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GEOLOGY AND HISTORY

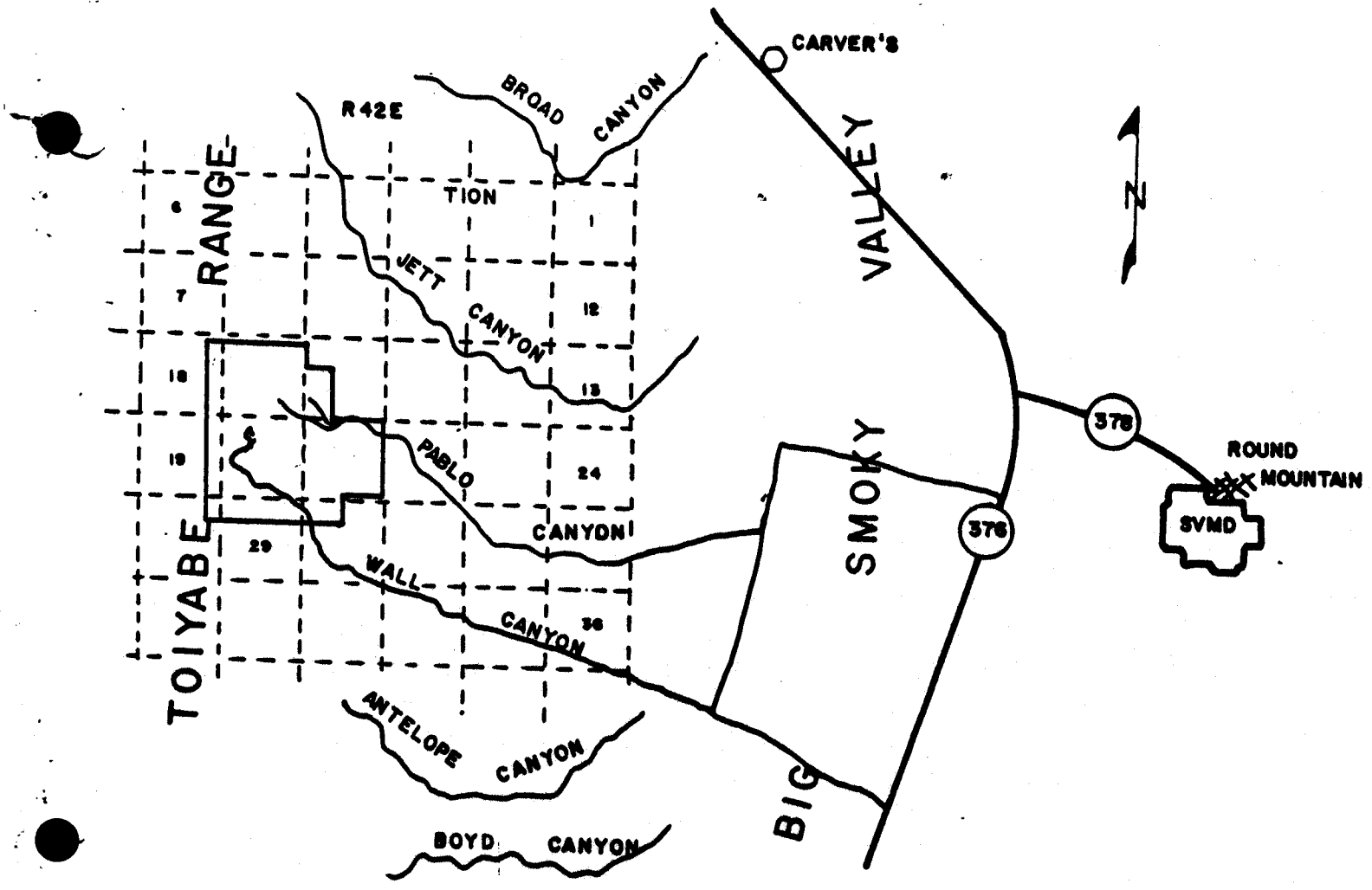
of the

BIG HORN CLAIM GROUP

NYE COUNTY, NEVADA

1985

see also map files for 20 plates



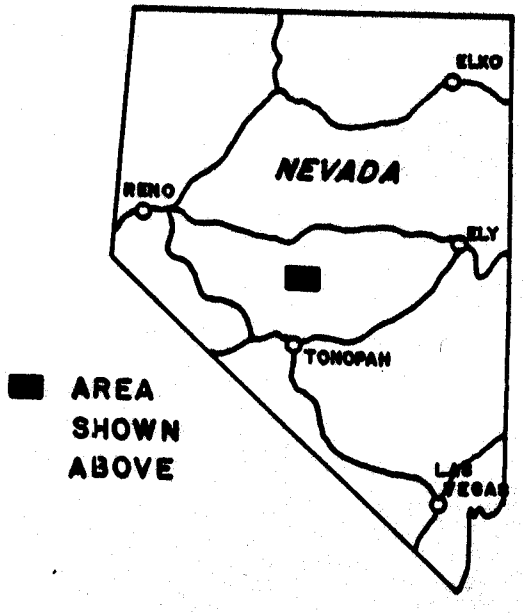


FIG. 1. WALL CANYON PROJECT LOCATION

SECTION I

1.1 Purpose of Report

The Nevada Bureau of Mines has written three reports, with sections dealing with the geology and mineralization of the Big Horn Mine area. The recent work by the Nevada Bureau of Mines, which was in conjunction with the U.S.G.S., and the work by the mine owners has established a better and more complete identification of the geologic formations of the area. In turn, this has lead to a better understanding, regarding ore controls.

This report is directed with the intention of presenting a geologic overview of the area and of presenting a more complete picture regarding the geologic controls of the mineralization at the mines. Finally, this report might be used by persons unfamiliar with the area, as a reference.

To accomplish this, a review of the regional geology, taken, in part, from the recent Nevada Bureau of Mines Report, as well as data from the older reports. From this, local concepts can be understood and in the area where information was previously lacking, geology, as it effects mineralization, can be identified.

The mine area consists of the consolidation of four separate mine groups. In this report, (1)the properties known as the Big Blue, Mammoth, Big Bananza, Bullwacker, and Blue Jacket will be referred to as the West Workings. (2)The Copper Rivet, Copper King, and the Temple-Belmont Group will be referred to as the Central Workings. (3)The South Workings includes the Mary Bennet, B & Me, Comet, Red Bluff, Anaconda, and the 1891. (4)The East Workings consist of the Last Chance, Whitby, Ashby, and the Calidonia. The South Workings include the first known workings in the Wall Canyon-Pablo Canyons area, although some of the earliest locations refer to other existing claims, of which there is no written record.

1.2 Geography

The general area where the Big Horn Mine Group is situated, is considered to be semi-arid, although this location is much wetter than most of the mining districts in Nevada. Annual precipitation is about 14 inches; and higher than average snowfalls occur on the property. Sometimes three to four feet of snow accumalate. Access to the mine is usually from April until late December, although during mining operations, the roads are kept open year-around will minimal effort.

The Big Horn Mine Group is located on the East slope of the Toiyabe Mountain Range and is in the Toiyabe National Forest, Nye County, Nevada and stand at an elevation ranging from 7700 to 8200 feet. Vegatation consist of native grass, sage, buck brush, mountain mohogany, juniper, and pinion pine trees.

There are several springs on the property. Summer daytime temperatures rarely exceed the low 90's F. and night-time temperatures are cool. Winter temperatures are cold with freezing temperatures common.

SECTION II

2.1 Physiographic Provines

The Big Horn Mine Group is located in the Great Basin, which covers most of Nevada. The Great Basin is characterized by numerous block faults, North-South trending mountain ranges and valleys. This block faulting started 17 to 20 million years ago, in the Late Tertiary times, thus creating many mountain ranges in Nevada with tilted volcanic rocks "perched" on top of the range. The Toiyabe Mountains being one such range.

2.2 Regional Geology

Mr. Kleinample, U.S.G.S. and Mr Ziony recently published, through the Nevada Bureau of Mines, a geologic report on the northern part of Nye County, Nevada. The regional geology, pertaining to the Toiyabe Range is thus reported.

"Northern Nye County, that part of Nye County north of the 38°, and occupies some 11,000 square miles of Central Nevada. Topgraphy of the region, is characterized by a series of alternating nearly north-south trending ranges and intermontone valleys commonly on the order of several thousand feet and in some places, nearly 7000 feet deep.

Bedrock, exposed mainly in the mountain ranges and pediments, includes sedimentary,igneous, and metamorphic types and ranges in geologic age from PreCambrian to Quaterary (Pleistocene). Pre-Cenozoic rocks extend across the region, with chiefly sedimentary strata, that spans the Paleozoic Era, lying in the east and central parts. In the far western part, sedimentary stratas are commonly interbedded with metavolcanic rocks and are exclusively late Paleozoic (?) and Mesozoic in age. In general, most of the Paleozoic strata change in facies from east to west. In northern Nye County; the eastern rocks consist in the main of a carbonate assamblage (platform facies) that yields in the central and western regions to a mixed carbonate-shale transitional assemblage (possibly either back-arc or slope origin). A volcanic detrital assemblage with near-shore elements dominates the Late Paleozoic (?) and Mesozoic sections in the extreme western part of northern Nye County and is possibly of island-arc or back-arc basin orgin.

Plutonic rocks outcrop in widely scattered bodies of small area extent in the western half and in the far eastern part of northern Nye County. Most of the

plutons are pre-Cenozoic and Cretaceous; however, at least one, in the Toquima Range, is Jurassic. Several hyabassal granitic masses exposed in the White Pine Range (eastern Nye County) and one in the Toiyabe Range have been dated radiometrically as Mid-Tertiary. A few other granitic plutons in eastern Nye (Grant and Quinn Canyon Ranges) were similarly dated as Tertiary, but at least the Grant Range body at Troy may be a radiometrically reset Cretaceous pluton.

Cenozoic rocks in northern Nye County consist chiefly of arealy very extensive, volumious, and thick pyroclastic material in ash-flow sheets of silicic to intermediate composition. The sheets are locally as thick as about 20,000 feet, and the older ones, Early to Middle Oligocene, are confined to the central and eastern parts of the region. A lesser volume of extensive and locally thick andersite to dacitic lavas and associated intrusive and protrusive masses are intercalated with the tuff sheets near the base of the volcanic section, particularly in the western and northern parts of the area. Similar intermediate and basic lavas also form a thin cap to the volcanic section in large parts of the western region. Rhyolitic lavas and clusters of protrusive bodies are much less abundant than the above-described rocks, but are found over a widely scattered areally and stratigraphically. Rhyolites locally lie at the base of the Tertiary volcanic section in the eastern and central parts of the County and in the central part, are as much as some 37 m.y. old.

Laterally discontinous Cenozoic sedimentary units scattered throughout the region form minor intercalations within the volcanic rocks and define periods of deltaic and lacustrine continental sedimentation into relatively ephemeral areally restricted basins. Such periods were most numerous in the Early and Middle Cenozoic.

A thin to thick deposit of Holocene sediments covers much of the intermontane valleys and generally directly overlies a valley fill that consists of at least several thousand feet of Late Tertiary and Pleistocene sedimentary rocks.

Geologists have traditionally considered that during most of the Paleozic, all of Central Nevada (including northern Nye County), lay within the broad north-trending Cordilleran geosyncline. The geosyncline may more properly be classed as a geocline bordering an early continental margin that extended northward across the region. Rocks of the carbonate asemblage on the continental platform (east of Long 117° W.) graded successively westward and downslope through an abrupt transitional assemplage into a coeval siliceous and volcanic assemblage that formed in an oceanic island-arc system.

A succession of Late Paleozoic, Mesozoic, and Cenozoic tectonic events have effected these rocks. The two earliest recognized events, the late Paleozoic

Antler and the suceeding early Mesozoic Sonoma orogenies, are marked by deformations that reflect large-scale mainly eastward-directed movement of an oceanic plate. Both events characteristically lead to the juxtaposition of the diverse facies described above--a telescoping effect--as demonstrated by rocks of the siliceous and volcanic assemblages resting upon strata of the transitional or the carbonate assemblage in the region of the Monitor, Toquima, Toiyabe, and Shoshone Ranges.

A relatively continuous period of Late Triassic and Early Jurassic sedimentation in the western part of the region was interrupted in the late Early Jurrassic by the Nevadan orogeny, an event that yielded its own characteristic orogenic assemblages of course clastic rocks (Dunlap Formation) deposited within restricted basins of the orogeny. Folding and trusting associated with this event were directed southward, then eastward, and finally, terminated with high-angle faulting and widespread plutonism ending the diastrophism.

The eastern part of northern Nye County was affected by major deformation during Laramide time (Sevier Orogeny) in the Late Mesozoic. Eastward-directed overturned folds and trusts with chiefly younger strata thrust over the older characterize this event and are well displayed in the Pancake, Quinn Canyon, and Egan Ranges.

Cenozoic tectonism is distinguished by widespread volcanism throughout the county, which mainly preceded basin-and-range normal faulting. Cycles of volcanism and erosion, epecially in the Oligocene and Miocene, led to the formation destruction, and local preservation of calderas, shields domes, and other constructional volcanic features. Caldera (caldron) complexes are of major significance in the volcanic evolution of the region: enormous volumes of ash-flow tuffs spread out for scores of miles from localized eruptive centers and then collapsed over the vents along subcircular and elliptical faults to form subsided caldrons. Calderas of different ages commonly impinge and coalesce to form diversely aged complexes, and the later calderas may partly obiterate or conceal earlier ones.

Transcurrent faults are postulated by some geologist to have been active in the Tertiary and indirectly may account for part of the disruptive segmentation seen in the present outlines of some mountain ranges and valleys. One system of arcute northwesterly trending transcurrent faults may have sheared apart a postulated major late Oligocene caldron in the north Reveille Range. The shearing of the caldera appears to have ended about 19 m.y. ago with the injection of dikes along some of the faults.

The basin-and-range normal faults, which generally strike north to northeast, represent the last stage of structural evolution of the region and account for

the present basin-and-range topography. Major movement along most of the faults apparently postdates the Oligocene and Early Miocene welded tuffs, and there has been recurrent movement to the present time along many of the faults. The Tertiary domical and block uplifting of the White Pine and Grant Ranges is postulated to have generated gravity slides and low-angle faults that account for numerous displaced bedrock blocks in the area. Other landslide masses and megabreccia units comprising Paleozoic and Tertiary rocks exist elsewhere within the Tertiary volcanic section and probably formed either by gemorphic modification of caldron or shearing and brecciation along major faults.

The principal metallic and nonmetallic commodities produced in northern Nye County have been gold, silver, antimony, lead, tungsten, mercury, petroleum, and magnesite and related minerals. There has also been production of zinc, copper, arsenic, gemstones (chiefly turquoise), brines, talcose minerals, sand, gravel, clay, and dimension stone (including travertine). Occurances of some commodities for which there is no reported production include: uranium, vanadium, selenium, manganese, nickel, glass (perlite and pumice), silica, and zeolites. Other commodities for which there generally has been some small production include chiefly barite, fluorspar, and molybdeum.

Hoist rocks for the ore deposits in the region are diverse in age and type and include Lower to Upper Paleozoic and Mesozoic (Triassic and Jurassic) sedimentary and volcanogenic strata, Jurassic, Cretaceous, and Tertiary plutonic rocks, and Tertiary volcanic and Cretaceous (?) and Tertiary sedimentary rocks. The major part of the silver and much of the mercury production has come from Tertiary rocks --Tonopah and Tybo for silver and Peavine and Union for mercury. Most of the lead in northern Nye County has come from Tybo from the same hoist rock as the silver.

The bulk of the gold came from mainly deposits formed during Tertiary volcanism, although many of the gold deposits are genetically or spatially related to Mesozoic intrusive rocks. Placer gold deposits of Tertiary age yielded much gold at Manhatten and Round Mountain. Fluorspar is also everywhere associated with Tertiary volcanism, however, large deposits may be found in Paleozoic carbonate rocks. Magnesite at Gabbs is in a Tertiary dolomite host rock, but could have been formed in the Late Cretaceous or Early Tertiary.

Undiscovered metallic and nonmetallic ore bodies probably remain in the mountainous areas of the county, but deposits hidden beneath alluvium in the extensive intermontane valleys are also increasingly being sought. It is expected that some of the deposits beneath the valleys may lie at mineable depths. These alluviated areas represent a larger unknown than mountainous terrian. Application of large-scale

exploratory programs using sophisticated geophysical, geological, and geochemical methods afford the most promise for sucessful exploration.

2.3 Geology of the Toiyabe Mountain Range, Northern Nye County

The southern two-thirds of the Toiyabe Mountain Range, one of th highest and most prominent ranges in the basin and range province, lies within Nye County, Nevada. The range is more than 100 miles long and between 7 and 10 miles wide, except south of North Twin River, where the range is more than 15 miles in width. At its' southern end, the Toiyabe Range merges with the Shoshone Range on the west. The highest point, Toiyabe Dome, has an altitude of 11,788 feet, and most of the crest, of the range, exceeds 10,000 feet. The range is elevated and tilted westward by frontal faults of large throw, which cut Quaternary sediments along the west side of Big Smokey Valley. A series of echelon normal faults of lessor throw, with the west (valley) side down, locally enhance the western bountry of the range. These are part of parallel high-angle faults, displayed as scarps in Quaterary sediments in the Reese River Valley, that probably outline a graben in the buried rock. This range and the Shoshone Range differ in topographic form from the Toquima Range by extending essentially unbroken linear mountain chains throughout their lengths. Major differences in geology from the north to the south in the ranges generally has not led to severe topographic segmentation; as in the Toquima Range.

Lower Paleozoic rocks (autochthonous Cambrian and Ordovician quartzite, slate, and limestone) unconformably suceeded by Permian sedimentary strata and inferred Late Paleozoic (?) sedimentary and metavolcanic strata and intruded by several large Cretaceous and Tertiary granite plutons and dikes, are exposed continuously along the east flank of the range as far south as Peavine Canyon. The relatively gentle western slope of the range and the crest of North Twin River is underlain by Tertiary ash-flow tuffs that dip gently towards the west but otherwise are little deformed. A 13 mile diameter, nearly circular, caldron underlies the highest part of the range between North Twin River on the north and Broad Creek on the south (Speed and McKee, 1976). Farther south, Tertiary silicic ash-flow tuffs and intrusive bodies and associated sedimentary strata and breccia form a structurally complex volcanic center. The inferred Peavine caldera is part of the center and underlies the southernmost part of the range.

The pre-Tertiary rocks between the Lander County line and San Juan and McLeod Creeks compose a northwest-dipping homocline, intruded by granite, and truncated on the east by a trust fault. Means (1962) has demonstrated that the rocks are complexly folded on a small scale and that two major phases of deformation occured,

The first deformation, tentatively assigned to the mid-Paleozoic Antler orogeny, produced a large north-trending cyncline overturned toward the east. The second deformation, ascribed to Mesozoic (possibly Sonoman) events, is evidenced by small scale folds whose axis trend northwesterly; it was accompanied by metamorphism and the pervasive development of cleavage. Discordant plutons were subsequently emplaced. A northeast-striking normal fault, downthrown on the west and with dip-slip of between 3,500 and 4,000 feet (Means, 1962, p.96), displaces pre-Tertiary rocks near the crest of the range.

Paleozoic strata between McLeod and Broad Creeks generally dip steeply to the west, and large scale isoclinal folds were noted by R.C. Speed (1974) in the Paleozoic section at Ophir Canyon. Farther south in the range, from Jett Canyon to Boyd Canyon, strata dip southwestward and are strongly folded on a small scale. Fold axis, which generally trend west-northwest, parallel to and coextensive with those in the Toquima Range to the east, probably record Mesozoic orogenic events. Several trust faults of relatively small displacement crop out south of Jett Canyon; some place older beds on the younger, whereas others place younger beds on the older. A relatively large fold exposed, at the mouth of Wall Cayon, is overturned toward the northeast and suggests tectonic transport in that direction.

High angle faults of probable Mesozoic or Tertiary age disrupt the Paleozoic strata and, in places, are intruded by granitic rocks, one mass of which was radiometrically dated at some 29 m.y. (Speed and McKee, 1976) at Broad Canyon. This mass forms a dikelike body and occupies a fault surface that separates Ordovician rocks from the Tertiary Darrough Felsite. Reverse faults, which are vertical or dip very steeply, are exposed north of North Twin River and in the valley of South Twin River. The northern segments locally emplace Late Paleozoic rocks or Early Paleozoic and may represent a folded part of the Golconda trust. Dip-slip Tertiary movement may have affected this thrust. The steepened thrust faults abut on east-striking fault in North Twin River Canyon on which, according to Ferguson and Cathcart (1954), strike-slip movement may have occured. This fault has been intruded locally by granitic dikes that are presumably correlated with the approximately 29 m.y. old body in Broad Canyon farther south. The Broad Canyon body intrudes a northeast-striking fault that crosses from Broad Canyon to Pablo Canyon and likewise could have undergone horizontal displacement. The fault separates relatively undeformed rocks on the north from intensely deformed rocks to the south. R.C. Speed (1975) considered the hypothetical strike-slip faults to coincide with and possibly represent caldron-bound faults of a caldera from which the Tertiary Darrough Felsite was

erupted. Strike-slip movement may thus not characterize these faults at all.

The inferred Peavine caldera, part of a complex Tertiary volcanic center impings on the southeastern part of the Toiyabe Range, where segments of the marginal caldron faults may be recognizable. One segment, conincident with Wood Canyon, separates complexly faulted and intruded tuffaceous rocks of the vent complex on the west from Early to Middle Tertiary rocks, including chiefly the Darrough Felsite on the east. An east-striking segmentm just west of the head of Boyd Canyon, separates mostly Permian rocks on the north from the inferred caldron. The structural blocks of Permian rocks may represent either the northern caldron wall or a resuged block near the wall. Another possible segment of the caldron wall and marginal fault may be exposed about 8 miles southeast of the mouth of Peavine Canyon, just south of Mud Spring (Bank Spring). There, the Tertiary volcanic complex abuts Paleozoic and Mesozoic strata along a contact that might represent the caldron margin but that coincides with the east-striking Pancake Range Lineament (Ekren and others, 1976). This Tertiary volcanic complex in the southernmost part of the Toiyabe Range is lapped on the west by the early Miocene Toiyabe Quartz Latite aand a subjacent andersite flow. The lapping rocks are relatively undeformed except for a gentle warp into broad north-plunging cyncline whose axis is approximately coincident with Indian Valley, and along which lies a small Quaternary Basaltic volcano at Black Mountain.

Northeast-dipping Permian (?) volcanic and clastic rocks are unconformable succeeded by west-dipping Dunlap Formation at the southern tip of the range. Limestone assigned to the Luning Formation locally has been thrust onto the Dunlap (Ferguson and Cathcart, 1954).

Nickel, platinum, chrome, and colbalt have not been produced in northern Nye County; however, interesting occurances are found in six general locations, including Jett, Antelope, and Twin Rivers Districts. The nickel and related minerals, chromium and colbalt, are nearly everwhere asociated with serpentinized ultramafites. The best deposits are believed to have been formed during alteration of some of these rocks, which had high primary contents of these metals. Depth of formation is not known. The geologic setting of the nickeliferous deposit at Willow Springs is similar to that at Candelaria, Nevada, where lower Paleozoic siliceous strata are unconformably overlain by Permian quartzite and grit of the Diablo Formation and the Lower Triassic Candelaria Formation.

The nickekiferous deposits near Manhatten are at least in part post-Early Triassic, because the Lower Triassic Candelaria Formation is mineralized.

Serpentinic (ultramafic) that is the source of the nickel and related metals possibly cut, alter, and mineralized the Candelaria. However clastic fragments of serpentine have been reported in the Candelaria (Poole and Wardlaw, 1978), and it is possible that the serpentinized rocks are faulted against older than the candelaria and the nickeliferous deposits in the Candelaria are secondary. Similarly, anomalously large amounts of nickel and other related metals at the other locations in the region may have formed by enrichment upon alteration of the serpentinite. The age of the metals' source rock, serpentinite, is not clearly established. Poole and Desborough (1973) believe that most of the serpentinites in the region were most likely derived from the Paleozoic upper mantle and were emplaced in their present position during the Antler orogeny. They considered that some serpentinite could have been remoblized from the Antler terrane or derived from the mantle during the Early Mesozoic Sonoma orogeny.

Between Pablo and Wall Canyons, roughly one mile northeast from the Big Horn Mine, is a dike of serpentinic rock. Specimans have been identified as being altered Gabbro and Periodotite (Poole, 1983), this dike is approximately one mile in length and from one to two hundred feet in width, although locally it may swell to three hundred feet in width.

Dolomitic masses faulted against the serpentinite may be Cambrian and are probably altered sedimentary beds and not carbonized serpentinite. F.G.Poole (1970), has raised the possibility that igneous rocks (for the serpentine), may be alpine-type dunites (Poole and Desborough, 1973). The structure implications of this matter would be major structures of pre-Tertiary age.

The Serpentinite bodies of the Toiyabe Range recently studied by F.G. Poole (1976) are believed to be along faults (also see Poole and Desborough, 1973).

Platinum was also reported in gold placer prospects that extend for several miles west from the mouth of Manhatten Gulch, Toquima Range. The prospects are in buried gravels in an area termed the "Manhatten Delta" (Tonopah Times-Bonanza and Goldfield News (1974a-1974b)). The platinum in the fanglomerates of the "delta" undoubtedly comes from serpentinized peridotite that crops out in the Toquima and Toiyabe Ranges and that must have been eroded away.

2.4 Antelope and Jett Mining Districts: Geology, Location, and History

The Jett Mining District originally conceived and encompassed only the drainage of Jett and Broad Canyons of the eastern flank of the Toiyabe Range. The name "Jett Mining District" was used in the much broader sense by Karl (1951, p.82) to include the Antelope District which covers the drainage of Wall and Antelope

and Pablo Canyons (organized in 1881), the Toyabe Mining District (organized in 1878) which included the basins of Boyd and Wood Canyons, and the Peavine Mining District (organized in 1906),but only included Horse Canyon and Peavine Canyon up to and including Toms' Canyon. The Peavine Mining District, as layed out by the miners, included all of the Peavine drainage, the Headwaters of the Reese River and the area west of these canyons to the boundries of the Superior Mining District. The Jett Mining district was organized in 1886.

The detailed description of these districts is taken largely from the published works of Ferguson and Muller (1949, p. 52-53 and plates 1 and 15), Ferguson and Cathcart (1954), Kral (1951) p.82-86, R.C. Speed and J.R. MacMillan (1972), and several other geologist who have described some of the mines in detail.

The earliest geologic map and geologic description are those by Emmons (U.S.G.S., 1870, p.320-348 and pl.13), who followed by some years the passage of John C. Fremont, who camped in 1845 at the hot springs (today known as Darrough Hot Springs). The springs were the site of human habitation long before the coming of the white man.

Production of these early years is almost all unrecorded and was probably relatively small; Lincoln (1923, p.172) mentions that considerable ore was shipped to Eureka and smelted (kral, 1951, p.83). Other sources mention the Toyabe District shipping ore to the mills at Jefferson. Until 1978, there were two ore wagons at the mouth of Boyd Canyon. Limited mining was done about 1921-22 on base metal silver deposits in Jett Canyon, near its' mouth, where another camp was started in the 1920's (Ferguson and Cathcart, 1954). The Gibralter Silver Mines Company of New York was active at this time on seven claims in Broad Canyon (Weed, 1922, p.1206). Base-metal silver and other precious-metal production has been less important since then.//

Greater values of ore have been mined since 1914 from deposits of antimony and mercury minerals.

Antimony production was started during World War I. The production during the 1935-1937 period only recently came to notice and the 1946-1953 production by the Last Chance Mining Company from the Big Horn Mine Group (Last Chance Mine). The Big Horn Mine Group, located on both sides of the divide between Pablo and Wall Canyons, has gone under other names in the past; Last Chance, Silver Divide, Bostian, Wall Canyon, Herd (?), and Francisco. (lawrence, 1963, p.140), who attributes to the mine about 738 tons of antimony ore containing 192 tons of antimony metal. The ore ranges in grade from 11 to 60 percent antimony metal. These production figures differ from D.E. White (unpublished data). Combined with other information, including the Eng. and Mining Journal, 1948a, p.114-115, suggest that actual production

from the Big Horn Mine was considerably higher, totaling about ~~5701~~ 5976 tons of ore containing ~~1690.68~~ 1860.28 tons of antimony metal.

The geologic setting of these districts is similar to that of the Twin River District to the north. With the expections noted below, the same pre-Tertiary rocks are present in both districts, differing chiefly in extent of exposure. Strata of the Cambrian Gold Formation and plutonic crop out over less area in these mining districts than in the Twin River District. As much as 200 feet (unmeasured) of shale, slate, and limestone of Silurian age, correlated with Kay and Crawford's (1964) Gatecliff Formation and Masket Shale, crops out in a thrust plate between Wall and Pablo Canyons; they next crop out in the Kingston District, Lander County. Also, several facies of Late Paleozoic strata are restricted to these districts in scattered locations south of Pablo Canyon; they are described in detail by Speed (1977a; 1977d). One facies is best developed near the head of Horse Canyon, where a dark-brown slope-formed unit 1,000-2,000 feet thick is composed of siliceous to calcareous shale and minor thin beds of intercalated dark-grey limestone. The facies is also exposed probably present in Boyd Canyon. A second more widely exposed facies crops out in the heads of Antelope, Horse, and Pablo Canyons. This facies consists chiefly of a moderate-yellow-brown to reddish-brown, shaly to slabby, locally fossiliferous and calcareous siltstone. Even though as much as 150 feet of the unit is exposed, the unit has not been precisely dated because the bevalve fossils are nondiagnostic. The third facies, a brown, medium to very course, gritty quartzitic sandstone attains its maxium development on the east slope of Horse Canyon near its head, where the strata are about a few hundred feet thick.

A small granitic body crops out just south of Boyd Canyon; another, farther south, is equally small. Compared to the other plutons, the latter exhibits an unusual feature in its contact relations with the surrounding Tertiary Darrough Felsite. Large zoned feldspar metacrysts to several centimeters long are developed within the contact zone, where numerous aplitic and less abundant granitoid dikes and sills cut the country rocks, and the metacrysts are especially conspicuous in the country rocks. Hyabyssal acidic porphyritic bodies, mapped as granite porphyry and quartz monzonite by Ferguson and Cathcart (1954), are scattered in the district. One, in the form of a very large dike that crosses Jett Canyon, includes mineralized quartz veins that were propected near the east end of the body in the early 1920s'. This dike is elongated northeastward because it intrudes a northeast-striking fault (Ferguson and Muller, 1949, pls. 1 and 15). Another even larger dike at Broad Canyon is about 30 m.y. old. Another such dike starts at the head of Wall and Pablo Canyons, and extends to the southeast for over two miles.

Serpentinite bodies as much as about 30 to 40 acres in extent are sparially associated with Late Paleozoic clastic rocks and the Permian (?) Pablo Formation. Some of the bodies were too small to show on the county geologic map, but most lie between Pablo Canyon, south to Horse Canyon, and several are within or near the Big Horn Antimony Mine at the head of Wall canyon. Some of the serpentinites are carbonatized, and some contain chrome (?); they are described as ultra-mafic rocks.

The oldest Teriary rocks are included with what Ferguson and Cathcart (1954) mapped as the Permian (?) Darrough Felsite. These rocks compose the bulk of that formation as originally defined, although Kleinample described the Darrough as restricted to a pile of dark-weathered rhyrolitic ash-flow tuffs. The unit, about 10,000 feet thick, is predominantly a series of welded tuffs, 22-27 m.y. old and is primarily divided on the county geologic map into middle volcanic sequence and the capping Toiyabe Quartz Latite, an ash-flow tuff sequence. The Tertiary volcanic statigraphy is grossly similar to that in the adjacent Cloverdale and Twin River Districts, but the middle volcanic sequence is less completely developed and less diverse lithologically in the Twin River District. In addition to predominant rhyolitic ash-flow tuffs, the middle sequence in the Jett and Cloverdale Districts is composed of air-fall and water-laid tuffs, tuff breccias, tuffaceous sedimentary rocks, and lava of rhyolitic composition. Brown-weathering andersite or dacitic lavas are volumetrically unimportant but form good marker horizons and are described as western region Cenozoic rocks. Rocks mapped as Esmeralda Formation by Ferguson and Cathcart (1954) in these mining districts, as well as the surrounding districts are, for the most part, clearly much older than the Esmeralda and Siebert Formations mapped in the regions south and southwest of the Toiyabe Range and have been included with the middle volcanic sequence. Updated, mildly tilted tuffaceous lacustrine beds just east of the mouth of Peavine Canyon are probably the youngest rocks exposed in the district and may correlate with the Siebert and Esmeralda Formations.

The structure of the district is basically like that described in the Twin River District. Three major phases of deformation have been recognized, and related to: (1) the late middle Paleozoic Antler (?) event; (2) the Early Triassic (?) sonoma (?) event; and (3) the Jurassic Nevada event. The Sonoma (?) orogeny has strongly affected only the allochthonous Permian (?) Pablo Formation, which is restricted to the Golconda (?) thrust plate (Speed, 1971). A series of thin imbricate thrust plates mapped between Wall and Pablo Canyons may be related to the Antler orogeny; other thrust faults in Jett Canyon probably have affinities to the Sonoma

orogeny and possibly to the Nevadan. Complex structural relations in the vicinity of Boyd and Antelope canyons have not been competely resolved, but Speed (1977a; 1977d) has described in detail the rocks and inferred tectonic events which may have left its imprint there and elsewhere in the range. Intense deformation was concluded prior to implacement of the ash-flow tuffs of the Darrough Felsite, because the Darrough is only slightly warped and tilted and overlies or locally intrudes the older deformed allachthonous Pablo Formation.

Basin-and-range normal faults are well developed along the range front, and locally the front exhibits faceted spurs. the faults locally define a series of blocks downstepped towards the valley; elsewhere a single major range-bounding normal fault was mapped. The youngest downdropped Tertiary rocks exposed are the middle volcanic sequence of western ranges. Other major Tertiary faults may be related to inferred caldron subsidence. Faults inferred to bound the postulated collapsed Peavine caldron, in the southern part of the mining district include; (1) on the east, the north-striking hoist-bounding fault west of Seyler Peak in Wood Canyon; and, possibly, (2) on the north, the 3½-mile-long-west-trending fault west of Boyd Canyon. The caldron is not well defined, but must extend west of Peavine Canyon beyond the district; its western limit may coincide with some of the faults near Cloverdale Canyon. Rocks within the postulated collapsed zone are mainly a complex of welded and nonwelded ash-flow tuffs, tuff breccias, and intrusive porphyries of siliceous composition. Some water-laid sedimentary strata composed of locally derived volcanic detritus are intercalated with the tuffaceous volcanic rocks. The capping Toiyabe Quartz Latite may conceal part of the caldron.

Speed and McKee (1976) have described another collapsed caldron in the northern part of the Jett District, between about Broad and North Twin River Canyons, from which the Tertiary Darrough Felsite was erupted. The major steep east and northeast striking faults coincident with those canyons and postulated to have incurred lateral movement by Ferguson and Cathcart (1954) are inferred caldron margin faults. (Kleinample, 1983, U.S.G.S., unpublished).

The mode of occurance of antimony is also similar throughout the range, but the deposit at the Big Horn Mine in the Antelope Mining District has been important commercially, and its description by Lawrence (1963, p.138-141) and other geologist are excepted.

2.5 Big Horn Mine Area Geology

The host geologic formation of the antimony veins is Silurian (Roberts Mountain Formation) composed mostly of thin bedded sandy lime from 600 to 1200 feet in width. This formation trends northwest and southeast, and is bound on all sides by thrust

faulting.

Geologic mapping of the claim blocks identifies the carbonate rocks as mostly thin bedded sandly lime, but also containing limestones, silty limestones, carbonate shales, sandstone lenses, and siltstones.

Based on the lithology and similarity to rocks identified as Robert Mountain Formation in the lower Wall and Pablo Canyons (Mullen, 1980), these rocks have been assigned as belonging to the Robert Mountain Formations. These rocks have been tilted 40° to 60° to the southwest. Overlying these rocks, along a thrust fault contact, identified as the Robert Mountain Thrust Fault, are cherts and shales of the Western Assemblage. The cherts and shales appear similar to rocks belonging to the Vinini Formation to the north.

Overlying the cherts and shales, also in the thrust fault contact are conglomerates and dolomitic limestones identified as belonging to the Antler sequence of the overlap assemblage. The upper thrust fault separating the Antler sequence rocks from the western assemblage rocks is identified as the Golconda Thrust Fault.

All three groups of sedimentary rocks are overlain by volcanics, principally welded tuffs derived from the development of the Toiyabe Caldera during the mid-Tertairy. The large number of felsic and mafic dikes within the sedimentary sequence are also believed to genetically relate to the development of the Toiyabe Caldera.

Mineralization within the claim block appears to be both fault and stratigraphy controlled. Surface mapping and subsequent drilling indicates that most of the antimony mineralization occurs in faults zones in conjunction with quartz veins and is either within or in close proximity to ultramafic structures, while most of the gold-arsenic mineralization occurs along favorable stratagraphic horizons in the carbonate units. There appears to be a slight age difference between the two types of mineralization with the antimony-quartz mineralization being slightly younger and cross-cutting the gold-arsenic mineralization. Plate 12 shows the cross-sectional relationship between the gold-arsenic and the antimony-quartz mineralization and the adjacent geology.

The two small hills, where the South Workings are located, are made up of Permian rocks, probably from a submarine lava flow (Poole, U.S.G.S., 1983) (Plate 2).

Ultramafic Occurances

Within the Robert Mountain Formations, and in the main confined to the limestone and thin bedded lime, are found lenses and pods, classified as containing ultramafic minerals, who's origin (Poole, 1983), along with the sometimes associated dolomitic rocks are the remants or rine of a prehistoric tectonic plate. The joints and planes of the limestone

shows the presents of the ultramafic minerals (identified by spectographic analysis as containing anomalous amounts of nickel, chrome, cobalt, and antimony). Some of the bright green mineralization has been identified as being "Mariposite", a bright green chrome mica. From the outcroppings, some 1/4 mile west of the West Workings, the limestone structure, which contains much of the ultramafic mineralization, can be traced, to the east, for a linear distance of some two miles or more.

Ultramafic mineralization is found on the dumps of the three main antimony mine areas, as well as many of the prospect pits and trenches, again suggesting a close relationship between the antimony mineralization and the limestone-ultramafic formations.

Intrusive Dikes and Sills

Just east of the West Workings, parallel to and in contact with the limestone, is a dike or sill of porphyry. This formation can be traced to the proximity of the Central Workings, where it is lost under the alluvial. This structure may trudicate against the N-S fault which transverses that area. At times this structure is not much more that a foot in width. South-east of the Central Workings, and striking towards the East Workings, outcrops a quartz-monzonite, sime 200 feet wide. North and northeast of the Central Workings, a dike of quartz-porphyry outcrops and strikes to the east. This dike crosses the north-south fault, east of the East Workings, and can be traced for more than a mile , to the east of the claim block. This granitic-porphyry dike lays on the north side and is parallel to the limestone-ultramafic formation and is separated from it by some 100 feet (more or less) of sandy lime and shale.

Faults and Fault Structures

As previously noted, the area abounds in faults and thrust faults. The geology map of the claim block notes the many faults. Some five hundred feet south of the East Workings is an outcroppings of solidified conglomerate, containing grains and uneven pieces (both in size and shape) of ultramafic mineralization. This outcropping may relate, indirectly, to the breccia zone located on the south side of the main vein, in the East Workings. This breccia zone is some 20-30 feet in width, and contains fragments of a dolomitic material, as well as small amounts of sulfides. As refered to earlier, the antimony-quartz mineralization is found in and along these faults in the form of veins, up to 12 feet in width, and elsewhere as lenses and pods, veins structures being the most common form. In all three workings, the veins are free from the wall rock on both the hanging and foot walls.

At the Central Workings, there are a series of antimony-quartz filled veins. None of the veins are normal to the host formations, as most of the veins cut across the strike and the dip of the formations. The host formation is almost always the thin bedded sandy lime, but in close association with the limestone-ultramafic formation. The quartz-antimony

veins are located on either side of, or in the case at the Central Workings, also crosscut through the formations. At the Central Workings, much of the antimony mineralization appears to lay in the fault zones under the limestone-ultramafic structure, although, above the 15 level, the mineralization at the surface is on the contact with this formation. Throughout the property, there are additional antimony-quartz veins which, to date, have not been developed, one such vein is located in the C-100 level.

The geochem program (1980) indicated the presents of additional mineralization between the Central Workings and the West Workings and also between the Central Workings and the East Workings.

At the West Workings, in addition to the Big Blue Veins (2), an antimony-quartz vein was discovered, in the hanging wall of the West Adit, prior to reopening this adit (1984). This veinlet is from 1 to 6 inches in width, and appears to be widening down dip. In places, the vein is solid stibnite and has the same general dip (SW) and strike (NW X SE) as the upper vein at the Central Workings (15 Level).

Mine Geology and Workings

The South Workings are not of the antimony-quartz vein system. This area is made of a Permain under-sea lava flow. The mineralization consist of chalcopyrite and a small amount of Molybdenum. Small pits, shafts, and a drift, some 125 feet in length, comprise these workings.

The East Workings, which includes the original "Last Chance Antimony Mine", is the easterly most known commercial antimony mineralization. North of the main vein outcroppings, was a small shaft on a second antimony-quartz vein. This area has since been worked over by a dozer which has destroyed the old workings. There are also several prospect pits in this area. This antimony-quartz vein is not well defined. The outcroppings of the East Workings can be traced for some 300 feet along the strike. There are three 40 feet deep shafts on this outcropping, as well as other surface pits. There is still antimony ore in these workings, with a mineralized width of from one to two feet. From the 230 foot crosscut, driven to intersect the vein, there was some 250 feet of drifting. A room is located between two of the stopes. The vein is accessable, but the drifts are caved. There was recorded 400 tons of 20 % ore mined from these workings during the First World War and an additional 100 tons of 30 % ore mined in 1946-47.

The host formation, on the south, is the thin bedded sandy lime, which is separated from the vein by some 20-30 feet of graphitic gouge, containing some sulfides and small pieces of dolomite (1 to 2 inches being normal), while on the north side the wall rock is the thin bedded sandy line in close proximity to the limestone-ultramafic and granitic-porphyry formations.

The Central Workings is the largest development of the Big Horn Antimony Mine Group containing over 3000 feet of workings. There were two shafts at these workings. The original shaft, now backfilled, was 115 feet deep (plus sump), and was developed by the C-15, C-60, C-80, and C-115 Levels. ("C" standing for "Central Workings"). The C-15 Level is now accessable from the surface. The C-60 and C-80 Levels are not accessable, nor are there maps of these levels. The C-115 Level is accessable from a raise starting on the C-140 Level and also from a winze off of the C-100 Level. The main shaft is a two compartment shaft, 185 feet deep (plus sump), and was developed by the C-100, C-140, and the C-185 Levels. All Levels are referenced from the collar of the original shaft.

In the main, the host formation is the thin bedded lime or shale, with the limestone-ultramafic in close proximity. There are a series of somewhat parallel veins and stringers, striking in two directions. The main North-South vein is within a thin bedded sandy limestone and shale, which is wholly incompetent. As the C-60 and C-80 Levels are not accessable, the length and width of the stopes on these levels is not known, although; whenever the C-100 Level was driven into these areas, either through crosscutting, or raising, stopes were encountered.

The C-15 Level was driven on a NW-SE vein, which is crosscut by a second vein striking about 20° further NW-SE than the first vein. This second vein was not developed on the C-15 Level, although, this second vein appears to be the wider of the two veins. The drift is on a fault zone, which shows a some antimony and is from 18" to 36" wide. The wider vein appears to be some five feet wide with leses and pods of antimony. On the C-100 Level, crosscutting and raising has encountered stopes on both of these veins. On the C-100 Level, the main N-S vein was also stoped, to the south. A second N-S vein some, 18" to 24" wide, was stoped in several places. This vein was also stoped, from the C-115 Level to the C-100 Level. Where this N-S vein intersects the NW-SE veins, the area was heavly stoped on both NW-SE veins. Some of the ore, left in place is 5 feet in width. This area was also under hand stoped down to and below the C-115 Level. The C-115 Level is only accessable along the main N-S vein, and was stoped, from the winze area (off of the C-100 Level), to the south as far as the workings are accessable. Mr. Strom, operator from 1955-1958, suggest this drift and stoping was very extensive. The Vein on the north side of the C-145 raise, is some 2 feet in width, and carries some 12 inches of antimony in quartz, on the hanging wall and some 15 inches of sheet antimony and wall rock on the footwall. Down the raise, driven from the C-140 Level, this vein is from three feet wide, near the C-115 Level to some 12 feet wide

as it nears the C-140 level. The mineralization is in layers; of wall rock and sheet antimony, antimony in quartz, and solid antimony. Based on the statements of Mr. Strom; "this vein was not developed, to either the north or to the south, to the full extent of the ore zone." The C-140 also drifted on one of the NW-SE veins. The mine was shut down at this time due to the bottom dropping out of the price of antimony (see settlement sheets).

The C-185 Level was in the process of being developed, at the time the mine was shut down. The NW-SE vein was drifted on for 50 feet with ore bunkers placed at these points. As the main N-S vein was not crosscut, the grade and width of this vein, on the C-185 level is not known.

There is another vein, on the C-100 Level, other than being crosscut, it has not been developed. Good ore, on the C-100 Level, can be seen. Most of the antimony production, since 1947 has been from the Central Workings.

The West Workings consist of a shaft, at one time some 100 feet deep, on a NW-SE vein which carries some 6 ounces of silver. A second parallel vein, to the north, carries about 4 ounces of silver. A three hundred foot crosscut was driven under this general area. The part of the crosscut which was driven under the shaft area is caved. A dozer cut, small incline shaft, another adit not yet opened, and many prospect pits dot the area. Much of the prospecting is around a sizable outcropping of limestone-ultramafic mineralization. This area was known, in the past, as the "Big Blue Area".

2.6 Recent Geological Work on the Big Horn Claim Group

Regional geological reconnaissance performed during 1980 discovered the existance of a substantial area of arsenic, antimony, and gold mineralization in the Paleozoic sediments around the Big Horn Claim Block. Surface geochemistry, geology, and drilling performed during 1980-1982 partially outlined the original area of mineralization and located additional areas of potential favorable mineralization.

Surface geochemistry including both rock chip samples from outcropping structures and also soil samples. A total of 269 samples were collected and assayed for gold and silver. Many of the samples were also checked for copper, lead, zinc, arsenic, antimony, and molybdenum. The results are in the index. Plate 1 shows the sample locations. From these sample locations, the results were recorded and geochem maps for the various minerals were made.

A surface geological map was constructed over the central portion of the claim group and is included as Plate 2.

Forty-four rotary drill holes were drilled to depths of 195 to 500 feet. Samples

were collected every five feet and assayed for gold and silver; with some being assayed for arsenic and antimony. A few were assayed for copper. These drill hole results are included in the drill hole logs and their locations are shown on plate 14. The one core drill location is also shown on plate 14 and a sketch of the core is in the core log.

Geochemistry

Surface geochemistry outlined several areas of substantial gold-arsenic and antimony-quartz mineralization. The largest zone of mineralization extends over a strike length of 4000 feet with an average width of 500 feet. An additional anomaly covering a minimium area of 1000 feet by 1000 feet occurs on the western edge of the Big Horn Claim Group. Geochemistry contour maps for Au, Ag, Cu, Pb, As, Sb, and Mo are shown on plates 4 - 11.

In general, Au As, and Sb anomalies occur in rocks identified as belonging to the Robert Mountain Formation of the eastern carbonate assemblage.

Drilling

This drilling program resulted in proven ore reserves of 309,000 tons averaging 0.027 oz/ton Au, probable ore reserves of 411,000 tons averaging 0.025 oz/ton Au, and inferred reserves of 500,000 tons averaging 0.025 oz/ton Au for a total of 1,220,000 tons averaging 0.025 oz/ton Au. The gold mineralization occurs in two zones, the largest of which averages 300 feet in width and can be traced for 1,900 feet along strike. Only one area, 400 x 300 feet of this mineralized zone has been drilled in detail. Gold mineralization occurs with an average thickness of 100 feet.

Gold and arsenic isopach values for the mineralized horizon in Zones I and II are shown in Figures 2 and 3. Gold values were averaged over the best fifty foot interval in the drill holes; while arsenic values were averaged for the entire drill hole. Cross sections showing correlations between mineralization in the drill holes in Zone I are shown in Figure 4.

The potential gold resource on this property is from 5,000,000 - 10,000,000 tons of ore.

The gold mineralization is open in both zones along strike to the northwest and down dip.

Conclusions

Gold

There are significant areas of gold mineralization within the carbonate rocks exposed on the Big Horn and WC Claim Groups.

Gold mineralization appears to be mostly associated with arsenic and probably occurs as minute particals of free gold contained within the arsenopyrite grains.

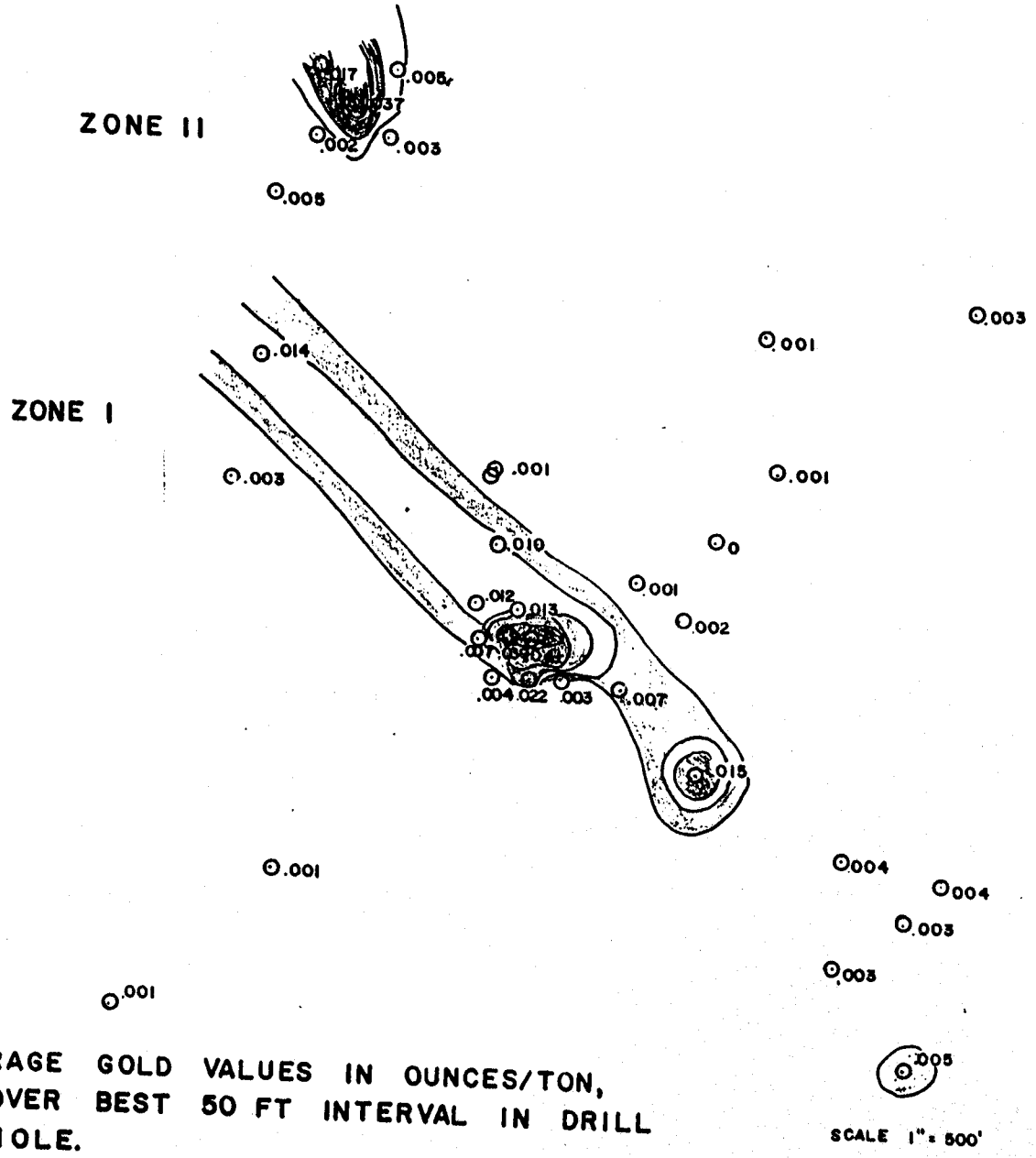
Gold mineralization encountered in the drill holes correlates well with up-dip surface arsenic anomalies.

Antimony

Although antimony was not the target of this exploration program, anomalous amounts of antimony was encountered both in the surface samples and in the drill holes during the 1981 phase of the program. Both surface samples and drill hole assays showed anomalous amounts of antimony between the West Workings and the Central Workings, and the Central Workings and the East Workings, as well as anomalous antimony values parallel to the existing workings.

Ultra-Mafic

Ultra-Mafic mineral, as shown by the anomalous amounts of Chrome, Nickel, Cobalt, and Antimony can be traced, by a series of lenses and pods over a width of 1000 feet and along the strike length for some 2 miles. Also note the results in drill holes No. 31, 32, 33, 34, and 35; where assays for Nickel and Cobalt were reported.



AVERAGE GOLD VALUES IN OUNCES/TON, OVER BEST 50 FT INTERVAL IN DRILL HOLE.

CONTOUR INTERVAL .005 oz/ton
BASE CONTOUR .005 oz/ton

FIG. 2. AVERAGE GOLD VALUES FOR DRILL HOLES

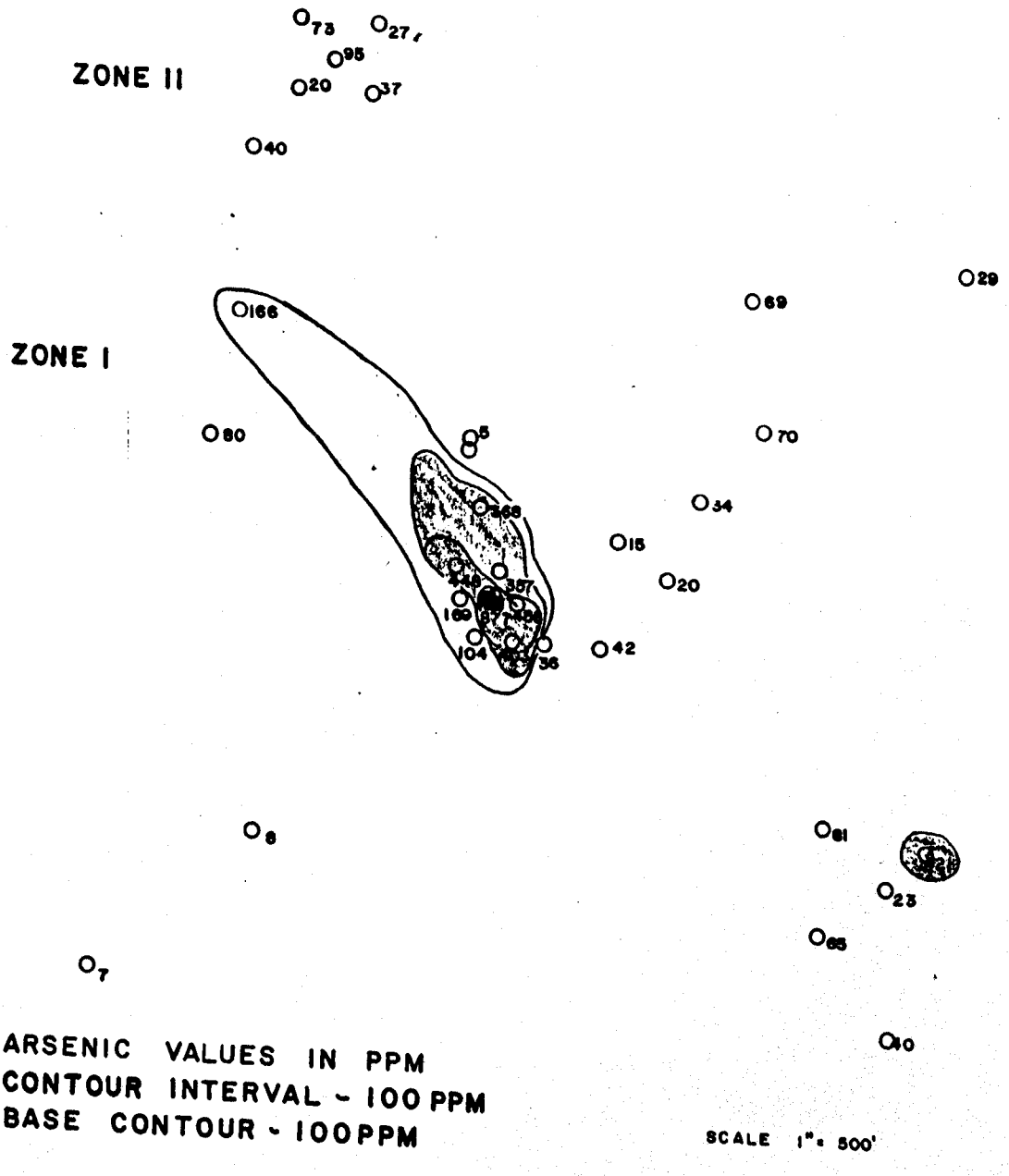


FIG. 3. AVERAGE ARSENIC VALUES FOR DRILL HOLES

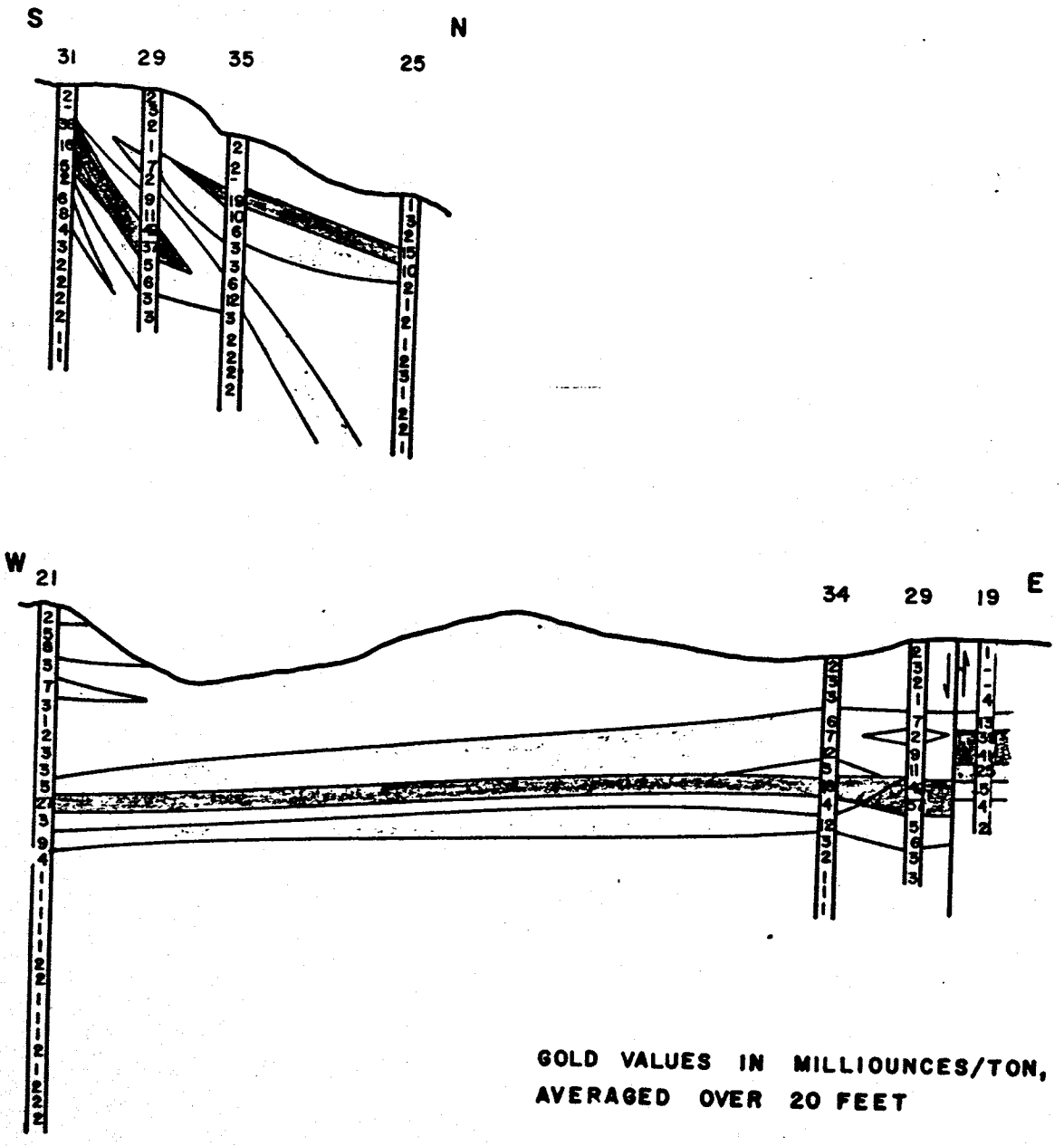


FIG. 4. N-S, E-W CROSS SECTION CORRELATIONS OF MINERALIZATIONS IN DRILL HOLES IN ZONE I.

SECTION III

MINING HISTORY

3. General Notes

As shown in the several State of Nevada Bureau of Mines Reports, U.S.G.S. Reports, and other articals refering to the Last Chance Mine, there is general confusion regarding the identification of the different levels, at the Central Workings.

As Nevada Antimony, (as a partnership, and later a Corporation), held the property from 1934 until 1980, their maps should have the correct level identification. The following level idenfication of the Central Workings Levels is based on the 1954, and later 1958 Nevada Antimony Maps. The 1954 Mine Map of the Central Workings, as supplied by Nevada Antimony Corporation was checked against the Mine Map in the possession of Mr. George Strum, Leasee from 1955-1958. All mine levels are referenced to the collar of the "ORIGINAL" shaft, as shown on the 1934 Claim Map Plate, filed with the Nye County Recorders' Office, for Nevada Antimony.

The levels are as follows: 15, 60, 80, 100, 115, 140, and the 185. The reason for the confusion is probably the fact that the original shaft, the point of the original 1934 survey, has been backfilled, and no longer exist. From the original shaft, there were four development levels; the 15, 60, 80, and the 115. The shaft was 115 feet deep, plus sump. The present adit, just northwest of the old generator building, is the original 15 level of the old shaft. It was, originally, 15 feet down from the collar of that shaft.

The bottom level (115) of the original shaft, lays between the adit level (100) and the 140 level of the main shaft.

On the Nevada Antimony Maps, this level (115) is identified as a Sub-level, and was not reestablished until 1956, when a raise, from the 140 level broke into it. A winze was then sunk from the 100 level to establish faster access to the level. As the bottom level of the original shaft was the 115 level, we have reestablished that number to this level.

The original "Last Chance Antimony Mine" (Wall Canyon or Silver Divide Mine) is what is now known as the East Workings.

3.1 Published History

Two Nevada Bureau of Mines Reports; Bulletin 50; by Victor E. Karl; "Mineral Resources of Nye County, Nevada"; and Bulletin 61, by Edmond F. Lawrence; "Antimony Deposits of Nevada", both have sections reporting on the Last Chance Antimony Mine (refered to as the Central Workings in this report). These reports are hereby combined to eliminate overlapping material.

"The mine was originally located in 1915 (1881). Four hundred tons of ore containing an average of 20 percent antimony was reported shipped during World War I. Several sources indicate that 14 tons of ore containing an average of 60 percent antimony and 29 tons averaging 45 percent antimony were shipped in 1939; and that 7 tons of 34 percent antimony ore were shipped in 1940. The shipments made during 1939 and 1940 were made by F. A. Vollmar, who leased the property. (Hugh Cameron, nephew of Vollmar, who worked in the mine from 1939-1942, states "the ore produced by Vollmar and shipped to Vollmars' mill at Minden, Nevada was much higher that the figures stated by the State of Nevada, Bureau of mine reports"). In 1941 and 1942, Fred J. Delongchamps leased the property and 214 tons of 10 percent antimony ore and 30 tons of 30 percent antimony ore were shipped. (During 1946-1947, the Last Chance Antimony Company shipped 100 tons of 30 percent antimony ore).

In 1946, Mr. N. L. Brown (and eta, under the name "Last Chance Antimony Company" leased the Grouse Springs Group of Claims (original Last Chance Antimony Claim), and in 1949, they leased the balance of the claim block). A 255 foot adit was driven which connected the main shaft at the 100 level to the surface. A 50 ton floatation mill was erected, later the mill was changed to tables and jigs. Later, a small rotary furnace and bag house (condenser) were constructed (to produce antimony trioxide at the mine from mine run ore). The operations were suspended in 1953 (the shut down being caused, in part by the drop in antimony prices and also from the poor recovery of antimony experienced at the mill). (In excess of 3000 tons of antimony ore containing 30 percent contained antimony were mined from 1948 through 1953).

In 1955, the mine was under lease to the Great Western Mining Company (, Mr. George Strum, General Partner). The last reported production (1957-1958) was 29 tons averaging 15 percent antimony and 15 tons of ore averaging 11 percent antimony (See elsewhere in this report).

The mine (Central Workings) was developed by a 180 foot shaft, with a total of 300 (3000) feet of drifting on the (15), 60, 80, 96 (100), 126 (115), (140), and 175 (185) foot levels. (see elsewhere in this report). The adit connects to the 126 (100) foot level. Other workings elsewhere on the property includes a 180 foot adit (15 level) above the shaft, several open cuts and short adits".

3.2 Unpublished History

Early mining claims, in the Wall Canyon Area, were recorded as early as 1881. The Antilope Mining District was organized during that year and encompassed the drainage

basins of Pablo, Wall, and Antelope Canyons. Some of the earliest claims were referenced to existing claims, enferring there were claims already in existance when they were located. The records of these earlier claims may have been destroyed in the fire at the Belmont Court House.

The first claim, of which there is still records, was the Mary Bennet Mine, located on June 5, 1881, by Adam McLeon. This claim was soon followed, on June 24, 1881, by the following claims; B and Me, located by A. A. Bruce, Charles Curelley, and Adam McLeon; the Comet Mine, located by F. C. McNeil, A. A. Bruce, and Adam McLeon; and another Mary Bennet (an extension of the Comet Mine), located by A. A. Bruce and J. Bellyea.

The next claims of record were dated 1885. Other claims may have been recorded in the Antelope Mining District Recorders Book, which has since been lost. On June 24, 1885, Mr. M. Curtiss located the Whitby Claim on the divide between Wall Canyon and Pablo Canyon (this is the first claim of record in Pablo Canyon), and refered to as being 1/3 mile north of the Red Bluff Mine (no record of a Red Bluff Mine as of this date). Then on November 19, 1885, Mr. Curtiss recorded the relocation of the Red Bluff Mine.

There is no record of other mining claims being located from 1885 until April, 1891. Again, the loss of the district mining recorders book may account for this. On April 30, 1891, the Ashby Mine was located by D. H. Jackson. On the same date, F. C. McNeil located two claims, the Anaconda Mine and the 1891 Mine. All of these locations were in Wall Canyon. On May 2, 1891, the Northwest Extension of the Ashby Mine was located as the Sandusky Mine by Mrs. May Deady and Mrs. Johana Compton.

On June 16, 1891, F. C. McNeil amended his Anaconda Claim Notice and stated " that a stone monument marks the boundry between the Ashby and the Anaconda Claims". On June 16, 1891, D. M. Jackson also amended the Ashby Claim Notice. On August 5, 1891, both D. H. Jackson and F. C. McNeil locate the Last Chance Antimony and Silver Mine. On August 14, 1891, they also locate the Calidonia Mine. Through 1894, the records show Proof-of-Labors' were filed on the Anaconda, Ashby, Calidonia, and the Last Chance Lode Claims.

On January 1, 1896, William O'Brein relocated the Anaconda Mine as containing Antimony, Gold, and Silver. On the same date, Mr. John Thorp relocated the Red Bluff Claim and shows it contains antimony. He also relocated the Ashby Claim, which he

renamed the "Confidance", and states it contains antimony. Next, Mr. Thorp relocated the Caldonia Claim as the San Domingo Claim.

On November 25, 1896, the first claim was located in Pablo Canyon. This claim was called the "Big Blue" and was located by S. D. Ott, original owner of the Pablo Canyon Ranch (which lay at the mouth of Pablo Canyon) and Mr. J. F. Stebbins (of later Round Mountain fame).

On January 1, 1898, Mr George A. Thorp located the Mammoth 1 and Mannoth 2 as being 1500 feet NW and 1500 feet SE from the shaft. The ores contain Antimony, Gold, and Silver. This shaft is thought to be the shaft on the Big Horn No. 7 (Big Blue Shaft).

The Anaconda Lode was again relocated on September 24, 1898 by F. C. McNeil and Walter Gayhart. The Dewey Mine (a relocation of the Emma Mine (no record of the Emma Mine)) was located on January 24, 1899 by William McCann (of later McCann Canyon) and on February 14, 1899, he also located the Big Bonanza Claims. These claims are though to be some 1500 feet southwest from the Big Blue Claims, where prospects of an early age have been found. On June 13, 1899, Mr. McCann located the Copper King Claim. This claim is thought to be in the area of the present generator building.

On April 9, 1903, the Chloride Mine was located and on April 20, 1903, the Bullwacker Mine was located. These last two locations were by James Frasuer, Lane Oakley, and J. B. Morris. These claims are probably the relocations of the Dewey and Big Bonanza locations of Wm. McCanns'.

Between October, 1905 and November 29, 1905, Henry Rixon, John McAuliffe, William Lynch, and George Lynch located the Temple No. 1, 2, and 3; the Belmont No. 1 and 2; the Ante Up, the Woodstock, the Atwater, and the Fortuna Claims. As some of these claims refer to the Henry Millet Ranch (Pablo Canyon Ranch (Ott had died)), it is assumed these claims were in Pablo Canyon rather than Wall Canyon. The Atwater Claim being at or near Pablo Creek and the others extending in a somewhat easterly direction from there. The importance of this group is, they undertook and completed a new road to the properties. This road was completed in 1906.

During 1906, the area being opened up by the new road, saw 63 new locations and another 49 locations in 1907. In 1908, only 3 new locations were recorded and in 1909, ten locations were recorded.

On April 22, 1910, Mr. J. E. Lindstrom and Otto Johnson staked the Copper Queen, the Copper Queen No. 1, 2, 3, 4, and 5; the Copper Queen Extension No. 1, 2, 3, 4, and 5

These claims were all in Wall Canyon and are thought to cover the area of the Big Horn No. 10, 11, 12, 14, and 19, in addition to the ground south and east of these claims, which is now covered by the WC Claim Group. The Copper Queen No. 5 and 6 were added on April 1, 1911, as being on the divide between Wall and Pablo Canyons. The Copper Queen Group probably covered the same general area as the Temple-Belmont Group.

On July 17, 1910, the Big Blue Ledge was relocated by Mrs. H. P. Millett, Charles Wilson, and J. C. Salaman, as the Blue Jay No. 1 and 2.

From January 10, 1911 thru April 1, 1911, Otto Johnson and J. E. Lindstrom expanded their Claim Group to include the Copper Chief No. 1, 2, and 3; the White Cliff No. 1 and 2; the Eagle, and relocated the Last Chance No. 1 and 2.

On May 22, 1912, with John Wiekland, this same group located the Copper Mountain No. 1, 2, and 3. On September 4, 1915, John Wiekland, Otto Johnson, and Oscar located the Antelope Claim in Wall Canyon.

On January 1, 1916, C. G. Phillips located the Silver King (old Caldonia), the Anna Bell (old Ashby), and relocated the Last Chance Lode Claim.

The forgoing outlines the early claim history of the area, as far as mining records are concern. This history can be broken into four principal work areas. The earliest discoveries were in the South Workings Area and include: the Mary Bennet, B and Me, Comet, Red Bluff, Anaconda, 1891, and the Copper Queen Group. None of these properties have any known production.

The West Workings includes; the Big Blue, Blue Jays, Mammoth, Big Bonanza, and the Bullwacker. Although this area has no known production, it is possible that a small amount of ore was mined. The extent of the workings, and the West Adit being driven to intercep the Big Blue Shaft, would suggest good mineralization may have been encountered in the shaft.

The East Workings recorded the earliest recorded production; that from the Last Chance Mine by the Silver Divide Mining Company (C. G. Phillips). This area includes the Last Chance, the Whitby, the Ashby, and the Calidonia.

The Central Workings has produced most of the antimony ore since 1919. This area includes; the Copper Rivet, Temple-Belmont Group, and the Copper King.

3.3 Antimony Production; Published and Unpublished

The South Workings has no known production. There are stringers of Copper bearing mineralization (with a small amount of molybdenum). These stringers are in the Permain

Formations, (under sea lava flows), which differ from the host formations which contain the antimony mineralization. These workings contain some 125 feet of crosscutting, as well as many small pits, shafts, and opencuts.

The west Workings has no known production, but the size of the dumps suggest the possibility of favorable mineralization was encountered in the Big Blue Shaft. There is some 300+ feet of crosscutting in the West Adit of the West Workings, with a second heading (caved) towards the Big Blue Shaft. There is a second vein, northeast of the Big Blue Shaft Vein. This second vein carries Silver, Antimony, and Copper. A third vein, in the hanging wall of the portal of the West Adit, was discovered while facing up the portal of the West Adit. The East Adit of the West Workings has not yet been reopened. There are numerous open cuts, prospect pits, small shafts, and several dozer-cuts on the veins in this area, suggesting wide spread mineralization.

The East Workings produced the earliest reported antimony production. The main workings is the "**ORIGINAL**" Last Chance Antimony Mine. This workings and the leasee, the Last Chance Mining Company (1946-1953), has given the whole area the name of "Last Chance Antimony Mine". In addition to the 400 tons of ore produced from these workings during the First World War, an additional 100 tons of ore containing 30 percent contained antimony was produced from 1946-1948 by the Last Chance Mining Company. Originally, from 1946-1948, the Last Chance Mining Company only leased the Grouse Spring Group of claims. It was not until 1949 that the Last Chance Mining Company leased the balance of the claims, which comprised the Nevada Antimony Group of Claims.

The Central Workings include the Temple-Belmont Group, which had developed the ground with, what on the Nevada Antimony Claim Group Map is shown as, the "original shaft". This shaft is the "point of origin" for the 1934 Nevada Antimony Claim Map Survey. The depth of the shaft, at this time, is not known, but the 15 level and possible the 60 level did exist. Each of the three groups, which made up Nevada Antimony, located part of the ground. The names of each sub-group are; the Grouse Spring Group, the Last Chance Group, and the Silver Martin Group. All of the claims were surveyed as one group, with the shaft as the "point of origin" for all of the claims. The three claim groups were to be known as the Last Chance Antimony Mine Group. Much of the early ore produced by Nevada Antimony, came from this shaft, from the existing levels. Nevada Antimony deepened the shaft to the 115 level and sump. The 80 and 115 levels were established and most of the ore mined during 1935-1937 came from these four levels.

From 1939 until 1945, several leasors operated the property, but were unwilling to expend the money needed for further development. In 1939, F. A. Vollmar leased the

mine and mined on the existing levels. In 1941-1942, Antimony Products Company, Fred J. Delongchamps, mined some 244 tons of ore from the existing workings. The shaft was weakened from leasees robbing shaft pillars, and the mine was shut down. The Last Chance Mining Company only lease the Grouse Springs Group of Claims, due to the condition of the shaft. When Additional financing became available, in 1949, they leased the balance of the claims and undertook the sinking of a new shaft (now called the "Main Shaft"). The Last Chance Mining Company leased the combined groups of claims until 1954, when a drop in metal prices and the poor recovery of antimony caused the closure of the mine. During the tenure of the Last Chance Mining Company, they established a regular mining camp; a 32 man bunk-house, a cookhouse, warehouse, compressor-generator building, shop, water wells, water lines, air lines, and power lines. Due to the unstable ground around the original shaft, the shaft was backfilled. A new shaft was sunk 180 feet deep, including sump, and levels were established on the 100, 140, and 185 levels; using the collar of the original shaft as the reference for mine levels. A 225 foot crosscut was driven to the surface, from the 100 level to facilitate pumping mine water and ore access. A 50 ton/day mill and bag house was constructed. The mill, from the start, had problems. According to many who worked at the mine and mill, many of the problems were man made. The mine and mill were shut down in 1954 after some 3275 tons of ore were mined, containing 1091.6 tons of antimony metal.

In 1955, the Great Western Mining Company, Mr. George A. Strum, General Partner, leased the mine. They also contracted to have the ore milled at the Stevens Mill (the old Clifton Mill) in Austin, Nevada. In addition to the ore recovered on the 100 level, development was started on the 140 level. When the main N-S vein was crosscut, it was drifted on for some 60 feet. A raise was driven up the orebody until the 115 level was located. Stoping started where the ore was 12 feet wide. Almost immediately upon starting the stoping, the bottom fell out of the price of antimony (1957). The stopes were shut down. The mine was kept on a "standby state" until 1958, when the equipment was removed. During the time the mine was kept at the "standby state", the 185 level was established and a crosscut was driven to the NW-SE vein, the vein drifted on for 50 feet, and ore bunkers were set at the end of the two drifts. When this project was started by the Great Western Mining Company, it was assumed, that the price of antimony would soon recover. In 1958, after making quarterly payments for one year after the mine had stopped producing ore, the lease-option to purchase agreement was returned to Nevada Antimony. The last concentrates were sold to settle the accounts (see settlement sheets). The Great Western Mining Company stated "proven reserves on

the 140 and 185 levels as being some 3000 tons of ore averaging 30 percent contained antimony. Total estimated probable and possible ore reserves, for the whole mine, were stated to be 22,000 tons of ore containing some 29+"percent contained antimony".

In 1965, the mine was under lease to the Hercules Mining Company, of Austin, Nevada. Mr. F. A. Vollmar and Mr. William Noach being the two main figures. Some 550 tons of ore was stockpiled on the property. Several shipments were made, and when one of the financial backers found there had been ore shipped for which he had not recieved his percentage, he shut the mine down. The ore grade was 40 percent contained antimony. In 1973, without the concent of the mine owners, some 250 tons of hand sorted ore was shipped to Utah. After the fact, the mine owners became aware of what had happened. The ore graded 42 percent contained antimony.

The Central Workings consist of two shafts, The original shaft, some 115 feet deep, plus sump, and the maint shaft 180 feet deep. The original shaft has been backfilled. The present adit, just west of the compressor-generator building is the 15 level of the original shaft. Total drifting and crosscutting contains some 3000 feet of workings, in addition there has been stoping off of the 60, 80, 100, 115, and 140 levels.

MINERAL PRODUCTION

ANTIMONY METAL/ TONS	TONS ORE MINED	PERCENT ANTIMONY METAL	YEAR (S) PRODUCTION	MINE OPERATOR
80.0	400	20	1917-1919	Silver Divide Mining Company
135.0	500	27	1935	Nevada Antimony Company
125.0	500	25	1936	Nevada Antimony Company
25.0	125	20	1937	Nevada Antimony Company
8.4	14	60	1939	F. A. Vollmar
13.1	29	45	1939	F. A. Vollmar
21.4	214	10	1941-1942	Antimony Products Company
9.0	30	30	1941-1942	Antimony Products Company
30.0	100	30	1946-1948	Last Chance Mining Company
1091.6	3275	30	1948-1954	Last Chance Mining Company
117.25	175	67	1955-1957	Great Western Mining Company
26.12	41	63.71	1955-1957	Great Western Mining Company
15.41	23	67	1958	Great Western Mining Company
40.0	100	40	1965	Hercules Mining Company
105.0	250	42	1965	Hercules Mining Company
16.0	200	8	1965	Hercules Mining Company

TOTAL TONS MINED ..... 5976 TONS

TONS/CONTAINED ANTIMONY METAL ..... 1860.28 TONS

AVERAGE ORE GRADE ..... 29.30 PERCENT

Antimony production information, history, and ore reserves of the Big Horn Mine Area includes information provided by the following persons, during personal interviews or phone conversations.

1. Danny Daniels, Hawthorne, Nevada; Truck driver for Cline Trucking of Tonopah, from 1955-1957. Hauled ore to the Stevens Mill in Austin, Nevada.
2. George Rong, Manhatten, Nevada; Hoistman for the Great Western Mining Company (deceased).
3. Norman Coombs, Tonopah, Nevada; Legal Represenative in Nevada for the Nevada Antimony Company.
4. James Larson, Tonopah, Nevada; Truck Driver for Nevada Antimony and later for the Great Western Mining Company.
5. Rudy Rundberg, Austin, Nevada; Associate of Vollmar and Noack. Operated the Clifton Mill for Stevens.
6. Hugh Cameron, Reno, Nevada; Nephew of Vollmar, worked at the mines (1939-1942) during summer vacations from High School. States "ore production during this time was much higher than the State reports".
7. Pat Stevens, Austin, Nevada; Wife of Ted Stevens; (mill owner and operator of Stevens Mill, Austin, Nevada).
8. "Gab" Nagy, Austin, Nevada; Miner for Vollmar, 1939-1942; Mill operator for Ted Stevens 1955-1968.
9. Don Cirac, Kingstone Village, Nevada; Leasee of the White Caps Mine, Manhatten, Nevada, 1953-1956.
10. Bob Wilson, Round Mountain, Nevada; Miner at Round Mountain, 1955 - present.
11. Jack Swanson, Gabbs, Nevada; Miner for the Last Chance Mining Company 1948 and again from November, 1952 through May, 1953; when the mine shut down.
12. Carl "Skook" Berg, Round Mountain, Nevada; Born and raised in the area, familiar with past mining operations in the area.
13. Rene Zaval, Round Mountain, Nevada; Old time resident of the area. Friend of Vollmar.
14. Frank Brotherton, Tonopah, Nevada; Miner for the Last Chance Mining Company 1952-1953 (deceased).
15. Bob Cornell, Gabbs, Nevada; Sank well on the property (1950) for the Last Chance Mining Company.
16. Tom Cahill, Gabbs, Nevada; Born and raised in Round Mountain. Worked at the mine in 1950 for the Last Chance Mining Company.
17. Alan Aric, Pasadena, California; Persident of Nevada Antimony Corporation, after the death of the previous president; George Olivier.

SAMINCORP
SOUTH AMERICAN MINERALS & MERCHANDISE CORPORATION
425 PARK AVENUE
NEW YORK 22, N. Y.

TELEPHONE MURRAY HILL 8-4100
CABLE ADDRESS: SAMINCORP, NEW YORK

PURCHASE CONTRACT NO. 1052-P

August 5, 1958

Great Western Mining Company
P. O. Box 727
Central Valley, California

Attention: Mr. George A. Sturm, Partner

Gentlemen:

Referring to our various conversations, we confirm our purchase from you of the below-mentioned material at the following terms and conditions:

I QUANTITY : Approximately 46,000 pounds net wet weight.

II QUALITY : Antimony Concentrates as produced by you at your mine in Nevada, assaying approximately as follows:

Antimony	67%
Sulphur	28%
Silica	2.6%
Iron	1.9%
Lime	0.2%
Arsenic	0.06%
Copper	0.02%
Lead & Zinc	Traces
Silver	About 0.40 ounces per short ton
Gold	About 0.03 ounces per short ton

III PACKING : In bags suitable for export shipment.

IV SHIPPING SCHEDULE : We understand that the material is available for prompt shipment from Nevada to San Francisco. Please await our shipping instructions, which will follow shortly.

V DELIVERY : FAS San Francisco, with all charges up to free-alongside-steamer, including wharfage and handling, if any, being for your account.

VI PRICE : $2.25 per unit of antimony content and per short ton of 2000 pounds net dry weight. This price is subject to a sales commissior of 5%.

VII PAYMENT : (a) 90% against the following documents:

1. Your invoice in triplicate
2. Clean, signed, negotiable dock receipt, issued in accordance with our instructions, and evidencing delivery to "free-alongs steamer San Francisco"
3. Weight certificate listing gross, tare, and net weights for tl entire shipment and bag per bag.
4. Provisional assay certificate.

Ret'd to Mr. Buchnier

423 PARK AVENUE
NEW YORK 22, N. Y.

Great Western Mining Co.
[illegible] (Nevada)

DATE Oct. 1, 1957
NO. C-605-P
File 5282

ORDER NO.

[illegible]

[illegible] Concentrates, shipped from [illegible] (Nevada) to Omaha (Nebraska) July [illegible], 1957.

[illegible] Car [illegible]

Gross weight	65553.0 lbs.	
Tare	[illegible].3 lbs.	
Net weight wet	[illegible].7 lbs.	
Moisture 3.7[illegible]%	[illegible] lbs.	
Net weight dry	[illegible].3 lbs.	
[illegible] - [illegible]% of 55326 lbs. or 2216.30 S.T.U. @ $3.[illegible] p. unit		$ 8,9[illegible].75
Less: Sales commission		
Sales price	$8,9[illegible].73	
Less [illegible] freight	[illegible].[illegible]	
	$[illegible] @ 5%	[illegible]01.26
		$ 8,5[illegible].49
Less: [illegible] fees for weighing, sampling and assaying		[illegible]3.15
		$ 8,402.34
[illegible]		7,[illegible].00
		$ 960.34

Los Angeles, California
December 5, 1934

The Nevada Antimony Company
Los Angeles, California

Gentlemen:

Re: Mining Claims of The Nevada Antimony Company
Located in Township 10, North Range 42 East.
Nye County, Nevada. Elevation 8,100 feet.

Property: Consists of fifteen claims held by possessory title.

Topography: The dominant features of the topography are long, rather narrow, flat-topped ridges which have a northwesterly trend. The country is drained to the southeast by rather narrow flat draws.

Geology: The rocks of the district are of many kinds and occur in complex association. They have been formed in part by deposition beneath the sea and in part by intrusion as igneous masses, as well as eruption of volcanoes. All of them except the largest have been metamorphosed more or less. The bedrock series consists of sedimentary rocks which were turned into a nearly vertical position during the post-Jurassic deformation. These rocks represent beds of clay which have hardened and metamorphosed. Interpolated in these sediments are layers of metamorphic lavas and tuffa, showing the volcanic eruptions occured while the sediments were being deposited. Irregularly intruding the sedimentary rocks with their included volcanic layers are masses and dykes of various granular igneous rocks, such as granite and gabbro. Clay sites and schists predominate, the latter produced by metamorphism of both ancient sediments and igneous rocks.

Local Geology: An irregular isolated area of Ryolite porphyry in shape Approximately one mile across, was intruded as a batholith into the formation about the time of the great post-Jurassic upheavel. This was accompanied by fissuring, faulting, and shear-zoning. It is reasonably certain that the mineral bearing veins of this section were also

formed shortly after that time, and that their age is early Cretacious.

The vein system consists of a series of sheeted zones containing several known veins, the main lode having a strike north and south with a dip of approximately 75 degrees to the east and three veins with a strike east and west, the later being cutter veins. The veins were formed chiefly by replacement along these zones and in instances have all the characteristics of true fissure veins. These sheeted zones were the openings which afforded channels for the ascending waters. The main vein, wherever exposed, shows approximately three feet of dolomite, some quartz porphyry with three feet of almost pure antimony ore against a grano-diorite foot wall.

The antimony occurs in lenses or short shoots, but has been opened up with cuts and shallow shaftsfor a distance of approximately 1500 feet along the vein. The vein-filling along the sides of the antimony all carries a small amount of gold values.

Conclusion: In conclusion, I will say that the showing and possibilities are so impressive that I feel confident, with a reasonable amount of money expended, that this mine will rank with the big producers of the country.

The writer's observations were made from rocks wherever exposed, and from information gleaned from old-time miners in the district.

Respectfully submitted,

(Signed) W. H. Gardner

(Copy)

CALIFORNIA TESTING LABORATORIES, INC.

Laboratory No. 24839

Sample: Stibnite Nov. 9, 1934

COMPLETE ANALYSIS

Antimony (Sb)	57.31%
Insoluble	20.53%
Iron Oxide (Fe O)	0.91%
Aluminum Oxide (Al O)	0.10%
Calcium Oxide (CaO)	1.25%
Magnesium (MgO)	0.05%
Sulphur (S)	19.28%
Lead (Pb)	0.11%
Copper (Cu)	0.10%
Manganese	0.05%
Molybdenum (Mo)	0.01%
Tungston Oxide (WO)	0.01%
Arsenic (As)	0.01%
Gold	Trace
Silver	Trace

COPY OF REPORT ON THE

NEVADA ANTIMONY PROPERTY

NYE COUNTY, NEVADA.

INTRODUCTION

Following correspondence with Burton H. Buehner of Los Angeles, and after reading a report by W. H. Gardner, which contained some very flattering statements concerning the property the writer examined the workings in a snow storm, under very unfavorable circumstances for the inspection of the surface rocks and outcrops, which were mostly covered by snow.

The following report, therefore, deals chiefly with those workings which were visited on February 23, 1935., the trip being covered in about fourteen hours from Tonopah.

LOCATION

The property of the Nevada Antimony Company is situated in Township 10 North, Range 42 east, Nye County, Nevada., approximatel7 56 miles due north of Tonopah, from which it is reached by auto road in about two hours.

It is 12 miles due west of Round Mountain Mining District.

There are fifteen unpatented claims in the group, which is located generally on the Index Map.

PHYSICAL FEATURES

The claims are spread over the high ridges and upland valleys and gulches of the Toyabe Range. They are reached through Wall Canyon which penetrates the abrupt scarp and eastern flank of the range, where the elevation changes from 5800 feet in the Big Smoky Valley to over 8000 feet in six miles, over a fair auto road. The Canyon walls are not steep and the road not difficult of maintenance.

There is an abundance of stunted forest growth for fuel and mine timber purposes on the property, and on adjoining government land.

Water is scarce, the nearby source of domestic water at present being confined to a very small dripping spring.

Plate 1 shows the location of a small log cabin on the property, which is new and in good condition. Another boarded cabin, containing sacked ore is shown on the Last Chance Claim. A fair road connects these two cabins, which will provide transportation facilities for the haulage of ore from the Last Chance Claim to the lower cabin and auto road.

GEOLOGY

The entire surface of the claims, with a few notable exceptions where some observations were made, was snow covered at the time of the writer's visit. Examination of the various tunnels disclosed ancient Gneisses and Schists. More recent sediments in the form of shale beds dipping locally in a steep angle to the west, and striking northwest, a prominent outcrop of felsitic porphyry, showing inclusions of Domomite, and portions of what appears to be a large dyke of recent Rhyolite.

The presence of all these rocks within a small group of claims is perhaps typical of Nevada mountain ranges, at least of those which the writer has seen. This condition naturally suggests interesting speculations but on account of the snow covering

no effort was made to correlate or classify these rocks. A few observations in connection with the occurance of veins and ore bodies within these rocks are given, however, in the following:

VEINS AND ORE DEPOSITS

1. Within highly metamorphosed rocks, gneissic in appearance, the writer observed a small quartz vein in the tunnel on Grouse Spring #4 claim. 18 inches of vein material near a fault cut off assayed only traces of gold and silver. However, a sample was taken in the face of the tunnel, where veinlets of quartz were exposed, which assayed 0.5% antimony. This is an interesting fact which may indicate the wide spread presence of antimony in the vicinity. See plate 3.

2. Disclosed in a tunnel on Silver Martin #2 claim (plate 2) are several mineralized fissures showing evidence of strike faulting. Two samples taken there assayed only traces of gold and silver.

3. The tunnel on Last Chance claim, where an ore house is built on the dump, has been recently extended to a point under a small deposit of almost pure stibnite, (antimony trisulphide, when pure carrying 71.4% antimony) (Sb_2S_3) which was discovered on the surface. Near the portal of this tunnel, the shale beds are fissured, folded, and distorted by movements of considerable proportions. Dolomitic shale and limestone were observed, also other evidence of the proximity of igneous rooks on the surface, and the writer is of the belief that the massive stibnite boulders, which show no vein structure alignment or banding of other minerals, represent a replacement of portions of favorable beds of shattered, limy and dolomitic shale, near a contact of igneous rocks.

Plate 2 shows details of this fissuring and deposit. At the time of the writer's visit the boulders of almost pure stibnite, slightly oxidized where surface waters had penetrated cracks, were seen in the bottom of the tunnel and in a small crosscut off the tunnel near the face. A sample of the sacked ore, about ten tons, in the ore house on the dump of this tunnel, assayed 53% antimony.

Shafts and pits on the Last Chance claim, east of the tunnel just described, were seen, but not mapped because filled with snow. It is said that antimony ore of considerable quantity was taken from these also.

4. Rocks containing antimony were seen on the dumps of shaft and pits on the Grouse Springs #3 claim, in the workings of which was disclosed veinlets of quartz in a fissure zone.

In general, the fissures mapped were small and of little prospective value, with the exception of the deposit on Last Chance claim. The strike of the fissuring is seen to be generally East-West.

No observations were made which would indicate a large vein structure, although a contact along the porphyry or ryolite dykes might constitute such a structure. zone

Sufficient observations to determine continuous outcrop of veins or dykes were impossible, and the writer leaves this section of the report in an unfinished condition, to be completed, if feasible, later.

HISTORY AND PRODUCTION

It is doubtful if the production of ore of any kind was made from this group of claims. Some antimony may have been shipped during high prices, but the amount, from the evidence seen in the workings was necessarily small.

The claims are not far from Round Mountain and Manhattan and would have been thoroughly prospected for silver and gold possibilities many years past. However, there is here a new development, which is neither barren nor uninteresting. The high price of antimony now (14½ ¢ per pound) should provide sufficient inducement and ample remuneration for the high grade ore, such as is seen in the Last Chance tunnel.

CONCLUSIONS

1. Further work at present should be confined to the recovery of the massive stibnite ore, wherever available, and development of a limited character along the fissures which haveproduced this type of ore in the shale beds. Further recommendations may be possible from reports of progress.

2. The marketing of antimony ores is of such a nature and the price so erratic that any large investment, in a mill, for example, would be a very doubtful venture, unless the product could be carried through to the metal itself. Such a plan, however, would depend entirely on the development of a large tonnage of profitable milling ore.

3. Further expenditure of funds for more claims, except as a means to obtain water is unwarranted. Careful inspection of the surface after the snow melts would probably result in the relinquishment of some of the claims in the group.

4. Gold and silver prospects on these claims have not been disclosed to the writer, though prospecting near the contacts of igneous rocks may prove these rare metals to be present also. No attention should be paid to theories about the favorable possibilities unless there is evidence that gold and silver do exist in the veins now uncovered. Outcrops should receive enough inspection and sampling to prove these points.

5. More water is needed if development requires a larger camp or power application.

6. Very little expense is necessary in order to maintain a good road for haulage.

7. Ore can be hauled to the railroad at or near Tonopah for about $5 per ton.

8. No ore reserve figure can be given, due to the nature of the deposit and of the development. About ten tons of high grade antimony ore is sacked ready for shipment.

9. Workings visited are generally in good condition, indicating that extensive timbering would be unnecessary.

10. The tunnel on the Last Chance claim shows rock alteration which is due to the percolation of mineralizing solutions, from which the massive stibnite boulders were deposited.

2506 Bayard St.,
Butte, Montana
March 16, 1935

Respectfully submitted.

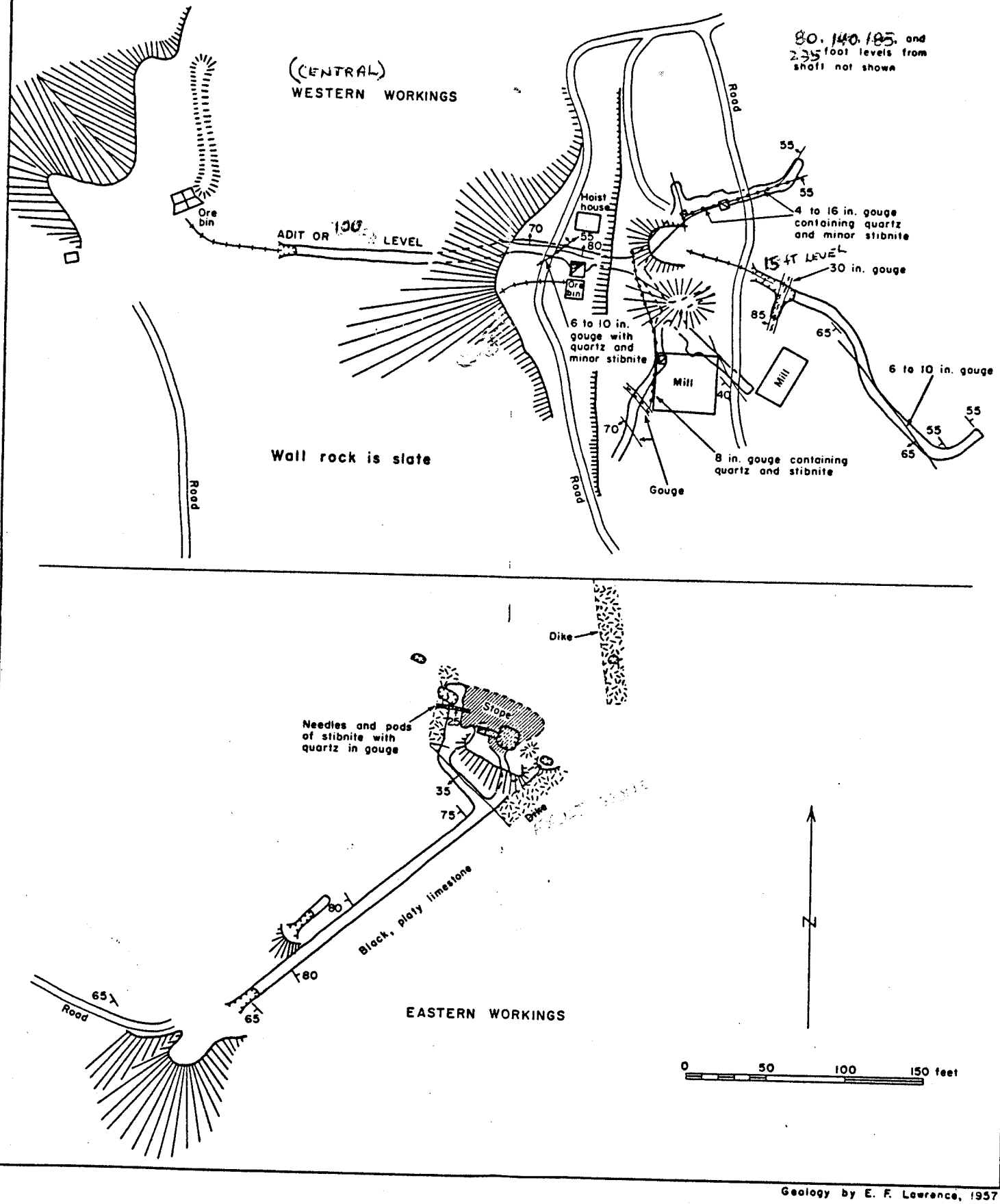
(Signed) Wm. A. O'Kelly

(Chief Eng for Anaconda Butte Corporation)

ORE HOISTING RECORD

The following dates and buckets of ore hoisted were taken from the inside wall of the hoist house. The year 1965 appears over the individual dates.

DATE	BUCKETS ORE HOISTED	TONS ORE (1000lbs./buckets)
Sept. 19	84	42.0
20	64	32.0
21	27	13.5
22	0	0.0
23	0	0.0
24	12	6.0
25	64	32.0
27	18	9.0
28	14	7.0
Oct. 1	31	15.5
2	22	11.0
3	21	10.5
4	52	26.0
5	74	37.0
6	37	18.5
10	38	19.0
13	43	21.5
15	36	18.0
16	17	8.5
17	33	16.5
-	38	19.0
-	31	15.5
-	30	15.0
-	75	37.5
-	48	24.0
	909	454.5/TONS ORE



Geology by E. F. Lawrence, 1957

GEOLOGIC MAP OF THE LAST CHANCE MINE

NYE COUNTY, NEVADA

NEVADA ANTIMONY CORP.
ALAN ARIC: PRESIDENT

LAST CHANCE, Antimony Mine

AKA, Silver Divide, Bastian, Wall Canyon, Herd, Francisco (?), Located in Section 17 (projected), T. 10 N., R. 42 E., on base map, U.S. 1:25,000 scale topographic map, Tonopah sheet, in Nye County, Nevada (county seat, Tonopah).

Subject mine is composed of 15 lode mining claims situated in the Jett District on the divide between Wall Canyon and San Pablo Canyon on the east flank of the Toiyable Range at an elevation of approximately 8000' and is connected by a dirt road approximately 11 miles long running westerly from Nevada State Highway 8A, said dirt road intersects Highway 8A at a point approximately $5\frac{1}{2}$ miles south of the intersection with State Highway 70 running easterly to Round Mountain. The intersection of State Highway 8A and 70 lies 63 miles south of Austin and 151 miles south of Battle Mountain and 54 miles north of Tonopah.

EXHIBITS ATTACHED

1. GEOLOGIC MAP, from Nevada Bureau of Mines Bulletin 61, Plate 8. Shows a portion of the Western Workings and the Eastern Workings. The Mill has been dismantled and only a portion of the foundation remains. A portion of the Mill building remains with its foundation. The Ore bin just south of the Main Shaft, Western Workings, is in fair condition.

2. CLAIM MAP, provided by mine owner. Shows Main Shaft, Western Workings located on the La Castana Claim, the Eastern Workings and three 40' deep shafts on the Santa Gertrudes Claim, and the Old Tunnel on the San Geronimo Claim.

3. MINE MAP, Last Chance Mine, composite map by Western Research + Engineering Co., data from various sources, shows #1 Tunnel, #2 Tunnel, Main Shaft, 15'-, 60'-, 140'- and 185'- levels of Western Workings.

4. REPORT on Last Chance Mine, from Nevada Bureau of Mines, Bulletin 61, Plate 8, Antimony Deposits of Nevada, pp. 140, 141.

5. Copy of REPORT on "Nevada Antimony Property" by Wm. A. O'Kelly, formerly Chief Engineer for Anaconda Butte operations.

6. Copy of REPORT on "Mining Claims of the Nevada Antimony Company" by W. H. Gardner, E.M.

7 & 8. Copy of the DESCRIPTIVE MINEROLOGY of Stibnite and Tetrahedrite by Dana, 17th edition.

9 & 10. Copy of April 1970 MINERAL MARKET PRICES for Antimony metal, ores and concentrates from Metals Week quotations as published in E/MJ-May, 1970.

COPY

SMITH-EMERY COMPANY

CHEMICAL ENGINEERS AND CHEMISTS
METALLURGICAL AND TESTING ENGINEERS
920 SANTEE STREET
LOS ANGELES 15
CALIFORNIA

LABORATORY

No. 367362 *Date* April 23, 1953

Sample Pulp

Received 4/20/53 *Marked* "Oxide Sample 4/20/53"

Submitted by Last Chance Mining Company, P.O. No. 353
P. O. Box 2068,
South Annex,
Van Nuys, California.

REPORT OF QUALITATIVE SPECTROGRAPHIC EXAMINATION

Element	*Approximate Quantity*
Silicon, Antimony	Major Constituents
Aluminum	Intermediate Constituent
Minor Constituents	
Iron	0.5%
Arsenic	0.5%
Magnesium	0.5%
Lead	0.1%
Calcium	0.1%
Barium	0.05%
Titanium	0.05%
Manganese	0.01%
Strontium	0.01%
Copper	0.005%
Boron	0.005%
Chromium	0.001%
Nickel	0.001%
Cadmium	None found
Zinc	None found

Respectfully submitted,

Smith-Emery Co.

CHEMISTS AND ENGINEERS

(See statements on reverse side regarding qualitative spectrographic examination)

APPENDIX 2

Geochemical Assays

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
					PPM				
1	Rock	.08	1.7	77	31	348	11	70	11
2	Rock	.07	.5	137	11	26	4	30	--
3	Rock	--	.6	10	27	52	--	5	--
4	Rock	--	1.0	19	13	42	--	5	--
5	Soil	--	--	30	20	85	3	30	--
6	Soil	--	--	35	20	90	2	60	--
7	Soil	--	2.1	60	20	150	4	90	--
8	Soil	--	--	40	15	110	2	45	--
9	Soil	--	--	40	20	70	--	90	3
10	Soil	--	--	35	20	90	5	105	--
11	Rock	--	1.2	38	19	38	2	55	--
12	Soil	--	--	35	25	100	2	130	26
13	Rock	.08	.4	8	19	130	--	30	2
14	Rock	--	1.2	64	15	38	4	1700	18
15	Rock	--	.8	54	23	31	4	20	--
16	Rock	.16	.4	27	18	31	3	10	--
17	Rock	--	1.0	36	12	17	4	10	--
18	Rock	.07	.8	62	15	30	7	15	--
19	Rock	.17	1.2	51	14	18	7	900	27
20	Rock	.25	1.6	42	10	12	7	1500	29
21	Rock	--	--	23	29	64	2	25	--
22	Rock	--	.4	25	25	68	--	15	--
23	Rock	--	--	23	28	66	--	20	--
24	Rock	.08	--	28	25	66	--	10	--
25	Rock	--	--	27	22	65	--	5	--
26	Rock	--	.5	59	22	53	2	10	--
27	Rock	.07	1.1	145	12	118	7	50	11
28	Rock	.58	--	21	23	45	--	15	3
29	Soil	.21	.9	29	16	34	3	60	--
30	Dump	1.32	.9	46	35	56	--	1000	6800
31	Rock	.08	2.2	13	37	11	--	5	19
32	Soil	--	--	45	25	105	3	90	39
33	Soil	--	--	30	30	85	--	65	11
34	Rock	.23	1.6	57	23	107	7	35	10
35	Soil	--	--	25	30	80	2	20	--
36	Rock	.08	2.5	14	36	14	--	5	--
37	Rock	--	--	28	8	8	3	20	--
38	Soil	--	--	85	20	95	4	40	--
39	Soil	--	--	80	25	50	8	70	--

			PPM						
Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
40	Rock	--	1.3	90	10	13	6	35	--
41	Rock	--	.4	17	21	41	--	20	--
42	Rock	--	.4	17	24	46	2	20	--
43	Rock	--	.6	18	17	38	--	240	6
44	Rock	--	.4	16	21	30	2	150	--
45	Rock	.08	--	24	19	19	4	55	--
46	Rock	.32	3.1	22	24	23	2	140	4
47	Prospect	--	1.4	73	13	35	9	420	17
48	Prospect	.28	1.1	36	17	46	8	360	18
49	Prospect	--	1.7	70	11	52	8	580	14
50	Rock	.08	1.3	31	13	10	21	210	4
51	Rock	--	.9	91	16	32	4	100	2
52	Soil	--	--	30	30	80	2	30	--
53	Soil	--	--	65	20	90	2	50	--
54	Soil	--	--	55	20	80	--	30	--
55	Soil	--	--	40	25	50	--	155	3
56	Dump	--	3.1	830	35	100	7	2400	120
57	Rock	.16	.9	126	14	101	10	10	3
58	Rock	--	2.9	15	33	13	--	5	--
59	Rock	.22	.9	29	16	34	3	50	21
60	Soil	--	--	65	25	165	3	40	--
61	Soil	--	--	40	20	110	3	30	--
62	Soil	--	--	15	25	65	3	15	--
63	Soil	--	--	20	25	50	3	10	--
64	Soil	--	--	20	20	55	--	10	--
65	Soil	--	--	25	30	80	3	15	--
66	Soil	--	--	30	20	70	3	10	--
67	Soil	--	--	30	30	80	3	10	--
68	Rock	--	--	26	9	32	--	5	--
69	Soil	--	--	20	20	50	2	10	--
70	Soil	--	--	15	20	55	--	10	--
71	Soil	--	--	15	20	45	2	10	--
72	Soil	--	--	20	25	55	3	15	--
73	Soil	--	--	25	25	70	3	15	--
74	Soil	--	--	35	60	130	4	90	--
75	Rock	--	.9	33	17	80	--	10	--
76	Soil	--	--	20	20	55	4	5	--
77	Soil	--	--	15	20	45	2	10	--
78	Soil	--	--	15	20	45	--	5	--

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
				PPM					
79	Rock	--	--	16	16	29	--	5	--
80	Soil	--	--	10	35	55	--	10	--
81	Rock	--	--	16	26	36	--	5	--
82	Soil	--	--	15	35	65	--	10	--
83	Rock	.17	--	12	26	29	--	5	--
84	Rock	.23	--	14	24	27	--	5	--
85	Rock	--	.6	16	24	44	--	5	--
86	Soil	--	--	15	30	65	2	10	--
87	Rock	--	1.3	33	20	18	--	140	25
88	Rock	.08	.4	34	16	52	2	5	--
89	Soil	--	--	20	20	65	2	15	--
90	Soil	--	--	15	20	50	2	20	--
91	Soil	--	--	25	30	80	--	55	--
92	Soil	.23	--	32	22	96	--	40	--
93	Soil	--	--	15	30	55	2	10	--
94	Soil	--	--	20	25	60	--	10	--
95	Soil	--	--	15	15	45	--	10	--
96	Soil	--	--	15	20	55	2	10	--
97	Soil	--	.2	22	36	102	--	10	--
98	Soil	--	--	10	30	60	--	15	--
99	Soil	--	--	35	45	90	2	30	--
100	Rock	--	.2	14	17	70	2	5	--
101	Rock	--	.5	114	12	57	8	15	--
102	Rock	--	.2	20	16	73	2	10	--
103	Soil	--	--	40	30	190	4	95	40
104	Soil	--	--	40	30	70	--	240	86
105	Soil	--	--	40	30	55	2	120	20
106	Dump	.21	.5	38	31	12	2	750	7000
107	Soil	--	--	40	30	85	2	270	15
108	Rock	.14	.3	27	14	29	3	10	4
109	Prospect	--	.4	21	16	45	--	125	33
110	Prospect	.19	.8	58	18	41	14	325	22
111	Rock	--	.2	30	9	100	--	30	12
112	Soil	--	2.0	70	35	160	6	240	7
113	Soil	--	--	85	45	195	--	50	--
114	Rock	.28	.4	49	17	43	2	15	--
115	Rock	.08	.3	28	14	43	3	10	--
116	Rock	--	.2	18	20	69	2	10	--
117	Rock	--	.3	18	18	96	3	15	--

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
					PPM				
118	Prospect	.42	.3	51	14	36	--	5000	52
119	Soil	--	--	80	40	60	--	500	360
120	Rock	--	.3	18	11	28	--	10	4
121	Soil	--	--	85	30	55	2	60	--
122	Soil	--	2.0	155	50	735	24	55	18
123	Soil	--	--	90	35	300	10	50	6
124	Rock	.07	.7	156	13	138	12	40	2
125	Soil	--	--	85	185	330	10	60	4
126	Rock	.14	.7	68	11	71	5	20	--
127	Soil	--	--	40	25	180	4	40	9
128	Soil	--	--	40	30	130	3	25	--
129	Soil	--	--	40	380	85	2	10	--
130	Rock	--	.8	89	17	47	7	10	--
131	Rock	--	.3	27	22	127	2	--	--
132	Soil	--	--	85	25	225	8	20	2
133	Soil	--	--	70	20	310	8	35	3
134	Rock	--	1.5	51	32	230	8	50	--
135	Soil	--	--	105	50	385	15	60	11
136	Soil	--	--	80	45	370	9	35	4
137	Rock	--	.4	104	9	55	12	15	--
138	Soil	--	--	70	35	205	9	65	3
139	Soil	--	--	25	25	155	2	30	3
140	Rock	--	.4	48	58	5910	4	20	--
141	Rock	.17	.2	14	17	62	2	5	--
152	Rock	--	4.2	16	16	31	--	10	--
143	Rock	--	.5	108	17	37	--	5	--
144	Rock	--	.4	100	12	25	--	5	--
145	Dump	--	3.1	1100	25	150	2	1400	31
146	Rock	--	.5	94	14	26	--	--	--
147	Rock	--	.4	113	14	28	2	10	--
148	Soil	--	--	60	20	50	--	20	--
149	Soil	--	--	50	25	45	--	25	--
150	Soil	--	--	40	35	80	2	40	3
151	Soil	--	--	65	35	70	4	45	2
152	Prospect	--	.8	29	25	17	2	10	--
153	Rock	--	.5	21	17	13	2	5	--
154	Soil	--	--	40	25	50	--	40	--
155	Soil	--	--	45	20	85	2	30	--
156	Rock	--	.4	92	13	23	2	5	--
157	Soil	--	--	50	30	160	6	30	--

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
					PPM				
158	Rock	.14	.7	21	23	4	5	15	--
159	Rock	.07	--	34	25	47	3	75	--
160	Soil	--	--	65	20	310	9	20	--
161	Rock	--	--	15	16	35	4	10	--
162	Rock	.07	1.1	69	23	61	9	20	5
163	Rock	--	--	17	21	38	1	5	13
164	Rock	--	--	25	14	49	--	5	1
165	Rock	.14	.5	65	41	111	7	10	1
166	Rock	--	.3	38	12	42	2	5	3
167	Rock	.07	--	19	21	15	2	10	7
168	Rock	.14	.3	16	19	28	--	10	13
169	Rock	1.51	.3	16	18	26	--	5	25
170	Rock	--	.3	23	14	20	3	10	21
171	Rock	--	--	29	8	6	5	60	4
172	Rock	--	--	44	8	7	4	15	--
173	Soil	--	--	25	20	105	2	15	--
174	Soil	--	--	25	25	60	--	20	--
175	Rock	--	.5	112	15	27	1	5	--
176	Rock	.14	.4	36	45	71	1	5	--
177	Rock	--	--	30	40	95	2	15	--
178	Soil	--	--	30	25	120	2	10	--
179	Soil	--	--	25	30	100	2	15	--
180	Soil	--	--	30	30	115	2	15	--
181	Soil	--	--	25	30	100	2	10	--
182	Soil	--	--	35	25	90	2	15	--
183	Soil	--	--	30	40	120	2	10	--
184	Rock	.16	2.0	24	24	17	1	5	--
185	Soil	--	--	35	30	85	2	15	--
186	Soil	--	--	45	30	140	4	25	--
187	Soil	--	--	55	25	105	7	55	3
188	Rock	--	.9	58	13	57	8	15	4
189	Rock	.08	2.6	100	20	136	13	10	6
190	Rock	.14	1.6	135	12	92	16	20	4
191	Rock	--	.8	72	10	226	12	20	4
192	Soil	--	--	20	20	170	3	15	--
193	Soil	--	--	35	30	85	2	55	15
194	Rock	--	1.8	13	22	23	2	5	--
195	Rock	.07	3.5	9	36	6	2	5	2
196	Rock	.16	.9	25	15	17	7	5	--
197	Rock	--	.8	17	15	28	3	10	--

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
				PPM					
198	Rock	--	.8	24	17	23	3	5	--
199	Rock	--	.9	27	14	33	4	5	--
200	Soil	--	--	15	25	55	3	10	--
201	Soil	--	--	20	25	65	--	10	--
202	Soil	--	--	20	285	55	2	15	--
203	Soil	--	--	40	30	125	3	80	9
204	Rock	--	2.5	25	20	23	5	10	1
205	Rock	.14	2.0	130	19	31	16	20	4
206	Soil	--	--	40	30	155	5	30	--
207	Rock	--	1.8	114	16	149	24	25	2
208	Rock	--	1.1	106	16	48	17	25	2
209	Rock	.14	.9	27	13	7	7	10	--
210	Rock	.16	.9	25	26	37	2	5	--
211	Soil	--	--	40	25	105	4	40	--
212	Soil	--	--	25	30	75	2	15	--
213	Rock	.42	10.6	24	12	30	3	10	--
214	Rock	--	.9	43	11	40	3	5	--
215	Rock	--	.6	31	12	37	2	5	--
216	Soil	--	--	20	20	55	2	100	--
217	Soil	--	--	30	25	60	3	50	--
218	Soil	--	--	35	25	65	4	35	--
219	Rock	--	--	76	4	10	7	60	--
220	Soil	--	--	55	20	60	2	30	--
221	Soil	--	--	40	20	55	3	25	--
222	Soil	--	--	20	20	55	2	30	--
223	Soil	--	--	25	25	60	--	35	--
224	Soil	--	--	40	20	70	2	40	--
225	Soil	--	--	55	20	40	2	20	--
226	Soil	--	--	90	20	45	2	45	2
227	Soil	--	--	40	25	105	3	30	--
228	Rock	--	.9	89	11	56	3	10	--
229	Rock	--	1.4	42	17	30	4	25	--
230	Rock	--	--	19	13	16	3	5	--
231	Soil	--	--	30	40	80	2	20	--
232	Rock	--	--	19	19	104	2	5	--
233	Rock	--	--	25	50	75	2	15	--
234	Soil	--	--	25	25	65	2	10	--
235	Rock	--	--	31	19	130	2	5	--
236	Rock	--	--	68	12	90	1	5	--

Sample #	Type	Au	Ag	Cu	Pb	Zn	Mo	As	Sb
					PPM				
237	Soil	--	--	20	20	50	--	20	--
238	Soil	--	--	25	25	50	2	20	--
239	Soil	--	--	25	20	55	2	25	--
240	Soil	--	--	60	85	100	3	70	3
241	Soil	--	--	45	50	85	2	45	5
242	Rock	.14	--	56	19	98	2	5	--
243	Rock	.07	--	65	12	46	2	10	--
244	Rock	.14	.7	10	64	88	1	10	--
245	Soil	--	--	50	25	55	3	15	--
246	Rock	.07	--	84	12	62	2	10	--
247	Soil	--	--	40	25	110	3	30	2
248	Rock	--	.4	45	31	72	4	20	2
249	Soil	--	--	30	25	75	2	15	--
250	Rock	--	--	9	13	24	3	5	--
251	Soil	--	--	15	25	50	2	20	--
252	Rock	--	--	11	15	46	2	15	--
253	Soil	--	--	50	35	150	2	45	8
254	Soil	--	--	45	60	150	2	35	3
255	Soil	.41	--	75	40	135	5	3200	2400
256	Soil	--	5.1	70	55	355	4	220	7
257	Soil	--	--	25	30	70	2	70	2
258	Rock	--	1.3	14	12	68	4	--	--
259	Rock	.14	.4	13	19	82	3	--	--
260	Rock	--	--	190	20	162	19	50	8
261	Soil	--	--	110	65	245	38	95	5
262	Soil	--	--	60	30	120	4	50	--
263	Rock	--	--	140	9	74	10	10	--
264	Soil	--	--	50	25	95	2	10	--
265	Soil	--	--	30	30	70	--	15	--
266	Rock	--	--	14	50	124	1	10	--
267	Soil	--	--	25	25	65	--	15	--
268	Soil	--	--	25	25	60	2	15	--
269	Rock	--	--	13	10	70	2	--	--

ASSAY LABORATORY REPORT

MISCELLANEOUS ASSAYS

Department Geology

Date 9-22-83

	SAMPLE DESCRIPTION	PPM Ni					
1	3	833					
2	8	909					
3	9	1023					
4	10	910					
5	13	416					
6	14	1023					
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23	analyzed by Li Bo Fusion						
24							
25							

SAMPLE LOCATION

ULTRAMAFIC INVESTIGATION

1. Big Horn No. 1; Ore stockpile material
2. Big Horn No. 10; Yellow Post opencut material
3. Big Horn No. 14; West end of claim; small pit material
4. Big Horn NO. 7; Big Blue shaft material
5. Big Horn No. 7; Big Blue tunnel dump stockpile
6. Big Horn No. 1; curve in road south of dozer cut
7. Wall Canyon No. 91 (?); north side of road, small opencut
8. Big Horn No. 10; resample of 2.
9. Big Horn No. 10; NW corner area; random rock sample, float
10. Big Horn No. 10; Crest of ridge; green prospect
11. Wall Canyon No. 58 (?) North side of road; Deer Location
12. Wall Canyon No. 57 (?); North side of road; Slide area & outcroppings
13. Wall Canyon No. 56 (?): North side of road; rectangler grren
14. Big Horn No. 10; Between sample No. 9 & No. 10; black silicious (?) outcropping
15. Big Horn No. 14; resample of 3
16. Big Horn No. 12; SE end; top of hill
17. Big Horn No. 1; NW of sample 6 (about 200 ft.)
18. Big Horn No. 2; above dozer cut
19. Big Horn No. 1; Near north center side line; "Moms' Dike"
20. Big Horn No. 1, South end of the generator Building
21. Explore; lower granitic Porphyry (?)

22. Explore; upper granitic prophyry dike

23. Big Horn No. 15; near corner No. 1; road material

24. Between sample 13 and road side; to the west

25. Location area of Big Horn No. 19

26. 100 feet north (approx.) from location; Big Horn No. 19; open cut in draw

27. 150 ft. northeast of Big Horn No. 10 Location; opencut material

28. Big Horn No. 16; Post No. 2 (SW corner) area

29. East slope of hill across from sample 2 SE)

30. Big Horn No. 14; shafts & pits, north of Location

31. Big Horn No. 14; going south from location along outcroppings.

32. Twin Road intersection; to the west of sample 7

33. From sample 7; along along hillside to side road; sample 24 area.

34. Plug outcroppings

35. Explore; just between volcanics; south of the flat ridge incline shaft.

36.

JOB NO. MJH 004
PAGE 1

ITEM NO. SAMPLE NO.
1 = X-013 - Black #1 workings
2 = X-014 - Grey #10; comp
3 = X-015 - Brown #14
4 = X-016 - #7 shaft
5 = X-017 #7 Tunnel

ITEM	1	2	3	4	5
ELEMENT					
Fe	1.5%	3%	3%	1.5%	2%
Ca	5%	20%	15%	0.3%	20%
Mg	1%	7%	3%	0.2%	10%
Ag	<1	<1	50	200	1
As	<500	<500	5000	1000	<500
B	20	30	20	50	10
Ba	200	300	200	1000	50
Be	<2	<2	<2	<2	<2
Bi	<10	<10	<10	<10	<10
Cd	<50	<50	<50	<50	<50
Co	<5	70	30	20	50
Cr	200	3000	200	1000	500
Cu	500	700	>10000	>10000	200
Ga	<10	<10	<10	<10	<10
Ge	<20	<20	<20	<20	<20
La	50	30	<20	20	<20
Mn	500	2000	1000	200	1500
Mo	<2	<2	<2	<2	<2
Nb	<20	<20	<20	<20	<20
Ni	100	1500	2000	1000	2000
Pb	200	200	150	15	10
Sb	>10000	>10000	5000	>10000	<100
Sc	<10	<10	10	<10	<10
Sn	<10	<10	<10	<10	<10
Sr	200	200	100	100	500
Ti	500	500	50	1000	200
V	<10	10	20	20	50
W	<50	<50	<50	<50	<50
Y	<10	<10	<10	10	<10
Zn	<200	<200	700	2000	<200
Zr	20	<20	<20	100	<20

ITEM NO. SAMPLE NO.
1 = SAMPLE 06
2 = SAMPLE 07
3 = SAMPLE 08
4 = SAMPLE 09
5 = SAMPLE 10

ITEM	6 1	7 2	8 3	9 4	10 5
ELEMENT					
Fe	2%	2%	7%	3%	3%
Ca	7%	5%	>20%	>20%	5%
Mg	15%	2%	10%	7%	15%
Ag	<1	5	<1	<1	<1
As	<200	<200	<200	<200	<200
B	10	150	30	15	<10
Ba	50	10000	150	300	20
Be	<2	<2	<2	<2	<2
Bi	<10	<10	<10	<10	<10
Cd	<50	<50	<50	<50	<50
Co	30	15	50	50	30
Cr	1500	2000	3000	5000	2000
Cu	7	300	15	70	10
Ga	<10	30	10	<10	<10
Ge	<20	<20	<20	<20	<20
La	20	20	20	20	20
Mn	1000	700	3000	2000	700
Mo	<2	<2	<2	<2	<2
Nb	<20	<20	<20	<20	<20
Ni	500	150	1000	1000	500
Pb	10	<10	10	20	<10
Sb	<100	<100	<100	<100	<100
Sc	<10	30	<10	<10	<10
Sn	<10	<10	<10	<10	<10
Sr	200	100	200	1500	200
Ti	70	1500	700	500	70
V	30	300	50	700	20
W	<50	<50	<50	<50	<50
Y	<10	<10	<10	<10	<10
Zn	<200	<200	<200	<200	<200
Zr	<20	<20	20	20	<20

ITEM NO. SAMPLE NO.
1 = #11
2 = #12
3 = #13
4 = #14
5 = #15

ITEM	1	2	3	4	5
ELEMENT					
Fe	3%	2%	2%	0.5%	3%
Ca	3%	0.5%	2%	3%	10%
Mg	2%	0.5%	1.5%	0.05%	5%
Ag	<1	<1	<1	1	<1
As	<200	<200	<200	<200	<200
B	10	<10	<10	10	<10
Ba	50	10	<10	100	20
Be	<2	<2	<2	<2	<2
Bi	<10	<10	<10	<10	<10
Cd	<50	<50	<50	<50	<50
Co	30	20	5	<5	30
Cr	300	300	70	10	2000
Cu	70	20	5	30	30
Ga	<10	<10	<10	<10	<10
Ge	<20	<20	<20	<20	<20
La	<20	<20	<20	<20	<20
Mn	500	100	200	300	300
Mo	<2	<2	<2	2	<2
Nb	<20	<20	<20	<20	<20
Ni	150	100	50	100	700
Pb	<10	<10	<10	<10	<10
Sb	<100	<100	<100	<100	<100
Sc	10	10	<10	<10	<10
Sn	<10	<10	<10	<10	<10
Sr	<100	<100	<100	<100	200
Ti	200	300	<20	300	200
V	50	50	<10	300	20
W	<50	<50	<50	<50	<50
Y	<10	<10	<10	<10	<10
Zn	<200	<200	<200	700	<200
Zr	<20	<20	<20	<20	<20

ITEM NO. SAMPLE NO.
1 = #16
2 = #17
3 = #18
4 = #19
5 = #20

ITEM	1	2	3	4	5
ELEMENT					
Fe	7%	3%	5%	5%	3%
Ca	7%	10%	>20%	20%	20%
Mg	5%	15%	15%	20%	10%
Ag	10	5	3	1	2
As	200	<200	500	<200	<200
B	15	10	20	10	15
Ba	1500	500	500	200	300
Be	<2	<2	<2	<2	<2
Bi	<10	<10	<10	<10	<10
Cd	<50	<50	<50	<50	<50
Co	20	50	30	50	70
Cr	700	2000	5000	2000	3000
Cu	2000	150	70	50	100
Ga	15	<10	<10	<10	<10
Ge	<20	<20	<20	<20	<20
La	<20	<20	<20	<20	<20
Mn	1500	1000	3000	1000	1000
Mo	<2	<2	<2	<2	<2
Nb	<20	<20	<20	<20	<20
Ni	200	1000	300	1000	1500
Pb	100	50	50	20	20
Sb	300	<100	500	500	<100
Sc	20	<10	<10	<10	<10
Sn	<10	<10	<10	<10	<10
Sr	<100	500	300	500	300
Ti	1000	300	500	30	200
V	200	50	70	30	50
W	<50	<50	<50	<50	<50
Y	<10	<10	<10	<10	<10
Zn	<200	<200	<200	<200	<200
Zr	<20	<20	<20	<20	<20

United States Department of the Interior
GEOLOGICAL SURVEY
BOX 25046 M.S. 905
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY
REFER TO:

August 6, 1984

Dear Gerry:

Herewith is a copy of our bulk mineralogy (X-ray diffraction analysis) summary of your suite of samples from the Wall Canyon Mine area.

My schedule this summer will not bring me to the Big Smoky Valley area, but I will contact you the first time I can visit the Round Mountain area.

Best regards,

Barney Poole

Enclosure

copy to Gerry Doyle

Wall Canyon Mine area, Toiyabe Range, NV

#5 - Dump Stockpile
qz., dolo., serp., illite
quartz, dolomite, serpentine, illite

#19 - qz, dolo., magnesite, serp

#10 - dolo., qz, illite

#5 - 400' South and a little east - dolo., qz

#3 - dolo., qz., calcite

#23 - dolo., qz, magnesite, trace of serp.

B. Poole

(Gerry Doyle samples)
P.O. Box 4
Round Mountain, NV 89045

APPENDIX 3

Rotary Drill Hole Logs

DRILL HOLE DATA REVIEW

DRILL HOLE NUMBER	DEPTH OF INTERCEPT FROM: (feet)	DEPTH OF INTERCEPT TO: (feet)	WIDTH OF INTERCEPT	COMMENTS
WC- 8	150	160	10	10 ft. quartz vein w/ pyrite (Sb?)
WC- 9	0	50	50	High Antimony Anomaly
WC-13	100	120	20	Emerald Green Material
WC-14	0	15	15	High Antimony Anomaly
WC-16	120	135	15	Purple (?) Lime
WC-18	70	100	30	High Antimony Anomaly
WC-19	75	195	120	High Antimony Anomaly
	120	140	20	Major Pyrite w/Stibnite
WC-21	100	160	60	Emerald Green Material
WC-23	25	30	5	High Antimony Anomaly
WC-26	115	130	15	Zone of Quartz Veins
WC-29	0	40	40	High Antimony Anomaly
	165	200	35	Strong Quartz Veins/Good Pyrite
WC-31	45	65	20	Quartz Vein Zone
	65	210	145	Green Material
WC-32	290	395	105	Green Material
WC-33	65	95	30	Green Material
	205	220	15	Green Material
	230	235	5	Quartz Vein Zone
	345	355	10	Quartz Vein Zone
WC-34	25	30	5	Green Material
	105	120	15	Quartz Vein Zone
	215	305	90	Green Material/20-30% Quartz Vein
WC-35	110	115	5	Green Material
	130	145	15	Green Material
WC-38	210	225	15	Green Material
WC-39	240	305	65	Green Material
WC-40				Many Quartz Veins
WC-41	45	60	15	Quartz Vein Zone
WC-42				Many Quartz Veins
WC-43	165	245	80	Quartz Vein Zone
WC-44	0	15	15	Oxidized Quartz Vein

ORE GRADE AND WIDTHS

DRILL HOLE NUMBER	DEPTH OF DRILL HOLE	ORE INTERCEPT FROM: (feet)	ORE INTERCEPT TO: (feet)	WIDTH OF ORE IN HOLE (feet)	AVERAGE ORE GRADE (ounces)	ROCK TYPE AND COMMENTS
WC- 5	300	230	235	5	.017	BLACK SHALE W/MINOR PYRITE
WC- 6	305	115	120	5	.014	GREY THIN BEDDED LIME/SOME SULFIDES
		195	200	5	.023	GREY THIN BEDDED LIME/ZONE OF SULFIDES
WC- 7	300	225	230	5	.017	BLACK CALCAREOUS SLATEY SHALE
WC- 9	600	0	5	5	.019	GREY THIN BEDDED CALCAREOUS SHALE
WC-14	300	25	30	5	.035	OXIDIZED ZONE, RED & ORANGE COLOR
WC-18	305	80	100	20	.028	INTRUSIVE DIKE, MONZONITE PORPHYRY ?
		130	135	5	.039	BLACK LIMESTONE & SILICIFIED LIME
WC-19	220	75	155	80	.031	BLACK SILICIOUS SHALE/STIBNITE
WC-21	600	235	250	15	.024	JASPERIOD
		275	280	5	.017	JASPERIOD
WC-22 b	300	120	160	40	.044	GREY & LIMEY SHALE INCLUDES 10 FEET @ .100
WC-23	300	80	95	15	.020	GREY LIMESTONE
WC-26	305	195	200	5	.022	BLACK SHALE
WC-28	300	75	90	15	.026	GREY DOLOMITIC SILICIOUS LIMESTONE
WC-29	280	80	85	5	.027	BLACK & GREY SHALES
		130	200	70	.045	BLACK & GREY SHALES
		235	240	5	.017	BLACK & GREY SHALES

cont.

ORE GRADES AND WIDTHS CONTINUED

DRILL HOLE NUMBER	DEPTH OF DRILL HOLE	ORE INTERCEPT FROM: (feet)	ORE INTERCEPT TO: (feet)	WIDTH OF ORE IN HOLE (feet)	AVERAGE ORE GRADE (ounces)	ROCK TYPE AND COMMENTS
WC-30	305	280	285	5	.015	BLACK CALCAREOUS SHALE
WC-31	325	45	70	25	.034	BLACK SHALE W/QUARTZ VEIN ZONE
		150	155	5	.015	BLACK SHALE
WC-33	405	150	160	10	.020	BLACK SHALE
		225	230	5	.016	QUARTZ VEIN ZONE W/PYRITE
		260	270	10	.020	BLACK SHALE
WC-34	300	110	115	5	.027	BLACK SHALE
		140	145	5	.046	BLACK SHALE
		195	200	5	.027	BLACK SHALE
WC-35	300	70	85	15	.028	INTENSE QUARTZ VEINING (50%) +
		170	175	5	.016	INTENSE QUARTZ VEINING (50%) +
		195	200	5	.015	BLACK SHALE W/QUARTZ VEINING
WC-36	305	40	85	45	.018	DARK GREY SHALE
WC-44	305	240	245	5	.043	PORPHYRY DIKE (?)

EXPLORATION DRILL HOLES

Drill Hole # WC-1 Location [illegible] TN. 10N R. 42E SEC 20

Depth 300' Date Drilled 5/23-5/24

Comments: [illegible] Drilling, [illegible] Sampling

Rock	Au	Ag	As	Sb
Alluvium		N	30	N
			75	
			45	
	.002		45	
			20	
			20	
			15	
			15	
			20	
	.001		15	
			15	
			20	
			15	
			15	
			15	
	.002		15	
			10	
			15	
			20	
			15	
			20	
	.001		10	
			15	
			10	
			10	
			10	
			10	
	.001		10	
			5	
			5	
			5	
			5	
			10	
	.001		10	
			5	
			5	
			N	
			15	
			20	
	.002		5	
			5	
			N	
			N	
			5	
Black Volcanic Breccia (basaltic andesite)			30	
	.002		40	
			35	
			20	
			10	
			35	
			25	
Silicic Volcanic Breccia	.001		5	
			N	
			N	
			N	
			N	
			5	
	.002		N	N
			N	170
		N	N	96

Comments

- alluvium [illegible] shales fragments
- oxide zone
- sulfide (unoxidized) minor pyrite only
- oxidized zone (fault?) moderate water flow
- unoxidized tuff with minor pyrite, chlorite common
- Calcite vein
- Yellow heavy minerals (realgar?) [illegible] yellow
- Silica & pyrite veins ~ 1% pyrite
- 1-2% magnetite, minor pyrite, strongly silicified, chlorite common

Drill hole attempted to penetrate volcanic cover to test underlying sediments → sediments not encountered

EXPLORATION DRILL HOLES

Drill Hole # WC-2 | Location Wyatt Canyon | T.N. | R. | SEC

Depth 275' | Date Drilled 7/26-7/27/81

Comments: Salm Young drillers, [illegible] Supplies, water at 100'

Rock	Au	Ag	Pb	Sb	Cu	Comments
Black shale		.03	10	N	85	black shale
		.04	10	N	75	
		.04	25	N	90	
		.04	15	N	70	
		.03	15	N	65	
		.04	25	N	35	
		.04	10	N	60	
		.04	5	2	70	
		.04	25	2	55	
		.03	10	2	55	
		.03	20	2	65	
Dike (andesite in qtz monz. [illegible])		.03	30	5	55	
		N	20	N	40	
			20		35	
			15		30	
			20		30	
			15		40	
			N		35	
			N		35	
100			3		20	chloritic DIKE
			N		20	
			5		25	minor sulfides.
			10		35	
			5		40	
			N		15	
			N		10	
			N		10	
			N		15	
			N		15	
			N		15	
			N		10	
			10		10	
			N		10	
			5		10	
			N		15	
			N		10	
			N		10	
200		N	10	N		
			15	3		
			13	2		
			20	2		
			10	3		
			10	N		
			10			
			10			
			10			
			5			
			10			
			5			
			5			
			5			
			5			
			5			
			5			
			5			
			6			
		N	5	N		
300						

EXPLORATION DRILL HOLES

Drill Hole # WC-4 Location Watt Canyon TN. R. SEC

Depth 300' Date Drilled 7/24–7/25/81

Comments: John Young driller, D-M sampler

Rock	Au	Ag	[illegible]	[illegible]	[illegible]	Comments
Olive Dolomite	Tr	N	20	N	105	
	.002		5		90	
	.001		10		95	
	Tr		15		90	
	.001		10		80	oxide
	.003		5		85	sulfide
	.002		10		35	
	.001		15		90	
	.002		15		70	
	.002		10		155	
	Tr		35		90	
	Tr		20		90	
	.001		10		95	
	.004		20		95	
	.001		20		60	
	.001		5		60	
	Tr		5		70	
	.001		5		30	
	Tr		5		60	
	Tr		5		20	
	.003		35		40	
	[redacted]		5		5	
	[redacted]		30		90	
	.002		15		235	
	.002		5		95	
	.004		25		25	Olive grey Dolomite oxidizes to orange
	.003		10		25	some minor sulfide joints
	.003		5		40	stockworks of minor qtz veinlets
	.003		5		100	occasional qtz veinlets
	.003		5		120	
	.001		5		100	
	.002		10		110	
	.004		10		55	
	.003		10		25	
	.003		25		25	
	.002		20		110	
	.003		15		115	
	.001		10		110	
	.001		10	N	70	
	.001		145	10	205	
	Tr		130	3	105	
	.002	N	30	3	140	
	Tr	.04	4110	46	3400	
	.001	N	30	7	140	
	.001		40	7	180	
	.001		30	N	135	
	.002		30		105	
	.001		95		125	
	.004		410		85	
	Tr		40		85	
	Tr		20		115	
	Tr		10		130	
	Tr		15		90	
	[redacted]		220		65	
	[redacted]		225		70	
	.001		205		80	
	Tr		35		100	
	Tr		35		95	
	.001		25		120	
	Tr	N	95	22	655	

EXPLORATION DRILL HOLES

Drill Hole	# WC-5	Location	Watt Canyon	TN.	R.	SEC
		Depth	305'	Date Drilled 7/30-31/81		

Comments: John young, driller, Dfm sampler, water at 50'

ft	Rock	Au	Ag	Comments
	Red oxidize Green ~~[illegible]~~ carbonized silicified [illegible] dolomite	Tr		
		002		
		Tr		
		Tr		oxide
		Tr		sulfide
		Tr		Extensive secondary qtz veining
		Tr		minor sulfide
		Tr		
		001		Same unit as WC-4
		Tr		
	Black shale	002		
		001		
		Tr		
		001		
		001		Pyrite increases
	Black Limestone	001		Towards dike
		001		
		Tr		
100		001		
		Tr		minor secondary
	Black shale	001		qtz
		Tr		
		Tr		
		001		
		Tr		
		001		
		002		
		002		
		003		
	qtz vein	Tr		
		Tr		
	Dike	Tr		
		001		
		Tr		chloritically at dike with minor sulfides
		002		
		Tr		
	Black shale	001		
		Tr		
200		001		
		003		minor
		002		Pyrite
		Tr		zone
		003		
		003		← qtz vein
		Tr		
		Tr		
		[redacted]		
		001		
		002		
		Tr		
		001		
	Calcareous black shale	001		
		002		
		001		Increase in pyrite &
		Tr		secondary qtz veins
		001		
		001		
		001		5% of pyrite
300		002		
		001		
		002		

EXPLORATION DRILL HOLES

Drill Hole #WC-6 Location WHITE CANYON TN. R. SEC.

Depth 305' Date Drilled 7/20-7/23/81

Comments: WATER AT 200'

ft	Rock	Au	Ag	As	Sb	Cu	Comments
		.002	.05	190	9		
		.001	.06	65	5		
		[illegible]	.06	65	5		
		001	.04	28	5		
		002	.04	90	5		
		.[illegible]7	.05	75	6		
		.002	.04	80	5		
		001	.03	45	5		
		002	.05	75	5		
		001	.04	65	4		
		.002	~	110	5		
		001	~	200	6		
		002	.03	110	5		
		001	.05	100	5		
		002	.03	45	6		
		.003	.03	20	3		
		[illegible]	.05	25	4		
		002	.02	25	4		
		.004	.07	20	4		
		.003	.02	21	3		
		Tr	~	30	2		
		Tr	~	25	3		
		Tr	.03	30	3		
		Tr	.04	15	3		
		[illegible]	.03	15	2		
		001	.04	15	3		
		.002	.03	15	2		
		002	.04	25	2		
		.003	.04	20	2		
		.001	.03	15	2		
		[illegible]	.03	15	3		
		[illegible]	.04	15	2		
		.004	.06	20	2		
		002	.12	40	2		
		002	.02	30	2		
		002	.11	20	2		
		001	.05	20	2		
		002	.06	25	3		
		002	.05	30	2		
		.003	.06	35	2		
		.002	.03	20	2		
		001	.04	25	2		
		002	.03	15	2		
		002	.03	15	2		
		002	.12	35	2		
		002	.06	15	4	50	
		[illegible]	.06	15	6	35	
		001	.11	25	3	100	
		003	.12	25	4	85	
		002	.11	20	4	90	
		003	.12	45	5	95	
		002	.07	20	6	40	
		002	.11	15	10	30	
		001	.15	10	14	35	
		002	.11	15	18	35	
		002	.08	25	4	35	
		002	.09	35	2	30	
		001	.10	25	14	100	
		.003	.10	25	15	75	
		003	.10	25	13	65	
		002	.10	30	21	80	

100' — 200' — 300'

BLACK DOLOMITE LIME

GREY LIMESTONE

GREY SHALE

BLACK SHALE

BLACK DOLOMITIC LIME WITH OCCASIONAL STRONGLY OXIDIZED ZONES, SECONDARY QTZ, CALCITE VEINLETS COMMON

OXIDE

SULFIDE

GREY THIN BEDDED LIME OCCASIONAL ZONES OF SULFIDES AVERAGE .1 TO 1%

GREY SHALE MINOR SULFIDES

EXTENSIVE SULFIDES IN BLACK SHALE 2-5% SOME CALCITE VEINLETS

EXPLORATION DRILL HOLES

Drill Hole # WC 7 | Location: wall canyon | TN. | R. | SEC

Depth: 300' | Date Drilled: 7/17/80

Comments: J... ... Driller, ..., BAM, JBW Sampler, water at 275'

ft	Rock	Au	Ag	As	Sb	Comments
	oxidized silicified Lime(?)	.001	N	110	16	oxide: Silicified Lime(?) Copper carbonate Brecciated, secondary ...
		Tr	↑	20	11	
		Tr		25	4	
		Tr		20	9	
		.002		90	5	
		.001		40	4	
		.002		20	3	
		Tr		75	2	
		.002		25	20	
		.002		10	2	
	Black silicified Lime	.001		10	2	sulfide: Same as above (not oxidized)
		.004		10	N	
		.001		10	↑	
		[redacted]		10		
	Grey limestone	.001		5		Grey limestone secondary calcite veinlets (Partly silicified)
		.002		5		
		[redacted]		5		
		.001		10		
100		.001		15		
		.001		10		
	Grey Jasperoid	.001		10		Grey Jasperoidal limestone secondary Qtz, calcite – minor sulfide
		.001		20		
		.001		5		
				15		
		.001		5		
		.001		10		
		[redacted]		10		
		Tr		5		
		.002		10		
		Tr		10		
		.001		10		
		.004		10		
		.001		10		
		.002		10		
		.002		5		
		.002		5		
	Grey limestone	.002		5		Grey unsilicified limestone
		.001		5		
200		.001		5		
	Black Calcareous slaty Shale	.003		10		Black Calcareous slaty shale secondary qtz & calcite No visible sulfides
		.002		5		
		.003		5		
		.001		10		
		.001		5	↓	
		[redacted]		5	N	
		.004		15	↑	
		.001		5		
		.001		10		
		Tr		15		
		.001	↓	10		
		.001		15		
		.001	N	20	↓	
		.002	.03	310	N	
		.001	N	100	N	
		.001	↑	30	2	
		Tr		20	2	
		Tr		15	3	
		Tr		15	4	
300	[illegible]	.003	↓	40	2	Qtz monzonite porphyry dike unoxidized
		Tr	N	35	N	

EXPLORATION DRILL HOLES

Drill Hole # WC-8 Location WALKER CANYON TN. R. SEC

Depth 465' Date Drilled 7-6-7-21-84

Comments: WATER @ 300' SAMPLE BADLY CONTAM BELOW 300'

ft	Rock	Au	Ag	Cu	Sb	Comments
			N	295	.28	
				430	.55	oxidized shales (?)
				45	7	
	Shale	003		95	7	
				90	6	
				235	5	OXIDE / SULFIDE: BLACK SHALE WITH NUMEROUS MINOR QTZ VEINLETS ALONG BEDDING PLANES
				10	1	
				45	5	
				30	1	
		002		95	13	
				100	7	
				125	.10	
				95	7	
				350	1	
				310	10	
		003		110	12	
				45	7	
				130	7	
100				30	10	
				40	10	
				35	6	
		001		25	6	
	Black Shale			25	15	
				25	5	
				25	7	
				5	11	
				30	19	
				45	15	
				30	13	
				140	.450	
				35	45	BLACK SLATE WITH NUMEROUS QTZ VEINLETS ALONG BEDDING PLANES AND CROSSCUTTING QTZ PYRITE VEIN
				35	22	
	Black Shale	001		25	15	
				35	10	
				70	9	
				95	7	
				40	17	
				110	.12	
200				15	1	
	Black Limestone	001	N	45	7	
		.07		35	7	
		.07		40	9	
		.03		35	6	BLACK LIMES WITH FINE SILICIFIED PARTS, SECONDARY QTZ VEINS .1-1% PYRITE
		N		35	5	
		.07		45	9	
		001 .03		35	6	
		.05		60	5	
		.07		40	4	
	Black Shale	.05		35	7	
		.07		30	7	THINBEDDED SHALE .1-.9% PYRITE
		.04		30	4	
		001 .04		55	4	
		.02		40	5	
	Gray Limestone	.03		45	5	
		.03		50	6	
		.03		55	3	
		.03		75	8	
		001 N		55	9	Gray Lime + secondary QTZ calcite VEINS 1-5% PYRITE
300				40	7	
				40	7	
				35	7	
				45	12	
	Qtz Monzonite Dike	001		25	6	
				35	4	
				20	5	
				30	9	QTZ MONZONITE DIKE
				20	7	
				25	4	
				15	8	
		001 .03		55	9	
		N		40	5	
				30	5	
				30	10	
				30	6	
				40	5	
		001		30	6	PROBABLY QTZ MONZONITE DIKE SAMPLE BADLY CONTAMINATED
				55	6	
				40	8	
400				40	5	
				30	9	

EXPLORATION DRILL HOLES

Drill Hole # WC-8 Location WARM CANYON TN. R. SEC

Depth 465' Date Drilled 4-7-81

Comments:

ft	Rock	Au	Ag	Zn	Sb	Comments
400	Qtz vein / dike	.001	N	40	4	HARD DRILLING. SAMPLE CONTAMINATED
		.001		50	8	
				55	4	
				35	3	
				40	3	
				150	10	
				40	5	
		.002		25	2	
				20	2	
				50	5	
		.001		30	1	
		.001		45	4	
		.001	N	45	4	

EXPLORATION DRILL HOLES

Drill Hole # WG-9 | Location Wall Canyon | TN. | R. | SEC

Depth 600' | Date Drilled 7/8 – 7/10/81

Comments: Jim Whitcock, driller. Drill Sampler, water at 125'

ft	Rock	Au	Ag	As	Sb
	↑	[illegible]	N	4500	<20
		[illegible]	↑	1600	500
		[illegible]		1200	218
	Grey shale	.001		450	95
		.001		250	9
		.001		80	11
		.001		150	6
	↓	.001		90	3
		.001		225	3
	↑	.001		1300	2
		.001		5	N
		.001		N	N
		↑		N	N
				N	N
				N	N
		GTR		N	2
		↓		N	2
				N	N
100		[illegible]		N	N
		[illegible]		N	N
		[illegible]		5	5
		.003		N	N
	Qtz	[illegible]		N	N
		[illegible]		N	N
	monzonite	↓		N	N
				N	↑
	Dike			N	
		.001		N	
				N	
		*		10	
				N	
				N	
				N	
		.001		N	
				N	
		*		N	
				N	
200	↓			N	
	Breccia	Tr		6	
				5	
	limestone	*		5	
				N	
	↑			35	
				5	
				N	
		Tr		5	
				5	
	Grey	*		N	
				N	
	black			N	
				N	
	shale			N	
		.001		N	
				N	
		*		10	
				35	
				5	
		.002		N	
				N	
300		*		N	
				N	
				N	
	↓			N	
				N	
		.001		25	
	Black			25	
		*		15	
	↓			N	↓
	to			N	N
				15	3
	green	.001		10	2
				20	2
	black	*		25	N
				15	N
	Jasperoid			25	3
				10	N
		.051	↓	N	N
			N	5	N
		*	.03	10	2
			.03	5	4
400			.05	15	4

Comments

Orange to grey thin bedded Calcareous shale

upper portion of dike Have been strongly infiltrated by calcite

Qtz monzonite porphyry minor sulfides Fresh Biotite

oxide / sulfide

Breccia zone with pyrite

thin bedded black lime 1% pyrite

Grey to black slatey shale with significant secondary Calcite Qtz & Pyrite veins ~ .5–1% pyrite

Black to green black Jasperoid – Extensive secondary qtz-pyrite veining ~1–3% pyrite

EXPLORATION DRILL HOLES

Drill Hole # WC 9 Location [illegible] TN. R. SEC

Depth 600' Date Drilled

Comments:

ft	Rock	Au	Ag	As	Sb
		[illegible]	.005	25	6
		.001	.07	10	4
		↓	.03	5	3
		↓	N	10	2
	Grey		▲	15	N
	To			10	▲
	Grey			10	
	~~Black~~	.001		5	
	shale			N	
		↓		10	
		?		N	
				N	
				N	
				5	
				3	
				3	
				9	
500				N	
				N	
				N	
				N	
				N	
				N	
				N	
				N	
				N	
				N	
				N	
				N	
				5	
				1	
				N	
				5	
				15	
				5	
				15	▼
600	↓		▼ N	5	N
			N	5	N

Comments

~~[illegible]~~ Slate with Extensive Pyrite, Calcite and Qtz veining — .5 - 1% pyrite

EXPLORATION DRILL HOLES

Drill Hole # WC10 Location Walt Canyon TN. R. SEC

Depth 305' Date Drilled 7/11/91–7/13/91

Comments: Johnson driller, Prim Smyles, water at 125'

ft	Rock	Au	Ag	As	Sb
	Qtz magnetite porphyry dike		N	20	N
			↑	5	↑
				5	
				5	
				5	
				5	
				5	
				5	
				N	
				5	
				10	
				5	
				5	
				N	
				N	
				N	
				N	
				N	
				N	
100				N	
				N	
				5	
				5	
				5	
				10	
				25	
	limestone			15	
			↓	5	↓
	Black pyrite rich limey shale		N	10	N
			.05	25	5
			.07	15	2
			.04	20	2
			.04	25	3
			.05	25	4
			N	15	N
			.04	15	N
			.03	25	2
			N	10	2
200			.03	15	2
			.03	15	2
			.04	15	2
			.07	10	4
			.04	10	N
			.03	5	N
			.03	5	N
			.07	10	N
			.04	10	N
			.03	25	2
			.04	20	2
			.03	10	N
			.05	15	
			.03	20	3
			.05	20	3
			.04	15	2
			.05	25	2
			.06	30	N
			.09	10	2
			.08	15	3
300			.04	20	N
			.03	30	N
			N	20	N

Comments:

evident sulfide

relatively unaltered Dike – partly chloritized, silicified. Biotite is fresh. Dike has been fairly strongly invaded by calcite.

Thin bedded black limestone

Black thin bedded limey shale with variable calcite content. Pyrite varies from .5–4%.

EXPLORATION DRILL HOLES

Drill Hole # WC-11 Location Swallcanyon TN. R. SEC

Depth [redacted] 300 Date Drilled 7/14/81

Comments: Soil brown Drilled 12¼" Sample water at 225'

ft	Rock	Au	Ag	Ti	Cu	Comments
	Brown Shale	.12	N	370	N	Brown-orange oxidized shale
		Tr	N	730	N	
		Tr	N	330	3	
		Tr	N	1200	7	
		Tr	N	1200	3	
		Tr	N	1600	3	
		Tr	N	350	4	
		Tr	.03	135	14	
	Brown limestone	.001	N	115	15	
		.001	N	140	21	
		.001	.03	45	16	Brown oxidized limestone
		Tr	.03	35	30	5% Veins
		Tr	.03	40	6	
		Tr	.03	50	11	oxide
		.001	.05	25	9	sulfide
		.002	.05	40	8	Interbedded Lime Gray Brown
		.002	.04	35	4	
		Tr	.03	40	N	
100		.002	.05	55	2	
		Tr	.03	20	N	
		.001	N	25	N	
		Tr	N	20	N	
		Tr	N	5	N	
	Gray limestone	.001	N	40	N	
		.003	.03	45	2	
		Tr	N	25	3	
		Tr	N	25	2	5% pyrite
		.002	N	30	7	
		.003	.01	65	2	Gray thin bedded limestone
		Tr	.03	80	3	.5-2% pyrite
		Tr	N	50	3	
		.001	N	20	N	
		.002	N	25	N	
		.002	.03	30	2	
		.002	.03	30	4	
		.001	N	35	3	
		Tr	N	30	N	
		Tr	N	20	N	
200		Tr	.03	35	2	
		Tr	.01	30	2	
		.003	.03	40	2	
		Tr	N	45	1	
		.001	N	40	3	
		Tr	N	40	1	
		Tr	N	40	9	
		.001	.01	30	3	
		.001	.01	55	N	
	Black limestone partly fractured	.001	N	50	N	Black very thin bedded limestone
		.001	N	30	N	partly fractured
		Tr	.03	65	3	.1-.5% pyrite
		.001	N	30	N	
		.002	N	60	N	
		.001	N	60	N	
		.002	N	80	N	
		.003	N	60	N	
		.001	N	40	N	
300		Tr	N	145	N	
300		.001	N	80	2	
		.001	N	40	2	
		Tr	N	30	N	

EXPLORATION DRILL HOLES

Drill Hole # UC-12 Location Draft Range TN. R. SEC

Depth 55' Date Drilled 7/11, 7/16/91

Comments: Tobyn, driller, DM Sampler, Hole lost fluid at 55' LOST CIRCULATION

ft	Rock	Au	Ag	As	Sb	Comments
		002		25	4	
		002	.03	25	5	
		001	.03	30	8	
		001	.03	20	8	
		002	.03	20	4	
		Tr	.03	20	2	
		002	.03	20	N	
		Tr	.03	25	N	
		Tr	.04	30	2	
		Tr	.04	40	4	
		Tr	.05	25	6	
	Black Chert					Black Chert - upper plate Roberts Mt.

EXPLORATION DRILL HOLES

Drill Hole # WC13 Location Wall Canyon TN. R. SEC

Depth 300-ft Date Drilled 6/27-6/29 1981

Comments: John Young Driller, OTM Samples, water at 185'

ft	Rock	Au	Ag	As	Sb	Comments
	Limestone		A	20	4	Buff colored oxidized limestone
				10	4	
				15	4	
	Silicified			10	2	
				5	2	
				5	N	
				5	N	Olive green argillic
				5	N	
				10	N	
	Limestone			N	N	
				10	N	
				5	N	
				20	2	
				15	3	Partly silicified buff limestone
				15	4	
				25	4	
	Shale			80	5	
				90	8	Black pyritic shale
100	Dike			120	2	
				90	5	altered, oxidized QFP monz dike
				145	3	
	Silicified Limestone			155	2	
				200	2	Black limestone partly silicified numerous secondary qtz veins & emerald green mineral - up to 1% pyrite
				170	2	
				185	2	
				155	3	dike - same as above
				220	8	
	Limestone			100	10	
				45	15	
				10	2	
				95	2	Grey siliceous, limestone up to 1% pyrite
				105	2	
				40	N	
				120	N	
				145	N	
				125	N	
				115	2	
200	Dike			120	N	
				60	N	
				50	N	
	Silicified			25	N	
				15	N	
				45	N	Numerous secondary qtz veins - 1-2% pyrite
			V	100	2	
			N	135	2	
			↑	95	2	
				40	1	
				10	2	
				35	5	
	Calcareous Grey Shale			10	4	
				40	2	
				25	2	
				25	2	
				45	L	
				30	L	
				20	L	
				15	L	Grey calcareous shale up to 1% pyrite - appears to be slightly metamorphosed & also silicified
300			V	20	N	
			N	15	N	
				30	2	

EXPLORATION DRILL HOLES

Drill Hole # WC 14 | Location Wait Canyon | TN. | R. | SEC.

Depth 305' | Date Drilled 5/29/81

Comments: Bruce [illegible] Driller, DTM Sampler, Dan to Bottom

ft	Rock	Au	Ag	As	Sb	Comments
	Limestone	.002	N	140	.172	oxidized large calcite xts
		.003		155	.320	Red - orange in color
		.002		130	.173	
		.003		40	30	
		N		45	21	
		.005		15	16	
	Qtz			15	7	Qtz vein?
	Limestone			15	7	Same as above
				15	N	
				20		
				15		oxidized / sulfide
				5		
				10		
				5		
				5		
				5		Grey to Black
				N		minor pyrite
				5		
100				5		minor Qtz vein occationally
				12		
				15		
				20		
				25		
				15		
				15	N	
				10	N	
				15	N	
				15	N	
	Calcareous Black Thin Bedded Shale			10	N	
				10	N	
				20	N	
				15	N	
				15	2	
				28	6	
				30	N	
				20	2	
				20	N	
				25	4	
200				15	N	
				15	N	
				20	N	
				15	N	
				5	N	
				5	N	
				5	10	
			N	N	N	
				N		
				5		
				5		
				10		
				10		
				5		
				5		
				5		
				N		
				5		
				5		
300				15		
				25		
			N	25		

EXPLORATION DRILL HOLES

Drill Hole # WC15 — Location: [illegible] canyon — TN. — R. — SEC

Depth: 305 — Date Drilled: 6/29/[illegible]

Comments: John [illegible], Daniel, D[illegible]

ft	Rock	Au	Ag	As	Sb	Comments
	Limestone		N	30	5	
				75	4	
				10	7	change to Brown Limestone
		Tr		20	5	
				25	5	
				20	4	
				15	5	
				25	5	
				12	9	oxide
	Black Shale	.001		120	5	sulfide
				75	4	
				10	3	
				5	5	
				5	1	
				5	4	
		.001		10	18	
				25	5	Black Hard Shale minor calcareous limes & veins
				25	7	
				75	20	.1-.5% pyrite
100				35	16	
				40	22	
		.001		80	29	
				130	29	
				65	25	
				25	12	
				30	12	
				40	9	
		.001		95	15	
				100	6	
				120	9	
				120	7	
				115	6	
				75	4	
		.001		70	6	
				35	5	
				50	6	
				35	6	
				30	6	
	Dark grey to Black Limestone			30	6	
200		.001		20	6	
				45	6	
				55	5	
				55	5	
				55	3	Dark grey to Black Lime, minor pyrite
			N	40	6	
		.001		75	3	
				75	3	
				55	5	
				50	3	
				50	7	
				45	7	
		.002		10	4	
				10	4	
				30	3	
	Calcite vein			15	2	Calcite vein
	Rhyolite			230	4	Possible light olive colored Rhyolite dike
				400	6	
	Dark grey Shale	.002		220	6	
				135	4	dark grey shale extensive secondary qtz veins 1% pyrite
300				80	1	
		.001	N	50	2	

EXPLORATION DRILL HOLES

Drill Hole # WC 16 **Location** Wyatt Canyon **TN.** **R.** **SEC**

Depth 300' **Date Drilled** 6/30/51

Comments: [illegible]

Ft	Rock	Au	Ag	Cu	Sb	Comments
	grey Brown Limestone		.04	33	18	
			.04	40	22	
			.05	35	20	
		.002	.04	70	19	
			.04	45	20	
			.04	45	21	
		[redacted]	.04	60	19	
		[redacted]	.04	70	23	
		[redacted]	.04	50	17	grey & Brown Limestone Secondary silica & CALCITE
		[redacted]	.03	25	10	
		[redacted]	N	33	14	
			N	30	3	
			N	15	2	
			N	50	3	oxide
			.03	35	12	
		.001	N	35	16	sulfide
			.03	30	22	
100			N	70	27	
	Black silicified lime		N	135	3	
			N	15	6	
			N	40	3	Black silicified Limestone - secondary qtz ~~[illegible]~~ veins
		Tr	N	30	3	
			N	15	2	
			N	5	11	
	Purple Lime		N	15	2	purple lime
			N	25	3	
				15	3	
	[redacted]	.001		5	2	JASPEROID
	Black Limestone			-	N	
				15	N	
				25	2	
				30	3	
				15	3	
		.001		15	2	Black thin Bedded Limestone ~~minor pyrite~~
			N	20	2	
			.03	35	1	
			.	21	5	
				25	5	
200				15	4	FAULT (?)
		.001		20	5	
	Black Limestone			25	2	
				25	9	
				20	2	
				25	4	
				15	3	
		.002		15	3	Black Limestone ~~[illegible]~~ secondary qtz & calcite veins
			N	15	4	
			.04	15	2	
			.04	15	3	more ~~[illegible]~~ than above
			.03	15	3	minor pyrite
			N	20	3	
		.001	N	15	3	
	Black Shale		.03	.5	3	
			.03	10	3	
			.03	15	6	
			N	25	5	Black thin shale with ~1% pyrite
			N	25	3	
		.002	N	25	3	
			N	20	3	
300			N	20	2	

EXPLORATION DRILL HOLES

Drill Hole #WC17 | Location Will Canyon | TN. | R. | SEC

Depth 565 | Date Drilled 5/30/81 - 6/3/81

Comments: Johnson [illegible] Driller, DTH sampler, water at 165'

ft	Rock	Au	Ag	[illegible]	[illegible]
	Soil	N	N	15	12
		001	N	15	10
		N		20	18
		N		30	19
		001		25	18
		N		140	19
		001		400	25
		001		65	27
	Limestone	.003		65	15
		N		95	13
				20	6
				10	2
				5	1
				5	2
				10	6
				5	3
				5	4
				30	5
100				60	8
	Silicified lime			35	3
				35	1
				25	2
				50	N
				35	2
				25	N
				10	
				10	
				15	
				20	
				35	
				20	
	Thin bedded			30	
				30	
	Limestone			25	
				25	
	with some			10	
				15	
	shaly			15	
200	layers			10	
				15	
			M	10	N
				15	
				15	
				15	
				20	
				15	
				10	
				15	
				15	
				10	
				15	
				15	
				20	
				15	
				25	
				25	
				15	
				10	
300				N	
				10	
				12	
				10	
	Black			10	
	calcareous			10	
	shale			10	
				10	N
				10	2
				35	2
				45	2
				25	2
				35	2
				45	2
				25	5
				40	4
	Silicified			40	1
	shale			30	2
	[illegible]			25	N
400				30	3
				35	2
			N	[illegible]	N

Comments

oxide

Grey limestone below oxide horizon - Reddish above

silicified lime with small qtz veins

grey thin bedded limestone with minor pyrite

↓ water ↓

Black thin bedded limestone with shaley layers 1-5% pyrite

Thin bedded calcareous shale with .5-1% pyrite

Black with minor qtz veins .5-1% pyrite

EXPLORATION DRILL HOLES

Drill Hole # WE17 | Location Quail Canyon | TN. | R. | SEC

Depth 565' | Date Drilled 5/30/81 - 6/3/81

Comments:

ft	Rock	Au	Ag	Cu	Sb	Comments
	Thin bedded shaley limestone		N	10	N	Grey thin bedded, siliceous (partly) shaley limestone with minor pyrite
500	chert & shale			20		Grey chert & shaley layers slightly calcareous No pyrite
	dolomite			10		Grey dolomite .5-1% pyrite
600				10		
				15		
				5		
				20		
				30		
				30	N	
				30	N	
				25	N	
				15	N	
				45	N	
				40	N	
				45	N	
				30	N	
				30	N	
				40		
				40		
				50		
				15		
				40		
				40		
				40		
				30		
				25		
				20		
				35		
				20		
				5		
				5	N	
				5	N	

EXPLORATION DRILL HOLES

Drill Hole # WC18 — Location: Wall Canyon — TN. — R. — SEC.

Depth: 305 — Date Drilled: 5/29 – 5/30/[illegible]

Comments: Bruce [illegible] Driller — Dim — Sampler — Bars n Bottom

Ft	Rock	Au	Ag	Cu	Sb
	Intrusive Dike Possibly Qtz Monz Porphy	↑	N	40	25
			↑	60	[illegible]
				75	5
		.001		5	2
				115	N
				105	N
				70	N
				10	N
				N	N
		.001		5	N
				5	2
				10	4
		↓		15	0
		[redacted]		95	21
		.035		270	83
		[redacted]		25	4
		[redacted]		240	183
	Black Limestone ↕ Silicified Lime	.001	↓	155	201
100		[redacted]	N	1600	53
		[redacted]	.04	1900	30
		.001	N	1500	17
		.001	↑	960	16
		.001		990	22
		.039		1300	17
		0.002		310	4
				90	4
				95	4
				65	4
	Grey To Black Shale	.002	↓	40	4
			N	60	4
		↓↑	↑	45	16
				75	13
				35	12
				35	6
		.003		30	N
				40	12
		↓↑		30	0
				25	4
200	Grey To Black Thin Bedded Limestone			25	2
				20	2
		.001		25	2
				15	2
		↓↑		20	2
				20	2
				30	N
				25	N
		Tr		25	N
				50	2
		↓↑		25	2
				20	2
				20	3
				40	10
		Tr		30	4
				20	3
		↓↑		25	3
				25	N
				30	N
				30	N
300		.0001		40	2
			↓	40	2
		↓	N	40	3

Comments

- 0–~75 ft: oxide; ~75 ft: sulfide
- 0–~100 ft: Strongly silicified, minor qtz pyrite veins common
- ~100–~135 ft: 2–10% / 1–10% pyrite; silicified – calcite veins
- ~135–~160 ft: weakly silicified minor pyrite
- ~160–~200 ft: weakly calcareous no pyrite (Possibly same or similar unit to Hole WC #14)
- ~200–305 ft: minor pyrite increasing toward bottom of hole
- ~300–305 ft: silicified

EXPLORATION DRILL HOLES

Drill Hole # WC 19 Location Walt Canyon TN. R. SEC

Depth 220' Date Drilled June 5, 1981

Comments: Tish Young driller Oster Sampler water at 49' Tried to re-enter hole on 6/10 - hole caved

ft	Rock	Au	Ag	As	Sb
	Black to grey Limestone	.001	N	50	30
		002		55	57
		001		45	48
		Tr		45	12
		Tr		25	11
		Tr		35	18
		Tr		15	5
		Tr		10	10
		001		30	8
		Tr		25	8
		001		15	9
		Tr		15	8
		002		25	6
		001		40	21
		001		45	10
	Black, siliceous shale	[redacted]		50	31
100		[redacted]		100	–
		[redacted]		110	450
		[redacted]		3900	300
		[redacted]		3600	97
		.002		225	13
		[redacted]		3000	27
		[redacted]		1400	4
		[redacted]		620	7
		[redacted]		420	7
		[redacted]		330	15
		[redacted]	N	1300	9
		[redacted]	.06	2400	115
		[redacted]	.06	1900	53
		[redacted]	.03	1700	50
		[redacted]	.03	310	27
		.004	.03	450	15
		[redacted]	"	430	10
		.004	N	320	8
		.004	.005	310	30
		.004	N	155	30
		.004		330	12
		.004		370	10
200		[redacted]		285	7
		.002		135	4
		.004		265	5
	Shaley Limestone	.001		65	3
		.001		25	2
		.001	N	20	3

Comments

oxide / sulfide

water } minor pyrite
Below Water Table
Some secondary qtz veins

} major pyrite 1-5% in this zone

} Bad zone major pyrite, minor stibnite
caved after pulling out of hole

Platy shale, numerous secondary silica veins & occasional calcite veins
pyrite veins & bedding replacement common

} numerous secondary silica veins minor pyrite

EXPLORATION DRILL HOLES

Drill Hole # WC 20 | Location Quail Canyon | TN. | R. | SEC

Depth 300' | Date Drilled 6 [illegible] 81

Comments: Sun. Using Driller, DSm Sampler, Day is bottom

ft	Rock	Au	Ag	Cu	Sb	Comments
	Greyish black limestone (Thin Bedded Pueblo outcrop)	Tr	N	[illegible]	[illegible]	oxide sulfide
		001		25	[illegible]	
		Tr		15	14	
		Tr		15	9	
		.004		20	4	
		002		20	2	
		.002		15	N	
		.001		15		minor secondary qtz & calcite veins
		.002		5		minor pyrite only
		Tr		20		
		Tr		20		
		Tr		20		
		Tr		15		
		001		10		
		.0011		15		
		Tr		10		
		Tr		10		
		.001		10		
		0.002		5		
100		.002		10		
		Tr		10		
		Tr		10		
		Tr		10		
		.0011		5		
		Tr		5		
		Tr		N		
		.001		N		
		.001		5		
	Black limey shale	.002		5		
		002		N		
		.002		5		Thin Bedded minor pyrite
		.004		5		
		Tr		5		
		.004		5		
		.001		N		
		.001		5		
		001		5		
200		.001		5		
		.001		10		
		Tr		10		
	Black shale	.001		10		
		.001		10		
		001		15		
		001		10		
		002		10		
		002		5		
		Tr		10		Thin Bedded Shale, only minor Calcite veins & lime layers
		Tr		10		minor pyrite
		.002		5		
		.002		10		
		.001		N		
		002		N		
		002		N		
		001		N		
		.002		N		
		.003		N		
300		002		N		
	Limestone	001		N		
		001		N		
		001		N		Black partly silicified limestone minor pyrite

EXPLORATION DRILL HOLES

1 of 2

Drill Hole # JC-21 Location Wh Canyon TN. R. SEC

Depth 600' Date Drilled 6-4 - 6-5 78

Comments: John Crowns Driller, DTM Sampler. water at 145'

ft	Rock	Au	Ag	Tex	S
			N	185	23
			N	15	4
		.007		20	11
		.003		30	2
	Grey	.003		75	2
		[illegible]		50	2
	Lime	[illegible]		20	2
	Stone	[illegible]		25	3
		[illegible]		40	N
		[illegible]		55	2
		[illegible]		40	2
		[illegible]		10	N
		–		5	N
		.00[illegible]		10	2
		.003		5	N
		.003		12	N
		[illegible]		25	3
		[illegible]		70	5
		[illegible]		55	4
100		.010		400	7
		.003		400	23
		.002		1000	29
		[illegible]		120	13
		.002		100	43
		.001		180	48
		.031		1200	35
		TA		2400	35
		.002		320	12
		.003		390	10
		.002		230	25
		.001		70	13
		.001		65	5
		TA		50	2
	Jasperoid	.003	N	95	4
		.003	.003	150	27
		[illegible]	.007	250	37
	Pyrite	[illegible]	.007	210	47
		.001	N	100	13
		.007		105	14
200		.003		145	6
		[illegible]		115	6
	Jasperoid	[illegible]		105	7
		.004		65	6
		[illegible]		100	10
		.010		1700	16
		[illegible]		1900	15
		[illegible]		1700	14
		.003		220	3
	Rhyolite dike	.005		45	N
		[illegible]	N	155	3
		.001		40	3
		.001		125	5
		[illegible]		600	10
		[illegible]		1700	28
		[illegible]		1800	11
		[illegible]		650	8
		.004		100	9
		.004		165	16
	Jasperoid	.004		95	27
300		.004		45	34
		.001		35	5
		.001		60	6
		.001		45	N
		.001		30	N
		.001		30	N
		.001		45	2
		.001		60	N
		TA		25	3
		.001		25	N
		.001		20	N
		TA		25	N
		.001		10	N
		.001	N	10	N
		.001		25	2
		.001		30	2
		.001		30	N
		.002		30	N
		.001		25	N
		.001		20	N
400		.001		15	N

Comments

oxide
sulfide

Grey limestone
minor qtz veining

Blackish limestone with minor qtz veining & minor pyrite
more plating

Emerald GREEN mineral present unknown chemistry

more qtz 1-5% veins .5-2% pyrite

whitish grey Jasperoid 1-2% pyrite

Pyrite vein

Grey to Black Jasperoid with Extensive secondary qtz veining 1-5% pyrite

white Rhyolite Dike with .5-1% pyrite

Jasperoid with olive green cast in color
extensive secondary qtz veining
.5-2% pyrite

EXPLORATION DRILL HOLES

2 of 2

Drill Hole # WE 21 Location COYOTE CANYON TN. R. SEC.

Depth 600' Date Drilled

Comments:

ft	Rock	Au	Ag	Cu	Sb	Comments
	Diorite	.002	M	5	M	
		.001		15		Same as above
		.002		10		
		.001		10		
		.001		10		
		.001		35		
		.001		25		
		.001		25		
		.002		30		
		.001		35		
		Tr		40		
		.001		30		
		.001		30		
		.001		50		
		.001		50	✓	
		.001		70	N	Grey-ish
		.001		130	2	Dolomitic
		.001		100	7	
500		Tr		95	4	silica stone
		Tr		105	3	with minor silicification
		.001		65	2	averages around 1% Pyrite
		.002		105	3	
		.002		135	4	
		.001		90	3	
		.001		95	4	
		Tr		95	5	
		Tr		50	6	
		.001		120	6	
		.001		75	7	
		.003		100	9	
		.002		75	3	
		.001		90	3	
		.002		65	3	
		.002		95	4	
		.002		90	6	
		.002		90	2	
		.001		85	2	
		0.002		75	2	
600		.003	✓	75	3	
		.002	M	60	1	

EXPLORATION DRILL HOLES

Drill Hole # WC22 | Location Wall Canyon | TN. | R. | SEC

Depth 35' | Date Drilled 6/19/81

Comments: John Young Driller. Dtm. Sampler | Hit fault — Lost circulation

ft	Rock	Au	Ag	Cu	Pb	Zn	Comments
	Thin Bedded Limey Shale		X	35	21	35	oxidized lt. orange-shale thin bedded limey
				85	13	10	
				95	33	60	
				85	12	30	
				40	7	30	
			↓	100	3	25	
			N	30	3	15	
							fault Hole lost

EXPLORATION DRILL HOLES

Drill Hole # WC 22B Location Cuait Canyon TN. R. SEC

Depth 300' Date Drilled 6/18/81 6/25/81–6/26/81

Comments: Tom [illegible] [illegible] 12 [illegible] Summer 10' south of WC-22 [illegible]

ft	Rock	Au	Ag	As	Sb	Cu
	Limey shale	.001	N	115	15	35
				130	31	35
		.001		90	11	30
				200	13	35
		.002		200	23	25
		.002		185	3	40
		TR		25	8	15
		.001		55	6	15
		.002		55	3	15
	water	.002	N	110	18	110
	Grey shale	.002	.03	70	30	135
		.001	N	80	14	110
		.002		[illegible]	11	60
		.001		80	12	90
		.001		25	11	115
		.001		45	9	60
		.003		50	13	80
		[redacted]		50	9	55
100		.001		35	10	95
		.002		75	10	45
		.003		60	10	65
		[redacted]		55	13	95
		[redacted]		500	20	105
		[redacted]		340	29	120
		[redacted]		2800	19	80
		[redacted]		12000	11	70
		[redacted]		870	11	30
	Limey shale	[redacted]		155	10	25
		[redacted]		400	14	40
		[redacted]		3400	8	25
		[redacted]		5100	11	15
		[redacted]	N	150	7	25
		[redacted]	N	720	6	25
		[redacted]	A	180	4	15
		.003		80	4	15
		.001		40	4	15
	Black shale	.002		60	5	20
		.003		145	6	20
200		.001		30	7	15
		.001		10	5	15
		.001		30	5	20
		.001		25	4	20
		.003		70	4	20
	Grey shaley Limestone	.001		45	7	10
		.001		90	5	20
		.001		120	9	20
		.002		80	3	10
		.001		20	5	10
		.002		115	8	25
		.001		10	6	10
		.001		40	5	15
		.002		20	4	20
		.001		15	4	10
		.002		10	5	15
		.001		25	7	10
		.001		15	3	10
		.002		75	4	10
		.003		30	6	30
300		.001		10	3	30
		TR		15	4	10

Comments

oxidized limey shale (orange)

Fault

unoxidized grey shale - minor sulfides. Fairly strongly silicified

Grey limey shale strongly veined by small white calcite veins - .1-.2% sulfides

Black shale minor secondary calcite veins. Minor sulfides

Grey shaley limestone - strongly silicified in part - numerous secondary calcite veins - minor sulfides

EXPLORATION DRILL HOLES

Drill Hole # WC23 | Location Wait Canyon | TN. | R. | SEC

Depth 300' | Date Drilled 6-[illegible]-[illegible]

Comments: [illegible] Driller [illegible] Samples water at 140'

ft	Rock	Au	Ag	as	Sb	Comments
	Limestone	.001	N/D	35	20	
		Tr		10	8	
		Tr		5	4	oxidized Reddish, possible seam
		Tr		10	2	
		[illegible]		40	10	
		.010		670	200	sharp contact may be formational
		[illegible]		225	14	
		.002		330	21	
		.001		370	4	
		Tr		25	5	
		.002		20	14	
		.002		35	10	
		.001		25	6	
		[illegible]		30	4	
		.002		15	5	
		.001		10	7	
		[illegible]		5	10	
100		.002		5	7	
		.040		10	6	
		.001		5	3	
		Tr		10	2	Grey limestone with white calcite
		.002		3	7	veins, occasional pyrite veins &
		Tr		5	4	disseminations
		Tr		10	3	
		.002		10	2	
		Tr		5	N	
		.001		5		
		Tr		5		
		Tr		5		
		Tr		5		
		Tr		5		
		Tr		10	N	
		Tr		5		
		.001		N		
		.001		5		
		Tr		N		
		Tr		N		
200		.001		5		
		Tr		N		
		Tr		N		
		.001		N		
		Tr		N		
		Tr		N		
		Tr		N		
		.004		5		
		.004		10		
		.004		15		
		Tr		30		
		Tr		10		
		Tr		10		
		Tr		10		
		Tr		10		
	Jasperoid?	Tr		5		Hard silicious chert like (Jasperoid?) layer
				5		
	Limestone	–		5		Grey limestone as above
		Tr		N		
		Tr		10		
		[illegible]		5		
300	[illegible]	Tr		10		Hard grey chert like layer (no pyrite)
		.001	N	10	N	

EXPLORATION DRILL HOLES

Drill Hole # WC 24 | Location: Wolf Canyon | TN. | R. | SEC

Depth: 345' | Date Drilled: 5/24 – 5/28 '81

Comments: Bruce Crane Driller, 13 Ams, dtm Samples

ft	Rock	Au	Ag	As	Sb	Comments
	Limestone	.001	N	20	22	Limestone
		.003	N	10	78	
		.003	N	10	62	
		N	N	15	26	
		.003	N	25	15	
		.001	N	15	10	
		N	N	15	10	
		.001	N	15	10	
		.001	N	15	73	
		N	N	20	4	
			N	10	N	Oxide / Sulfide
	Lime shale with qtz & calcite veines		N	10	N	
			N	10	N	
			N	10	3	
			N	10	3	
				15	6	
			N	10	[illegible]	
			N	20	7	
100			N	20	8	Calcite veins, qtz veins minor pyrite
			N	10	4	
			N	20	8	
			N	15	6	
			N	30	7	
			N	45	9	
				50	10	
				10	12	
				10	13	
				10	10	
	Non calcareous shale			10	6	
				15	2	
				20	5	
				10	7	
				15	4	
				10	8	
		I		5	4	
				5	9	
				5	3	
200				5	4	
				5	5	
				5	4	
				5	3	
				5	2	
				5	2	qtz vein
				5	N	minor calcite & qtz veins minor pyrite
				N	N	
				5	N	
				5	N	
				N	N	
				5	N	
				10	N	
				13	N	
				15	N	
				10	N	
				10	2	
				15	2	
				15	2	
				10	N	
300	Qtz ... pyrite conglomerate			10	2	
				10	N	
				10	N	
				10	N	non calcareous / calcareous; 1-5% pyrite - possible sandstone(?) Jasperoidal - Very hard
				15	N	
				10	7	
				15	2	
				10	N	
				10	2	
				10	N	
	Grey shale			5	N	
				5	N	no pyrite

EXPLORATION DRILL HOLES

Drill Hole #WC 25 | Location [illegible] | T.N. | R. | SEC

Depth 225' | Date Drilled [illegible]

Comments:

ft	Rock	Au	Ag	Cu	Sb
	Black Limey Shale	.001	N	15	5
		.001		33	8
		.001		50	8
		Tr		155	7
		[illegible]		1300	10
		.001		590	32
		.001		230	13
		.001		95	N
		.001		75	N
		[redacted]		60	8
		Tr		1500	10
		[illegible]		3200	8
		[illegible]		3500	7
		[redacted]		1300	2
		.002		1000	N
		.002	N	90	2
		.001		125	2
		.001		95	2
100	Grey Thin bedded Limestone	[illegible]	N	20	2
		.002	.03	195	8
		.001	.03	80	8
		[redacted]	N	60	2
		.001		60	3
		.001		60	N
		.001		105	N
		.002		25	N
		.001		90	N
		.001		25	N
		.001		25	2
		.002		25	N
		.002		30	2
		.002		40	2
		.001		45	2
		.001		50	3
		Tr		45	N
		Tr		110	2
		Tr		45	2
		Tr		30	N
200		.001		30	N
	Qtz mon. [illegible]	.001		40	N
		.001		20	N
		.001		15	N
		Tr		45	N
		.001		75	N
		[redacted]	N	80	N
300					

Comments

OXIDES / SULFIDES

Black calcareous shale (orange where oxidized) Calcite content decreasing toward base of unit

Grey thin bedded limestone with numerous secondary qtz & calcite veinlets & no visible pyrite

Hydrothermally altered & silicified qtz monzonite porphyry dike (Sill)

EXPLORATION DRILL HOLES

Drill Hole # WC26 | Location [illegible] Canyon | T N. | R. | SEC

Depth 305 | Date Drilled 6/19/81 [illegible] 6/25/81

Comments: [illegible] water at 90'

ft	Rock	Au	Ag	[illegible]	Sb	Cu
	Grey Limestone	001	N	30	7	50
		001	N	60	17	45
		002	N	70	4	60
		.003	N	60	10	50
		Tr	.14	410	220	900
		001	N	20	11	95
		.001		90	9	190
		.001		70	6	35
		[redacted]		65	8	35
		001		25	7	20
		002		40	4	20
		[illegible]		90	3	15
		00.2		25	2	15
		[illegible]		60	3	20
		[illegible]		40	2	15
		[redacted]		45	2	15
		002		25	2	15
		[illegible]		20	2	10
50		003		15	2	15
		003		15	2	15
		002		15	N	15
		002		20	N	15
		003		15	N	15
	Qtz vein	001		35	N	15
		003		35	3	10
		001		35	4	10
	Black shale	002		65	4	40
		001		35	4	140
		001		50	4	115
		002		50	3	75
		001		35	3	75
		001		65	9	140
		002		65	2	85
		001	N	40	3	195
		001	.03	100	4	235
		001	N	70	3	190
		[redacted]		45	3	175
		[illegible]		70	102	195
100		[redacted]		25	N	235
		003		20	N	75
		001		25	N	65
		003		10		85
		[redacted]		10		40
		003		5		20
		001		10		35
		001		5		35
		001		5		30
	Dark grey Dolomitic shaley limestone	001		N		30
		Tr		N		30
		001		5		35
		001		5		35
		Tr		N		40
		Tr		5		35
		001		10		40
		001		10		40
		001		10		35
		001		5		30
		Tr		10		35
150		Tr		5		30
		[redacted]		10		35
		001		N		25

Comments

Copper oxides PRESENT IN OXIDE PORTION

oxide

sulfide

Grey Thin Bedded limestone. Strongly oxidize to gossan at surface very finely disseminated sulfides .5-1%

Zone of Qtz + minor calcite veining (?)

Black Limey Shale with Extensive sulfides up to 5% (Pyrite) Some Silicification

calcite-qtz vein

Dark grey Lime possibly Transitional from above. Numerous secondary calcite veins = qtz. minor sulfides in this portion of hole.

EXPLORATION DRILL HOLES

Drill Hole # WC27 Location Coyote Canyon TN. R. SEC

Depth 295 Date Drilled 6/13 6/14-6/17 1984

Comments: John [illegible] Driller, Dim Sampler, water flow 150 gallons/minute at T.D.

Ft	Rock	Au	Ag	[illegible]	[illegible]
	Black Thin Bedded Lime Stone	[illegible]	[illegible]	30	2
		Tr	.12	35	3
		[illegible]	.14	35	6
		001	.125	55	7
		001	.110	20	3
		002	.114	35	6
		001	.110	45	7
		001	.110	35	6
		001	.10	30	3
		001	.10	05	6
		001	[illegible]	45	4
		002	[illegible]	55	4
		[illegible]	[illegible]	80	6
		001	[illegible]	[illegible]	8
		002	[illegible]	170	9
		002	~	[illegible]	10
		001	~	105	11
FAULT ZONE	[illegible]	Tr	N	120	13
		001	N	280	22
		002	N	120	11
		001	N	95	2
	Light Grey Lime Stone	002		120	10
		002		45	5
		002		30	3
		002		40	7
		003		60	3
		002		30	7
		002		20	4
		001		15	3
		001		20	4
		002		35	3
		[illegible]		20	3
		[illegible]		40	3
		[illegible]		15	6
		[illegible]		25	3
	Black Shale	002		40	5
		[illegible]		50	5
		002		45	8
200		002		50	7
		002	N	370	7
		002	.06	400	13
		002	N	550	21
		002	X	110	15
		003		135	9
		[illegible]		90	7
		[illegible]		95	5
		[illegible]		70	3
		004		80	4
		Tr		40	3
		002		50	6
		Tr		20	4
		Tr		25	4
		Tr		25	3
		002		25	5
		003		40	4
		002		35	5
		[illegible]		15	5
		[illegible]	N	20	6
300		002	.03	45	4

Comments

oxide
sulfide

Possibly upper plate rocks of the Vinini formation. Unit appears highly contorted

strong water flow ~ 50 gallons/minute

Partially silicified Light grey ~~limestone~~. Pyrite content ~ 2% at top of unit decreases to ~ 2% at bottom silicification increases toward base of unit.

Black to dark grey thin Bedded Calcareous Shale. Numerous secondary qtz/calcite veins. Pyrite content varies between 1-3%.

Water flow at bottom of hole very strong ~ 160 gallon/minute (150)

EXPLORATION DRILL HOLES

Drill Hole # GWC 28   Location [illegible]   TN.   R.   SEC

Depth 300'   Date Drilled June 12 13 1981

Comments: [illegible] water at 165'

ft	Rock	Au	Ag	Cu	SB
	[illegible]	002	N	255	76
	Shale	001	↑	150	.38
		001		1[illegible]	.47
		001		70	37
	↑	[redacted]		20	3
		0.01		12	15
		.003		30	33
		002		35	3
		001		23	10
		002		15	11
		Tr		25	13
		002		25	13
		[redacted]		1500	.14
		[redacted]		2700	19
		001		270	.12
		[redacted]		120	.10
		[redacted]		1100	17
		[redacted]		2200	.13
100		.002		1100	3
		001		4900	.10
		002		1150	8
	Gray	.002		215	9
		Tr		280	3
	Dolomitic	001		90	2
		002		110	N
	Silicified	Tr		75	↑
	Limestone	001		60	
		001		55	
		.004		40	
		.001		30	
		Tr		30	
		.001		45	
		001		85	
		001		100	
		Tr		45	
		001		200	
		.002		70	
		[illegible]		60	
200		001		30	
		.002		115	
		[redacted]		50	
		001		115	
		001		55	
		.002		175	
		.003		160	
		Tr		40	
		Tr		130	
		002		285	
		Tr		45	
		001		40	
		.004		20	
		.001		35	↓
		002	↓	110	
		002	N	230	72
		002	↑	120	N
		.003		90	↑
		.001		240	
		Tr		45	
300	↓	Tr	↓	110	↓
		Tr	N	50	N

Comments

oxide / sulfide } majority ~~[illegible]~~ oxidized

minor sulfides — .1 - 1%
(narrow) ~~[illegible]~~ zone of
secondary calcite &
qtz - silicification
common
secondary calcite &
qtz increase
below
200'

EXPLORATION DRILL HOLES

Drill Hole # WC 29 Location [illegible] TN. R. SEC

Depth 280' Date Drilled 7/28

Comments: [illegible] — [illegible] [illegible] Water at 30'

ft	Rock	Au	Ag	[illegible]	[illegible]
	ALLUVIUM	TR	N	180	510
		.004	N	110	320
		[redacted]	N	95	153
		.001	N	125	108
		[redacted]	.03	95	81
	BLACK Dolomitic Lime & CHERT	.002	N	15	55
		.001	↓	50	86
		.002		50	21
		.002		30	16
		.003		35	13
		TR		35	4
	BLACK GREY SHALES W/ QTZ VEINS	TR		30	4
		.001		30	6
		.001		40	4
		.001		40	2
		.001		40	4
		[redacted]		60	3
		TR		65	4
100		TR		50	5
		.002		65	10
		[redacted]		75	12
		TR		50	10
		.004		45	6
		TR		50	4
		.001		45	4
		.001	↓	50	6
		[redacted]	N	1200	7
		[redacted]			
		.001			
		[redacted]			
		[redacted]			
		[redacted]			
		[redacted]			
		.034			
		.100			
		.049			
		[redacted]			
		.015			
200		.059			
		.031			
		[redacted]			
		[redacted]			
		.002			
		.003			
		.003			
		.003			
		.003			
		[redacted]			
		.001			
		.003			
		[redacted]			
		.003			
		.001			
		.002			
		.004			
		.004			
300					

Comments

ALLUVIUM, MOSTLY LIMESTONE FRAGMENTS OXIDIZED.

BLACK DOLOMITIC LIME WITH INTERBEDDED CHERT, SOME QTZ VEINING

— DISEMINATED PYRITE

GREY SHALES
STRONG QTZ VEINING
DISEMINATED & VEIN PYRITE

— PYRITE VEIN

BLACK SHALES
LARGE AMOUNT OF DISEMINATED PYRITE

STARTED - 12:15 pm 7/28
STOPPED @ 280 @ 6 pm
LEFT PIPE AT 200'
7/29 - HOLE CALLED TO 200' - P[illegible]
~~[illegible]~~
7/30 -

Drill Hole #WC 80 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-4-82

Comments: DRILLER BRUCE YOUNG

ft	Rock	Au	Ag	Cu	Comments
0	OXIDIZED SHALE	.002		219	
		.001		143	BROWN OXIDIZED CALCAREOUS SHALE
		.002		110	OXIDIZED — NUMEROUS CALCITE VEINS.
		.001		140	
	↓	—		55	
	DARK GRAY SHALE	.002		44	
		.001		45	
		—		54	DARK GRAY SHALE WITH OCCASIONAL
		[redacted]		69	CALCITE AND QTZ VEINS.
		[redacted]		62	
		.001		80	
		[redacted]		106	
		.001		115	
		.002		44	
		.003		43	
		.001		33	
		.001		28	
		—		20	
100				30	
				23	
	DARK GRAY CALCAREOUS SHALE WITH CALCITE AND QTZ VEINS	.002		17	DARK GRAY CALCAREOUS SHALE
		—		11	WITH NUMEROUS CALCITE AND
				11	OCCASIONAL QTZ VEIN.
				11	
		.002		17	
		.004		19	
		[redacted]			
		.003		28	
		.004		26	
		.003		23	
		—		[illegible]	
		.004		[illegible]	
		—		22	
		.003		17	
		.003		[illegible]	
		.003		17	
		[redacted]		15	
		—		[illegible]	
200		—		[illegible]	
		.001		[illegible]	
		.001		12	CALCITE CHECKER VEIN
		.002		[illegible]	
		.003		[illegible]	
		—		[illegible]	
		.002		[illegible]	
		.003		[illegible]	
		.002		33	
		.002		[illegible]	MINOR PYRITE ON FRACTURES.
		.002		[illegible]	CALCITE VEIN
		.003		[illegible]	
		.003		[illegible]	CALCITE VEIN
		.003		[illegible]	
		—		[illegible]	
		—		[illegible]	
		[redacted]		[illegible]	
		.003		6	
		[redacted]		[illegible]	
		.001		5	
300		.002		[illegible]	
		.002		[illegible]	
		.002		11	CALCITE VEIN.
	TD 305				

EXPLORATION DRILL HOLES

Drill Hole # [illegible] Location [illegible] TN. R. SEC

Depth [illegible] Date Drilled [illegible]

Comments: [illegible]

Rock	Au	Ag	Cu	Co	Ni		Comments
Black shale	.003		444				
	.003		83				
	—		96				oxidized
	.001		85				
	—		127				
	—		551	50	595		
	.001		535				oxidized
	.001		693	50	830		
	.003		976				
	[redacted]		1936	50	915		
	[redacted]		695				
	[redacted]		848	15	230		oxidized alt. [illegible]
	[redacted]		738				
	[redacted]		1251	25	260		
	[redacted]		882				
	.002		848	30	455		
	[redacted]		519				
	.004		573	55	395		
	[redacted]		100				
	.003		883	60	985		
	.002		1010				
	.002		346	35	320		
	.002		319				
	.003		396	30	305		
	.001		414				
	[redacted]		404	25	270		black shale [illegible]
	[redacted]		814				[illegible]
	[redacted]		723	30	235		[illegible]
	[redacted]		848				
	.003		501	30	215		[illegible]
	[redacted]		448				[illegible]
	[redacted]		364	20	205		[illegible]
	[redacted]		213				[illegible]
	.003		364	20	105		minor sulfides
	.002		222				
	.003		186	15	95		
	.003		195				
	.003		169	15	100		
	[redacted]		124				
	.003		89	15	55		
	.002		112				
	.001		108				
Black shale interbedded [illegible]	.002		130				
	.002		108				
	.003		98				
	.002		98				
	.002		160				
	.001		135				
	.001		123				
	.002		162				[illegible]
	.002		155				[illegible]
	.002		216				[illegible]
	.002		1425				5%
	.001		343				
	.001		228				
	.002		126				
	.001		181				
	.002		231				
	.001		365				
	.001		120				
	—		125				
	.003		111				
	.003		138				
	.003		90				
	.003		107				
TD							

EXPLORATION DRILL HOLES

Drill Hole # WC-32 Location WALL CANYON TN. R. SEC.

Depth 395 Date Drilled 6-12-82

Comments: [illegible] Driller [illegible] Sampler

ft	Rock	Au	Ag	Cu	Co	Ni	Comments
0	BLACK SHALE	.001		45			
		.001		47			
		.001		61			OXIDIZED ZONE
		.001		39			
		[redacted]		53			
		.001		43			
		.002		35			
		.002		25			
		.002		22			
		.002		23			
		.001		31			QTZ VEIN ZONE SHALE CONTAINS FRAGMENTS
		.001		43			
		—		12			
		—		27			
		—		24			BLACK SHALE WITH QUARTZ AND CALCITE VEINS
		.001		157			
		.001		70			
		.002		54			
		.001		37			
100		—		29			
		.004		31			
		.001		48			
		.002		44			
	BLACK SHALE INTENSELY [illegible] VEINED	[redacted]		12			
		.002		32			
		.001		73			↓ PYRITE COARSE GRAINED AND COMMON IN BOTH QUARTZ VEINS AND IN SHALE BASALLY
		.001		21			
		[redacted]					
		.003		812			
		.001		291	15	50	
		.001		56			
		—		59	10	45	
		—		83			
		.001		62	15	45	
		.001		97	15	45	
		.003		889			
		.003		700	10	60	
		.002		1348	15	50	
		.002		345			
200		.003		123	10	50	
		.001		234			
		.003		71			
		.003		96			
		—		7			
		—		20			
		.004		47			
		.004		5			
		.003		41			
		[redacted]		20			CALCITE VEINS
		—		117			
		[redacted]		175			
		[redacted]		395			
		.003		[illegible]			
		.002		47			BLACK SILICIFIED JASPEROIDAL
		—		31			
		.003		25			
		[redacted]		75			
		[redacted]		15			
		.001		[illegible]			
300		.002		16			
		[redacted]		344			BLACK SHALE CALCAREOUS UNIDENTIFIED GREEN MINERAL
		.001		50			
		.001		12			
		—		22			
		—		35			
		—					
		.001		23			
		.003					
		—		20			
		—		27			
		.002		12			
		.002		20			
		—		16			
		.001					
		.001		10			
		.001		10			
		.003		13			
		.001		[illegible]			
400		.003		7			
				[illegible]			

405 TD

EXPLORATION DRILL HOLES

Drill Hole # [illegible] Location [illegible] Canyon TN. R. SEC.

Depth 405 Date Drilled [illegible]

Comments: [illegible] shallow, RH sampler water at 80'

Rock	Au	Ag	Cr	Co	Ni	
oxidized	.001		251			
	.002		235			
	.002		213			
	.003		125			
	[illegible]		—			
Black shale	[illegible]		97			
	[illegible]		69			
	[illegible]		24			
	.004		51			
	.003		66			
	.003		22			
	.003		23			
	.003		140			
silicified shale ([illegible])	.002		130			
	.004		523			
	.002		—			
	[illegible]		—			
	.002		212			
	.003		70			
100	.001		28			
Black shale	.001		52			
	.002		42			
	.002		32			
	.002		66			
	.002		—			
	.002		40			
	.002		32			
	.003		20			
	.003		13			
	.002		203			
	[illegible]		325			
	[illegible]		—			
	.003		313			
	[illegible]		274			
	[illegible]		362			
Black shale silicified	.003		132			
	.002		32			
	.003		22			
	.001		22			
200	.002		22			
	.003		32	20	60	
	.002		241	50	695	
	.003		133	30	295	
	[illegible]		240	30	700	
	[illegible]		562	30	230	
Black shale	[illegible]		1015	35	295	
	[illegible]		1280	35	335	
Black shale	.003		93	25	75	
	.003		40	20	30	
	.003		33	20	50	
	.002		54			
	.002		34			
	.004		24			
	.004		73			
	[illegible]		1044			
	[illegible]		295			
	[illegible]		348			
	[illegible]		297			
300	[illegible]		180			
	.003		73			
	.002		4			
	.002		14			
	.001		26			
	.001		60			
	.001		93			
	.001		103			
	.002		64			
	.002		13			
	.001		26			
	.003		53			
	.002		93			
	.003		72			
	.002		101			
	.002		137			
	.002		132			
	.003		172			
	.003		214			
	[illegible]		67			
	.001		43			
405	.001		97			
	.002		[illegible]			

Comments

Black shale (brown and oxidized) no sulfide or qtz veins

Strongly qtz veined silicified shale (tan & green mixed) minor pyrite [illegible]

silicified black shale - no pyrite minor qtz veins

Strongly silicified qtz veined [illegible] no pyrite

[illegible]

Strong qtz vein zone [illegible] green mineral [illegible] black shale

silicified black shale

Intensely silicified strongly [illegible] black shale

[illegible] black shale [illegible]

Slightly interbedded black shale No qtz veins no pyrite

Qtz pyrite vein zone

[illegible]

black silicified shale

EXPLORATION DRILL HOLES

Drill Hole # WE-34 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-10-82

Comments: BLACK Shale Breccia Vein Sample

ft	Rock	Au	Ag	As	Co	Ni
0	BLACK SHALE WITH MINOR AMT QTZ VEINING.	.002		83		
		.002		59		
		.002		112		
		.001		221		
		.002		408		
		.002		387		
		.002		427		
		[illegible]		492		
		[illegible]		73		
		.003		34	16	30
		.002		—	21	20
		.001		65	20	30
		[illegible]		3390	20	35
		.003		3220	26	40
		.004		695	25	30
		.002		378	26	40
		[illegible]		5090	20	60
		[illegible]		790	30	100
		.003		84	20	30
		.002		130	20	5
		.007		550	25	60
		[illegible]		668	20	100
		[illegible]		381	16	30
		[illegible]		465	20	30
		.002		39	21	50
		.004		368	20	50
		.005		153	25	100
100		[illegible]		774	20	40
		[illegible]				
		[illegible]		939		
		[illegible]				
		.002		224		
	BLACK SHALE WITH [illegible]	.004		233		
		.003		446		
		[illegible]		145		
		[illegible]				
		.002				
200		[illegible]		2221		
		.004		74		
		.001		31		
		.002		278		
		.003		308		
		[illegible]		502		
		.001		306		
		.001				
		.001				
		.003				
		.002		316		
		.001		363		
		.001		315		
		.002				
		.001		177		
		.001		174		
		.001		265		
		.001		657		
		.001		592		
		.002		466		
300		.001		312		
		.001		320		
305 TD.		.001		357		

Comments

NO QUARTZ VEINS 0-5'

OXIDIZED ZONE

UNIDENTIFIED GREEN MINERAL

BLACK SHALE WITH OCCASIONAL QUARTZ VEINING

MINOR QUARTZ VEINING

PYRITE IN SHALE AND QTZ VEINS

QTZ VEIN ZONE.

MINOR PYRITE IN SHALE.

QUARTZ VEINING 20-30%

UNIDENTIFIED GREEN MINERAL

PYRITE IN SHALE AND QTZ VEINS

CALCITE ON BEDDING SURFACE

UNIDENTIFIED GREEN MINERAL

EXPLORATION DRILL HOLES

Drill Hole # WC-35 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-11-82

Comments: BRUCE YOUNG DRILLER ROY SAMPLER

Ft	Rock	Au	Ag	Cu	Co	Ni	Comments
	BLACK SHALE MINOR QTZ VEINING	.001		291			OXIDIZED ZONE
		.002		383			
		.003		342			
		.003		349			
		.002		192			
		.003		147			
		.003		247			
		—		183			
		—		269			
		—		156			
		—		324			
		—		386			
		[illegible]		532			
	INTENSE QTZ VEINING 50%+	.003		806			
		[illegible]		627			BLACK SHALE WITH OCCASIONAL QTZ VEINS.
		[illegible]		739			
		[illegible]		779			PYRITE IN QTZ VEINS AND SHALE
		[illegible]		787			
100		[illegible]		993			
		[illegible]		414			
		[illegible]		455	55	.1170	
		[illegible]		379			
		[illegible]		627	10	80	[illegible] GREEN MINERAL
		.003		265			
		.003		307	25	405	
		.003		454			
		[illegible]					
		.003		279	45	835	
		.003		4414	75	.13[illegible]	GREEN MINERAL.
		.002		1890			
		.003		444	55	.109	
		.002		—			
		.002		189	55	.11[illegible]	
		[illegible]		280			
		[illegible]		260	80	80	
		.003		600			
		[illegible]		779	25	2.65	
		[illegible]		335			
		[illegible]		182	20	75	MINOR PYRITE IN QTZ VEINS AND SHALE
200		[illegible]		1167			
	BLACK SHALE MINOR QTZ VEINING DECREASING INTENSITY WITH DEPTH.	.007		1130			
		.004		622			
		.002		913			
		.001		[illegible]			
		—		78			
		.002		121			
		.002		76			
		.002		137			
		.001		47			BLACK SHALE CHALCOPYRITE.
		.003		142			
		.001		65			
		.001		·			
		—		42			
		.002		117			
		.002		65			
		.003		160			
		.003		77			
		.002		114			
		.002		59			
300		.002		81			
		.003		47			

313 T.D.

EXPLORATION DRILL HOLES

Drill Hole #WC-36 Location [illegible] TN. R. SEC.

Depth 305 Date Drilled

Comments: [illegible]

Ft	Rock	Au	Ag	As
	DARK GRAY SHALE	.001		—
		.001		—
		.001		—
		.002		81
		.003		119
		.003		79
		[illegible]		55
		[illegible]		345
		[illegible]		316
		[illegible]		224
		[illegible]		151
		[illegible]		65
	[illegible]	[illegible]		263
		[illegible]		107
		.015		—
		[illegible]		—
	CALCAREOUS SHALE	[illegible]		123
		[illegible]		159
100		.002		471
		.001		264
		.002		153
		.002		137
		.002		104
		.003		63
		.003		65
		.003		6[illegible]
		.001		47
		.002		37
		.001		33
		.003		41
		.003		23
		.003		13
		.002		15
		.002		28
		.002		16
		.002		15
		.003		17
		[illegible]		32
200		.003		14
		.004		14
	DARK GRAY SHALE	.002		19
		.002		
		.002		76
		.002		[illegible]
		.002		36
		.002		22
		.001		—
		.001		—
		.002		54
	SILICIFIED GRAY SHALE	.002		45
		.002		101
		.002		57
		.003		45
		.002		22
		.003		60
		.002		37
		.003		32
		.002		27
		.003		—
305		.004		—
		.002		—

TD 305

Comments:

- CALCAREOUS ZONE
- OXIDIZED ZONE
- CALCITE-QTZ VEIN ZONE.
- CALCITE MORE ABUNDANT NEAR BASE.
- CALCAREOUS ZONE.
- DARK GRAY SHALE WITH NUMEROUS CALCITE-QTZ VEIN. [illegible]
- GRAY SHALE SILICIFIED AND SLIGHTLY CALCAREOUS.
- [illegible] SHALE [illegible] QTZ VEIN.

EXPLORATION DRILL HOLES

Drill Hole # WC-37 Location WHALE Canyon T.N. R. SEC.

Depth 305 Date Drilled

Comments: Bruce Young Driller Rory Shafer

Ft	Rock	Au	Ag	Cu	Comments
0	CALCAREOUS GRAY SHALE			145	
				87	
				54	
				90	
				59	
				59	
				30	
				72	
				59	
				61	
				72	
				67	
				94	
				51	
				33	
				31	
				23	
				16	
100				24	
				12	
				31	
				20	
				25	
				30	
				23	
				26	
	GRAY SHALE			10	
				14	
				12	
				13	
				11	
				11	
				11	
				13	
				13	
				16	
				12	
				9	
200				7	
				12	
				12	
				12	
				12	
				7	
				9	
				8	
				11	
				7	
				14	
				4	
				8	
				10	
				9	
				6	
				7	
				9	
				11	
				14	
300				23	
	TD 300				

OXIDIZED ZONE

GRAY SHALE WITH OCCASIONAL CALCITE VEIN. QTZ VEINS RARE.

GRAY SHALE

EXPLORATION DRILL HOLES

Drill Hole # WC-38 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-13-82

Comments: BRUCE YOUNG DRILLER RICK-SAMPLER

Ft	Rock	Au	Ag	Cu	Comments
0	BLACK SHALE	.001		37	
		.002		56	
		.002		14	
		.003		24	OXIDIZED
		.002		19	
		.003		55	
		.002		69	QTZ VEIN.
		.002		47	
		.002		—	
		.002		—	SHEARED.
		.001		21	
		.001		22	
		.002		—	
		.001		—	
		.001		—	
		.001		—	
		.001		—	
		.001		—	
		.001		63	
100		.002		—	
		.003		20	
		.002		23	OCCASIONAL CALCITE VEIN LITTLE QUARTZ
		—		—	BLACK SHALE WITH OCCASIONAL QTZ AND CALCITE VEIN.
		—		—	
		—		—	
		—		—	
		.002		25	
		—		—	
		—		22	
		.001		25	
		—		31	
		.002		21	
		.001		31	
		—		20	
		—		16	
		—		27	QUARTZ VEIN ZONE.
		—		16	
		—		20	
200		—		20	
		—		54	
		—		45	
		—		21	- SOME PYRITE IN QUARTZ VEIN.
		—		22	
		.002		14	QUARTZ AND CALCITE VEIN ZONE.
		.001		10	
		.002		11	UNIDENTIFIED GREEN MINERAL
		.003		—	
		.001		12	
		.001		16	
		.001		13	QUARTZ VEIN ZONE
		.001		10	
		.005		12	
		.001		14	
		—		21	
		.002		—	
		.001		13	
		.001		13	
300		.002		—	
		—		—	QUARTZ VEIN ZONE
		—		—	
305 TD.		—		—	

EXPLORATION DRILL HOLES

Drill Hole # WC-59 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-15-82

Comments: BRUCE YOUNG DRILLER PAT MILES SAMPLER.

ft	Rock	Au	Ag	Cu	Comments
0	GRAY	.001		141	
		.001		215	CALCITE VEINS
	SHALE	.001		115	
		.002		123	
		.003		60	
		.002		65	QTZ VEINS
		.001		75	
		.001		84	
		.001		--	
		.002		69	OXIDIZED ZONE NO SAMPLE 40-45'
		.002		125	
		.002		75	
		.003		51	LESS OXIDIZED
	CALCAREOUS	.003		34	
	SHALE	.003		26	
	GRAY	.001		23	
	GRAY	.002		17	
		.001		18	
	SHALE	.002		39	CALCITE VEIN
100		.002		23	
		.001		36	DARK GRAY SHALE WITH OCCASIONAL [illegible] OF [illegible] QTZ AND CALCITE VEINS. NO PYRITE SEEN IN HOLE
		.001		—	
	CALCAREOUS	.001		—	
		.004			
	SHALE	.003		116	
	DARK GRAY	.003		23	
		.002		10	
		.003		19	
		.002		14	
		.003		15	OCCASIONAL CALCITE VEIN
		.003		25	
		.003		20	
		[illegible]		16	
		.003		17	
		.002		13	
		.003		17	
		.007			
	VERY DARK	.001		24	
		.001		34	
200	GRAY	.001		57	ABUNDANT CALCITE VEINS
	CALCAREOUS	.001		15	
		.001		15	
	SHALE	.001		—	OCCASIONAL CALCITE VEIN,
		.001		12	
		.004		17	
	SLIGHTLY	—		16	OCCASIONAL QTZ AND CALCITE VEIN
	GREENISH	.002		18	
	GRAY	.003		21	ABUNDANT QTZ VEINS.
	SILICIFIED	.003		15	
		.002		12	
	SHALE	.002		29	
		.002		—	
		.002		29	
		.002		—	
		.002		10	OCCASIONAL QTZ VEIN AND IDENTIFIED OXIDIZED MINERALS [illegible] QTZ VEINS IN UPPER HALF OF ZONE.
		.002		—	
		.002		16	
		.003		11	
		.002		—	
300		.002		14	
		.002		34	

TD 305

EXPLORATION DRILL HOLES

Drill Hole # WC-40 Location WALL CANYON TN. R. SEC

Depth 300 Date Drilled 6-17-82

Comments: BRUCE WARDS DRILLER PAT MILL SAMPLER

Ft	Rock	Au	Ag	Cu	Comments
6	GRAY SHALE	.002	.03	410	
		.002	.03	324	
		.002	.02	477	
		.003	.02	281	
		.001	.02	191	
		.003	.04	147	QTZ VEIN ZONE
		.002	.02	155	
		.001	.04	165	
		.001	.04	201	
		.002	.02	233	
		.001	.02	37	
		.003	.02	135	QTZ VEIN ZONE
		.002	.02	40	
		.002	.02	35	
		.002	.02	24	
		.002	—	18	
		.002	.02	77	
		.002	—	64	
100		.003	.03	87	
		.002	—	402	
		.003	.02	205	QTZ VEIN ZONE
		.001	—	180	QTZ VEINS – 85–90, 105–115
		.001	—	67	
		.001	—	54	
		.001	—	51	
		.002	—	47	QTZ VEIN ZONE – QTZ VEIN 125–130
		.001	—	123	
		.003	—	242	
		.001	—	151	
		.003	.02	222	
		.001	.02	165	
		.002	.02	120	
		.002	—	73	QTZ VEIN ZONE
		.002	—	124	
		.002	.02	142	
		.001	.02	132	
		.001	.02	297	
		.003	.02	235	
200		.002	—	83	
		.002	—	67	
		.001	—	66	
		.002	—	137	
		.002	—	321	
		.002	.02	231	
		.003	.02	246	
		.004	.02	191	
		.003	.02	135	
		.002	.02	141	
		.002	.02	290	QTZ VEIN
		.001	.02	82	
		.002	.02	94	
		.001	.02	113	
		.002	.02	97	
		.001	.02	61	
		.001	.02	30	
		.002	—	150	
		.001	—	55	
		.001	—	56	
	CALCAREOUS SHALE	.002	—	55	
300		.002	—	51	QTZ VEIN ZONE
	TD 300				

GRAY SHALE WITH QTZ VEINS AND LIMONITE STAIN ON FRACTURES & BEDDING PLANE IN SHALE THRU 285'

MINOR PYRITE IN QTZ VEINS AND SHALE.

EXPLORATION DRILL HOLES

Drill Hole # UX-41 Location WALL (RAGGED) TN. R. SEC

Depth 205 Date Drilled 6-25-82

Comments: Bruce Young Driller Lies Hampton.

Ft	Rock	Au	Ag	Cu	Comments
0	GREY SILICIFIED SHALE.	.002	.02	30	GRAY SILICIFIED SHALE WITH OCCASIONAL QTZ VEIN
		.001	.02	43	
		.001	.03	31	
		.001	.02	20	
		.001	.02	25	
		.002	.03	41	
		.001	.02	29	
		.002	.03	46	
		.001	.03	35	
		.001	.02	29	
		.001	.03	24	
		—	.02	109	
		.001	.02	20	
		—	.03	24	
		.001	.03	11	
		.001	.02	25	
		.001	.02	26	
		.002	—	10	
		.002	—	22	
		.001	—	17	
		.001	—	71	
		.001	—	26	
		.001	—	19	
		—	—	11	
		.003	—	15	
		—	—	14	
		—	—	10	
		—	—	11	
		.001	.02	26	
		.001	—	11	
		.001	—	31	
		.001	—	25	
		.002	—	1	
		.003	.02	55	
		.003	—	46	
		.005	—	15	
		.001	.02	76	
100	BLACK SHALE	.003	.04	57	
		.003	.07	37	BLACK SHALE WITH OCCASIONAL QTZ VEIN.
		.003	.03	50	
		.001	.04	80	
		.003	.05	45	
		.003	.05	45	
		.001	.05	76	
		.001	.02	31	
		.002	.03	49	
		.003	.02	30	
		.003	.02	147	
		.004	.02	142	
		.002	.02	186	
		.002	—	1096	QTZ VEIN ZONE
		.003	.02	1375	
		.002	.02	845	
		.002	.02	350	
		.003	—	247	
		.002	—	251	
		.002	—	134	
		.002	—	201	
		.002	—	167	
300		.004	.05	192	
		.002	.05	268	QTZ VEIN ZONE.
305 TD					

GRAY SILICIFIED SHALE WITH OCCASIONAL QTZ VEIN

QTZ VEIN ZONE - LARGEST VEIN 4.5'

BLACK SILICIFIED BRECCIATED SHALE WITH QTZ VEIN ZONE

QTZ VEIN ZONE

QTZ VEIN ZONE WITH PYRITE IN QTZ VEINS

SILICIFIED CHLORITIZED ZONE.

ABOVE AVERAGE QTZ VEIN CONTENT, SMALL AMOUNTS SILICIFIED SHALE VERY HARD 175-185

BLACK SHALE WITH OCCASIONAL QTZ VEIN.

QTZ VEIN ZONE

QTZ VEIN ZONE.

EXPLORATION DRILL HOLES

Drill Hole # WC-42 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-26-82

Comments: BRUCE YOUNG DRILLER PAT MILLS SAMPLER

ft	Rock	Au	Ag	As	Comments
0	GRAY	—	.02	51	
	SILICIFIED	—	.02	53	
	SHALE	.0001	.02	56	
		.0001	.02	57	SHALE OXIDIZED
		.0001	.02	47	ALONG FRACTURES.
		—	—	32	
		.0001	.02	31	
		.0002	—	25	
		.0002	—	17	
		—	.02	36	QTZ VEIN ZONE
		.002	.02	21	
		.0001	.02	15	
		.0002	.02	22	
		.0001	.02	30	QTZ VEIN
		.0001	—	57	ZONE
		.0001	—	31	
		—	.02	24	
		—	—	35	GRAY SHALE INTENSELY
		.0001	—	5	SILICIFIED - JASPEROIDAL.
100		.0002	—	27	ARSENOPYRITE AND QTZ VEIN.
		.0002	—	31	
		.0001	—	31	
		.0002	—	10	
		.0001	.02	59	QTZ VEIN
		.0001	—	40	ZONE
		—	.02	42	
		—	.02	33	
	BLACK	.0001	.02	40	
		—	.02	29	
	SHALE	.0001	.02	37	
		—	.02	31	
		.0001	.02	25	
		.0002	.02	30	
		.0001	—	—	
		.0002	.05	31	
		.0001	.03	23	
		.0001	.02	237	CALCITE-QTZ VEIN.
		.0001	.02		
		[illegible]	.07	657	
200		.0002	.04	657	QTZ VEIN ZONE; SLIGHT OXIDATION ON FRACTURE SURFACES
		.0002	.05		
		.0002	.05	472	
		.0001	.02	308	
		.0001	.03	242	
		.0002	.03	205	
		.0001	.03	159	
		—	.02	26	
	POSSIBILITY		.02	438	
	SMALL RHYOLITE DIKE	.0001	.02	222	
		.0003	.03		
		.0001	.02	467	
		.0002	.02	307	
		.0002	.02	257	
		[illegible]	.03		QTZ VEINS
		.0002	.02		BECOMING MORE
		.0004	.03	37	ABUNDANT BASALLY.
	[illegible]	.0003	.02	40	
		.0002	.02	326	LOTS OF SHALE FRAGS
		.0001	.02	412	IN DIKE - POSSIBLY CONTAMINATION.
300		.0013	.02	392	
		.0002	.02	339	

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GRAY SILICIFIED SHA[LE] WITH NUMEROUS QTZ VEINS.

PYRITE CLO[SELY] ASSOC. WITH QTZ VEINS ALSO FINELY DISSEMINATED THROUGHOUT SHALE [ROCK]

PYRITE IN QTZ VEINS AND...

EXPLORATION DRILL HOLES

Drill Hole #WC-43 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-27-82

Comments: BRUCE YOUNG DRILLER PAT MILLS SAMPLER

ft	Rock	Au	Ag	Oz
0	BLACK SHALE	.003	.03	160
		.002	.03	150
		.003	.03	432
		[illegible]	.03	468
		[illegible]	—	504
		[illegible]	.02	357
		.002	.02	283
		.003	—	483
		[illegible]	.03	215
		.002	.03	247
		.002	.03	287
		.002	.05	131
		.002	.04	121
		.002	.03	106
		.003	.07	130
		.001	.09	77
		.002	.05	107
		.003	.07	212
		[illegible]	.05	492
100		.002	.02	229
		—	—	64
		.003	—	87
	SERICITIZED RHYOLITE DIKE	.003	—	241
		—	.02	267
		—	—	35
		.001	—	107
		.002	.03	216
		.001	.02	314
		.001	.02	103
		.002	—	123
		.001	.02	421
		—	.02	101
		.001	.09	672
	SLIGHTLY SILICIFIED SHALE	.002	.05	1773
		.002	.08	640
		.001	.08	32
		.001	.05	1312
		.001	.05	714
		.002	.07	405
200		.002	.02	35
		.002	.04	1390
		.001	.03	210
		.001	.04	172
		.001	.05	742
		.002	.05	492
		.002	.05	535
		.001	.04	382
		.001	.02	1388
		.001	.03	264
	BLACK SHALE	.001	.03	330
		.001	.05	336
		.001	.02	150
		.002	.02	206
		.001	.03	326
		.002	.03	237
		.001	.03	420
		.001	.03	252
		.001	.03	380
300		.001	.16	533
		.001	.07	461
		.001	.03	301

TD-305

Comments

- (0–~45 ft) OXIDIZED ZONE
- BLACK SHALE WITH OCCASIONAL QTZ VEIN.
- BLACK SHALE BECOMING HARDER SANDY TO CONTACT WITH DIKE.
- POSSIBLE PYRITE IN QTZ VEIN IMMEDIATELY ABOVE DIKE.
- OXIDIZED ZONE.
- SERICITIZED RHYOLITE DIKE PYRITE CONTENT 0.5%
- GRAY JASPEROIDAL SHALE PYRITE COMMON IN QTZ VEINS AND IN SHALE BASALLY BECOMING
- HIGHLY SILICIFIED JASPEROIDAL SHALE WITH NUMEROUS QTZ VEINS.
- SHALE SLIGHTLY CHLORITIZED
- BLACK SHALE WITH NUMEROUS QTZ VEINS, PYRITE COMMON

EXPLORATION DRILL HOLES

Drill Hole #WC-44 Location WALL CANYON TN. R. SEC.

Depth 305 Date Drilled 6-28-82

Comments: Chuck Williams Driller Randy Sampler

ft	Rock	Au	Ag	Cu
0	QTZ VEIN	.001	—	110
		[illegible]	.02	296
	BLACK SHALY	.003	—	333
		.001	—	277
		.001	.02	480
		.002	.02	413
		.001	.06	408
		.001	.02	359
		.002	.04	164
		.002	.06	140
		.002	.03	172
		.003	.03	1?2
		[illegible]	.03	222
		.003	.03	230
		.002	.03	277
		.004	.03	371
		.003	.03	234
		.002	.05	223
		.004	.03	73
		.003	—	7
100	[illegible]	.0006	—	6
	BLACK SHALE	[illegible]	.03	116
		[illegible]	.33	136
		[illegible]	.03	204
		[illegible]	.08	109
		.002	.06	9
		.004	.04	130
		.002	.02	138
		.003	.61	235
		.002	.02	150
		.002	—	157
		.004	.02	362
		.003	.03	316
		.002	.03	203
		.002	.06	213
		.002	.05	178
		.001	.04	97
		.001	.04	23
		.002	.03	60
200		.003	.03	67
		.002	.05	42
		.002	—	23
		.002	.05	47
		.001	.04	47
		.003	.05	33
		.003	.06	32
		.004	.04	6
		.003	.04	70
		.002	.02	68
		.002	.06	145
	BASALT DIKE	.002	.05	188
		.002	.05	143
		[illegible]	.07	122
	BLACK SHALE	.006	.05	164
		.004	.05	132
		.004	.05	223
		[illegible]	.04	133
		[illegible]	.04	170
		[illegible]		185
300		[illegible]		235
		[illegible]		245

TD 305

Comments

- OXIDIZED QTZ VEIN
- QTZ VEINS AND FRACTURES IN SHALE OXIDIZED
- QTZ VEIN.
- QTZ VEIN ZONE
- QTZ-CALCITE VEIN
- QTZ CALCITE VEIN ZONE.
- DIKE SLIGHTLY CALCITIZED

BLACK SHALE WITH OCCASIONAL QTZ VEIN OR QTZ VEIN ZONE

PYRITE IN SHALE BASALT FROM 70'

PYRITE COS IN [illegible]

PYRITE CONTENT IN SHALE [illegible] BASALT

BLACK SHALE CONTAIN RARE BUT NOTICEABLE CALCITE V[illegible]

PYRITE IN BASALT ~1%?

PYRITE IN BLACK SHALE

APPENDIX 4

Core Drilling, Core Log

FINE CHLORITIZED SANDY BEDS

FINE SAND – SILICA CEMENT

FINE SAND – $CaCO_3$ CEMENTATION

CHLORITE ?

QTZ

SULFIDE

CALCITE

EXPLORATION DRILL HOLES

Drill Hole # WC-01 Location WC-21 TN. R. SEC

Depth 0-40' Date Drilled 7/27

Comments:

ft	Rock	Au	Ag	DIP VEINS	MINERALIZATION	COMMENTS
5	ALLUVIUM STREAM FILL)					STREAM FILL
2	ALLUVIUM (STREAM FILL)					
11	LIMESTONE			?	QTZ	ORANGE SILICIFIED LIME
	DOLOMITIC BRN, OXID			60°	QTZ, CALCITE	DOLOMITE MASSIVE, OXIDIZE
	LIME DOLO GREY BLK				CALCITE	LIMEY DOLOMITE NON OXIDIZED FRIABLE
5	LIME DOLO BLACK GRY			?	CALCITE	FRIABLE, LIMEY DOLOM LESS VEIN CALCITE (POOR RECOVERY)
10% REC	SHALEY LIME BLACK GREY			60°	ABUNT CALCITE VEINS Dis Pyr.	HIGHLY FRIABLE SHALEY LI DISSEMINATED PYRITE CARBONACEOUS
2	LIME/BLACK SHALEY LIME			40°	ABUNT CALCITE VEINING CONTORTED BACT	- FAIRLY DENSE LIME GRADING TO SHALEY LI - PYRITE VEINLETS
35% REC	SHALEY LIME ALTERATD W/LIMEY SHALE			15°-50°	ABUNT CALCITE HIGHLY CONTORTED Dis & Vein Pyr	- ALTERNATING RYHC SHALES & LIME SHALES → HIGH LIME
85% REC	FAIRLY SHALEY LIME TO DENSE LI			40°	ABUNT CONTORTED CALCITE VEINS	- FAIRLY LIMEY CALCITE - LIMEY SHALES - CARBONACEOUS
	FAIRLY DENSE SHALEY LIME			45°	LARGE CALCITE VEINS	- CARBONACEOUS PYR LIMES - LIME DE NO MINERALIZA
100% REC	BLACK SHALEY LIME			20°	DIS. PYR CALCITE VEINS (LESS ABUN)	CARB. SHALEY LIME CONTORTED CALC VEI
10	BLACK SHALEY LIME			10°	CALCITE VEINS DIS PYR	CARB SHALEY LIME CONTORTED CALCITE

EXPLORATION DRILL HOLES

Drill Hole # WC-C1 Location TN. R. SEC

Depth 40' – 90' Date Drilled 7/21 & 7/31

0/0 REC

Comments:

Rock	Au	Aq	Dip Veins	Mineralization	Comments
DENSE BLK SHALY LIME			75°	SMALL TO MED. CONTORTED CALCITE VEINS	DIS. PYRITE DENSE
BLACK LIMEY SHALES			?	CALCITE VEINS	HIGHLY FRIABLE FAIRE LIMEY SHALE
BLACK LIMEY SHALES			?		
BLACK LIMEY SHALES			?	CALCITE VEINS	FAIRLY FRIABLE TOP LIMEY SHALE
NO CORE					
				HOLE PROBLEMS	
				CEMENTED TOP 40 CORE	
				RAN Reduced CASING	
				TO 60' = NX SIZE	
				COMMUNICATION W/ WC-20	
				POSSIBLE HYDRO FRACING	
BLACK CARBONACEOUS SHALE			?	SMALL THIN CALCITE VEINS	
BLACK CARBONACEOUS SHALES (DENSE)			50°	= HIGHLY FRIABLE = SMALL CALCITE VEINS = FAIRLY DENSE = SOME CONTORTED BEDDING = CALCITE VEINS FOLLOW BEDDING (USUALLY)	
BLACK CARBON-ACEOUS SHALES			75°	= SMALL CALCITE VEINS ALONG BEDDING = HIGHLY FRIABLE, SOFT = HIGHLY FRIABLE, SOFT = SWELLED	
BLACK CARB. SHALES			25°	= CALCITE VEINS CUT BEDDING AS WELL AS FOLLOW IT = LACK OF CALCITE VEINS 78 & 82 = MORE BROKEN UP AS A RESULT	

EXPLORATION DRILL HOLES

Drill Hole # DDCC 1 Location TN. R. SEC

Depth 80' - 120' Date Drilled 7/3

Comments: GEORGE LEWIT DRILLER

ft	Rock	Au	Ag	DID VEINS	MINERALIZATION	COMMENTS
80	BLACK CARB. SHALES			? NONE	- LACK OF CALCITE VEINS - BROKEN UP BABY - HIGHLY FRIABLE	
	BLACK CARB. SHALES				- FAIR DENSE SHALES PLATY - BRECIATION CONTORSION	
				30	- SOME CALCITE VEINING - SWELLING EVIDENT - DISEMINATED PYRITE < 1%	
90					- SANDY LAYER 27' - 27.4' THAT HAS CALCAREOUS CEMEN	
	BLACK CARB. SHALES			?	- CONTORTED BEDDING - DISEMINATED PYRITE - FAIRLY DENSE - LITTLE TO NO CALCITE	
	BLACK CARB. SHALES			?	- HIGHLY CONTORTED BEDDING - MINOR FAULTING EVIDENT - FAIRLY DENSE - SOME SMALL CALCITE VEINS	
100					- DISEMINATED PYRITE - BOTTOM HIGHLY FRIABLE AND CONTORTED	
	BLACK CARB SHALES			?	- SANDY LAYER - INTENSE BRECIATION - CALCITE FRACS - FAIRLY WELL CONSOLIDATED	
110					- CONTORTED BEDDING - DISEMINATED PYRITE	
	BLACK CARB SHALES			?	- INTENSE BRECIATION - HIGHLY CONTORTED BEDDING - PRESENCE OF CHLORITE? DISEMINATED PYRITE - FRIABLE, REDUCTION OF CALCITE	
120	BLACK CARB. LIMEY SHALES				- SANDY @ 116' CALC CEMEN DISEMINATED PYRITE - SMALL PYRITE VEIN @ 116.2 - EXTREMLY FRIABLE - CALCITE VEINS	
					EXTREMLY BRECIATED	

EXPLORATION DRILL HOLES

Drill Hole # WCC1 Location TN. R. SEC

Depth 120 - 160 Date Drilled 2[illegible]

Comments: GEORGE LEVETZ DRILLER

Rock	Au	Ag	Dip	Minor Units	Comments
BLACK CARB LIMY SHALE					- CALCITE VEINS - EXTREAME BRECIATION
BLACK CARB LIMEY SHALE			45°		- CALCITE VEINS - SMALL - SANDY LAYERS CALC. CEMEN - BRECIATION MODERATED - DIS PYRITE < .1%
BLACK CARB SHALE			?		- HIGHLY CONTORTED - CALCITE VEINS - EXTRA BRECIATION - DIS. PYRITE < .1% - MOD. CONSOLIDATED
BLACK CARB SHALE					- EXTREME BRECIATION.
BLACK CARB SHALE			?		- SMALL CALCITE VEINS - STOCK - POOR CONSOLIDATION WORK - SWELLING - DIS. PYRITE: < .1%
BLACK CARB SHALE					- SMALL CALCITE VEINS STOC - DIS. PYRITE < .1%
			60°		- LOW DEGREE BRECIATION - FRIABLE - MODERATED CONSOLIDATION
BLACK CARB SHALE					139' - 140' EXTREAMLY BROKEN
BLACK CARB SHALE			60°		MED TO LARGE CALCITE VEINS - PLATY - SMALL AMT PYRITE
BLACK CARB SHALE			?		- LARGE AMT CALCITE VEINS - POORLY CONSOLIDATED, BROKEN - DIS. PYRITE - CONTORTED BED
BLACK CARB SHALE			?		- LG. CALCITE VEIN AT 150' OF 1 - SM. CALCITE VEINS THROUGHOUT - FAIR CONSOLIDATION - CONTORTED BEDDING - PYRITE VEIN PRESENT DIS. P
BLACK CARB SHALE			?		- MICRO FAULTING 150' - HIGHLY CONTORTED BEDDING PLA - PYRITE VEINS DIS. PYRITE + MICRO FAULTINGS - FAIR CONSOLIDATION 154
BLACK CARB SHALE			?		- BRECIATED, CONTORTED WAVY CALCITE VEINS - SANDY LAYERS, WELL CONSOLIDATED - FRIABLE 158 - 160' - MINOR FAULTING - MINOR PYRITE

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location TN. R. SEC

Depth 160' – 200' Date Drilled 7/31/81

Comments: GEORGE LEVITT – DRILLER

Ft	Rock	Au	Aq	DIP VEINS	MINERALIZATION	COMMENTS
160	BLACK C. SHALE			?	- EXTREMELY FRIABLE 158 – 160 AND BRECIATED 161.	
70%	BLACK CARB. SHALE			?	- EXTREMELY FRIABLE AND BRECIATED - CRUMBLY. MINOR DISS PYR	LITE
100%	BLACK CARB SHALE				- SOME CALCITE FRAGS 164	
85%	BLACK CARB SHALE				- SANDY LAYER 165 – 165.2 / Calc - BRECIATED CRUMBLY 165.2 – 166.7 - MINOR DISS PYRITE - CALCITE PRESENT 167	
170	BLACK CARB SHALES			?	- SANDY LAYERS – CALC CEMENT - CALCITE VEINS - DISSEMINATED PYRITE – 1% / - SOME CONTORTED BEDS 170.	
95%	BLACK CARB SHALE			?	- SANDY LAYERS CALC CEMENT - BRECIATED, PLATY CONTORT - SOME SWELLING CLAYS ? 172	
180	BLACK CARB SHALES			30°	- SANDY LAYERS CALC CEMENT - FRIABLE SHALES - MINOR PYRITE ? - CONTORTED BEDDING 177.	
85%	BLACK CARB SHALES			35°	- WELL CONSOLIDATED - SANDY LAYERS – Ø CALC CEM - MINOR PYRITE - SOME CALCITE VEINS - SHALES FRIABLE 182 /	
85%	BLACK CARB SHALES			?	CLOSE CALCITE VEIN (or 183.3 - CAL. FRAGS. – PLATY SHALE - SANDY LAYERS - BRECIATED, MINOR FAULTED 185.	
80%	BLACK CARB SHALE W/ CALC SHALE			?	- SANDY LAYER 186 – 187.5 SOME VERT. DIP - MINOR FAULTING - CALCITE VEINS - INTERBEDDED SHALES & SANDS 189.4	
100%	BLACK CARB SHALES			?	- HIGHLY FRIABLE SHALES - CRUMBLY - SANDY LAYER – CALC CEM @ 191.7 - MINOR CALCITE VEINS 194.3	
	BLACK TO GREY INTERBED CALC. SAND & CARB. SHALE			45°	- WELL BRECIATED - WELL CONSOLIDATED - MOSTLY INTERBEDDED SANDS W/ ALT. SHALES - PYRITE VEINING - Calcite VEINS	
200						200.3

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location TN. R. SEC

Depth 20' - 243' Date Drilled 5/1/91

Comments: ACOUSTIC TELEVIEWER

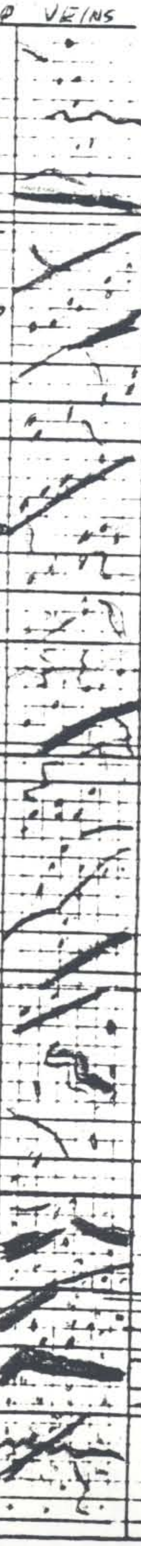
200ft	Rock	Au	Ag	DIP VEINS	MINOR LITH & MINOR ...
20%	BLACK TO GREY INTERBED CALC. SANDS & CARB. SHALES			?	- WELL BRECIATED, BROKEN - MOD. CONSOLIDATION - SHALES FRIABLE - SANDS WELL CEMENTED W/ CaCO3 - CALCITE VEINS 20ft.
	CARB. SHALES			?	- EXTREMELY FRIABLE SHALES - CRUMBLY = SOFT CALCITE
100	BLACK TO GREY SHALEY LIMESTONE AND CALC. SANDS			?	- BRECIATED - MINOR DIS. PYRITE - WELL CONSOLIDATED - SOME SANDS - CALC. CEMENT - CALCITE VEINS THROUGHOUT
210					- GREY DENSE SHALEY LIMES - CONTORTED ON BOTTOM OF INTERVAL 212
80%	BLACK TO GREY CARB SHALEY LIMESTONE AND CALC. SANDS				- BRECIATED, JUMBLED - MINOR DIS. PYRITE
180				?	- WELL CONSOLIDATED - CALCITE VEIN. THROUGHOUT - SOME CALC. SANDS - GREY SHALEY LIMESTONES
220					- GRADING INTO CARB LIMEY SHALES 222.8
100	BLACK TO GREY CARB LIMEY SHALES & CALC. SANDS			?	- BRECIATED, SOME FRIABLE SHALES - MOSTLY LIMEY SHALES - CALCITE VEINING - FEW CALC. SANDS - LITTLE OR NO PYRITE 227.1
230	BLACK TO GREY				- BRECIATED - WELL CONSOLIDATED - MOSTLY LIMEY SHALES
100	CARB LIMEY SHALES			?	- CALCITE VEINS - PYRITE VEIN ON BOTTOM - SOME CALC. SANDS INTER & FRAGS. 235.3
100	BLACK TO GREY CARB SHALES			?	- BRECIATED - CALC. SANDS THROUGHOUT - CALCITE VEINS - WELL CONSOLIDATED - LITTLE OR NO PYRITE
243					

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location [illegible] TN. R. SEC

Depth 240'-280' Date Drilled [illegible]

Comments: [illegible]



Depth / Recovery	Rock	Au	Ag	Dip	Comments
240' 100%	GREY TO BLACK CARB. LIMEY SHALES			?	- BRECIATION. - MOSTLY LIMEY SHALES - CALCITE VEINS. - WELL CONSOLIDATED. - SAND LAYERS ALMOST VER[T] 245.3
100%	GREY TO BLACK CARB LIMEY SHALES			48°	- SANDS (CALC. CEMENT) INTERBEDDED W/ SHA[LES] - CALCITE VEINS - LITTLE OR NO PYRITE - WELL CONSOLIDATED
250 100%	GREY TO BLACK CARB LIMEY SHALES			45°	- MINOR BRECIATION 251.1 - CALC. SANDS INTERBEDDED W/ LIMEY SHALES - CALCITE VEINS - WELL CONSOLIDATED
100%	GREY TO BLACK CARB LIMEY SHALES			?	- MINOR BRECIATION 255.3 - INCREASE IN BRECIATION - MOD. CONSOLIDATION - SAND LAYER - CALCITE VEINS 259.[illegible]
260 100%	GREY TO BLACK CARB LIMEY SHALES			?	- MOD CONSOLIDATION TO 262 - EXTREMELY BROKEN & FRIAB[LE] BELOW 262' (POSSIBLE FAULT ZONE) - SANDS - HIGH BRECIATION - THICK CALCITE VEINS 265.4
100%	GREY TO BLACK CARB LIMEY SHALES			?	- POOR CONSOLIDATION - INTENSE BRECIATION (FAULT BRECCIA) - CALCITE VEINING W/ CHLOR[ITE] - CRUMBLY FRIABLE - LITTLE OR NO PYRITE 271.0
270 100%	GREY TO BLACK CARB LIMEY SHALES			?	- CRUMBLY ON TOP (BRECCIATED) - LARGE CALCITE VEINS W/ CHLO[RITE] - DISEM. PYR. - MOD. CONSOL. TO BOTTOM 273.5
	GREY TO BLACK CARB SHALE			0° 5°	DIS. PYRITE & VEINS CALCITE VEINS W/ CHLORITE (LESS) - MODERATE CONSOL. - CALC. SAND LAYERS, FLAT LYIN[G] - LOST LIMEY, CALCITE VEINS 27[illegible]
280	GREY TO BLACK CARB SHALE			?	CONTORTED BEDDING BRECIATED - NO LIME IN SHALES - SANDS, CALCITE VEINS - DIS PYR VEIN 279.5

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location ______ TN. ______ R. ______ SEC ______

Depth 280' - 320' Date Drilled 8/1/81

Comments: [illegible]

Depth	Recovery	Rock	Au	Ag	Dip	Veins / Mineralization / Comments
280'	100%	BLACK TO GREY CARB SHALES			?	- BRECIATED, CONTORTED - CALCITE VEINS W/ CHLORITE - DIS. PYRITE - LARGE SAND LAYER ON BOT (WELL SORTED & ROUNDED) CALCITE CEMENT - FRIABLE SHALES 284.5
	100%	BLACK TO GREY CARB SHALES			?	- HIGHLY BRECCIATED CONTORTED - SAND FRAGS., CALCITE W/CHLORITE VEINS - DIS. PYRITE - SHALES FRIABLE 287.8
290		BLACK TO GREY CARB SHALES			?	- SAND FRAGS. WELL CONSOLIDATED - CALCITE VEINS W/CHLORITE - LESS LIMEY - MINOR SB - SHALES FRIABLE 291.0
	100%	BLACK TO GREY CARB SHALES			?	- BRECIATED HIGHLY CONTORTED - CALCITE W/ CHLORITE - EXTREMELY BROKEN, FRIABLE SHALES - DIS. PYR., SAND FRAGS. 294.3
	100%	BLACK TO GREY CARB SHALES			?	- SAND (CALC) FRAGS. - HIGHLY BRECIATED - SHALES, FRIABLE & PLATY
300	100%	BLACK TO GREY CARB SHALES			?	- CHLORITE, LITTLE CARB VE. - PYRITE IN CHLORITE VEINS - MICA PRESENT ALSO IN (SERICITE)
	100%	BLACK TO GREY CARB SHALES			?	- SANDS (CEMENT CHLOR) 300. - DECREASE IN CALCITE VEIN - PYRITE IN CHLOR SANDS - CONTORTED BEDDING - SHALES BRITTLE 303.7
	100%	BLACK TO GREY CARB SHALES			?	- PYRITE IN CHLORITE SANDS - LITTLE CALCITE - SHALES FRIABLE CONTORTED 307.1
310	90%	BLACK TO GREY CARB SHALES			?	- DIS & VEIN PYRITE SOME OXIDIZED - PLATEY & FRIABLE SHALES - LITTLE CALCITE VEINING - SANDS CHLORITE CEMENT - BRECIATED ON BOTTOM 313.0
		BLACK TO GREY CARB SHALES			?	- SHALES [illegible] FRIABLE 314.6 - [illegible] - [illegible] 315.2 - PYRITE [illegible] - [illegible]
320						

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location _____ TN. _____ R. _____ SEC _____

Depth 320-360' Date Drilled 8/1/81

Comments: [illegible]

ft	Rock	Au	Aa	DIP VEINS	MINERALIZATION & COMMENTS
320					
100%	BLACK TO GREY CARB SHALES			?	- BRECIATED CRUSHED CONTORTED - SHALES FRIABLE PLATY - CHLORITE & CEMENTED SANDS (MICA) - PYRITE IN 327
100%	BLACK TO GREY CARB SHALES			?	- HIGHLY BRECIATED ON TOP - LESS SANDS CHLORITE, $CaCO_3$ - SHALES, PLATY / FRIABLE
100%	BLACK TO GREY CARB SHALES			?	- MICA / DES. PYRITE 325-8 - FRIABLE WELL CONSOLIDATED - SOME CALCITE & CHLORITE VEIN - PYRITE & OXIDED PYRITE IN - LITTLE OR NO SANDS
330	A				- CONTORTED & MICRO FAULTS 330
100%	BLACK TO GREY CARB SHALES			?	- EXTREMELY FRIABLE - QTZ VEINING 332 - CALCITE & CHLORITE - BRECIATED & CONTORTED - PYRITE IN VEINS
100%	BLACK TO GREY CARB SHALES			?	- FRIABLE, PLATY SWELLING - QTZ, $CaCO_3$ CHLOR. VEINING - PYRITE IN VEINS DESIM. 337
340 100%	BLACK TO GREY CARB SHALES			?	- FRIABLE, BRITTLE - CHLORITE & $CaCO_3$ VEINS - DIS. & VEIN PYRITE
100%	BLACK TO GREY CARB SHALES			?	- RECOMING WELL CONSOLIDATED - CHLORITE - SOS
100%	BLACK TO GREY CARB SHALES			?	- FAIRLY WELL CONSOLIDATED - $CaCO_3$ CHLORITE VEINS - DIS PYRITE
4'8"	BLACK TO GREY CARB SHALES			?	- WELL CONSOL PLATY - LOST 3.1' MISLATCH - DIS. PYRITE - SOME $CaCO_3$ CHLORITE VEINING
350					- SILICA CEMENTING - SOME CONTORTED BEDS 350.4
85%	BLACK TO GREY CARB SHALES			?	- SHALES WELL CONSOL, PLATY LL - SANDS CEMENTED W/ SILICA - SOME CHLORITE & $CaCO_3$
					- CONTORTED & FAULTED BEDDING - DIS PYRITE
100%	BLACK TO GREY CARB SHALES			?	- SHALES LESS CONSOL. PLATY - BRECIATED SANDS FRIESL - SANDS CEMENTED W/ MANY $CaCO_3$ CHLORITE SILICA
360					

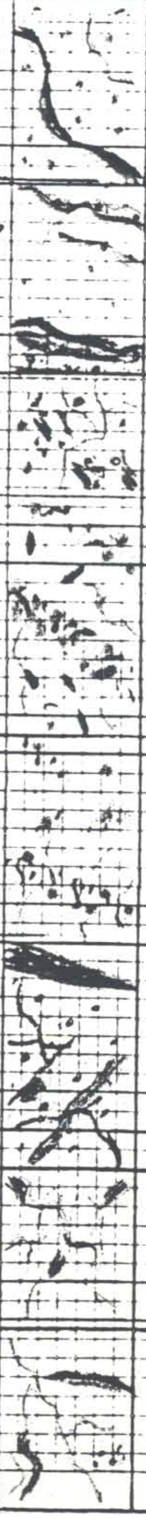
2.1'

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location ______ TN. ______ R. ______ SEC ______

Depth 360'–400' Date Drilled [illegible]

Comments: [illegible]

Ft / Recovery	Rock	Au	Ag	D.P.	Veins	Mineralization / Comments
360 / 100%	BLACK TO GREY CARB SHALES			?		360.7 – FAIRLY WELL CONSOLID., PLATY – SANDS + CHLORITE, SILICA, MINOR CACO – FRAGMENTED – SOME $CACO_3$ VEINS, DIS PYRITE – WELL BRECIATED ON BOTTOM 36[illegible]
90%	BLACK TO GREY CARB SHALES			70° TOP / 50° BOT		– CONTORTED BEDDING, SMALL FOLDS – SANDS (SILICA CACO, MINOR CHLORITE CEMENT) – FAIRLY WELL CONSOLIDATED – BEDDING ABSENT ON BOTTOM 367.[illegible] – LARGE $CACO_3$ QTZ CHLOR. VEIN ON BOTTOM, WELL BRECIATED – MINOR PYRITE IN VEIN – SMALL FRAGS IN VEIN (BRECCIA) ON BOTTOM
370 / 85%	BLACK TO GREY CARB SHALES			?		37[illegible] – EXCESSIVE BRECCIATION – SAND FRAGS – MINOR CHLORITE, PYRITE, SILICA – MED. CONSOLIDATION. – CALCITE CEMENT IN SANDS & $CACO_3$ VE[INS] 37[illegible]
	WELL BRECIATED					– INTENSE BRECIATION, NO CONSOL. IN SHALES – CRUMBLY, FRIABLE
90%	BLACK TO GREY CARB SHALES			?		– SEVERAL LARGE SANDS (CHLOR, CACO CEMENT (MINOR SILICA) 376 – MINOR PYRITE IN SANDS – SMALL QTZ CALCITE VEINS IN SANDS. – SAND IS WELL SORTED, FINE GRAINED 3[illegible]
380 / 100%	BLACK TO GREY CARB SHALES			?		– MED CONSOLIDATION LESS BRECCIAT[ED] – SAND FRAGS WELL CEMENTED – MINOR QTZ VEINS – MINOR CHLORITES, DIS PYRITE – SANDS W/ CALCITE & QTZ VEINS, MINOR PYRITE & CHLORITE 383
100%	WELL CONSOLID. LIGHT GREY LIMEY SANDS			65°		38[illegible] – 2.1' TRUE THICKNESS WELL CONSOLIDATED LIMEY SAND (FINE GRAINED) – QTZ MORE PROMINENT ON TOP AND GRADES INTO A LIMEY CEMENT ON BOTTOM – QTZ CALCITE VEINING PROMINENT – MINOR CHLORITE – SERICITE – LITTLE TO NO SULFIDES
390 / 30%	BLACK TO GREY CARB SHALES			?		– SHALE FRIABLE, CRUMBLY, PLATY – POOR RECOVERY ON TOP – CALCITE QTZ VEINING MINOR CHLORITE – LIMEY ON BOTTOM – SERICITE PRESENT 39[illegible]
80% / 400	BLACK TO GREY CARB. SHALES			?		– CRUMBLY, BADLY BROKEN, POOR CONSOLIDATION, BEDDING NEAR VERT. – SOME CALCITE VEINING – LIMEY SHALES – GRAPHITE SURFACES, CLEAVAGES – MINOR CHLORITE – LITTLE TO NO PYRITE SEEN

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location TN. R. SEC

Depth 400'–440' Date Drilled 2/6/81 – 3/4/81

Comments: Location Elevation Diameter

ft	Rock	Au	Ag	Dip	Veins	Mineralization	Comments
400	BLACK TO GREY CARB. SHALES			?		– OCCATIONAL SAND FRAGS. – VERTICAL BEDDING	40
100%	BLACK TO GREY CARB. SHALES			?		– PLATY. BADLY BROKEN SHALES – LIMEY – VERT. BEDS – GRAPHITE ON CLEAVAGE PLANES – POOR CONSOLIDATION	
100%	BLACK TO GREY CARB SHALES					– FAIR CONSOLIDATION. CONTORTED BEDDIN	
	SHALEY			?		– CALCITE VEINS SMALL. MINOR CHLORITE – BRECCIATION INCREASING – VERTICAL BEDDING MINOR PYR. 40?	
100%	BRECCIA					– POSSIBLE FAULT ZONE – FRABCE – INTENSE BRECCIATION SAND – LIMEY. SMALL $CaCO_3$ VEINS	
410				?		– DIS PYRITE	4
						– FAULTS PRESENT – CHLORITE – FAIR CONSOLIDATION ON TOP	41
	SHALEY					– INTENSE BRECIATION – FAIR CONSOLIDATION	
	BRECCIA			?		– SERICITE THROUGHOUT INTERVAL	
100%						– SAND FRAGS. $CaCO_3$ CEMENT – MINOR CHLORITE – SMALL CALCITE VEINS – DIS. PYRITE POOR CONSOLIDATION ON BOTTOM	416
420	INTERBED SANDS CARB SHALES AND LIME					– 4" SAND ON TOP WELL CONSOLIDATED	
100%				60°		– LARGE CALCITE VEINS VEIN – $CaCO_3$ VEINS CUT BY CALCITE VEINS – DIS. PYRITE ; MINOR CHLORITE – LIME & LIMEY SHALE LAYERS. FA – HIGHLY CONTORTED BEDDING. 42 – SERICITE – PARTINGS IN SHALES	
	BLACK TO GREY CARB SHALES					– OCCASIONAL SAND FRAGS – MINOR – SOME INTRUSIONS	$CaCO_3$
LOST				?		– PLATY – FAIRLY CONSOLID. – INCREASE IN CHLORITE – GRAPHITE IN CLEAVAGE PLANE – DIS PYR ; SERICITE – LIMEY ON BOTTOM OF INTERVAL	
430						– CHLORITE IN SANDY LAYERS	432
	BLACK TO GREY CARB SHALES					– SAND – SILICA & MINOR CALCITE CEME ON TOP FINE GRAIN – WELL CONSOLIDATED	
				?		– WELL CONSOLIDATED – BRECCIATION CONTORTED BEDDING	
						– SAND FRAGS THROUGHOUT – CHLORITE, $CaCO_3$ VEINING MINOR – MINOR PYRITE	CONTORTED 427 433
	WELL CONSOL BLACK TO GREY			?		– CHLORITE IN SANDS MINOR $CaCO_3$ – PYRITE IN SAND LAYERS	
440	CARB SHALE					– SHALES WELL CONSOLIDATED	

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location TN. R. SEC.

Depth 440'-480' Date Drilled 7/4/81 - 7/5/81

Comments: GEOLOGIST PRATT, DRILLER

	Rock	Au	Aa	Dip	Veins	Mineralization / Comments
440						
90%	WELL CONSOL BLACK TO GREY CARB SHALES			?		- ABUNDANT SERICITE - CONTORTED BEDDING - MICROFAULTS COMMON - QTZ & CaCO3 VEINS - PLATY CLEAVAGE 442.'
	↑ WELL CONSOLIDATED					- WELL CONSOLIDATED, SHALES - SAND LAYERS - CHLORITED, CONTOR
	BLACK TO GREY CARB SHALES			40°		≈ .1 → ABUNDANT PYRITE, SERI MINOR CALCITE VEINS & QT
100%				—		- PYRITE DISSEMINATED THROUGHOUT
				70°		- CONTORTED, WAVY BEDDING - CHLORITIZED SAND LESS ABUNDANT ON BOTTOM OF INTERVAL
450						- BRECIATION INCREASING AT BOTTOM 451.'
	BRECIATED BLACK TO GRAY CARB SHALES					- FAIR CONSOLIDATION AT TOP (CRUMBLY) - POOR CONSOLIDATION, FRIABLE FROM 455 TO 458. BRECIATED
95%				7		- SAND FRAGS CONTAIN ABUNDAN ARSENOPYRITE — DIS PYRITE THROU
						- LESS PROMINENT THAN ABOVE INTERVAL - MINOR CALCITE VEINS, SER - LITTLE TO NO QTZ 458.
460	BRECIATED					- FAIR CONSOLIDATION
	BLACK TO GREY CARB SHALES					- SAND FRAGS. OF PYRITE (ARSENOPYRITE)
100%						- LESS ABUNDANT
				7		- MINOR CALCITE VEINS
						- BRECIATED THROUGHOUT INTERVAL = MICROFAULTED & FRACTURES
						- CONTORTED BEDDING - CHLORITE SHALES THINNED - SERICITE 466.'
	FAIR CONSOL BRECIATED BLACK TO GREY CARB SHALES					- FINE TO WELL CONSOLIDATED - CONTORTED & BRECIATED - SAND FRAGS IN A GRAINY MATRIX - CALCITE VEINS - ARSENOPYRITE IN SANDS
100%				8		- MICROFAULTS - LITTLE TO NO QTZ
470						- SAND LAYERS THINNED CONTORTED. CHLORITIZED W/MINOR PYRITE - BRECIATED 471.'
	POOR CONSOL BRECIATED BLACK TO GREY SHALES					- HIGHLY BRECIATED CRUMBLY - EXTREMELY FRIABLE, CONTORTED - CHLORITIZED DECREASING
90%				60		- SAND FRAGS (CaCO3) 476.' - INCREASE IN CALCITE VEINING - LITTLE TO NO QTZ PYRITE IN SANDS
480						476

EXPLORATION DRILL HOLES

Drill Hole # WCC-1 Location TN. R. SEC

Depth 480'-500' Date Drilled 4/6/81 - 4/8/81

Comments: SURFACE ALLUVIUM OXIDIZES MORE POSSIBLE ARSENOP

	Rock	Au	Ag	DIP VEINS	MINERALIZATION
480	BRECIATED BLACK TO GREY CARB. SHALES			?	- CHLORITIZATION INCREASING IN - INCREASE IN SULFIDES IN SANDS - MINOR CALCITE VEINS - CONTORTED & BRECIATED BEDS - FAIR CONSOLIDATION - SMALL FAULTS SMALL QTZ VEINS
	BLACK TO GREY CARB SHALES			35°	- HIGHLY SILICIFIED IN TOP - QTZ & CALCITE VEINS - ABUNDANT ARSENOPYRITE & PYRITE - FAIR CONSOLIDATION; BRECIATION
490	CRUMBLY BLACK TO GREY CARB. SHALES			?	- HIGHLY FRIABLE "CRUMBLY" - CHLORITE CALCITE - PLATY BRECIATED. POOR CONSO - SOME SANDS - CHLORITIZED - MINOR ARSENOPYRITE & PYRITE, SERICITE - GRAPHITE ON CLEAVAGE PLA - CONTORTED BEDDING
500	BLACK TO GREY CARB SHALES			0°	- NEARLY FLAT LYING BEDS ON TO - FAIRLY WELL CONSOLIDATED - ARSENOPYRITE & PYRITE DIS - BRECIATED & CONTORTED BE
					T.D. - 500 ft 4/6/81 - QTZ VEINS ON BOTTOM

APPENDIX 5

Mining Districts

MINING DISTRICTS

STARTING AT THE LANDER-NYE COUNTY LINE, AND CONTINUING ALONG THE EAST SIDE OF THE TOIYABE MOUNTAIN RANGE. THE MINING DISTRICTS WITHIN SMOKEY VALLEY ARE:

1. BLUE SPRINGS MINING DISTRICT

ORGANIZED: 1892

AREA: EXTENDS FROM THE LANDER-NYE COUNTY LINE TO CLEVELAND CANYON AND INCLUDES BROTHERS WATER CANYON; WHICH IS THE NORTHWEST FORK OF PARKS CANYON. INCLUDES BOWMAN,AIKEN,DECKER,ALICE GENDTON,DECKER BOB,McLEOD,GREENHALGH,TRAIL,CLEVELAND, AND BROTHERS WATER CANYONS.

2. MILLETT MINING DISTRICT

ORGANIZED: 1904

AREA: REMOVED FROM THE TWIN RIVER MINING DISTRICT THE AREA OF PARKS, WILDCAT, CLAY, MOES, AND MICHELS CANYONS.

3. TWIN RIVER MINING DISTRICT

ORGANIZED: 1864

AREA: FROM PARKS CANYON ON THE NORTH, INCLUDED ALL OF THE LATER MILLETT MINING DISTRICT, AND CONTINUES SOUTH THROUGH SUMMIT, WISCONSIN, OPHIR, LAST CHANCE, HERCULES, NORTH TWIN RIVER, SOUTH TWIN RIVER, BELCHER, AND COVE CANYONS.

4. JETT MINING DISTRICT

ORGANIZED: 1876

AREA: THE DRAINAGE OF JETT AND BROAD CANYONS.

5. ANTELOPE MINING DISTRICT

ORGANIZED: 1881

AREA: PABLO, WALL, AND ANTELOPE CANYONS

6. TOYABE MINING DISTRICT

ORGANIZED: 1878

AREA: BOYD AND WOODS CANYONS

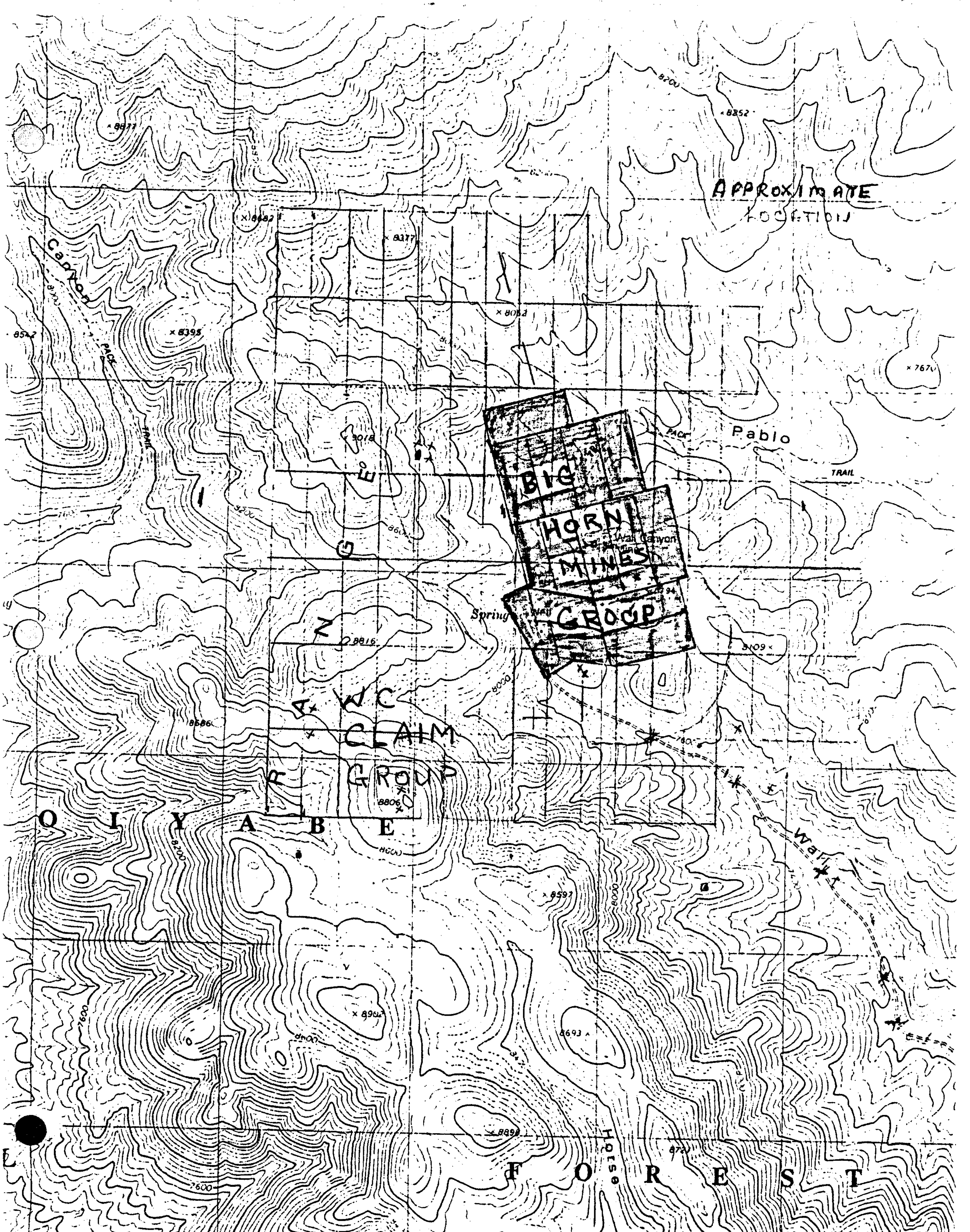
7. PEAVINE MINING DISTRICT

ORGANIZED: 1906

AREA: ALL OF THE PEAVINE DRAINAGE AND THE HEADWATERS OF THE REESE RIVER; AS FAR WEST AS POPULAR CREEK (NOW CALLED BEASON CREEK).

APPENDIX 6

General Information


APPROXIMATE LOCATION
BIG HORN MINES GROUP
W C CLAIM GROUP
Pablo
PACK TRAIL
Canyon
Wall Canyon
Spring
Wall
Horse
R A N G E
T O I Y A B E
F O R E S T
8852
8677
8682
8377
8395
8542
8052
7670
9018
8816
8686
8806
8597
8962
8693
8898
8109
8200
8600
8000
7600

(234) Item 10

PROPERTY NAME: Last Chance Mine
OTHER NAMES: Big Horn Antimony Mine
MINERAL COMMODITY(IES): Antimony, silver
TYPE OF DEPOSIT: Vein, Sheer zone
ACCESSIBILITY: Via dirt road up Wall Canyon
OWNERSHIP: Gerald Doyle, Dale Clouser, 1983
PRODUCTION: 192 tons antimony metal through 1963 (Lawrence, 1963)
HISTORY: Discovered in 1915, produced during WWI, WW II, 1947-55, 1957-58

County: Nye
Mining District: Jett
AMS Sheet: Tonopah
Quad Sheet: Toms Canyon
Sec. Unsur, T _____, R _____
Coordinate (UTM):
North 4,285,160 m
East 0,475,000 m
Zone +11

DEVELOPMENT: Vertical shaft, lower intersecting adit, cuts, trenches

ACTIVITY AT TIME OF EXAMINATION: None, but property has been drilled within the past one or two years, ue fresh trenching done and two old portals have been cleaned and reopened, probably this year)85).

GEOLOGY: Recent work above and east of the old main shaft exposes a N55W, NE-dipping quartz-carbonate vein. Vein material is streaked green from copper probably from oxidizing t tetrahedrite. Dark sulfide (tetrahedrite?) disseminated throughout the vein outcrop. Ore specimens collected on the dumps near the main shaft consist of massive stibnite with white quartz, calcite and fragments of black carbonaceous shale. Wall rock of the vein is carbonaceous shale and limestone.

Sample sites 2688, 2689

REMARKS: Exposures at the main portal are not good, outcrop at sample site 2688 may, however be the principle structure.

REFERENCES: Kral, 1951, Lawrence 1963, Kleinhampl and Ziony, 1984.

EXAMINER: J.V. Tingley
DATE VISITED: 10/1/85

(234) Item 11

PROPERTY NAME: Big Horn #7 Claim
OTHER NAMES: Last Chance Mine
MINERAL COMMODITY(IES): Antimony
TYPE OF DEPOSIT: Vein, shear zone
ACCESSIBILITY: Via 4WD road from L.C. mine
OWNERSHIP: Gerald Doyle, Dale Clouser, 1983
PRODUCTION: Unknown
HISTORY: Unknown

County: Nye
Mining District: Jett
AMS Sheet: Tonopah
Quad Sheet: Toms Canyon
Sec. Unsur, T _____, R _____

Coordinate (UTM):
North 4 1 2 8 5 3 6 0 m
East 0 4 7 4 6 8 0 m
Zone +11

DEVELOPMENT: One adit

ACTIVITY AT TIME OF EXAMINATION: None, but adit has been recently cleaned out and retimbered at portal, drilling in area within past year or two.

GEOLOGY: A N60-65E, 50SW-trending fault zone is exposed at the portal of the adit, wall rock here is a rubble of black, carbonaceous shale, limestone, and chert cemented with orange and orange-brown iron oxides. Blocks of rhyolite dike are found in the colluvium above the portal, possibly the dike follows the fault zone. Vein material collected from the dump consists of clots and disseminations of stibnite in white quartz with calcite, iron and antimony oxides, pale blue-green oxide mineral stains the quartz-possibly indicates the presence of tetrahedrite.

Sample Site 2690

REMARKS:

REFERENCES:

EXAMINER: J.V. Tingley

DATE VISITED: 10/1/85

United States Department of Agriculture
Forest Service
Toiyabe National Forest
Tonopah Ranger District
P.O. Box 3940 - Tonopah, NV 89049

Reply to 2810

Date December 12, 1985

Mr. Gerald A. Doyle
P.O. Box 350
Round Mountain, NV 89045

Dear Mr. Doyle:

The plan for dewatering the C-100 level adit as outlined in the enclosed environmental assessment is hereby approved. This is an approval of your operating plan 04/86/005. It is unnecessary to resubmit an operating plan each year for items approved in a previous plan. We do appreciate being informed of your progress.

If I or my staff can be of further assistance don't hesitate to call.

Sincerely,

Guy W. Pence

GUY W. PENCE
District Forest Ranger

Enclosures

NOTICE OF INTENTION TO OPERATE OR BASIC OPERATING PLAN Ref. 36 CFR 252 FSM 2850	TOIYABE	TONOPAH	WALL & PABLO CANYONS
	d. State NEVADA	e. County/Counties NYE	f. Mining District ANTELOPE
	g. Type of Claim or Claims: Lode ☒ Placer ☐ Mill Site ☐ Tunnel Site ☐	h. Operation: New ☐ Continuing ☒ Reactivating ☐	FOREST SERVICE USE: Forest Service Region & Unit No. 2850 Date Rec'd

NOTE: (INSTRUCTIONS TO OPERATORS. Please complete in as much detail as possible. Use maps and sketches where appropriate. Additional sheets can be used if necessary. Completed information should be furnished to District Ranger's office.) To the extent authorized by law this information will be held confidential. As an agency of the Federal Government, the Forest Service is required to comply with the Freedom of Information Act.

NOTICE OF INTENTION TO OPERATE.

Notice is hereby given that the undersigned intends to conduct prospecting, mining, or milling operations, etc., on the claim(s) and/or unclaimed federal lands as indicated below.

NAME OF CLAIMS ON WHICH OPERATIONS WILL BE CONDUCTED	NAME OF OWNER AND ADDRESS	LOCATION Section	Township	Range	LOCATION Date
BIG HORN & WC	GERALD A. DOYLE	16-17-18-19	10 N	42 E	ORIGINAL BIG HOR
	JANET B. DOYLE	20-21-22	10 N	42 E	1980
	P.O. BOX 350	28-29-30	10 N	42 E	WC JAN & JUNE 19
	ROUND MOUNTAIN, NEVADA 89045				
UNCLAIMED LANDS ON WHICH OPERATIONS WILL BE CONDUCTED: NONE					

ACCESS - Describe the type and standard of the proposed means of access and the means of transportation to be used (such as 4-wheel drive vehicle, tractor, pickup, etc.). Furnish a map showing the proposed route of access and relationship to claims or unclaimed lands noted above.

NOTE: Construction, reconstruction, or restoration of a road as a means of access across National Forest System lands or unpatented mining claims will be authorized separately by issuance of a special-use permit. (If an operating plan is required, it must be approved in writing by the authorized officer prior to the issuance of the special-use permit.)

TRANSPORTATION WILL INCLUDE DUMP TRUCKS (10 WHEEL) PICKUPS; AND OTHER EQUIPMENT AS REQUIRED

PROPOSED OPERATION (Describe proposed surface disturbing activities, such as backhoe, trenching, drill road construction, tunnel site development, settling ponds, bulldozer exploration, etc.) Furnish a map showing location of proposed operations and relationship to claims or unclaimed lands noted above.

NOTE: Work roads within the claims will be covered by the Operating Plan.

SEE ATTACHED SHEET "PROPOSED OPERATIONS"

OPERATION IS A CONTINUATION OF THE 1985 PLAN

reclaim the disturbed areas.

NOTE: Operations, including access, shall be conducted so as to minimize adverse environmental impacts on National Forest surface resources.

PLACE TEMPERARY DAM FOR MINE WATER DISCHARGE IF NEEDED

PERIOD OF OPERATION - Period or periods during which operations, including road work, and use will take place.

Road Work: AS WEATHER PERMITS /Other Operations: ON GOING

OPERATOR'S NAME (Print or type)	ADDRESS	TELEPHONE NUMBER
GERALD A. DOYLE	P.O. BOX 350 ROUND MOUNTAIN NEVADA 89045	377-2332

SUBMITTED BY AND DATE: Gerald A. Doyle 10/25/1985

FOREST SERVICE EVALUATION

NOTICE TO OPERATORS:

(1) Approval of this operating plan does not constitute certification of ownership to any person named as owner herein.

(2) Approval of this operating plan does not constitute recognition of the validity of any mining claims named herein, or of any mining claim now or hereafter covered by this plan.

This operation would cause a significant disturbance of surface resources? Yes ☐ No ☒

The information provided is sufficient to constitute a basic operating plan?
Yes ☐ No ☐ and an operating plan must be prepared and submitted to this office.

A special-use permit is required? Yes ☐ No ☐

☐ A bond in the amount of _____ in the form of cash or surety to assure reclamation as described under "Environmental Protection Measures" and item 2 of the Evaluation and Report of Notice is required.

☐ No bond is required.

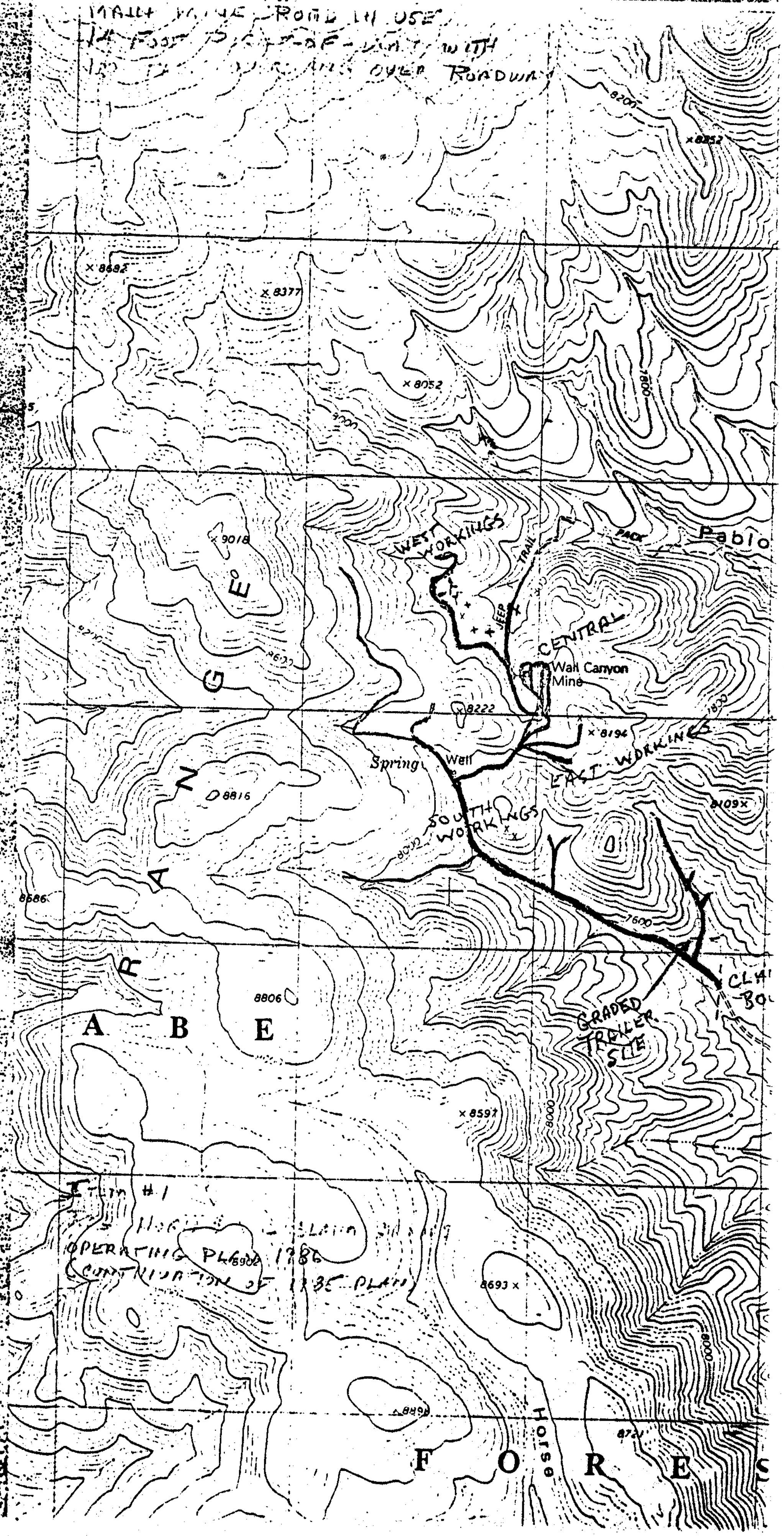
(3) Antiquities Act of 1906 (P.L. 59-209).
NOTE: "That any person who shall appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department by the Government having jurisdiction over the lands on which said antiquities are situated, shall, upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court."

(4) Approval of an operating plan does not constitute permission of the Secretary so as to relieve the operator from criminal prosecution under the Antiquities Act.

Evaluated by:	Date:	Signature:	Title:
Approved by (Authorized Officer):	Date:	Signature:	Title:

BIG HORN & W/C CLAIM GROUPS OPERATING PLAN FOR 1986. (CONTINUATION OF 1985 PLAN)

1. MINE ROADS (GREEN) TO BE INCLUDED IN THE MINEPL
2. CONTINUE OPENING EAST AND WEST ADITS OF THE WEST WORKINGS. REQUIRES AN ADDITIONAL AREA (APPROX) 35 FEET X 70 FEET TO BE REMOVED FROM THE EAST AD FENCE BIG BLUE SHAFT.
3. PLACE TRESTLE OVER LOWER ROAD AT EAST WORKINGS. LAY TRACK.
4. MOVE PRESENT STOCK PILES FROM THE CENTRAL WORKINGS APPROX 500 FEET SOUTHEAST OF PRESENT LOCATION.
5. CONTINUE WORK AT LEVEL C-100. WHEN OPEN, DEWATER LEVELS C-140 & C-115, C-185 FOR EVALUATION. LAY TRACK.
6. REMOVE ALLUVIAL AT PORTAL OF C-15 ADIT.
7. REMOVE BRUSH & SMALL TREES AROUND GENERATOR SHED AND CENTRAL SHAFT AREA.
8. PLACE SELF CONTAINED TRAILER AT SITE CLEANED OFF FOR THAT PURPOSE DURING 1985.


OVER ROADWAY
8200
8852
8682
8377
8052
WEST WORKINGS
TRAIL
JEEP
PACK
Pablo
9018
CENTRAL
Wall Canyon Mine
8222
8194
Spring
Well
EAST WORKINGS
8816
SOUTH WORKINGS
8109
8686
7600
8806
A B E
GRADED TRAILER SITE
8597
OPERATING PLAN 1986
8902
8693
F O R E S
Horse
8721

Decision Notice, Environmental Assessment
and
Finding of No Significant Impact
for
Operating Plan #04-86-005
Gerald Doyle-Wall Canyon

Decision Notice

It is my decision to approve Operating Plan 04-86-005 submitted by Gerald Doyle for his claims in Wall Canyon. These claims are in Sections 16 through 22, and Sections 28 through 30, T. 10N., R. 42E. MDM in Nye County Nevada. All but one item had been approved on May 6, 1985 under last year's operating plan. The item not previously approved but approved in this operating plan called for building a reservoir to temporarily store water from the central addit which must be dewatered to allow sampling. The alternative approved for this purpose is (D) to build a reservoir on previously disturbed land immediately adjacent to the addit. Water will be allowed to percolate and evaporate from this impoundment. Alternatives to this were A, no action; B, build a dam in the canyon below the addit; C, pump to the opposite side of the mountain and allow the water to run off overland.

My decision is based on minimizing resource disturbance, ease of reclamation, economic considerations for the operator and feasibility.

Environmental Assessment

Gerald Doyle submitted operating plan 04-86-005. All but one item had been approved in FY 85. Mr. Doyle needs to dewater the central addit on his claim group in order to sample that addit. Water samples provided to Harry Van Drielan of the Nevada EPA indicate low toxicity and near neutral pH. Mr. Van Drielan's comments are in Appendix A.

Originally Mr. Doyle wanted to place an impoundment in the Canyon below (in elevation) and north of the addit or to pump the water over the ridge southwest of the addit and allow it to flow overland. On November 16, 1985 Mr. Doyle and Bud Henderson met on the site to determine the best alternative. The alternatives considered and the mental evaluation done are summarized in the following paragraphs

Alternative A is the No Action Alternative. Mining laws and Forest Service Policy based on those laws guarantee reasonable access to mineral operators for the purpose of discovery and development of the mineral resource. Though a No Action Alternative is required under N.E.P.A., it would be unreasonable to expect an operator to explore an addit without first removing the water.

Alternative B calls for building a dam in the narrow canyon below the addit. The canyon is relatively steep (between 10% and 30% slopes) with steep canyon walls. The soil is moderately to extremely erodable. A previously undisturbed area would require extreme modification. The dam would need to be relatively high and thick to provide for safety. Since the canyon is fairly steep the impoundment would be larger than one located on flat ground. Construction cost and reclamation cost would be high relative to other options.

Alternative C, pumping water over the ridge would probably be about as expensive as Alternative B due to pumping station costs, deenergizing structure cost and reclamation of deenergizing structures and erosion which would occur in spite of reducing the head produced by the water.

Alternative D, the preferred alternative involves cutting down a previously disturbed somewhat flattened area immediately adjacent to the addit. The cut material will be used as fill for making the impoundment walls. Though the impoundment is calculated to be 3 feet in height, the walls will be built 5 feet high to provide an ample safety margin. The earthen dam will be 8 to 10 feet wide at the top with interior and exterior walls of 45° or less. Since this area is disturbed and flattened under previous operations no additional reclamation costs are expected. The existing bond will cover the operation. Equipment operation will be easier relative to down canyon operation and consequently should be considerably cheaper. The water will be allowed to percolate and evaporate from the pond after sampling.

The following table indicates subjective values on a scale of 0 through 10 with 0 being the worst situation and 10 the best.

Subjective Comparison

	A No Action	B Canyon Dam	C Overland Flow	D Evaporation Pond
Resource Disturbance	10 None	3	5	8
Reclamation	10	2	6	10
Operator Ecomomics	0	4	4	9
Feasibility	0	8	8	10

There should be no additional resource disturbance under Alternative A, but much under Alternative B due to where the dam is to be placed and the probable engineering specifications necessary to assure an adequate margin of safety. The overland flow Alternative would cause less disturbance than Alternative B but more than Alternative D because deenergizing structures would reduce but not completely eliminate the destructive potential of flowing water. Alternative D will take place on previously disturbed ground. Little additional disturbance should occur.

Reclamation for Alternative A and D will be essentially the same, as the existing disturbance will be reclaimed and little if any additional area will be disturbed with either Alternative.

Building and reclaiming an impoundment in the canyon as in Alternative B will be more difficult and expensive than building the impoundment near the addit as in Alternative D. Alternative C would be expensive due to the length of pipe and pumping substations as well as the need to haul heavy rocks and gabions to build deenergizing structures. No Action would not allow the operator to meet his objectives.

No action is infeasible because the operator could not sample the addit without dewatering it first. Alternatives B and C are about equally feasible. They could be done but more engineering expertise and care would be necessary to insure success than Alternative D. Alternative D is most feasible as it can be done without disturbing new ground, without moving water very far or exposing areas to the cutting action of moving water.

Finding of No Significant Impact

I have determined that this action would not significantly affect the quality of the human environment. Therefore an Environmental Impact Statement is not needed. This determination was made considering the following factors:

A. The irreversable and irretrievable resource commitments and adverse cumulative and secondary effects associated with this project are minor.

B. The physical and biological effects are limited to the area of planned development and use.

C. No known threatened or endangered plants or animals are within the affected area.

This decision may be implemented immediately. It is subject to appeal pursuant to Secretary of Agriculture Appeal Regulations 36 CFR 211.18, except for the mining operator who can appeal pursuant to 36 CFR 228.14.

A Notice of Appeal filed under 36 CFR 211.18 must be filed with this office within 45 days from the date of this decision. A Notice of Appeal filed pursuant to 36 CFR 228.14 must be filed with this office within 30 days from the date of this decision.

Guy W. Pence Date 12/5/85

Guy W. Pence

RICHARD H. BRYAN
Governor

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION
Capitol Complex
Carson City, Nevada 89710
(702) 885-4670

October 1, 1985

Gerald A. Doyle
P.O. Box 350
Round Mountain, Nevada 89045

APPENDIX A HARRY VAN DRIELAN

Re: Big Horn Mine

Greetings:

I have received and reviewed your submittal for the proposed dewatering of the mine. The hydrogen ion activities (pH) you report indicate that surface water in this region is more acidic than the waters taken from the mine. By inference, it is expected that the toxic metal burden in the impoundment of the mine waters will be very light and that this water should pose little or no endangerment to the animals and plants in the area. It is recommended that the impoundment is sized to hold the total amount of water pumped from the mine and that the bottom of the impoundment allows for a large amount of percolation. Upon completion of bulk sampling and cessation of dewatering, the impounded water should be allowed to percolate and evaporate; when standing water is no longer visible the dike or dam must be breached to allow free drainage of rain or snow-melt runoff.

Enclosed are the maps of the mine you sent. These are felt to be more valuable to your prospects than are useful to keep in the file. It is requested that you provide a 7-1/2 minute topographic map or an orthophoto quad, marking the mine adit and the impoundment.

Should you have any question in this matter, please ask.

Respectfully,

Harry van Drielan

Harry van Drielan
Environmental Management Specialist

HvD:mlw
cc: Jan Ford, USFS-Tonopah

OCT 8

WALL CANYON-PABLO CANYON WATER SAMPLES

The following water samples were secured from their respective locations on July 14, 1985.

Each sample contained approx. 1/2 quart of water. The samples were placed in clean jars with sealed lids.

The samples were taken to the assay laboratory at Smoky Valley Mining, and tested by titration to determine the Ph of each sample. The samples were tested with 24 hours of their being secured.

The following results were recorded:

SAMPLE #1. WC-1 Ph = 8.13 Location: C-100 Adit: Central Workings.

SAMPLE #2. WC-2 Ph = 7.81 Location: Spring below proposed dam site.

SAMPLE #3. WC-3 Ph = 8.10 Location: Pablo Creek at Mine Canyon Road.

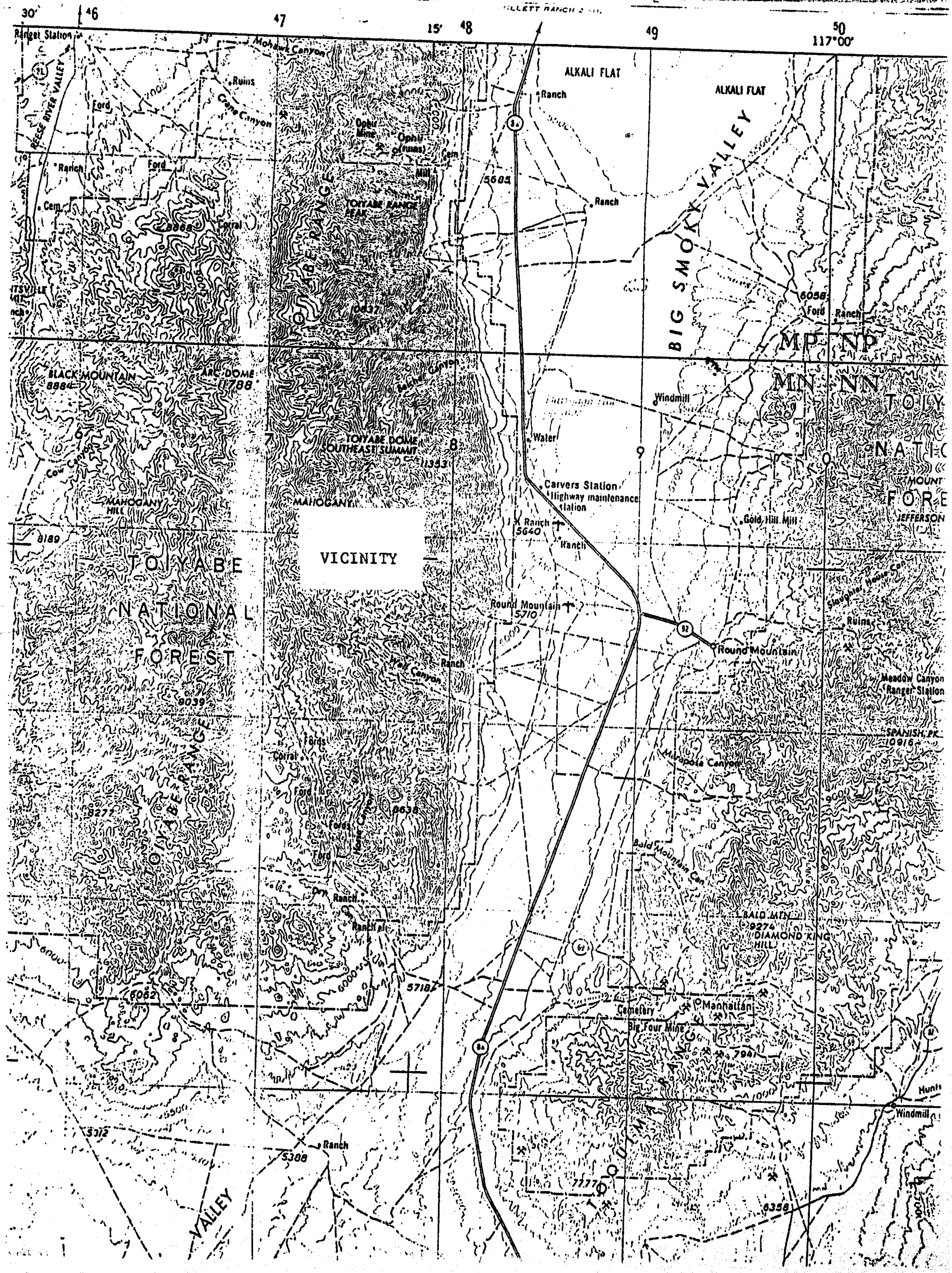
SAMPLE #4. WC-4 Ph = 8.31 Location: West Adit West Workings.

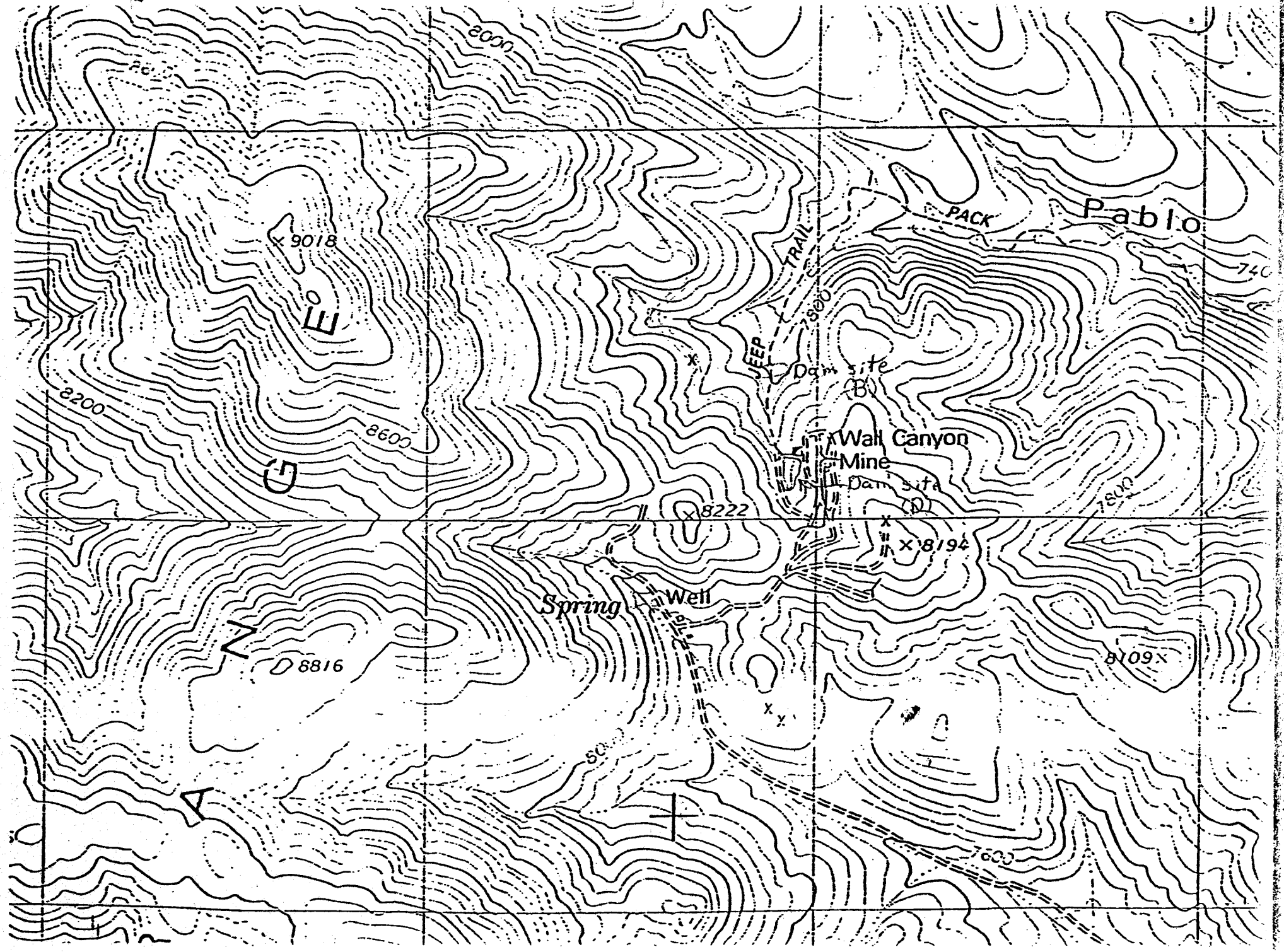
SAMPLE #5. WC-5 Ph = 8.05 Location: Adit Level; East Workings.

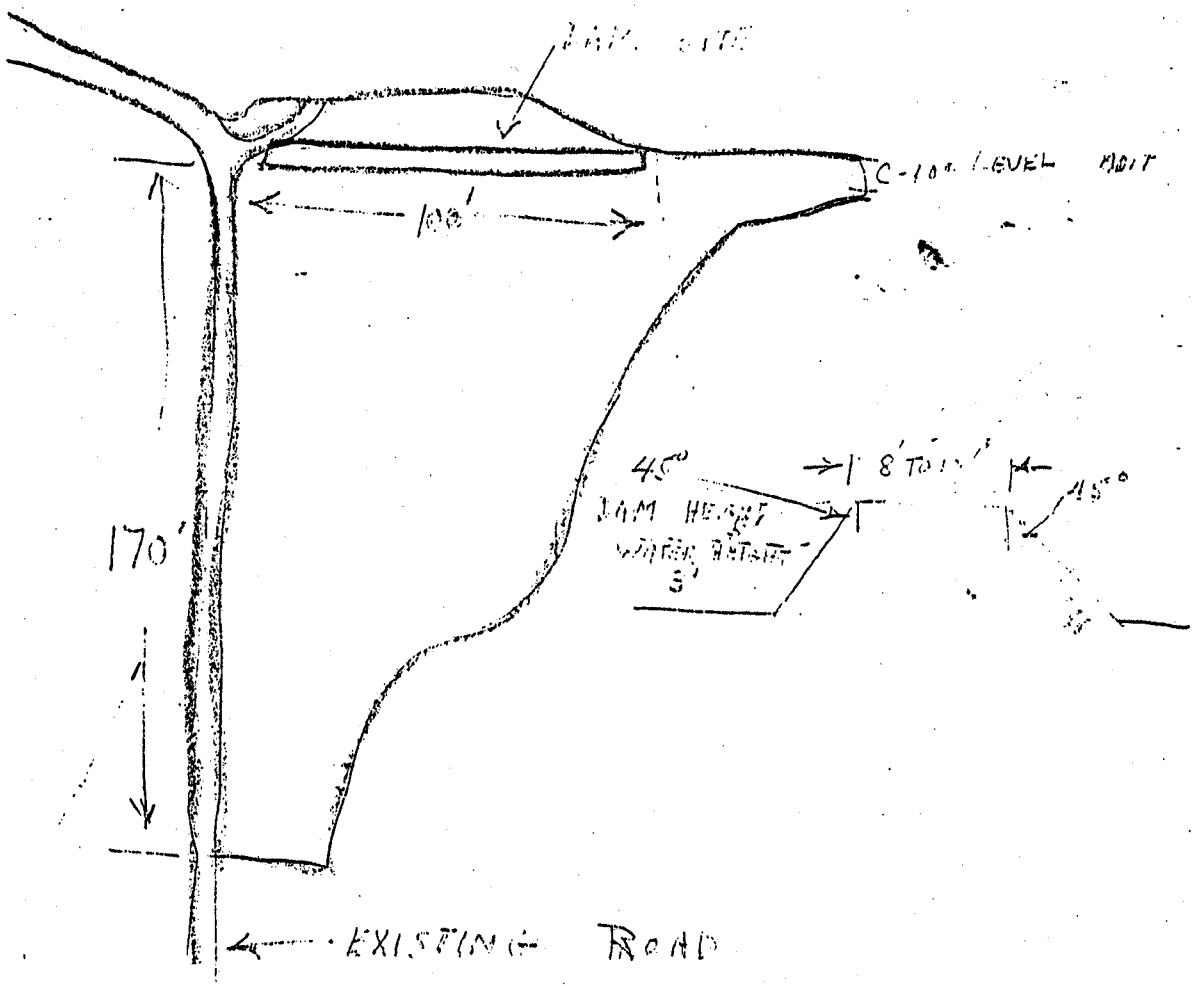
Sample $6. WC-6 Ph = 7.64 Location: Spring avove house in Wall Canyon.

APPENDIX B

MAPS


VICINITY
TOIYABE NATIONAL FOREST
TOIYABE RANGE
BIG SMOKY VALLEY
ALKALI FLAT
Round Mountain
Carvers Station
Highway maintenance station
Manhattan
BLACK MOUNTAIN 8884
ARC DOME 11788
TOIYABE DOME SOUTHEAST SUMMIT 11353
TOIYABE RANGE PEAK
BALD MTN 9274
DIAMOND KING HILL
SPANISH PK 10916
Meadow Canyon Ranger Station
Big Four Mine
Gold Hill Mill
Mohawk Canyon
Ophir Mine
Windmill
REESE RIVER VALLEY
117°00'


2000
9018
EDGE
2200
8600
JEEP TRAIL
Dam site
Wall Canyon
Mine
Dam site
8222
8194
Spring
Well
8816
8109
PACK
Pablo
7400
7600



APPENDIX C IMPOUNDMENT SKETCH

Januray 28, 1986

Mr. Gerald Doyle
Box 4
Round Mountain, Nevada 89045

Dear Mr. Doyle:

Mr. Garcia asked me to write to you concerning the Wall Canyon Road. Enclosed please find a copy of a map of that road. I have marked the area Nye County blades in green.

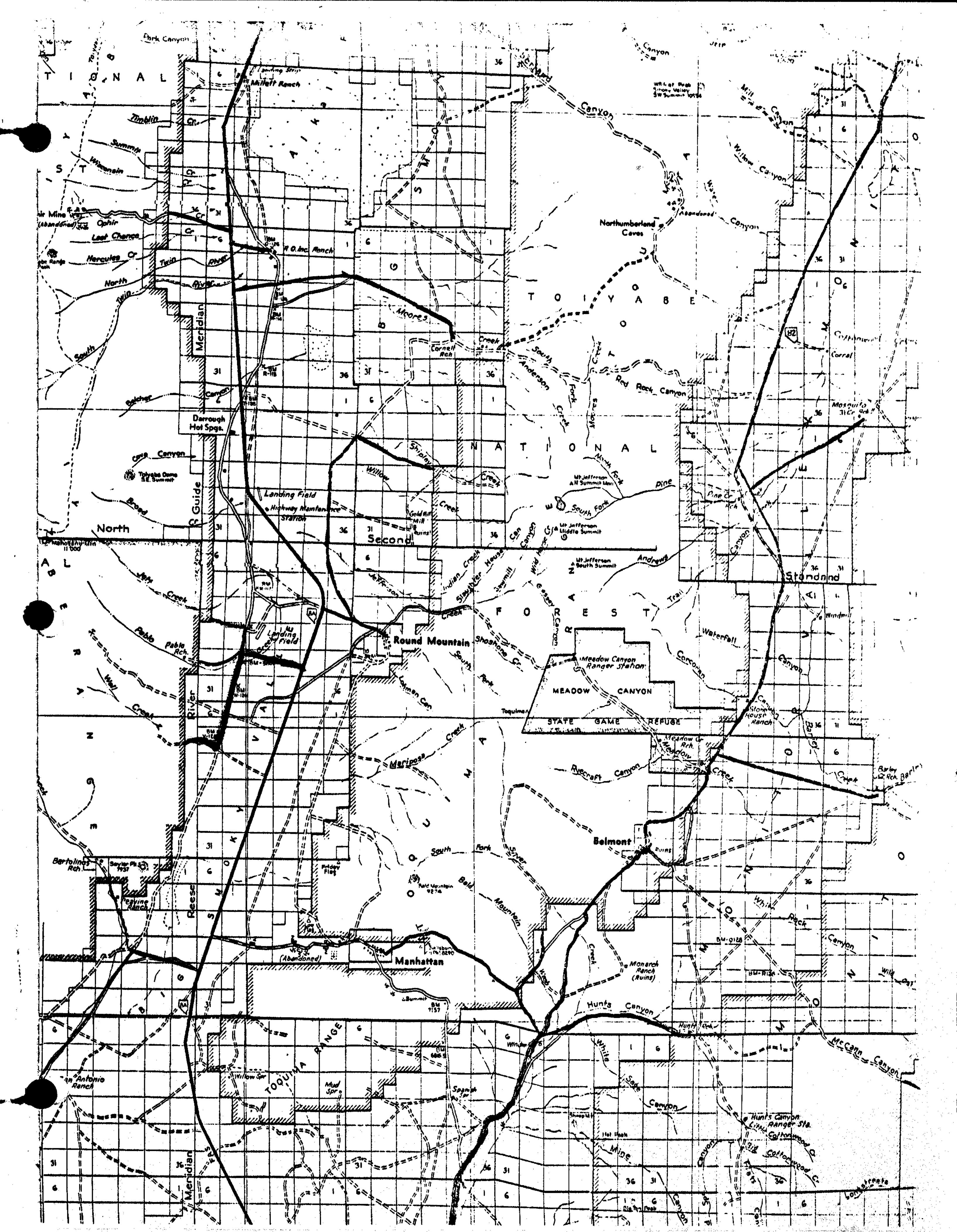
The road in this area is bladed about once a year.

Our motor grader is now in the Mores Creek Area. As soon as the roads in that area are completed we will be moving down the valley. At that time we will blade the road in the Wall Canyon Area. If you wish to talk to me concerning the Wall Canyon Road please feel free to call me at 482-3335.

Sincerely yours,

Phyllis Logan

Phyllis Logan
Road Administrator
Nye County Road Department
P. O. Box 887
Tonopah, Nevada



Park Canyon
Millett Ranch
Timblin Cr.
Summit
Wisconsin
Ophir
Last Chance
Hercules Cr.
Twin River
North Twin River
South
Meridian
R O Inc. Ranch
Moores Cr.
Cornell Rch.
Creek
South Anderson Creek
Red Rock Canyon
Northumberland Caves
Abandoned
Canyon
Willow Canyon
Mill Canyon
T O I Y A B E
N A T I O N A L
F O R E S T
Darrough Hot Spgs.
Guide Cr.
Landing Field
Highway Maintenance Station
Second
North
Broad
Jefferson Creek
Pablo Rch.
Indian Creek
Andrews
Pine Cr.
Mosquito
Standard
Round Mountain
Shoshone Cr.
Meadow Canyon Ranger Station
MEADOW CANYON
STATE GAME REFUGE
Toquima
Waterfall
Corcoran
Canyon
Mariposa Creek
Ryecraft Canyon
Meadow Creek
Barley Creek
Belmont
Reese River
South Fork
Bald Mountain
Manhattan
(Abandoned)
Monarch Ranch (Ruins)
Hunts Canyon
Hunts Rch.
White Rock Canyon
McCann Canyon
TOQUIMA RANGE
Willow Spr.
Mud Spr.
San Antonio Ranch
Bertolinos Rch.
Peavine Ranch
Sage Canyon
Hunts Canyon Ranger Sta.
Little Cottonwood C.
Big Cottonwood C.
Mine

PROOF OF PERFORMANCE AND COMPLETION OF

ANNUAL ASSESSMENT WORK

STATE OF NEVADA:
:SS
COUNTY OF NYE :

The undersigned in whose behalf the following work was performed or improvements made, certifies that at least $13,000.00 dollars was expended and/or the following labor expended or improvements made having a value thereof, consisting of:

1. Completing the reopening and timbering of the C-100 level from the Main Shaft to the Portal.
2. Roadwork on the Big Horn No's 1,4,7,9,11,14,20; and the WC No's 3,7,8,10,32,34,35,36,38,39,41,54, 55,57,91,103, & 104 & on the Main Mine Road in Wall Canyon.
3. Layed track on level C-100 from the Main Shaft to the Portal.
4. Erected electrical lines on level C-100 from the Main Shaft to the generator.
5. Installed a main electrical switch box and circuit breaker on level C-100.
6. Installed a pump & pipe lines from level C-140 to level C-100.
7. Constructed a Mine Water Retaining Dam and rerouted the mine roads around the dam area.
8. Worked at upgrading the mine to conform to MSHA Standards.
9. Worked on rehabiliting the Hoist House, Generator Building, & Foremans' House.
10. Built a gate & fence on the Main Mine Road approx. 3/4 mile from the Summit of Wall Canyon.

All of the work done was done for the benefit of all of the Lode Mining Claims of the Big Horn and WC Claim Groups. These claim groups are contiguous. The names of the individual claims and their related information is listed in Exhibit "A"; which is attached hereto. All of these claims are Lode Mining Claims and are not patented.

These Lode Mining Claims are located in Sections: 17,18,19,20,21,29, & 30: Township 10 North: Range 42 East: MDM & B, situated in the Antelope Mining District (Organized in 1881); of the County of Nye, State of Nevada, during the year ending 12:00 Noon, September 1, 1986.

The Claim Maps are filed as Documents No's: 25401, 37401, 46999, 93614, & 101454 in the Nye County Recorders Office.

The work described above was performed by Gerald A. Doyle and Janet B. Doyle and/or their Agents. The above cited work is ongoing.

The names and addresses of the Owners are: Gerald A. and Janet B. Doyle, P. O. Box 450, Round Mountain, Nevada 89045.

Such expenitures were made by and at the expense of Gerald A. Doyle and Janet B. Doyle; owners of said claims for the purpose of holding said claims for the valuable minerals contained therein.

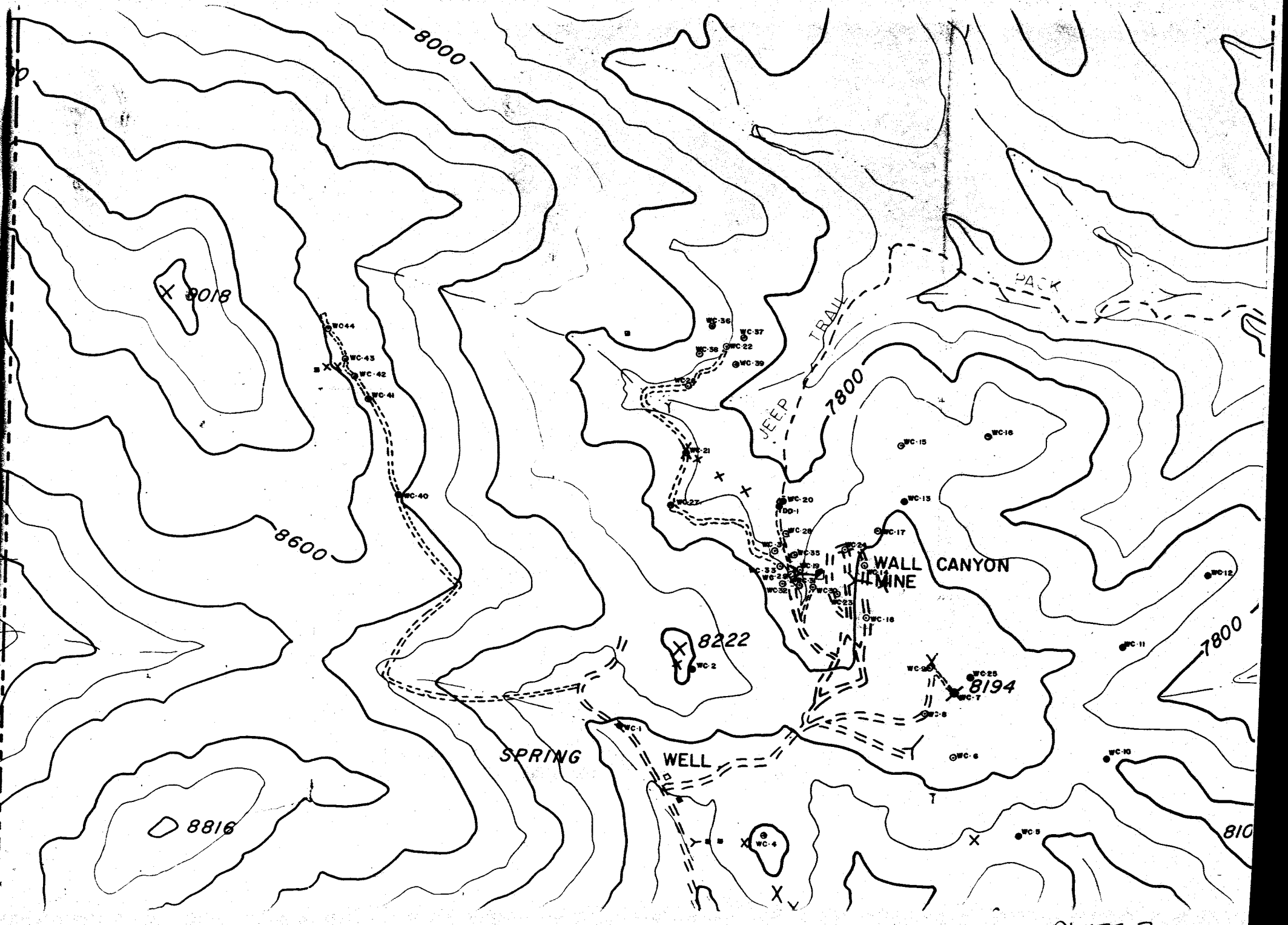
Gerald A. Doyle

SUBSCRIBED AND SWORN TO BEFORE ME THIS 25th DAY OF AUGUST, 1986.

Barbara Berg
NOTARY PUBLIC

MY COMMISSION EXPIRES:
11/9/87

OFFICIAL SEAL
BARBARA BERG
NOTARY PUBLIC-STATE OF NEVADA
NYE COUNTY, NEVADA
My appointment expires Nov. 9, 1987


8000
9018
8600
8222
8816
8194
7800
JEEP TRAIL
PACK
WALL CANYON MINE
SPRING
WELL
WC-1
WC-2
WC-4
WC-5
WC-6
WC-7
WC-8
WC-10
WC-11
WC-12
WC-13
WC-15
WC-16
WC-17
WC-18
WC-20
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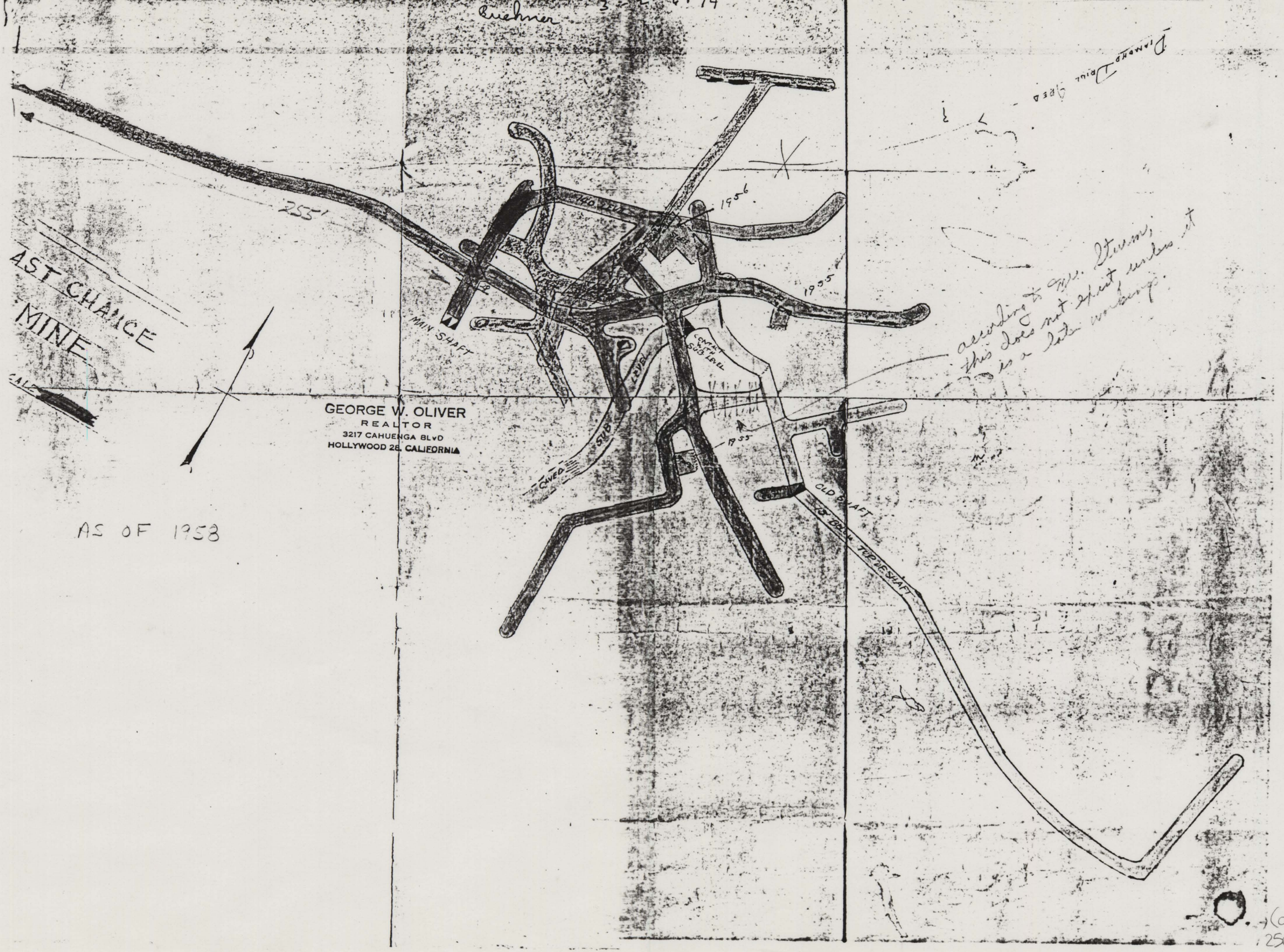
WC-37
WC-38
WC-39
WC-40
WC-41
WC-42
WC-43
WC44
DD-1

PLATE 3


Buehner
Diamond Drill Area
255'
AST CHANCE
MINE
CALE
MAIN SHAFT
1956
1955
CONTACT
SUB LEVEL
SUB LEVEL
1955
CAVED
OLD SHAFT
TOP OF SHAFT
GEORGE W. OLIVER
REALTOR
3217 CAHUENGA BLVD
HOLLYWOOD 28, CALIFORNIA
according to Mr. Stevens, this does not exist unless it is a lost workings.
AS OF 1958
(after 46/155)
25600017