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TOMBSTONE

Mining District

Cochise County, AZ

Santa Fe Mining, Inc.
Semi-Annual Geologic Reports
To T.D.C. 1988-1992

Excellon, U.S.A.

REPORT AUGUST, 1988

SFM SANTA FE MINING INC.

Albuquerque, New Mexico

SEMI-ANNUAL REPORT

TO

TOMBSTONE DEVELOPMENT COMPANY

ON

EXPLORATION ACTIVITIES ON THE SFPM LEASE, TOMBSTONE ARIZONA

FEBRUARY 11 - AUGUST 11, 1988

SEMI-ANNUAL REPORT
TO
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OVERVIEW

The purpose of the exploration program in the Tombstone area, to date, has been the gathering and integration of a variety of structural and geochemical data aimed at generating specific drill targets in the project area. The area of exploration, shown in Figure 1, was selected to evaluate numerous manifestations of possible carbonate replacement-type ore deposits such as those in the Charleston-Bronco Hill, State of Maine, and Section 32 areas, as well as in the main Tombstone mining district. The data gathering program has progressed through three major phases: a review of the literature and past exploration work, air photo and field structural interpretation, and geochemical sampling. This effort, to the date of this report, has resulted in the generation of two specific exploration targets, one of which is presently being drilled. Additional targets will be determined as the on-going process of data analysis continues. Thus far, approximately six man months of work has been expended on the project, at a cost of about $52,000.00, of which approximately two thirds has been for work on the SFPM

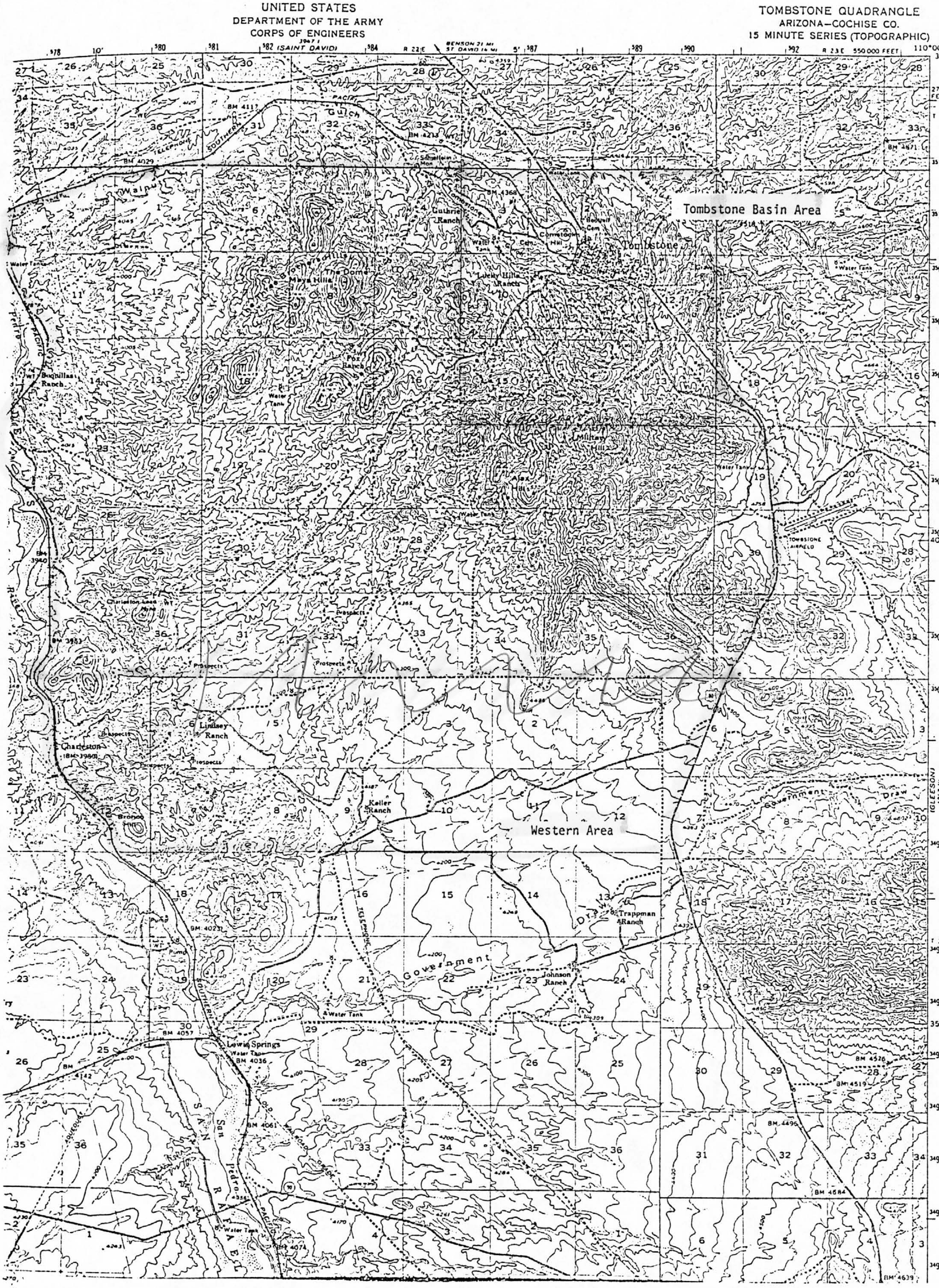

Figure 1. Proposed exploration areas in the Tombstone district and vicinity, Cochise County, Arizona.

lease. The following sections outline the work accomplished in each of the exploration phases mentioned above, as well as discusses the drill targets generated thus far.

LITERATURE SEARCH AND REVIEW OF PAST EXPLORATION

A thorough review of all of the published literature on the Tombstone district, as well as a review of available private archives, yielded valuable documentation of surface and sub-surface geology, ore controls, and certain geochemical zoning patterns. The information thus gathered strongly influenced the formulation and design of subsequent exploration program. Three major sources of information were available: published material, private company archives, and public collections of unpublished maps and reports.

The computerized GEOREF system was used to recover a comprehensive bibliography of the Tombstone literature dating from 1882 to the present. Included in the listing are early reports contained in various mining journals, state and federal articles and bulletins, articles in more recent geologic books, guidebooks, and journals, as well as theses and dissertations. Most valuable among this group is the dissertation by Newell (1975), which contains an excellent geologic map and abundant geochemical data, and the Arizona Bureau of Mines Bulletin 143 (Butler, et. al, 1938) which contains invaluable plans and cross sections of the ore bodies in the main Tombstone district.

Little information was obtained from private company archives, with the exception of the map collection of Tombstone Development Company. Most companies who have mined or have done exploration work in the district either no longer exist, have destroyed or misplaced the pertinent information, or are unwilling to disclose what information they have. A case in point is Newmont Exploration whose personnel were unable to locate drill records or core from their 1952 underground program in the district. Interviews with retired Newmont engineers who performed the work also yield little useful information. The map files of Tombstone Development Company were the only source of private archival information which proved useful to the exploration program.

Two archive collections, available to the public, contained the most valuable underground information obtainable from any source; those of the Arizona Bureau of Geology and the American Heritage Collection at the University of Wyoming. The former has a fragmentary collection of underground maps of various mines in the district, some showing underground geology, and a very few showing assay data. The underground workings and geology of the Lucky Cuss Mine are particularly well documented in this collection. The American Heritage Center's Anaconda collection, available to corporate users for an annual fee of $8,500.00, contains an excellent collection of reports and mine maps covering the northeast part of the

Tombstone mining district. Level maps show detailed underground geology, details of mineralization, and abundant assay data.

The result of the literature search phase of the project was two-fold. First, it allowed the formation of several theoretical models for mineralization in the Tombstone district, and delineated numerous areas for field testing of these ideas. Secondly, the collected information, in part, dictated the design and methods to be used in the subsequent field program; i.e. it suggested the required areal extent of exploration program, as well as the type and density of field information required to identify specific drilling targets.

STRUCTURAL ANALYSIS

Insofar as many important carbonate replacement deposits are known to be controlled, at least in part, by structure, a thorough structural analysis of the Tombstone region was undertaken in order to identify the most promising areas for ground follow-up. Given the time and manpower available, it was decided that such analysis could best be undertaken using aerial photography. Various types of images were considered for use, ranging from LANDSAT and high-level U-2 images to low-level photography. Given the size and type of target under investigation, it was decided to utilize 1:24000 scale natural color aerial photographs.

The 1:24000 photos were obtained from Exploration Photography, Tucson, from an existing file. These photographs served well in delineating the major structural trends in the Tombstone area. Four sets of structural trends were documented: 1) an early, strong N-S trend primarily affecting Paleozoic and Cretaceous sedimentary rocks, 2) a strong E-W trend, again affecting Paleozoic and Cretaceous sediments, and to a lesser extent Cretaceous volcanics, 3) a NE trend strongly developed in Cretaceous sediments and volcanics, and 4) a late, weak NW trend affecting all rock types.

Despite attempts at computer enhancement, sufficient structural detail in areas of primary interest could not be obtained from the 1:24000 set which also suffered from poor color rendition. To rectify these problems, McLain Harbers Co., Inc. of Tucson, was contracted to re-fly the area to obtain a set of 1:12000 scale (from approximately 6000' above average terrain) natural color stereo photographs of the region, as well a three spot 1:24000 photographs from an altitude of 12000' above average terrain. The resulting set showed superb structural detail as well as excellent rock color rendition. Additional structural overlays were made on these photos and added to the previous 1:24000 interpretations. Together, these were computer-transferred to 7.5 minute topographic quadrangle maps. The 1:12000 photos were subsequently used in the field for mapping additional structural details and for plotting sample point locations.

The resulting structural interpretation map was then overlaid on a geologic map showing all mines, prospects, and mineralized trends in the Tombstone region. The resulting composite showed an excellent correspondence between certain structural trends and/or intersections, and areas of known mineralization. In addition, several areas of favorable structural intersection without known mineralization became apparent as the result of this analysis, serving to further focus the subsequent field mapping and sampling program.

GEOCHEMICAL SAMPLING AND FIELD DATA COLLECTION

The bulk of the effort on the Tombstone project has been spent gathering geochemical samples, as well as collecting and compiling certain geologic data at the sample locations. A total of 355 surface and underground rock samples were collected in the project area previously defined by geologic and structural studies. Of these, 103 surface and underground samples were taken on lands leased by SFPM from Tombstone Development Company. Both surface and underground samples were also taken from property controlled by Tombstone Development adjacent to the SFPM lease; the results of this sampling will be included in the next semi-annual report of activities.

The goal of the sampling program was to obtain the geochemical signature of the highest grade mineralization in a given area, in order to generate metal ratio contour maps, raw assay contour maps, and/or metal value and metal ratio vectors. To this end, samples consisted of either high-graded dump samples or channel samples of vein material in place. Considerable difficulty in obtaining such samples was experienced in the leased part of the main Tombstone mining district because of the extensive reworking of old dumps and general lack of underground access. An important exception to this situation was in the Lucky Cuss Mine area where sampling could be carried out underground on the 100-500 levels along a stretch between the Old Guard incline and the McCann patent.

All samples collected were assayed as follows: Au and Ag by standard fire assay (Copper State Labs, Tucson), 30 trace element suite by ICP analysis, As, Sb, Bi, Ge, Se, and Te by hydride generation ICP analysis, and F assay by NaOH fusion and ICP processing (Acme Analytical Laboratories, Vancouver). Assay results for samples collected on the SFPM lease are listed in Appendix I; sample locations are shown on the enclosed sample location map.

At each sample location, various geologic data were also collected. These include the following: type and dimensions of mineralization; sample mineralogy, paragenesis, and dilution; alteration type, mineralogy, width and intensity; host rock lithology; strike and dip of mineralized structure and cross structures; and estimated extent of mine workings. It is intended that all of this information will be encoded and entered into the computer data base, along with all assay data, for subsequent analysis. To date, however, only the assay data has been entered, as well as the coding for host rock lithology, alteration type, and alteration intensity. These latter data appear in Appendix I, accompanying the assay results for each sample.

DATA ANALYSIS

The goal of the data analysis phase of the project is the generation of specific drill target locations based on the integration and interpretation of all of the geologic, structural, and geochemical data at hand. Upon completion of data entry (which is still in progress), the following information will be available for each sample site: a three dimensional sample location (UTM coordinate and elevation), all assay data, and coded geologic/structural information, as discussed above. These data will be used to generate maps showing the distribution of raw assay data, contoured maps of various groups of metal ratios, and maps showing the various types of mineralization and alteration in the project area, and their relationships with each other. In addition, all assay data will be factor analyzed and sample scores plotted to show their areal distribution.

The end result of such analyses should be the delineation of structural/geochemical "bulls eye" targets and/or well-defined geochemical vectors pointing to mineralization centers both in the Tombstone main district and elsewhere in the area. Drill sites will then be selectively assigned to the highest quality targets.

DIAMOND DRILLING

Two drill hole sites have been established on the SFPM lease, the locations of which are shown on the enclosed sample location map. Vertical, 3000 foot deep, HQWL core holes are planned for both locations. Site locations were based on raw sample assay data, structural interpretation, and information gathered from the published literature.

Diamond drill hole T-1 was collared on July 22 at the common corner of the West Side, Blue Monday, and Tribute patents in an area of complex structure near the intersection of the West Side fissure and north-trending structures associated with the Tribute dike. The hole is designed to test for the presence of: 1) mantos, developed deep in the Naco section which are rooted in the West Side fissure feeder and/or 2) the development of a chimney along the West Side at a point of north-trending structural intersection(s). Secondary, the hole is intended to provide a good stratigraphic cross section of the middle and upper parts of the Naco group carbonates, and to test for the presence of Schieffelin granodiorite beneath this part of the mining district. A copy of the drill log for T-1 will be forwarded to Tombstone Development Company upon completion of the hole.

Drill hole T-2 is designed to explore the Lucky Cuss structure at a point approximately 2300 feet below the surface. To be collared about 700 feet due east of the Lucky Cuss shaft on the East Side patent, the hole is targeted on the intersection of the Lucky Cuss fault and the receptive carbonates of the Middle Naco group, a potential site for the development of significant mantos or chimneys. The drill hole location was based on underground structural observations and the results of sampling in the Lucky Cuss Mine, as well as on published information which suggests an increase in gold values with depth in both the Lucky Cuss and Old Guard Mines.

Additional drill holes are planned to test for deep mineralization on the Lucky Cuss structure. At present two holes are tentatively planned: one to be drilled beneath the Mn-Ag chimneys on the McCann and Wedge claims, and another beneath the Mn-Ag-Pb chimney cropping out at the Luck Sure Mine. Additional drill sites elsewhere on the SFPM lease will be spotted as data analysis progresses.

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SEMI-ANNUAL REPORT TO TOMBSTONE DEVELOPMENT COMPANY ON ACTIVITIES ON THE SANTA FE PACIFIC MINING LEASE IN THE TOMBSTONE DISTRICT, COCHISE COUNTY, ARIZONA

W. D. RIESMEYER

FEBRUARY, 1989

SEMI-ANNUAL REPORT TO TOMBSTONE DEVELOPMENT COMPANY ON ACTIVITIES ON THE SANTA FE PACIFIC MINING LEASE IN THE TOMBSTONE DISTRICT, COCHISE COUNTY, ARIZONA

W. D. RIESMEYER

SUMMARY

A total of five core holes, with an aggregate footage of 14,841 feet, was drilled on the Santa Fe Pacific Mining lease in the Tombstone district between July 21 and December 20, 1988. Several mineralized intercepts were obtained but none were of both ore grade and width. In addition to the Cretaceous Bisbee formation, an extensive Paleozoic stratigraphy was cored during the program. This included the Martin, Escabrosa, Horquilla, Earp, Colina, and Epitaph formations. While all formations contained mineralization, drill results showed the Earp to be most strongly mineralized, followed by the Epitaph and Colina. Carbonates, particularly recrystallized and/or skarned limestone, appear to be the most receptive host for replacement type mineralization which occurs only rarely in the other lithologies cored during the program. Structural observations suggest that formations occurring deep in the section and consisting primarily of carbonates (i.e. the Martin through the Colina) deformed plastically, while those higher in the section, and having a large clastic component (i.e. the Epitaph the Bisbee), deformed in a more brittle fashion. Mineralization occurring in the core may be classified into six types: 1) base metal

replacements, 2) pyrite replacements, 3) skarn-related mineralization, 4) fracture-controlled mineralization, 5) manganese oxide replacements, and 6) base metal oxide deposits. Of these, types 1, 3, 5, and 6 are volumetrically most important and have yielded the best assay results. Types 1, 2, 5 and 6 resemble manto-type replacements. Some are high grade, but are too thin to constitute ore. Type 4 mineralization includes quartz vein deposits which are of high grade but are volumetrically insignificant. Type 3, skarn mineralization, while widespread is generally of very low grade. Very little direct structural information was derived from the drilling program aside from confirming the continuity of the Lucky Cuss fault to depths exceeding 2,500 feet. Two drill holes missed their targets, apparently because of significant changes in the dip, at depth, of major structural features such as the Westside fissure and the Empire dike. Inter-hole stratigraphic correlations suggest the presence of major, pre-Bisbee faulting which may be significant in planning further exploration in the district.

INTRODUCTION

This report outlines and discusses the results of the drilling program conducted by Santa Fe Pacific Mining, Inc. between July and December, 1988, on lands leased from Tombstone Development Company. The drilling program represents a part of a continuing exploration effort in and around the Tombstone mining district which began in early 1988 with an extensive mapping and sampling project, the results of which were outlined in a previous semi-annual report of activities. The recently completed phase of drilling consisted of five deep core holes with an aggregate footage of 14,841, targeted on areas thought to be favorable for the occurrence of economic carbonate replacement deposits. While numerous mineralized intervals were discovered in the course of the program, none were found to be of adequate thickness and/or grade to be economic. The drilling did, however, yield information pertaining to stratigraphy and structure which will be of value in targeting additional core holes on the property.

This report is intended as a supplement to the accompanying detailed drill logs for holes T1-T5 which record the stratigraphic and structural information from each hole, as well as descriptions and assay data for the mineralized intervals encountered. Laboratory assay sheets are appended. The following report expands on the log information. The first section describes, in detail, the stratigraphy revealed by the drilling program. Included are lithologic descriptions and paleontological information, as well as summaries of the alteration, structure, and mineralization found in each formation. The second section classifies and describes the various types of mineralization found in the drill core. Each type is described in terms of form, mineralogy, related alteration, structure, and preferred host rock. Representative metal values for each type of mineralization are also included. The final section discusses the structure observed in the core and also describes the structural geology implied by hole to hole correlations. The report is accompanied by two plates. Plate 1 is a geologic map of the Tombstone district which shows the results of mapping during the first phase of exploration, as well as the location of the five drill holes. Plate 2 presents simplified graphic logs for each hole. Summary structural and mineralization data are also plotted on the logs, and inferred inter-hole correlations are shown.

PROGRAM OUTLINE

A total of 14,841 feet of core was drilled in the Tombstone district between July 21st and December 20th, 1988. Five holes, designated T1-T5, were completed. DDH T1 was drilled on the East Side (280) patent to a depth of 2,834. The hole was lost short of its projected TD at 3000 feet because of caving ground. T2, drilled on the Blue Monday claim, reached TD at 3,003 feet. T3, on the East Side (376), was TDed at 3,000 feet. T4 was drilled on the Luck Sure and reached a depth of 3,000 feet. T5 was collared on the Silver Thread patent and TDed at 3,004 feet beneath the Empire claim. All holes were vertical except T5 which was drilled N57^{o}W at -80^{o}. NC core was recovered from the upper parts of the holes until reduction became necessary to NX core. Core recovery in all holes averaged 100%.

Drilling was carried out by Longyear Contract Drilling Company utilizing Longyear Hydro-44 rigs. The program began using two 10 hour shifts. Inadequate progress, however, required changing to three 8 hour shifts in early November. Overall average production was approximately 35 feet per shift. Core logging was done on site on a daily basis. W. D. Riesmeyer and K. E. Eagan (North American Exploration, Inc.) where the primary core loggers. P.K.M. Megaw logged the majority of T2 early in the program. The core was stored on site in a watertight sea-going container. Core for assay was shipped to various labs for splitting or sawing, and sample prep.

Assaying, early in the program, was done by Copper State Analytical Laboratory in Tucson, but was later shifted to Mountain States R&D in Vail, Arizona. Gold and silver were determined by standard fire assay; copper, lead, and zinc by regular assay. Thirty trace elements were determined by ICP analysis, and As, Sb, Bi, Ge, Se, and Te by hydride generation and ICP analysis. Fluorine was determined by sample fusion with NaOH, leaching and analysis by specific ion electrode. All minor element determinations were done by Acme Analytical Laboratories, Ltd., Vancouver, British Columbia. Assay results were entered in the computerized Tombstone data base, and major metal assay values were posted on the drill logs.

STRATIGRAPHY

The following formations were cored during the 1988 drilling program: Martin limestone, Escabrosa limestone, Horquilla limestone, Earp formation, Colina limestone, Epitaph dolomite, and the Bisbee formation. In addition, Schieffelin granodiorite was encountered in one hole. In general, the Bisbee and formations of the upper Naco group were recovered in drill holes 1-4, while the Bisbee, Horquilla, Escabrosa, and Martin were cored in hole 5 in an apparently up-faulted block.

Most rocks in the project area are moderately to strongly altered. This, along with the paucity of fossils, made the precise determination of formation tops and bottoms difficult. Formation contacts could, however, be determined with a fair degree of certainty within a few to a few tens of feet. The stratigraphy of each hole, as well as hole to hole correlations, are summarized on Plate 2.

Martin Limestone

Distribution and Thickness. The upper Devonian Martin limestone was encountered only in DDH T5 where it was cored in the lower 339 feet of the hole. Only two questionable bedding angles were determined which suggest between 185 and 300 feet true thickness of the Martin were cored. Gilluly measured a true thickness of 230 feet in the Tombstone Hills, suggesting a nearly complete section may have been drilled in T5.

Lithology. In drill hole T5, the Martin consists of light to medium gray, silty to argillaceous, generally massively bedded limestone, with abundant interbedded siltstone. The siltstones form beds from a few inches up to 30 feet thick consisting of tan, brown, or green, fine to medium grained clastic material. Such beds are far more abundant than in the overlying Escabrosa. The limestone generally lacks any distinguishing characteristics except for the presence of black (organic) stylolites which are common in the lower part of the unit.

Stratigraphic Relationships. The Martin is in apparent conformable contact with the overlying Escabrosa. The upper contact was placed at the contact between "clean" Escabrosa limestone and the distinctly silty limestone of the Martin. The abundance of interbedded siltstone also served to differentiate the two formations. Scattered intervals of very poorly preserved crinoid stems and brachiopods are present in the cored section, but they were of no diagnostic value.

Alteration Summary. Due to the silty and argillaceous nature of the limestone, skarn development is prominent in the Martin. Several long intervals of weak to moderate wollastonite garnet-vesuvianite skarn with a pseudo-conglomerate structure were cored. Where not skarned, the limestone is moderately recrystallized. Siltstone units are moderately hornfelsed and contain significant amounts of epidote. ?

Mineralization Summary. No significant mineralization was found in the Martin. Weak, disseminated and veinlet-controlled pyrite mineralization is associated with skarned intervals, as are trace amounts of sphalerite. Two rhodochrosite "veins" (2" and 6"), with associated trace pyrite and sphalerite, were cut in the lower part of the formation.

Structural Characteristics Summary. In T5, the Martin is "tight"; fracture intensity is low, both in limestone and siltstone units, even where skarned or hornfelsed. Fracture angles are generally >45° to the core axis. The only exception to these characteristics is a 15 foot sheared and brecciated zone in an unaltered siltstone unit high in the formation. Here, nearly vertical fractures and shears are tightly cemented by calcite.

Escabrosa Limestone

Distribution and Thickness. The lower Mississippian Escabrosa limestone was cored only in DDH T5 where a total of 702 feet was recovered. Measured bedding angles suggest a true thickness of 450 feet was cut. This does not match well with Gilluly's measurement of 733 feet in the Tombstone Hills, perhaps indicating a part of the T5 section has been faulted out or attenuated along the limb of a fold.

Lithology. The Escabrosa in T5 is primarily a limestone unit, but, unlike the formation elsewhere in Cochise County, it here contains approximately 12% siltstone interbeds. Where least altered, the limestone is very light to medium gray, fine grained, and massively bedded; some intervals consisting of crinoid cocina. Several sections contain one to two inch, round to irregularly shaped, dark gray to cream colored chert nodules. Chert is far less common, however, than in the overlying Horquilla. Limestones are weakly stylolitic towards the top of the formation. Siltstone interbeds range from a few inches up to 13 feet thick. They are predominantly brown, but are also black, green, or dark gray, and are fine to medium grained, and thinly bedded to massive. One five foot bed of fine grained, greenish white dolomite was cored near the middle of the formation.

Stratigraphic Relationships. The Escabrosa is in apparent conformable contact with the underlying Martin and the overlying Horquilla limestone. The upper contact is distinguished by a dramatic increase in the degree of recrystallization in Escabrosa limestone, compared with that in the Horquilla, as well as a substantial decrease in the amount of chert downward across the contact. While this division may appear to be quite arbitrary, the contact, as picked, fits very well with published descriptions. The fossil content of the Escabrosa is rather sparse, consisting largely of crinoid stems and unidentifiable brachiopods, gastropods (up to 1" tall), rugosa (up to 3" long), and various pieces of trilobites. One cross section of a pygidium, sufficiently well preserved and distinctive, allowed positive identification of the lower Mississippian trilobite crytosymbole hercules, confirming the unit to be Escabrosa.

Alteration Summary. The entire Escabrosa section in T5 is altered to one degree or another. The upper half of the unit is strongly recrystallized, yielding a coarse grained white marble. Interbedded siltstones are strongly hornfelsed. In the lower half, limestones are either weakly recrystallized or weakly to moderately skarned. Where best developed (around and in cherty horizons), the skarn has a pseudo-conglomerate structure with mottled pink, apple green, and gray colors, and consists of silica, tan garnet, epidote, chlorite, and wollastonite. Other intervals are silicified in a distinctive anastomosing network fashion. Also, in the lower half of the formation, short two and three foot intervals have been converted to light green talc probably derived from dolomite interbeds. Siltstone units in the lower half are weakly to moderately hornfelsed; some hornfels intervals have been bleached.

Mineralization Summary. Disseminated and veinlet-controlled pyrite occurs sparingly throughout the Escabrosa, most commonly associated with hornfels and the most strongly developed skarn intervals. Similarly, very weak sphalerite, galena, and/or chalcopyrite disseminations or veinlets occur, associated usually with skarn intervals. Nowhere do base metal sulfides exceed 1%. Two 2" rhodochrosite "veins" occur in the cored section which are accompanied by trace sphalerite, galena, and chalcopyrite.

Structural Characteristics Summary. The Escabrosa, in T5, is very "tight"; fracture intensity is very low throughout, except in the lone dolomite bed where it is moderate. Most fracture orientations fall between 30^o and 60^o to the core axis. Faults, shears, breccias, and other signs of brittle deformation are altogether lacking, while evidence of plastic flow, with nearly vertical orientation, is abundant.

Naco Group
Horquilla Limestone

Distribution and Thickness. As is the case with the above-mentioned units, the lower Pennsylvanian Horquilla limestone was cored only in DDH T5. A total of 1,497 feet was cored. Measured, well-defined bedding shows that T5 cored a true thickness of 1,060 feet which compares very well with the 999 foot thickness measured by Gilluly in the Tombstone Hills.

Lithology. The Horquilla in T5 consists of over 95% limestone. The remainder consists of siltstone/shale beds up to 16 feet thick, and one four foot bed of cherty (intraformational ?) conglomerate. The bulk of the siltstone/shale, as well as the conglomerate, occur in the upper quarter of the formation. The limestone, where unaltered, is very light gray, fine to medium grained, and massive to thickly bedded. Several intervals in the upper quarter have a distinct shaly component, while the lower three quarters of the formation is very "clean" limestone. Large, brown to black, rounded chert nodules occur sparingly in the upper quarter of the Horquilla, are rare in the middle parts, and are quite numerous in the lower quarter. The general abundance of chert in the Horquilla serves well to distinguish it from limestones of the overlying formations of the Naco Group.

Stratigraphic Relationships. The upper contact of the Horquilla in T5 is a profound erosional unconformity being overlain by the Cretaceous Bisbee formation. While the lowermost Bisbee is a conglomerate, there is no evidence, in the core, of an erosional surface at the top of the Horquilla. The definition of the lower Horquilla contact has been discussed previously. In addition to the abundant chert, identification of the Horquilla was materially aided by the presence of abundant fossils. The formation contains numerous large, chert filled burrows and other evidence of extreme bioturbation. Also observed were long sections composed almost exclusively of fossil "trash": crinoid stems, fusilinids, rugosa, brachiopod fragments (both articulated and non-articulated types), and bryozoa. One rugosa was identified with fair certainty as rugosa lophophyllidium a Penn-Perm horn coral. Most important, however, was the discovery of the lower Pennsylvanian index fusilinid triticites sp? exceptionally well preserved in chert in the lower part of the formation.

Alteration Summary. Alteration of the Horquilla in T5 consists primarily of recrystallization and skarning of the limestone and development of hornfels in the rare siltstone units. Recrystallization affects the upper and middle parts of the formation. In these areas, long sections have been converted to a coarse grained gray-white marble. In the lower half, only patchy, weak recrystallization was observed. Ska[illegible] shows similar spatial development. Unlike most other formations in the project area, Horquilla skarn mineralogy is simple, consisting of quartz and wollastonite, with only rare, patchy development of garnet.

Mineralization Summary. Most mineralization observed in the Horquilla occurs in the upper half of the formation associated with skarn or recrystallized limestone. Here, several zones of manganese oxide dendrites with associated pink limestone alteration and disseminated pyrite were observed. Zones of trace to very weak, disseminated and veinlet-controlled pyrite, sphalerite, and galena in skarn are also common in the upper half of the Horquilla, but none returned significant assay values. The best intercept was a ten foot segment of galena>sphalerite>>pyrite associated with a quartz vein in recrystallized limestone, four feet of which ran 8.99 opt Ag and .06 opt Au.

Structural Characteristics Summary. Like the carbonate formations below it, the Horquilla is "tight", with a low fracture density throughout. Fracture angles are low; generally less than 45° from horizontal; high angle fractures are exceedingly rare. What best exemplifies the structural character of the Horquilla is the presence of numerous zones of plastic deformation and flowage, all of which are oriented within 15° of vertical. This strongly suggests that the Horquilla deformed plastically along the limbs of the Silver Thread anticline rather than yielding in a brittle fashion.

Earp Formation

<u>Distribution and Thickness</u>. The upper Pennsylvanian Earp formation was cored in DDHs T1, T2, T3, and T4. All four holes were TDed in Earp sediments. Footages cored were 225, 455, 585, and 1,250 feet respectively. Measured bedding angles indicate true thicknesses of 180, 410, 480, and 715 feet. Gilluly reports a thickness of 595 feet for the Earp in the Tombstone Hills. The great thickness of the formation in T4 is undoubtedly due to repetition of the unit by faulting, of which there is abundant evidence in the core.

<u>Lithology</u>. The Earp is easily distinguished from other members of the Naco group by its large clastic component. This component ranges from 74% of the formation in T2 to 34% in T4, and consists mostly of shale and siltstone, along with one short interval and sandstone and one of arkose. Earp shales are black to greenish black, laminated to thinly bedded, and generally calcareous. Siltstones range in color from tans and browns to grays and blacks. Most are finely bedded, and many intervals are calcareous. The lone sandstone unit, in T3, is light gray, very fine grained, and thinly bedded. There is no apparent pattern of upward fining or coarsening of the clastic units within the Earp. Earp limestone units are light shades of gray where unaltered, and white where recrystallized. Unaltered limestones are fine to medium grained and generally massive, although rare bedding planes are occasionally observed. Much of the limestone in the Earp section is argillaceous or has a silty component,

judging by the abundant development of skarn minerals. Stylolites are common in several limestone intervals. A few dolomite beds, up to 10 feet thick, are interbedded with limestone in two holes. ?

Stratigraphic Relationships. The top of the Earp is placed at the top of the first significant clastic unit occurring beneath the Colina. While an occasional similar clastic bed occurs within the Colina, the character of any underlying Colina limestone is so distinctive that picking the first Earp clastic unit can be done with confidence. In core, the Colina-Earp contact is entirely conformable; there was probably no time break between the deposition of the two formations. The bottom contact, that between the Earp and Horquilla, was not penetrated in any drill hole. The Earp is only sparingly fossiliferous and those fossils that exist are very poorly preserved. Crinoid stem and rugosa fragments were found, along with unidentifiable fusilinids; none were of any use in determining the age of the formation.

Alteration Summary. Irregular development of recrystallization, skarn, and hornfels characterize the alteration of the Earp. Alteration patterns are complex within a single hole and are not consistent between holes, undoubtedly due to the complex vertical and lateral changes between carbonate and clastic lithologies. The Earp in T1 shows moderate to strong recrystallization and hornfels development, but no significant skarn, while T4 shows very strong recrystallization and hornfelsing and patchy skarning. T2 and T3 show similar alteration, but also contain intervals of skarn which appear to increase in thickness and intensity down hole. Skarn in the lower Earp of T2 and T3 is the most strongly developed and the most mineralogically complex of any found to date in the district. Developed both in limestones and in calcareous clastics, skarning is so intense that little or no remnant carbonate remains in the core. In these areas, the rock has been totally converted to quartz, green and/or tan garnet, vesuvianite, and wollastonite. In some skarn zones a brown pyroxene is also present. In addition to these prograde minerals, retrograde (?) actinolite, chlorite, talc, and epidote are present in some skarn zones.

Mineralization Summary. The Earp is perhaps the most heavily mineralized formation drilled, although nowhere were ore grade intercepts obtained. Pyrite mineralization occurs with all lithologies and alteration types, but shows a strong preference for calcareous and/or hornfelsed siltstone. Disseminated to semi-massive manto-type galena-sphalerite± chalcopyrite mineralization occurs mainly in skarned limestone; one 1 foot interval of such mineralization assayed 13.42 opt Ag, 5.10 Pb, and 3.66 Zn. Similar mineralization also occurs in skarned dolomite, and, to a leaser degree in recrystallized limestone. Perhaps the most intriguing mineralized interval occurs in probable cave fill below a 13 foot void in T4. Here, at a depth of 2845, feet wulfenite, mimetite, hemimorphite, and possible bromargyrite are found disseminated through the vuggy fill. Manganese oxides appear to form a halo above and below the mineralization.

Structural Characteristics Summary. Overall, the fracture intensity in the Earp is low. However, unlike lower formations, there exist several zones of moderate to high fracture density, especially in the clastic units and in the occasional dolomite horizon. Fracture orientation spans the range from nearly flat to vertical. Further, the Earp is broken by numerous faults which have left relatively open gouge and breccia zones. No evidence of plastic deformation was observed. In general, the Earp appears to have yielded in a more brittle fashion than underlying units.

Colina Limestone

Distribution and Thickness. The Permian Colina limestone was cored in DDH's T1, T2, T3, and T4. In these holes, a total of 675, 655, 680, and 510 feet of the formation, respectively, was recovered. Recalculation, using very questionable bedding angles, shows 520, 505, 490, and 335 feet true thickness were cored. Gilluly reports a thickness of 635 feet in the Tombstone Hills.

Lithology. The Colina is the most distinctive formation cored during the drilling program. With few exceptions, it is a white to very light gray, coarse grained calcite marble which, in places, is stylolitic. Only in a few short intervals does recrystallization decrease enough to hint of the Colina's original character - a dense, aphanitic, black limestone. In DDH T2 and T4, the Colina consists exclusively of limestone marble. In T1 and T3, a few beds of thinly bedded dark gray siltstones and shales, generally less than 10 feet thick, occur towards the bottom of the formation, reflecting a change towards the more clastic sedimentation of the underlying Earp.

Stratigraphic Relationships. The top of the Colina is placed at the base of the last clastic or dolomite unit of the overlying Epitaph formation. Because of the distinctive marblized nature of the Colina and the lack of clastic units in its upper part, the top contact is easily spotted. The character of the lower contact with the Earp has been previously discussed. Because of the strong recrystallization, most fossils in the Colina have been destroyed. None of the Colina-characteristic gastropods omphalotrochus were observed in the core; the only fossils found were poorly preserved and unidentifiable fusilinids.

Alteration Summary. Strong recrystallization is the most characteristic alteration type in the Colina and has affected all of the limestone to one degree or another. Siltstone/shale horizons are strongly hornfelsed. Towards the bottom of the unit, numerous zones of generally weak quartz-wollastonite-garnet-vesuvianite±pyroxene±actinolite±epidote± chlorite skarn have been developed in what must originally have been zones of argillaceous limestone. Short intervals (<5') of Colina marble have been sanded, yielding a mass of extremely friable calcite crystals. Significant sanding has not been observed in any unit other than the Colina.

Mineralization Summary. The Colina is the third most well mineralized unit next to the Earp and Epitaph. Numerous thin mantos or thin, bedding-parallel veins of massive galena-sphalerite-chalcopyrite±pyrite are scattered throughout the formation. They range from paper thin up to a few inches thick. One such "mini-manto", 1.5 inches thick, assayed 1.87 opt Ag, 2.14% Cu, 10.4% Pb, and 5.4% Zn. Finely disseminated galena-sphalerite-pyrite occurs associated with skarned intervals in the lower part of the formation, and along organic-rich stylolites. In either occurrence sulfides do not exceed 1%. Significant manganese oxide replacements occur in the Colina in T1 and T4. In T1, a seven foot section is largely replaced by manganese oxides and only assays .35 ppm Ag. In T4 there are numerous, thin manganese oxide mantos. Two such zones, two and six feet thick, contain, in addition to manganese minerals, wulfenite, mimetite, and fluorite; assemblages similar to those found in stopes of the Empire Mine. One 1 foot section assayed 2.84 opt Ag.

Structural Characteristics Summary. Fracture density in the Colina is generally low and fracture orientation is usually >45^{o}. The intensity of fracturing tends to increase in skarned intervals and in siltstone interbeds. There are few faults in the Colina; those which exist have left tight, thoroughly healed breccias or shears. Any convincing evidence of pre- or syn-metamorphic plastic or brittle deformation of the Colina has been obliterated by the intense recrystallization.

Epitaph Dolomite

Distribution and Thickness. The Permian Epitaph dolomite occurs in drill holes T1-T4. The cored footages are as follows: T1: 1,010', T2: 540', T3: 1,040', and T4: 590'. Adjusted for bedding angles, true thicknesses are 780', 440', 735', and 200' respectively. Gilluly reports a thickness of 780 feet in the Tombstone Hills. The abnormal thinness of the formation in T4 is undoubtedly due to intense faulting along the Lucky Cuss structure. The thin section in T2 may be more apparent than real in that the upper contact with the problematical Scherrer formation may be misplaced, or part of the Epitaph may simply have been faulted out (see Plate 2).

Lithology. Epitaph lithologies are extremely varied. Included are limestone, dolomite, shale, siltstone, arkose, sandstone and conglomerate. The reader is referred to Plate 2 for a generalized view of the distribution of the various lithologies in the drill holes. It would appear that facies changes in the Epitaph were quite rapid. Thick sequences of dolomite, for example, are present in T1 and T2, especially in the upper and lower quarters. Dolomite is lacking, however in T3 and T4, suggesting either a rapid facies change or localized dolomitization. Clastic units are abundant in T1, T3, and T4, but are almost absent in T2, while carbonates are abundant in all holes except T4 which is composed to a large degree of siltstone and arkose.

Stratigraphic Relationships. The upper contact of the Epitaph rests against basal conglomerate of either the Bisbee or Scherrer formations and is clearly an erosional unconformity. The Bisbee basal conglomerate is composed primarily of limestone fragments mixed with rarer sandstone and siltstone pebbles, in an arkosic matrix. The Scherrer basal conglomerate consists of epidotized dolomite clasts. The nature of the lower contact of the Epitaph has been discussed above. Only a very few fossils were found in the formation: forams, fusilinids, brachiopods, and echinoderm spines; none were of diagnostic value.

Alteration Summary. In general, the Epitaph shows a noticeably lower degree of pervasive alteration than other formations in the project area. While certain units in the Epitaph show very strong skarn or hornfels development, the overall aspect of alteration in the formation is weak. The exceptions to this observation are a strong skarn section in T3, and moderate to strong argillization found in T2 and T4. The skarn section in T3 is unique among those in other drill holes because of its thickness - slightly more than 200 feet, and its distinctive structure - that of a pseudo-conglomerate. Skarning apparently progressed along bedding and fractures to yield a rock with rounded "clasts" set in a matrix of skarn, all of which resembles a sedimentary conglomerate. Skarn minerals are quartz, wollastonite, tan garnet, and vesuvianite, along with rare brown pyroxene. In DDH T-2, Epitaph limestone has been largely converted to a white to tan gritty clay for several feet above and below a mineralized interval. Save for a short section of equally intense, but non-mineral-related argillization in T4, this type of alteration is also unique among all the drill holes.

Mineralization Summary. The Epitaph is the second most intensely mineralized formation after the Earp. Unlike the Earp, mineralization in the Epitaph tends to occur in discrete thin mantos and is not scattered throughout the formation as veinlets and disseminations. In T1, a semi-massive manto, two feet thick, composed of galena and sphalerite, assayed 5.81 opt Ag, .09% Cu, 8.3% Pb, and 7.5% Zn over the best one foot. A similar two foot thick manto in T2, which contained, in addition, significant chalcopyrite, assayed 1.32 opt Ag, 1.04% Cu, 5% Pb, and 3.95 Zn over one foot. Several semi-massive pyrite mantos, one to two feet thick, also occur in T1, but all failed to return significant assays. T3 and T4 lacked noteworthy mineralization. It is significant that all important mineralization observed in the Epitaph occurs in limestone units and noticeably avoids adjacent dolomite beds.

Structural Characteristics Summary. The Epitaph has yielded in a far more brittle manner than any of the underlying formations. Fracture intensity, while highly variable, is strong over many intervals, and shows a variety of orientations. Near vertical orientations are more common in the Epitaph than in underlying units. Numerous faults and shears are present in the formation, many of which have left partially open breccias and semi-porous gouge zones. Only in the thickest carbonate units is fracture intensity low, but even here, there is no strong evidence of plastic deformation.

Scherrer Formation (?)

Distribution and Thickness. The Permian Scherrer formation (?) was observed in only one drill hole: T2. Its presence and identification are somewhat problematic in that the Scherrer has never been reported in the Tombstone district; its closest documented occurrence is at the northern end of the Dragoon Range. A total of 895 feet of probable Scherrer was cored in T2 with an estimated true thickness of 770 feet. Gilluly reports a thickness of 687 feet in the Gunnison Hills.

Lithology. The Scherrer is primarily a clastic formation with limestones, dolomitic limestones, and dolomites occurring in the middle and upper parts. The lower half of the formation consists of a generally coarsening upward sequence of lower shales and upper siltstones. The upper half of the formation consists of sandstones with thick interbeds of limestone or dolomite. In the sandstone units, several thick graded sequences were observed consisting of basal pebble conglomerate ranging upward to silty, fine grained sandstones.

Stratigraphic Relationships. The top of the Scherrer in T2 is well-defined at the base of the basal (Glance) limestone conglomerate of the Bisbee formation. The contact is clearly erosional, but there is no apparent angular unconformity between the two formations. The lower contact of the Scherrer is set at the base of a dolomite pebble conglomerate which overlies shales of the Epitaph formation. The placing of this contact is somewhat arbitrary and is perhaps too low, accounting for the anomalously thin section of underlying Epitaph referred to previously. No fossils were found in the Scherrer to assist in resolving this problem.

Alteration Summary. Alteration throughout the Scherrer is generally weak with the exception of moderate recrystallization of some of the carbonate units. Clastic units, especially those deepest in the section, show weak development of hornfels. Weak wollastonite-actinolite skarn is patchily developed in some carbonate units and in sections of calcareous sandstone. With the exception of the Bisbee, the Scherrer is the least altered formation observed during the present drilling program.

Mineralization Summary. Weak disseminated and veinlet-controlled pyrite mineralization is found throughout the Scherrer. Weak manganese oxide replacements of carbonate units are scattered through the upper half of the formation. No significant base or precious metal mineralization, however, occurs anywhere within the Scherrer.

Structural Characteristics Summary. Brittle deformation characterizes the Scherrer. Fracture density, while variable, is high over long sections. Fracture orientation is also highly variable with numerous high and low angle sets observed. Numerous breccias, both semi-open and healed are present, most notably in the brittle sandstone units. Carbonate units, while showing low to moderate fracture density, host numerous breccias and shears, and show no evidence of flowage or plastic deformation.

Bisbee Formation

Distribution and Thickness. The Cretaceous Bisbee formation overlies Paleozoic rocks in all drill holes in the project area. Cored thicknesses are as follows: T1: 650', T2: 445', T3: 685', T4: 650', and T5: 395'. Calculated true thicknesses are 330', 295', 310', 120', and 250' respectively. In the Tombstone area, Gilluly reports a thickness is excess of 3000 feet. Accordingly, all drill holes penetrated the very basal parts of the Bisbee.

Lithology. In the project area, the Bisbee formation consists of a basal conglomerate (Glance) of variable thickness overlain by finer grained clastic rocks with interbedded limestones. The basal conglomerate ranges from 8 to 28 feet thick. In T2, T3, and T4, limestone pebbles and cobbles are the dominant clast lithology, while sandstone and siltstone fragments are the primary clast types in T1 and T5. Overlying the conglomerate are thick, monotonous intervals of siltstone or arkose with lesser amounts of sandstone and conglomerate. Graded bedding is common in some units. Limestone units are scattered throughout the section, but are more numerous towards the bottom. They range in thickness from a few inches up to 75 feet. Hole to hole correlation of the limestone units proved impossible (see Plate 2), suggesting the carbonate units are very lenticular and that the historically applied names (eg. the "Blue", "Joe", etc.) are of use only on a very local basis.

Stratigraphic Relationships. As discussed above, the base of the Bisbee is set at the base of the lowest (basal) conglomerate. The top of the formation was not seen in core. A few scattered fossils - gryphea and large gastropods- were found in the Bisbee, but none had any diagnostic value.

Alteration Summary. With the exception of that cored in DDH T3, the Bisbee is only weakly altered. Carbonate units show weak, patchy development of skarn, while the clastic units are weakly hornfelsed. Very weak silicification affects nearly all Bisbee lithologies.

In T5, short intervals of arkose and siltstone are sufficiently silicified to resemble "novaculite." Bisbee lithologies in T3 are slightly more altered than those in other holes, but overall the formation has the appearance of being only lightly "cooked", in contrast to the distinctly strong alteration found in the Paleozoic section.

Mineralization Summary. Aside from intervals of up to 10% disseminated pyrite in arkose, siltstone, and limestone, and the weak development of manganese oxide replacements in a few carbonate intervals, no significant mineralization was observed in the Bisbee. In the case of the limestone units, this is slightly surprising as these were the hosts for most of the known ore in the district. The only hint of the possible proximity of ore in the Bisbee was found in T5. Here, euhedral blue green and green fluorite crystals line vugs in a brecciated, silicified limestone. The fluorite's character and nature of occurrence are identical to that which occurs adjacent to the large oxidized orebodies of the Benton-Albert stopes in the Empire Mine.

Structural Characteristics Summary. Most of the clastic units in the Bisbee show strong, brittle deformation in many sections. Numerous fault breccias, shears, and punky gouge zones are common in the clastic units, as are long sections of high fracture density, many of which are dominated by nearly vertical breaks. Carbonate units, contrastingly, generally have low fracture density and many have the appearance of having been smeared along very closely spaced shear planes. While no evidence of true plastic deformation was observed in the carbonates, the "smearing" phenomenon closely approximates it.

Igneous Rocks

Scheffelin Granodiorite

Distribution and Thickness. Two sills (?) of Scheffelin granodiorite occur in DDH T1 which also bottomed in granodiorite. The upper sill occurs in Epitaph limestones, and is seven feet thick. The lower sill cuts Earp shales and is three feet thick. The drill hole cut 11 feet of Scheffelin in the bottom before caving prevented further progress.

Lithology. The Scheffelin is a reddish gray, medium grained, equigranular rock composed of plagioclase, minor K feldspar, minor quartz, and accessary biotite and hornblende. Minor oxidized pyrite was observed in the Earp sills.

Alteration Summary. The granodiorite is moderately altered. Feldspars have been thoroughly kaolinized, while the mafic minerals have been, in part, chloritized. The rock is stained with iron oxides, either from oxidized pyrite or from the alteration of mafic accessory minerals. The limestones and shales immediately adjacent to the sills are not visibly altered - no contact metamorphic effects could be found despite a careful search. This is in accord with findings at similar exposures underground in the Lucky Cuss Mine, and suggests that the Scheffelin was intruded in a very dry condition at fairly low temperatures.

Mineralization Summary. The Scheffelin contains trace amounts of accessory pyrite and is cut by tiny pyrite-bearing veinlets. Given the unaltered and unmineralized nature of the immediately adjacent wall rock and the generally unmineralized nature of the Scheffelin, it is doubtful that the intrusive was responsible for the CRD mineralization in the Tombstone district.

MINERALIZATION

All holes in the 1988 drilling program contained mineralization of one type or another, as did all of the formations cored in the holes. Mineralization varied greatly, however, as to type, mineralogy, and intensity, ranging from skarns containing disseminated pyrite, to thin, but intensely mineralized base and precious metal "mini-mantos", to massive, argentiferous manganese oxide replacements. This section classifies and describes the various types of occurrences found in holes T1-T5.

Base Metal Replacements

This classification embraces bedding-controlled base metal replacements of unskarned limestones. Numerous occurrences are found in the core, but the best examples are found in T1 and T2 in the Epitaph and Colina, respectively.

Mineralogy. The megascopic mineralogy of this type of mineralization is rather simple, consisting of galena, sphalerite, chalcopyrite, and pyrite, along with possible tetrahedrite and argentite. Sphalerite is typically of the honey-yellow amberjack variety; blackjack is rare. Galena, sphalerite, and chalcopyrite usually occur as coarse interlocking grains, up to .5", while pyrite is more fine grained and disseminated among the other sulfides. Tetrahedrite (?) and argentite (?) are very fine grained and occur in tiny veinlets cutting other sulfides. Typically the paragenesis is amberjack sphalerite - blackjack (if present) - galena - chalcopyrite - tetrahedrite (?), with pyrite occurring throughout the sequence.

Form. This type of mineralization has extremely sharp footwall and hanging wall contacts which are coincident, or nearly so, with the bedding of the host limestone. In gross aspect the contacts are planar, but in detail are slightly irregular. Ranging from 0.1" to 2' in thickness, they resemble miniature mantos in most aspects.

Host Rocks. Base metal "mini-mantos" occur exclusively in "clean" recrystallized, but unskarned, limestone; most commonly that of the Epitaph or Colina. These replacements clearly avoid dolomite units, some having grown from a limestone bed up to the contact of a dolomite unit and stopping abruptly. Such replacements have not been observed in "dirty" limestones, or in any of the clastic units.

Associated Alteration. Most "mini-mantos" are unaccompanied by any discernible alteration, having razor sharp contacts against unaltered limestone. In a very few cases, manganese oxides, in the form of dendrites and/or pinkish limestone, form what may be a halo in both the hanging and footwall of the small mantos. This possible "halo mineralization" occurs several feet (up to eight feet in one case) above and below the manto and is separated from the manto by totally barren limestone.

Metal Values. Manto-type replacement mineralization found in the drill holes is usually of ore grade, but never approaches ore widths. Typical assays are as follows: 1 foot grading .02 opt Au, 5.81 opt Ag, .09% Cu, 8.3% Pb, and 7.5% Zn; 1 foot of a 2 foot thick interval grading 1.3 opt Ag, 1.04% Cu, 5.0% Pb, and 3.94% Zn; and a 1.5 inch thick interval grading 1.87 opt Ag, 2.14% Cu, 10.4% Pb, and 5.4% Zn. Most intervals of mineralization in this classification were too thin (.1"-.5") to have yielded a meaningful assay because of excessive dilution.

Pyrite Replacements

Pyrite replacements occur ubiquitously throughout the core from all of the drill holes, and show great variation in form and intensity. Included in this classification are weak disseminations in megascopically unaltered limestones, to more intense disseminations in skarn, to semi-massive manto-type mineralization in limestone.

Mineralogy. In some of its occurrences, especially in skarns and manto-type mineralization, pyrite replacements are accompanied by base metal sulfides, but in the majority of cases pyrite occurs alone as attested by assay values discussed below.

Form. Pyrite replacements take a variety of forms. Most common are weak, fine grained disseminations of anhedral pyrite. These occur over intervals of less than an inch up to scores of feet in a wide variety of lithologies and with several associated alteration types. Veinlet- and fracture-controlled pyrite often accompanies the disseminations, and some disseminations are clearly rooted in more intensely mineralized fractures. Weak, fine grained pyrite replacements also occur associated with wavy stylolites, especially in moderately to strongly recrystallized limestones. At the other end of the replacement intensity scale are the manto-type semi-massive pyrite replacements. These take a form very similar to base metal "mini-mantos" discussed above. They are bedding parallel with sharp foot and hanging wall contacts, and range between a tenth of an inch up to two feet thick. They are composed of up to 60-70% anhedral pyrite in a quartz-calcite gangue.

Host Rocks. Pyrite is found in all lithologies cored. It is perhaps most common in fine grained clastic rocks; siltstones and shales, as fine grained disseminations, typically in the 1-2% range, but, in places, forming up to 10% of the rock. In these host rocks some, and perhaps most of the pyrite may be diagenetic. Similar pyrite mineralization also occurs in arkose, sandstone, and conglomerate where it is more clearly of replacement origin. Weak to moderate (up to 10%) pyrite disseminations also occur in limestones and dolomites. In many cases it shows a preference for thin carbonate units sandwiched between fine grained clastic beds, or for the upper parts of carbonate beds immediately beneath shale or siltstone horizons. Semi-massive manto-type pyrite mineralization occurs exclusively in carbonates. Unlike the base metal manto-types, it occurs both in limestone and dolomite.

Associated Alteration. Pyrite replacement mineralization occurs most commonly in altered rock, but is also occurs in rocks that are not visibly altered - most commonly in limestone. Hornfelsed clastic sediments and skarned carbonates, almost without exception, contain varying amounts of pyrite. In these cases, it is usually in the form of weak, fine grained disseminations, although manto-style semi-massive pyrite occurs in weakly skarned Earp and Horquilla limestones and dolomite. In other cases, pyrite usually accompanies moderate to strong silicification, and zones of weak to strong argillization.

Metal Values. Only in rare instances was pyrite replacement mineralization developed intensely enough to warrant assay. Even where strongly developed, metal values in this type of mineralization are low. The best one foot interval of disseminated pyrite mineralization in shale (T2) ran ND Au, 1.03 ppm Ag, .01% Cu, .16% Pb, and .18% Zn, while the best one foot interval of manto-style pyrite mineralization in Earp limestone (T1) ran .41 ppm Au, 43.75 ppm Ag, ND Cu, .03% Pb, and .01% Zn.

Skarn-Related Mineralization

Skarn-related mineralization is found in all of the Tombstone drill holes and in every carbonate-bearing formation cored during the program. In all instances the mineralization was either too weak or too thin to even approach economic grades.

Mineralogy. As with other types of Tombstone mineralization, that related to skarns is, megascopically, quite simple. In decreasing order of abundance, the sulfide minerals are pyrite, blackjack sphalerite, galena, amberjack sphalerite, and chalcopyrite. Typically all sulfides are anhedral and fine grained; exceptionally sphalerite grains obtain dimensions of one inch in diameter. Amberjack sphalerite is relatively rare, and where present is invariably rimmed by blackjack. Galena too is rimmed and/or corroded by blackjack. This suggests an early phase of skarn mineralization consisting of low temperature iron-poor amber sphalerite and galena, followed by higher temperature, iron-rich black sphalerite, pyrite, and minor chalcopyrite. Very rare green sphalerite occupies an unknown position in this paragenesis.

Form. Two types of skarn-related base metal mineralization are present. One consists of mineralization which forms an integral part of the skarn occurring as disseminations, veinlets, and bands, while the other appears to be manto-type mineralization with relatively narrow skarn alteration selvages. The first type of mineralization varies in intensity from sparse, fine grained disseminations in which pyrite, galena, and sphalerite for only 1-2% of the skarn. More intense mineralization is marked by the appearance of veinlets and narrow bands of sulfides making up 3-5% of the rock. Most intense skarn mineralization is marked by irregular semi-massive "knots" of sulfides which locally make up 10-15% of the skarn. Such mineralization rarely exceeds intervals greater than 6". Chalcopyrite accompanies the other base metal sulfides only in this most intense style of mineralization. The second, or manto-type skarn-related mineralization is very similar to base metal "mini-mantos" described above, but have not been observed to exceed 1.5 inches in thickness. They differ, from those previously described, in having narrow selvages, one to three inches thick, of skarn minerals (garnet, vesuvianite, wollastonite, etc.); the entire assemblage occurring in unaltered or recrystallized limestone. Intergranular relationships suggest that, in this type of mineralization, a thin skarn manto developed first, with later base metal mineralization replacing the central part of the skarn.

<u>Host Rocks and Associated Alteration</u>. Mineralized skarn is found in every carbonate bearing lithology in every formation cored during the program, but is best developed in the Earp. The Earp was probably most susceptible to skarning because of the "dirty", argillaceous nature of the limestones, and the numerous, thin clastic units interbedded throughout the carbonate horizons. The Colina, being the "cleanest" carbonate formation cored, has relatively few, thin skarn horizons. Where best developed in the Earp or other formations, skarn has completely replaced the rock leaving no residual carbonate. Such skarn is composed of quartz, tan or

green garnet, wollastonite, vesuvianite, and rare brown pyroxene, which occur in widely varying proportions. Retrograde (?) chlorite, epidote, actinolite, and clays are generally unimportant constituents. Most skarn zones encountered in the drilling, then, appear to be prograde, an observation in accord with the increasing temperature suggested by the paragenesis of skarn-related base metal mineralization.

Metal Values. Only the more massive skarn-related replacement zones were assayed. A one foot section of py>sl>gl in a strong Earp limestone skarn assayed 1.09 ppm Au, 13.42 opt Ag, .38% Cu, 5.1% Pb, and 3.66% Zn. Another similar zone in the Earp assayed .03 ppm Au, 1.15 opt Ag, .16% Cu, 1.79% Pb, and .09% Zn. A one foot section of Earp garnet-vesuvianite skarn containing a two inch gl-cpy-py-sl vein assayed .14 ppm Au, 2.05 opt Ag, .33% Cu, 1.52% Pb, and .72% Zn. A 1.5 inch "mini-manto" with a skarn selvage in the Colina assayed over one foot (note the very large dilution) yielded the following: .01 ppm Au, 21.09 ppm Ag, .16% Cu, 2.52% Pb, and 1.73% Zn.

Fracture-Controlled Mineralization

This classification embraces vein mineralization as well as fracture- fault-, and breccia-related mineralization. It does not include the skarn-related vein and veinlet-controlled sulfides discussed above.

While mineralization of this classification is very widespread in all of the Tombstone drill holes, it is volumentrically insignificant, especially in the case of base metal sulfides. It is important to point out, however, that most mineralized fractures are high angle. Since the Tombstone drill holes were vertical or nearly so, the abundance and importance of this type of mineralization may, accordingly, be underestimated.

Mineralogy. All of the base metal sulfides discussed above, along with pyrite and manganese oxide minerals occur as fracture-controlled mineralization. Significantly, though, fault and breccia zones, as well as intervals of unusually high fracture density, are almost exclusively mineralized by manganese oxide minerals and finely disseminated pyrite. Base metal sulfides do not occur in such zones. Galena, sphalerite, and chalcopyrite, as well as pyrite occur in veins and veinlets which are isolated from intervals of major structure, suggesting mineralized fractures may predate many of the major structures found in the core. Of possible significance, too, is the fact that base metal sulfides (as well as fluorite) most commonly occur in high angle ($\geq 80^{\circ}$) fractures, and often leave coexisting (but not necessarily coeval) flatter fractures barren. Sphalerite is the most common base metal sulfide found in these fractures, followed by galena; chalcopyrite is uncommon. Where both amberjack and blackjack are present, the former is always rimmed by the latter, as is the case with skarn-related sphalerites. Only the larger veins contain significant gangue minerals. Quartz and calcite are the most common; the former is most closely associated with base-and precious metal-bearing veins, while the latter is more commonly associated with pyrite- and/or manganese oxide-bearing veins. Rhodochrosite and fluorite are uncommon gangue minerals.

Form. Mineralization in the classification occurs as fracture fillings, ranging in thickness from paper thin up to .1 inch across, and in veins up to two inches thick. As noted above, most mineralized fractures and veins have high-angle orientations. Fracture fillings tend to be tightly filled with pyrite and/or base metal sulfides, while veins (>.1") are commonly vuggy and contain clusters of euhedral gangue minerals: quartz, calcite, or fluorite. Dustings of iron or manganese oxides typically coat gangue or sulfide minerals in such vugs. Crustified veins are apparently quite rare; only a few were found in core from T5. These are one to two inches across and consist of thick outer layer of brilliant pink, acicular rhodochrosite, followed by a band of dense white quartz, and are cored by irregular masses of amberjack and pyrite.

Host Rocks. Fracture-controlled mineralization occurs in all lithologies cored. Fracture-controlled pyrite and manganese oxides are very non-specific in there occurrence, showing no preference among the various carbonate and clastic lithologies present. Base metal sulfide-bearing fractures and veins, conversely, show a distinct preference for carbonate units, but apparently none between limestone and dolomite. Only rarely are tiny sphalerite veinlets observed in siltstone or shale units.

Associated Alteration. Alteration haloes around veins and fracture fillings in the Tombstone core are remarkably rare, and when present are exceedingly thin - much thinner than the half-width of the associated vein. Fracture fillings usually have no associated alteration with the exception of those containing manganese oxides minerals. These rarely have thin selvages of manganese dendrites and weak argillic alteration. Larger veins occasionally have thin bleached haloes, and, in the case of quartz-rich veins, an irregular halo of weak silicification.

Manganese Oxide Replacements

Two distinct types of manganese oxide mineralization are apparent in the Tombstone area. The first type embraces weak disseminations, fracture coatings, and dendrite development which is widespread in the upper parts of the drill holes and of more sparing occurrence deeper in the holes in highly fractured or faulted areas. This type is probably related to supergene processes. The second type, probably directly related to hydrothermal processes, are massive replacements of limestone by manganese oxides which occur in drill holes T1, T4, and T5. A third type, manganese oxides which form apparent haloes around base metal mantos have been discussed in a previous section.

The first, or "supergene" type is briefly described here and will not be considered further in the follow-on discussion. This type of manganese mineralization is found mainly in the upper parts of the drill holes: above 640 feet in T2, above 395 feet in T3, above 490 feet in T4, and above 545 feet in T5. These intervals correspond roughly to the modern water table. In addition, this type of mineralization occurs deeper in the drill holes, but only in areas of brecciation, faulting, or dense fracturing. These data imply that this type of mineralization is related to supergene processes or circulating groundwater. The nature of the mineralization, too, suggests supergene redistribution of manganese, as the oxides occur primarily as dendritic fracture <u>coatings</u> or as weak impregnations in porous lithologies such as sandstone or arkose. Massive manganese oxide replacements are considered below.

<u>Mineralogy</u>. The major manganese oxide in massive replacements is a fine grained, black, sooty mineral which is probably a mixture of pyrolusite and psilomelane. A few of the replacements contain a compact, dense, heavy manganese mineral which may be manganite. X-ray diffraction studies would be needed to positively identify the minerals occurring in these deposits. Manganese-rich replacements occur in T4 which also contain wulfenite and mimetite. These are discussed in a separate section, but it should be borne in mind that they may be related to the purely manganese oxide replacements of the present discussion.

Form. Manganese replacements are intervals of limestone which have been replaced by between 20 and 100 percent manganese minerals. The foot and hanging wall are well-defined and usually sharp, although weak dendrite-type mineralization or pink limestone may extend several feet from the massive interval. Thicknesses of massive or semi-massive mineralization range from six inches to 6.5 feet. Where bedding in the host limestone can be determined, the foot and hanging wall of the manganese replacements appear to be parallel or nearly so. This type of mineralization, then, appears to take the form of relatively thin mantos.

Host Rocks. Manganese mantos have only been found in limestone hosts. In DDH T1, a 6.5 foot manto occurs in strongly recrystallized Colina limestone. In T4, five mantos, between one half and three foot thick, also occur in recrystallized Colina. In T5, a one foot thick semi-massive manto occurs in moderately recrystallized Horquilla limestone.

Associated Alteration. The manto in T1 shows no hanging wall alteration, but a one foot interval of weak to moderate sanding is present in the immediate footwall. Mantos in T4 are surrounded by up to 15 feet of weak manganese oxide dendrite development, and the T5 manto has a two to three foot thick halo of pink manganiferous limestone alteration surrounding it.

Metal Values. The mantos in T4 and T5 have generally low metal values. Assay ranges are as follows: .01-.07 ppm Au, 1.58-11.73 ppm Ag, 5 ppm - .01% Cu, 76 ppm - .33% Pb, and 98 ppm - .27% Zn.

Base Metal Oxide Mineralization

Mineralization in this classification bears many similarities to the ore that was mined during the heydays of the Tombstone district. Similar in both mineralogical composition and in physical form, the base metal oxide intercepts from the present drilling program differ from the old bonanza ores in grade, thickness, and depth of occurrence. Only three intervals containing base metal oxides were encountered during the drilling; all are in DDH T-4.

Mineralogy. The mineralogy of the "ore" and gangue minerals in the three intercepts is remarkably similar, with a few exceptions as noted below. Of the "ore" minerals, the lead oxides are the most common. Mimetite ($Pb_5(AsO_4)_3Cl$) is the most abundant, occurring as yellow-green, or lemon-yellow pseudo-hexagonal crystals up to .1" long, which line fractures or vugs. Wulfenite ($PbMoO_4$) is almost as common. It occurs as thin, delicate brilliant orange to red-orange panes, frequently twinned, and reaching .5" in size. Cerrusite is probably present but is too fine grained to be identified. No discrete zinc oxide minerals (smithsonite, hemimorphite, etc) were identified in any of the three intervals, but assay data suggests their presence. Silver oxides, notably bromargyrite (AgBr), are apparently very rare. Sooty black manganese oxides are present in two of the three intercepts. One intercept contained a sky blue mineral tentatively identified as aurichalcite $[(Zn,Cu)_5(CO_3)_2(OH)_6]$. Gangue minerals include quartz, calcite, and fluorite. Quartz forms tiny crystalline druses, or occurs as multiple generations of botryoidal crusts. Calcite is either crystalline (tiny scalenohedra) or massive, and ranges in color from black (manganiferous) to clear, to brilliant yellow (iron oxide-bearing). Fluorite is abundant as a gangue mineral and occurs as coarse druses of perfectly euhedral white to clear cubes. Orange iron oxides and thin films of manganese oxides commonly coat all "ore" and gangue minerals in these assemblages.

Form. Two intercepts, those at 1320' (5' thick) and 1470' (2' thick) appear to have a manto-like form. Both foot and hanging wall contacts are sharp and well-defined. While bedding is difficult to discern in the strongly recrystallized host rock, the contacts of the mineralized intercepts are parallel to stylolites and, therefore, probably also to original bedding. Mineralization is clearly of a replacement nature; no vein-like characteristics are present. The margins of the intercepts are composed largely of manganese oxides in a quartz-calcite matrix, juxtaposed against unaltered limestone. The interiors are very vuggy; some open spaces approach one inch across and are lined with crystals or druses of ore and gangue minerals.

The third intercept, at 2845', has an entirely different form, appearing to be weakly mineralized cave fill, lying immediately beneath a 13 foot natural void. Because of its unusual nature and its potential importance is future exploration, this occurrence is described, in detail, below:

2792-2798':	recrystallized light gray, stylolitic limestone.
2798-2800':	as above, but containing 1/2" vugs containing orange calcite crystals (dog tooth spar) and amorphous clots of manganese oxides. Several fractures at 20^{o} to core axis, haloed by manganese oxide dendrites and finely disseminated pyrite are present.
2800-2822.5':	recrystallized white limestone with numerous thin seams of talcy clay at 30^{o} to core axis. Specks of manganese oxides and orange carbonate scattered throughout.
2822.5-2823':	white, slightly gritty, weakly sanded, recrystallized limestone.
2823-2836':	void; possible oxidation cave.
2836-2836.5':	very vuggy limestone. Vugs lined with perfectly clear rhombs of iceland spar; accompanied by white, sectile clay.
2836.5-2837':	pulverent orangish-gray clay with calcite crystals scattered throughout.
2837-2842':	very porous and vuggy limestone; vugs lined with calcite and quartz druses and with gray clay; numerous quartz and calcite veinlets. Strong iron oxide Liesegang banding is offset by 80^{o} micro-faults.
2842-2844':	as above, but contains angular 1" fragments of argillized siltstone. Interval suggestive of a collapse breccia.

2844-2852': assayed interval. Very similar to unit immediately above. Vugs filled with pulverent bright orange iron oxides, and calcite crystals (scalenohedra with growth patterns outlined by iron oxides). Brilliant red-orange wulfenite panes and doubly terminated yellow-green mimetite crystals form druses in vugs and along fractures. Possible trace cerrusite and bromargyrite along open fractures.

2852-2865': recrystallized stylolitic limestone. Upper contact sharp; upper one foot contains only very rare tiny vugs and thin clay seams.

Host Rocks. The base metal oxide intervals at 1320' and 1470' occur in moderately recrystallized Colina limestone, while that at 2845' occurs in moderately to strongly recrystallized Earp limestone. In all three cases, the marble is clean, save for the presence of organic-rich stylolites. The lack of a silty or argillaceous component is indicated by the total absence of skarn minerals in either the hanging or footwall limestones of the mineralized intervals.

Associated Alteration. The alteration in the 2845' occurrence is adequately described above. The 1320' occurrence shows a weak halo of manganese oxide, both as dendrites and fracture-fillings extending 13 feet into the hanging wall and 13 feet into the footwall where it is accompanied by minor pink manganiferous limestone. The 1470' occurrence shows a similar, but weaker manganese halo. It is accompanied, however by a zone of high angle fractures lined with fluorite, which extends nine feet into the hanging wall.

Metal Values. The best one foot of the 1320' occurrence ran .14 ppm Au, 32.33 opt Ag, .09% Cu, 1.27% Pb, and 1.60% Zn, while the best one foot of the 1470' zone assayed .07 ppm Au, 2.84 opt Ag, .02% Cu, 2.8% Pb, and .21% Zn. The best one foot assay interval in the 2845' occurrence ran .07 ppm Au, .32 opt Ag, .01% Cu, .21% Pb, and .48% Zn. The reader is referred to the T5 log for complete assay information. It is noteworthy that assays of the complete intervals show that in these oxidized mineral occurrences the values for lead and zinc are almost equal and that zinc values, in places, exceed those for lead. Unoxidized base metal "mantos" at Tombstone usually show nearly equal lead and zinc values, or lead exceeding zinc. Insofar as zinc, in an oxidizing environment is far more mobile than lead, it is usually the case that oxidized mantos (at, for example, Leadville and Santa Eulalia) are strongly depleted in zinc by descending ground water. The values shown by the above three intercepts, accordingly, suggest in situ oxidation with little or no transport of the metal components away from their initial site of deposition.

STRUCTURAL GEOLOGY

One of the major thrusts of the Tombstone drilling program was to explore for manto mineralization in ground adjacent to major structures rather than to specifically target chimney-type mineralization within the structures themselves. The structures that were cut by certain drill holes were the result, then, of needing to explore footwall and hanging wall rocks, not of targeting the structure per se. The result of this approach was that little new information was generated concerning specific structures (i.e., the Lucky Cuss fault zone, etc). In some cases (e.g. T5) the nature and geometry of certain target-related structures became even less clear as the result of drilling. On the other hand, the wide scatter of hole locations generated some unexpected inferred data concerning major structures heretofore unknown. The following sections describe both the structural data directly observed in the drill holes, and those structures which drilling data imply to exist.

Observed Structural Data

Lucky Cuss Fault Zone. DDHs T1, T3, and T4 were designed to explore ground in the hanging and footwalls of the Lucky Cuss fault zone. All were vertical holes of depths judged sufficient to cross the fault where it cut suitable carbonate host rocks deep in the Paleozoic section.

Drill hole T1 was collared 900 feet due East of the Lucky Cuss headframe where the fault zone strikes nearly north-south. Data gathered from the accessible mine workings, as well as from published cross sections, indicates that the Lucky Cuss fault (between the surface and 400 feet underground) dips eastward at 70^{o}. The planned fault intercept was 2,460 feet. It is most likely that the Lucky Cuss fault was actually cut at 2,655 feet, indicating on overall surface to intercept dip of 72^{o}. At this depth, the fault is represented by a three foot calcite-cemented breccia zone in a nine foot thick shale sandwiched between two massive Earp limestone beds. The breccia contains only weak, disseminated pyrite mineralization. Weak to moderate galena-sphalerite replacements occur, however, in the hanging wall limestone immediately above the fault.

Drill hole T3 was collared 450 feet east and 100 feet south of a large glory hole resulting from the mining of a 50 foot diameter chimney of argentiferous manganese oxide ore localized on the Luck Cuss fault. The fault in this area strikes almost due north and underground data indicated a southward rake of between 85^{o} and near vertical. Measured surface and underground dips ranged from vertical to as low as 55^{o} E. The planned fault/chimney intercept, assuming a 80^{o}E dip and 87^{o} rake, was 2,480 feet. The fault was actually cut at 2,426 feet, indicating an actual overall dip of 79^{o}E. Several fractures, measured above and below the fault, dip between 70^{o} and 80^{o} which generally agree with the projected fault dip. The fault zone itself is seven feet thick and consists of sheared and brecciated, calcite- and quartz-cemented arkose which contains several intervals of strong manganese oxide mineralization both as replacements and as vug and fracture fillings. No base metal replacements occur in immediate hanging or footwall limestones. The targeted chimney either dies out above the intercept depth, or was missed by the drill hole because of a change in rake.

Hole T4 targeted the down dip extension of mineralization at the Luck Sure Mine. The hole was collared 600 feet east of the mine openings where the Lucky Cuss fault still strikes almost due north before starting a sharp swing to the east (see Plate 1). Surface dips on various strands of the Lucky Cuss in the mine area range from 75°E to 85°E. Assuming an average dip of 80°E, the planned fault intercept was at 2,830 feet. This point lies nearly in the center of the 13 foot natural cave intersected between 2,823 and 2,836 feet. Fracture angles in rocks of the immediate foot and hanging wall tend to support an 80° fault dip. The nature of the mineralization associated with this intercept is described in detail in a previous section.

The intercept widths of the Lucky Cuss fault may appear surprisingly narrow. They are not uncharacteristically so, however, when compared to numerous segments of the Lucky Cuss observed both on the surface and underground where the width pinches and swells dramatically both along strike and down dip. Continuous exposures along several levels of the Lucky Cuss mine show the fault varies from a few inches thick in barren areas, up to perhaps ten or twenty feet in mineralized areas (the exact width being obscured by replacement mineralization). Width may vary from one extreme to the other over a strike length of only a few feet. Accordingly, it is concluded that, although stratigraphic displacements could not be determined either underground or in core, the nature, dip, and intensity of faulting along the Lucky Cuss does not significantly change from the surface to the depths drilled.

Westside-Eastside Fissure. DDH T2 was collared near the intersection of the Westside-Eastside fissure, the Grand Central fault and the Tribute dike. Near the collar location, the dike dips west at 85° and the fissure dips 75° northwest (see Plate 1). Published cross sections and underground measurements in the Westside mine, however show the fissure to have an overall vertical to steep southeastward dip. It was anticipated, therefore, that the drill hole would pierce the dike-fissure intersection at depth, somewhere in the middle of the Naco section. Drilling results, however, showed otherwise. Neither the Tribute dike or the Eastside fissure were cut in the hole, indicating that both either maintain a vertical dip or reverse their indicated dip at depth. The presence of a thick section of Scherrer formation in T2 is undoubtedly due to faulting which may involve some movement on the Eastside fissure. It is probable, however, that pre-Bisbee faulting is also involved, as will be discussed in a subsequent section.

Empire Dike and Breccia Pipe (?). DDH T5 targeted mineralization associated with a strong breccia occurring at the intersection of the Empire dike and the Silver Thread roll. Neither the dike or the roll crop out on the surface, but both are mapped in detail on the 400 and 500 level of the Empire Mine. Careful delineation of the breccia mass and associated structures in the Benton-Albert stopes showed, on two levels, that the intersection of the vertical dike and roll axis had produced a vertically oriented breccia with a pipe-like geometry. T5, accordingly was targeted to intersect the breccia approximately 1,500 feet vertically below the breccia exposed on the 400 and 500 levels. As was the case with T2, the target was missed completely - neither the breccia or the dike were cut by the drill hole. The structural implications of the "miss" are as follows: 1) since the drill hole was oriented almost at right angles to the dike which was never cut, the dip of the dike must have changed from vertical to westward (away from the hole) at depth, and 2) the existence of the associated mineralized breccia at a depth of 2000 feet can neither be proved or disproved by this drill hole since the associated Empire dike was never penetrated, and there is no way of telling how closely the hole approached the dike along its course.

Implied Structural Data

Perhaps the most important structural data generated by the program can not be observed directly in the core, but rather is implied, based on drill hole stratigraphic information. In the following discussion reference is made to Plate 2 which shows the stratigraphic correlation between all of the Tombstone drill holes.

Inter-hole correlation clearly shows that the Paleozoic section has been affected by major faulting that is not expressed in the Bisbee and therefore must be pre-Bisbee in age. Evidence for this is found in the stratigraphy of holes T2 and T5. In DDH T2 a thick section of Scherrer is present immediately below the undisplaced Bisbee unconformity and above a severely foreshortened section of Epitaph. One solution to the geometry so imposed is shown on Plate 2 which suggests the Scherrer was faulted in on a generally east-dipping normal fault which also "decapitated" the upper parts of the Epitaph. The east dip is required to maintain the inter-hole stratigraphic integrity shown between T1, 3, and 4. In T2, the missing part of the Epitaph suggests a fault displacement exceeding 500 feet.

Diagonally across the Tombstone basin, DDH T5 revealed that the Horquilla limestone immediately underlies the Bisbee unconformity which, as in T2, shows no apparent displacement. The existence of the Horquilla in this location implies that the area containing holes T1-4 has been downdropped in excess of 2,300 feet relative to T5. Such a pre-Bisbee displacement may have occurred along one major fault as shown on Plate 2, or may represent the cumulative displacement of a series of west-dipping, west side-down step faults between T2 and T5.

Another noteworthy feature of Plate 2 is the apparent "flatness" of the Bisbee unconformity between drill holes T3, T1, T2, and T5. Closer spaced drilling might reveal local irregularities, but, in general, the unconformity would still maintain a fairly constant elevation. This implies that post-Bisbee faults (i.e. <u>most</u> of the faults within the Tombstone basin shown on Plate 1) did not produce significant vertical displacement. This is in accord with published mapping and with personal observations both on the surface and underground. The literature also suggests that lateral movement on such structures was minimal.

The only exception to this generalization, documented by the present drilling program, is the apparent movement on the Lucky Cuss fault. Examination of Plate 2 shows that the contacts between the various Paleozoic units in hole T3 are displaced sharply downward relative to those in T4, as is the Bisbee unconformity. Recognizing the distortions inherent in the diagram, and the presence of several cross faults (Plate 1), it still appears that these displacements are the result of drag, or successive, closely spaced stepwise displacements, caused by movement on the Lucky Cuss fault (compare Plates 1 and 2). If this is true, it can be further noted that the contact displacements decrease in magnitude upwards. Between T3 and T4, the Earp-Colina contact is displaced downward by 811 feet, the Colina-Epitaph contact by 640 feet, and the Epitaph-Bisbee unconformity by only 187 feet. These figures imply that the Lucky Cuss fault has been in existence at least since Colina, and probably Earp time, and moved, perhaps as a growth fault, through Epitaph time. Movement continued or was reactivated in Bisbee time, offsetting the unconformity. If this analysis is correct, it marks the Lucky Cuss fault as one of the more important and fundamental elements of the structural fabric of the Tombstone district.

Santa Fe Pacific Mining, Inc.

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Box 27019
Albuquerque, New Mexico 87125
505/881-3050

May 1, 1989

FEDERAL EXPRESS

Mr. LaVerne Baxter
Tombstone Development Company
Route 2, Box 67
Grand Island, Nebraska 68803

Tombstone Project
Cochise County, Arizona
File 3-033-000 1

Dear LaVerne:

Santa Fe will commence its 1989 drilling program on the Tombstone Development Company lease May 1st. This years drilling program will consist of one rig and will be as follows:

1. T-6 will be drilled on the Luck Sure Patent at the same location as last years hole T-4. This hole will be drilled first.

2. T-7 will be drilled on the West Side Patent.

3. T-8 will be drilled on the Contention Patent.

4. T-9 will be drilled on the Silver Thread Patent at the same location as last years hole T-5.

I will supply you with a map of all drill sites prior to the completion of the drilling of T-6.

If you have any questions, please call.

Very truly yours,

Dennis Cole

Dennis Cole
Manager-Land

DC:dlu

Attachment

cc: W.D. Riesmeyer

REPORT AUGUST, 1989

Semi-Annual Report to Tombstone Development Company

on the

Tombstone Project, Cochise County, Arizona

W. D. Riesmeyer
Santa Fe Pacific Mining, Inc.
September, 1989

Santa Fe Pacific Mining, Inc.

6200 Uptown Blvd. N.E., Suite 400
Box 27019
Albuquerque, New Mexico 87125
505/881-3050

September 11, 1989

Re: Tombstone Project
Cochise County, Arizona
SFPM File 3-033-0001

Mr. LaVerne Baxter, President
Tombstone Development Company
P. O. Box 1445
Grand Island, Nebraska

Dear LaVerne:

Attached in accordance with the term of the Lease between Tombstone Development Company and Santa Fe Pacific Mining is the semi-annual report covering Santa Fe's work during this period of time.

If you have any questions concerning this report, please feel free to call either me or Duncan Riesmeyer of this office.

Very truly yours,

Dennis Cole

Dennis Cole
Manager-Land

DC:fy

Attachment

cc: D. Riesmeyer

Semi-Annual Report to Tombstone Development Company
on the
Tombstone Project, Cochise County, Arizona

Introduction

Santa Fe Pacific Mining, Inc. conducted diamond core drilling on the Tombstone Development Company lease between May 1 and August 7, 1989. Two deep core holes (T-6 and T-8), with an aggregate footage of 4,200', were completed during the period. Extremely difficult drilling conditions, with attendant increased costs, prevented completion of the anticipated four hole program.

The following report describes the results from the two drill holes. Included are descriptions of the stratigraphy, structure, and mineralization encountered in each hole. A geologic map showing the location of each hole, as well as graphic logs for T-6 and T-8 are appended as Plates 1 and 2, respectively. Complete drill logs and assay sheets form an appendix to the report.

Diamond Drill Hole T-6

DDH T-6 was drilled between May 1 and June 10, 1989, on an asimuth of S85W at -80 degrees from the collar of DDH T-4 (see prior report). T.D. was 1,900'. The bearing of the hole was a direct line between the T-4 collar and the main shaft of the Luck Sure workings, which exploited a chimney of argentiferous manganese and lead oxide ores, lying within the Lucky Cuss fault. Drill hole T-6 was sited to explore for similar chimney and attendant manto mineralization in and adjacent to the Lucky Cuss where the fault was projected to cut the Paleozoic limestones of the Earp formation, apparently 1700 feet below the surface. The proposed intercept laid on a straight line projection between the outcrop of the Luck Sure mineralization and the oxidation cave, and accompanying mineralization, cut in T-4 at a depth of 2840 feet, which is thought also to lie in the Lucky Cuss fault zone.

Stratigraphy

DDH T-6 cut a section which included the Bisbee, Epitaph, Colina, and Earp formations. A complete stratigraphic description of these formations is included in a prior report; only a brief summary description will be given here.

Bisbee Formation. Rocks of the Cretaceous Bisbee formation were cored from the collar to 672 feet. The bulk of the unit consists of a generally coarse polylithic conglomerate, with clasts in some sections reaching boulder size. Clasts consist primary of underlying Paleozoic units - limestone, marble, sandstone, siltstone, and shale, which are supported in a generally calcareous, sandy matrix. The second most abundant Bisbee lithology is fine to coarse sandstone, quartzite, and arkosic sandstone. The lower-most part of the Bisbee consists of siltstone and mudstone.

Epitaph Formation. In T-6, the Pennsylvanian-Permian Epitaph formation, consisting primarily of limestone and siltstone was cored between 672 and 1088 feet. The upper part of the unit is composed of fine siltstone and interbedded sandstones and arkose. The bulk of the unit is light grey limestone which has been recrystallized to a medium grained marble. The bottom of a lower siltstone unit marks the contact with the underlying Colina limestone.

Colina Limestone. The Colina limestone, cored between 1088 and 1521 feet, is also of Pennsylvanian-Permian age, and consists almost entirely of white to light grey, coarsely crystalline marble. Rare, thin dolomitic sections are present, as well as healed collapse breccia, and thin siltstone intervals. A small solution cavity and a four foot jasperoid interval were encountered in the upper part of the unit. The appearance of the first significant siltstone at 1521 feet marks the contact with the underlying Earp formation. A thin fault sliver of white marble between 1740 and 1750 feet is also tentatively assigned to the Colina.

Earp Formation. The Pennsylvanian-Permian Earp formation was cored between 1521 and 1738 feet and between 1750 and 1900 feet. It consists of limestone, calcite marble, and dolomite, along with interbedded siltstone, sandstone, and arkose. Coarse recrystallization of the limestones in the upper part of the unit make the distinction between the Colina and Earp carbonates difficult.

Structure

Despite the number of faults and breaks mapped on the surface between the Luck Sure shaft and the collar of T-6, drilling showed very little structural disruption of the section except in the Bisbee, and in and near the Lucky Cuss fault. The contact between the Epitaph and Colina, and between the Colina and Earp formations can be readily correlated between holes T-4 and T-6, both dipping eastward between 45 deg. and 50 deg. This is in accord with bedding angles measured in both holes which generally range between 40 deg. and 60 deg. The numerous faults, noted on the accompanying drill logs, which cut the Paleozoic section, are generally high angle, but, as shown by hole to hole correlation, have only minor vertical offset.

A complication to this apparently simple structural picture is found in the attitudes of the Bisbee beds and the Bisbee-Epitaph contact. In both T-4 and T-6, bedding in the Bisbee dips very steeply - between 70 deg. and 90 deg., up to 50 deg. steeper than that of the underlying Paleozoic units. In addition, correlation between T-4 and T-6, shows the Bisbee - Epitaph contact to dip west at 6 deg. While this may be due to an extremely rugged unconformity surface, the attitude of the Bisbee beds suggest a tectonic cause. The shallow contact angle and the steep bedding angles suggest thrust faulting along the unconformity with possible overturning of the upper plate Bisbee. While there is some evidence of overturning reflected in the core, there is little or none of a thrust at the contact. For the time, the issue is unresolved.

The Lucky Cuss fault was intercepted in T-6 at 1738 feet, approximately 45 lateral feet from the projected intercept on the line between its outcrop at the Luck Sure and the T-4 intercept. Thus the Lucky Cuss dips 79 deg. between the surface and the T-6 intercept, and 75 deg. between T-6 and the oxidation cave in T-4. The cave and underlying mineralization encountered along the fault in T-6 suggest the Lucky Cuss zone to be about four feet thick, considerably thinner than the 20 foot thick section measured on the surface.

Mineralization

While several mineralized intercepts were obtained in T-6, none were of adequate grade and/or width to constitute ore. Of these, the three most significant are described below. Complete assay results for these and other assayed intervals are located in the appendix.

The interval 991.5'-992' contained a thin (0.5') replacement consisting of nearly massive blackjack sphalerite and minor disseminated galena. The intercept assayed 31.0 opt Ag, 0.81% Cu. 3.20% Pb, and 17.3% Zn. Mineralization appeared to be concordant with bedding and had razor-sharp contacts with the carbonate host. Mineralization occurred within an alteration shell of strongly recrystallized Epitaph limestone (marble). These characteristics suggest a typical CRD-type manto, albeit very thin. This "mini-manto" may conceivably be rooted in the Lucky Cuss fault, 500 feet distant, up dip along bedding. It does not, however, extend further down dip to T-4 only 285 feet away.

The interval 1185.5'-1187' is a vuggy, strongly oxidized zone in Colina limestone in the immediate footwell of a barren three foot thick jasperoid. The zone contains manganese oxides lining vugs, as well as remnant kernels of galena (to 1" across), and scattered wulfenite. The zone assayed 3.28 opt Ag. 0.69% Pb, and 1.64% Zn. Projected 290 feet down dip along bedding to T-4, a silica-fluorite-pyrite-manganese zone is encountered which may be a manto-like correlative of the T-6 intercept.

The Lucky Cuss fault is probably represented by a two foot oxidation (?) cavern cut between 1738' - 1740', which is similar in nature to the cavern on the Lucky Cuss which was drilled in hole T-4. The T-6 cave (fault) has a siltstone hanging wall and a vuggy marble footwall. Unlike the T-4 cave, this cavern is floored only by vuggy, semi-massive manganese oxides; no wulfenite or anglesite was observed. Assays showed some lead oxides to be present, however, viz: 2 feet of 0.18 opt Ag, 0.06% Cu, 2.35% Pb, and 0.35% Zn. It is probable that the low Ag, Cu, and Zn values have resulted from migration of these metals away from this strongly oxidized zone, only the Pb remaining, fixed as oxidation zone-stable, fine grained cerrusite.

Below the cavern, zones of manganese oxide impregnations and dendrites occur in Earp limestones, the strongest of which lies between 1797.5' and 1802'. Assays show the manganese oxides to be argentiferous, carrying 0.88 opt Ag; no other significant metal values are present. It is probable that this MnOx zone is an alteration/mineralization halo related to the Lucky Cuss zone.

Diamond Drill Hole T-8

DDH T-8 was drilled between June 12 and August 7, 1989 from a site on the north end of the PBR Minerals open pit. The hole was drilled due west beneath the pit at an angle of -61 deg. T.D. was 2,300'. The hole was sited to explore the possible down dip extension of rich silver-gold ore associated with a generally north-trending complex of faults and the Empire-Contention dike. Published cross sections show bonanza-grade oxide ore was closely associated both with the margins of the dike and with the multitude of steeply dipping normal faults which progressively offset the dike westward. Because the best "shallow" ore was found where dikes or faults cut Bisbee limestones, it was believed that larger ore bodies might be found where the fault-dike system cut thick sections of Paleozoic carbonates at depth.

Stratigraphy

DDH T-8 cut a section consisting of the Bisbee formation and the Horquilla and Escabrosa limestones. These units are also thoroughly described in a prior semi-annual report, and only a brief summary of their characteristics is given below.

Bisbee Formation. Unlike the Bisbee drilled in T-6 which contained coarse clastic sediments - sandstones an conglomerates, the 802.7 feet of Bisbee drilled in T-8 consists of fine clastics - siltstone and mudstone, as well as limestone. Only rare, thin interbeds of sandstone or arkose were encountered in the section. The siltstones, in the upper 200 feet of the hole, are strongly shattered and altered, creating extremely bad drilling conditions. Drill progress, on occasion, was as little as one foot per 20 hour shift. Below the zone of shattering, the siltstones, black, tan, brown or red in color, are seen to have a variable sandy component and frequently grade into finer grained mudstones. Limestones showing varying degrees of argillization, dolomitization, and silicification, form interbeds, up to 50 feet thick, within the siltstone section.

Horquilla Limestone. The Pennsylvania-Permian Horquilla limestone forms the lower-most formation of the Naco group, underlying the Earp formation. The Horquilla was cored in T-6 between 802.7' and 1949.5'. The upper part of the unit is a thickly bedded, light grey to pinkish grey limestone which contains a few thin interbeds of siltstone. From 897' to 1332' the Horquilla is a limestone or dolomitic limestone breccia. Clasts average 2.5" to 3" across, and are supported in a calcite matrix. This sub-unit either represents a healed collapse breccia, or, more likely a tectonically shattered interval which was subsequently solution-healed with calcite. The lower half of the Horquilla in T-6 is composed of thickly bedded to massive, stylolitic, medium to coarse grained limestone which contains a few thick beds of dolomite and siltstone. Weak skarning affects the lower part of this limestone unit. The lower-most unit of the Horquilla is a thinly bedded dark grey to brown siltstone which disconformably overlies the Escabrosa.

Escabrosa Limestone. The Mississippian Escabrosa was cored between 1949.5' and T.D. at 2300'. The unit consists of thickly to massively bedded, moderately recrystallized, light to dark grey limestone, with lesser amounts of dolomite and dolomite limestone. Most parts have been affected by weak skarning and argillization. Stylolites are common throughout the section. Only one thin interbed of dark grey siltstone appears in the section.

Felsite Dike. A felsite dike intrudes the Escabrosa between 2179' and 2199'. The dike is an orangish cream aphanitic-porphyritic rock with a sharp footwall contact, but a very diffuse hanging wall contact. Phenocrysts consist of small plagioclase and potassium feldspar crystals, rare rounded quartz "eyes", and blackish green biotite books. The aphanitic groundmass is very siliceous and has the appearance of potassic flooding. The rock probably has a quartz monzonite composition. The dike contains no sulfides, and shows no trace of argillization, unlike most other dikes seen on the surface or underground in the district.

Structure. The lack of surface outcrops along the line of T-8, as well as poor pit exposures and the lack of underground and nearby drill hole data, make any structural analysis of T-8 extremely difficult and speculative. Despite these difficulties, the following observations are, nonetheless, offered.

Faults. Numerous faults were recognized on the T-8 core. Most have a dip ranging from 58 deg. to 78 deg.; regional structural data suggest that most, or all, dip eastward . Most show little or only moderate displacement, as differing lithologies or formations are not juxtaposed. The only apparent exception is a major fault very near the Bisbee-Horquilla contact. This fault, dipping eastward at 75 deg., when projected to the surface, corresponds closely to the location of the Contention fault as mapped by Butler. Because of its proximity to the formational contact, it is probable that the Bisbee has been down-dropped against the Horquilla along this structure. The northeast-trending Tranquility fault, approximately 600 feet north of the drill collar (see Plate 1), dips southeast and is probably responsible for down dropping the Bisbee-Horquilla contact approximately 245 feet relative to the position of the contact in DDH T-6 (see prior report).

As shown on Butler's cross sections, east-dipping faults progressively offset the contention dike to the west with increasing depth. No dike segments were encountered in T-8 with the exception of the above described felsite which occurs at a vertical depth of 1900'. Its projected position is 1000' west of the outcrop of the Contention dike as mapped by Butler. Drill data shows the felsite dike probably dips east at -60 deg. Its location and attitude militate against its being a segment of the Contention; it is more likely a segment of the Sulphuret dike which cutcrops just west of the vertical projection of the bottom of T-8. The absence of segments of the Contention dike further up-hole is, at present, unexplained.

Folds. Various tectonic fabrics observed in the core, as well as known structural trends elsewhere in the district, suggest that T-8 passed through the axis of one or more folds. Unfortunately, because fabrics in drill core cannot be absolutely oriented in three dimensional space, the true dip and strike of bedding, recorded on the drill log, cannot be determined. Accordingly, on the basis of one drill hole, positive proof of a fold structure cannot be obtained. However, it should be noted that the trace of the Girard "roll" (anticline) projects across the course of T-8 (Plate 1). Manipulation of measured bedding angles in the core suggest that the axis of the roll may have been crossed between 1000' and 1300'. This corresponds to the location of the intense breccia cored in the Horquilla, as described above. It may be speculated that this breccia formed as a result of shattering along the crest of the roll. That weak mineralization occurs associated with the bottom of this breccia unit may be analogous to roll crest replacements which are well documented elsewhere in the Tombstone district.

Mineralization

Mineralization occurs sporadically throughout the length of T-8. Most, however, is very weak. Only two intercepts yielded significant assay values, but those were not of sufficient grade and/or width to constitute ore. Assays for all intercepts chosen for analysis, in addition to the two discussed below, appear with the T-8 drill log in the appendix.

A three foot intercept, between 1648.6' and 1651.6', assayed 0.64 opt Ag, 0.62% Cu, 2.16% Pb, and 2.35% Zn. The mineralization consists of 20% coarsely disseminated sphalerite = chalcopyrite galena, hosted in strongly recrystallized and weakly skarned Horquilla limestone. Mineralization is accompanied by weak pink and black manganese oxides, as well as possible fine grained green garnet. In addition, the sulfides are surrounded by a halo of recrystallization up to 7 feet thick, and a shell of weak chlorite-epidote skarn up to 23 feet wide. There is no obvious structural control for the mineralization, and it is probable that it is a part of a weak bedding controlled skarn-sulfide manto system of unknown source.

The best mineralized interval in DDH T-8 occurs associated with the felsite dike between 2154' and 2177.5', in the dike hanging wall, and between 2198.5 and 2199' in the footwall. The hanging wall zone consists of up to 30% total sulfides including galena, sphalerite, chalcopyrite and chalcocite. Trace amounts of various copper oxides and wulfenite are scattered through the section. The average tenor of the interval 2154' to 2177.5' (23.5') is .002 opt Au, 1.14 opt Ag, 0.61% Cu, 6.54% Pb, and 2.57% Zn. Reference is made to the appendix for a complete tabulation of the metal values in this interval. The footwall intercept contains about 20% sulfides with a mineralogy similar to the section above. Associated alteration occurs mostly in the hanging wall and consists of weak recrystallization, and weak to moderate sanding. A one foot cavern, completely filled with massive crystalline calcite and dolomite occurs in the immediate footwall of the dike.

It will be noted that the felsite dike contains anomalous lead and zinc values only on its margins; the interior of the dike is completely barren. This, in addition to its megascopically unaltered nature and lack of even visible pyrite, suggests the dike is post-mineral and was not the source of the surrounding CRD mineralization. Accordingly, it is suggested that mineralization is related to a pre-dike fault (the same as, for example, mineralization in the Westside fissure). Both the fault and mineralization are thought to have been subsequently intruded by the barren felsite.

SUMMARY

Two deep core holes were completed on the Tombstone Development Company lease as part of Santa Fe Pacific Mining's 1989 exploration program. A 1,900 foot hole was drilled in the Luck Sure mine area, and a 2,300 foot hole was cored under the PBR Minerals open pit. Both holes were targeted on major faults, the Lucky Cuss and the Contention fault complex, which hosted significant ore deposits in the near-surface environment. The holes were directed to intersect these structures at depth where they cut thick sections of Paleozoic carbonate rocks - locations holding potential for hosting large mantos and chimneys of CRD mineralization. Both holes cut the targeted structures, but found only minimal development of sulfide mineralization, the grade and/or thickness of which was inadequate to constitute ore.

APPENDIX

Drill Logs and Assay Sheets
for
DDH T-6 and DDH T-8

DIAMOND DRILL
HOLE T-6

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UJV 086
June 13, 1989
T-6 991.5-992

SANTA FE PACIFIC MINING INC.
Attn: Mr. Duncan Riesmeyer
6200 Uptown Blvd., #400
Albuquerque, NM 87125

Analysis of 1 Drill Core Samples

		FIRE ASSAY				
ITEM	SAMPLE NUMBER	Au (oz/t)	Ag (oz/t)	Cu (%)	Pb (%)	Zn (%)
1	T-6 991.5-992	.002	31.00	.81	3.20	17.3

cc: Mr. Fred Jenkins
Mr. Dale Armstrong

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK DATE SIGNED ARIZONA U.S.A.

6/13/89

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UJV 107
June 30, 1989
T-6 (1185.5 TO 1896)

SANTA FE PACIFIC MINING INC.
Attn: Mr. Duncan Riesmeyer
6200 Uptown Blvd., #400
Albuquerque, NM 87125

Analysis of 8 Drill Core Samples

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	FIRE ASSAY Ag (oz/t)	Cu (%)	Pb (%)	Zn (%)
1	T-6 1185.5-1187.5	.010	3.28	.04	.69	1.64
2	T-6 1597.5-1602	<.002	.07	.01	.04	.09
3	T-6 1741-1743	.008	.18	.06	2.35	.35
4	T-6 1770-1772.2	<.002	<.01	<.01	.02	.02
5	T-6 1779-1780.3	<.002	<.01	<.01	.01	<.02
6	T-6 1797.5-1800	<.002	.88	.02	.03	.32
7	T-6 1801.4-1802.4	<.002	.87	.01	.05	.18
8	T-6 1891.5-1896	<.002	.86	.02	.37	.35

cc: Mr. Fred Jenkins
Mr. Dale Armstrong

REGISTERED ASSAYER CERTIFICATE 9425 WILLIAM L. LEHMBECK ARIZONA U.S.A.

6/30/89

DRILL HOLE: T-6

page: 1

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mas)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	50 / 60 / 100			5																			**Bisbee Fm:** Sandstone; Lt grey in color, Fine → v Fine grained, Possibly Beach Sands {Aeolian?} Calcite cemented (Effervesces lightly).					
5	85	BISBEE																					9.2 Caliche layer {1 foot} Fracture Filling !					
10	100			10																								
15	100			5	65																		Fault, Gouge < Breccia {3"}					
20	100																											
25	100			10																								
30	100			5																								
35																												

DRILL HOLE: T-6

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA page: 2 Au	Ag	Cu	Pb	Zn
				5																			BISBEE FM: SANDSTONE: Fine - medium grained to locally conglomeritic; clasts; seds, LS, Shale & Qtzite. grey in color, bedding 0~10° to core axis, locally fossiliferous, (GRYPHEA SP.); Calcite cemented.					
					30																							
40		BISBEE		5																								
				5																								
45																												
				0																								
50					90																							
				5																								
55																												
				5																								
60					40																							
					0																μ							
				10	0																							
																					↙							
65					90																↙							
				10																	↙							
70					0																							

DRILL HOLE: T-6

ASSAY DATA page: 3

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	ANGLES
5/10	100	BISBEE	20	20
75	100			
80	100		5	20
85	100			
90	100		10	20
95	100			
100	100			65
105	100			

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES | ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

DESCRIPTION:

BISBEE FM: WHITE - LT GREY SANDSTONE - LOCALLY GRADATIONAL W/ GRAVEL SIZED CONGLOMERATE (PEBBLE CONGLOMERATE). Ss. IS MOD-MATURE {i.e. >90% QTZ, WELL ROUNDED, MINOR MAGNETITE, V. MINOR FSPAR}. SANDSIZE RANGES FROM CLAY SIZE ~ V. FINE SAND SIZE, GRAD. TO PEBBLE SIZE CLASTS {ONLY LOCALLY}. MINERALIZATION IS ONLY TRACE MnOx, BEDS ARE BIOTURBATED IN PART, CALCAREOUSLY CEMENTED.

DRILL HOLE: T-6

ASSAY DATA page: 4

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100			5	40																		BISBEE Fm: CONTINUED AS BEFORE. (SEE PAGE 3)					
110	100			13	80																		- NO FeOx -					
115	100			10	60																		- CALCITE VIENING V. MINOR {< 1/8" WIDE}					
120	100			0	0																		CALCAREOUS CEMENT.					
					0																		* CONGLOMERATE IS MATRIX SUPPORTED POLY-CLASTIC MUD-FLOW TYPE FAN-GLOMERATE.					
125	100			0	85																							
130	100			0	90																							
135	100			0	30																							
140				5																								

5/11

DRILL HOLE: T-6

ASSAY DATA page: 5

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
140–145	100	BISBEE Fm	5	5, 30	BISBEE SANDSTONE: INTRAGRADATIONAL W/ FAN-GLOMERATE. BEDDING IS NEAR 0° W/CORE AXIS. SS. IS CALCITE CEMENTED. MINOR MnO_x DENDRITES ALONG FRACTURE FACES, MIXED CLAYS ALONG STRONG SLIP-FACES OF FAULTS & SOME JOINTS.
145–150	100		5	0, 5	
150–155	100		0, 5	0	
155–160	100		0	80	CONGLOMERATE ZONE.
160–165	100		0	15	
165–170	100		5	40	
170–175	100		0, 0	30	

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

DRILL HOLE: T-6

ASSAY DATA page: 6

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100			5	80																		BISBEE Fm: CONT. SEE PAGE 5.					
180		BISBEE		0																								
				0	70																							
185	100																											
				5	45																							
190																												
	100			0																								
195																												
				0	25																							
200	100			5																								
				0																								
205	100			0																								
	100			0	30																							
210	100			5																								

DRILL HOLE: T-6

ASSAY DATA — page: 7

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
210–215	100	BISBEE	0, 5	30
215–220	100		5	
220–225	100		0	45
225–229	100		0	
229–234	100		0	85
234–240	100		5, 0	
240–243	100			20
243–245	100		0, 5	10

DESCRIPTION

BISBEE Fm: V. CONGLOMERITIC;

MATRIX SUPPORTED, POLY CLASTIC: [SIZE ≈ 8" MAX ? PEBBLE COBBLES & OCCASIONAL BOULDERS.
MATRIX SIZE: SILT ~ COARSE SIZE.
MOD ~ LIGHT CALCITE CEMENTATION.
- LOCALLY V. FINE BEDDED Ss. ~ SANDY SILTSTONE, 242'
EVIDENCE OF RIP-UP BEDS.
- DEPOSITION RATE MOD. HIGH.
- FINE BEDDED SUB-UNITS MAY BE ALGAL- BOUNDSTONE IN PART (?), NO CLEAR EVIDENCE OTHER THAN FINELY LAMINATED.

DESCRIPTION OF CONGLOMERATE

1. CLASTS ARE ROUNDED ~ VERY ANGULAR. SIZE IS VARIABLE, MUD & SAND SUPPORTED.
2. CLASTS MAY OR MAY NOT BE IMBRICATED {PREFERENTIAL ORIENTATION}
3. LITHIC FRAGMENTS OF:
   - ABRIGO Ss, Sts, Ls,
   - COLLINA Ls, MARBLE
   - EPITAPH Ls.
   - EARP Ls. STS.
   - HORQUILLA Ls.
   - ESCABROSA Ls.
   - SUGAR LOAF VOLCANICS
   - PIMA QTZ ITE.
   - UNIDENTIFIED IGNEOUS ROCK TYPES.

Au	Ag	Cu	Pb	Zn

DRILL HOLE: T-6

ASSAY DATA page: 8

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
		BISBEE FM		5	10																		BISBEE Fm: CONT.					
					5																		SEE PAGE 6 & 7.					
250	100			5	10																							
				5	10																							
255				10	10																							
				8																								
260	100			5																								
265				5																								
				5																								
270	100			5																								
275																												
	100			5																								
280																												

5/12

DRILL HOLE: T-6

ASSAY DATA page: 9

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mss)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	BISBEE Fm																					BISBEE CONGLOMERATE : CONT.					
285																												
290	100																											
295					45																							
300	100				0																							
	100				0																							
305					5																							
310	100				30																							
					30																							
315	100																											

DRILL HOLE:

ASSAY DATA — page: 10

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
	100	BISBEE FM	5	40
320			0	
	100			
325			5	40
	100			
			5	
330				45
	100			
			5	
335				
			0	
340	100			
			0	
345			5	
				10
	100			
			5	
350				

Column headings: DRILL HOLE: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES; FAULTS, SHEARS, ETC.; CALCITE VEINING; QUARTZ VEINING; HORNFELS; SKARN; RECRYSTALLIZATION; ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION; BLEACHING; SANDING; Fe OXIDE; EPIDOTE + CHLORITE; OTHER; MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass); DESCRIPTION; ASSAY DATA: Au, Ag, Cu, Pb, Zn

DESCRIPTION:

BISBEE CONGLOMERATE : CONT.

DRILL HOLE: T-6

ASSAY DATA page: 11

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

Footage: 355, 360, 365, 370, 375, 380, 385

Recovery: 100, 100, 100, 100, 100, 100, 100

Formation: BISBEE Fm

Bedding angle: 5, 0, 5, 5, 5, 5

Fracture angles: 80, 0, 0, 45, 50

DESCRIPTION

BISBEE CONGLOMERATE: CONT.
SEE PREVIOUS DESCRIPTION.

SILICIFIED STARTING @ 347

FAULT; SANDSTONE, FINE GRAINED
WELL SORTED, MATURE, GREY-GREEN IN
COLOR, CALCITE CEMENTED. & PART. SILICIFIED

DRILL HOLE: T-6

ASSAY DATA — page: 12

FOOTAGE	RECOVERY	FORMATION	FRACTURES ANGLES	DESCRIPTION
390	100	BISBEE FM.	45	BISBEE SEDIMENTS: SEE PREVIOUS DESCRIPTION.
395				CONGLOMERATE SHOWS STRONGER IMBRICATION.
400	100			
405			30	
410	100		0	
			0	
415				
420	100		38	

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wrns mass) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-6

ASSAY DATA page: 13

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
	100	BISBEE	5	38	BISBEE SEDIMENTS : CONT. SEE PREVIOUS DESCRIPTION
425					
			5		
430	100				
				45	
			5		
435					
440	100			35	CLAST SIZE INCREASING
			5	5	
				0	
445					
			5	0	
				0	
450				10	
	100		5	25	
455					

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-6

ASSAY DATA page: 14

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
		BISBEE	5	30	BISBEE SEDIMENTS: CONT., SEE PREVIOUS DESCRIPTION
460	100				
465			5	45	
				30	
470	100				
475				30	
480	100			45	
			5		
485					
			5	60	
490				45	

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

DRILL HOLE: T-6

ASSAY DATA page: 15

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
	100	BISBEE	5	45	BISBEE SEDIMENTS: CONT.) SEE PREVIOUS DESCRIPTION
495			0		
				30	
500	100				
				50	
			0		
505					
				60	
510				30	
	100				LARGE RAFTED BOULDER OF COLLINA MARBLE (?)
					MINOR EPIDOTE PROPOLIZATION
515				30	
			0		
520	100				
				25	
525			0		

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

DRILL HOLE: T-6													ALTERATION								MINERALIZATION			DESCRIPTION	ASSAY DATA page: 16				
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)		Au	Ag	Cu	Pb	Zn
				5	45																		BISBEE SEDIMENTS: CONT., SEE PREVIOUS DESCRIPTION.					
530	100	BISBEE		10																			CONG. DEMINISHING INTO SS. THEN SS.SILTSTONE. WELL SORTED FINELY LAMINATED TO BEDDED. MAUVE IN COLOR					
535				5	40																		SANDSTONE: WELL SORTED - BEDDED. QTZ. MATURE, CLEAN GREY IN COLOR					
540	100			5	45																							
545				0	40																		HORNFELSING PICKS UP @ 545'					
550	100			0	45																							
555				5																			BLEACHING IN PART					
560	100			5																								

DRILL HOLE: T-6

page: 17

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

Footage: 565, 570, 575, 590, 585, 590, 595

Recovery: 100, 100, 100, 100

Bedding angle: 5, 10, 10, 10, 15, 15, 15

Fractures angles: 50, 45, 50, 50

DESCRIPTION

BISBEE SANDY-SILTSTONE: MAUVE IN COLOR, SILTY ~ SANDSIZE CLASTS, BEDDING @ ≈ 5-10°, HORNFELSED IN PART; BLEACHED IN PART, NO FE-PYRITE OR OTHER MINERALIZATION. EPIDOTE ~ CHLORITIC ALTERATION IN PART; ARGILLIZED IN PART, ALONG SHEARS, FAULTS, ETC.

590 ~ 599' AN ALTERATION PHENOM. CAUSING A "BRECCIA-LIKE" PATTERN. - POSSIBLY RELATED TO BLEACHING.

DRILL HOLE: 7-6

ASSAY DATA page: 18

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	DESCRIPTION
		Bisbee Fm.	10	BISBEE SANDSTONE ^ SILTSTONE: CONTINUED AS BEFORE.
600	100			
			5	
605				
610	100			
615			0	
620	100		0	
625			0	
	100			ZONE OF ARGILLATION & RUBBLE.
630				

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

DRILL HOLE: T-6

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
	100	BISBEE FM	0	0	BISBEE SILTSTONE - SANDSTONE: CONT. SEE PREVIOUS DESCRIPTION.
635			5	5	
			5	0	
640	100		10	5	FAULT ZONE 641.7' ~ 645.9' BRECCIA >> GOUGE
				45	
645			10		
650	100		5	0	
				5	
655			10	10	
660	100			10	END OF BLEACHING.
665	100		10		

Columns: LITHOLOGY, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER; MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass)

ASSAY DATA page: 19

Au	Ag	Cu	Pb	Zn

DRILL HOLE: T-6

page: 20

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
670	100	BISBEE	5	10
675	100	EPITAPH DOL.	10	15
680	100		10	
685	100		10	
690	100		10	10
695			5	
700			10	

LITHOLOGY | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION

BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mas)

DESCRIPTION

EPITAPH SILTSTONES ~ MUDSTONES: F. GRAINED SILT ~ V.F. GRAINED SAND, CALCAREOUSLY CEMENTED; F. BEDDED ~ F. LAMINATE IN PART; PRESERVED BEDDING AT 0 ~ 10°; BECOMING BLEACHED @ 682 ~ 701'; SMALL CALCITE VEINLETS THROUGHOUT

ASSAY DATA: Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-6

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
705	100	EPITAPH DOL.																					EPITAPH SEDIMENTS: V.F. SANDSTONE ~ MUDSTONE. F. GRADED, BEDDED AND IN PART LAMINATED; OXIDE ZONE (ORANGE IN COLOR) 701' ~ 706, BELOW TAN ~ WHITE IN COLOR, CALCAREOUS IN PART; ARGILLIZATION & CHLORITIZATION LOCALLY.					
710	100				30																		NO SULFIDE MINERALIZATION.					
715																												
720	100				35																							
725																												
730	100				30																f, f, f, f, f							
735																												

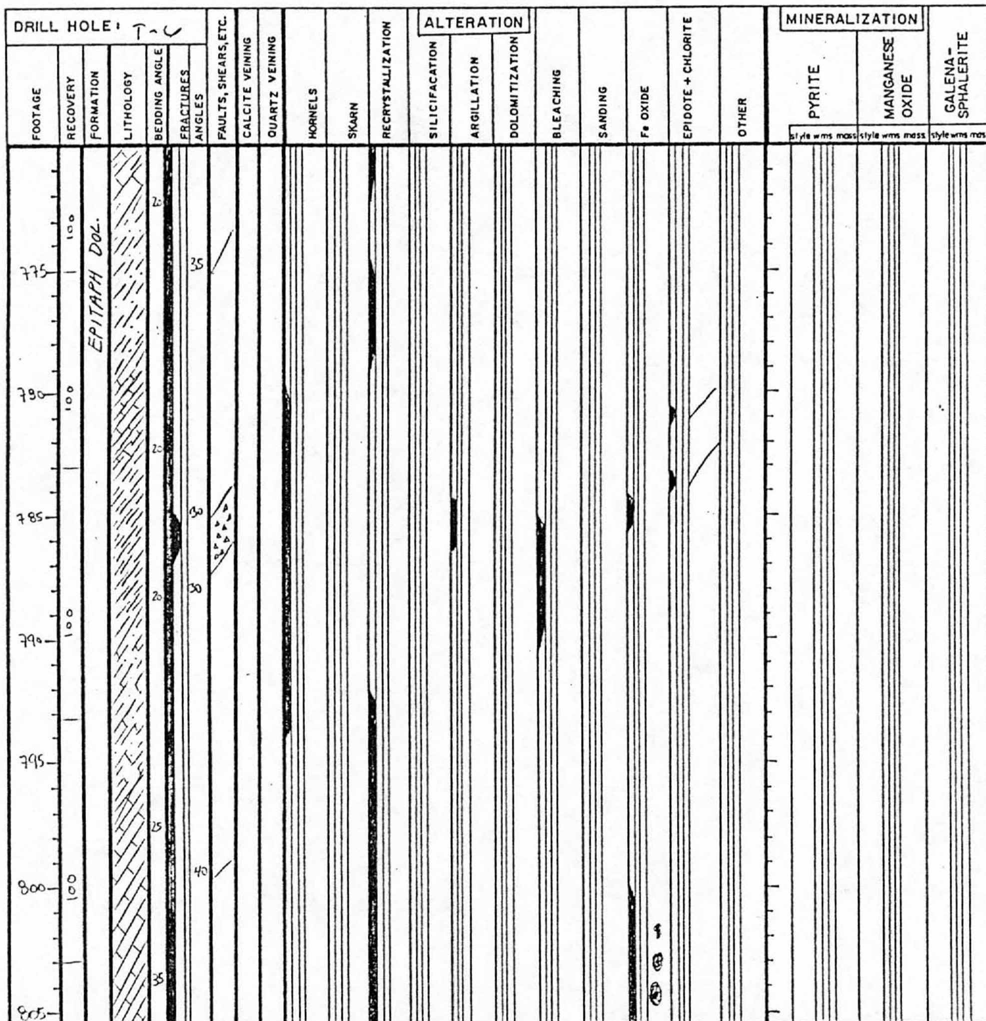
page: 21

DRILL HOLE: T-6

ASSAY DATA page: 22

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
		EPITAPH DOL.		10		EPITAPH SEDIMENTS: CONT. AS BEFORE.
740	100				45	
745				15		LIMESTONE ~ DIRTY TO SILTY IN PART; MASS. TO FINELY BEDDED; FOSSIL FRAGMENTS; RECRYSTALLIZED.
750	100			15		
755				15	30	
760	100					
765	100			20	45	
770	100					

Column headings: FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass) | Au | Ag | Cu | Pb | Zn



DESCRIPTION

EPITAPH SEDIMENTS: CONT.

ALT DIRTY LIMESTONES ~ SILTSTONE
SEE PREVIOUS DESCRIPTIONS.

LIMESTONES GRADING INTO MUDSTONE–
SILTSTONE ~ SANDY SILTSTONE.
{TRANSGRESSIONAL ONLAP}
CALCAREOUS IN PART.

LIMESTONE: Less Silt, stc, mod-Rextlzd,
Epidote "Blooms" ALTERATION LOCALLY;
BROWN ~ Lt GREEN IN COLOR; MINOR
CHLORITE ALT. THROUGHOUT. CALCITE
VEINING THROUGHOUT.

ASSAY DATA

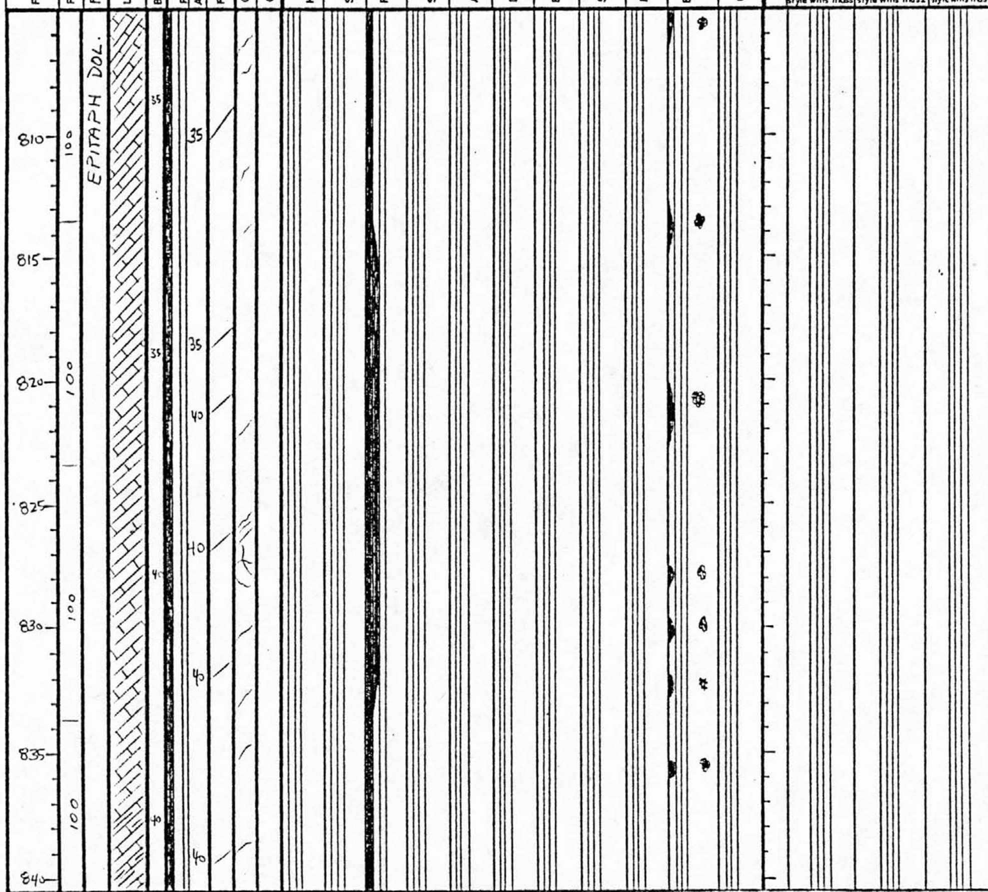
page: 23

Au	Ag	Cu	Pb	Zn

DRILL HOLE: T-6

ALTERATION | MINERALIZATION | DESCRIPTION | ASSAY DATA page: 24

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn



LIMESTONE: SEE PREVIOUS PAGE! LOCAL FOSSIL "TRASH".

LOCALLY SILTY: V.F. BEDDED

DRILL HOLE: T-6

ASSAY DATA page: 25

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

Footage: 845, 850, 855, 860, 865, 870, 875

Recovery: 100, 100, 100, 100, 100

Formation: EPITAPH DOL.

Bedding angle: 10, 35, 35, 30, 10

Fracture angles: 20, 30, 30, 25, 30, 30

DESCRIPTION

LIMESTONE: CONTINUED, SEE PAGE 23.

SILTY LAYERS: V. FINELY BEDDED OR LAMINATED; DARK BANDING IN LS.

EPIDOTE - CHLORITE ALT. IS UNIFORM AND CONTINUOUS.

DRILL HOLE: T-6

ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER

MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass)

ASSAY DATA page: 26

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	Au	Ag	Cu	Pb	Zn
				30																			LIMESTONE: CONT. SEE PAGE 23					
880	100	EPITAPH DOL.		45	40																							
					40																							
885																												
				40																			LIMESTONE ~ LESS SILT: LT GREY IN COLOR.					
890	100																											
					45																							
895																												
				45																								
900	100																											
					50																							
905				45																								
	100				45																							
910				45																								

DRILL HOLE: T-6

page: 27

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA - SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
915	100	EPITAPH		40	50																		LIMESTONE: CONT. SEE PAGE 23					
920				40	45																		LIMEY SILTSTONE: CLAY ALT. (ARGILLIZED) AND CHLORITIZED IN PART, BLEACHED IN PART, WHITE ~ LT GREEN IN COLOR					
925	100			45	50																		LIMESTONE: AS ABOVE.					
930					50																							
935	100			45	50																							
940				45																								
945	100			35																								

DRILL HOLE:								ALTERATION									MINERALIZATION			DESCRIPTION	ASSAY DATA page: 28				
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)		Au	Ag	Cu	Pb	Zn
	100	EPITAPH		30	50																		EPITAPH : CONT. AS BEFORE. Epidote - chlorite "BLOOMS" - SEE PREVIOUS DESCRIPTION.					
950					0																							
	100			35	0 0																							
955																												
				30	35																							
960	100																											
				25																								
965					45																		LIMESTONE BECOMING MARBLE ↓					
970	100			20																								
					30																							
975					0																							
	100			20	0																							
980																												

DRILL HOLE: T-6

page: 29

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	GALENA-SPHALERITE	DESCRIPTION
	100	EPITAPH DOL.	5			EPITAPH: LIMESTONE, CONT AS BEFORE.
985				40		
			20			
990	100		35		▮	SEMIMASSIVE BLACK JACK SPHALERITE ≈2.5" WIDE VEIN. {CUT & ASSAYED}
				50		
995			50			
1000	100			45		LIMESTONE ~ LESS RECRYSTALLIZATION, {NO LONGER MARBLE}
			5?			
1005						
1010	100		50	40		MARBLE — WHITE, VERY COARSELY RECRYSTZD.
1015						

FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE | MANGANESE OXIDE | GALENA-SPHALERITE (style wms mass)

ASSAY DATA: Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-6

ASSAY DATA page: 30

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MINERALIZATION: MANGANESE OXIDE (style wms mass)	MINERALIZATION: GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
		EPITAPH DOL.		45	45																		EPITAPH: CONT AS BEFORE, EPIDOTE "BLOOMS", mod REXTLZD MARBLE. SPECKLED GREY IN COLOR.					
1020	100																											
1025				40	75																		MINERALIZATION: NONE					
1030	100			35																								
1035																												
1040	100			30	60																							
1045					60																							
1050	100			30																								

DRILL HOLE: T-6

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mas)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn

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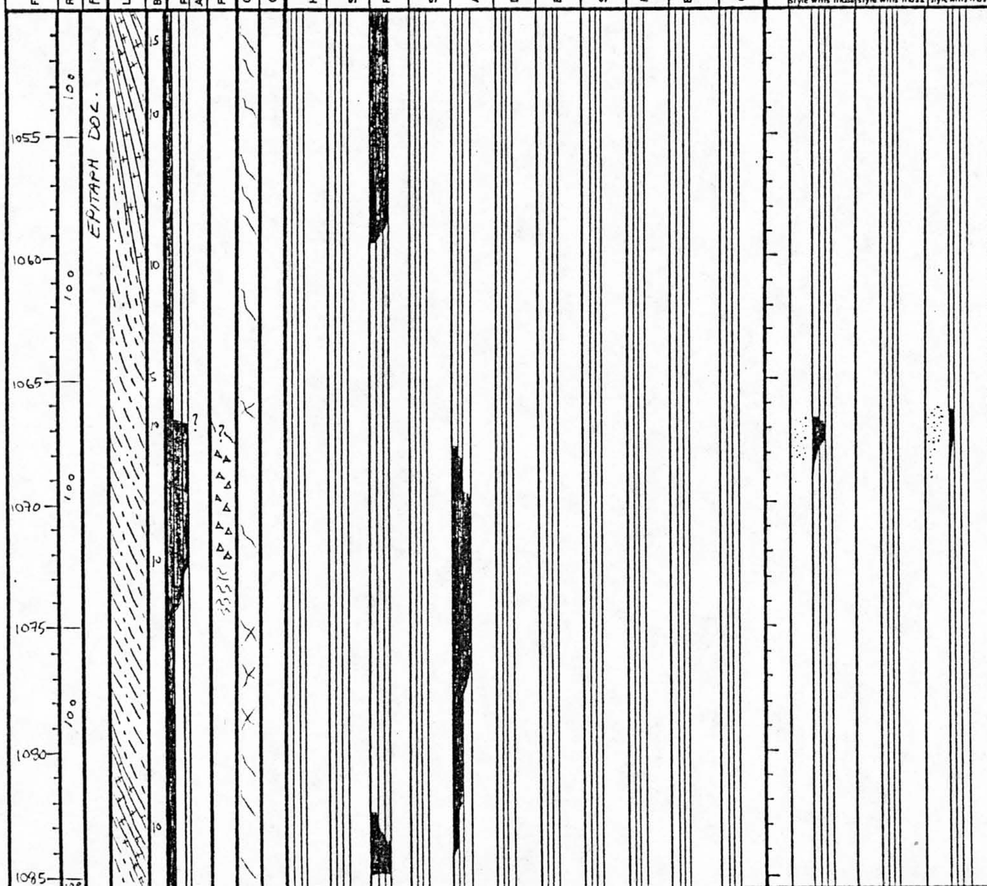

EPITAPH. CONT AS BEFORE.

DEPOSITIONAL CONTACT LS ↑ SILTSTONE ↓
1057' @ 10°

BRECCIA ZONE: FAULT ANGLE & THROW UNK.
DISSEM. PYRITE ~ AMBERJACK

CLAY ALTERED: {MOSTLY ALLOPHANE}.
YELLOW ~ YELLOW GREEN IN COLOR,
WAXY IN TEXTURE, CROSSCUT BY
NUMEROUS CALCITE VEINS.

LIMESTONE: MARBLE ~ SEE ABOVE DESCRIPTION.

DRILL HOLE: T-6

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FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

Footage: 1090, 1095, 1100, 1105, 1110, 1115, 1120

Recovery: 100, 100, 100, 100

Formation: EPITAPH; COLLINA LS

Bedding angle: 15, 15, 15, 15

Fractures angles: 15, 20, 15

DESCRIPTION

COLLINA LIMESTONE: {MARBLE} —

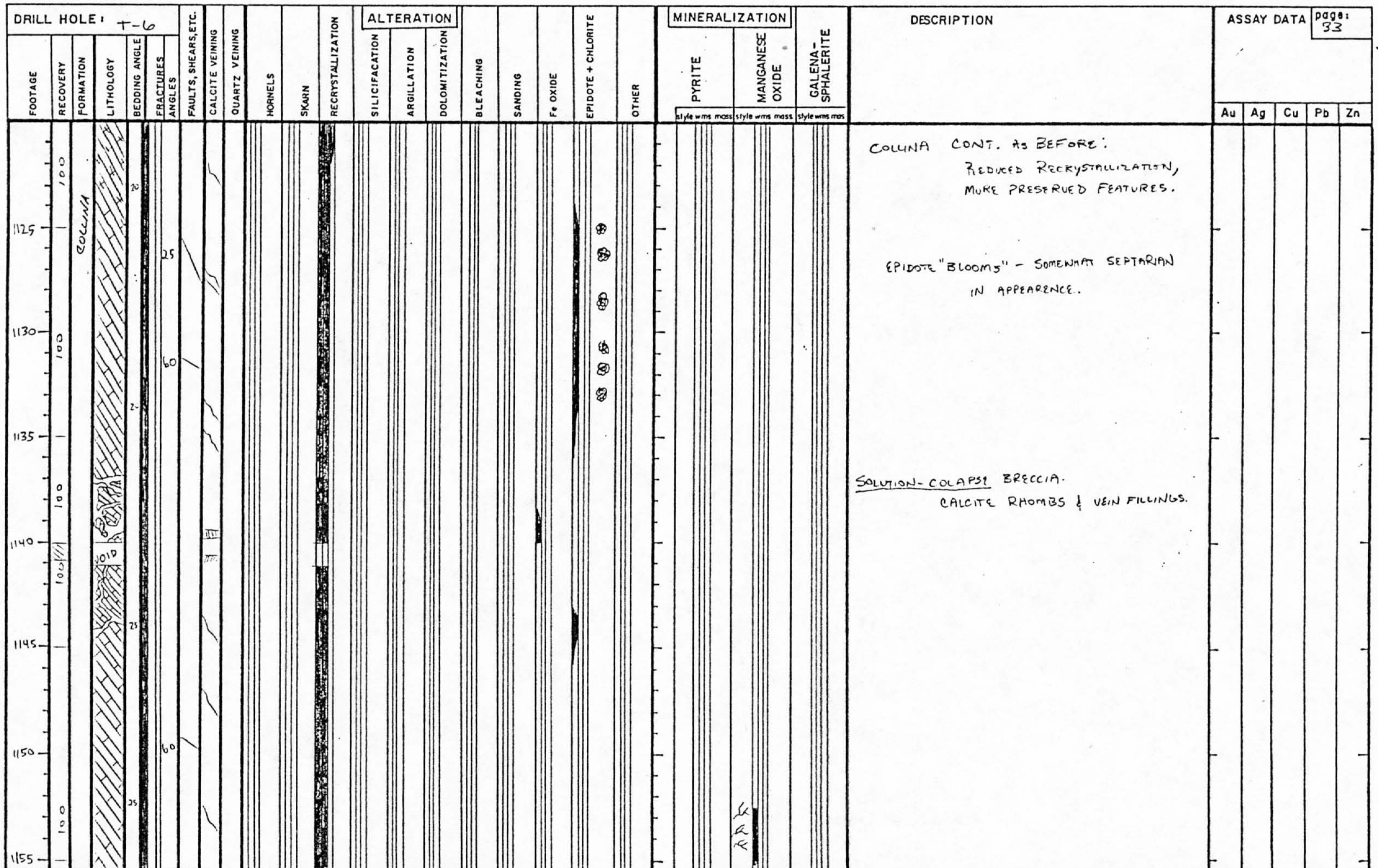
1088' COARSELY RECRYSTALLIZED,
LT ~ MOD GREY IN COLOR,
SLIGHTLY CHLORITIZED LOCALLY
"BLOOMS" — LOCAL TRACE FE-
PYRITE. GIVING CORE A "MOTTLED"
APPEARENCE.

◄TRACE SPHARITE; 1~2% TOTAL SULFIDES.

DRILL HOLE: T-6

ASSAY DATA page: 33

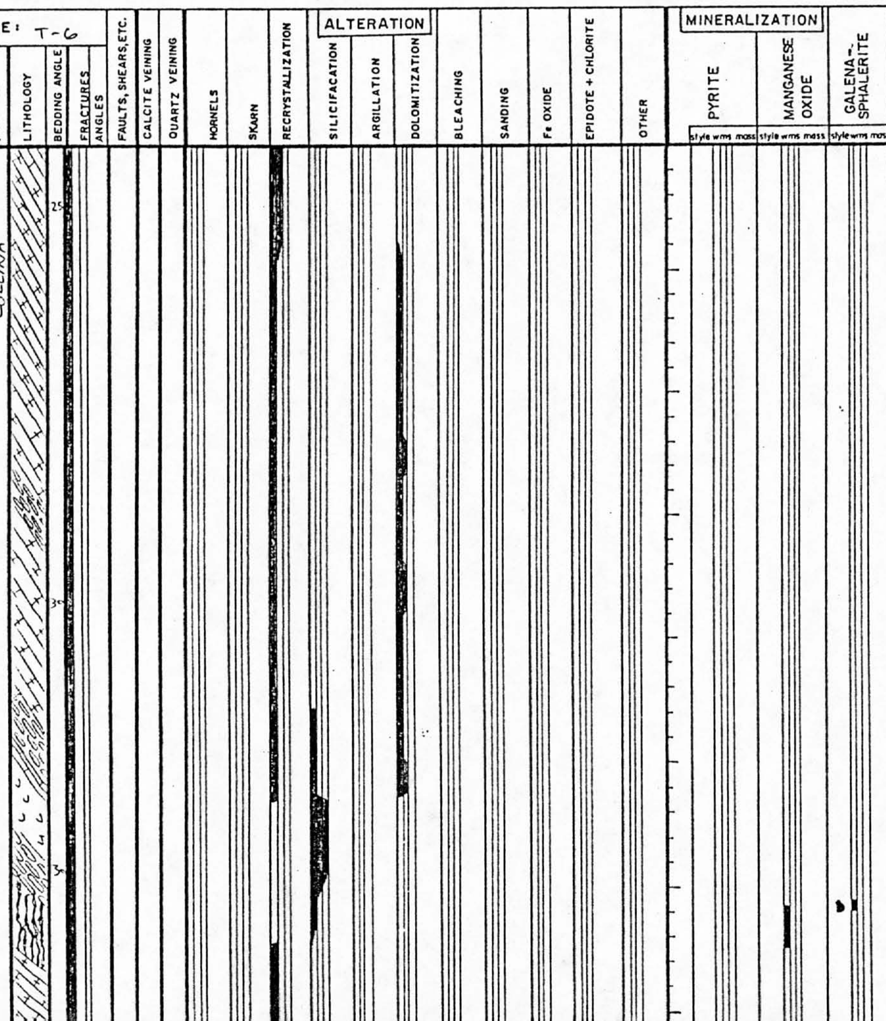
FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
1120–1125	100	COLLINA	20		COLLINA CONT. AS BEFORE: REDUCED RECRYSTALLIZATION, MORE PRESERVED FEATURES.
1125–1130	100			25	EPIDOTE "BLOOMS" - SOMEWHAT SEPTARIAN IN APPEARENCE.
1130–1135	100		20	60	
1135–1140	100				SOLUTION-COLAPSE BRECCIA. CALCITE RHOMBS & VEIN FILLINGS.
1140–1145	100	VOID	25		
1145–1150					
1150–1155	100		35	60	



DRILL HOLE: T-6

ASSAY DATA page: 34

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	DESCRIPTION
			25	Collina . CONT. AS BEFORE. 1187.7 LIMESTONE. BECOMES DOLOMITIC DOWN SECTION; MARBLIZED, STRONGLY RECRYSTALLIZED.
1160	100	COLLINA		
1165				
1170	100			SILICA ~ SOLUTION BRECCIA
1175			30	
1180	100			JASPEROID ~ SOLUTION BRECCIA W/ SILICA REPLACEMENT.
1185			3	VUGGY, STRONGLY OXIDIZED ZONE, LARGE {1"} BLEB OF GALENA, MnOx ALONG WALLS OF VUGS. – ASSAY. 1185' ~ 1188' – TRACE WULFENITE: BRIGHT YELLOW.
1190	100			



Au | Ag | Cu | Pb | Zn

5/27

?

DRILL HOLE: T-6

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
1195	100	COLLINA			50																		COLLINA LS: WHITE MARBLE; COARSELY RECRYSTALLIZED. NO DISCERNABLE BEDDING. VUG ≈ 5.5" w/ V. CLEAR CALCITE RHOMBS, FOLLOWED BY SECONDARY {1194.5 ~ 1195'} SIDERITE.					
1200	100				45																		1197.4 ~ 1197.9' VUG; SAME AS ABOVE. 1199-1199.4' VUG: SAME AS ABOVE.					
1205																												
1210	100			?	50, 50																							
1215																												
1220	100			?	65																							
1225																												

DRILL HOLE: T-6

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MINERALIZATION: MANGANESE OXIDE (style wms mass)	MINERALIZATION: GALENA-SPHALERITE (style wms mas)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
		COLLINA LS			50	/	//																COLLINA LS. {MARBLE} - SEE PREVIOUS DESCRIPTION.					
1230	100																											
1235																												
					45	/	/																					
1240	100																											
1245																												
1250	100						//																					
1255																												
	100				50	/	//																					
1260																												

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DRILL HOLE: T-6

ASSAY DATA page: 37

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
					COLLINA LS. SEE PREVIOUS DESCRIPTION.
	100				
1265					
		COLLINA LS.		45	
1270	100				
			?		
1275					
1280	100				SHALY INTERVAL: HORNFELSED IN PART.
				0	DIAGENITIC PYRITE.
1285			40°		
				0	
			40°	5	
1290	100				
			?		
	100			30	
1295					

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER; MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass); DESCRIPTION; ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-6													ALTERATION								MINERALIZATION			DESCRIPTION	ASSAY DATA				page: 38
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)		Au	Ag	Cu	Pb	Zn
					20																		COLLINA LS: CONT. SEE PREVIOUS DESCRIPTION.					
1300																												
1305					35																							
					30																							
1310					35																							
1315																												
1320					35																							
1325					60																							
1330																												

DRILL HOLE: T-6

ASSAY DATA page: 39

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES	ANGLES
	100	COLINA		?		30
1335						
	100					
1340						45
1345						
	100					
155				?		
						35
1355						
	100					
1360						35
1365	100					

FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mas)

DESCRIPTION

COLLINA LS. {MARBLE}, MOD - COARSELY RECRYSTALLIZED WHITE MARBLE. SWIRL LIKE TEXTURE COMMON THROUGH OUT (POSSIBLY REM. STYLOLITES). MARBLE IS LOCALLY GREY IN COLOR. LOCALLY DOLOMITIC LS. IN PART.

- NO DISCERNABLE BEDDING

MINOR DISSEM. Fe-PYRITE.

V. MINOR Fe OX STAINING ASSOC. W/ VEINLETS ETC.

ASSAY DATA: Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-6

ASSAY DATA page: 40

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
			?	60
1370	100	COLLINA		
1375	100		?	
1380	100			
1385			?	65
1390	100			56
1395	100		?	
1400				

LITHOLOGY | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mass)

DESCRIPTION

COLLINA LIMESTONE:
WHITE MARBLE, COARSELY RECRYSTALLIZED, MINOR HEMATITE ~ GOETHITE STAINING
NO OTHER MINERALIZATION ~
CONTINUOUS THROUGHOUT;
MINOR ARGILLATION THROUGHOUT.

Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-6

ASSAY DATA page: 41

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
1405	100	COLLINA		?	25																		COLLINA: CONTINUED AS BEFORE. SEE PREVIOUS DESCRIPTION					
1410																												
1415	100			?	50																							
1420																												
1425	100			?	60, 20																							
1430	100																											
1435					25																							

DRILL HOLE: T-6

ASSAY DATA page: 42

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
1440	100	COLLINA LS.		?	30																		COLLINA LS: CONT AS BEFORE, SEE PREVIOUS DESCRIPTION.					
1445																							NO MINERALIZATION					
1450	100			?	45																							
1455					30																							
1460	100			?																								
1465	100				0, 5, 20, 30																							
1470																												

DRILL HOLE: T-6

ASSAY DATA page: 43

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
1470–1475	100	COLLINA	?	25	COLLINA: CONT. SEE PREVIOUS DESCRIPTION: LITH. & TEXTURE UNCHANGED.
1475–1480			?	45	QUARTZ FILLED VUG'S.
1480–1485	100		?		
1485–1490			?		
1490–1495	100		?	90	
1495–1500					SANDING: COMPLETE DESTRUCTION OF PREXISTING MARBLE & ITS TEXTURE ~ VERY CALCAREOUS ~ REACTS VERY STRONGLY TO HCl. REDDISH IN COLOR.
1500–1505	100		?	90, 90	VUGS COLLINA AS BEFORE.

Form column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

DRILL HOLE: T-6

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FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mass) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

Footage	Recovery	Formation	Bedding angle	Fracture angles
1510	100	COLINA LS	?	45
1515			?	50, 0, 0, 10
1520	100			45
1525		EARP FM	35	
1530	100		?	50
1535			?	70
1540	100		?	

DESCRIPTION

COLLINA LS: MARBLE AS BEFORE.

SILTSTONE: QUARTZ & SILT, RED IN COLOR
BEDDING @ 35°

DRILL HOLE: T-6

ASSAY DATA page: 45

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES | ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

FOOTAGE: 1545, 1550, 1555, 1560, 1565, 1570, 1575

RECOVERY: 100, 100, 100, 100, 100, 100

FORMATION: EARP

ANGLES: 35, 35, 35, 50, 45, 35, 35, 90

DESCRIPTION:

COLLINA: As BEFORE, INCREASING VUGS.

SILTSTONE: CALCAREOUS IN PART, RED IN COLOR, HEMATITE STAINED.

COLLINA LS.

VUGGY 1550 ~ 1555'

1559-61'

SILTSTONE: AS ABOVE.

LIMESTONE: AS ABOVE

VUGGY @ 1574'

DRILL HOLE:																								ASSAY DATA	page: 46
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag / Cu / Pb / Zn
	100	EARP		?	30																		LIMESTONE: MARBLE ^ MOD REX+L. V. WHITE IN COLOR, V. LITTLE MINERALIZATION; CALCITE VEINING; SHARP CONTACTS W/ SILTSTONE UNITS.		
1580	100				35																				
1585	100			?	60																				
					60																				
1590	100				35																				
1595	100			?	40																		SILTSTONE: SEE PREVIOUS DESCRIPTION.		
1600				35																					
				55																			LIMESTONE: AS ABOVE.		
1605	100			?	60																				
					60																		REDUCED TO NX @ 1609.		
1610	100																								

DRILL HOLE: 4-6

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FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
1615	100	EARP	1	35	COLLINA LS: AS ABOVE.
1620	100		1	50	
1625			1	70, 45	
1630	100		1	35	
1635			1		THIN ARKOSIC UNIT: SAND SIZE QUARTZ, MAGNETITE, FSPAR & SED. ROCK FRAGS. PINK IN COLOR. HEMATITE STAINED.
1640	100		1	30	LIMESTONE: AS ABOVE.
1645	100		1	30	

Other column headings: FAULTS, SHEARS, ETC. · CALCITE VEINING · QUARTZ VEINING · HORNFELS · SKARN · RECRYSTALLIZATION · ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION · BLEACHING · SANDING · Fe OXIDE · EPIDOTE + CHLORITE · OTHER · MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) · ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-6

ASSAY DATA page: 49.

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	Au	Ag	Cu	Pb	Zn
		EARP		?	35																		COLLINA LS. CONT AS BEFORE. OCCASIONAL STYLOLITES.					
1650	100			?																								
				?	40																							
1655				?	45																							
1660	100			?	30																							
1665					45																							
1670	100			?	45																							
1675				?	50																							
1680	100																											

DRILL HOLE: T-6

ASSAY DATA page: 49

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	EARP		?	35																		COLLINA LS. AS BEFORE NO MINERALIZATION					
1685					40 40																							
1690	100			?																								
1695					50																							
					40																							
1700	100			?	70																							
1705					35 40																							
1710	100			?																								
1715					40																							

DRILL HOLE: T-C

ASSAY DATA page: 50

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	FRACTURES ANGLES	DESCRIPTION
					COLLINA LS. AS BEFORE.
1720	100			35	
				40	EARP FM: CONTACT ~ DOLOSTONE/ SILTSTONE, LT GREY IN COLOR,
1725				60	
1730	100	EARP		60	
1735	100			35	
	10			40	CAVE SYSTEM
	V	OI	D		
1740		COLLINA LS.	SEMI MASS MNOX	40	LUCKY CUSS FAULT SEMIMASSIVE MNOX | COLLINA LS.
	100				COLLINA LS. AS ABOVE. COARSELY XTLN MARBLE, WHITE IN COLOR.
1745				70	
1750	100			40	

Au	Ag	Cu	Pb	Zn

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER; MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass)

DRILL HOLE: T-6

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FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
1750–1755	100	COLLINA / EARP		35, 40	COLLINA LS AS PREVIOUS DESCRIPTION. EARP FM. FAULT [ALL GOUGE].
1755–1760		EARP	?	60	DOLOMITIC LS; SILTY IN PART, GREY GREEN IN COLOR.
1760–1770	100		40	40	SHALE - SILTSTONE: CALCAREOUS IN PART, FINELY BEDDED, BEDDING ∢° CLEARLY 40°; MINOR MnOx; GRADES INTO UNDERLYING LIMESTONE. FAULTS ALONG BEDDING PLANE
1770–1780	100		40	40, 40	LIMESTONE; MASSIVE; LOCAL BEDDING (40°) W/ STYLOLITES; MnOx ASSOC. ROCK PINK IN COLOR (MnOx).
1780–1785	100		40	40	LS CHANGES TO GREY IN COLOR, MnOx STILL PRESENT (BLACK, VEINLET CONTROLLED). FAULTS ALONG BEDDING PLANE.

LITHOLOGY · BEDDING ANGLE · FRACTURES ANGLES · FAULTS, SHEARS, ETC. · CALCITE VEINING · QUARTZ VEINING · HORNELS · SKARN · RECRYSTALLIZATION

ALTERATION: SILICIFACATION · ARGILLATION · DOLOMITIZATION

BLEACHING · SANDING · Fe OXIDE · EPIDOTE + CHLORITE · OTHER

MINERALIZATION: PYRITE (style wms mass) · MANGANESE OXIDE (style wms mass) · GALENA-SPHALERITE (style wms mass)

ASSAY DATA: Au · Ag · Cu · Pb · Zn

DRILL HOLE: T-6

ASSAY DATA page: 51

FOOTAGE	RECOVERY	DESCRIPTION
1790	100	EARP FM: LIMESTONE; GREY IN COLOR, MASSIVE, STYLOLITES, LT. RECRYSTALLIZED; FAULTS, JOINTS, SLIPS ALONG BEDDING PLANE.
		1789 ~ 1791' PYROLUCITE BLEBS.
1795	100	SHATTERED ZONE. 1799' – 1802.5'
1800	100	PYRITE BLEB.
		ROCK IS SILTY IN PART 1801' – 1806.5'
1805		
1810	100	
1815		
1820	100	

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION (SILICIFACATION, ARGILLATION, DOLOMITIZATION), BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION (PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE; style wms mass), DESCRIPTION, ASSAY DATA (Au, Ag, Cu, Pb, Zn)

Bedding angles: 40, 6, 45, 40, 30

Fracture angles: 40, 70, 45, 50, 45, 80, 70, 40, 40

DRILL HOLE: T-6

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FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mass)

DESCRIPTION

ASSAY DATA: Au | Ag | Cu | Pb | Zn

1825	100	EARP	50	50	EARP: LIMESTONE; COARSELY REXTLZED, WHITE ~ GREY IN COLOR, LOCAL STYLOLITES;
1830	100		50	35	DOLOSTONE: SIMILAR TO ABOVE LIMESTONE SUBUNIT.
1835			45		SHALE: LT GREEN IN COLOR; FINELY BEDDED; HARD.
			45		LIMESTONE } AS ABOVE
1840	100		45	50	DOLOSTONE: AS ABOVE.
1845				40	SHALE: AS ABOVE
1850	100		40	40	
1855			40	40	

DRILL HOLE: T-6

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	Au	Ag	Cu	Pb	Zn
1860	100	EARP			45, 50																		EARP: LIMESTONE: AS BEFORE					
1865																												
1870	100				45																		DOLOSTONE: AS BEFORE					
1875					50																							
1880	100			40	30, 30																		SHALE: AS BEFORE					
1885	100				25																		LIMESTONE: AS BEFORE EXCEPT SILTY IN PART					
1890																												

DRILL HOLE: T-6

ASSAY DATA page: 54

FOOTAGE	RECOVERY	FORMATION	FRACTURES ANGLES	DESCRIPTION
	100	EARP	30	EARP LIMESTONE: AS PREVIOUSLY DESCRIBED BLACKJACK-AMBERJACK VEINLET.
1895			45	
	100		30	
1900				T.D. 1900' 6/10/89

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass), DESCRIPTION, ASSAY DATA: Au, Ag, Cu, Pb, Zn

DIAMOND DRILL
HOLE T-8

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UJV 118
July 21, 1989
T-8 (230 TO 643.5)

SANTA FE PACIFIC MINING INC.
Attn: Mr. Duncan Riesmeyer
6200 Uptown Blvd., #400
Albuquerque, NM 87125

Analysis of 9 Drill Core Samples

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	Ag (oz/t)	Cu (%)	Pb (%)	Zn (%)
1	T-8 230-235	.006	<.01	<.01	<.01	.01
2	T-8 235-238	<.002	<.01	<.01	<.01	<.01
3	T-8 403-405	.004	.01	<.01	<.01	.01
4	T-8 405-410	<.002	<.01	<.01	<.01	<.01
5	T-8 525-529	.002	.10	.01	<.01	.04
6	T-8 529-533	.006	.22	<.01	<.01	.10
7	T-8 632.5-635	.006	.10	.01	<.01	.02
8	T-8 635-640	<.002	<.01	.01	<.01	.02
9	T-8 640-643.5	<.002	<.01	<.01	<.01	.01

cc: Mr. Dale Armstrong

cc: Mr. Fred Jenkins

REGISTERED ASSAYER CERTIFICATE No. 9425 WILLIAM L. LEHMBECK

SKYLINE LABS, INC.
1776 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UJV 149
August 18, 1989
T-8 807-808.4 TO
T-8 1669-1671

SANTA FE PACIFIC MINING INC.
Attn: Mr. Duncan Riesmeyer
6200 Uptown Blvd., #400
Albuquerque, NM 87125

Analysis of 17 Drill Core Samples

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	Ag (oz/t)	Cu (%)	Pb (%)	Zn (%)
1	T-8 706.3-707.3	<.002	.04	.01	<.01	.03
2	T-8 746.5-751.5	<.002	<.01	<.01	<.01	.03
3	T-8 807-808.4	<.002	<.01	<.01	<.01	.01
4	T-8 813.5-817	<.002	<.01	<.01	<.01	.01
5	T-8 1314-1319	<.002	<.01	<.01	<.01	.01
6	T-8 1319-1324	<.002	<.01	<.01	<.01	.01
7	T-8 1324-1327	<.002	<.01	.01	.06	.06
8	T-8 1390-1395	<.002	<.01	<.01	.02	.04
9	T-8 1476-1481	<.002	<.01	.01	.02	.01
10	T-8 1481-1486	<.002	<.01	<.01	.02	<.01
11	T-8 1486-1491	<.002	<.01	<.01	.03	.01
12	T-8 1643-1644	<.002	<.01	<.01	.02	.07
13	T-8 1646-1648.6	<.002	<.01	<.01	<.01	.02
14	T-8 1648.6-1651.6	.004	.64	.62	2.16	2.35
15	T-8 1651.6-1653.5	<.002	<.01	.01	.03	.03
16	T-8 1653.5-1658.5	<.002	<.01	.05	.02	.03
17	T-8 1669-1671	<.002	.02	<.01	.02	.03

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UJV 150
August 18, 1989
T-8 (2153 TO 2226)

SANTA FE PACIFIC MINING INC.
Attn: Mr. Duncan Riesmeyer
6200 Uptown Blvd., #400
Albuquerque, NM 87125

Analysis of 22 Drill Core Samples

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	FIRE ASSAY Ag (oz/t)
1	T-8 2153-2154	<.002	<.01
2	T-8 2154-2155	<.002	3.15
3	T-8 2155-2157	<.002	.59
4	T-8 2155-2158 **	.000**	.00**
5	T-8 2157-2158	.002	1.96
6	T-8 2158-2161.5	.002	.68
7	T-8 2161.5-2162.5	<.002	2.14
8	T-8 2161.5-2163.5 **	.000**	.00**
9	T-8 2162.5-2163.5	<.002	<.01
10	T-8 2163.5-2165	<.002	.30
11	T-8 2165-2167.5	.002	4.46
12	T-8 2167.5-2172.5	<.002	.33
13	T-8 2172.5-2177.5	<.002	.56
14	T-8 2177.5-2182	<.002	<.01
15	T-8 2182-2186	<.002	<.01
16	T-8 2186-2189.5	<.002	<.01
17	T-8 2189.5-2194.5	<.002	<.01
18	T-8 2194.5-2198.5	<.002	.10
19	T-8 2198.5-2199	<.002	10.29
20	T-8 2199-2202 *	.000*	.00*
21	T-8 2202-2205	<.002	<.01
22	T-8 2205-2209	<.002	<.01
23	T-8 2209-2211.5 *	.000*	.00*
24	T-8 2211.5-2216.5	<.002	<.01
25	T-8 2216.5-2219.5	<.002	<.01

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JOB NO. UJV 150
August 18, 1989

ITEM	SAMPLE NUMBER	FIRE ASSAY Au (oz/t)	FIRE ASSAY Ag (oz/t)
26	T-8 2219.5-2224 *	.000*	.00*
27	T-8 2224-2226	<.002	<.01

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JOB NO. UJV 150
August 18, 1989

ITEM	SAMPLE NUMBER	Cu (%)	Pb (%)	Zn (%)
1	T-8 2153-2154	.02	.06	.10
2	T-8 2154-2155	2.28	7.35	2.45
3	T-8 2155-2157	.68	2.62	3.05
4	T-8 2155-2158 **	.00**	.00**	.00**
5	T-8 2157-2158	1.33	5.90	4.25
6	T-8 2158-2161.5	.19	2.61	2.50
7	T-8 2161.5-2162.5	1.69	4.00	5.35
8	T-8 2161.5-2163.5 **	.00**	.00**	.00**
9	T-8 2162.5-2163.5	.01	.08	.18
10	T-8 2163.5-2165	.12	1.60	.77
11	T-8 2165-2167.5	1.43	13.00	6.10
12	T-8 2167.5-2172.5	.56	.73	1.87
13	T-8 2172.5-2177.5	.08	1.31	1.50
14	T-8 2177.5-2182	.02	.09	.55
15	T-8 2182-2186	.01	.02	.02
16	T-8 2186-2189.5	.02	.02	.05
17	T-8 2189.5-2194.5	.02	.20	1.05
18	T-8 2194.5-2198.5	.02	.68	2.53
19	T-8 2198.5-2199	.49	15.60	2.60
20	T-8 2199-2202 *	.00*	.00*	.00*
21	T-8 2202-2205	<.01	.04	.03
22	T-8 2205-2209	<.01	.16	.04
23	T-8 2209-2211.5 *	.00*	.00*	.00*
24	T-8 2211.5-2216.5	<.01	.01	.01
25	T-8 2216.5-2219.5	<.01	.20	.07

SKYLINE LABS, INC.
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JOB NO. UJV 150
August 18, 1989

ITEM	SAMPLE NUMBER	Cu (%)	Pb (%)	Zn (%)
26	T-8 2219.5-2224 *	.00*	.00*	.00*
27	T-8 2224-2226	<.01	.11	.05

*NOTE: No sample submitted.

**NOTE: Sample not received.

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

DRILL HOLE: T-8

ASSAY DATA — page: 1

Column headings: FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mas) | DESCRIPTION | ASSAY DATA: Au, Ag, Cu, Pb, Zn

Footage: 5, 10, 15, 20, 25, 30, 35

Recovery: No Recovery c Rock Bit (0–18); 50% (18–24); 100 (24–34)

Formation: Alluvium

DESCRIPTION:

QAL Alluvium: Valley Fill:
Primarily Bisbee Seds.
Other sediments incl. volcanics, unk. sed. rocks, minor Ls. Clast angular – sub angular, mostly matrix supported.
FeOx stained throughout.

DRILL HOLE: T-8

ASSAY DATA page: 2

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	QAL																					QAL					
40	100	BISBEE Fm.		?																			ERROSIONAL CONTACT — BISBEE SEDIMENTS: SILTY SANDSTONE ~ SANDY SILTSTONE; BRICK RED IN COLOR, SEVERLY SHATTER ROCK; JAROSITE ON FRACTURE FACES.					
45	100			?																								
	100																											
50	100																											
	100			?																								
55	100			?																								
	80																											
60–70	NO RECOVERY ROCK BIT																						NO RECOVERY.					
70				?																								

DRILL HOLE: T-8

ASSAY DATA page: 3

FOOTAGE	RECOVERY	FORMATION	FRACTURES / ANGLES	DESCRIPTION
	100	BISBEE Fm.	0° ← TOO NUMEROUS TO ESTIMATE →	BISBEE SEDIMENTS: CONT. AS BEFORE; SEVERELY FRACTURED.
	100			CALCITE - ARAGONITE VUG ~ LOST CIRCULATION. REGAINED w/ PAPER
75	100			
80	100			
	100			
85	100			
	100			
90	100			
	100			SANDSTONE LENS. ARKOSIC IN PART
95	100			
	75			
100	50			
105	66			

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES | ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE | MANGANESE OXIDE | GALENA - SPHALERITE (style wms mass)

Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-8

ALTERATION | MINERALIZATION | DESCRIPTION | ASSAY DATA | page: 4

Footage	Recovery	Formation	Fractures / Faults, Shears, etc.	Manganese Oxide	Description
106–140	66, 56, 56, 18, 18, 18, 75, 100, 100, 100, 100, 100, 100, 50, 100, 100	BISBEE	TOO NUMEROUS TO MEASURE; SHATTERED		BISBEE SEDIMENTS : SEVERLY SHATTERED ROCK; PRIMARILY SANDY SILTSTONE; ARKOSIC IN PART, SANDY THROUGHOUT HEMATITE STAINED. – SOME FRACTURES ARE WIDE ENOUGH TO CARRY SURFACE WATER LADDEN W/ TERRIGENOUS MATERIAL {PRIMARILY SAND}.
~136–140				~	MnOx DENDRITES

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass), Au, Ag, Cu, Pb, Zn

Footage scale: 110, 115, 120, 125, 130, 135, 140

DRILL HOLE: T-8

ASSAY DATA page: 5

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY
140–157	56, 96, 56, 100, 66, 75	BISBEE	
157–161	0%		NO RECOVERY
161–162	50		
162–164	20		NO REC.
164–168	50, 100		
168–171	0%		NO REC.
171–173	25%		
173–175	50%		

FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE | MANGANESE OXIDE | GALENA-SPHALERITE (style wms mass)

DESCRIPTION

BISBEE SEDIMENTS: CONTINUED
SHATTERED ROCK -
POOR RECOVERY

Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-8

page: 6

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFICATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mas)

DESCRIPTION

ASSAY DATA: Au | Ag | Cu | Pb | Zn

Footage: 180, 185, 190, 195, 200, 205, 210

Recovery: 25, 100, 25, 100, 0 %, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 70

Formation: BISBEE

Lithology: NO RECOVERY

BISBEE SEDIMENTS CONTINUED.
ROCK STILL SEVERLY SHATTERED.
- POOR RECOVERY.

NO RECOVERY

PYROLUCITE DENDRITES.

DRILL HOLE: T-8

ALTERATION

MINERALIZATION

DESCRIPTION

ASSAY DATA page: 7

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | SILICIFACATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | PYRITE | MANGANESE OXIDE | GALENA-SPHALERITE

style wms mass. | style wms mass. | style wms mass.

Au | Ag | Cu | Pb | Zn

215

220

225

230

235

240

245

100 | 25 | 66 | 50 | 100 | 50 | 100 | 50 | 50 | 100 | 100 | 100 | 0 | 60

TOO NUMEROUS TO COUNT

SHATTERED ZONE

BISBEE SEDIMENTS: SEE PREVIOUS DESCRIPTION

← TRACE PYRITE

LIMESTONE INTERBEDS. LIMESTONE; MASSIVE + TAN TO LT BROWN IN COLOR, WEAK ARGILLIC ALT.; NUMEROUS MnOx DENDRITE; TRACE PYRITE.

DRILL HOLE: T-B

ASSAY DATA page: 8

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.
250–280	16, 45, 70, 100, 100, 100, 0, 100, 70, 66, 50, 50, 50, 50, 100, 75, 10, 4, 10	BISBEE		65	TOO NUMEROUS TO COUNT.	SHATTERED ZONE

Column headings: CALCITE VEINING · QUARTZ VEINING · HORNELS · SKARN · RECRYSTALLIZATION · ALTERATION: SILICIFACATION · ARGILLATION · DOLOMITIZATION · BLEACHING · SANDING · Fe OXIDE · EPIDOTE + CHLORITE · OTHER · MINERALIZATION: PYRITE · MANGANESE OXIDE · GALENA-SPHALERITE (style, vnms, mass.) · Au · Ag · Cu · Pb · Zn

DESCRIPTION

BISBEE SEDIMENTS: CONT. SEE PREVIOUS DESCRIPTION.

LIMESTONE: BEDDING @ 65° LIMESTONE/ DOLOSTONE; DK grey IN COLOR. SLIGHTLY SANDY IN PART

DRILL HOLE: T-8

ASSAY DATA page: 9

Footage	Recovery	Formation	Bedding angle	Fractures angles	Description
285	100, 100, 100	BISBEE	60	70, 70	LIMESTONE: CONT. AS BEFORE. DENDRITES THROUGHOUT.
290	100		55, 58		SILTY LIMESTONE; RED IN COLOR FE OXIDE; BEDDING @ 55° ~ 60°
295	90, 100, 25		60		LIMESTONE: AS ABOVE
300	75, 14, 75				
305	60		60		
310	100		60	40, 45	
315	100		60		SILTY LIMESTONE: AS ABOVE, LACKING IN FE OXIDES. GREY IN COLOR.

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

DRILL HOLE: T-8

ASSAY DATA page: 10

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
315–320	100	BISBEE FM.	60	30, 20	LIMESTONE ~ V. DARK GREY TO BLACK IN COLOR, WEAK SILICIFICATION; V. HARD; PARTIALLY DOLOMITIZED; JAROSITE STAINING IN VEINS MnOx DENDRITES THROUGHOUT.
320–325	100		60	30, 30	
325–330	100		60	35	
330–335	100			30	
335–340	100		60	20, 90	LIMESTONE: BECOMING SILTY IN PART.
340–345	100				LIMESTONE – CLEANER.
345–350	100				
350	100				

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION: PYRITE (style wms mass), MANGANESE OXIDE (style wms mass), GALENA-SPHALERITE (style wms mss), DESCRIPTION, ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-8

ASSAY DATA page: 11

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	BISBEE FM.																					ARKOSIC SANDSTONE. SANDY FINE GRAINED, FSPARS, HEAVIES: MAGNETITE; FeOXIDES;					
355	100																											
	100																											
360	100%																											
365	<10%																						SANDY-SILTSTONE: FINE GRAINED, ARGILLIC IN PART; FINE MnOx DENDRITES. SALMON IN COLOR.					
	50%																											
370	80																											
	100																											
375	75																											
380	0																											
	100																											
385	100																						SILTY LIMESTONES: DARK GREY IN COLOR, SLIGHTLY DOLOMITIC.					

DRILL HOLE: T-8

ASSAY DATA page: 12

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
390, 395, 400, 405, 410, 415, 420	95, 100, 100, 100, 100, 100, 100, 100, 100, 100																						BISBEE SEDIMENTS ALTERNATING LS. & SILTSTONE. SEE PREVIOUS					

DRILL HOLE: T-8

ASSAY DATA page: 93

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
	100	BISBEE		
	100		40	
	101			45
425	100			45
	100			
430	150		4	
	100			
435				
	100		40	
440	100			
			7	
445	100		7	
	75			45
450	100		40	
	100		40	
455				

Columns: FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFICATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mass) | DESCRIPTION | ASSAY DATA: Au | Ag | Cu | Pb | Zn

DESCRIPTION

BISBEE SEDIMENTS: CONTINUED
SEE PREVIOUS DESCRIPTION.

- ALT SILTSTONES - LS.

DRILL HOLE: T-8

ASSAY DATA page: 14

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	BISBEE FM.																					BISBEE SEDIMENTS: CONT SEE PREVIOUS					
460	100																											
	100																											
465	80																											
470	75																											
475	100																											
480	100																											
485	100																											
490	100																											

DRILL HOLE: T-8

page: 15

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
	100	BISBEE	45	40
	100			
495	100			
500	100			25
	95			
505	100			
510	100			
	100			
515	100			
	100			
520	100			
	100			
525	100			

LITHOLOGY · FAULTS, SHEARS, ETC. · CALCITE VEINING · QUARTZ VEINING · HORNFELS · SKARN · RECRYSTALLIZATION

ALTERATION: SILICIFACATION · ARGILLATION · DOLOMITIZATION · BLEACHING · SANDING · Fe OXIDE · EPIDOTE + CHLORITE · OTHER

MINERALIZATION: PYRITE (style wms mass) · MANGANESE OXIDE (style wms mass) · GALENA-SPHALERITE (style wms mas)

DESCRIPTION

BISBEE ALT. SS - LS.

- LIMESTONES ARE MORE COMPETENT THAN SS. - SILTSTONES, WHICH ARE SEVERLY FRACTURED & BROKEN. FEOX ON FACES. MINOR MNOX DENDRITES

- SANDY SILTSTONE: FINE GRAINED SAND MIXED W/ SILT. FEOX THROUGH-OUT. MINOR MNOX DENDRITES.

ASSAY DATA

Au	Ag	Cu	Pb	Zn

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	100	BISBEE																					BISBEE CONTINUED. ALT. LS / SILTSN.					
	100																						526-527' JASPEROID, POSSIBLE ASSOC. RHODONITE (?)					
530	100																						525-533' SEMIMASSIVE MnOx - PSILAMELANE					
	100																											
	100																						SANDY SILTSTONES ALTERNATING w/ SILTSTONES.					
535	100																											
	100																						→ Ss. SILTSTONE: RED IN COLOR FINE GRAINED, SAND SIZE GRAINS MnOx STOPS @ 535'					
540	100																						→ SILTSTONE: TAN IN COLOR, V. FINE GRAINED, DEMINISHED FeOXIDES.					
545	100																											
	45																											
550																												
555	70																											
560	100																											

DRILL HOLE: T-8												ALTERATION									MINERALIZATION			DESCRIPTION	ASSAY DATA					page: 17
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER		PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)		Au	Ag	Cu	Pb	Zn	
560–595	100, 100, 100, 100, 100, 90, 100, 100, 100, 100, 100, 100, 100, 100, 100	BISBEE		?	SHATTERED; SHATTERED																			BISBEE SEDIMENTS : CONTINUED SEE PREVIOUS DESCRIPTION.						

Footage marks: 565, 570, 575, 580, 585, 590, 595

DRILL HOLE: T-8

ASSAY DATA page: 18

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MINERALIZATION: MANGANESE OXIDE (style wms mass)	MINERALIZATION: GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100	BISBEE																					BISBEE SEDIMENTS CONT. SANDY SILTSTONE; SEE PREVIOUS DESCRIPTION					
600	100																											
605	100																											
610	100																											
615	100																											
620	100																											
	20%																											
625	0%																											
630	50																						BECOMING BRECCIATED {HEALED IN PART}					

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
635 – 665	100, 75, 70, 100, 75, 50, 70, 100, 2, 100, 90, 25, 100, 100				45, 50, 45, 45, 20; SHATTERED																		BISBEE SEDIMENTS: CONT. AS BEFORE. - CEMENT IS CALCITE ~ DOLOMITE, V. WEAK EFFERVESCENCE. = HEALED BRECCIA ZONE; SILICA CEMENT 663' FAULT, BRECCIA = GOUGE W/ 3" CLAY SEAM AT BOTTOM TOTAL FAULT THICKNESS ≈ 1.5' UNKNOWN ANGLE & THROW					

DRILL HOLE:

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFACATION | ARGILLATION | DOLOMITIZATION

BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE | MANGANESE OXIDE | GALENA-SPHALERITE (style vnts mass)

DESCRIPTION

ASSAY DATA — page: 20 — Au | Ag | Cu | Pb | Zn

BISBEE FM.

45

SHATTERED

NO REC.

20

BISBEE SEDIMENTS CONT. AS BEFORE.

LOTS OF REGROUND ROCK. AS WELL POUNDED AS STREAM GRAVEL. W/ MINOR MIXED CLAYS.

MINOR CONGLOMERATE SUB-UNIT

MINOR LS. W/ DENDRITES.

NO RECOVERY

DRILL HOLE: T-8

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	100				45, 50, 45																		BISBEE SEDIMENTS CONT. ALT. SILTSTONES – LIMESTONES					
705	100																						MANGANESE VEINLET					
	100																						LIMESTONE IS FOSSILIFEROUS {GRYPHEA, SP?}					
710	87				35, 40																							
715	66				40, 45, 70																							
	100				50, 45																		VEINLET @ 721' HAS SIDERITE INCRUSTING QUARTZ & CALCITE					
720	100																											
725	100																						SILICIFIED LS. WILL NOT EFFERVESCE. V. DARK GREY IN COLOR, V. FINE GRAINED.					
730	100																						LIMESTONE {SILICIFICATION STOPS} BECOMES SILTY IN PART. NO ARGILLATION.					
735	100																											

DRILL HOLE: T-8

ASSAY DATA page: 22

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES
	100		?	45
740	100	BISBEE		60
			?	60
			?	75
745	100			20
			30	45
750	100			40
			30	35
755	100			
	100		30	45
760	100			70
				30
765	100		30	35
770				

LITHOLOGY | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass) | DESCRIPTION | Au | Ag | Cu | Pb | Zn

DESCRIPTION

BISBEE SEDIMENTS: CONTINUED, SEE PREVIOUS DESCRIPTION

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE
775	100	BISBEE	38
780	100		34
785	100		35
790	100		35
795	100		35
800	100		35
805	100	HORQUILLA	

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFACATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER, MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass), DESCRIPTION, ASSAY DATA: Au, Ag, Cu, Pb, Zn

DESCRIPTION

BISBEE SEDIMENTS:
CONT. AS BEFORE.

MANGANESE DENDRITES
802.7' – HORQUILLA: SEE DESCRIPTION NEXT PAGE.

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER FLUORITE	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
810–840	100, 100, 100, 100, 100, 100, 100	HORQUILLA		35, 35, 35, 35, 35, 35, 35	45, 45, 50, 50, 35, 60, 20, 45, 70, 35																		HORQUILLA LIMESTONE. LIMESTONE – LT GREY IN COLOR, MINERALIZED (MnOx); LOCAL FLUORITE VEINING. 814' – 817' MASSIVE FLUORITE DEEP PURPLE TO DARK GREEN SILTSTONE INTERBED – RED IN COLOR. LIMESTONE – FOSSILIFERROUS BRACHIOPODS – SPIRIFER Sp? NUMEROUS STYLOLITES THROUGHOUT					

DRILL HOLE: T-8

ASSAY DATA page: 25

FOOTAGE	RECOVERY	FORMATION	BEDDING ANGLE	FRACTURES ANGLES	DESCRIPTION
840–845	100	HORQUILLA	35	45, 40	HORQUILLA LIMESTONE: LT GREY TO PINK IN COLOR; STYLOLITES; LIGHTLY RECRYSTALLIZED; LOCALLY SILTY; MINOR MnOx DENDRITES THROUGHOUT. LOCAL REDUCTION BLEBS. LOCAL ALLOPHANE {BRIGHT GREEN} FRACTURE FILLINGS.
845–850	100			40	
850–855	100		35	45	
855–860	100			45, 60	
860–865	100		35	65	
865–870	100			40	FLUORITE VUG – VEIN.
870–875	100		40	35	SILTSTONE INTERBED.
875	100		40		

Column headings: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER; MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style vns mass); DESCRIPTION; ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-8							page: 26
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	FRACTURES ANGLES	MANGANESE OXIDE	DESCRIPTION	ASSAY DATA (Au, Ag, Cu, Pb, Zn)
	100	HORQUILLA		45	⟨	HORQUILLA LIMESTONE: SEE PREVIOUS DESCRIPTION.	
880	100			50	⟨	MANGANESE DENDRITES STOP —	
885	100			40			
890	100			50		SILTSTONE INTERBED - RED IN COLOR, FINELY BEDDED; FINE GRAINED, SLIPS & JOINTS ARE CLAY COATED.	
895	100			35		LIMESTONE FAULT BRECCIA ≈ 20' THICK.	
900	100					REDUCED TO NX @ 899' LIMESTONE: SOLUTION BRECCIA :. MONOLITHIC, CLAST SUPPORTED w/ ROCK FLOUR GOUGE, NOT CALCITE CEMENTED {AT LEAST VISABLY}	
905	100			70			
910							

Column headings on form: FOOTAGE, RECOVERY, FORMATION, LITHOLOGY, BEDDING ANGLE, FRACTURES ANGLES, FAULTS, SHEARS, ETC., CALCITE VEINING, QUARTZ VEINING, HORNFELS, SKARN, RECRYSTALLIZATION, ALTERATION: SILICIFICATION, ARGILLATION, DOLOMITIZATION, BLEACHING, SANDING, Fe OXIDE, EPIDOTE + CHLORITE, OTHER; MINERALIZATION: PYRITE, MANGANESE OXIDE, GALENA-SPHALERITE (style wms mass); DESCRIPTION; ASSAY DATA: Au, Ag, Cu, Pb, Zn

DRILL HOLE: T-8

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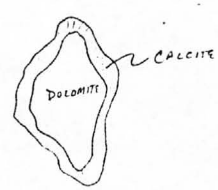
FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mas)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	100	HORQUILLA			70																		LIMESTONE: WHITE - LT GREY IN COLOR; LOCAL REDUCTION BLEBS;					
					45																							
915	100				50																		CONTACT {END OF BRECCIA} @ 50°					
920	100				50																		Probably a self-healed tectonic breccia WLR. 924' START OF SOLUTION BRECCIA {COLLAPSE BRECCIA}					
925																							ROCK IS DOLOMITIC IN PART. FRAGMENTS THAT ARE DOLOMITIC ARE BEING REPLACED BY CALCITE.					
930	100				45																							
935					35																							
940	100																						MATRIX IS CALCITE w/ LOCAL CHLORITE AND MINOR HEMATITE STAINING.					
945	90				40																							



DRILL HOLE: T-8

ASSAY DATA page: 28

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
				?	35																		LIMESTONE: AS BEFORE COLLAPSE BRECCIA - MINOR PRESSURE SOLUTION.					
950	100			?																								
955																												
960	100			?	40																							
965																												
970	100			?																								
975					50																							
980	100			?																								

DRILL HOLE: T-8

ASSAY DATA page: 29

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
985	100			?	50																		LIMESTONE – CONTINUED AS BEFORE. ROCK QUALITY DATA > 90%					
990	100			?																								
995				?	45																							
1000	100			?																								
1005				?																								
1010	100			?	60																							
1015	100			?	45																							

DRILL HOLE: T-8

page: 30

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION

ALTERATION: SILICIFICATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

MINERALIZATION: PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mass)

DESCRIPTION

ASSAY DATA: Au | Ag | Cu | Pb | Zn

FOOTAGE	RECOVERY	FRACTURES ANGLES	DESCRIPTION
			LIMESTONE - CONTINUED AS BEFORE, SEE PREVIOUS DESCRIPTION.
1020	100		
1025			
1030	100		
1035			
1040	100	50	FAULT @ 50°
1045			
1050	100	55	FAULT @ 55°

DRILL HOLE: T-8

ALTERATION | MINERALIZATION | DESCRIPTION | ASSAY DATA | page: 31

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | SILICIFICATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER

PYRITE (style wms mass) | MANGANESE OXIDE (style wms mass) | GALENA-SPHALERITE (style wms mass)

Au | Ag | Cu | Pb | Zn

Footage	Recovery	Bedding angle	Fracture angles	Description
	100	?	30	LIMESTONE - CONT. AS BEFORE. SEE PREVIOUS DESCRIPTION
1055		?		
		? ?	35	
1060	100			
1065			40	
1070	100	?		
1075			65	
1080	100			
		?	45	FAULT @ 45°
1085	100			

DRILL HOLE: T-8

ALTERATION

MINERALIZATION

DESCRIPTION

ASSAY DATA page: 32

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
				?	40																		LIMESTONE - CONTINUED - SOLUTION ~ COLLAPSE BRECCIA SEE DESCRIPTION PAGE 27 CALCITE VEINING THROUGHOUT IN PLACES LIMESTONE IS MICRITIC IN PART					
1090	100																											
1095					55																							
1100	100			?																								
1105					50																							
					50																							
					40																							
1110	100																											
1115				?	20																							
1120	100																											

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MINERALIZATION: MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	100			?																			LIMESTONE ~ CONTINUED {AD NAUSIEM} COLLAPSE BRECCIA: SEC DESCRIPTION PAGE 27					
1125					40																		CHLORITIZATION CEASES					
1130	100				40																							
1135				?																			MINOR ARGILLATION					
1140	100																											
1145					45																							
1150	100			?																								
1155	100				56																							

DRILL HOLE: T-8

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
				?	40																		LIMESTONE — CONTINUED AS BEFORE SEE GENERAL DESCRIPTION, PAGE 27					
1160	100																											
					40																							
1165				?																								
1170	100																											
1175																												
1180	100			?	40		X																					
1185																												
	100						X																BRECCIA CLAST SIZE MAX ≈ 6" AVE ≈ 2.5"-3.0"					
1190				?																								

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wrns mass)	MINERALIZATION: MANGANESE OXIDE (style wrns mass)	GALENA-SPHALERITE (style wrns mass)	DESCRIPTION	ASSAY DATA: Au	Ag	Cu	Pb	Zn
	100			?	45																		LIMESTONE: – CONTINUED AS BEFORE; SEE PREVIOUS DESCRIPTIONS					
1195																							– ALTERATION INCREASING DOWN SECTION.					
1200	100																											
1205				?	60																							
1210	100																											
1215				?	55																							
1220	100																											
1225					35																							

DRILL HOLE: T-8

ASSAY DATA page: 36

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	ALTERATION: SILICIFACATION	ALTERATION: ARGILLATION	ALTERATION: DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	MINERALIZATION: PYRITE (style wms mass)	MINERALIZATION: MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mass)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
				?	30																		LIMESTONE - CONTINUED AS BEFORE; LIMESTONE BECOMING PINK IN COLOR. MINOR FE-PYRITE STARTS @ 1257'					
1230	100																											
1235				?	50																							
1240	100																											
1245					35																							
1250	100			?																								
1255					40																							
1260	100																											

DRILL HOLE: T-8

FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNFELS	SKARN	RECRYSTALLIZATION	SILICIFICATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE (style wms mass)	MANGANESE OXIDE (style wms mass)	GALENA-SPHALERITE (style wms mss)	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100			?	45																		LIMESTONE: AS BEFORE — COLLAPSE SOLUTION BLACKJACK SPHALERITE (MARMATITE) FE PYRITE THROUGHOUT — TOTAL SULFIDES < 4% PYRITE >> SPHALERITE.					
1265																												
1270	100			?																								
1275					50																							
1280	100			?																								
1285				?																								
1290	100			?	45																							
1295	100			?																								

DRILL HOLE: T-8

ALTERATION

MINERALIZATION

DESCRIPTION

ASSAY DATA page: 38

FOOTAGE | RECOVERY | FORMATION | LITHOLOGY | BEDDING ANGLE | FRACTURES ANGLES | FAULTS, SHEARS, ETC. | CALCITE VEINING | QUARTZ VEINING | HORNFELS | SKARN | RECRYSTALLIZATION | SILICIFICATION | ARGILLATION | DOLOMITIZATION | BLEACHING | SANDING | Fe OXIDE | EPIDOTE + CHLORITE | OTHER | PYRITE | MANGANESE OXIDE | GALENA-SPHALERITE

style wms mass | style wms mass | style wms mass

Au | Ag | Cu | Pb | Zn

Footage	Recovery	Bedding angle	Fractures angles
		?	45
1300	100		
1305		?	30
			45
1310	100		
			30
			40
1315		?	
			35
1320	100		
			50
1325			40
			45
	100	?	
			30
133[illegible]			

LIMESTONE: CONTINUED AS BEFORE.

AMBERJACK - GALENA VEINLETS

DRILL HOLE: T-8

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FOOTAGE	RECOVERY	FORMATION	LITHOLOGY	BEDDING ANGLE	FRACTURES ANGLES	FAULTS, SHEARS, ETC.	CALCITE VEINING	QUARTZ VEINING	HORNELS	SKARN	RECRYSTALLIZATION	SILICIFACATION	ARGILLATION	DOLOMITIZATION	BLEACHING	SANDING	Fe OXIDE	EPIDOTE + CHLORITE	OTHER	PYRITE	MANGANESE OXIDE	GALENA-SPHALERITE	DESCRIPTION	Au	Ag	Cu	Pb	Zn
	100				20, 20, 60																		LIMESTONE - CONT. SOLUTION - COLLAPSE BRECCIA DISCONTINUES @ 1333' LS. BECOMING					
1335				60	45																							
1340	100				0, 0																							
1345				60	30																							
1350	100				45																		MINERALIZED SECTION. TRACE VESSUVIANITE; FeS2, MANGANESE; TRACE SPHALERITE					
1355																												
1360	100			60	10																							
1365	100				45																							