperatures drop rapidly.

4.3 TOPOGRAPHY

The Bruner mining district is in the north end of the Paradise Range; the Eastgate district is in the Desatoya Mountains to the north. Together they make up one of the long narrow, north-south-trending ranges separated by long, flat basins making up the Basin & Range geographic province in Nevada. Because rivers do not drain into the ocean, the Nevada part of the Basin & Range is called the Great Basin. The Paradise-Desatoya range has a steep western face dissected by steep-walled canyons, and a gentle east slope. The highest point in the north end of the Paradise Range has an elevation of 6,989 feet; Lodi Valley on the west has elevations of 5,000-5,690 feet; and Smith Valley to the east, elevation of 6,300-6,600 feet. The highest point in the south end of the Desatoya Mountains is Buffalo Mountain (elevation 7,603 feet).

4.4 VEGETATION

The Bruner-Eastgate area is thinly wooded with a mixture of juniper and pinon pine, as well as sagebrush, rabbit brush, desert peach, and other shrubs. Willows, cottonwoods, choke-cherry, and aspens grow along the deeper canyons. Lodi and Smith Valleys are covered by sagebrush, rabbit brush, and other smaller shrubs.

5. MINING HISTORY

5.1 BRUNER (PHONOLITE) MINING DISTRICT

The history of the district can be divided into 6 periods:
* 1906 - 15: development and mining of individual mines;
* 1915 - 25: purchase and mining much of the district by Kansas City - Nevada Consolidated Mines Company;
* 1926 - 42: the major period of mining;
* 1948 - 49: some mining by lessors;
* 1978 - 87: Jesse Wilson operations;
* 1985 to date: drillhole-geologic-geochemical-geophysical exploration.

The gold deposits were discovered circa 1906. Reportedly, surface showing of gold telluride were the largest ever seen (Western Nevada Miner, 18 Dec 1915). Several different towns existed in the early days. The townsites of Phonolite and Duluth were platted in 1907 (Paher, 1970). Phonolite had a post office from January 1907 to July 1909. Duluth had a post office from April to December 1907. Bruner (which was at the same site as Phonolite) had a post office from October 1910 to January 1912, and from December 1915 to June 1920. (Garnett & Paher, 1982).

The following is an abstract of Tipton (Jan 82): The district was first called Phonolite, and like the town, was named for the volcanic rock phonolite (rhyodacite) which makes up much of the district. Phonolite is named for the ringing sound it makes when struck. *"This camp was the most advertised of the towns born with the strike, and the Paymaster was the most notable claim."*

Duluth, named for the Michigan city, was to the southwest and separated from Phonolite by a hill. *"This camp was promoted by the Mohawk-Duluth Mining Company of San Francisco who obtained a number of claims.....The Black Mule Claim, owned by David Fife and William Bills became the best known of the claims at Duluth and the center of the mine workings. In 1906 a 625 pound specimen estimated to contain $1200 in gold was displayed in brokerage houses around the state to promote the properties of Duluth. The rock was found in a strike made on the Fife properties. In 1907 ore sacked from the surface was reported to run from $30 to $500."*

"Henry (Bill) William Bruner came to Phonolite from Goldfield during the money panic of 1906....[and] began acquiring mining claims for Kansas City speculators."

"Large milling improvements were contemplated .....and an ample source of water had to be found.....In February 1907 it was decided that the water would be piped from Lebeau Creek across Ione Valley, a distance of nine miles at a cost of about $40,000. [The] Phonolite Townsite and Water Company was incorporated, and the promoters laid out an elaborate townsite with an electric plant and water system. The streets.....were named for various states....Those running the other direction were named for minerals: Lead Street, Copper Street, Silver Street, Gold Street, Mercury Street, and Manganese Street. All of this imaginative planning was to little avail, however, for the camp was soon a financial failure, and the post office closed in 1909"

PRODUCTION OF BRUNER DISTRICT 1920 - 1990

Year	Ore Tonnage		Value ($)	Gold Price (US$/oz)	Equivalent Gold(oz)	Actual Recovered Gold(oz)	Silver(oz)
1920 [2]	750		?	20.67	420.0 [4]		
1924 [2]	50		12,000	20.67	20.7		
1926	2,755		74,765	20.67	3,617.1		
1927	3,957		140,800	20.67	6,811.8		
1929	20,039		326,848	20.67	15,812.7		
1930	1,200		19,500	20.67	943.4		
1935	724		20,343	35.00	581.2		
1936 [1]	771	(13,821)	175,823	35.00	5,023.5	(3,992.5	16,877)
1937	16,302		191,382	35.00	5,468.3		
1938 [1]	16,108	(17,447)	212,475	35.00	6,070.7	(5,585.0	16,679)
1939	18,038		231,279	35.00	6,608.0		
1940	19,574		155,365	35.00	4,439.0		
1941 [2]	5,000		88,710	35.00	2,534.0	1,506.0	18,079
1942 [2]	71		2,117	35.00	60.4	37.0	411
1948	147		6,606	35.00	188.7		
1949	9		378	35.00	10.8		
1980 [2]	3,100		?		162.0 [3]	162	47
1981 [2]	1,000		?		48.0 [3]	48	72
TOTAL	109,595		1,658,391.00		58,820.3		

Data from Kleinhampl and Ziony (1984) unless otherwise indicated. Calculates to average recovered grade of 0.56 ounces per ton, gold equivalent.

[1] Penelas Mine production shown in (-) where inconsistent with Kleinhampl/Ziony.
[2] U.S. Bureau of Mine statistics
[3] actual gold only
[4] calculated using 0.56 oz/ton gold equivalent

Although little money was available, *"Bruner plugged away developing and acquiring more holdings. It was during this time that he made a shipment of ore which was the only shipment made up to the time the mill was completed.....Bruner was affiliated with two mining groups, the Phonolite Paymaster Mining Company and the Phonolite Silent Friend Mining Company. In the later part of 1915 the companies merged and called themselves the Kansas City Nevada Consolidated Mines Company. The new company was set up with a capitalization of 6,000,000 shares and began extensive exploration work."* There were about a dozen prospectors in the district in 1914; the company hired "between 16 and 19 men."

Bruner was general manager and director of operations. *"In 1916 the company paid $25,000 cash for [the Derelict] claims below the summit just west of Duluth. These were purchased from David Fife and William Bills, who had earlier promoted the mining excitement at Duluth.....[they had worked] the ore with an arrastra."*

[The Company immediately] *"began formulating plans to build a [cyanide] mill and complete the pipe line that had been planned at the time of the original gold strike. In order to raise the necessary funds, they increased the stock capitalization another 1,000,000 shares and later sold bonds for additional money.....As the years went by, the camp was more frequently called Bruner and less often Phonolite"* and the post office was renamed Bruner. Bruner *"reached its peak at about 30 persons."*

The pipeline was finished in 1919. It was *"made of redwood wrapped with steel wire"* and was buried *"to keep the pipe from freezing.....with an abundance of water on its way, construction started [1919] on [a 50-ton] mill [at the Paymaster].....The Denver Engineering Works got the machinery contract....Instead of the traditional stamps, the grinding in the new plant was to be done by a ball mill. Two large diesel engines were set up to furnish the power. In a matter of months the large modern mill was finished.....The fabulous new 50 ton mill at Phonolite ran only a month or two after it was completed in 1915. The one bullion bar that was made was shipped to San Francisco bringing about $2,000. Since there were about $3,000 in outstanding debts....[the mill was] shut down.....in spite of good milling operations the ore was too broadly disseminated through a large area, and proved to be trading dollars, which considering the enormous difficulties and hardships encountered warranted the closing of the mills."* (Fallon Standard Newspaper, 19 Aug 20).

Exploration did continue and the mill converted to custom milling. In *"1922 the Phonolite mill turned out its second bullion bar which was immediately taken to Reno for promotional purposes before it was sold. By utilizing ores from the mining districts of Telluride, Mammoth, and Broken Hills, [and Bruner].....the plant [was kept] running for over a year....The mine and mill holdings of the Kansas City Nevada Company were sold at a sheriff's sale in Tonopah January 17, 1925 and was purchased by representative of the bond holders. In the summer of 1926 the mill was being operated by the Golden Eagle Mining Company"*

"The old town of Phonolite was gradually moved across the summit to the mill and by August of 1926 the boarding house and seven cabins were at the new location. The company was at that time constructing a four-car garage on the new townsite, and planned to move all the rest of the buildings but one from the old settlement. Storage tanks with the capacity of 90,000 gallons supplied water for

the town and mill....In addition a storage reservoir [was built]. This water was utilized in milling operations and as a winter source of ice which was in good demand in nearby camps," [and was being trucked to the dry camps of Broken Hill and Quartz Mountain].

"Ore being mined at the Golden Eagle properties, the Duluth and Paymaster, was averaging $42 a ton. Eight men were working the mines and some rich ore showing quantities of free gold was found in a small streak in one of the tunnels. These two mines, located about 1 1/2 miles apart, yielded small but steady returns over a number of years. Some of the lower grade ore, assaying about $4.10 was used as fill in the reservoir....Sometime in the waning days of Phonolite, the mill was shut down and a watchman was hired....One night after he had worked in the mill building....welding on his automobile, the mill went up in flames. It is presumed that a spark from the welding torch had smoldered un-noticed until late at night. The cause of the fire was a matter of some speculation, however, since the property was amply insured" (Tipton, Jan 82).

"As the sun was setting on Phonolite [Bruner], a new era dawned just over the hill [to the south] at a camp called Penelas. This camp was named for Silverino Penelas, a Spanish prospector, who had been patiently working more than 40 claims that he had acquired while prospecting the Duluth area....[since] about 1913."

"In 1923 Penelas was working 17 claims on the Leader Group adjoining the Duluth Mine [on the east]. He had a shaft down 110 feet and was using a windlass to hoist the muck. The shaft was sunk on a hanging wall vein, intersected a cross fissure of gold ore, and reached a foot wall vein which showed free gold in open cut. Samples of this ore reportedly showed a ratio of one ounce gold to five ounces silver....By 1928 Penelas had extended his workings along the Leader veins to a depth of a hundred feet and a length along the vein of 250 feet....Penelas wheeled the muck to the shaft, piled it up, and continued to do so until the drift was completely filled, leaving only a small space at the top to crawl over." Penelas died in 1931.

"In 1931 Louis D. Gordon, manager of the Nevada Porphyry Gold Mines, Inc., at Round Mountain secured an option on the Penelas claims. He started development work, but immediately found himself in a property dispute with Kay H. Beach, manager of adjacent Duluth property....[after] the suit was settled, Gordon was able to buy the property."

"By 1935.....a full-sized mining camp began to grow out of the forest, ...[the] Penelas Mining Company was incorporated. Lou Gordon acted as manager of the company which was owned by himself and Mr. and Mrs. R.H. White, of the White Sewing Machine Company and the White Automobile Company."

Penelas *"consisted of a mine office, store house, assay office, [and] twelve family homes, four two-man bunk houses, two four-man bunk houses, and other living quarters to accommodate a total crew of fifty workers. All of the dwellings had electric lights, radios, and the nicely painted family homes each had an electric refrigerator. Water was piped into many of the dwellings....A well for the water supply was sunk 580 feet....A four inch pipeline was laid 6,000 feet to the mill....A radio broadcasting station was set up to send messages quickly to Fallon."*

"The geological formation in which the ore bodies occurred was andesite and rhyolite intruded [by] diorite dikes. The ore shoot, being principally gold with some silver, was about 250 feet long with an average width of about four feet. The mill, equipped to treat 40 tons of ore a day, operated by the cyanide process. It came into full production in 1936 utilizing ore from bodies at a depth of 300 feet. About 30 men working three shifts were employed...." (see Section 5.14 for production statistics)

"The mine and mill at Penelas continued in production until 1941 when the supply of pay ore was finally exhausted....the equipment of the mill was sold at public auction....and the houses were sold and moved or abandoned to the elements. A small mountain of glaring white cyanide tailings and a few mill foundations are all that remain of what was once [called] the most modern mining camp in Nevada" (For more information on individual mines see Sections 5.11-5.16, below).

From north to south, the mines are:

5.11 Paymaster. The *Paymaster* mine, on a conical hill at the north end of the Paradise Range (see Fig. 4), was developed as early as 1906. It was purchased by the Kansas City - Nevada Consolidated Mines Co. in 1915. The mine is developed by a 375-foot shaft with 2,000 feet of workings on three levels (see Fig 6). Values were mainly above the 1st (125-ft) level in a poorly defined zone requiring careful selective mining. Kral (1951) states that building the mill *"was apparently unjustified as no recorded production is shown for the company"* and that *"little or no work has been done since about 1923."* However, in 1978, Jesse R. Wilson purchased much of the district; he developed the Paymaster area into an *in situ* cyanide-leach operation, capable of producing 2 oz gold/day. A 0.04% sodium cyanide solution was poured on benches and down oblique drill holes, perculated through the orebody, collected in the old workings, was pumped from the old shaft to an activated-carbon tower which stripped the gold and silver and regenerated the solution which was piped to a holding tank to be recirculated. Wilson also assembled a 300-ton cyanide mill which from 1980 to 1986 was used to treat open-pit ore from the Paymaster as well as ore from the "Amethyst Pit". Only incomplete production records exist for the *in situ* operation and open-pit ore.

5.12 Bruner. The *Bruner (Phonolite)* mine is about a half mile southeast of the Paymaster on the east slope of the Range. The workings include the 1,000-ft, east-west Phonolite adit (see Fig. 3), several shafts, and (?) other workings. Garside (Aug 81) lists the Bruner and Phonolite as separate, adjacent mines as does the topo map (U.S. Geological Survey, 1969B). Quin (Jul 90, Fig. 4) calls it the *"Bruner Prospect"*, and Garside (Aug 81) states that production was *"probably none"* for both "mines".

5.13 Duluth. The *Duluth (Black Mule; Ole Peterson; Golden Eagle; July Lode)* is just south-southwest of the Bruner-Phonolite, mostly on the west flank and crest of the Range (see Figs. 4 & 5). Exploration and development began in about 1906 by the Golden Eagle Mining and Milling Company. From 1936-44, the mine yielded $70,000 in gold and some silver. From 1980 to 1986, Jesse Wilson mined the July vein; mostly by open pit methods but also to a limited extent underground; the ore was milled at his mill on the Paymaster. No production records were kept. The mine is developed by two adits (Lower and Upper Tunnels) with over 1,000 feet of workings, stopes, and three (Hagarth, Grag, and White) shafts. Ore occurs mainly in a chimney-like, 8 x 14 foot ore shoot which has been mined to the surface (70 ft).

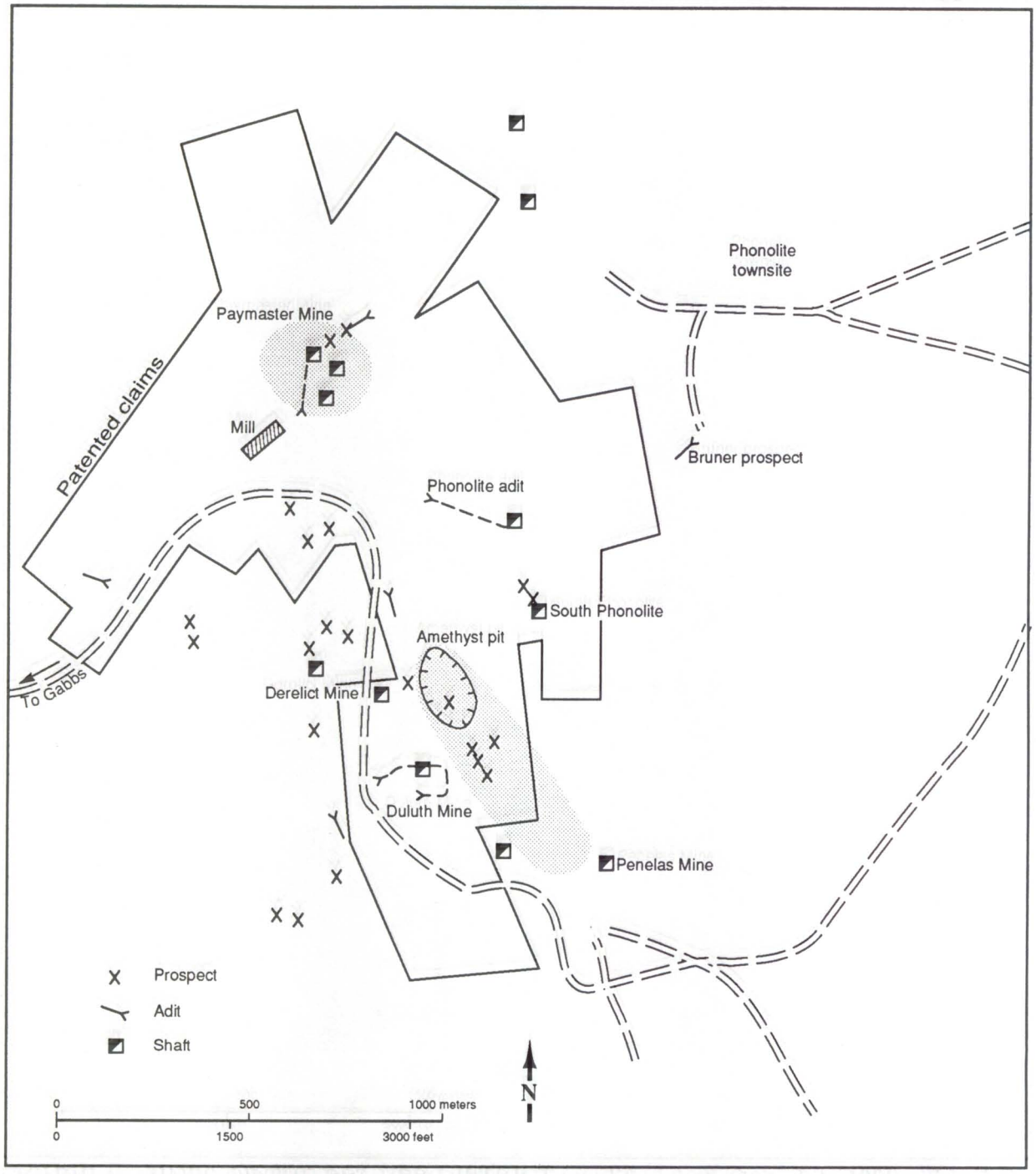

FIGURE 4. MINES OF THE BRUNER DISTRICT (modified from Quin, July 1990). Stippled areas worked by Jesse Wilson.

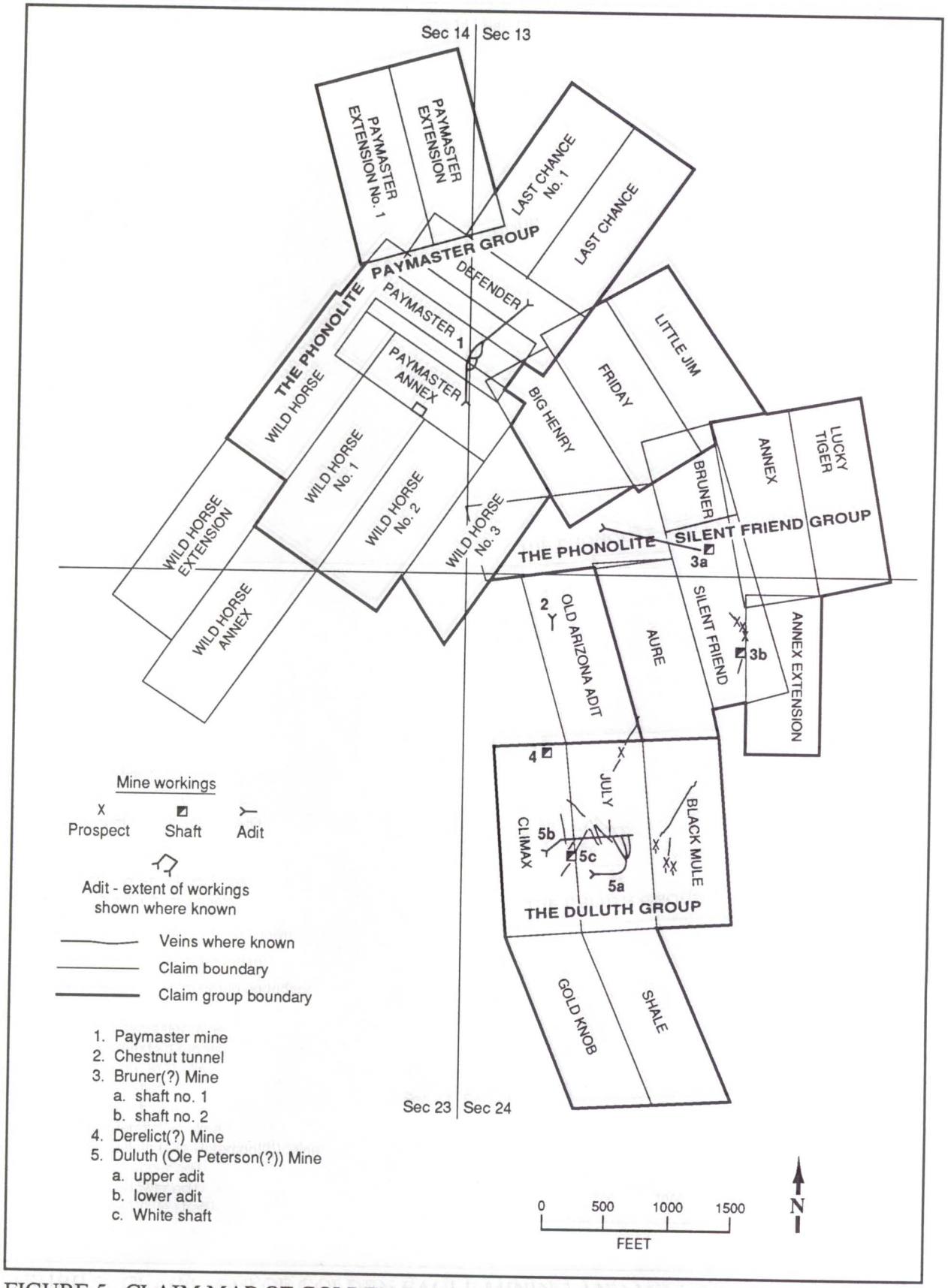

FIGURE 5. CLAIM MAP OF GOLDEN EAGLE MINING AND MILLING COMPANY, BRUNER DISTRICT (from Kleinhampl and Ziony, 1984).

5.14 Penelas. The *Penelas Mine* is southeast of the Duluth in the southeast part of the district on the east flank of the Range (see Fig. 4 & 8). From 1931 to 1942 the mine was operated by the Penelas Mining Co. The ore was exhausted in 1941. The Penelas Mine had produced (U.S. Bureau of Mines statistics):

Year	Tons	Gold (oz)	Silver (oz)
1935	183	517.81	3,437
1936	12,821	3,932.51	16,877
1937	15,945	4,707.00	28,209
1938	17,477	5,585.00	16,679
1939	18,069	6,347.00	13,883
1940	10,550	3,366.00	22,161
1941	5,000	1,506.00	18,079
1942	71	37.00	411
TOTAL	81,116	25,998.32	119,736
AVERAGE		0.321	1.476

The ore occurred in two veins. The workings include the 1,000-ft, 73° inclined Penelas shaft and 4,000 feet of workings on nine levels spaced 100 feet apart. The 6th, 7th and 8th levels were the most productive; no ore was found below the 900-foot level. The vein was 55 feet wide on the 700-foot level.

5.15 Derelict. The *Derelict* mine is immediately northwest of the Duluth (see Fig 3). The property consisted of two claims. The workings include a steeply inclined, 300-foot shaft. There is no recorded production, although shipments reportedly were made in 1939, and Jesse Wilson reportedly did some open-pit mining in the 1980's. In 1979, Morrison Knudsen drilled 9 core-holes on the property (see section 6.2).

5.16 Bruno Prospect. The Bruno prospect is immediately northwest of the Paymaster Mine, in the northernmost part of the Paradise Range. There are several pits, short adits, and "shafts" on the property. In 1987, Inspiration Gold, Inc. and Callahan Mining Corp. entered into a joint venture to explore the area by conducting: (1) detailed (1 in. to 200 ft) geologic mapping; (2) sampling (83 rock-chip & 10 soil); and (3) reverse-circulation drilling (totalling 2960 ft in 11 holes) was done. (Ernst, 1989 and 1988). *"Anomalous gold (to .028 opt) and silver (to .072 opt)[was found] in narrow zones (to 5 feet) in rhyolite flows that underlie the tuffs. Mercury is locally anomalous (to 2.08 ppm) in argillized tuff and quartz-veined rhyolite flows"* (Ernst, 1989). In 1990, Newmont Exploration drilled three additional holes (see section 6.45).

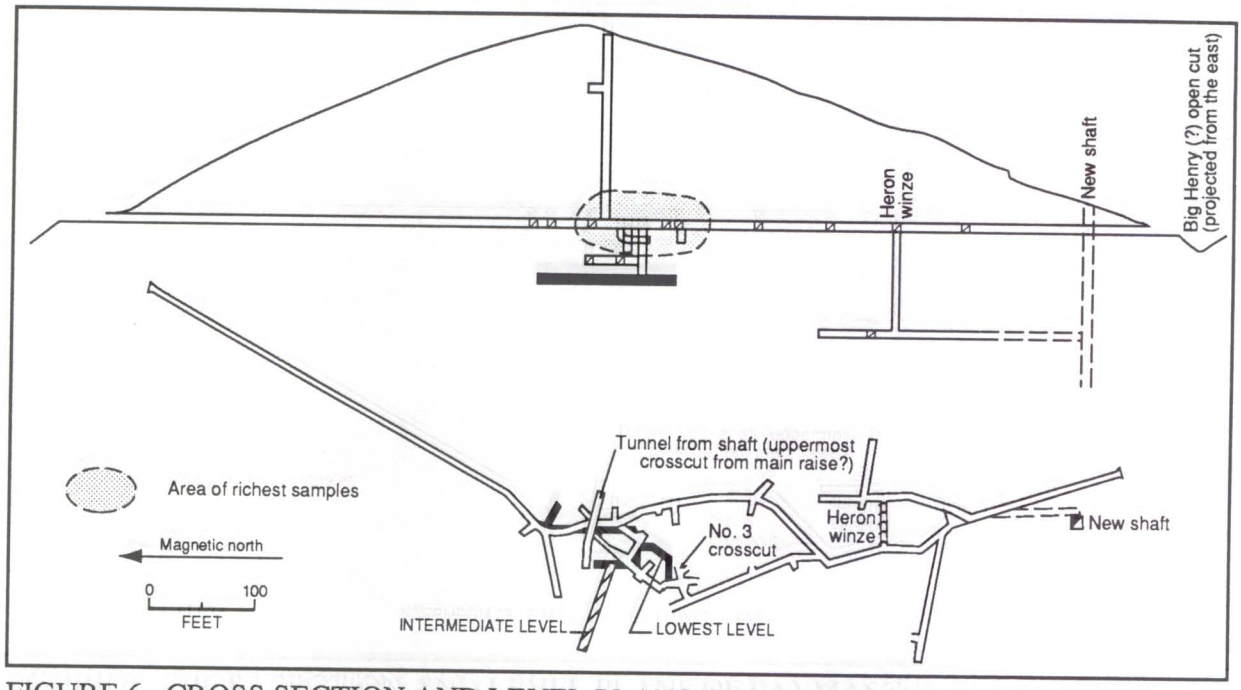

FIGURE 6. CROSS SECTION AND LEVEL PLANS OF PAYMASTER WORKINGS (modified from Kleinhampl and Ziony, 1984).

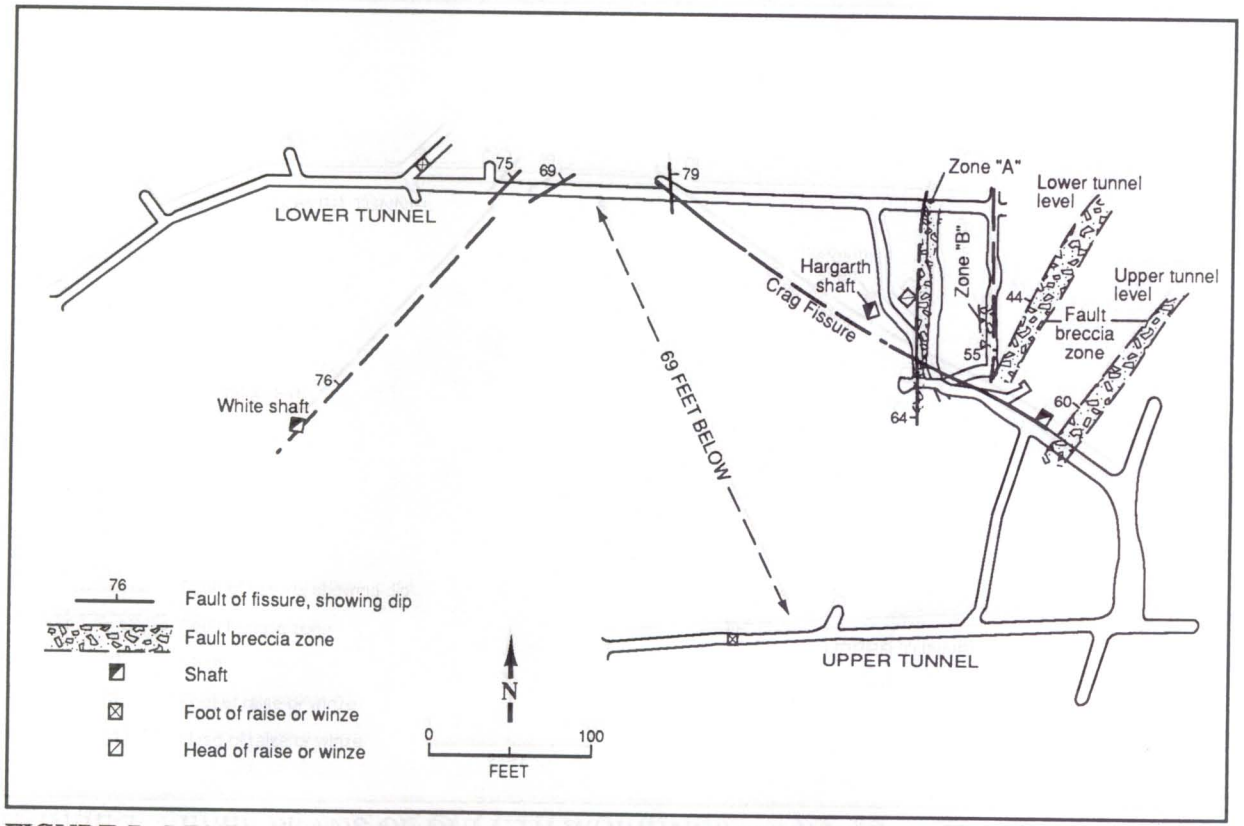

FIGURE 7. LEVEL PLANS OF DULUTH WORKINGS (modified from Kleinhampl and Ziony, 1984).

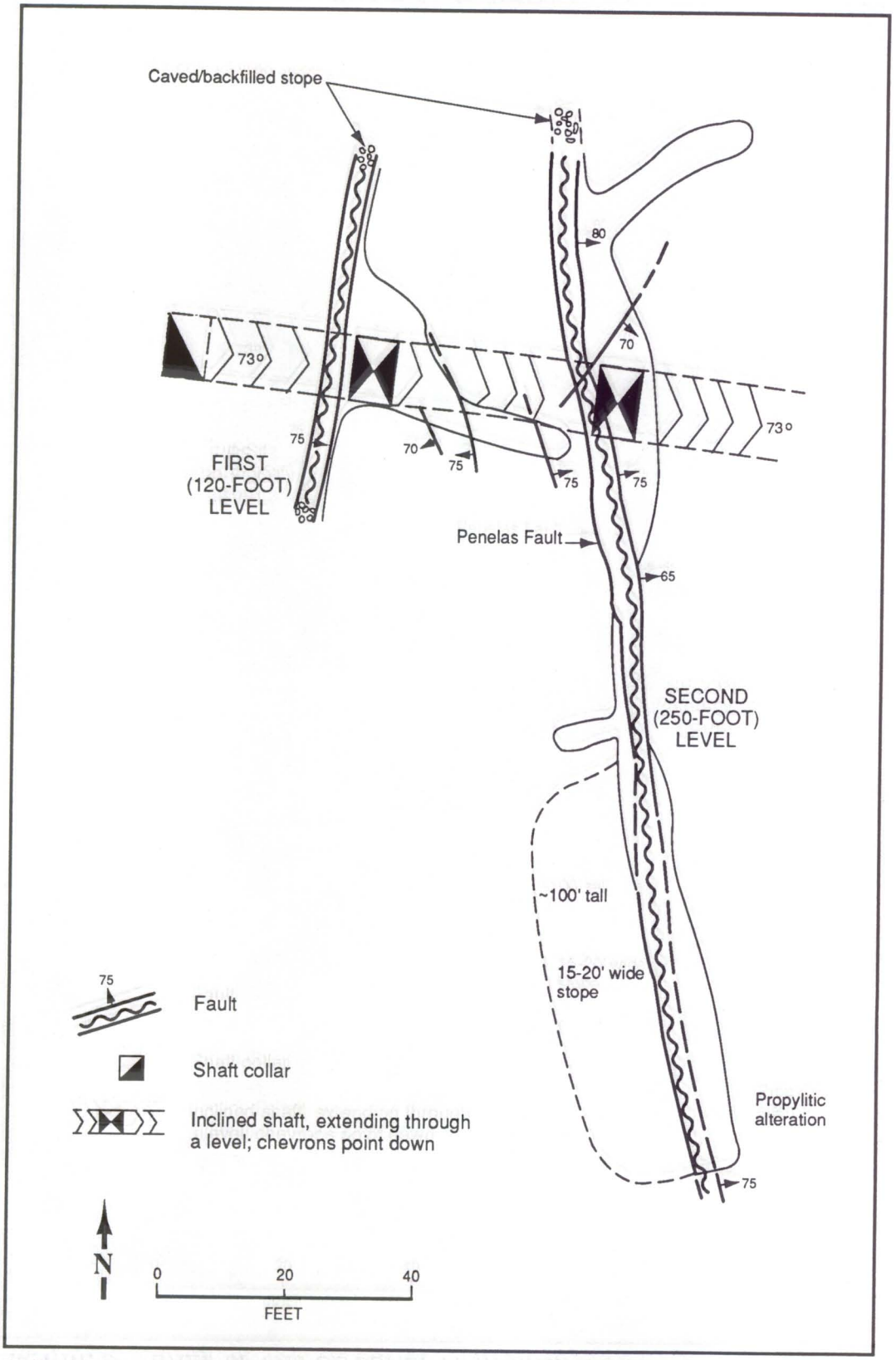

FIGURE 8. LEVEL PLANS OF PENELAS WORKINGS (after Newmont, 1990).

5.17 Steen (Logos). The Steen property (Logos Claims) is just north of the Paymaster Mine, south of Burnt Cabin Summit. In 1987, Pegasus Gold Corp. did surface sampling and Miramar drilled one hole on the property. Essentially no mineable grade material was encountered (Pegasus Gold Corp. records, 1987).

5.2 EASTGATE MINING DISTRICT

The Eastgate district extends north from the Bruner district for about 10 miles. There is no concentration of mines and prospects like at the Bruner district; but only a few scattered mines and prospects. From north to south these are:

5.21 Eastgate. The Eastgate (Gold Ledge/Double Eagle) Mine is in a canyon on the steep west flank of a west spur of the Desatoya Mountains, 3 miles (5 road-miles) south of Eastgate (see Fig 3). The property was located in 1906, was worked intermittently by various individuals and companies, and shipped $20,000 worth of ore by 1940. One shipment contained 0.91 ounces gold, and 13.44 ounces silver per ton, and 2.0% lead. Morris (10 Jan 90) mentions *"production grades of 0.27 oz/t Au and 4.3 oz/t Ag."* A sample from the main vein contained 0.47 ounce gold and 2.04 ounces silver per ton (and a trace of lead); a sample from the east vein ran 0.073 gold and 0.29 silver (Willden & Speed, 1974, p. 68, 70-1). The mine is developed by two adits. The 375-foot Double Eagle Adit connects with a 300-foot, inclined shaft with short drifts on 4 levels; the 400-foot Gold Ledge adit, to the north (see Fig. 7), has a 50-foot raise or shaft to the surface. Both adits have stopes. High-grade values were in three parallel quartz veins in a shear zone.

In 1987, Freeport McMoran Corp. drilled 7 "rotary" holes totalling 3,600 feet, and collected 600 rock-chip, underground channel, and soil samples. *"Their exploration target was several million tons of high grade precious metal mineralization with intervening higher tonnages of lower grade material. Freeport concluded that the prospect was extensively mineralized, well developed and capable of producing a small but significant economic deposit. This proved unattractive to this large mining corporation and Freeport dropped their option late in 1987."* (Morris, 10 Jan 90).

In 1988, U.S. Borax & Chemical Co. drilled 10 holes totalling 4,675 feet, took 181 surface rock chip and 41 underground channel samples, and mapped the alteration and geology. *"The most significant result of the Borax work was a drill intersection of 0.343 oz/t Au over 15 feet in hole EG-4 at a depth of 545 feet* (see Fig. 8)*....Borax like Freeport concluded that the Eastgate Project had gold potential for a small to moderate tonnage high grade deposit but this was not within their corporate target."* (Morris, 10 Jan 90).

In October 1989, Mincon Atlantic Ltd. (wholly owned subsidiary of Cabot Resources Corp.) optioned the property from Borax. Nine channel samples were cut, testing a 500-ft strike length of the vein structure. Values ranged from 0.213 ounces gold and 3 ounces silver per ton over a width of 4 feet to 1.17 ounces gold and 19 ounces silver per ton over a width of 6 feet. A fan of 5 reverse circulation holes were drilled (see Fig. 11) confirming *"the high-grade values in the Eastgate Vein."* (Cabot Resources, 17 Aug 90).

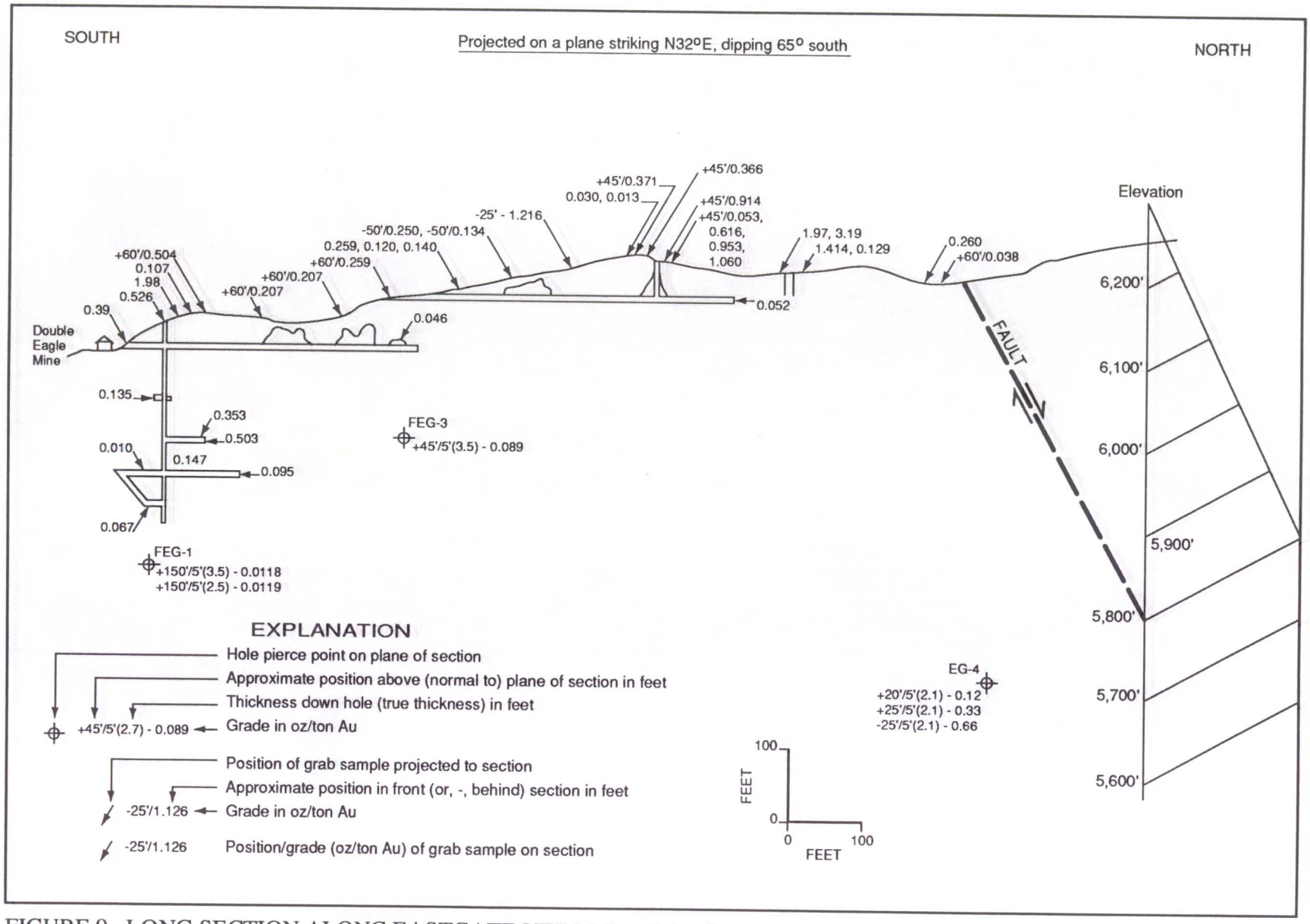

FIGURE 9. LONG SECTION ALONG EASTGATE VEIN (after Cabot Resources, May 1990).

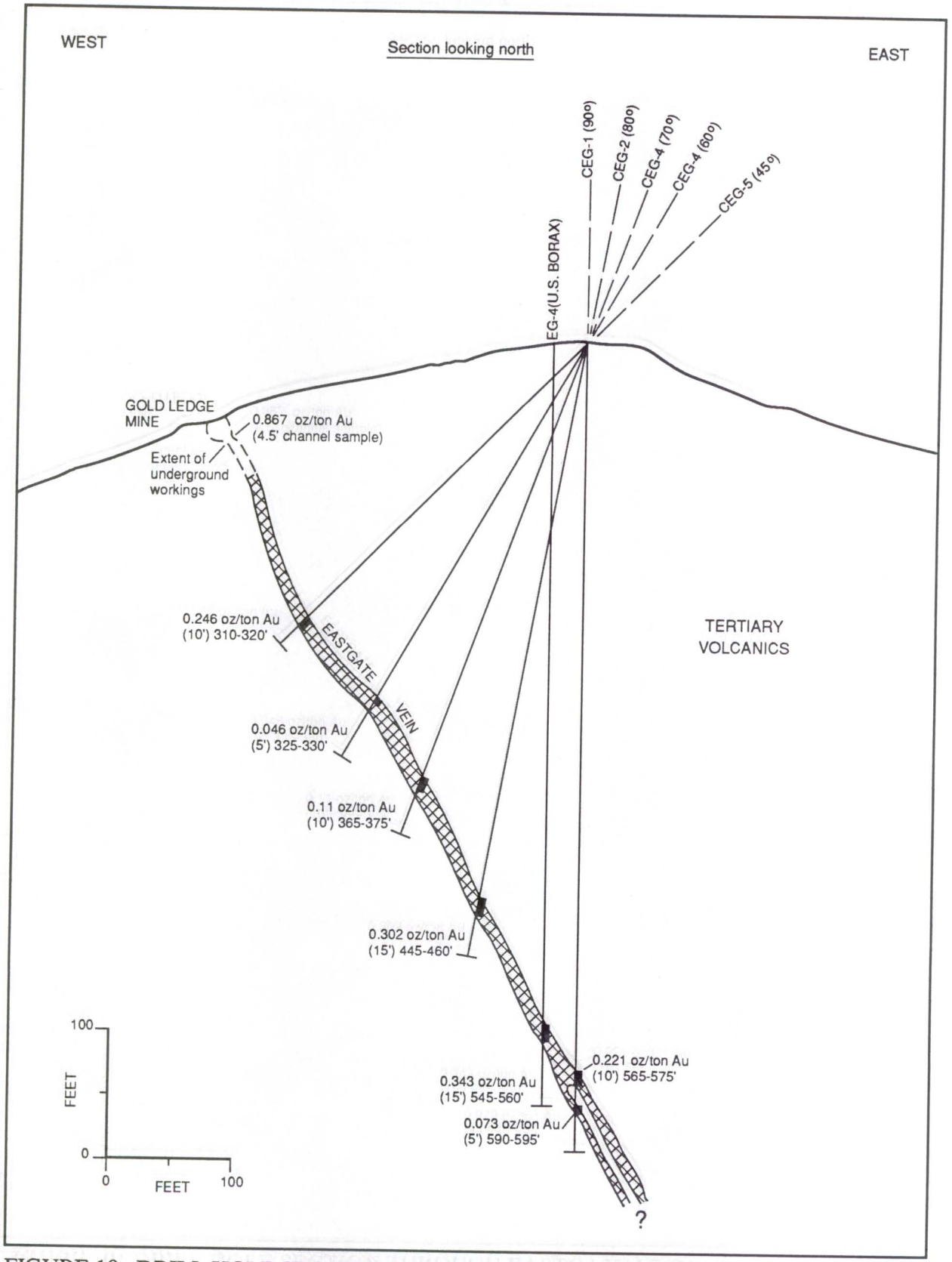

FIGURE 10. DRILL HOLE SECTION THROUGH EASTGATE VEIN (after Cabot Resources, May 1990).

5.22 Buffalo Hump. The Buffalo Hump Mine is in southeast Churchill County on the crest of the ridge west of the Buffalo Creek road, 5 miles southeast of the Gold Ledge Mine and 2½ miles northwest of the Magmatic Quartz Mine. The deposit was probably discovered shortly after 1900. It is developed by several adits (longest about 400 feet), an inclined shaft, drifts, crosscuts, and interconnecting winzes and raises, together totalling over 1500 feet (see Fig. 11). Vanderburg (1940) reports that several carloads of ore have been shipped; the only documented shipment was in 1936 - - - 24 tons averaging 0.5 ounces gold and 5½ ounces of silver per ton. Since the 1930's some gold has been produced intermittently, using crude experimental methods. Willden and Speed (1974, p. 69-71) made a sample map of the workings.

Atlas Precious Metals, Inc. optioned Buffalo Hump in 1984-85; they did surface mapping; rock-chip and soil sampling; and drilled six, 300-ft, vertical, reverse circulation holes. High values were found in quartz pods but did not extend into the wall rock - - - there does not appear to be a stratabound, bulk-mineable, gold-silver deposit in the upper, 300-ft of the hill. The property was optioned (10 Feb 89) by Miramar (White, Aug 90). Deeper drilling is needed to check out possibilities below 300 feet, and test adjacent areas.

5.23 Magmatic Quartz. The Magmatic Quartz (Aspen; Highland) Mine is 3 miles southeast of the Buffalo Hump Mine in Lander County on the east slope of the Desatoya Range. The gold deposits were discovered in *"about 1907, and two prospectors names Rope and Reader explored the area extensively between 1908 and 1911....Reeder shipped some ore [to] the Illinois Mine smelter [that ran] $240 per ton"* The camp was called Aspen, and the mining district Telluride. For a while, after 1911, *Silverine Penelas relocated [and operated] the property....In February 1931, 12 claims covering most of the vein system at Aspen were located by V.S. Baxter, M.C. Stromer, John Berlin, and George Lerchen. They cleaned out Reader's old shaft, retimbered it, and extended it to the 100 foot level in an attempt to located the highgrade shoot. They made only one shipment and soon left the camp of Aspen to the rattlesnakes and jackrabbits."* (Tipton, Jan 82). Only one vein is developed by a 75-foot inclined shaft, with a drift extending north from the shaft for 90 feet, and a drift extending 30 feet south. The other veins have only pits and trenches along their length which can be traced for up to a mile. *"About 1000 tons of handsorted ore has been shipped from the shaft and vicinity assaying from $100.00 to $400.00 per ton"* (McGill, 1938; Reynolds, 9 Jan 39). The property is on two claims: Quartz No. 1 and Quartz No. 2 held by Legend Corporation (Frank M. Lewis).

5.24 Minnova Property. The Minnova (U.S.) Inc. property is south of the Magmatic Quartz Mine in Lander County. Little exploration has been done although apparently some sort of geophysical survey has been made for Minnova.

5.25 Chalk Wells. Chalk Wells is 4 miles northwest of the Bruner district, in Churchill County. There are *"three shafts, 2 about 10m deep, one 25m deep [and] several small pits.... just 0.5 km southwest of Chalk Wells (site)"* (Garside, Aug 82). The workings are in altered Tertiary volcanic rocks. Circa 1986, Inspiration Gold, Inc. did gold exploration here (details are not available). In May 1989 Newmont Exploration examined the area, located 54 claims and drilled a 210-foot hole. The cuttings were reportedly disappointing. (White, 14 Aug 90).

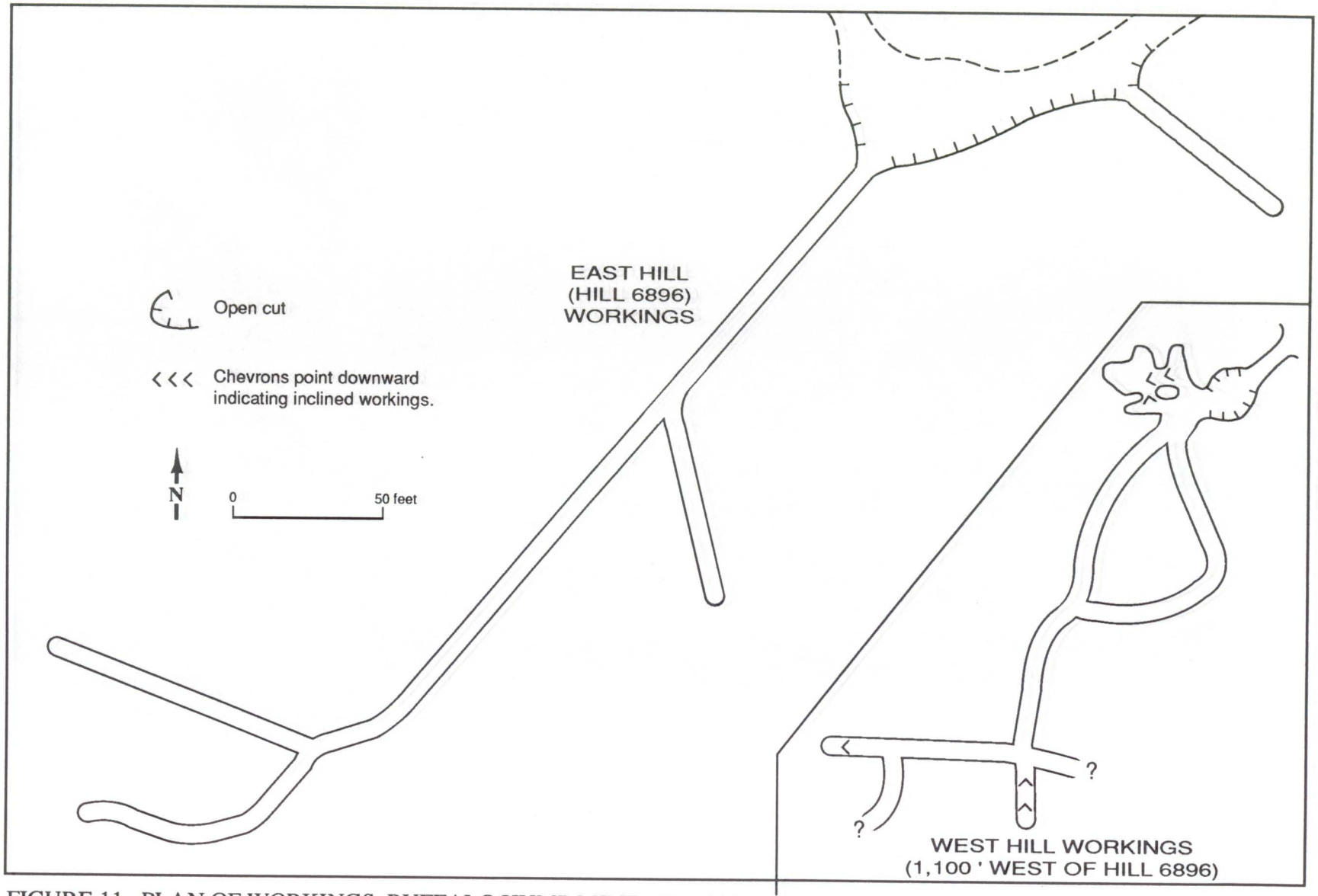

FIGURE 11. PLAN OF WORKINGS, BUFFALO HUMP MINE (East hill workings after White, August 1990; west hill workings after Willden and Speed, 1974).

6. RECENT EXPLORATION

6.1 LUCKY CHANCE MINING

During 1981-82, the Lucky Chance Mining Company examined the Duluth Mine. Some geologic mapping and geochemical sampling was done (Quin, Jul 90, p.17). No records of this activity have been found.

6.2 MORRISON KNUDSEN

In 1979 (?), Morrison Knudsen drilled 9 diamond-drill, core-holes, totalling 1,509 feet, in the Derelict (southern Paymaster area). Holes 79-1 to 79-5 and 79-7 to 79-8 were vertical; holes 79-10 and 79-12 were inclined 45° N65°E. *"All the holes were geologically logged"*; 5 holes were *"not analyzed"*; 3 contained *"no material of ore-grade"*; 2 holes 79-5 and 79-8 contained *"ore-grade"* intercepts (+0.01 oz/ton gold). And *"all old dumps were sampled."* (Beers, -?- 1979). The assaying was not completed, and the data was not turned over to the owners because MK was not paid for their work. (S. Quin, personal communication).

6.3 KENNECOTT

In 1983, Kennecott Corporation drilled 15 reverse-circulation holes (BRU-1 to -15) totalling 6,630 feet in the district on what is now the Miramar property (Kennecott, Jul 85). *"Some of the more significant results include the following"* (Quin, Jul 90, p. 17-18):

Hole	From (Feet)	To (Feet)	Interval (Feet)	Gold (oz/ton)
BR4	0	60	60	0.012
BR5	30	110	80	0.014
	150	160	10	0.141
BR6	90	140	20	0.034
	150	170	20	0.040
BR8	310	330	20	0.030
BR11	200	210	10	0.061

Quin also states: *"It is reported by Mrs. Wilson that they were negotiating to acquire the property while conducting a drill program. When negotiations broke down, they abandoned the property and no further information was passed on."*

6.4 GLAMIS GOLD

In 1988, Glamis Gold Exploration, under option from Miramar, drilled 29 air-trac holes totalling 1,733 feet. Eighteen holes (PM-1 to PM-18) were in the Paymaster hill; eleven (Jul-1 to Jul-11) were over the Duluth workings. Nearly vertical, mineralized, shear zones up to 70 feet wide were encountered; these zones contained 0.01 - 0.02 ounces per ton gold; narrower quartz veins within the shear zones contain 0.01 - 0.04 ounces per ton. (Gray, 11 Jul 88).

6.5 NEWMONT EXPLORATION LTD.

In December 1988, Newmont Exploration signed an agreement with Miramar Mining Corp. to explore the Bruner property. Newmont has conducted an extensive exploration program including:

6.51 Geology. The entire district was mapped at 1 inch equals 500 feet (Dobak et al, 18 Jan 91, Plate I); the Duluth *"target"* was mapped at 1 inch equals 200 feet.

"The volcanic rocks [were] separated into three basic units; an [older] porphyritic andesite flow, a latite crystal tuff, and a sequence of epiclastic rocks and glassy rhyolite flows and tuffs. The latite crystal tuff hosts the vast majority of the known gold mineralization in the district" (Dobak, 29 May 89). *"At least 3 generations of flow-dome complexes have been recognized intruding the package of intermediate volcanic rocks along all major structural directions."* (Dobak, Jun 89). The flow-domes are all *"felsic....Two [are] quartz poor varieties and one quartz porphyry. The quartz porphyry occurs adjacent to the Penelas Mine and sampling has shown it to be consistently anomalous in gold"* (Dobak, 28 June 89).

A separate alteration "overlay" map was prepared (Dobak et al, 18 Jan 91, Plate III). Dobak (24 Sep 90) states that: *"Alteration mapping confirmed that gold anomalies detected in the soil survey correspond to areas of pervasive potassic alteration. The best exposure of potassic alteration is over the Duluth Mine area."*

Underground workings were mapped during sampling of the Phonolite Adit (Dobak, 7 Jul 90B), Paymaster (Dobak & Mallette, 26 Jun 90), Duluth (Dobak & Burcar, 19 Apr 89) and Penelas (Buscar & Dobak, 11 May 89).

6.52 Geophysics. A helicopter-borne magnetic survey was made of the district and the covered, pediment to the east; and detailed, ground-magnetic surveys were done to "fill-in" and refine the airborne data. Dobak (29 May 89) states that: *"The major north and northwest structural trends are distinguishable in a contoured plot of the total field data. The mineralized north-trending structural zone that hosts the Penelas and [Duluth] deposits is readily identifiable as a linear magnetic low. Similar magnetic linears were also revealed in the covered area to the east of the Bruner property."*

A ground radiometric survey was also made that Dobak (24 Sep 90) states *"confirm[s] many of the alteration patterns defined by field mapping. The survey also suggests that alteration in the South Phonolite [Bruner] target area might be more extensive than previously recognized."* (See section 6.6 for additional details on the geophysics.)

6.53 Geochemistry. A soil orientation survey was made, and used to help plan the soil sampling. A soil survey was then made on 100 foot centers and 400 foot line-spacing. Dobak (28 Jul 89) states that: *"Results from the soil geochem survey show a 2,000' by 800' northwest-trending gold anomaly with values greater than 100 ppb. This occurs over the Duluth Mine and extends towards the Penelas Mine. The first round of drilling will address the central portion of this anomaly."* And that (Dobak, 24 Sep 90): *"Results from the soil grid....the Bruno claims to the northwest of the Paymaster Mine outlined a gold anomaly along the east-bounding structure of a north-trending graben."*

6.54 Re-Assaying Kennecott Drill Holes: *"Newmont re-assayed and re-logged all the available cuttings left on site by Kennecott from their 15-hole drill program. Assay results were largely very similar to those obtained by Kennecott, with locally higher and lower values, as might be expected in this type of deposit.....Newmont re-numbered the holes as BRU #1 - BRU #15."*

NEWMONT RE-ASSAYS OF KENNECOTT DRILL HOLES

Hole #	From (Feet)	To (Feet)	Width (Feet)	Gold (oz/ton)	Silver (oz/ton)
BRU #4	10	60	50	0.016	0.38
	60	70	10	0.011	0.14
	70	80	10	NA	NA
	80	90	10	0.029	-0.1
	90	100	10	0.011	0.15
BRU #5	30	110	80	0.011	0.41
	150	160	10	0.052	-0.1
BRU#6	90	100	10	0.034	0.29
	100	150	50	NA	NA
	150	170	20	0.029	0.62
	170	220	50	0.010	0.29
BRU #8	260	350	90	0.009	1.12
including	310	330	20	0.021	1.04
BRU #11	200	210	10	0.001	0.39

(Quin, Jul 90)

6.55 Drilling. Newmont drilled 74 (BRU-16 to -89) reverse-circulation holes on the Bruner property. The first 10 holes *"totaling 4,920 feet were completed during the month of August. These holes average 500' in depth and with the exception of one were all 60° east-dipping angle holes. These holes were all drilled on patented claims and targeted the extensions of the north-trending structures in the Duluth Mine and the area of highest gold values in the soil geochem survey. The drill holes were designed to test the north-trending structural zones and to gain structural and stratigraphic information."* (Dobak, 29 Aug 89) ....."The significant intercepts from this drilling are summarized in the following table:

HOLE #	*Depth*	*Intercept*	*Au opt*	*Ag opt*
BRU-16	*0 - 15'*	*15'*	*.014*	
	45' - 50'	*5'*	*.058*	
BRU-17	*120' - 130'*	*10'*	*.013*	
	0 - 20'	*20'*	*.027*	
BRU-18	*75' - 100'*	*25'*	*.025*	
	165' - 170'	*5'*	*.030*	
BRU-19	*40' - 45'*	*5'*	*.075*	
	75' - 85'	*10'*	*.022*	
	85' - 95'	*10'*	*.388*	
	95' - 125'	*30'*	*.023*	*8.130*
	145' - 190'	*45'*	*.036*	
	490' - 505'	*15*	*.027*	
BRU-20	*235' - 295'*	*60'*	*.016*	
BRU-21	*0 - 75'*	*75'*	*.011*	
	405' - 420'	*15'*	*.010*	
BRU-24	*0 - 10'*	*10'*	*.012*	
	180' - 185'	*5'*	*.046*	
	250' - 295'	*45'*	*.031*	*2.36*
	355' - 360'	*5'*	*.058*	
BRU-25	*180' - 200'*	*20'*	*.054*	
	300' - 305'	*5'*	*.013*	
	320' - 325'	*5'*	*.013*	
	405' - 410'	*5'*	*.014*	

(Dobak, 29 Oct 89)

"One 700 foot and two 800 foot vertical holes were completed during the fourth quarter [of 1989]. The targets of these holes are the extensions of structural zones encountered in the Duluth Mine, and volcaniclastic sedimentary rocks found at the base of the latite crystal tuff. Two of the three holes intersected the volcaniclastic sedimentary rocks below 600 feet, however they are not mineralized. There is significant gold mineralization in the upper portions of the holes hosted in the latite crystal tuff. Listed below is a summary of these intercepts:

Hole #	*Depth*	*Intercept*	*Au opt*	*Ag opt*
BRU-26	*125' - 140'*	*15'*	*0.014*	
	160' - 225'	*65'*	*0.083*	
	305' - 320'	*15'*	*0.012*	
	345' - 355'	*10'*	*0.025*	
	395' - 400'	*5'*	*0.026*	
BRU-27	*95' - 115'*	*20'*	*0.069*	
	115' - 120'	*5'*	*1.284*	*1.01*
	135' - 150'	*15'*	*0.052*	
	150' - 155'	*5'*	*1.806*	*1.06*
	170' - 175'	*5'*	*0.026*	
	190' - 220'	*30'*	*0.018*	
	485' - 490'	*5'*	*0.033*	
BRU-28	*15' - 25'*	*10'*	*0.013*	
	25' - 30'	*5'*	*0.215*	
	30' - 40'	*10'*	*0.017*	

(Dobak, 30 Jan 90)

"A size fraction analysis and sampling tree study of four types of mineralization encountered in the 1989 drilling program at Bruner has detected a severe coarse gold problem associated with samples containing quartz-adularia veining as well as a subsampling problem at the 300 gm pulp stage using standard study suggest that acceptable accuracy and reproducibility can be achieved through the combination of an intermediate -40 mesh grinding step <u>and</u> extra grinding of the pulp to 80% -200 mesh." (Dobak, 30 Apr 90)

The 1990 drill program began on 5 May. *"The goal ....is to drill test all of the significant targets developed during 1989.*

- *Paymaster: A structural zone on the northwest flank of Paymaster hill identified in the underground workings that returned values of >0.10 opt Au in three ten foot chip samples.*

- *Duluth: A 2,500' by 1,000' northwest-trending Au soil anomaly over the Duluth Mine workings.*

- *North Penelas: A 600' by 800' Au soil anomaly along the north margin of a rhyolite quartz porphyry flow-dome.*

- *South Phonolite: A 2,000' long Au soil anomaly along the axis of the north-trending ridge south of the Phonolite shaft.*

- *Southeast Pediment: The projected extension of the northwest-trending zone of mineralization under alluvial cover. A prominent magnetic lineament extends for 1.5 miles southeast of the Penelas Mine."* (Dobak, 5 Jun 90).

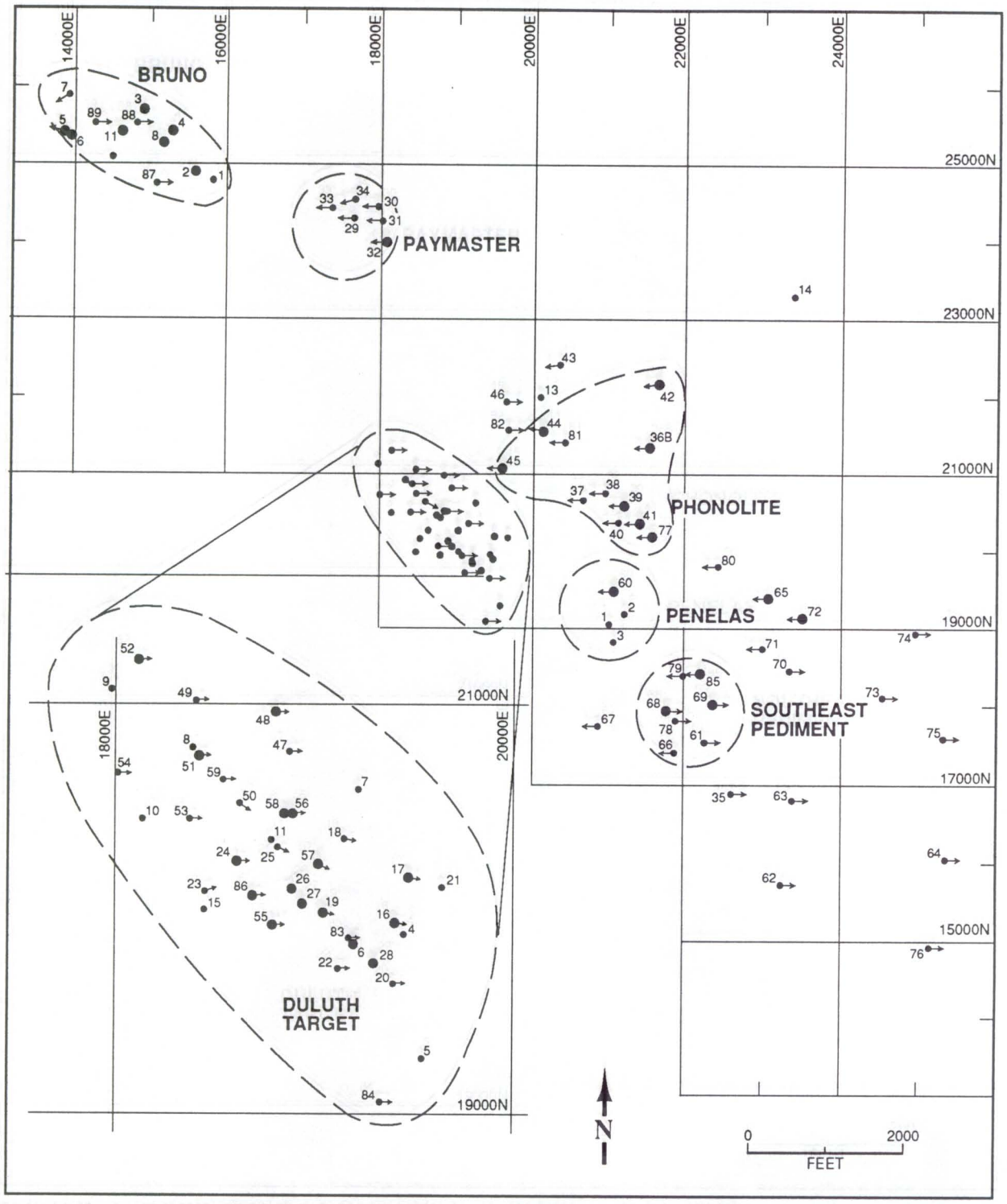

FIGURE 12. DRILL HOLE LOCATIONS IN THE BRUNER DISTRICT. Showing exploration targets (see section 6.65.) Larger dots are holes with +20 ft., +010 oz/ton Au intercepts.

Dobak (29 Mar 90) states that by the end of May *"16 [additional] angle holes [had] been drilled for a total of 5,841 feet. Two of the five drilling targets have been tested, Paymaster Hill and North Penelas. The drill rig is presently set up on the South Phonolite target area."*

Hole #	Depth	Intercept	Au opt	Ag opt
BRU-32	125' - 150'	25'	0.107	
	170' - 190'	20'	0.013	
BRU-36B	85' - 130'	45'	0.016	
BRU-39	0' - 20'	20'	0.016	
BRU-41	65' - 90'	25'	0.025	
	165' - 175'	10'	0.015	
	255' - 275'	20'	0.027	

Dobak and Mallette (Aug 90) report the following:

Hole #	*Depth*	*Intercept*	*Au oz/st*
BRU-48	*40' - 80'*	*40'*	*.012*
BRU-51	*10' - 20'*	*10'*	*.016*
BRU-52	*105' - 110'*	*5'*	*.120*
	370' - 410'	*40'*	*.013*
BRU-55	*85' - 125'*	*40'*	*.019*
BRU-56	*95' - 105'*	*10'*	*.077*
	130' - 140'	*10'*	*.089*
	380' - 390'	*10'*	*.056*
BRU-57	*315' - 335'*	*20'*	*.019*
	390' - 400'	*10'*	*.030*
BRU-59	*130' - 140'*	*10'*	*.013*
BRU-60	*170' - 180'*	*10'*	*.037*
BRU-68	*305' - 315'*	*10'*	*.068*
	345' - 407'	*125'*	*.017*
BRU-69	*510' - 530'*	*20'*	*.014*

A very encouraging intercept was encountered in BRU-68 located in the pediment southeast of the Penelas Mine. In this east-dipping angle hole, 125 feet of .017 oz/st Au was intercepted near the margin of a rhyolite quartz porphyry flow-dome. This intercept occurs at the intersection of two prominent northwest-trending lineaments defined by ground magnetic data."

A new drill program began in October *"to test three remaining targets. These include 1) Southeast Pediment, 2) South Phonolite and 3) a north-striking graben within the Bruno (Cleary and Graf) claims. In addition, a 700-foot angel hole will test for high-grade feeders beneath the Duluth Mine.*

At the Southeast Pediment four holes were spotted to test for additional mineralization peripheral to BRU-68 ..... Of these four holes, the most encouraging cut a thick section of potassically altered latite beneath a rhyolite porphyry sill. Two others were entirely in silicified to argillized rhyolite porphyry, and the fourth cut only propylitic volcanic sediments that are unlikely to host significant gold.

Two holes were completed at South Phonolite where radiometric data had suggested that potassic alteration was much more extensive than previously recognized. Both holes, however, showed only propylitic alteration within latite tuff and dacite dikes." (Mallette, Oct 90).

Hole #	Depth	Intercept	Au oz/st
BRU-72	250' - 285'	35'	0.032
	390' - 400'	10'	0.027
BRU-77	485' - 495'	10'	0.012

"Four reverse-circulation drill holes were completed during [November] for a total of 2,918 ft. Three holes were spotted on the Bruno claims and one hole was spotted in the Duluth area. These holes completed the current drilling program in which 12 holes were drilled for 6,403 ft."

"Three [700-foot] holes drilled on the Bruno claims targeted latite within the alluvial-covered downthrown block of a N-S graben where radiometric and soil gold anomalies overlapped along the eastern bounding fault. Previous shallow drilling by Inspiration failed to test latite within the alluvial-covered downthrown block and this will constitute our primary target. Two of these holes successfully penetrated hangingwall latite, the eastern bounding fault, and bottomed in footwall latite. The most intense alteration was associated with the bounding fault and consisted of moderate argillic with moderate to strong stockwork quartz veinlets. The third hole successfully tested latite bedrock in the central portion of the graben. Alteration was generally weak argillic although a strongly silicified (pervasive and vein) interval was encountered over a 60 ft apparent thickness. One hole drilled in the Duluth area was designed to test the lower portions of the Duluth and July veins. Unfortunately, this hole had to be terminated before intersecting either the Duluth or July veins due to bad drilling condition" (Mallette, Nov 90).

Hole #	Inclination(°)	Intercept From (ft)	Drilled To (ft)	Width (ft)	Grade (oz/st)
BRU-81	60	385	400	15	0.012
BRU-83	60	0	15	15	0.051
		30	75	45	0.046
		90	135	45	0.014
		295	310	15	0.015
BRU-85	60	245	265	20	0.030
		295	305	10	0.025
		330	340	10	0.039
BRU-86	60	45	60	15	0.047
		80	115	35	0.040
		330	355	25	0.023

The Duluth area remains the most consistently mineralized portion of the property (BRU-83, BRU-86); Hole BRU-83 was drilled in the Duluth area and the spread of mineralization across structures is a positive feature. Scattered mineralization was also encountered in the Southeast Pediment area (BRU-85)." (Mallette, Dec 90).

6.56 Other Sampling. Both levels (1,600 feet) of the Duluth Mine were sampled in February 1989: *"164 chip samples 1 to 10 feet in length were taken along the back, perpendicular to the structural grain. From these samples 85 returned assays greater than 0.010 opt Au and 24 samples returned assays greater than 0.050 opt Au. The mapping and sampling show that production was concentrated along three nearly parallel north-trending structures dipping 65 to 75 degrees to the west. As exposed on the two levels of mine workings this structural zone is approximately 100 feet wide and has been drifted on for approximately 300 feet along strike. Sampling has confirmed that the structures assay up to 0.500 opt Au and the wall rock assays 0.010 to 0.040 over this 100 foot width. Gold values along this structural zone are open ended to the north, south, and east."* (Dobak, 27 Feb 89).

"Underground mapping and sampling [was] completed in the Penelas mine [in May]. Due to caving of stopes only a small portion of the workings are accessible near the shaft on the first and second levels. On the first two levels production was along a north-trending structure dipping 70 degrees to the east with felsic flow-dome on the hanging wall and latite crystal tuff on the footwall. (Dobak, 29 May 89).

"During December [1990] the Paymaster Mine was mapped and the areas around the stopes were sampled. The predominant rock type encountered in the mine is latite crystal tuff, some of the volcaniclastic sediments at the base of the latite tuff section are found in the central part of the workings. The production area of the mine workings extend along a N5°E east-dipping structure for approximately 300 feet of strike length. Silicified breccia and crushed quartz-adularia vein material occur over widths of 6 inches to 3 feet within this structure. Quartz-adularia alteration in the hanging wall and foot wall grades to propylitic within tens of feet. This vein terminates in a northeast-trending structural zone located under the northwest flank of Paymaster Hill."(Mallette (-?-Dec 90).

6.57 Environmental. Ed Jucevic, a mining consultant, was hired to examine the Paymaster Mine workings and give his assessment of any potential safety hazards remaining from the past cyanide leaching operations. No detectable HCN gas was found in the mine workings using two separate instruments, a Dereagor tube and a Interscan 1280 electronic continuous flow gas analyzer. An analysis by High Desert Laboratories of sump water in the mine returned a value of 0.23 ppm weak acid dissociable cyanide. The maximum WAD cyanide recommended for drinking water is 0.2 ppm. (Dobak, 28 Nov 89).

6.58 NEL Conclusions. Douglas Wood, District Exploration Manager, Newmont Exploration Ltd. (Reno) stated that (Wood, 27 Jul 1990) *"Based upon data collected thus far, the Bruner area exhibits characteristics which indicated that the district has the potential for surface-minable, bulk-tonnage gold deposits...[and that] the strengths of the property lie in the size of the mineralized area and the numerous exploration targets it contains. [And further that] well into its second year of evaluation, the Bruner Project continues to be of great interest to Newmont. I believe that the program we have devised will thoroughly and professionally evaluate the entire project area. While it is the nature of explorationists to be optimistic during the early stages of a property evaluation, my enthusiasm for the Bruner Project has not been dimmed by the results of our efforts thus far."*

6.6 MIRAMAR MINING CORP.

In 1990, a BLEG (bulk leach extractable gold) survey was made covering the south part of the Bruner district north to the Buffalo Hump. *"It is a geochemical technique utilizing stream sediment samples to detect gold mineralization upstream from sample sites.....it involved collection of 10-pound minimum-mass samples. The samples are minus 1/4-inch sediment from active gravel/sediment bars in dry washes. The gulches to be sampled were pre-selected on a topographic map for completeness of coverage, representativeness, and access. Samples were screened to minus 1/4-inch in the field, stored in plastic bags, and delivered to American Assay Laboratories, Inc. in Reno. They measured out 10 pounds of sample and add lime and 9% cyanide for a 24-hour agitated leach. That is followed by an organic extraction and atomic absorption analysis for gold and silver. Results are plotted on a topographic base map so that anomalous drainages can be identified....A total of seven samples were collected downstream from known mineralization, two at Buffalo Hump and five at Bruner. Every one of them is strongly anomalous. Those samples vary from 1.6 parts per billion (ppb) to 54.7 ppb."* (White, Aug 90A). In addition a number of other anomalies were discovered (see Fig. 13).

Miramar also did some interpretation of LANDSAT and U.S. Geological Survey air photography (S. Quin, personal communications; Schilling, 1990-91) Four or five parallel northwest-trending structures extend from Bruner to north of Buffalo Hump; northeast-trending faults off-set the mountain range; circular features probably are calderas, and mottled areas (on the LANDSAT photos) are areas of intense alteration.

Frontier Geoscience Inc. *"analyzed the various regional and property geophysics data...for Miramar [the regional and property geophysics is in] agreement....the strong northeasterly trending magnetic linear that bisects the property is seen to be a segment of a regional trend in excess of 50 km [in] length....[and some of the] property-scale northwest [and east-west] trends are evident at the regional scale."* (Candy, Jun 91). (See section 9.54 for additional details.)

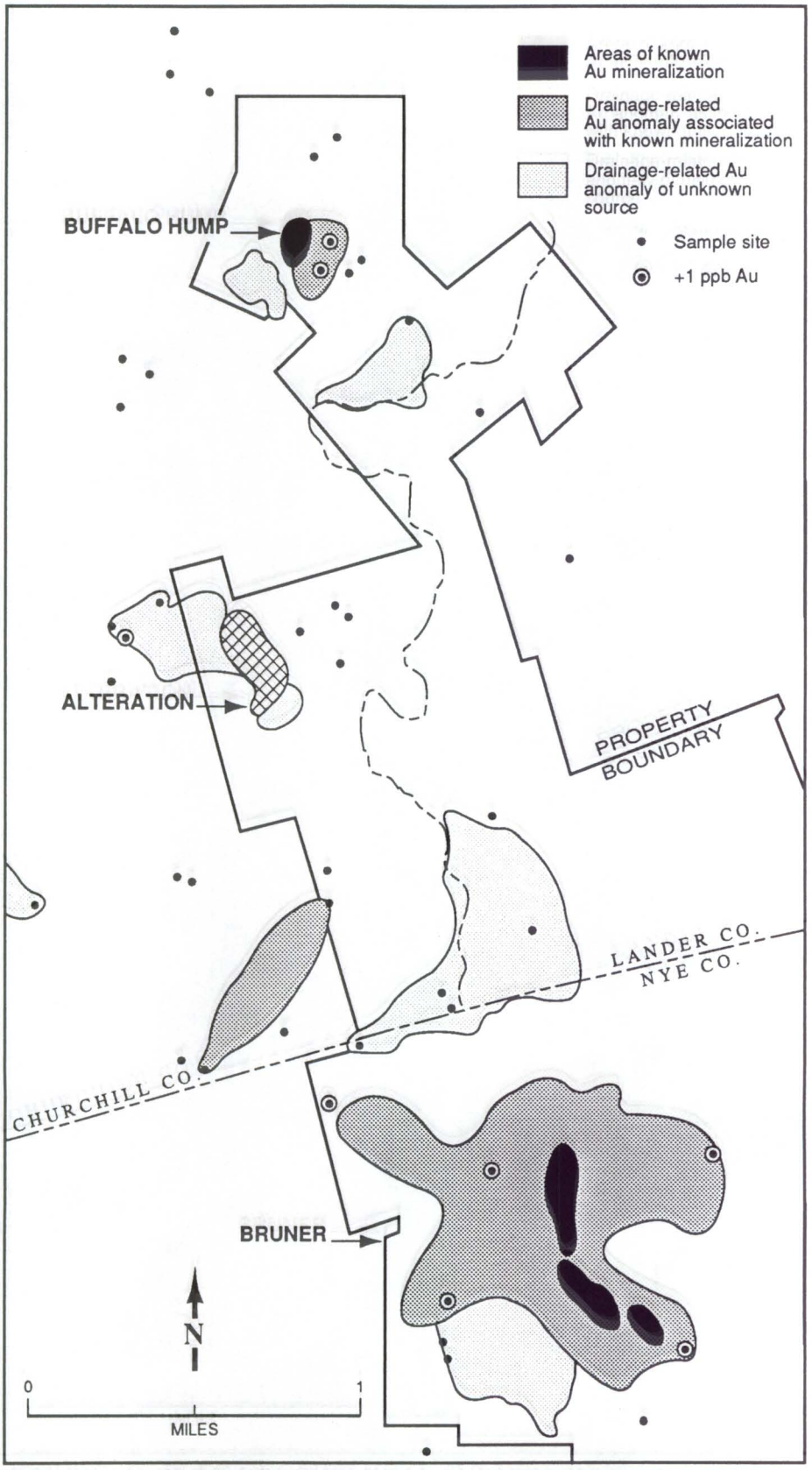

FIGURE 13. BLEG GEOCHEMICAL SURVEY (White, Aug. 1990). See also section 6.6.

7. AGREEMENTS, OWNERSHIP, CLAIMS

7.1 AGREEMENTS

The following information has been provided by Miramar Mining Corporation:

7.11 Bruner Property (28 Patented and 59 Unpatented Claims)

"By agreement effective October 22, 1991, Miramar Mining Corporation, through its wholly owned US subsidiary Orcana Resources Inc., acquired a 100% interest in the Bruner Property, subject to the payment of US$31,250 per annum for eight years, the issuance of 150,000 free trading common shares of Miramar Mining and the granting of warrants to Purchase 116,000 common shares at a price of C$1.25 and for another 116,000 common shares at a price of C$1.50 per share over a period of five years. There are no royalties of any kind against this property.

Miramar had initially entered into an agreement with the owners in April 1988 to acquire a 100% interest in the property for US$2,000,000, payable at US$400,000 per year plus interest commencing in September 1990. The commencement of these payments was postponed until September 30, 1991 by issuing 116,000 warrants at $1.00 and paying US$50,000 and could have been postponed further until September 30, 1991 by the issuance of 116,000 warrants and payment of US$50,000 and again until September 30, 1993 by issuing 118,000 warrants and payment of US$50,000. This agreement is no longer in effect, having been superseded by that dated October 22, 1991."

7.12 Newmont Agreement

"In December 1988, the Company, Orcana and Newmont Exploration Limited ("Newmont") entered into an agreement whereby the Company and Orcana agreed to assign all of their interest in the Bruner property to Newmont and Newmont agreed to assume all of Orcana's obligations under the original agreement except the obligations relating to the issue of the Bruner Extension Warrants referred to above and the shares issuable on the exercise of those warrants. Under the terms of the agreement, the Company was not required to participate financially until the decision was to be made by Newmont to exercise the option to purchase the claims. At that point the Company could elect to either form a joint venture with Newmont in which the Company (or Orcana) would have a 49% working interest or to receive an NSR. Under the terms of the draft joint venture agreement which formed a part of the December, 1988 agreement (together, the "Newmont Agreements"), the Company could elect not to contribute in excess of US$245,000 per annum towards the expenses of the joint venture, in which case any expenditures in excess of U.S. $245,000 would have been funded by Newmont and Newmont would have received out of production revenues of $2 for every $1 so funded. Under the terms of the Newmont Agreements, if the Company choose not to participate in the joint venture the Company would have received a 5% NSR until Newmont has recovered its investment and a 7% NSR thereafter."

"During the term of the Newmont Agreement, Newmont located 336 new claims (the "BR" claims) surrounding the Bruner Property on almost all sides and optioned and leased additional property from the Nevada Agricultural Foundation and Callahan/Wildhorse. Newmont's interests in all of these claims were transferred free and clear to Orcana on the termination of the Newmont Agreement.

"On August 14, 1990 Newmont gave the Company formal notice of Newmont's election to exercise the first right to extend the Bruner option exercise date from September 30, 1990 to September 30, 1991. On August 24, 1990 Newmont paid the Company the sum of $50,000 as required by the Newmont Agreements at the time of the extension of the underlying agreement. On September 24, 1990 Newmont also sent a notice of extension to the Owners extending the option period. The option extension consideration was paid to the Owners in November, 1990."

"Effective February 20, 1991 Newmont terminated its option agreement with the Company and quit-claimed the additional claims, which had been acquired by Newmont, to the Company at no cost."

7.13 Steen Agreement (32 Unpatented Claims)

"In an agreement dated November 7, 1989, Miramar entered into an agreement with John and Gladys Steen for the right to explore the 32 Logos claims, subject to monthly advance royalty payments and a 5% NSR. Miramar elected to terminate this agreement on September 1, 1991 and has no further rights or interest in there claims.

7.14 Callahan/Wildhorse Agreement (14 Unpatented Claims)

"Under the terms of the agreements, dated February 1, 1990 and March 23, 1990 between Callahan Mining Corporation and Wildhorse Exploration Corporation and Newmont Exploration (such agreements are being assigned by Newmont to the Company) right had been granted to Newmont to explore and mine unpatented lode mining claims known as the Bruno #101 thru #114, subject to a 4% net smelter royalty payable quarterly to Wildhorse and a 1% net smelter royalty payable quarterly to Callahan (once they have received a total of US$10,000 in advance royalty payments as outlined below) and advance annual royalty payments commencing February 1, 1991 in the amount of US$10,000, February 1, 1992 annual advance royalty payment of US$15,000, and February 1, 1993 and thereafter each February 1st that the agreement remains in force the annual advance royalty payment of US$20,000. Of the above annual advance royalty payments, 20% is payable to Callahan Mining until Callahan has been paid a sum of US$10,000. Thereafter the obligation to Callahan Mining reduces to the 1% net smelter return."

7.15 Buffalo Hump Agreement (15 Unpatented Mineral Claims)

"The company has an option on 15 unpatented mineral claims, known as the Buffalo Hump property, that lie approximately six miles north of the north boundary of the Bruner property and are located in Township 15N, Range 37E, section 15. The Company paid the owner U.S. $1,500 in February, 1989 to secure the option, which requires payment of U.S.$85,000 on or before September 30, 1992 for a 100% interest in the Buffalo Hump property, subject to a 5% NSR. The option on the Buffalo Hump property was acquired by the Company because of the property's geologic similarities to the Bruner property which is located further south, and presence of gold mineralization in old workings on the property. The Company has only conducted limited reconnaissance exploration activities on the property."

7.16 Other Properties (360 Unpatented Mineral Claims)

"Miramar Gold Corporation, a wholly owned US subsidiary of Miramar Mining Corporation, acquired by location the Pyrite 1-135, Wren 1-59, Cody 1-50, Aurum 1-37, Golden 1-8 and Summit 1-71.

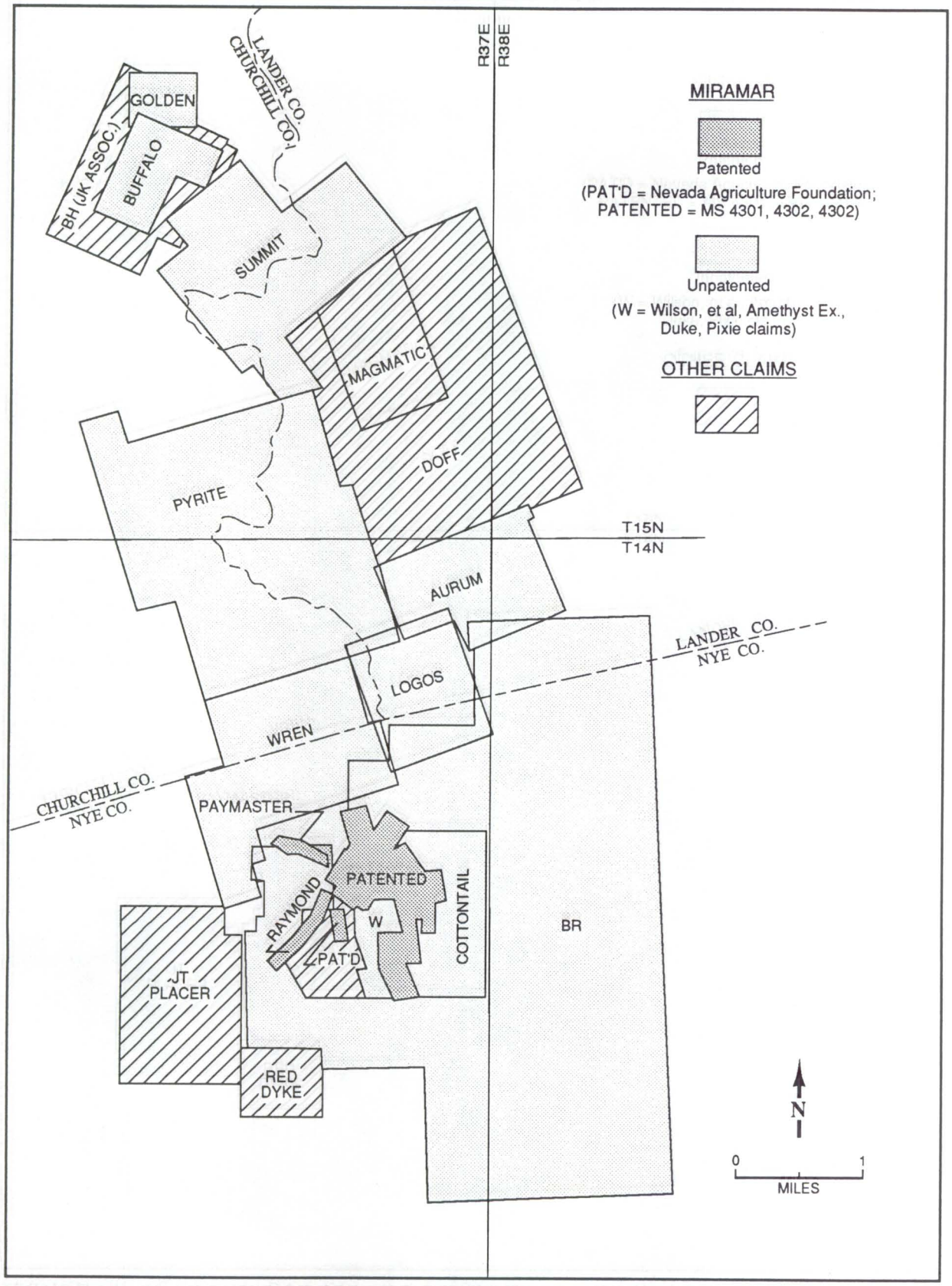

FIGURE 14. CLAIM MAP OF BRUNER DISTRICT (after Big E., 4 July 1990). See also Section 7.

7.2 OWNERSHIP/CLAIMS

7.21 Properties held under the Memorandum of Understanding, dated April, 1988.

7.211 Patented mining claims and millsites located in T14N, R37E, Sections 13, 14, 23 and 24, Nye County, Nevada(also see Fig. 14):

Claim Name	Mineral Survey Number	Patent Number
Paymaster	4301	616421
Paymaster Extension #1	4301	616421
Paymaster Extension	4301	616421
Defender	4301	616421
Last Chance	4301	616421
Last Chance #1	4301	616421
Paymaster Annex	4301	616421
Wild Horse	4301	616421
Wild Horse #1	4301	616421
Wild Horse #2	4301	616421
Wild Horse #3	4301	616421
Big Henry	4301	616421
Friday	4301	616422
Little Jim	4301	616422
Sooy	4303	616422
Bruner Lode	4303	616422
Annex	4303	616422
Lucky Tiger	4303	616422
Aura	4303	616422
Silent Friend	4303	616422
Annex Extension (Fraction)	4303	616422
Climax	4302A	616422
July	4302A	756224
Black Mule	4302A	756224
Shale Lode	4302A	756224
Gold Knob	4302A	756224
July Millsite	4302B	756224
Black Mule Millsite	4302B	

7.212 Unpatented lode mining claims located in T14N, R37E, Section 13, 14, 22, R38E, Sections 18, 19 and 20, in Nye County, Nevada.(see also Fig. 14):

Claim Name	BLM Serial Number	County Book & Page
Amethyst Extension	132489	256 37-86
Raymond	132490	256 32
Raymond #1	132491	256 33
Raymond #2	132492	256 29
Duke	132493	246 30
Duke #1	132494	256 31
Pixie	132495	256 34
Pixie #1	132496	256 35
Pixie #2	132497	256 36
Cottontail #1 - #50	132498 -132547	256 28

7.22 Properties staked and 100% owned by Miramar.

7.221 Unpatented Lode claims located on unsurveyed Public Lands Section 15, T15N, R 37E, SE Churchill County, Nevada (see also Fig. 14):

Claim Name	BLM Serial Number
Golden 1-8	603501-603508
Summit 1	602132
Summit 3-14	602133-602144
Summit 35-49	302146-602160
Summit 66	602169
Pyrite 1-25	602172-602196
Pyrite 51-60	602202-602211
Pyrite 74-78	602214-602218
Pyrite 82-89	602221-602228
Pyrite 99-117	602232-602250
Pyrite 118-135	603509-603526
Wren 25-46	602110-602131
Cody 1-22	615612-615633
Cody 35	615646

7.222 Lode Mining Claims located in Lander County, Nevada, (see also Fig. 14):

Claim Name	BLM Serial Number
Summit 2	602313
Summit 15-34	602321-602340
Summit 50-65	602342-602357
Summit 67-71	602358-602362
Pyrite 26-50	602256-602280
Pyrite 61-73	602282-602294
Pyrite 79-81	602299-602301
Pyrite 90-98	602302-602310
Cody 23-34	615634-615645
Cody 36-50	615647-615661

7.223 Unpatented lode mining claims located in T14N, R37E, Section 13, 14, 23, 24, 25 and in T14N, R38E, Sections 18, 19 and 20, in Nye County, Nevada.(see also Fig 14):

Claim Name	BLM Serial Number
Wren 1-24	601751-601774
Wren 47-59	601775-601787
Aurum 1-37	601788-601824
BR #1 - #122	533252-533363
BR #113 - #336	565953-566176

7.23 Properties under lease/option etc:

Claim Name	BLM Serial Number
Bruno #101- #114	386905-386918
Elk patented lode Claim	(Mineral Survey No. 4298)
Gold Dyke	87358
Gold Dyke Ext #II	87359
Gold Dyke Ext #III	87360
Buffalo Hill No. 1	87361
Buffalo Hill No. 2	87362
Buffalo Hill No. 3	87363
Buffalo Hill No. 4	87364
Buffalo Camp	87365
Buffalo Well	87366
Buffalo Hump No. 1	91946
Buffalo Hump No. 2	91947
Buffalo Hump No. 3	91948
Buffalo Hump No. 4	91949
Buffalo Hump No. 5	91950
Buffalo Hump No. 6	91951

8. GEOLOGIC SETTING

8.1 PHYSIOGRAPHY

The Bruner and Eastgate districts are in the Great Basin part of the Basin and Range physiographic province, with long, narrow, north-trending upfaulted mountain ranges separated by wider, downfaulted graben-basins. As the ranges were uplifted, they were deeply eroded, and the debris filled adjacent basins. Most of the ranges are not only uplifted but the fault blocks have been tilted eastward - - - typical ranges have steep, western faces and gently dipping eastern slopes that disappear beneath the basins as gravel-covered pediments. Three other features effect the landscape of much of Nevada but in a much more subtle fashion: (1) structural lineaments, (2) calderas, and (3) rhyolitic volcanic centers. Thus, the topography of the Bruner/Eastgate area is mainly structurally controlled.

8.2 LINEAMENTS

Roberts (1964) points out that the most prominent structural trend in Nevada is N45°W; he lists and names a number of lineaments, mineral belts, and faults that follow this trend, along which ore deposits, intrusive bodies, strike-slip faults, etc. are concentrated. From southwest to northeast, these include the San Andres fault of California, the Walker Lane fault zone (with many strands), the Fallon-Manhattan mineral belt (which can be divided into the Rawhide-Paradise Peak-Tonopah, and Wonder-Bruner-Round Mountain strands); the Battle Mountain trend; and the famous Carlin trend. The lineaments are major zones of weakness along which ore-forming fluids and magmas can rise and form mineral deposits. Most of the N45°W strike-slip faults have right-lateral movement which has turned Nevada into an extensional zone between the Sierra Nevada and Idaho Batholiths.

The second most common structural trend is N 30°E; this trend is represented by numerous younger (?) strike-slip (?) faults (that offset the northwest lineaments and mountain ranges); topographic "lanes" or grabens (like the one from Carson City to the Carson Sink); and "range-front" mineral belts (such as Chimney-Getchell-Preble). (It should be noted that ranges in Nevada normally are <u>not</u> uplifted along frontal faults but rather along a "sawtoothed" pattern of alternating northwest and northeast-trending faults).

A third structural trend is E-W; it is prominent in east-central Nevada and Utah (Jerome & Cook, 1967). Two lineaments (mineral belts) are known in Nevada: (1) the Cherry Creek, and (2) the Ely-Yerington. Both continue into Utah as aligned mining districts, granitic plutons and the east-west trending Uinta Mountains.

The Ely end of the Ely-Yerington lineament is marked by the aligned porphyry-copper bearing plutons of the Ely district, the Hamilton silver mines, the Monte Cristo stock and porphyry-copper mineralization, and a mineralized stock in the Pancake Range to the west. The Yerington porphyry-copper mine and intrusive, a miles-long east-west "dike" (Bingler, 1971), the Pumpkin Hollow iron (magnetite) deposit, Rawhide gold district, and Bruner form the western end; to the east it is obscured under the thick pile of volcanic rocks that cover central Nevada.

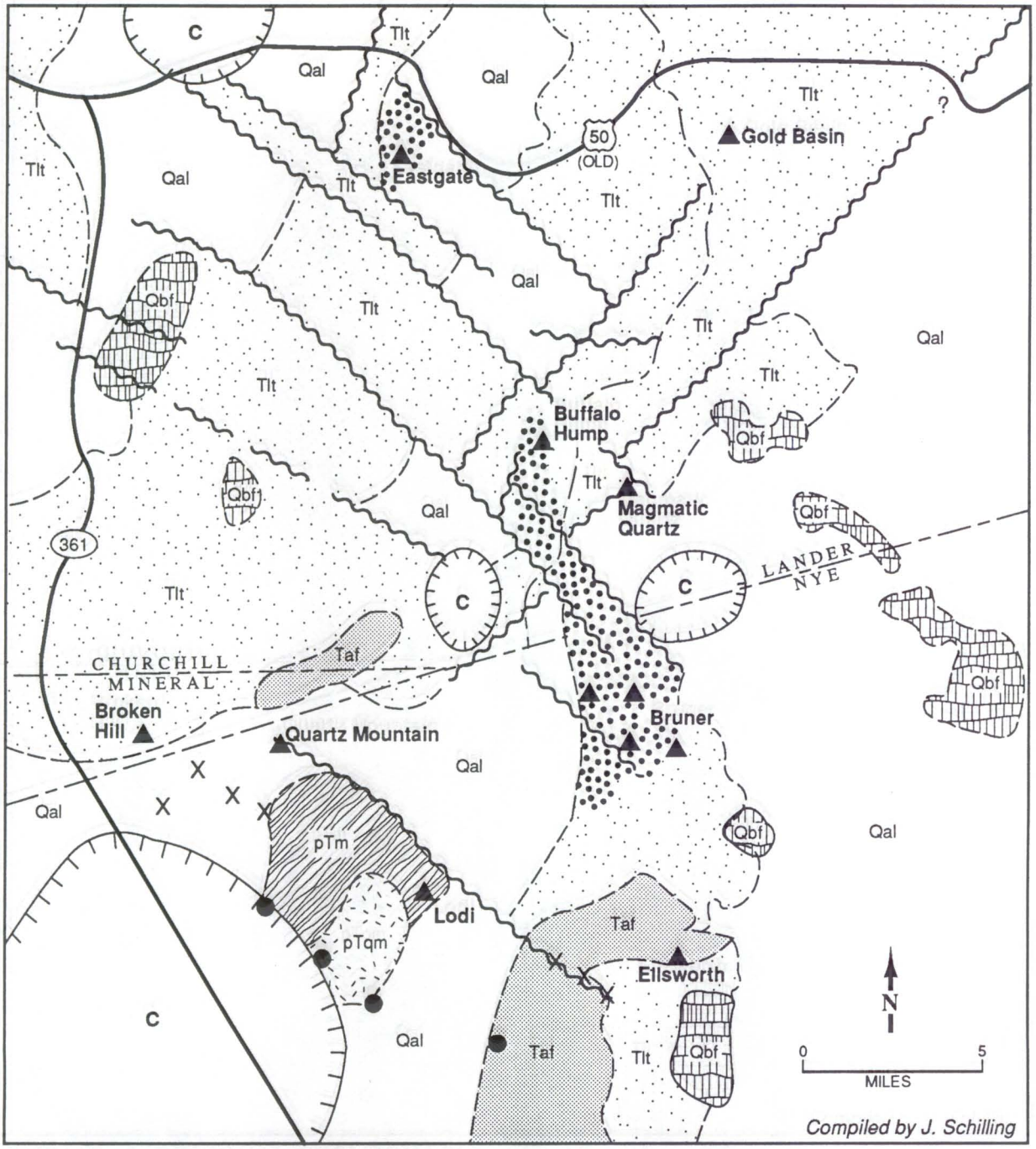

FIGURE 15. REGIONAL GEOLOGY MAP. C = calderas; x = prospects; ▲ = gold mines; ● = tungsten mines; ~~~ = faults. See Figure 12 for symbols. In west Tlt may be equivalent to Trs; Qal in part Tertiary.

8.3 CIRCULAR FEATURES

Calderas are common in western Nevada, and can be recognized by vague, circular fault-traces visible from the air or on airphotos, or by geologic mapping. Calderas are important targets when exploring for bulk-minable, open-pit gold mines in the western U.S. The ring (boundary) fault and other faults (both circular and radiating) serve as conduits along which magmas can be extruded, and along which ore-forming fluids can travel, and be deposited as veins in the faults and as disseminations in the surrounding wallrock. Calderas must be considered by any gold (-silver) exploration program. Several calderas are present in the Bruner-Eastgate area and are substaniated by the geophysical surveys (section 9.54).

8.4 VOLCANIC CENTERS

Volcanic centers also are common in western Nevada. They include stratovolcanos, cinder cons, intrusive-extrusive domes, calderas, and intrusive-extrusive complexes which are combinations of the above. Their outlines range from circular to highly irregular.

Volcanic-center complexes are especially important targets of gold-silver exploration --- the more complicated (and difficult to map) the better. Such igneous complexes provide multipulses of mineralization and heating which are so important to hydrothermal ore formation. The Bruner district is in such an igneous complex, and has seen at least three major pulses of mineral/igneous activity.

8.5 STRATIGRAPHY

In west-central Nevada, the rocks are mostly volcanic in the mountains and alluvial (valley-fill) in the basins (see Figs. 15 & 16).

8.51 Older Rocks. Pre-Tertiary rocks are exposed in west-central Nevada in scattered *"windows"* in the Tertiary volcanic rocks. These rocks are mostly metamorphosed volcanic rocks and granitic plutons. Apparently none are exposed in the immediate vicinity of Bruner.

8.52 Volcanic Rocks. The volcanic rocks range from rhyolites to andesite to basalts. The sequence usually is (1) older andesite flows, dikes, plugs and stratovolcanos: (2) overlying rhyolite to latite flow domes, welded-tuff, unwelded crystal tuffs, and volcaniclastic sediments; (3) veins, disseminated mineralization, and alteration; and (4) local basalt lava-flow cappings, dikes, plugs, and cinder cones.

The basalt magma is most fluid and spreads out from volcanic centers as extensive lava flows or forms cinder cones. In contrast, the rhyolitic magma is much more viscous and forms flow domes at the volcanic center and blankets large areas with pyroclastic rocks. The andesites are usually intermediate in viscosity.

Volcanic activity from most centers was both multipulsed and sequential but not simultaneous; individual units can not be traced long distances but intertongue with units of differing lithologies from different volcanic centers. The volcanic "pile" usually is at least a thousand feet thick.

A thick, permeable host-rock is an important plus in the formation of a bulk-mineable (disseminated) gold deposit. The Latite Crystal Tuff unit (section 9.123) at Bruner is such a host-rock.

8.53 Alluvium. The "valley-fill" ranges from boulders, gravel, and sand in the alluvial fans on the margins of the basin-valleys to fine muds and evaporates in the playalake areas in the middle of the valleys. The valley-fill ranges to over a mile thick, commonly is thousands of feet thick, but where pediments exist may be only a few hundred feet thick or even absent.

8.54 Soils. Soils are poorly developed, usually are thin, and contain abundant mineral grains and rock fragments. The soils are rapidly eroded by flash-floods, and become part of the valley-fill.

8.6 REGIONAL ALTERATION

The older Tertiary andesites are regionally propylitized. Mafic minerals have been altered to chlorite, epidote, and gold-barren pyrite.

9. BRUNER DISTRICT GEOLOGY

9.1 ROCK UNITS

9.11 PreTertiary. Apparently no pre-Tertiary rocks are exposed in the district.

9.12 Tertiary.

9.121. Andesite Flows. The oldest (Oligocene or older Miocene) exposed rocks are dark green-gray, regionally propylitized, porphyritic andesite flows composed of 35%, 0.1 - 1 cm phenocrysts (plagioclase, hornblende, pyroxene) in a microcrystalline groundmass.

9.122 Tuffaceous Sediments. Pale green to chalk white, fine-grained, tuffaceous sediments of highly variable thickness occur locally at the top of the andesite sequence but commonly are absent.

9.123 Latite Crystal Tuff. Gray, porphyritic, welded ash-flow tuffs of latite to quartz latite composition unconformably overlies the andesite sequence. This unit is characterized by 2 - 3%, 4 - 5 mm books of biotite as well as plagioclase and K-feldspar phenocrysts. There are some interstratified lithic tuffs of the same composition in the sequence that contain rounded pebble to boulder-size rock fragments. This unit has also been called rhyolite, is Miocene in age, and is over 150 feet thick. This sequence appears to correlate with the 21 - 24 m.y. old Toiyable Quartz Latite. A K-Ar date on biotite from the latite at Bruner was 19.3 m.y. (Kleinhampl & Ziony, 1984). Because of its porous nature this unit is an especially suitable host-rock for dissemenated gold-silver mineralization.

9.124 Volcaniclastic Sequence. Glassy air-fall tuffs and volcaniclastic rocks including some poorly welded lithic tuffs, vitrophyres, and locally hot-spring siliceous sinter, are interstratified with the Dacite Intrusive-Extrusive Complex (section 9.124 below).

9.125 Dacite Extrusive-Intrusive Vent Complex. *"A small volcanic centre clearly is coincident with the [Bruner] district....the centre lies on the southeastern periphery of what may be genetically related to a much larger centre....in Churchill County."* (Kleinhampl & Ziony (1944). Another, smaller caldera may exist northeast of the district.

Purple-brown hematite stained, usually vesicular, spherulitic dacite and rhyodacite flows containing 2mm biotite and plagioclase phenocrysts, are interstratified with the Volcaniclastic sequence, and *"post-date the quartz-adularia alteration [veins, and gold mineralization?] in the older units"* (Newmont Mining, 1990).

At least 3 pulses of igneous activity occurred at the Bruner volcanic centre:

(1) First, emplacement of light tan-grey, flow-banded porphyritic rhyolite flow-domes, plugs, and dikes, pre-dating (cut by) the quartz-adularia veins. The rhyolite contain quartz and lessor sanidine and plagioclase phenocrysts. The rounded hill just east of the Penelas mine is a porphyritic rhyolite flow-dome.

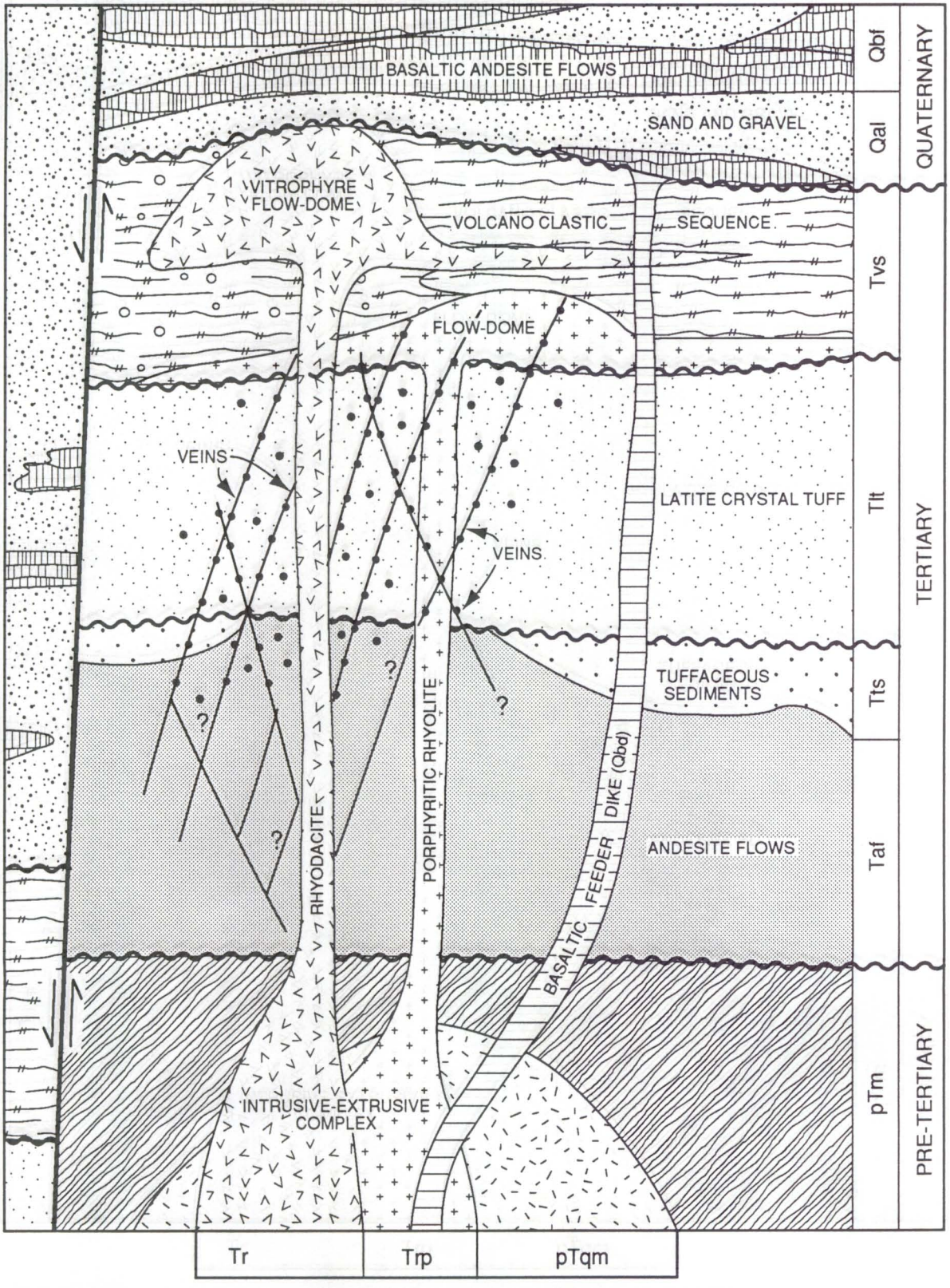

FIGURE 16. DIAGRAMMATIC SECTION OF THE BRUNER-EASTGATE AREA.

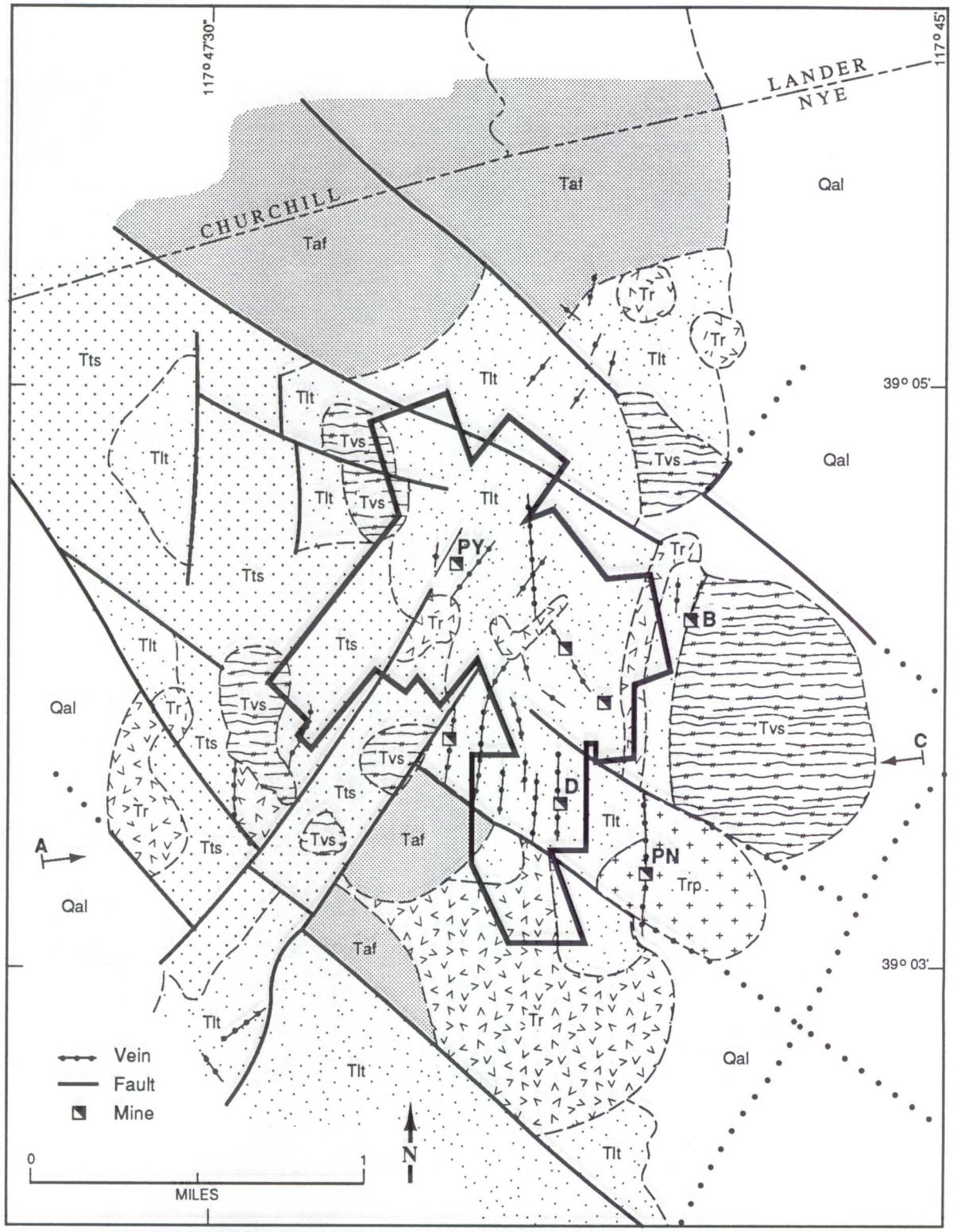

FIGURE 17. RECONNAISSANCE GEOLOGIC MAP OF THE BRUNER DISTRICT. Patented claims outlined; PY = Paymaster, D = Duluth, PN = Penelas, B = Bruner. See Figure 12 for symbols. (Based on Dobak, et al., 1991; Kleinhampl and Ziony, 1984; Schilling, 1990-91)

(2) emplacement of light-gray, flow-banded, fine-grained rhyodacite flow-domes, irregular bodies, and dikes, post-dating (cutting and covering) the quartz-adularia veins. The rhyodacite contains sparse biotite and plagioclase phenocrysts. A large rhyodacite flow-dome forms a large hill south of the Duluth, dikes and more irregular bodies are exposed in the core of the district, and a small plug and several irregular bodies are exposed 1 1/2 miles to the north.

(3) emplacement of the youngest pulse of tan, flow-banded vitrophyre flow -domes and more-irregular bodies. The vitrophyre contains rare, fine-grained biotite phenocrysts. The vitrophyre is exposed at the Derelict mine and in the hills several miles to the southwest.

9.126 Granitic Pluton. As at Round Mountain, the sources of the Dacite Extrusive Vent Complex rocks, the quartz-adularia alteration, the gold-silver mineralization, hot spring activity, and breccia pipes and dikes, probably is a deeply buried granitic pluton emplaced at the intersection of several major structural lineaments (see section 8.2).

9.13 Quaternary

9.131 Basaltic Andesite Flows and Dikes. The older rocks are cut by dikes and covered by flows of dark grey, fine-grained basaltic andesite. Most dikes trend N45°W.

9.123 Alluvium. Silt, sand, and gravel occur along drainages in the mountains, cover the pediment east of the mountain range, and deeply fill the down-faulted valley to the west. The "valley fill" includes alluvial fans containing sand, pebbles, and boulders, which grade to sand, silt, and playa muds in the center of the valley. The playas also contain evaporates, and where deeper lakes existed, diatomaceous earth.

9.2 STRUCTURES

9.21 Lineaments. The Bruner district occurs at the intersection of several major, regional lineaments (see section 8.2).

9.22 Faults.

9.221 North-South Faults. Many, usually short, north-trending, commonly steeply west-dipping normal faults (and fractures?) are common in the district. There is a concentration (breccia pipe?) of these fault-fractures at the Duluth Mine. Most are filled with quartz-adularia gold veins, and thus are pre-mineral.

9.222 Northeast Faults. Several, long, straight, strike-slip (?), N 30°E trending faults cut the district. These faults are unmineralized and thus probably post-mineral.

9.223 Northwest Faults. Several, long, straight, strike-slip N 45°W trending faults in the district parallel, and probably are strands of the Fallon-Manhatlen lineament. These faults cut off the Duluth fault-fractures (see section 9.221) and offset the northeast faults (section 9.222) with right-lateral movement, indicating that they are the youngest of the three sets of faults.

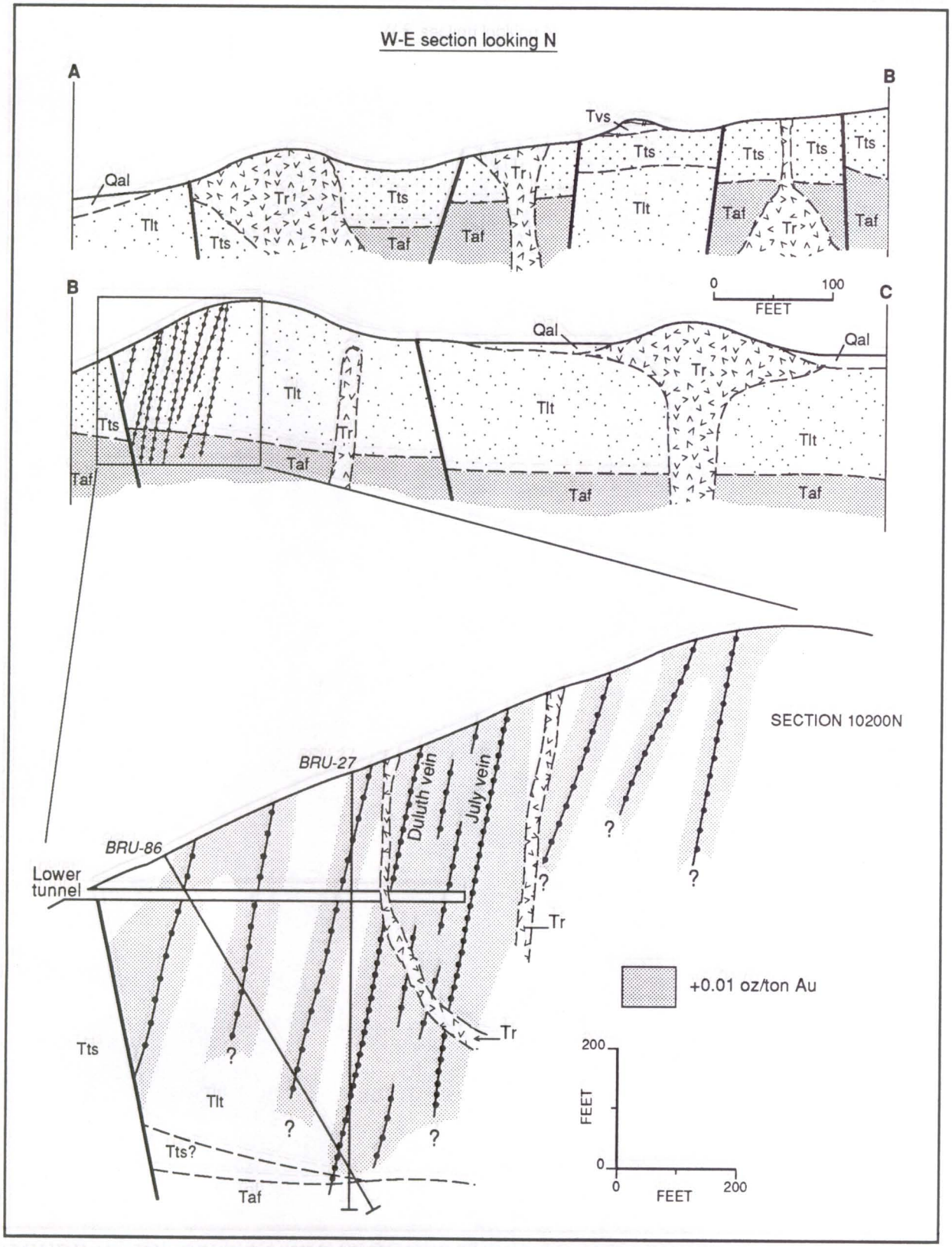

FIGURE 18. DIAGRAMMATIC SECTIONS THROUGH THE BRUNER DISTRICT (above) AND DULUTH TARGET (below). See Figure 12 for symbols. (Based on Dobak, et at., 1991; Kleinhampl and Ziony, 1984; Schilling, 1991-91; Holabird, February 1991)

9.23 Calderas. Kleinhampl & Ziony (1984) state that *"the Bruner [Volcanic] centre lies on the southeastern periphery of what may be....a caldera, in....Churchill County."* Airphotos suggest another caldera just northeast of the district which is confirmed by the geophysics (section 9.5), and another even-more-obscure one southwest of the district. There indeed may be a nest of calderas in the area.

9.24 Breccia Pipes. The concentration of fault-fractures (see section 9.221) at the Duluth target has been called a breccia pipe, but might be better called a highly-fractured, pipe-shaped, hydrothermal conduit, in which fault and/or intrusive breccias occur along the cracks. No evidence of the upward movement of breccia fragments has been reported, although it may have taken place.

9.3 ALTERATION

9.31 Bleaching. The sialic volcanic rocks in the district have been bleached, argillized, sericitized, and iron-stained over an area one mile wide, three miles from north to south, and at least 600 feet deep. Gold-barren, disseminated pyrite was deposited over what is now the bleached area, probably by sulfateric, volcanogenic, hot-water action. Weathering (air and water) has oxidized the disseminated pyrite forming acid which bleached, stained, and formed alunite, sericite, and clay mineral in the rock. Oxidation depths are more than 600 feet (Dobak, May 89).

9.32 Silicification. Weak silicification occurred over much of the bleached-oxidized area, and apparently accompanied the disseminated pyrite.

9.33 Quartz-Adularia-Gold Flooding. More intense alteration followed the initial silicification-pyrite dissemination. Quartz/adularia filled open-space along faults and fractures and replaced clasts (breccia fragments), forming veinlets and veins. The flooding also disseminated quartz and adularia through the wallrocks, especially through the Latite Crystal Tuffs (section 9.123). The most intense alteration covers an north-south oval area at least 2,000 feet long, 800 feet across, and over 600 feet deep, coinciding with the Duluth "orebody" and geochemical anomaly.

9.4 MINERALIZATION

9.41 Spacial Relation to Rock Units. The gold-silver mineralization (veins and disseminations) is (1) mostly in the Latite Crystal Tuff (9.123) and the first, Porphyritic Rhyolite phase of the Dacite Intrusive-Extrusive Vent Complex (9.125); (2) may or may not extend downward into the Andesite Flows (9.121); (3) is cut, intruded, and covered by the Rhyodacite and Vitrophyre phases of the vent complex (9.125); and locally is covered by the Andesite Flows (9.121).

9.42 Spacial Relation to Faults. The high-grade gold-silver veins fill the North-South Faults/Fractures, and the lower grade disseminated gold mineralization extends outward from these veins into both the hanging and footwalls. Values decrease outward in each wall.

9.43 Shape, Attitude, and Size. Only the Duluth target is drilled out to the point that it can be described. The veins/disseminations at Duluth together form a tabular-shaped body (blanket) at least 2,000 feet long (north-south), 800-feet across, and up to 600 feet thick.

Veins. The veins within the body: (1) are higher grade, (up to 0.5 oz per ton gold) than the disseminated mineralization (2) usually dip 75° west; (3) commonly strike north-south, less commonly east-west, or rarely other directions; (4) are tabular or chimney-shaped; (5) are a foot to over 20 feet thick.

Disseminations. The disseminated mineralization in the wallrock: (1) is lower grade than the veins (commonly 0.01 - 0.04 oz per ton gold adjacent to veins); (2) decreases in grade outward from the veins but commonly remains above 0.008 oz per ton gold at 50 feet; and (3) apparently is mostly in the Latite Crystal Tuff (but could extend downward into the Andesite Flows which is essentially untested).

9.44 Age. The quartz-adularia-gold mineralization occurred during the Miocene ---it cuts and is in the Latite Crystal Tuff (19.3 m.y.) and Porphyritic Rhyolite (oldest) Flow-Domes, and in turn is cut by the Rhyodacite and Vitrophyre (younger) Flow-Domes. Adularia from the Duluth vein gave a K-Ar age of 16.5 +/- 0.5 million years (J. Tingley, Nevada Bureau of Mines & Geology, oral communication), confirming the Miocene age.

Many of the other bulk-mineable gold deposits are also Miocene in age.

9.45 Mineralogy.

Minerals. In order of decreasing abundance the vein minerals are (± 60%) quartz, (± 30%) adularia, and pyrite. Early reports mention tellurides at the surface (Western Nevada Miner, 18 Dec 1915). Secondary minerals include limonite, hematite, montmorillonite, alunite (?), and calcite.

Paragenesis. The sequence of mineralization appears to be: (1) gold-barren quartz -(?) pyrite flooding (disseminated pyrite and silicification in the country rock, and massive "bull" quartz filling open-space and replacing fragments of country rock in the fault-fracture veins (?) accompanying intrusion/extrusion of the Porphyritic Rhyolite flow-domes; (2) continuing faulting/fracturing (brecciation and sheeting) of the wallrock and veins; (3) increasingly gold-rich quartz, adularia, pyrite, (4) base-metal (copper, lead, zinc) sulfides, and silver minerals deposited in fractures and vugs in the wallrock (mostly Latite Crystal Tuff) accompanying intrusion/extrusion of the Rhyodacite and Vitrophyre flow-domes; (5) deposition of calcite and other carbonate minerals as each pulse of mineral-forming fluids cooled; and (6) oxidation of the sulfide to depths of hundreds of feet and the formation of secondary oxides, carbonates, and silicates. There were are least 3 pulses of mineralization, and frequent faulting, greatly complicating the paragenetic relationships.

Changes with depth. The mineralization changes with depth from: (1) oxidized (limonite and hematite); (2) unoxidized (pyrite); (3) unoxidized (pyrite and base metal sulfides); (4) unoxidized (pyrite, galena, sphalerite, chalcopyrite, and other base-metal sulfides + molybdenum and tungsten minerals).

9.5 GEOCHEMISTRY/GEOPHYSICS

9.51 Soil Sampling. Soil sampling over much of the district by Newmont reportedly (Newmont Annual Report 1989) *"show a [strong] 2000' by 800' northwest-trending gold anomaly with values greater than 100 ppb....over the Duluth Mine and extending towards the Penelas Mine,* Quin (Jul 90) *"contoured the gold and silver soil [data]...The results show a broad north-westerly trending zone, at least 3,000 feet wide, weakly anomalous in both gold and silver. Within this zone is an area approximately 2,500 - 3,500 feet long and 800 -1,200 feet wide that is highly anomalous in gold and silver. Values typically exceed 100 ppb gold and 300 ppb silver, whereas background gold values are 1-5 ppb gold and less than 50 ppb silver....Additional, lesser, anomalies correspond with the old Phonolite and Penelas workings and several other areas."* (See Figs. 20 & 21).

Clark (5 May 91) adds *"Gold and silver are strongly correlated and occur predominantly in the south of the grid [in the Duluth area], trending parallel to the geology in a northwesterly direction. In the western part of this 'high-value' area, the high silver is directly associated in the field with high gold, whereas in the southern part of this 'high-value' area, the gold forms an elevated background on which silver is also high....High values of arsenic, antimony, lead, zinc, and copper also occur in this same general 'high-value' area, but not directly correlated with the high gold and silver....being associated more with moderate peaks of gold and silver, but not with the highest gold and silver values. These [five] elements do have a significant association with each other....*

....the highest gold values occur on the western part of this 'high-value' area, whereas the highest silver values trend across this 'high-value' area in a northwest to southeast direction. This has resulted in the high silver overlying high gold peaks in the west, but overlying a high-background gold plateau in the south-central part of the grid."

Soil geochem surveys have proven to be excellent gold exploration tools in western Nevada and elsewhere in the world. The NEL survey at Bruner is especially useful. It clearly points out the targets, and was used to spot drill-holes, and should be used to plan future exploration. The NEL survey also correlates with the quartz-adularia alteration, bleaching and argillic alteration, favorable host-rocks (Latite Crystal Tuff), mined areas, and rock sampling. The major drawback of NEL's survey is that it does not cover the entire Miramar property, or the Paymaster target. The unsampled portion of the property should be soil-sampled before exploration drilling is done.

9.52 Stream sampling. BLEG sampling by Miramar (see section 6.6) located a number of gold anomalies, especially in the areas north and south of the soil survey.

9.53 Rock sampling. Several hundred rock samples from the surface and underground were collected and assayed for gold and silver by Newmont (Dobak et al, 18 Jan 91, Plates IV & V). *"The majority of anomalous [surface] samples came from the Duluth Anomaly. Other anomalous areas included the Paymaster and Phonolite areas"* (Quin, Jul 90). (See also section 6.55).

The Duluth was sampled by Newmont in 1988 with encouraging results:

"Upper Workings - 70 ft. of 0.017 opt Au, 0.286 opt Ag
45 ft. of 0.038 opt Au, 0.350 opt Ag

Lower Workings - 50 ft. of 0.027 opt Au, 0.107 opt Ag
10 ft. of 0.434 opt Au, 0.300 opt Ag
100 ft. of 0.012 opt Au, 0.130 opt Ag
28 ft. of 0.012 opt Au, 0.109 opt Ag
20 ft. of 0.032 opt Au, 0.220 opt Ag
70 ft. of 0.024 opt Au, 0.261 opt Ag" (Dobak, 29 Nov 88)

The Paymaster was sampled later. *"The Paymaster vein returned assays of up to 1 opt over widths of 6 inches to 2 feet. Gold values in the hanging wall and foot wall taper off rapidly. The north trending Paymaster vein and the workings terminate in a structural zone at the centre of the Paymaster Hill. Three ten foot chip samples within this structural zone returned values of 0.1 opt Au."* (Dobak, 28 Feb 90).

Quin (Jul 90) calculated the width-weighted average grade of all the Duluth and Paymaster samples:

Location	Number of Samples	Gold (oz/ton)	Silver (oz/ton)
6533 Level Duluth	109	0.028	0.18
6608 Level Duluth	40	0.027	0.57
Paymaster	87	0.030	0.19
or*	*75	*0.041	0.26

*excluding NE 100 feet of barren drift

As Quin (Jul 90) points out: The *"results were sufficiently encouraging to persuade Newmont to [continue drilling]....Clearly these results are of economic interest, when compared with Round Mountain's average mined grade of 0.028 oz/ton gold and virtually no silver. Average grades could be increased by selective mining methods being utilized to separate waste and ore."*

9.54 Geophysics.

Magnetic survey. Magnetic surveying by Newmont *"delineates the major structure features [faults] identified by geologic mapping....also identifies several [fault/veins] in areas of poor exposure....[and] traces structural trends that control gold mineralization out under the sedimentary cover [of the pediment to the east]"* (Dobak, 29 Oct 89). See Fig. 19.

An analysis for Miramar of Newmont's survey and Nevada Bureau of Mines and Geology regional data showed that the property-scale fault *"linears"* at Bruner are along regional-scale lineaments. For details see (Candy, Jun 1991).

Gravity survey. Gravity surveying by Newmont *"over the pediment to the southeast of the Penelas Mine....determined that the gravel cover is shallow, 100' to 500' deep."* (Dobak, 25 Apr 90).

Candy's analysis of Newmont and Nevada Bureau of Mines and Geology gravity data also confirms the presence of calderas around the district, and of the pediment southeast of the Peneles Mines. (See Candy, June 1991, and Fig. 19).

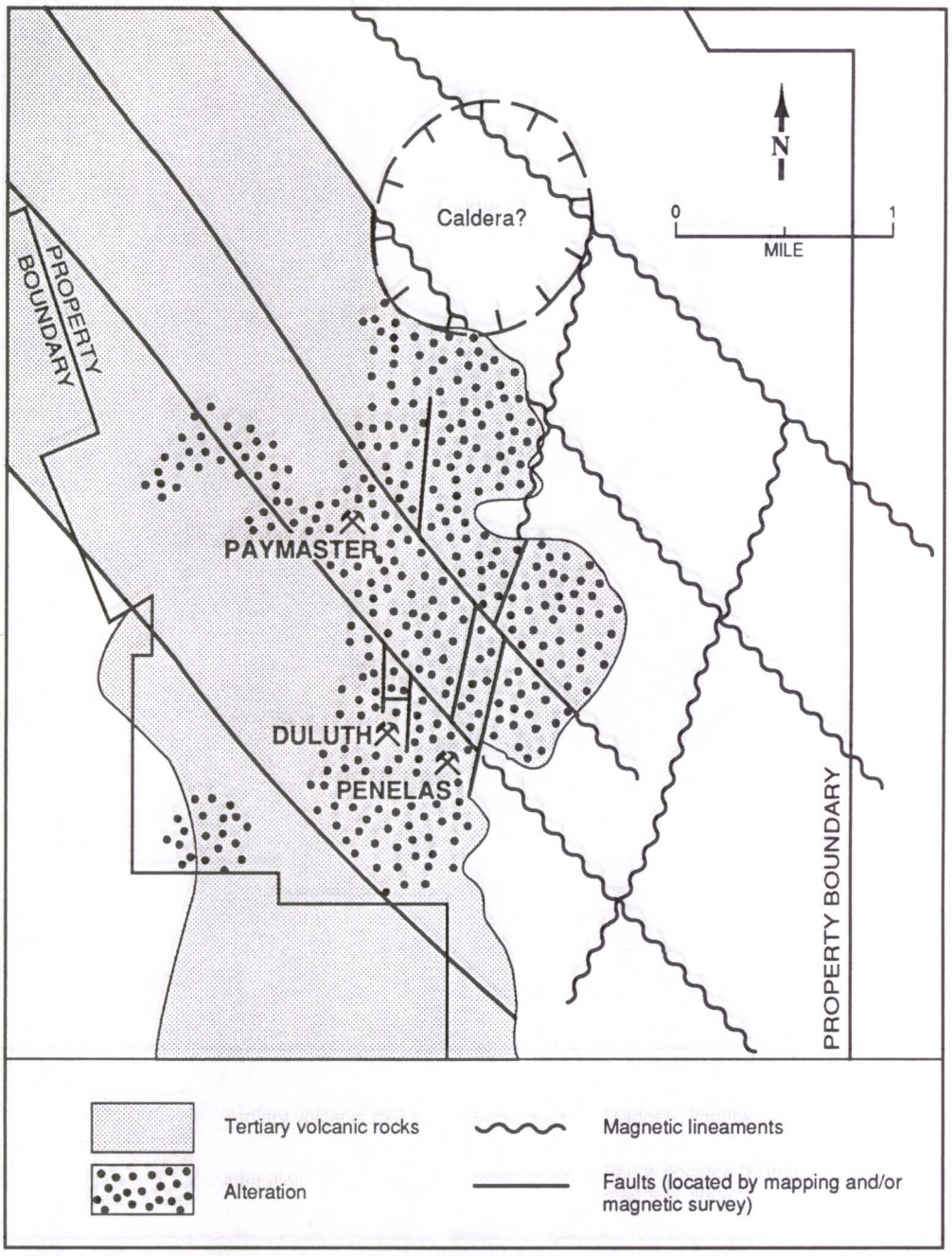

FIGURE 19. RESULTS OF MAGNETIC SURVEY (modified from Quin, July 1990).

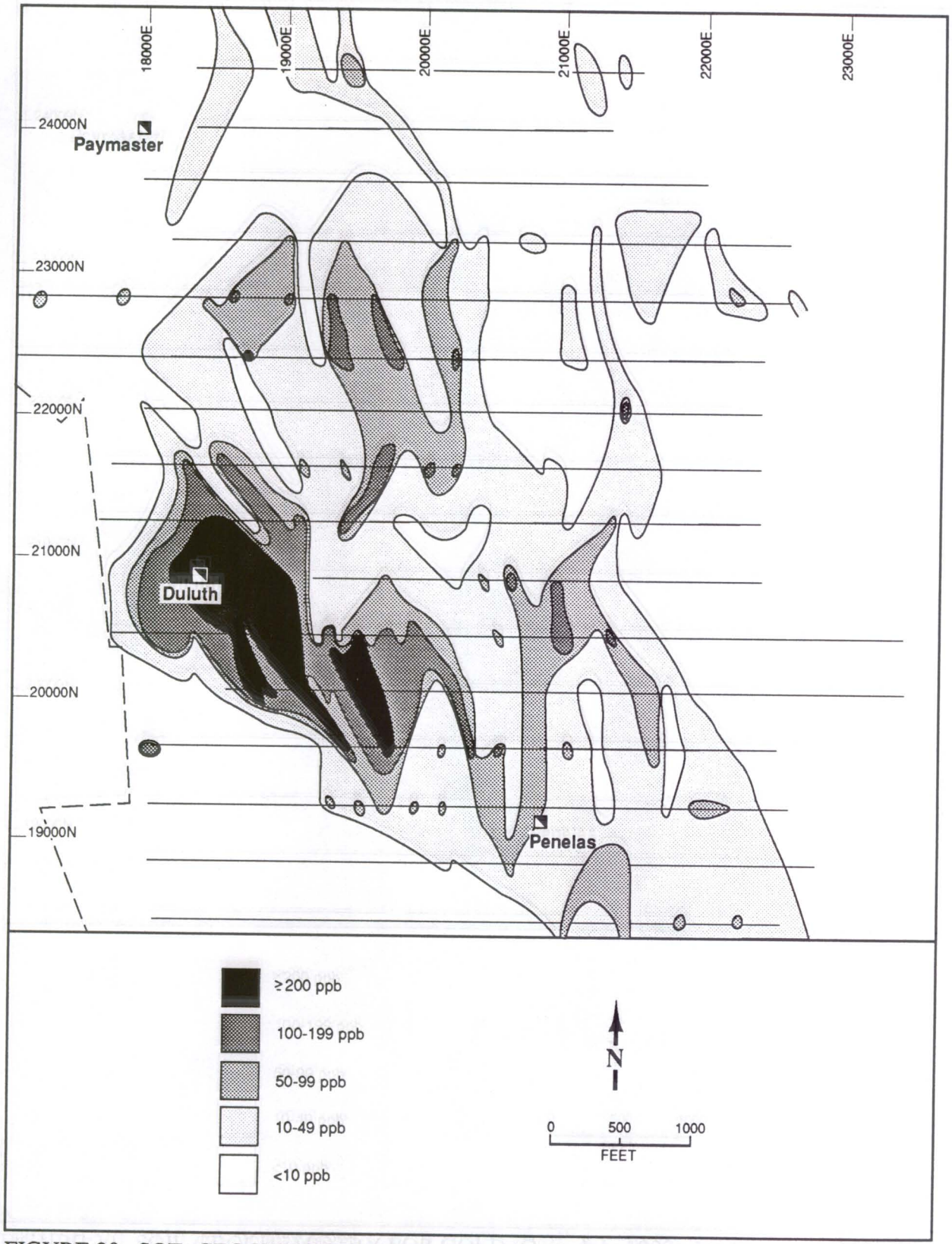

FIGURE 20. SOIL GEOCHEMISTRY FOR GOLD (Quin, July 1990 after Newmont data).

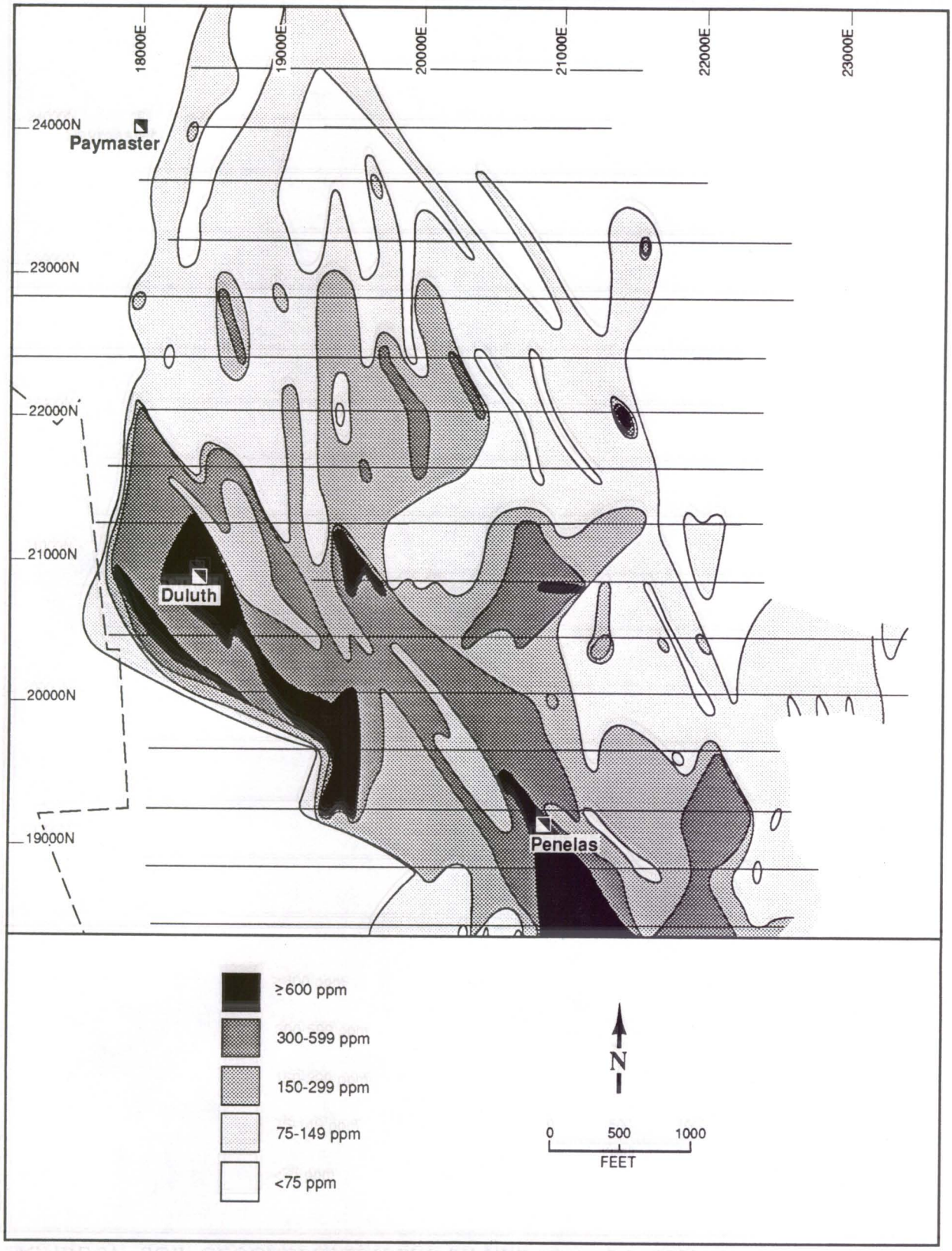

FIGURE 21. SOIL GEOCHEMISTRY FOR SILVER (Quin, July 1990 after Newmont data).

10. EASTGATE DISTRICT GEOLOGY

The mines and prospects of the Eastgate district are more scattered than those of the Bruner district. The geology of both districts is quite similar although the Eastgate deposits are somewhat more variable than the Bruner deposits.

10.1 EASTGATE MINE

The Eastgate Mine (see also section 5.21) is in *"Miocene [rhyodacite] tuffs and flow breccias....The area is cut by one or more vein structures, running North 25 degrees East along which several episodes of epithermal activity have taken place. This activity intensely altered a large area of the faulting, striking north 60 - 80 degrees west has cut and offset the vein zone."*

"Alteration and mineralization occur over a strike length of one mile with widths exceeding 1,200 feet. The vein zone varies from 10 - 80 feet and contains individual parallel siliceous veins from 2 - 15 feet in thickness. The siliceous veins, which are usually composed of brecciated banded, multi-stage quartz-adularia also appear to carry the majority of the gold and silver values. The association of several ages of adularia with minor occurrences of sulphur and gypsum in surface areas indicate a boiling zone within an epithermal system....[drilling intercepted] high grade gold values [at depths of over 350 feet] indicating that high-grade gold values do exist at a considerable depth below surface epithermal boiling zone." (Cabot Resources, 17 Aug 90). The presence of over 2% lead in some of the ore indicates the presence of base-metal epithermal mineralization which is not reported in the Bruner district.

The wallrock (rhyodacite tuff) is a favorable host for disseminated gold mineralization but drilling and other sampling, to date has not found any tonnage.

10.2 BUFFALO HUMP MINE

The Buffalo Hump Mine (see also section 5.22) is in Miocene *"rhyolite [latite] crystal tuff."* The stratigraphy is similar to Bruner: The tuff overlies *"pyroxene andesite [flows]"*, locally intertongues with volcaniclastic *"tuff breccia [and] rhyolitic ash-fall tuff with graded bedding [,and is overlain by "rhyolitic ash-fall tuff with interlayered dacite."* (McFarland, Feb 75); this Miocene volcanic sequence in turn is overlain by thin basaltic andesite flows and cut by basaltic dikes. A intrusive/extrusive vent complex *"terminated the system on the south end"* at Buffalo Mountain (Kehmeier, Nov 90).

Numerous faults cut the rocks, dip steeply, and strike N45° W, N30° E, or are curvilinear (suggesting caldera-like structures in the Buffalo Mountain vent complex). The wider, 5 to 20-foot fault zones contain *"angular tuff fragments ranging from 2 to 5 cm....within a soft, slightly sheared matrix....the narrower, up to 2-foot faults are very fine grained....fault gouge"* (McFarland, Feb 75). The entire volcanic sequence has been tilted to the northeast.

"Argillic alteration [and bleaching are] locally intense....in the Buffalo Hump hill, with its abundance of small faults" (White, Aug 90). The quartz-gold mineralization occurs as pods in the northeast-striking, faults; *"silicification does not extend into the wallrock....wall rock assays less than 0.003 oz/st*

Au in most cases....[vein] faults breccia and gouge....assays 0.05 oz/st and less [and the quartz pods] at least a half ounce gold....Limonitic crusts and dull orange-brown stains are ubiquitous....1 - 3% disseminated pyrite occur [below] about 100-foot depths of oxidation" (White, Aug 90).

Rock and soil sampling showed an oval anomaly of mercury (+100 ppb) antimony (+ 3 ppm), arsenic (+ 25 ppm), silver (+0.7 ppm), and gold (+10ppb) in the Buffalo Hump hill with a narrow "tail" extending south (Kehmeier, Nov 84). BLEG results (White, Aug 90C) indicate anomalous gold values to the south and west, and should be explored by soil sampling and drilling.

10.3 MAGMATIC QUARTZ MINE

The Magmatic Quartz Mine (see also section 5.23 and McGill, -?- 1938; Reynolds, 9 Jan 39) is in Miocene (?) andesite flows locally capped by a Quaternary basalt flow. The rhyolitic crystal tuffs found to the north and south are missing in this area, probably by erosion in Quaternary time.

The two principal veins strike northwest and dip 50 degrees east; three smaller veins strike northeast and also dip 50° east. the veins range from a few inches to 15 feet thick and can be traced for up to 1/2 mile. The vein filling is mostly quartz, abundant calcite and adularia, some pyrite and reportedly (Western Nevada Miner, 18 Dec 15) tellurides.

10.4 CHALK WELLS PROSPECTS

The Chalk Wells prospects (see also section 5.25) are in altered rhyolitic Tertiary volcanic rocks; with depth the rhyolitic lithic tuffs change to older *"andesite - derived sandstone."* Samples of dump material at the old Tri County well assayed 19 & 3 ppm gold, and displayed pervasive quartz-adularia alteration. A 210-foot vertical hole drilled by NEL encountered 70-feet of alluvial gravel with 140-feet of unaltered tuff below; abundant water occurred at the base of the gravel (Garside, Aug 81).

White (14 Aug 90) adds: *"The northern shaft is sunk on a small shear cutting notably heterolithic fragmental agglomerate (sample R-5, 0.006 oz/s.t. Au) with some limonite staining on fractures and some microcrystalline quartz lined vugs. Both the iron and quartz are likely supergene. Selected quartz including some fracture and vug confined chalcedony (sample R-6) assayed undetectable gold and silver (less than 0.003 oz/s.t. Au, 0.05 oz/s.t. Ag)."*

10.5 YELLOW STAR PROSPECT

The Yellow Star prospect is located 1 1/2 miles northeast of Buffalo Hump in the SE 1/4 S5, T15N, R38E. A shaft and several adits explore very thin, discontinuous quartz veins. Two *"high-graded samples"* of quartz from the dumps assayed only 0.019 and less than 0.003 oz/s.t. Au. Marshall Earth Resources ran resistivity and soil geochemistry surveys. *"Neither survey appears to have much utility...There is neither any abundance of fractures or shears or any widespread alteration to suggest any disseminated gold target. The vein and wall rock samples are barren. On this basis I believe there is virtually no gold in the rocks of the old prospect area"* (White, 14 Aug 90).

10.6 TEEL PROSPECT

The Teel prospect is just west of the Yellow Star prospect. An adit and shaft (now caved) explore the area. The country rock is *"clay-altered, quartz crystal lithic tuff [cut by vertical] quartz veinlets up to 1 inch thick...oriented parallel to the adit."* A grab sample of hand-cobbed vein material *"assays 0.2 oz/s.t. Au."* The veins locally *"carry sparry calcite"* but lack *"any evidence of mineralization."* (White, 14 Aug 90).

11. MINING POTENTIAL

11.1 BRUNER DISTRICT

A significant amount of exploration work has been completed in the Bruner District, including geologic mapping, soil geochemistry, airborne and ground geophysics, surface and underground rock sampling and numerous drill holes. This work has delineated several mineralized targets, but drilling has not been carried out in sufficient density to establish proven or probable ore reserves. However, in the area of the Duluth Mine, drill information is available in sufficient density to allow the calculation of a preliminary resource for the Duluth Zone. Additional, fill-in drilling will be required to increase the confidence of this resource sufficiently to establish a proven or probable reserve.

11.11 Duluth Resource Estimation

There have been three resource estimates completed for the Duluth Zone. The principal difference between these estimates is the overall area included and the data used to estimate tonnage and grade. The author's estimate (section 11.112) encompasses the largest area and is the most comprehensive of the three studies, taking into account all types of sampling data to calculate the average grades.

The use of the term "resource" as opposed to "reserve" is deliberate. The term RESOURCE is used in this report to indicate a mineralized area delineated in sufficient detail by drilling, geology, geophysics, geochemistry, etc. to allow overall parameters on tonnage and grade to be determined with a level of confidence and accuracy considerably higher than "possible" or "inferred" but less than that of a "proven" or "probable" reserve. Additional development drilling will be required to fill in information gaps between the 37 drill holes used in this calculation and to increase the level of confidence in the Duluth Zone resource. Completion of this fill-in drilling would allow the delineation of a proven or probable reserve in accordance with accepted industry standards.

The term "resource" is therefore used to indicate the overall parameters of the mineralized zone, without consideration of the economic viability of that mineralization that is implicit in the designation as a "reserve". The term "preliminary resource" is used to indicate that additional resources are anticipated to be developed in the Duluth Zone as areas outside of the resource estimate area are tested by drilling, since the mineralization so far delineated in the Duluth is not closed off in several directions.

In addition, several of the other targets appear to have excellent potential for the delineation of reserves and resources, based on the exploration results to date, including drilling. These other target areas are, however, not drilled in sufficient detail to calculate any resources at this time.

11.111 Newmont Exploration, Ltd: *"NEL's program identified a small inferred resource in the Duluth Mine target area and some small vein-type potential....southeast of the Penelas Mine. The inferred Duluth resource, a cross sectional estimate based on 12 drill holes, amounts to 2,227,907 tons @ 0.025 opt Au yielding 55,548 oz Au with a stripping ratio estimated to be 1.4:1. The grade used is the*

weighted average of the 120 feet of continuous chip samples taken perpendicular to the Duluth structure in underground workings....[a rock density of] 13ft 3/ton [was used]. " It should be noted that the grade was apparently based entirely on chip-sampling (and not on drill hole samples).

"Due to the very erratic nature of the mineralization drilling on at least 100 foot centers would be required to confirm and possibly increase this resource. Due to limited size potential it is not recommended that Newmont continue with the program." (Dobak, et al, 18 Jan 91).

NEL 12-HOLE ESTIMATE, DULUTH TARGET

Section	tons Ore	Waste	oz/ton grade	oz gold	based on no. holes
19,700N					
19,800N					
19,900N	457,077	586,308	0.025	11,427	3
20,000N	605,830	534,038	"	15,146	3
20,100N	859,838	976,185	"	21,496	2
20,200N	305,162	951,807	"	7,629	4
20,300N					
20,400N					
	2,227,907	3,048,418	0.025	55,548	12

(Dobak, -?- 1991)

11.112 Holabird: Holabird (Feb 1991) has also made a cross-section resource estimate of the Duluth target based on the same 4 cross-sections and 12 drill-holes plus 4 additional cross-sections and 10 additional drill-holes not used in the NEL estimate (above). The grade used is based on weighted drill-hole cuttings assays. A rock density of 12.5 ft ^{3}/ton was used.

HOLABIRD 20-HOLE ESTIMATE, DULUTH TARGET

Section	tons Ore	Waste	oz/ton grade	oz gold	based on no. holes
19,700N	25,920		0.012	321	1
19,800N	340,800		0.033	11,174	3
19,900N	1,136,520		0.018	20,272	3
20,000N	948,960		0.035	33,342	3
20,100N	1,103,960		0.053	58,524	2
20,200N	672,120		0.083	56,103	4
20,300N	310,280		0.023	7,119	2
20,400N	88,800		0.034	3,007	2
	4,627,360		0.041	189,862	20

(Holabird, 5 Feb 91)

11.113 Schilling: I have also made a cross-section resource estimate of the Duluth target based on 19 sections including all used by Holabird and NEL (above). This estimate was based on the geology which indicates the importance of linear faults that contain through going high-grade veins. These linear zones of mineralization were projected along strike and down dip, and widths and grades assigned based on drill intercepts and underground and surface sampling. All structures identified by NEL were plotted onto east-west cross-sections 100 feet apart and correlated with the logs of the 37 NEL drill-holes. Grades and tonnages were then calculated for each 100-foot slice. A rock density of 12 ft^3/ton was assumed.

SCHILLING 37-HOLE ESTIMATE, DULUTH TARGET

Section	Tons Ore	Waste	oz/ton grade	oz gold	based on no. holes
19,600N	106,250		.011	1,169	1
19,700N	212,500		.011	2,338	1
19,800N	469,166		.027	17,744	2
19,900N	1,702,708		.040	28,411	3
20,000N	1,714,167		.027	46,997	3
20,100N	2,188,750		.049	108,994	3
20,200N	1,729,167		.033	56,741	4
20,300N	1,518,334		.021	33,192	2
20,400N	509,250		.028	14,745	2
20,500N	526,667		.020	10,310	4
20,600N	341,667		.010	3,533	1
20,700N	504,166		.010	5,180	3
20,800N	539,583		.011	5,049	1
20,900N	257,917		.018	4,604	2
21,000N	500,001		.018	8,784	0
21,100N	662,400		.018	11,674	2
21,200N	776,250		.019	14,553	2
21,300N	659,374		.012	8,045	1
21,400N	70,000		.015	1,050	0
	14,988,317		.026	383,114	37

11.114 Comparisons: In comparing these three resource-estimates, the following should be considered:

(a) the Holabird tonnage-estimate covers twice the area of the NEL estimate; the Schilling tonnage - estimate covers 2.4 times the area of the Holabird estimate. Thus the tonnage estimates are roughly comparable.

(b) the NEL grade-estimate (0.025 oz au/ton) and a separate grade-calculation (0.028) by Quin (Jul 90) are based only on surface and underground rock-sampling; the Holabird grade-estimate (0.041 oz Au/ton) is based only on drilling intercepts; the Schilling grade-estimate is based on NEL drilling intercepts, surface underground sampling, geology, and soil geochemistry.

(c) the NEL estimated stripping ratio (1.4:1) is assumed.

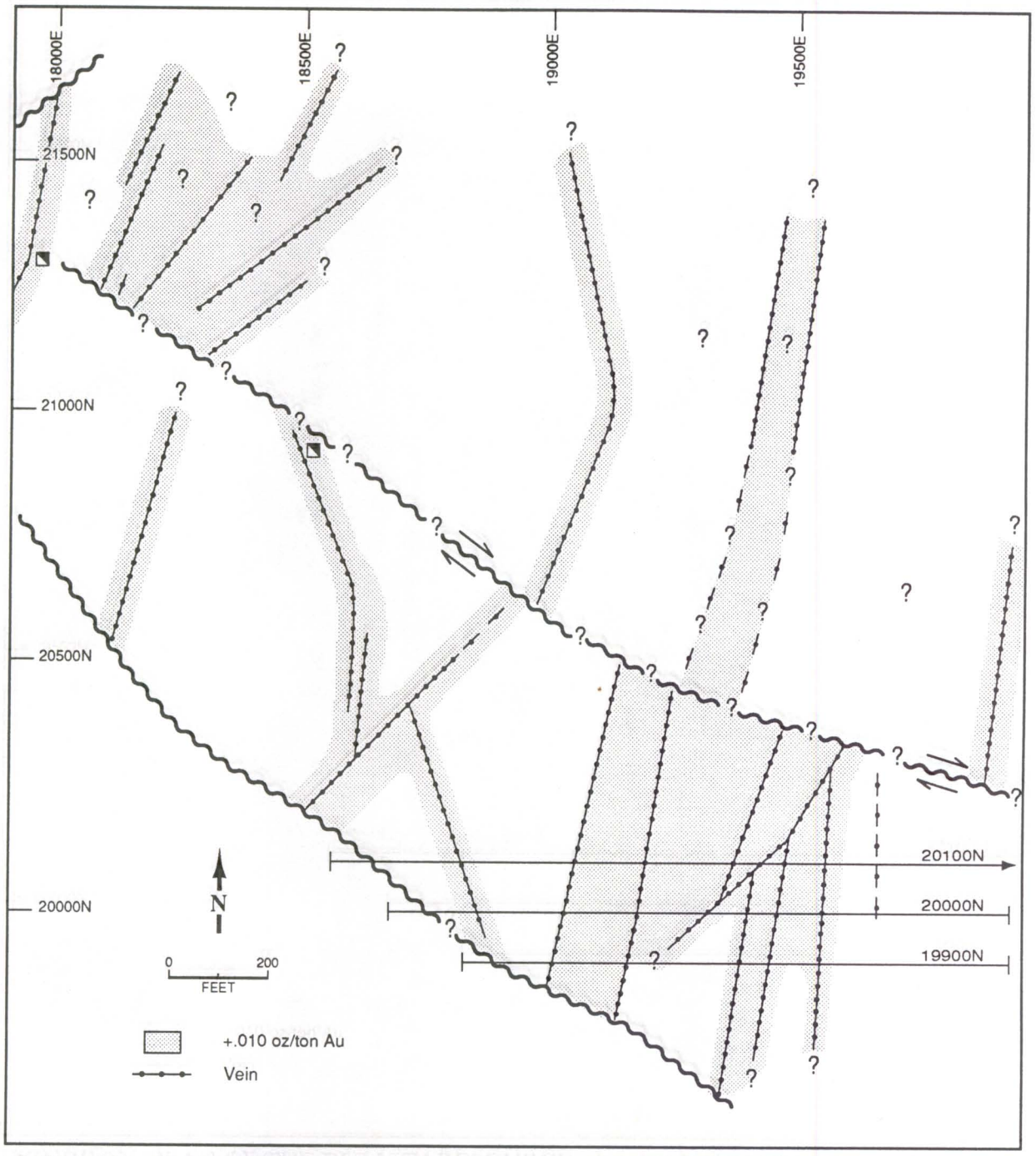

FIGURE 22. PLAN OF THE DULUTH RESOURCE, showing high-grade veins and lower grade disseminated gold, and faults. See Figs. 22A-22C for cross sections.

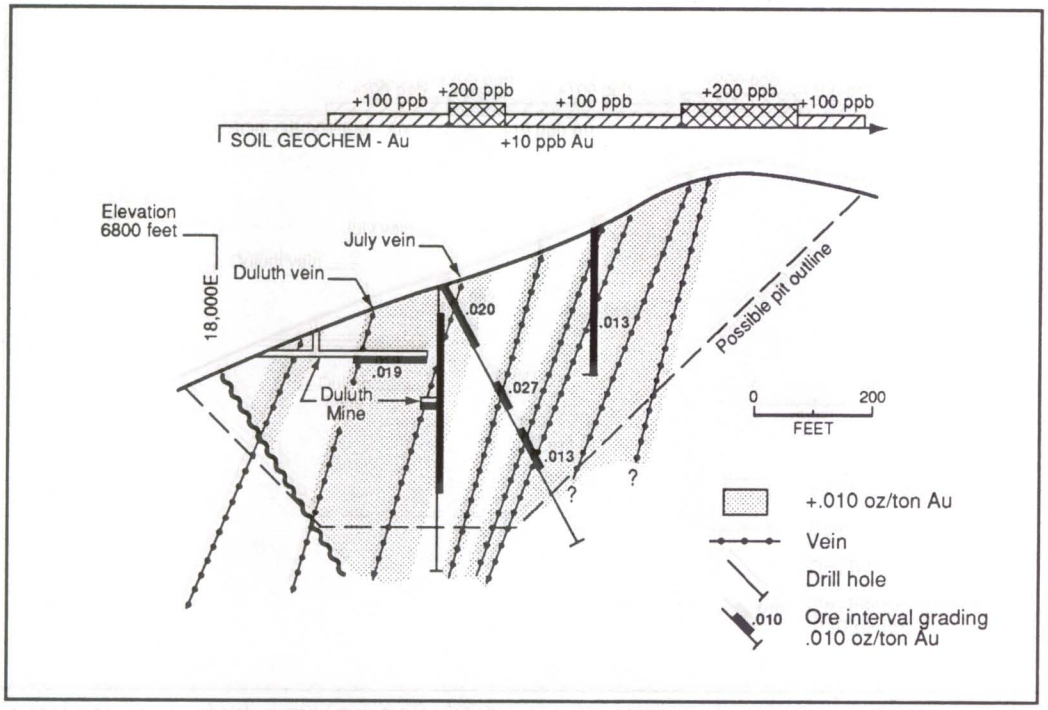

FIGURE 22A. DULUTH RESOURCE - EAST-WEST SECTION 19900 NORTH

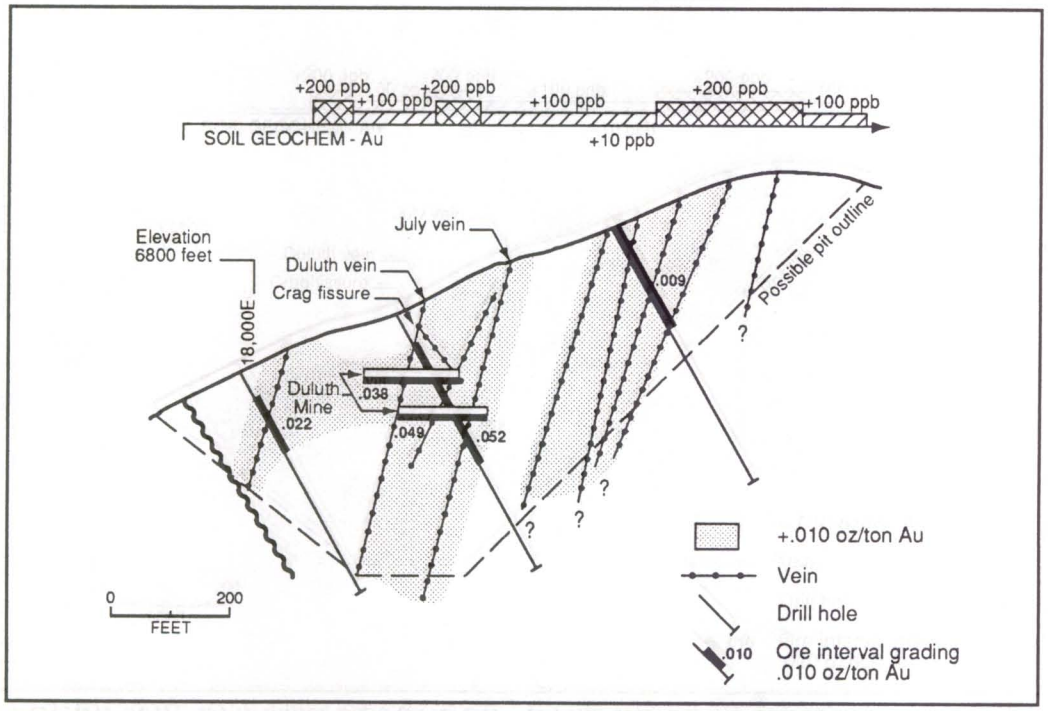

FIGURE 22B. DULUTH RESOURCE - EAST-WEST SECTION 20000 NORTH

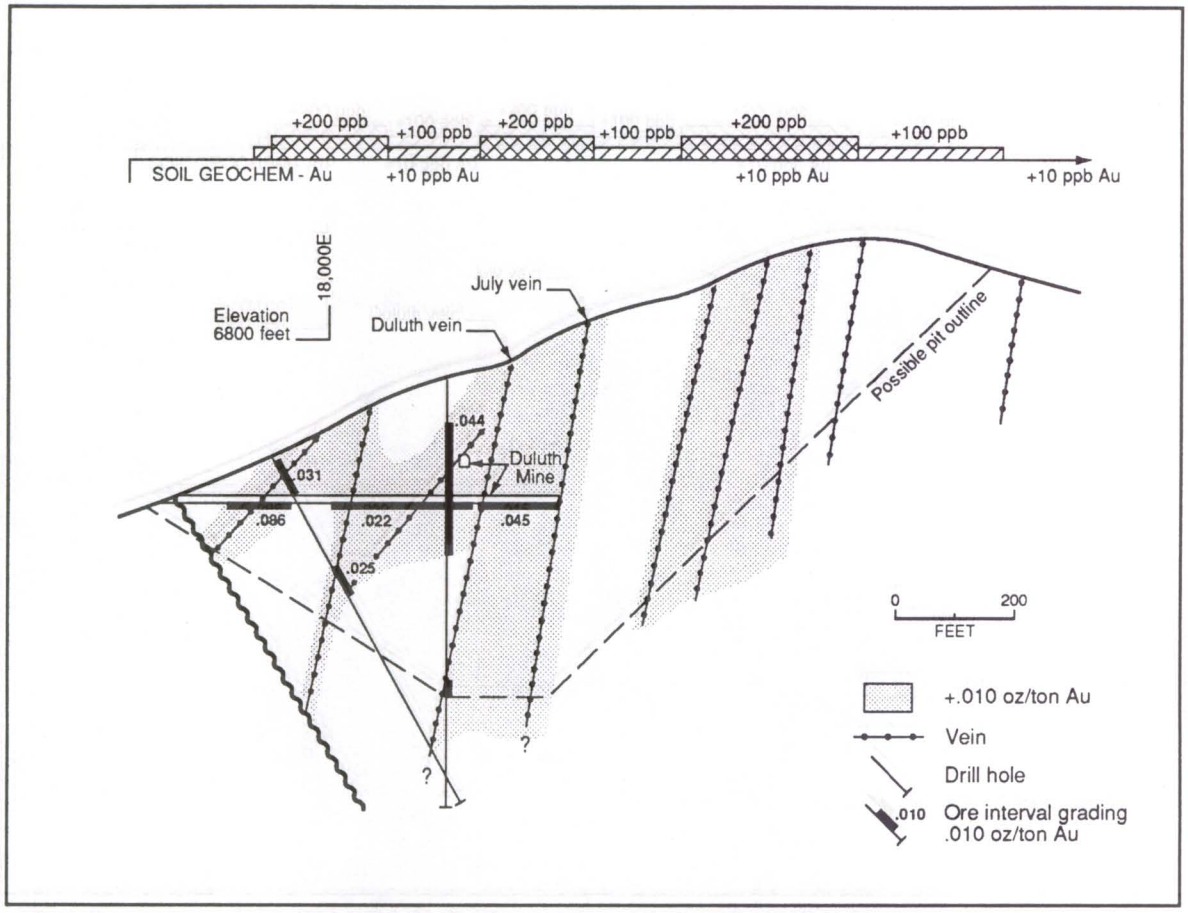

FIGURE 22C. DULUTH RESOURCE - EAST-WEST SECTION 20100 NORTH

11.12 Conclusions

Drilling in the Bruner district has established a resource (mining potential) of at least 380,000 ounces of gold in the Duluth area; additional, development drilling is needed to outline and prove up this resource. Additional, exploratory drilling is needed to outline resources at other targets.

The Bruner district has mining potential for the following reasons:

Kleinhampl and Ziony (1984) concluded the following: *"The ore potential for the district is larger than that deduced from the limited exploration and interest accorded the area in recent years. This view is reinforced by:*

(1) a respectable past mineral production.

(2) locally intensely altered Tertiary volcanic rocks.

(3) extensive areas of altered Tertiary rocks in and adjacent to the district.

(4) the presence of clustered, abundant Tertiary intrusive bodies in a mineralized area that may be peripheral to a caldera-like structure on the northwest.

(5) a partial similarity of the Tertiary geology to that at Tonopah."

Quin (Jul 90) added:

(6) "widespread [gold-silver] mineralization over an area 1.5 miles by 0.5 miles.

(7) reported similarities to Round Mountain and Rawhide districts, both major producing gold-silver mines.

(8) Newmont's aggressive approach to the exploration....and continued land acquisition on behalf of the joint venture would indicated that they are encouraged by their results to date."

Other favorable considerations include:

(9) location of the district at the intersection of several regional lineaments (deep-seated structural zones of weakness) along which ore-forming fluids and magmas can easily rise and form ore deposits.

(10) a concentration of faults/fractures at the Duluth mine forming a structural stockwork or breccia pipe that provides: (a) open-space in which high-grade veins have formed; and (b) access to permeable wallrock.

(11) the presence of numerous other faults providing additional conduits, and open-space for vein formation.

(12) a thick, outcropping sequence of permeable, pre-mineral rhyolitic tuffs providing an excellent hostrock for near surface, bulk-mineable, heap leachable, oxide ore.

(13) multipulsed mineralization, faulting, and intrusion

(14) close similarities to many other bulk-mineable gold mines, including Gold Quarry, Goldfield, Sleeper, etc., etc.

(15) At least ten "significant [Duluth-type] targets" (see section 6.55) which have been discovered by drilling, etc.:

(a) the Duluth which has been partially drilled but whose limits have not been established on the north, southeast, or with depth.

(b) 5 other targets established by soil sampling and limited drilling where some ore has been found but where its extent has not been established (see Fig. 12).

(c) 5 BLEG anomalies (see Fig 13).

(d) the possibility of additional targets because Newmont's exploration program was stopped in midstream.

(e) the possibility of off-property Duluth-type targets.

(16) the absence of any human dwellings or activities other than prospecting, mining, and ranching ---a minimum of local interference. Gabbs and Ione are the nearest towns (see Fig. 1), no other dwellings are closer.

(17) <u>at least</u> 4.6 million tons grading 0.028 -0.041 oz Au/ton has been found at the Duluth target (see also 15A & B, section 11.11).

(18) the Duluth target probably contains additional tonnages of ore.

(19) other targets (Fig. 12 & 13) probably contain substantial tonnages of ore.

(20) there are targets in the Eastgate District (to the north) that possibly contain ore (see Fig. 13).

(21) that Miramar's property includes nearly all the targets.

11.3 SUMMARY

My conclusion is that the following factors combine to give the Bruner area great potential:

Regional Geology
-numerous large gold mines
-important mineral belts
-extensive volcanic activity

Local Geology
-intersecting mineral lineaments
-intense quartz-adularia alteration
-a multi-pulsed volcanic center
- extensive fault/fracture stockworks
-a thick porous volcanic host-rock
-gold-rich veins in the stockworks
-gold disseminated in the host-rock

Exploration Data
-numerous gold intercepts in drill-holes
-gold/silver-rich soil and rock anomalies

Mining History
-more than 59,000 ounces of gold produced
-some gold production by in-situ leaching,

While the above summary reiterates section 11 including the conclusions of others, it should be clearly understood that I agree with all their conclusion (nos. 1 -8) and have listed 14 (nos. 9 - 22) additional, positive factors. And to further emphasize the numerous positive factors, I have reiterated all of them at appropriate spots throughout the report.

In summary, based on presently available information, the Bruner area has great potential for bulk-mineable gold-silver deposits, and the recommendations for further work (outlined in section 12) should increase this already good potential.

12. RECOMMENDATIONS

It is recommended that: (1) the Duluth resources be developed; and (2) other Duluth-type targets be explored for additional reserves.

Stage 1

(1) that a 100' = 1" scale copyable topographic base map (with contours, cultural features, land grid, etc.), and east-west cross-sections (with drill holes, workings, etc) spaced at 100-foot intervals, be prepared of the Duluth target area.

(2) that a 1000' = 1" scale base map be prepared of the Bruner district.

(3) that the maximum size of maps and sections be less than 2 1/2 x 3 1/2 feet.

(4) that the base maps [nos. (1) & (2)] be used to make copyable "second-originals" on which other features (geology, claims, etc.) can be drafted, and from which additional copies can be made.

Stage 2

(5) that the Duluth target be developed by 600-foot, 60° each inclined, reverse-circulation drill-holes spaced equidistant (east-west) between the NEL exploratory holes. The holes should bottom in the Andesite Flows (not the Latite Crystal Tuffs). This will require at least 18 additional holes. (or approximately 11,000 feet of drilling at a cost of $125,000). Several of the holes should be cored to better understand the style of mineralization.

(6) that because the northwest and southwest limits of the Duluth target is not established, additional exploratory drilling may be needed after no. (5) is completed.

Stage 3

that if development drilling under Stage 2 is successful, the Duluth could be mined and the rest of the property be explored in parallel.

(7) extend the geologic (and soil geochem) mapping north to Buffalo Hump.

(8) exploratory drilling be done at:
- (a) the other Bruner targets (see section 6.55).
- (b) the BLEG anomalies (see section 6.6) that are not based on previously known mineralization.
- (c) the Buffalo Hump Mine area to test for deeper and peripheral mineralization (see section 11.22).
- (d) any targets found by (7).

Stage 4

(9) that if exploratory drilling establishes a resource at any of the targets:
additional 100' = 1" scale base-maps and cross-sections be made of such "successful" targets.

(10) that "development" drilling be done.

(11) that an attempt be made to learn more about the potential of the Minnova Property (see section 5.24).

(12) that an attempt be made to establish the potential of the Chalk Wells prospect (see section 11.25).

13. REFERENCES

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14. STATEMENT OF QUALIFICATIONS

I, John H. Schilling, do hereby certify that:

1. I am a consulting geologist with a business at 1301 Royal Drive, Reno, Nevada 89503 [(702) 747-3385].

2. I have a B.S. degree in geology from Penn State University; an M.S. degree in economic geology from the New Mexico School of Mines; and an additional two years Ph.D. studies at Harvard University.

3. I have been practicing my profession as an economic geologist for more than 40 years, mainly in Nevada, New Mexico and Peru, but also in other countries and states.

4. I was the State Geologist of Nevada and Director of the Nevada Bureau of Mines and Geology for 14 years.

5. I have written over 150 published reports on mining and geology.

6. I am a Fellow of the Society of Economic Geologists and a member of a number of other geological associations.

7. I have visited the Bruner area a number of times and have studied the Gabbs-Lodi area in detail.

8. I have based the Report on the extensive data files at the offices of American Eagle Resources, Inc., in Reno, Nevada.

9. I have no interests in the Bruner Property, in Miramar Mining Corporation or in American Eagle Resources, Inc.

10. I believe the information contained in the Bruner Report to be accurate, but make no representations or warranties as to the accuracy, validity or completeness, and shall have no liability for any reliance made with respect to any use of the data and information in the Report.

11. I hereby give permission for Miramar Mining Corporation to reproduce this report, or any part of it, in a Prospectus or Statement of Material Facts or other public document provided, however, that no portion may be used out of context in such a manner as to convey a meaning differing materially from that set out in the whole.

Dated at Reno, Nevada, this 20 day of Nov, 1991.

John A. Schilling

John H. Schilling, Mining Geologist