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WAR EAGLE/GLADIATOR PROJECT--A FINAL REPORT

YAVAPAI COUNTY, ARIZONA

Noranda Project #0845

by

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Tucson Office

Noranda Exploration, Inc.

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INTRODUCTION

The War Eagle-Gladiator project area is located twenty-four (24) miles southeast of Prescott, Arizona in the southern Bradshaw Mountains (Figure 1). The inactive War Eagle and Gladiator mine workings are 1.3 and 1.9 miles, respectively, north of the Crown King townsite at about 7000 feet elevation.

In their heyday, the War Eagle and Gladiator mines produced high-grade gold and silver ore from semi-conformable veins. Total production is estimated at 50,000 tons averaging 0.44 oz/ton Au, 3 oz/ton Ag, 0.35% Cu, 4.5% Pb and 15.0% Zn.

Noranda optioned the War Eagle-Gladiator property in early 1981 as a result of work performed during the 1980 Gold Districts reconnaissance program. To better evaluate the property, a detailed mapping and sampling program was undertaken between March and September, 1981 by T. Connelly and the writer. A total of eight man-months were spent mapping from a base at Crown King. One hundred ninety-five rock chip samples were collected on the property and adjacent areas. A soil sample grid over the War Eagle- Gladiator iron formation yielded 230 samples on 25 and 50 foot spacings. Five diamond drill holes totalling 1844 feet were drilled by Connor's

Drilling Inc. Expenditures through November 30, 1981 totalled $176,233.71. Rock chip, soil sample, underground and claim maps are on file in the Tucson office.

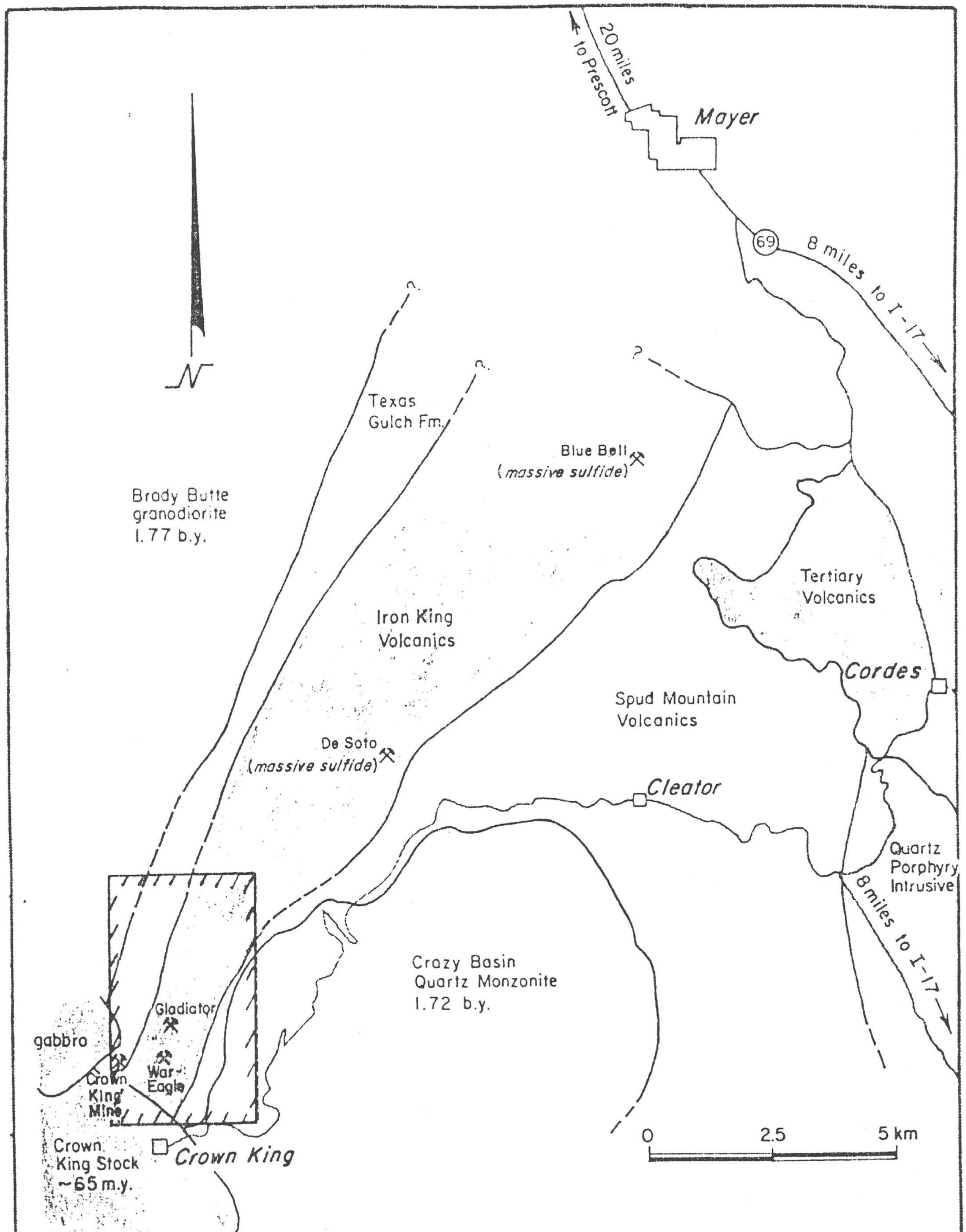

FIGURE 1. Location Map and Regional Geologic Map of the Mayer - Crown King and Black Canyon Schist Belts.

STRATIGRAPHY

General Statement

Volcano-sedimentary rocks in the map area consist of a thick sequence of intermediate flows and pyroclastic rocks interbedded with lesser amounts of felsic pyroclastics, epiclastics and iron formation. These rocks are intruded and bound by Precambrian and Laramide-age granitic bodies.

Rocks throughout the map area have been metamorphosed to regional amphibolite grade. Preservation of volcanic features is excellent. Pillowed andesite flows with interstitial hyaloclastic breccias and chilled selvages are locally preserved. Collapsed pumice fragments in felsic tuffs and clasts up to block size in felsic tuff-breccias are also recognizable.

Nearly all of the stratigraphic sequence exposed in the map area is part of the Iron King Volcanics of the Big Bug Group, Yavapai Series (Anderson, et al., 1971). The Iron King Volcanics include andesites, rhyolites, sediments and iron formation. However, the formation is dominated by andesites in the map area and is referred to in this report as the andesite complex. The andesite complex is underlain by a thin ribbon of pelites belonging to the uppermost Spud Mountain Volcanics, also of the Big Bug Group. Overlying the Iron King Volcanics and Yavapai Series with major unconformity is the Texas Gulch Formation. Both Anderson and Creasey (1958) and Blacet (1968) suggest that the Iron King Volcanics and adjacent rocks are west facing in the area of interest. Our field mapping confirmed westward stratigraphic facing.

Spud Mountain Volcanics

Pelites (SMP): Pelitic siltites and shales exposed east of the andesite complex are the oldest exposed rocks in the map area. Lithologically, this unit consists of magnetite-bearing siltites, chloritic mudstone, minor shales, magnetite-bearing chert and rare mafic flows. The fine-grained clastic rocks are well foliated and are composed chiefly of quartz-muscovite-albite-biotite and magnetite. Overlying the pelites with major unconformity is the Iron King Volcanics.

Iron King Volcanics

Andesite Tuff (ATF): This unit comprises about 60% of the andesite complex. In most instances, the andesite tuffs can be distinguished from andesite flows by their well-foliated, fine-grained texture in contrast to the medium to coarse grained, sub-ophitic texture of the flows. Where flows are fine-grained, massive outcrop morphology and poorly developed foliation distinguish them from the poorly exposed, well-foliated tuffs.

The tuffs are usually dark green and composed of tremolite-actinolite, hornblende and plagioclase. Accessory minerals include quartz, epidote, calcite, muscovite, biotite and rare cummingtonite. Quartz, plagioclase and subordinate epidote, calcite and muscovite make up a very fine-grained matrix.

An important subunit, AMS, includes reworked tuffaceous material mixed with quartz-eye rhyolite tuffs and hematitic cherts. The AMS unit in the western portion of the map area appears to grade northward into felsic tuffs. Cherty rhyolite tuffs with thin bands of specular hematite are common in the west-central map area.

Andesite Flows (APL, AFL): Andesite and rare basalt flows with small quantities of interbedded tuffs and epiclastics are found throughout the andesite complex. In general, the flows form isolated lens-like masses in a sea of andesite tuffs and fragmentals. The most significant flow complexes are exposed east of the War Eagle prospect and at the north edge of the map area. Flows become thinner, of smaller lateral extent, and more sporadically distributed northward. Massive flows are designated AFL and pillowed flows are designated as APL on the geologic map (Plate 1).

The typical mineral assemblage is hornblende and andesine plagioclase, with quartz being the most common accessory mineral.

Basalt flows make up only a small percentage of the observed lava flows. The basalt lavas were distinguished from andesite flows by relict ophitic textures and the mineral assemblage plagioclase, hornblende, and tremolite. In addition, the mafic flows are generally fine-grained and olive green in color.

Compositionally Banded Andesite Pyroclastic Unit (APY): This heterogeneous unit is a major rock type in the southern map area. The rock consists of abundant tremolite, up to 10% calcite, minor epidote and thin white bands of extremely fine-grained plagioclase and quartz. Petrologically, this banded unit is typically a lapilli-tuff. However, significant quantities of fine-grained tuff are interbedded locally with the coarser fragmentals. The banded pyroclastics grade into fine-grained, well-foliated, andesite tuffs to the north.

Felsic Volcanic Unit (RTF): Fine-grained felsic tuff, rhyolite lapilli tuff, felsic tuff-breccia and quartz eye tuff occur as thin, discontinuous lenses within the andesite complex. These small lenses crop out near the northern terminous of Gladiator ridge, and increase in frequency, thickness and clast size northward (Plate 1). The felsic pyroclastics can be found interbedded with both andesite tuffs and iron formations. These rocks are considered time correlative with felsic rocks associated with the DeSoto massive sulfide prospect.

The felsic tuffs are well foliated to massive and white or pink in color. Quartz is by far the most abundant mineral with lesser amounts of muscovite. Biotite and pyrite are the most common accessory minerals.

Banded Iron Formation

General statement: Although some lithologies mapped as iron formation do not contain sufficient iron content to qualify, they are included under this heading for purposes of field work. Banded cherts lacking iron-oxides, but which are conformable with iron formation stratigraphy, are included in this category. Although rocks described as carbonate facies contain less than 15% total iron they are interbedded with, and considered part of, the iron formation. Individual units vary in thickness from 1-2 millimeters to several feet and extend laterally from about six inches to hundreds of feet.

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Oxide facies: Oxide facies iron formation (OIF) is composed of purple, hematitic banded chert. Recrystallized quartz and hematite are the principle constituents. Magnetite and thin layers or laminae of carbonates are locally present. No primary sulfides were observed.

Carbonate facies (CIF): In order of decreasing abundance, calcite, quartz, biotite, ankerite and siderite are the chief constituents of the carbonate facies rocks. Carbonate content ranges from 20%-60% and pyrite-pyrrhotite laminations are infrequent. Typically, these rocks are medium-grained and thinly bedded. Chert and andesite tuff units containing more than 20% carbonate are included in this unit.

Sulfide facies (SIF): Sulfide iron formation is volumetrically the most abundant facies type. On Gladiator ridge it grades northward into carbonate facies and southward into oxide facies with progressively more clastic dilution.

Sulfide facies rocks form a complex stratigraphic assemblage of chemicl and clastic sediments. The major lithologies are thinly bedded to laminated carbonaceous, pyritic mudstone interbedded with garnetiferous, chlorite-rich mudstone, chert, and infrequent carbonate lamellae. Chert occurs as thin beds rarely exceeding one cm in thickness. Soft sediment deformation textures are common at outcrop and hand specimen scale.

Northeast of hill 6876, thin lenses of felsic tuff are rarely interbedded with sulfidic iron formation. Small pods of anthopyllite-bearing amphibolite are found in the northeast portion of the map area. Anthophyllite + quartz + garnet + pyrite is the characteristic assemblage. Pyrite makes up 5-10% of these very dense, coarse-grained, rocks.

Calcareous cherts: Cherts containing between 5-10% carbonate are included under the heading CCT. The calcareous cherts are white, with thin interbedded orange-brown, oxidized carbonate layers. Magnetite is common and sulfides are rare. Both quartz and carbonate are recrystallized, and relict bedding is well-preserved.

Texas Gulch Formation

Felsic pyroclastics, siltites and quartz-muscovite schists of the Texas Gulch Formation unconformably overlie the andesite complex. Siliceous siltites (TGS) occur at the base of the Texas Gulch Formation and pinch out toward the center of the map. Fine-grained rhyolite tuff, lapilli tuff and arkosic sands are designated TGV. The pelitic unit (TGP) is a distinctive silver-gray quartz-muscovite schist. Relict bedding is locally pre-

8

served and outcrop scale folds and crenulation cleavage are frequently exposed.

Intrusive Rocks

Gabbro (gb): These massive, dark-green, rocks are recognized by their relict gabbroic texture and a circular or elliptical outcrop pattern (Plate 1). Hornblende and plagioclase are the primary minerals. These intrusive bodies are considered synvolcanic and may represent feeders for the overlying lava flows.

Crazy Basin Quartz-Monzonite (CBqm): The Precambrian Crazy Basin quartz-monzonite is exposed in the east and southeast portion of the map area. The pluton intrudes the Spud Mountain pelites and has been described by Anderson and Blacet (1972) as coarse-grained with conspicuous pink microcline crystals, white plagioclase laths, and quartz; biotite is the chief accessory mineral.

In hand sample, the intrusive lithologies are characteristically non-foliated and very massive. An unpublished age date of 1.72 b.y. is suggested by Leon Silver of the California Institute of Technology. The zircon age date and massive character of the intrusive body implies a post-kinematic emplacement history.

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Crown King Granodiorite (CKgd): The Crown King stock is a Laramide intrusive body exposed in the southern portion of the map area (Plate 1). In hand sample, the rock is a medium-grained, hypidiomorphic-granular, granodiorite. Essential minerals are plagioclase, orthoclase and quartz with biotite, hornblende and sphene as the principal accessory minerals. Although the intrusion has not been radiometrically dated, petrographically similar intrusive rocks, exposed at Walker and along Big Bug Creek in the Mount Union quadrangle, yield K/Ar ages of 64 m.y. and 70 m.y., respectively.

Latite Porphyry (LP): Numerous latite dikes of Laramide(?) age intrude the Precambrian stratified rocks. The dikes are oriented sub-parallel to the regional west-dipping foliation and preferentially intrude the carbonaceous mudstone in the War Eagle and Gladiator iron formations. Underground mapping suggests the latite dikes were important in preparing the country rock for the deposition of quartz-calcite-pyrite veins. In hand specimen, the latite dikes are porphyritic, with plagioclase, hornblende, K-feldspar, and magnetite set in an aphanitic groundmass. The latite dikes are locally calcite-bearing where they intrude calcareous mafic tuffs.

STRUCTURE

Previous Studies

In spite of three studies conducted by others on Precambrian rocks in the Bradshaw Mountains, the various workers are in disagreement with regard to fold geometry and stratigraphic sequence. A review of these studies shows that three structural interpretations have been proposed for the Proterozoic metavolcano-sedimentary sequence exposed between Crown King and Mayer.

Studies conducted by the U.S.G.S. (Anderson and Creasy, 1958; Blacet, 1968; Anderson, et al., 1971) have delineated a subhorizontal, overturned syncline, cored by Iron King Volcanics. Blacet (1968) ascribes the ubiquitous steeply plunging mineral streak lineation to metamorphic recrystallization parallel to the "a" kinematic axis. In contrast, DeWitt (1976, 1979) subdivides the Iron King Volcanics and in doing so defines a steeply SW plunging, overturned, south closing anticline. This anticline occupies roughly the same position as Blacet's (1968) syncline. As a consequence, DeWitt inverts the U.S.G.S. stratigraphy. However, DeWitt's fold geometry depends heavily on correlating isolated, discontinuous cherty iron formations within the Iron King Volcanics. This method of reconstruction, along with some lithologic contacts, is somewhat arbitrary. Supporting evidence for a steeply plunging fold geometry is the subparallel mineral-streak lineation, which DeWitt concludes is parallel to the "B" kinematic axis. A comparison of U.S.G.S. and DeWitt fold geometry is shown in Figure 2.

O'Hara (1980) describes near vertically plunging, overturned, isoclinal folds within the Texas Gulch Formation and the Spud Mountain pelites. Texas Gulch rocks core a syncline, and the pelites core an anticline. Unfortunately, O'Hara does not pursue the consequences of his steeply-plunging fold geometry within the Iron King Volcanics. O'Hara's stratigraphy is in broad agreement with that of U.S.G.S. investigtions.

Interpretation

Our mapping demonstrated that bedding, with few exceptions, is subparallel to foliation. Foliation throughout the map area strikes monotonously NNE, and dips steeply westward except in the vicinity of faults or in the hinge zones of minor folds.

The large iron formation in Peck Canyon is located on the southern flank of a felsic edifice. This iron formation grades northward into thick, coarse-grained felsic pyroclastics and debris flows. In the southern

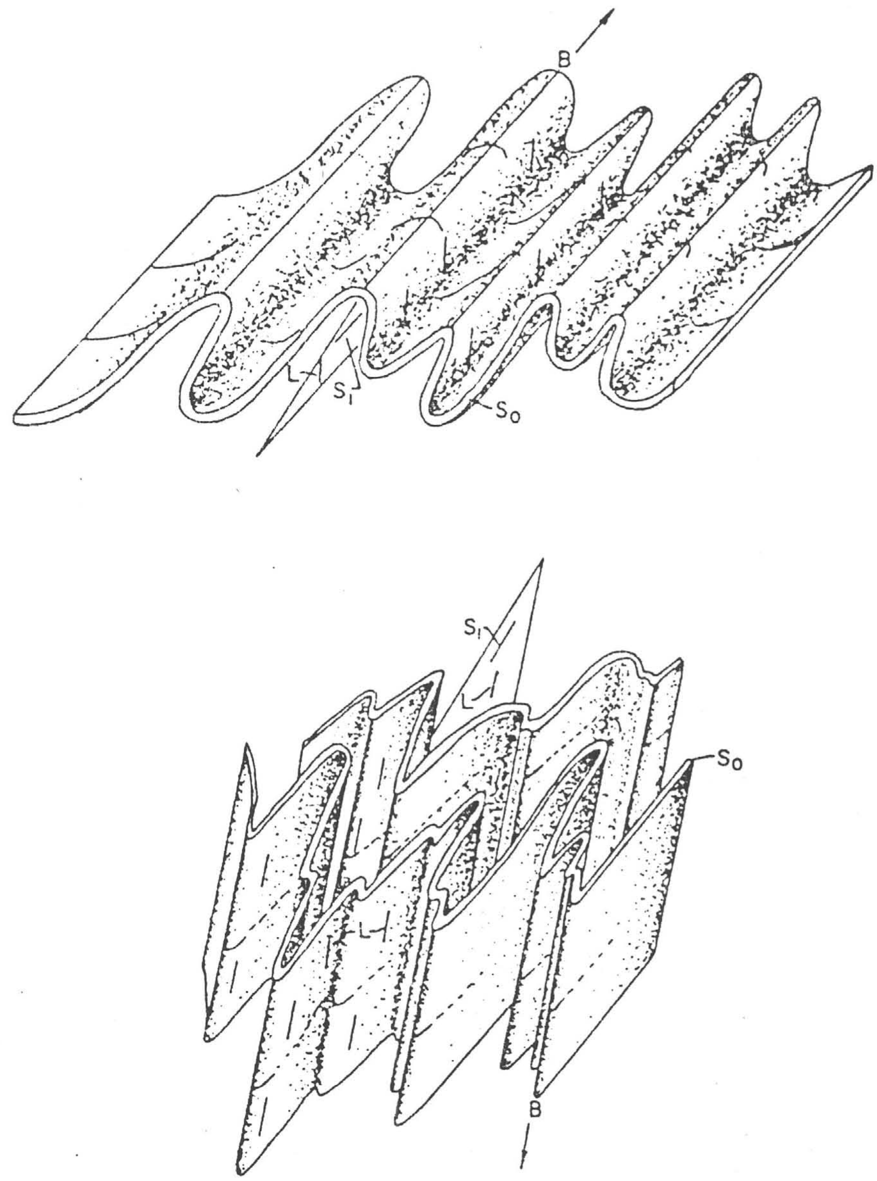

FIGURE 2. Comparison of possible fold orientations proposed by U.S.G.S. workers and Hopwood (top) and DeWitt (bottom). S_0 = original bedding, S_1 = regional foliation, L = lineation, B = beta axis of folds. Modified from DeWitt, (1976).

portion of the map area, the Peck Canyon iron formation is interbedded with andesite flows and pyroclastics.

Felsic volcanics are, therefore, considered to have been deposited penecontemporaneously with mafic and intermediate volcanics. Recognition that differing rock types are laterally equivalent instead of a folded stratigraphic succession, in conjunction with the lateral continuity of iron formations through DeWitt's proposed structures, puts DeWitt's interpretation in question.

Steeply-plunging isoclinal folds were observed throughout the map area both at hand specimen and outcrop scale. In most cases, the fold axis plunge 60 degrees or more. On the western flank of hill 6876 a steeply-plunging, south-closing fold is suggested by the outcrop configuration. However, due to poor exposure, this structure could not be properly delineated. This is the only structure that disrupts the NNE trend of adjacent rock units. Otherwise, rock units conform to the regional NNE trend (Plate 1). These folds are interpreted as parasitic, steeply-plunging intrafolial folds of the type described by Hopwood (1978). Our mapping was unable to substantiate or refute the subhorizontal fold geometry proposed by the U.S.G.S.

Two types of faults were observed: 1) Precambrian strike-slip and 2) Tertiary normal faults. The Precambrian faults are of negligible displacement and are interpreted as the result of flexural slip during the main period of deformation. Fault gouge cemented by milky quartz marks these faults. Tertiary normal faults trend WNW and offset lithologic contacts by as much as 200 feet. Most faults of this type can be followed for only a few hundred feet of strike length. Drag folding is commonly observed near the fault plane.

MINERALIZATION

Detailed study of core and surface geology suggests that two distinct styles and ages of mineralization are represented at the War Eagle-Gladiator: 1) syngenetic pyrite/pyrrhotite ± arsenopyrite laminations in sulfidic iron formation and, 2) Tertiary quartz-calcite veining. Unfortunately, the younger veining event is superposed on the syngenetic mineralization resulting in a confusing geochemical overprint. All historical production was won from vein-type mineralization.

Pyrite/pyrrhotite and sparse grains of arsenopyrite occur as delicate, paper-thin laminations parallel to bedding and as fairly rare disseminations in carbonaceous mudstone. Locally, the sulfides have been remobilized into clots and thin veinlets of very short length. A 10-inch thick discontinuous zone of semi-massive arsenopyrite in carbonaceous mudstone was observed underground; the arsenopyrite is considered a primary semi-massive sulfide lens or bed. The bedded and load-deformed nature of the sulfides, lack of replacement textures, and ubiquitous small scale veining suggest that sulfide mineralization was syngenetic with deposition of the carbonaceous mudstone.

Tertiary mineralization is limited to quartz ± calcite ± sphalerite ± galena ± arsenopyrite ± chalcopyrite veining. The Gladiator vein, with a structurally related latite porphyry dike usually occupies the center of the carbonaceous mudstone. The vein swells to a maximum of eight feet in thickness and averages less than one foot. Pyrite, galena and sphalerite occur in a gangue of quartz and rarely abundant calcite. Native gold has not been observed.

The most significant vein mineralization was intercepted in DDH G-81-3; a weighted average of assays shows that the four-and-one-half feet of vein-related massive sulfide contained 0.90 oz/ton Au, 3.73 oz/ton Ag, 2.01% Pb, 6.9% Zn and 0.27% Cu. The massive sulfide is not believed to be exhalative in origin because of the presence of thin, open-space quartz veinlets in the sulfide body, minor amounts of rhodonite at the top, colloform textures and brecciation along the vein margins. The massive sulfide was not intercepted in other drill holes and is not laterally continuous.

Elsewhere in the district, historically producing veins north of the Crown King stock are mineralogically and structurally similar to the Gladiator vein. The Crown King vein, the most prolific in the district, contains quartz with abundant pyrite, sphalerite, with some chalcopyrite and native gold. The vein averaged about two feet in width and the grade is reported to have averaged 0.5 oz Au/ton and 4 oz Ag/ton (Wilson, E. D., et al., 1934).

DRILLING RESULTS

The War Eagle-Gladiator drilling program consisted of five diamond drill holes totalling 1844'. The following table shows location, bearing, inclination and depth. Coordinates are on a north-south grid with its origin at BM 7016. Distance and depth are in feet.

Hole #	Location	Bearing	Inclination	Total Depth
G-81-1	560S-800W	S80E	-55°	501'
G-81-2	250N-265W	S80E	-60°	281'
G-81-3	2600S-920W	S75E	-63°	280'
G-81-4	3135S-1065W	S75E	-60°	331'
G-81-5	438N-590W	S80E	-60°	451'

Lithologies encountered in core mirror the distribution of volcanic lithologies and iron formation facies exposed on the surface; andesite flows and tuffs make up the hangingwall on the north end of the iron formation in holes G-81-1,2,5 and andesite tuffs predominate on the south end in holes G-81-3,4. Footwall rocks show a similar lateral facies change from north to south, with calcareous andesite tuff forming the footwall in G-81-1,2,5, and calcareous andesite tuff interbedded with andesitic fragmentals in holes G-81-3,4.

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Facies distribution of the iron formation corresponds well with that observed on the surface. Hole

G-81-1 penetrated 71' of sulfidic iron formation. To the north, in holes G-81-2,5, calcareous mudstone and carbonate facies iron formation are interbedded with pyritic mudstone. The iron formation is dominated by chert and garnetiferous chloritic mudstone to the south in holes G-81-3 and 4. A thinning of the iron formation to the south and an increase in clastic dilution suggests a depositional environment on the flanks of the euxinic basin.

The spatial relationship of Laramide quartz veining with latite porphyry dikes and carbonaceous mudstone alluded to by surface and underground mapping was further substantiated in the core. Latite porphyry dikes preferentially intruded the carbonaceous mudstone--probably along bedding plane faults. Subsequent quartz veining was localized along or near the latite-mudstone contact. A notable exception to this relationship is the massive sulfide vein hosted in andesites in G-81-3. Other Laramide vein systems in the area do not necessarily exhibit this relationship.

GEOCHEMISTRY

The gold content of the iron formation, discounting quartz vein occurrences, is very low. Geochemical values rarely exceed 0.05 ppm Au, with the bulk of both core and rock chip samples, at or below the detectable limit (0.02 ppm). Where anomalous values in the carbonaceous mudstone were obtained, careful visual inspection generally reveals the presence of very thin quartz veinlets. Although there are no reliable criteria to discern the age of many of the veinlets, most are believed to be Laramide in age.

A preliminary plot of As and Au geochemical data was unable to substantiate an apparent association of anomalous Au with arsenopyrite except where veining is present. However, the small range and low geochemical values for gold are not amenable to statistical treatment.

The Zn content of the carbonaceous mudstone rarely exceeds 1000 ppm. Enrichment of up to 2000 ppm Zn is associated with garnetiferous, chloritic mudstone .

Pb and Ag exhibit a close sympathic relationship and appear to be related to the chloritic mudstone in a similar manner as Zn. Pb varies from below the detectable limit to about 50 ppm, except where veining occurs. Ag values in unveined samples are also low, ranging from below detectable to 5 ppm. The Cu content of non-veined iron formation ranges from 8 to over 200 ppm and averages about 150 ppm.

Laramide quartz veining is considered responsible for the anomalous gold mineralization in the War Eagle-Gladiator iron formation. Base and precious metals in the iron formation may have been leached by hydrothermal fluids during the veining event(s). However, extensive alteration in the mudstone was not observed.

may represent Mg-rich alteration zones around fumerolic vents. Soft sediment deformation features and fluidization structures are common and suggest deposition in the form of a water-saturated gel. Organic carbon in concentrations of up to 2% suggests prolific biological activity.

The various iron formation facies are interbedded and grade into each other. Transition between facies was probably controlled by variations in Eh, ph and temperature. Garnet coloration in the iron formation varies both laterally and stratigraphically suggesting variations in the bulk chemistry of the iron formation.

Dilution by fine-grained tuffs and epiclastics is an integral component of the iron formations. The Peck Canyon iron formation, potentially an attractive target because of its association with felsic rocks, yielded low geochemical values. Extreme dilution by tuffs and epiclastics may have been responsible.

Zinc enrichment in the mudstones is associated with the presence of garnet and chlorite. If the garnets are of spessartine variety, this may suggest that chlorites are Mn-rich and represent silicate facies iron formation. However, this has not been substantiated.

DISCUSSION

The Proterozoic metavolcano-sedimentary rocks exposed between Crown King and Mayer document the rapid accumulation of volcanics and sediments in a subaqueous environment that was dominated by broad, shield-like pyroclastic domes of considerable relief. The volcanic pile consists principally of rocks of intermediate composition. Felsic rocks occur as discontinuous lens-like units in the andesite pile. Ultramafic rocks are absent. Volcanic and sedimentary units have limited lateral extent and may be viewed as intertongueing lens-shaped bodies.

The Peck Canyon iron formation is interbedded with, and grades northward into, rhyolite tuffs belonging to the DeSoto felsic pile. This suggests the iron formation was deposited on the flanks of a felsic edifice. The War Eagle-Gladiator iron formation, which rests on coarse-grained andesite tuffs, was deposited on the flanks of an andesitic pyroclastic dome.

It is generally agreed that Algoma-type iron formations are the products of fumarolic activity during periods of volcanic quiescence. The underlying volcanic pile is the probable source for silica and metals. Small lenses of anthopyllite schist observed in the map area

Laramide veining has left a confusing geochemical overprint on the War Eagle-Gladiator formation. However, non-veined samples of iron formation yield anomalous geochemical values for Au, As, Pb, Zn, Cu and Ag. The stratigraphic position of the War Eagle-Gladiator, the association with volcanic rocks, the presence of organic carbon, anthophyllite schist and interbedded nature of the facies strongly suggest the War Eagle-Gladiator iron formation is, in part, exhalative in origin.

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TONY BENNETT'S DAUGHTER "ANN"

PATENTED M.C. GLADIATOR

161.15 AC.

1ST S EXT WAR EAGLE ✓

WAR EAGLE ?

2ND N EXT. " ✓

N. EXT " ✓

GLADIATOR ✓

Magnet ✓

Magnet #2 ✓

CHARLSTON ✓

Olympia ✓

Monitor ✓

MARRIMAC ✓

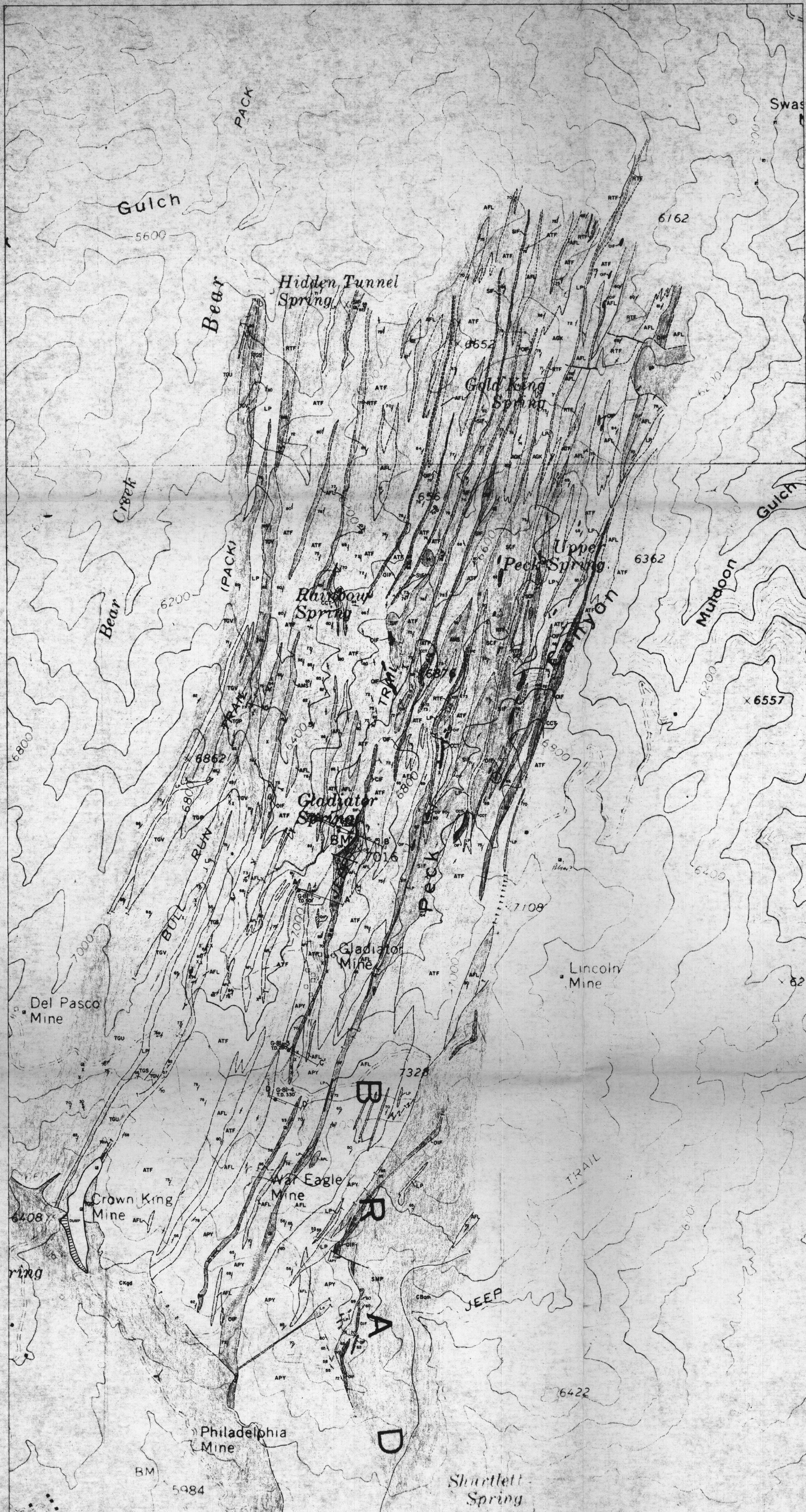
LONE JACK ✓

1ST N. EXT WAR EAGLE ✓

ANTHONY N. BENNETT

SARIVAL Rd. GOODYEAR

932-3946



EXPLANATION

METASEDIMENTARY AND METAVOLCANIC ROCKS

INTRUSIVE ROCKS

CRETACEOUS

CROWN KING GRANODIORITE– Medium-grained, hypidiomorphic-granular, granodiorite with plagioclase, orthoclase and quartz as essential minerals; biotite, hornblende and sphene are common accessory minerals.

LATITE AND QUARTZ LATITE (LP) – These light-colored dikes are fine to medium-grained with phenocrysts of plagioclase, hornblende and K-feldspar set in an aphanitic groundmass of quartz and feldspar. The dikes are locally pyrite-bearing and are generally oriented subparallel to foliation.

— UNCONFORMITY —

CRAZY BASIN QUARTZ MONZONITE– Coarse-grained with conspicuous pink microcline, white plagioclase laths and quartz, with biotite as the chief accessory mineral.

GABBRO (gb) – Dark green rocks composed of hornblende and plagioclase. Gabbro is distinguished from andesite and basalt flows by lack of foliation, gabbroic texture, and circular or elliptical outcrop pattern.

PROTEROZOIC

Texas Gulch Formation

TGV– Rhyolite tuff, lapilli-tuff and interbedded arkosic sandstones

TGS– Weakly foliated, fine grained greywackes and argillaceous greywackes.

TGP– Pelitic sediments. Rocks have been metamorphosed to silver-grey, quartz-muscovite schist.

TGU– Undivided Texas Gulch Formation where poor exposures make distinction between units impossible.

— UNCONFORMITY —

Iron King Volcanics

ANDESITE FLOWS (AFL, APL) – Massive (AFL) and sometimes pillowed (APL) flows are medium to coarse-grained, poorly to weakly foliated, and composed of hornblende and plagioclase with accessory quartz. Massive outcrop morphology helps distinguish flows from tuffs.

ANDESITE TUFFS (ATF) – Moderately to well foliated, dark green, fine grained pyroclastics, composed of tremolite-actinolite and hornblende with accessory quartz, plagioclase and epidote. Carbonate is locally abundant. Tuffs are distiguished from andesite flows by well developed foliation, fine grain size and lack of relict sub-ophitic texture.

UNDIFFERENTIATED VOLCANIC SEDIMENTS (AMS) – Reworked tuffaceous material interbedded with quartz-eye rhyolite tuff and ferriginous chert.

COMPOSITIONALLY BANDED ANDESITE PYROCLASTIC UNIT (APY) – Lapilli-tuffs interbedded with tuff and rare tuff-breccias. Mineralogically, the tuffs consist of tremolite-actinolite, calcite, minor epidote and thin white bands of very fine grained quartz and plagioclase.

FELSIC VOLCANIC UNIT (RTF) – Well-foliated to massive rhyolite pyroclastic rocks ranging from cherty, fine-grained tuffs to tuff-breccias. Tuffs grade into thicker, coarser grained units northward.

GOLD KING UNIT (AGK) – Heterolithic debris flows interbedded with magnetite-bearing chert, chloritic muds and rhyolite tuffs. The Gold King is transitional between the Peck Canyon iron formation and felsic tuffs

BANDED IRON FORMATION

Sulfide Facies (SIF, SCF) – Pyritic, carbonaceous mudstone interbedded with thin chert beds and chloritic mudstone (SIF). Locally abundant hematitic chert (SCF). Sulfidic iron formation is thinly bedded to laminated and soft sediment deformation textures are common.

Carbonate Facies (CIF) – Medium-grained, thinly bedded unit composed of calcite, quartz, biotite and muscovite with accessory ankerite and siderite.

Oxide Facies (OIF) – Hematitic banded chert, locally magnetite-bearing. Barren chert is indicated by diagonal lines.

Calcareous Chert (CCF) – White to buff colored chert with abundant orange-brown carbonate lamallae. Locally this unit contains up to 10% carbonate.

— UNCONFORMITY —

Spud Mtn. Volcanics

PELITIC SEDIMENTS (SMP) – An intertongueing sequence of magnetite-bearing siltites, garnetiferous, chloric mudstone, minor shales, rare mafic flows and magnetite-bearing chert.

89 Strike and dip of foliation

72 Trend of lineation lying in plane of foliation

Strike of vertical foliation

81 Strike and dip of bedding

Axial trend of small anticline, syncline

Axial trend of folds too small to plot individually

Contact, dashed where approximately located, dotted where inferred

Fault, dashed where approximately located

N

0 400 800 feet

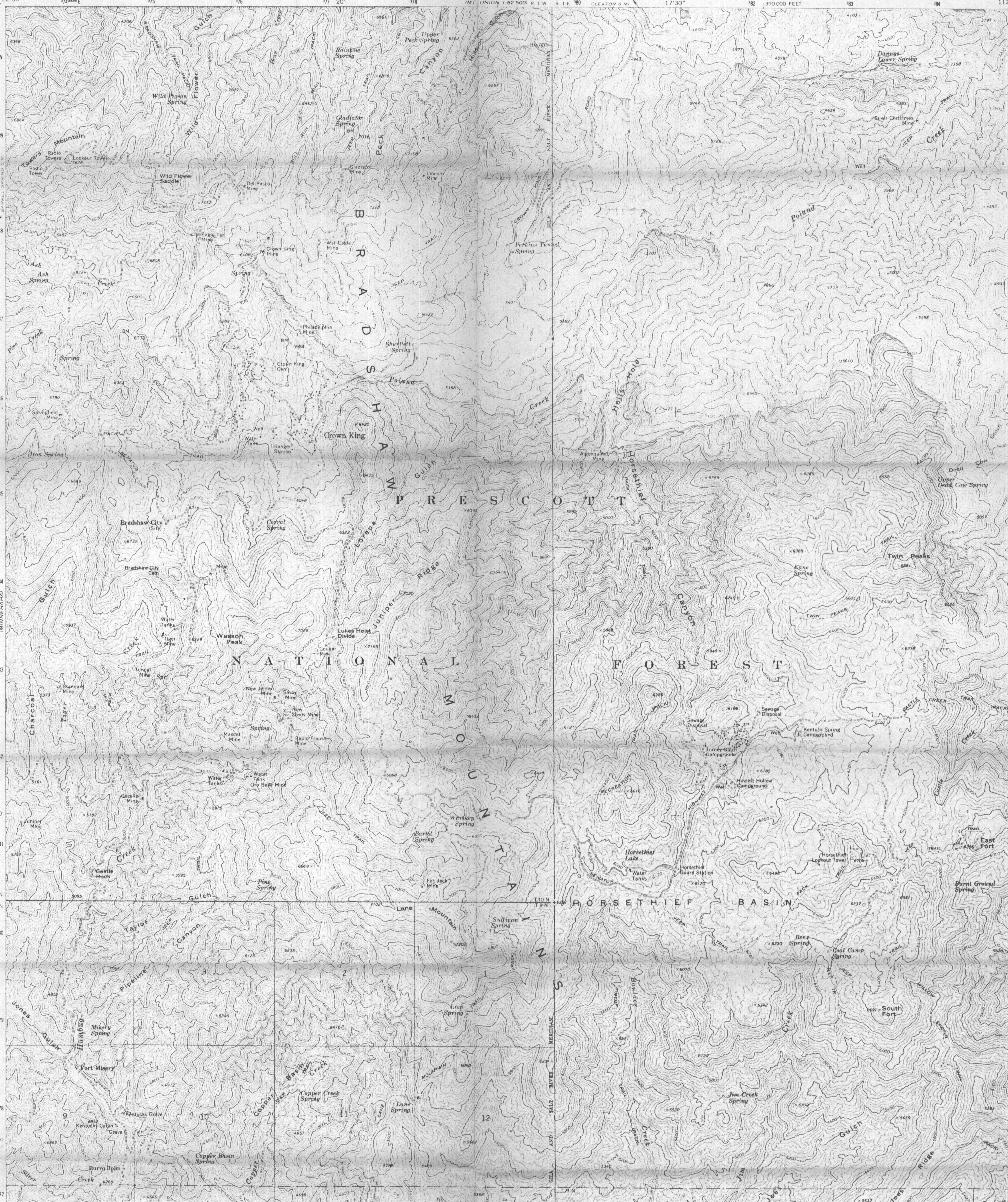
1" = 400'

REVISED	Geologic Map of the War Eagle-Gladiator Property	
	PROJECT : War Eagle-Gladiator NO. 0845	
	LOCATION : YAVAPAI COUNTY, ARIZONA	
	DATA BY : M. DENNIS, T. CONNELLY DATE: DECEMBER 7, 1981	
	DRAWN BY : J.R. CONTRERAS	
PLATE I	noranda NORANDA EXPLORATION, INC. TUCSON DISTRICT	INDEX

Bear
Rainbow Spring
(PACK)
TRAIL
×7077
×6862
×6876
Gladiator Spring
BM
×7016
JEEP
TRAIL
Peck
BULL
RUN
Gladiator Mine
Del Pasco Mine
7328
B
R
A
D
War Eagle Mine
Crown King Mine
6408
6600
Spring
Philadelphia Mine
6288
BM

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CROWN KING QUADRANGLE
ARIZONA—YAVAPAI CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 CROWN KING 15' QUADRANGLE



(COPPEROPOLIS) 3552 III SW

(BLACK CANYON CITY) 3552 II SW

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Where omitted, land lines have not been established

GN MN
0°44' 13 MILS
14° 249 MILS

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

Primary highway, hard surface		Light-duty road, hard or improved surface	
Secondary highway, hard surface		Unimproved road	

Interstate Route U. S. Route State Route

ARIZONA

QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

CROWN KING, ARIZ.
NE/4 CROWN KING 15' QUADRANGLE
N3407.5—W11215/7.5

1969

AMS 3552 III NE—SERIES V898

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