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Item 62

SUMMARY REPORT
OF THE
EXPLORATION POTENTIAL OF TENNECO MINERALS HOLDINGS
IN THE TONOPAH MINING DISTRICT
NYE-ESMERALDA COUNTIES, NEVADA

SOME PLATES AND OR MAPS TOO LARGE TO COPY FOR COMPLETE REPORT SEE FILE

BY

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MARCH 1984

EXPLORATION POTENTIAL OF TENNECO MINERALS HOLDINGS IN THE TONOPAH MINING DISTRICT NYE-ESMERALDA COUNTIES, NEVADA

SUMMARY

Tenneco Minerals controls 108 patented and 11 unpatented mining claims covering formerly productive properties in the Tonopah mining district, Nye County, Nevada.

Tonopah is a bonanza silver/gold camp with a production history of some nine million tons of ore averaging 20 opt silver and 0.20 opt gold from fissure veins in Tertiary volcanics. Principal operating period was from 1902 to 1929 when major mines closed because of low metal prices.

Exploration targets, at depths of ±1000 feet, remain at both the east and west ends of the district where the vein systems have been downdropped by faulting. Targets in both areas are expected to be some 2-3 million tons at historical grades.

Tenneco is seeking exploration proposals from interested parties to further explore and develop deep, untested parts of the Tonopah district.

LOCATION

The Tonopah Mining District is located midway between Reno and Las Vegas in Nye and Esmeralda counties of south central Nevada (Figure 1). The district is situated at the southern end of the San Antonio Mountains at an elevation of approximately 6000 feet. Tonopah is accessible by U.S. Highways 6 and 95, both major routes of travel, and by the Nye county airport located eight miles east of Tonopah.

LAND POSITION

Tenneco Minerals controls 108 patented and 11 unpatented mining claims in the Tonopah mining district.

The patented claims were acquired from Summa Corporation in April of 1977 and carry a 2% net smelter return royalty. The eleven unpatented claims are controlled wholly by Tenneco.

The land controlled by Tenneco covers approximately two thirds of the formerly productive area in the district. It includes three of the four largest producers in the district; the Tonopah Mining Company (Mizpah mine), the Tonopah Belmont Company, and the West End Consolidated Company. The other major producer was the Tonopah Extension Company currently under lease to Chevron Resources.

Surface rights have been severed on several of the claims lying within the town of Tonopah, but all minerals are reserved to Tenneco. Title reports are available for inspection through Tenneco's Land Department in Denver.

HISTORY

The Tonopah district was discovered in May of 1900 by Jim Butler. The camp boomed when Butler granted leases on his five original claims in 1901 and sold his remaining holdings to the Tonopah Mining Company a year later. Production steadily increased yearly until its peak in 1918 when the ore mined was valued at over $9,000,000. Mining operations gradually declined from 1918 till 1929, when the low price of silver at 29¢ an ounce caused the major companies to close down. Small scale leasing operations continued until 1948 (Carpenter, 1953).

Total recorded production is 8,800,000 tons from which 1,861,000 ounces gold and 174,153,000 ounces silver were recovered (Bonham & Garside, 1979). Average grades were .20 opt gold and 20 opt silver.

REGIONAL GEOLOGY

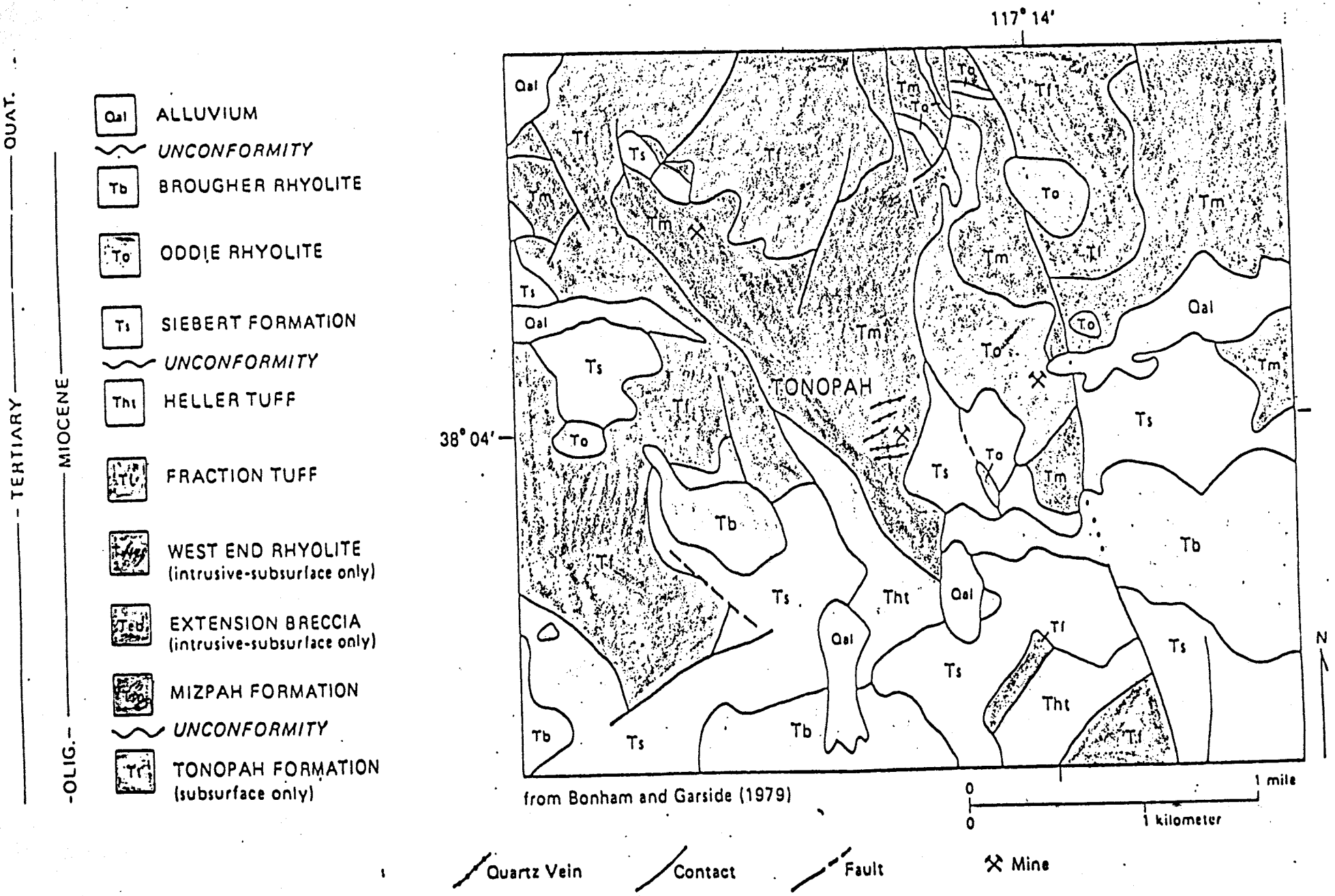
The Tonopah mining district is located at the south end of the San Antonio Mountains, a small north-south trending range in Central Nevada.

The area is underlain by a thick sequence of intermediate to felsic Tertiary volcanics and volcanoclastics that are dissected by a strong N-S fault set and a subsidiary E-W fault set. Paleozoic and Mesozoic sedimentary and intrusive rocks underlie parts of the northern end of the range.

DISTRICT GEOLOGY

The geology of the Tonopah district has been described in numerous publications. The Nolan bulletin (1935) contains the classical description of the district and includes detail on the underground geology unvailable elsewhere. The recent work by Bonham and Garside (1979) is a comprehensive study of surface geology. Fahley's unpublished thesis (1981) examines the controls of mineralization using fluid inclusion data.

Geology of the district is illustrated in generalized fashion on Figure 2. Stratigraphic section, description of the rock units and position of mineralization within the stratigraphy is shown on Figure 3. All of the units present at surface, and to explored depths in the mines, are volcanics of early Oligocene to late Miocene age.



Generalized geologic map of the Tonopah area.

Figure 2

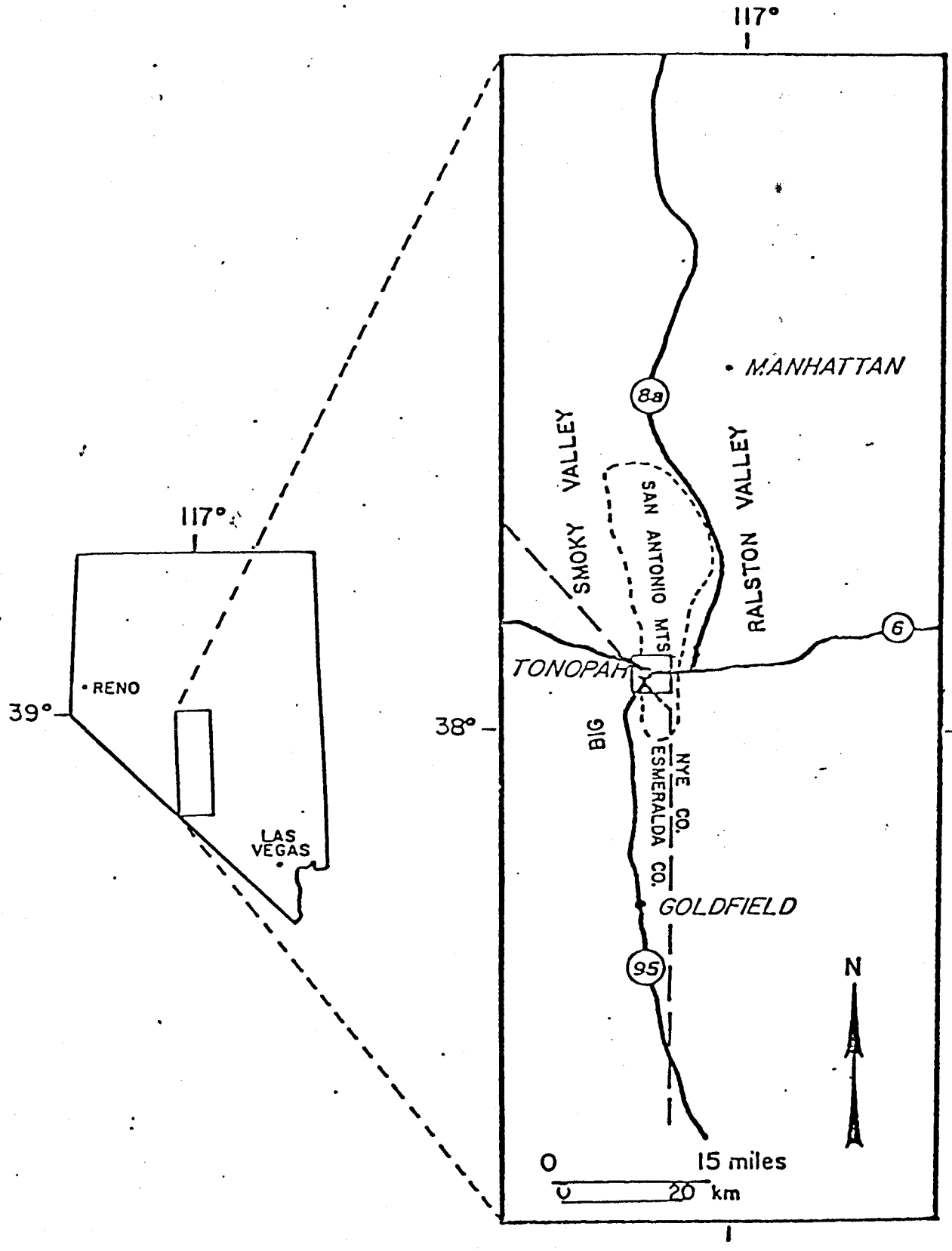
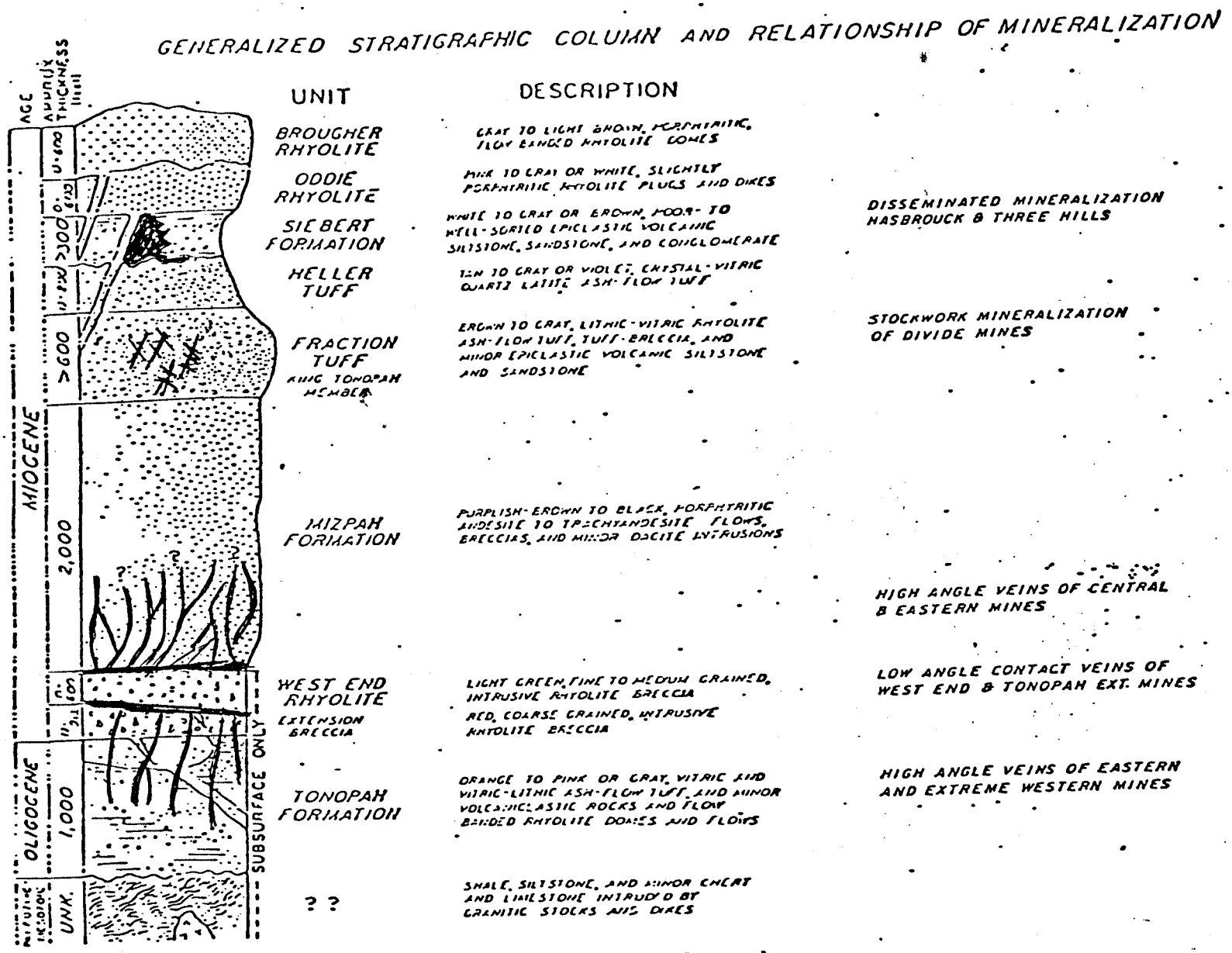


Figure 1: Location Map.



Generalized stratigraphic column of the Tonopah district. Stratigraphic nomenclature is after Bonham and Garside (1979).
Modified from Fohley 1981

Figure 3

A brief geologic history of the district is summarized below:

1. Accumulation of Tonopah Formation.
2. Eruption of Mizpah andesite.
3 Pre-mineral NS and NW faulting with vertical displacement up to 2000 feet.
4. E-W low angle faulting of the complex Tonopah fault.
5. Intrusion of Extension breccia and West End rhyolite along Tonopah fault.
6. Mineralization (believed associated with West End rhyolite).
7. Post-mineral faulting along NW faults.
8. Deposition of Fraction, Heller, and Seibert tuffs.
9. Rejuvination of N-S faults.
10. Intrusion of Oddie rhyolite and Brougher rhyodacite.
11. Erosion to present day level.

ALTERATION & MINERALIZATION

Hydrothermal alteration halos in the Tonopah district display zonation patterns characteristic of epithermal vein systems. Outward from the veins is a narrow zone of quartz-sericite-adularia which sharply grades into an argillic zone where groundmass and phenocrysts are totally altered to clay minerals. The argillic zone grades into a propylitic zone which includes a district wide albitization of the plagioclase. In the more intense propylitic zones calcite forms in open spaces and fractures and the groundmass and ferromagnesian minerals are chloritized. The width and intensity of the alteration zones is a function of depth and host rock.

The veins in the Tonopah district can be classified into two types:

A. Flat veins (0-30°) associated with Tonopah fault and intrusion of West End Rhyolite. These veins dominate in western part of district.

B. High angle veins (50-90°) in hanging wall branches of Tonopah fault. This system dominates in eastern part of the district.

Mineralogically and texturally the veins are very similar with quartz, sericite, adularia, rhodochrosite, pyrite, sphalerite, galena, chalcopyrite, and gold being deposited early then replaced by quartz, argentite, pyrargyrite, and polybasite (Fahley, 1981). Supergene enrichment was only significant in the near surface and outcropping veins in central part of the district.

TENNECO EXPLORATION PROGRAM

The initial objective of Tenneco and its predecessors in Tonopah was the development of reserves in the King Tonopah mine and

exploration for similar, undeveloped veins outside the main district. This work proved inconclusive, however, and emphasis was later placed on general evaluation of the main district. Targets considered included the following:

1. Faulted extensions of high grade vein systems.
2. Stringer and breccia zones in the wall rocks adjacent to the veins.
3. Disseminated deposits as replacements of favorable units.

Work completed during this evaluation included:

1. Geologic mapping of district.
2. Compilation of underground data for the entire district.
3. Development of cross sections from composite mine working maps.
4. Rock chip and underground sampling in the central outcropping part of the district.
5. Core drilling - 12,262 feet in the King Tonopah area and 8,233 feet in the West End area.
6. Rotary drilling - 4,405 feet in the West End area, and 3,434 feet in the central part of district.
7. Soil geochem sampling - 12 square miles north of Tonopah, one square mile southwest of Tonopah.
8. Sampling of dumps and tailings.

EXPLORATION POTENTIAL

Best opportunity for significant new discovery in Tonopah is with potential downfaulted extensions of the formerly productive vein systems at either end of the district. Figure 4 is a simplified representation of these ideas showing general structural elements, depth to targets and anticipated target size. It overlays Figure 5 which shows the Tenneco claim position and major shafts in the district.

Target 1 - Extension of the West End-Ohio vein systems across the Monarch Pittsburg fault. The West End Mining Company did only limited exploration across the fault before closing their mines. Figure 6 is a cross sectional view of these two veins on the West End property and their relation to the Tonopah fault system. These veins occupy the south limb of the domal shaped Tonopah fault. The mineralization on the north limb of the fault was mined semi-continuously along a 5000 foot strike length and downdip to a depth of 2400 feet. The south limb was mined for 1800 feet along strike before being faulted off by Monarch Pittsburg fault. The downdip potential was never tested below 800' depth as the veins crossed property lines and were in litigation during most of the mining period.

A target size of 2 million tons grading 15 to 20 opt silver and .15 to .20 opt Au from 15-50 foot thick flat lying veins is considered realistic.

Target 2 - Extension of the Belmont vein system across the Halifax fault. The Belmont veins, which were mined for approximately 1000 feet along strike between the 700 and 1400 foot levels, produced over 2,000,000 tons of ore grading 30 opt silver and .30 opt gold. The eastern extension of the vein system was faulted off by Halifax fault (see Figures 7 & 8). The Halifax Mining Company explored for the faulted eastern extension of the vein system, but found only limited segments within the large Halifax fault zone. Area beyond this fault zone is effectively unexplored.

Fluid inclusion work by Fahley shows temperatures in Belmont veins are similar to those in the Mizpah system indicating that the hydrothermal system is continuing in this direction. This, along with the fact that segmented vein sections were found within the Halifax fault zone suggests that significant extensions may exist even further east on down thrown side of the fault. This area has a potential for 2 million tons of 20 opt Ag and .20 opt Au from multiple, 10-30 foot thick, high angle veins.

ADDITIONAL POTENTIAL

Tonopah Belmont Mine - The Tonopah Belmont mine was thoroughly sampled several times since its closure. This data suggests some 300,000 to 500,000 tons of developed ore, at district grades of 20 opt silver and 0.20 opt gold, remains in the mine. A similar tonnage, at lower grade, remains as gob in old stopes.

Dumps & Tailings - Extensive sampling of dumps and tailings on Tenneco property indicates potentially significant low grade surface reserves:

Dumps - 1,050,000 tons @ 2.00 opt Ag, 0.02 opt Au
Tailings - 1,446,000 tons @ 1.40 opt Ag, 0.01 opt Au

Preliminary metallurgical tests indicate 70% recoveries by cyanidation methods for dump and tailings ore.

CONCLUSIONS

The Tonopah district offers opportunity for discovery of high grade gold-silver ores in deep vein systems. Tenneco is seeking joint venture proposals from mining companies with demonstrated capability in the exploration, development and exploitation of such deposits.

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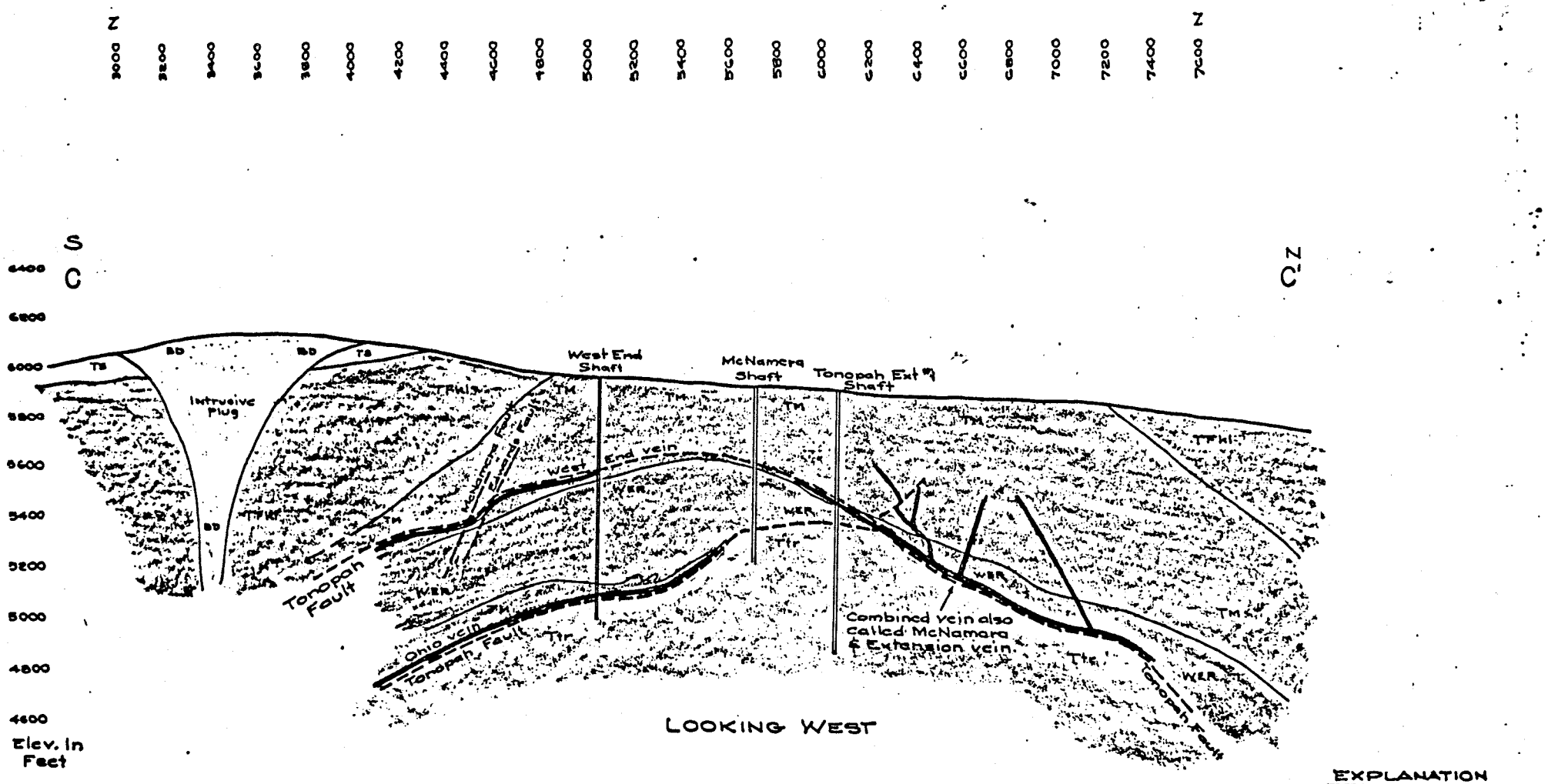
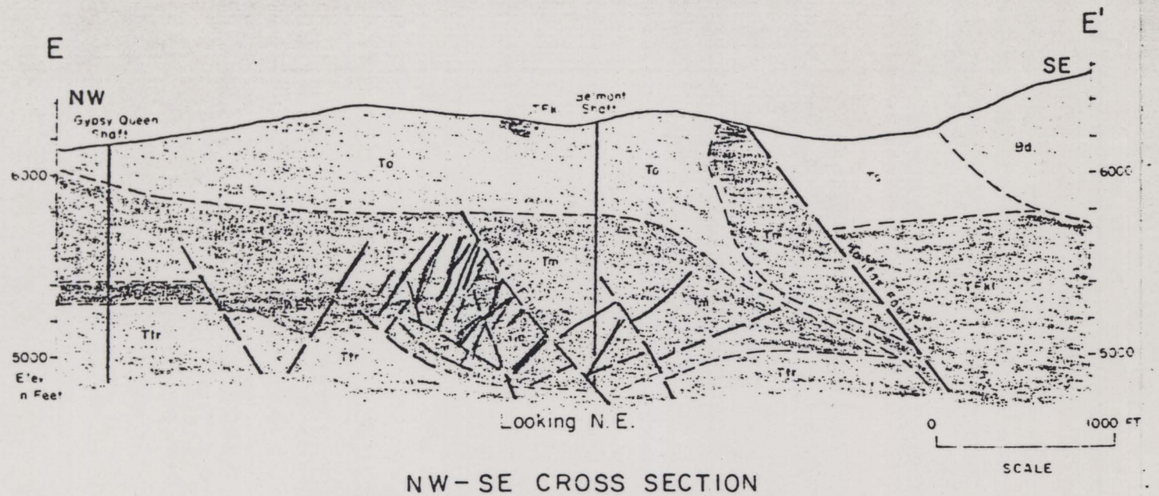


N S CROSS SECTION
THROUGH 4000 E. COORDINATE
TONOPAH MINING DISTRICT
NYE COUNTY, NEVADA

Figure 6



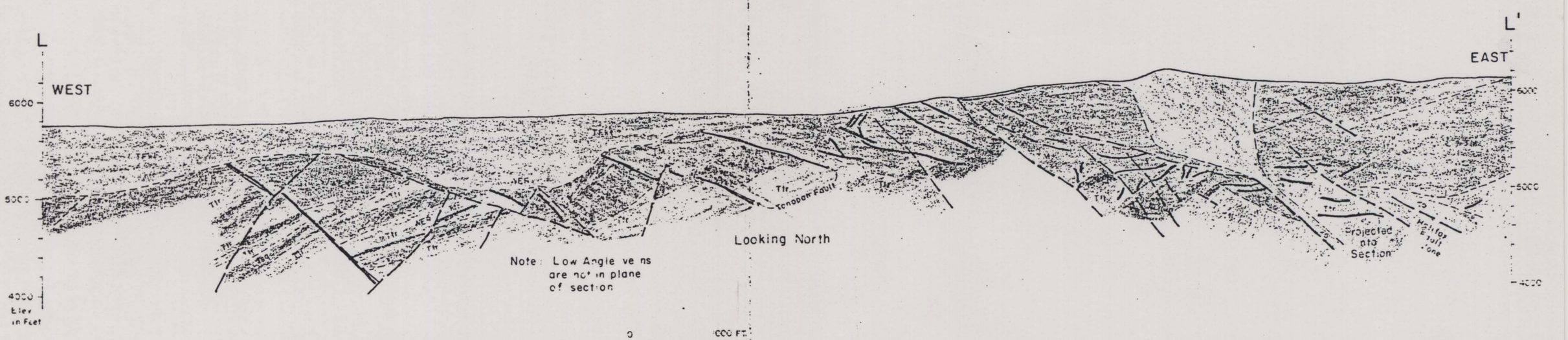
NW-SE CROSS SECTION
THROUGH EASTERN PART OF DISTRICT
AFTER FAHLEY 1981

FIGURE 7

EXPLANATION

	Bd	Brougher dacite
	To	Oddie Rhyolite
	Ts	Siebert Tuff
	TFkl	Fraction
	WER	West End Rhyolite
	Tm	Mizpah Andesite
	Ttr	Tonopah Fm
	Tsg	Sand Grass Andesite

No Vertical Exaggeration



LONGITUDINAL SECTION
THROUGH 5400 N COORDINATE
MODIFIED FROM NOLAN WORK

FIGURE 8

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King Tonopah

4000 E C'

Belmont Flt.

Extended Tonopah Claims

East Target
High angle vein
1000'-1700'

Victor

Cash Fly

Midway

West End-Ton Ext.
vein system
2.5 mt
200'-2400'

West Target
Flat veins
800'-1500'

Mizpah vein
system
.3 mt
0'-700'

Belmont vein system
2.5 mt
700'-1400'

Halifax Flt.

Mizpah Flt.

Monarch
Pittsburg
Faults

L 5400 N

5400 N L'

C

E

E'

30-40°
45°
35°
65°
70°
60°
75°
80°
40°
30°
15°-20°
50°
90°

SKETCH MAP COMPOSITE
OF MAJOR VEIN & FAULTS

TONOPAH MINING DISTRICT

OUTLINE
OF
TENNESSEE CLAIMS

OVERLAY
FIGURE 4

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