CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

PRINTED: 12/11/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

3 of 5

PRIMARY NAME: BUCKEYE WASH AREA URANIUM

ALTERNATE NAMES:

COCHISE COUNTY MILS NUMBER: 925

LOCATION: TOWNSHIP 12 S RANGE 29 E SECTION 10 QUARTER SE
LATITUDE: N 32DEG 24MIN 01SEC LONGITUDE: W 109DEG 22MIN 03SEC
TOPO MAP NAME: MARTIN WELL 7.5 - MIN

CURRENT STATUS: EXP PROSPECT

COMMODITY:
URANIUM

BIBLIOGRAPHY:
ADMMR BUCKEYE WASH AREA URANIUM FILE (1 OF 3)
CONTAINING GENERAL INFORMATION & REPORTS
ADMMR BUCKEYE WASH AREA URANIUM FILE (2 OF 3)
CONTAINING GEOPHYSICAL DATA
ADMMR BUCKEYE WASH AREA URANIUM FILE (3 OF 3)
CONTAINING DRILL LOG DATA

1978 BUCKEYE WASH, ARIZONA SUMMARY REPORT AND RECOMMENDATIONS

April 5, 1978

J.P. Lastra

UC 149-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METAL DIVISION

1820 SAN PEDRO N.E., SUITE 11, ALBUQUERQUE, NEW MEXICO 87110

To (Name) A. A. Kovschak
Division Metals
Location Grand Junction, Colorado

Date April 5, 1978

Originating Dept. J. P. Lastra

Answering letter date

Copy to

Subject 1978 Buckeye Wash Summary and Recommendations

Introduction

The Buckeye Wash project consists of 5 Arizona State Prospecting Permits, covering some 3060 acres in Cochise County, Arizona. The Buckeye Wash property is approximately 40 miles southeast of Safford, Arizona, and is located in the immediate vicinity of UCC's Bowie zeolite operation. The potential host for uranium mineralization is the fluvial deposits of the Pliocene-Pleistocene Gila Group.

The Buckeye Wash prospecting permits were acquired in January, 1977, following initial exploration efforts.

Geologic Setting

The Buckeye Wash property is located within the San Simon Valley, which is an element of the Basin and Range Province of southern Arizona and is part of a northwest structural trend extending from Globe, Arizona to Rodeo, New Mexico (Fig. 1). The San Simon Valley has been termed asymmetrical with a deep trough several miles southwest and parallel to the median axis of the basin.

Basin sediments consist of a sequence of younger and older alluvial deposits, with the older deposits usually referred to as the Gila Group. The Gila Group is of Pliocene-Pleistocene age and consists of 2500 to 4000+ feet of lacustrine and fluvial sediments. The sediments themselves range from silts and clays through extensive sand and gravel deposits. Gypsum, marl, and limestone zones are also common in the lacustrine sediments of the San Simon Valley. Intercalated basaltic to rhyolitic flows and tuff beds also are present within the sediment sequence of the Gila Group.

Exploration History

Literature Research

Exploration efforts began in early 1976 in the San Simon Valley. Literature investigation brought to attention an airborne radiometric survey of southeastern Arizona conducted by Texas Instruments for ERDA. From this survey 6 anomalies were outlined in the San Simon Valley. Figure 2 reflects the position of 4 of these anomalies which are present in the north central portion of the San Simon Valley.

Track Etch Survey

During the summer of 1976 a Track Etch survey was conducted over selected portions of the San Simon Valley. A total of 23 reconnaissance Track Etch cups were placed to evaluate anomalies outlined by the ERDA

airborne radiometric survey. Additionally, 50 cups were placed on approximately 1 mile centers to evaluate the potential of the area adjacent to and covering four previously established UCC zeolite claim groups (Fig. 2).

The close spaced survey outlined an apparently significant Track Etch anomaly adjacent and slightly east of the present Buckeye Wash property. Track Etch cup 23340 exhibited 840.5 tracks/sq. mm which when compared to the mean value for the entire survey proved significantly anomalous (15.86 X Bkgd.). Figure 3 is a contour map showing the relationship of the Track Etch survey and is expressed in tracks/sq. mm divided by background tracks/sq. mm. Additionally, Track Etch cup 23340 was repeated in May of 1977 and again an anomalous measure was obtained. Figure 4 reflects V_2O_5 values from soil samples collected at each of the Track Etch locations. A comparison of Figures 3 and 4 shows a comparable spatial relationship of the Track Etch highs and the V_2O_5 highs.

Water Sampling Program

Beginning in February, 1977, a ground water sampling program was conducted in the San Simon Valley and adjacent valleys of southeastern Arizona and southwestern New Mexico (Fig. 5). A total of 109 wells were sampled in the San Simon Valley and an additional 146 wells were sampled in the adjacent valleys.

Water samples were analyzed for uranium, vanadium, selenium, sulfate, chloride and lithium. Additionally, field analyses were conducted to determine carbonate and bicarbonate concentrations. Water samples in the central portion of the San Simon Valley were obtained from an aquifer system below the lacustrine sediment sequence at depths ranging from 700 to 1000+ feet. Interpretation of the ground water data resulted in the location of an apparent geochemical interface delineating a potential zone of uranium concentration.

U_3O_8 values for the San Simon Valley ranged from 60 ppb to less than one ppb. Correspondingly, U_3O_8 values in the Buckeye Wash area ranged from 41 ppb to less than one ppb. As noted in Fig. 6, a high U_3O_8 concentration was observed southeast of the Buckeye Wash area and the U_3O_8 content in the ground waters decreased in the vicinity of the Buckeye Wash property. Due to the regional northwesterly flow of ground water through the San Simon Valley, the uranium values suggested a potential precipitation of uranium in the vicinity of the Buckeye Wash property.

Similarly, the suite of indicator elements supports a ground water interface extending through the Buckeye Wash property. Selenium values (Fig. 7) drop from a high of 260 ppb to less than 10 ppb across the proposed Buckeye Wash interface. Additionally, lithium values decline north and west of the Buckeye Wash property (Fig. 8).

Consistently with the other indicators, sulfate values decrease across the interface while chloride values increase north and west of the interface trend (Fig. 9, 10). The sulfate-chloride relationship suggests a zone of sulfate precipitation, possibly to be associated with uranium precipitation, followed by a zone of increasing chloride content in the down gradient direction from the proposed interface. As can be seen in Figure 11, vanadium values generally correspond to the previously discussed relationship, however, it is not possible to delineate the proposed interface from the vanadium data. Additionally, R/D values were calculated from the CO_3 equivalent - HCO_3 ratio and this relationship again outlines the geochemical interface (Figure 12).

Structural Investigations

A detailed examination of the San Simon Valley using ERTS images and NASA high altitude photographs has led to the location of various lineaments and circulars within the valley. In addition, gravity and aeromagnetic information from the University of Arizona has suggested possible fault relationships in areas of the San Simon Valley. As shown in Figure 13, aeromagnetic and in part ERTS data reflect a fault system in the vicinity of the Buckeye Wash property. However, prior to the 1978 drilling program additional evidence was not available to support the fault relationships or their effect on potential mineral accumulations. A discussion of structural information acquired through 1978 drilling will be made in a latter section of this report.

1977 Drilling Program

Drilling of two stratigraphic test holes on the Buckeye Wash property began in late May 1977. The first hole (2-1) was drilled in Sec. 2, T12S R29E (Plate 1) to a depth of 1997 feet. As anticipated, lacustrine silts and clays were encountered to a depth of 775 feet. Below this lake-bed sequence 564 feet of coarse subangular sands and gravels were penetrated. From the nature, angularity and sorting of the sand-gravel sequence, as well as the structural make-up of the basin, this sand-gravel sequence has been interpreted to reflect extensive alluvial fan deposits. Similar alluvial fan deposits are evident along the present day basin margins and their existence in varying degrees of development can be viewed throughout the basins history.

At a depth of 1339 feet, 12 feet of trace mineral were encountered in a lithologically distinct water bearing sand. This sand unit will be referred to as the A-sand and as can be seen on the accompanying cross sections (Plates 2, 3), the A-sand exhibits a distinct lithologic character which may be correlated in successive drill logs. Below the A-sand a sequence of rhyolitic flows and detrital volcanic gravels were encountered to a depth of 1527 feet. At this point a 36 foot tuffaceous zone was penetrated. Following the tuffaceous zone detrital volcanics and volcanic flows persisted to T.D.

In the second hole, 10-1 (Sec. 10, T12S R29E), which is 1.1 mile southwest of hole 2-1, a similar lithologic sequence was encountered. In this hole (10-1), as in hole 2-1, lacustrine silts and clays dominated the first 830 feet. Alluvial fan sands and gravels were encountered and persisted to a depth of 1461 feet. Immediately below the fan deposits the A-sand, detailed in the discussion of hole 2-1, was penetrated. The A-sand had thickened to 27 feet in hole 10-1 and again exhibited trace (2 X Bkgd.) mineral. Following 100 feet of detrital volcanics and intensely fracture friable volcanic flows, the lower tuffaceous zone was penetrated. The tuffaceous zone had thickened to a total of 115 feet. Below the tuffaceous zone interbedded flows and volcanic detritus continued to a terminal depth of 2005 feet.

Drilling statistics for the 1977 Buckeye Wash program are outlined in Appendix A.

1978 Buckeye Wash Exploration Program

Drilling commenced on February 10th, 1978 and was completed on March 8th with the drilling of three holes for a total combined footage of 4317 feet. The 1978 Buckeye Wash drilling program was designed to evaluate the potential of the A-sand with respect to lithology, mineral relationships, and mode of deposition. Additionally, the 1978 program was developed to test the ground water interface trending through the Buckeye Wash property.

Subject: 1978 Buckeye Wash Summary
and Recommendations

Prior to the 1978 phase of the Buckeye Wash-San Simon Valley exploration program, the significance of the Buckeye Wash Track Etch anomaly was in doubt. 1977 drill information had outlined the presence of some 700+ feet of silt and clay immediately below the Buckeye Wash surface. This lacustrine clay and silt sequence appears to be an impenetrable barrier to the migration of radon. Rather than the Track Etch anomaly reflecting possible uranium concentrations at a depth comparable to that of the ground water interface (700'+ - 1000'+), it was determined that localized uranium concentrations within the upper clay zone probably account for the high Track Etch values. This relationship can be seen north of the Buckeye Wash property some 22 miles (Figure 2). In the area to the north (Flat Tire Claim Group) local uranium mineralization (carnotite-type) may be observed in the tuffaceous lacustrine clays. A reconnaissance Track Etch cup placed in this area during 1976 exhibited 387.5 tracks/sq. mm while an associated outcrop sample of the exposed lacustrine clay contained .10% U_3O8. However, the extent of the mineralization was found to be extremely localized and of a random nature. Drilling of this northern area by Exxon and Anaconda has supported this conclusion and it is believed that work has been discontinued in the area.

Subject: 1978 Buckeye Wash Summary
and Recommendations

1978 Buckeye Wash Drill Results

Three holes were drilled on the Buckeye Wash property in February-March, 1978. Hole 10-2 (Sec. 10 T12S R29E) was drilled 2400' east of hole 10-1 (Plate 1) in an attempt to evaluate the potential of the A-sand as it thickened in the southeasterly direction. Additionally, hole 10-2 was located on the leading edge of the ground water interface (Fig. 14). The sediment sequence in hole 10-2 was found to correlate well with previous Buckeye Wash drilling.

In summary, 800 feet of lacustrine clay were encountered. These clays were followed by 580 feet of alluvial fan sediments (gravels and coarse sand) and the A-sand was penetrated at a depth of 1380 feet. As anticipated the A-sand had thickened to 50 feet, however, the sand proved to be barren. Drilling continued to a total depth of 1780 feet penetrating a sequence of interbedded rhyolitic flows and detrital volcanic gravels. The tuff zone encountered in holes 2-1 and 10-1 is not discernable in this hole which probably reflects minor changes in the character of the volcanic sequence.

Following 10-2, hole 11-1 (Sec. 11, T12S R29E) was drilled to further test the ground water interface (Fig. 14) and to investigate the mineral potential in the up gradient direction from holes 2-1 and 10-1 (Plate 1). Hole 11-1 was plugged to a depth of 1323 feet and cored to a total depth of 1337 feet. The sediment sequence

encountered included 795 feet of lacustrine clays and silts which were followed by 437 feet of alluvial fan gravels. The A-sand was penetrated at 1232 feet. The total thickness for the A-sand in this hole was 9 feet and again the zone proved to be barren. At 1260 feet a highly fractured rhyolitic flow was encountered and continued to T.D. (1337'). As previously noted, a 14 foot core run was made in this hole. Projections from previous drill holes established the position of the A-sand at 1330 feet, however, due to unknown fault relationships an attempt to core the A-sand failed and recovered core represented the lower volcanic flow sequence.

Following 11-1, hole 11-2 (Sec. 11, T12S R29E) was drilled some 2640' north of hole 11-1 (Plate 1). Hole 11-2 was placed to evaluate the mineral potential between hole 2-1 which contains trace mineral in the A-sand and hole 11-1 which is barren through the same interval. Additionally, it was believed that placement of 11-2 between holes 11-1 and 2-1 would allow for an accurate depth pick for the A-sand and the subsequent coring of that interval. As shown on Figure 14, hole 11-2 is located along the ground water interface. As in previous holes, lacustrine clays were encountered to a depth of 830 feet, however, only 170 feet of fan gravels were encountered. The A-sand was penetrated at a depth of 1000 feet and the first rhyolitic flow was encountered at 1039 feet and continued to a terminal depth of 1200 feet. No attempt

was made to core the A-sand as this interval was again encountered above the expected intercept.

Drilling statistics for the 1978 Buckeye Wash program are presented in Appendix B.

Geologic Interpretation

The Buckeye Wash property is located in the San Simon Valley of southeastern Arizona and is typified by a sedimentary sequence composed of lacustrine clays, silts, marls and thin limestones overlying extensive immature alluvial fan deposits. Beneath the poorly sorted, subangular gravels and sands which compose the fan deposits are the A-sand and a sequence of interbedded rhyolitic flows, tuffs, and detrital volcanic gravels.

Structurally the San Simon Valley represents a down dropped fault block bounded on each side by uplifted ranges of a typical Basin and Range character. Similarly the Buckeye Wash area is affected by faulting. As evidenced by holes 2-1 and 11-2 (Plate 2) a fault or fault system crosses the northern end of the Buckeye Wash property. The fault trends in an east-west direction across the property (Fig. 15) and has resulted in the uplifting of the southern portion of the Buckeye Wash property (340+' displacement) with respect to the northern portion. However, as can be seen in Plate 2, faulting occurred prior to the deposition of

the lacustrine sequence and therefore no fault trace is visible on the Buckeye Wash surface. Similarly, from cross section A-A[1] (Plate 2) it is evident that faulting occurred after the deposition of the A-sand.

The A-sand is now viewed as a distinct lithologic unit deposited above a sequence of volcanic flows. Although no core was recovered from the A-sand both electric log and samples of drill cuttings support the A-sand as being composed of a fairly clean water bearing sand. The electric log character of the A-sand may be observed in Plate 2 and Plate 3 and a distinct SP reversal may be observed. As shown in the above mentioned figures the A-sand thickens to the southeast resulting in a maximum thickness of approximately 50 feet. Depositional mode for the A-sand is not yet understood, however, it is assumed to represent a blanket sand deposited under fluvial conditions. The A-sand appears to overlie a more silty sequence and locally appears to be in contact with the lower detrital volcanics and rhyolitic flow sequence. The A-sand was deposited following a period of active volcanism during which the lower sequence of volcanic material was laid down. Multiple volcanic flows are evidenced as are periods of erosion, marked by the deposition of detrital volcanic sands and gravels between flows. Contemporaneously with the deposition of the A-sand extensive alluvial fan deposits were being laid down. These fan deposits extended basinward to eventually cover the A-sand and occupy the position between the A-sand and the overlying lacustrine sequence. As previously noted, at a time following deposition of the

A-sand and prior to the lacustrine deposition, faulting occurred. Subsequent to the faulting and erosional leveling of the basin, lacustrine deposition followed resulting in 700-800+ feet of lacustrine silts and clays. Deposition of the lake-bed sequence was then halted and fan development again dominated the basin. Such fans may now be observed in the northern portion of the San Simon Valley. However, erosion has resulted in dissection of both the fans and the upper portion of the lake-bed sequence in the northern portion of the San Simon Valley.

Summary and Conclusion

Of the five holes drilled on the 3060 acres comprising the Buckeye Wash property, two holes exhibited trace (2 X Bkgd.) mineral and three holes proved to be barren. In addition to testing the mineral potential of a portion of the Buckeye Wash area, 1978 drilling coupled with 1977 drill results gained an insight into the structural relationships of the Buckeye Wash property and has led to a potential understanding of the geochemical ground water interface.

Both the ground water interface and the recently determined fault system have been previously discussed, however, an examination of the two components is now in order. As previously stated, the ground water interface was determined by comparison of various analyses results of water samples collected from a depth of 700 to 1000+ feet. This

comparison led to the construction of an arcuate ground water interface through the Buckeye Wash property. This interface showed a marked drop in uranium content for waters north of the interface versus waters to the south. This drop in uranium content as well as previously discussed indicator element relationships led to the construction of a zone of potential mineral precipitation.

As shown by comparison of Figure 14 and Figure 15, the fault trend and interface trend tend to spacially correspond and, therefore, the ground water interface may reflect the influence of the fault system rather than a zone of mineral precipitation. The relative position of the upthrown southern block corresponds with the interface zone and the northern downthrown block corresponds with the zone north of the interface in which a drop in U_3O_8 and related indicator elements was observed.

This does not completely negate the potential for uranium accumulation along the proposed geochemical interface, however, an interrelationship of the fault system and the ground water interface is suggested.

In summary, 1977-78 drill results and related data indicate the presence of an immature, complexly faulted sediment sequence with only one apparent target zone (A-sand). The target zone itself is still lithologically untested; relatively thin (9' to 50' maximum); adjacent to a volcanic sequence capable of explaining the trace mineral observed; relatively deep (1000' to 1461') and represents rocks of a relatively young age (Pliocene-Pleistocene). The potential exists for mineral

accumulation within the A-sand, however, based on the information gathered to date, it is doubtful that deposits of an economic size or grade compatible to UCC established guidelines can be developed on the Buckeye Wash property.

Recommendation

It is my recommendation, based on current findings, that the Buckeye Wash property be excluded from further exploration programs and that the 5 Arizona Prospecting Permits not be renewed. However, prior to the expiration date of said prospecting permits it is recommended that the Buckeye Wash property be reviewed by the appropriate department for potential zeolite reserves.

1977 BUCKEYE WASH SUMMARY

UC 149-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METAL DIVISION

1820 SAN PEDRO N.E., SUITE 11, ALBUQUERQUE, NEW MEXICO 87110

To (Name) W. A. Street
Division Metals
Location Albuquerque, New Mexico

Date October 26, 1977
Originating Dept. J. P. Lastra
Answering letter date

Copy to

Subject 1977 Buckeye Wash Summary

Introduction

The Buckeye Wash project consists of 5 Arizona State Prospecting Permits, covering some 3060 acres. The Buckeye Wash property is located in Cochise County, Arizona and is approximately 40 miles southeast of Safford, Arizona. The potential host for uranium mineralization is fluvial deposits of the Pliocene-Pleistocene Gila Group.

The Buckeye Wash prospecting permits were acquired in January 1977 following initial exploration efforts.

Geologic Setting

The Buckeye Wash property is located within the San Simon Valley. This valley is an element of the Basin and Range Province of southern Arizona and is part of a northwest structural trend extending from Globe, Arizona to Rodeo, New Mexico (Fig. 1). The San Simon Valley has been termed asymmetrical with a deep trough several miles southwest and parallel to the median axis of the basin.

Basin sediments consist of a sequence of younger and older alluvial deposits, with the older deposits usually referred to as the Gila Group. The Gila Group is of Pliocene-Pleistocene age and consists of 2500 to 4000+ feet of lacustrine and fluvial sediments. The sediments themselves range from silts and clays through extensive sand and gravel deposits. Gypsum, marl, and limestone zones are also common in the San Simon Valley. Intercalated basaltic to rhyolitic flows and tuff beds also are present within the sediment sequence of the Gila Group.

Exploration Programs 1976-1977

Literature Research

Exploration efforts began in early 1976 in the San Simon Valley. Literature investigation brought to attention an airborne radiometric survey of southeastern Arizona conducted by Texas Instruments for ERDA. From this survey 6 anomalies were outlined in the San Simon Valley. Figure 2 reflects the position of 4 of these anomalies which are present in the north central portion of the San Simon Valley.

Track Etch Survey

During the summer of 1976 a Track Etch survey was conducted over selected portions of the San Simon Valley. A total of 23 reconnaissance Track Etch cups were placed to evaluate anomalies outlined by the ERDA airborne radiometric survey. Additionally, 50 cups were placed on approximately 1 mile centers to evaluate the potential of the area

adjacent to and covering four previously established UCC zeolite claim groups (Fig. 2).

The close spaced survey outlined an apparently significant Track Etch anomaly adjacent and slightly east of the present Buckeye Wash property. Track Etch cup 23340 exhibited 840.5 tracks/sp. mm which when compared to the mean value for the entire survey proved significantly anomalous. Figure 3 is a contour map showing the relationship of the Track Etch survey and is expressed in tracks/sp. mm divided by background tracks/sp. mm. Additionally, Track Etch cup 23340 was repeated in May of 1977 and again an anomalous measure was obtained. Figure 4 reflects V_2O_5 values from soil samples collected at each of the 50 Track Etch locations. A comparison of Figures 3 and 4 shows a comparable spatial relationship of the Track Etch highs and the V_2O_5 highs.

Water Sampling Program

In February 1977 a water sampling program was initiated in the San Simon Valley. From data collected during this program an apparent R/D interface was delineated. As shown in Figure 5, a complex R/D interface was outlined in the immediate vicinity of the Buckeye Wash property. Similarly, a portion of the R/D interface crosses the northeastern portion of the Buckeye Wash property.

Additionally, analyses of the water samples for vanadium, sulfate, chloride, and lithium reflect a geochemical interface spatially compatible to the R/D interface. A comparison of Figures 5, 6, 7, 8, and 9 shows this relationship.

Subject: 1977 Buckeye Wash Summary

Water sample W-15311 exhibits an apparently anomalous (41 ppb) U_3O_8 content. As may be observed in Figure 10, sample W-15311 is located southeast of the Buckeye Wash property. Due to the northerly ground water flow through the basin, this may reflect movement of U_3O_8 into the vacinity of the Buckeye Wash property.

Structural Investigations

A detailed examination of the San Simon Valley using ERTS images and NASA high altitude photographs has led to the location of various lineaments and circulars within the valley. In addition, gravity and aeromagnetic information from the University of Arizona has suggested possible fault relationships in areas of the San Simon Valley. As shown in Figure 11 aeromagnetic and in part ERTS data reflect a fault system in the vacinity of the Buckeye Wash property. Presently, no additional evidence is available to support or reject the fault relationships or their possible effect on potential mineral accumulation.

1977 Drilling Program

Drilling of two stratigraphic test holes on the Buckeye Wash property began in late May 1977 (Fig. 12). The first hole was drilled in Sec. 2, T12S R29E to a depth of 1,997 feet. As anticipated, lacustrine silts and clays were encountered to a depth of 740 feet. Below these lake bed deposits a 450 foot sequence of course subangular sands and gravels was penetrated. From the nature and angularity of the gravels, as well as

the structure of the basin, this course sand and gravel zone is believed to reflect extensive alluvial fan deposits which dominated this portion of the basin. However, at a depth of 1,339 feet 12 feet of trace mineralization (2 X Bkgd.) were encountered in what appears to be a fine water bearing sand. Below this unit a rhyolitic flow was encountered. Beneath the flow, a 36 foot zone of tuff and fine sand was penetrated to a depth of 1,564 feet. This zone was again followed by volcanic flows and detrital volcanics which persisted to T.D.

In the second hole (Sec. 10, T12S R29E), which is 1.1 mile southwest of the first hole (2-1), similar sediments were encountered with the exception of the absence of the volcanic flows. In this hole (10-1), as in hole 2-1, lacustrine clays dominated the first 830 feet. Beneath the clay sequence, alluvial fan gravels were encountered and persisted to a depth of 1,330 feet. At a depth of 1,461 feet the upper sand zone, detailed in the discussion of hole 2-1, was again penetrated. Trace (2 X Bkgd.) mineralization was present throughout the 27 foot thickness of this interval. Following 100 feet of gravels, the lower sand-tuff zone was penetrated. The thickness of this lower zone had increased to 115 feet. Below the lower zone fan gravels were encountered and continued to T.D.

Subject: 1977 Buckeye Wash Summary

Summarily, stratigraphic test holes 2-1 and 10-1 outlined the basic nature of the San Simon Valley in the area of the Buckeye Wash property. The 700 to 800 feet of lake-bed material reflects a relatively stable period during which an extensive lake or series of lakes dominated the basin. Prior to this, the development of large alluvial fans, as evidenced by the course sand and gravel sequence, reflects a period of active erosion and intense valley filling.

With respect to the zone of trace mineralization the lithology is largely inferred from the electric logs and the samples collected by rotary drilling methods. A complete evaluation of the potential of the proposed sand zones will necessitate coring of the intervals of interest.

Correlation of electric logs suggests a thickening of both the upper sand zone and the lower sand-tuff zone to the south and west. This thickening is consistent with that exhibited in the lake-bed sequence some 600 feet above. At present no evidence for faulting has been observed in holes 2-1 and 10-1 as was suggested from the aeromagnetic data.

Drilling statistics for the 1977 Buckeye Wash program are outlined in Appendix A.

Subject: 1977 Buckeye Wash Summary

Proposed 1978 Drilling Program

The 1978 Buckeye Wash 827 budget is expected to be $125,000. Hole depths for the 1978 drilling program are estimated to average 1700 feet at an estimated cost of $10.50/ft. Estimated cost figures are down from costs incurred during 1977 as it is believed that a contract may be secured at a much lower footage rate than that of Longyear Company.

Using the above cost estimates, one (1) core hole and five (5) rotary plug holes are planned. Presently plans call for two (2) rotary plug holes, followed by the core hole, to evaluate the potential of both the upper sand and the lower sand-tuff zone. Total core interval is estimated to be approximately 40 feet.

Conclusion

In summary, it is presently felt that a good uranium potential exists in the San Simon Valley. However, location of favorable host lithologies may prove allusive due to the lack of surface expression and the very limited subsurface information available.

Drilling efforts during 1978 will concentrate on identification of the lithologies encountered in the previously discussed zones of trace mineralization. Additionally, 1978 drilling will attempt to more completely evaluate the Buckeye Wash Track Etch and ground water anomalies.

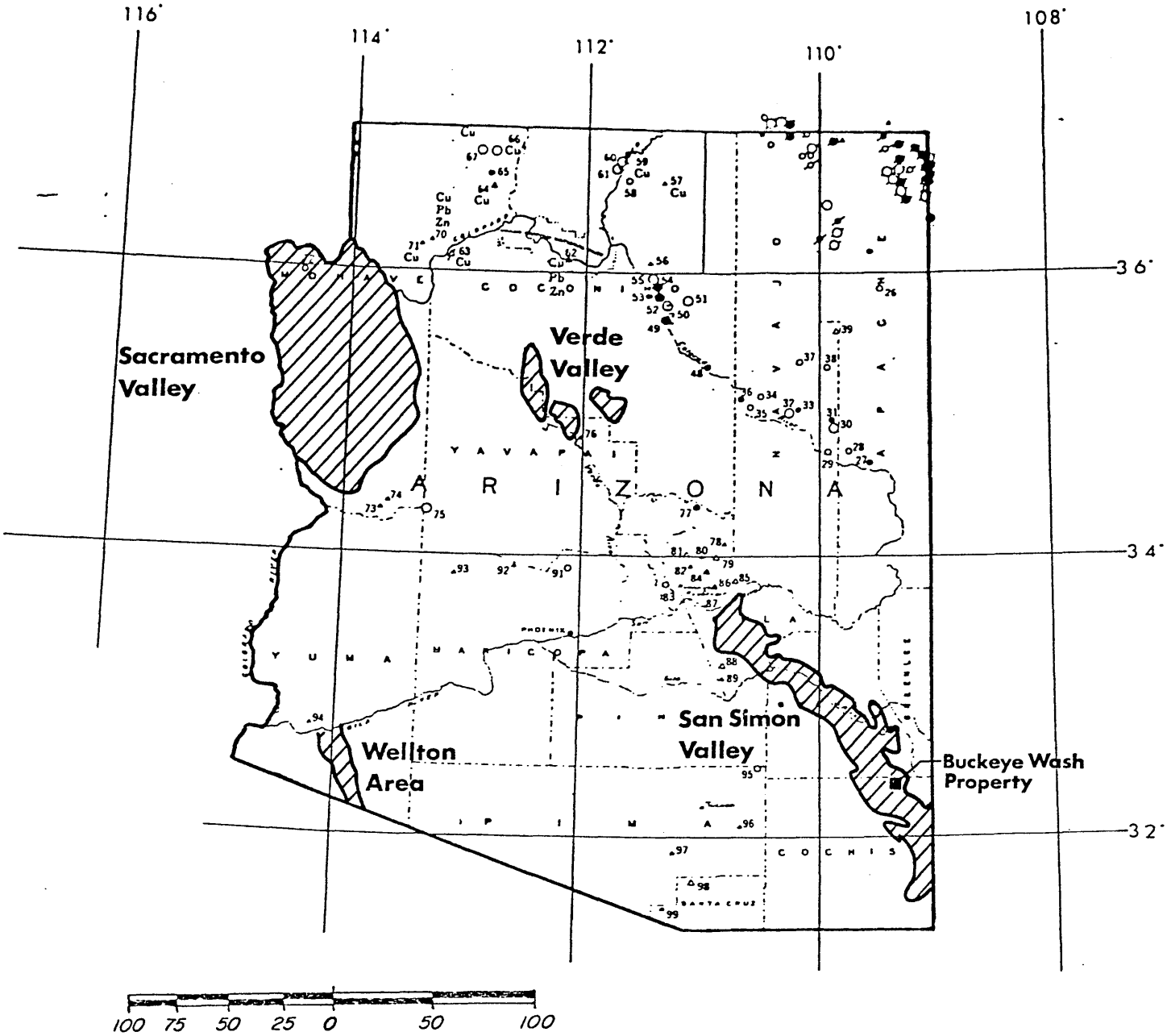
Attachments

JPL/mo

APPENDIX A

1977 BUCKEYE WASH DRILLING COST BREAKDOWN:

Description	Hole 2-12-29-1	Hole 10-12-29-1
Drilling, Mud, Casing	$ 23,167.40	$ 20,270.25
Site Preparation	$ 220.00	$ 655.00
Electric Logging	$ 938.17	$ 193.65
Geolograph	$ 458.50	$ 458.50
Supervision	$ 900.00	$ 600.00
Expenses	$ 493.86	$ 235.61
Vehicle	$ 45.25	$ 45.25
Sample Preparation	$ 54.84	$ 146.24
Sidewall Sampler		$ 450.00
Drilling Water		$ 100.00
TOTAL COST	$ 26,278.02	$ 23,154.50
Avg. Cost Per Foot (Drilling, Mud, Casing, Logging, Geolograph, Water, Site Prep. & Rest.)	$ 12.41/ft.	$ 10.81/ft.
AVG. COST PER FOOT	$ 13.61/ft.	$ 11.55/ft.
TOTAL DRILLING EXPENDITURE 1977	$ 49,432.52	
TOTAL AVG. COST PER FOOT	$ 12.35/ft.	



ARIZONA

SEDIMENTARY URANIUM OCCURRENCES (U.S.G.S.P.P. 538)

FIGURE 1

SAN SIMON AREA, ARIZONA

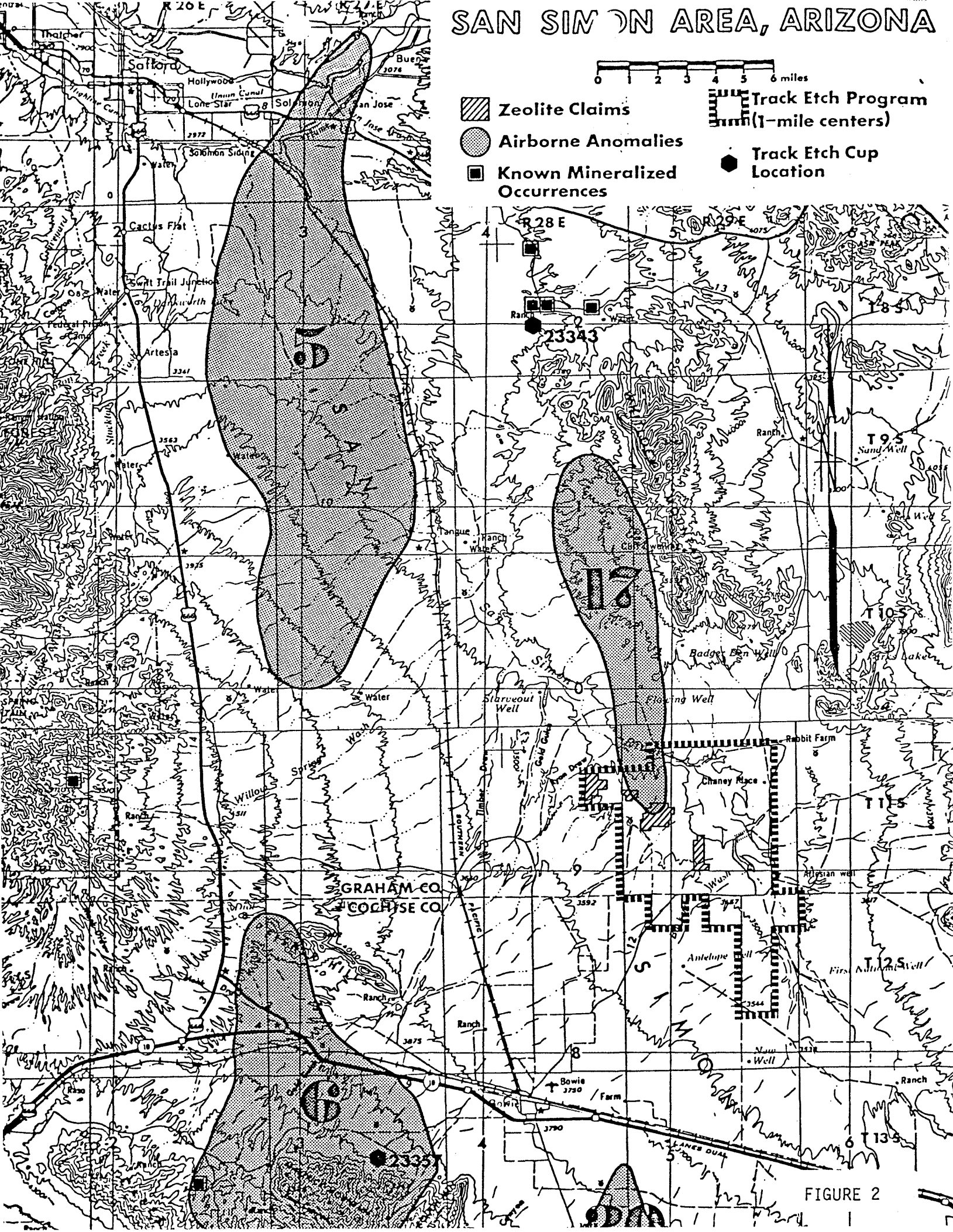


FIGURE 2

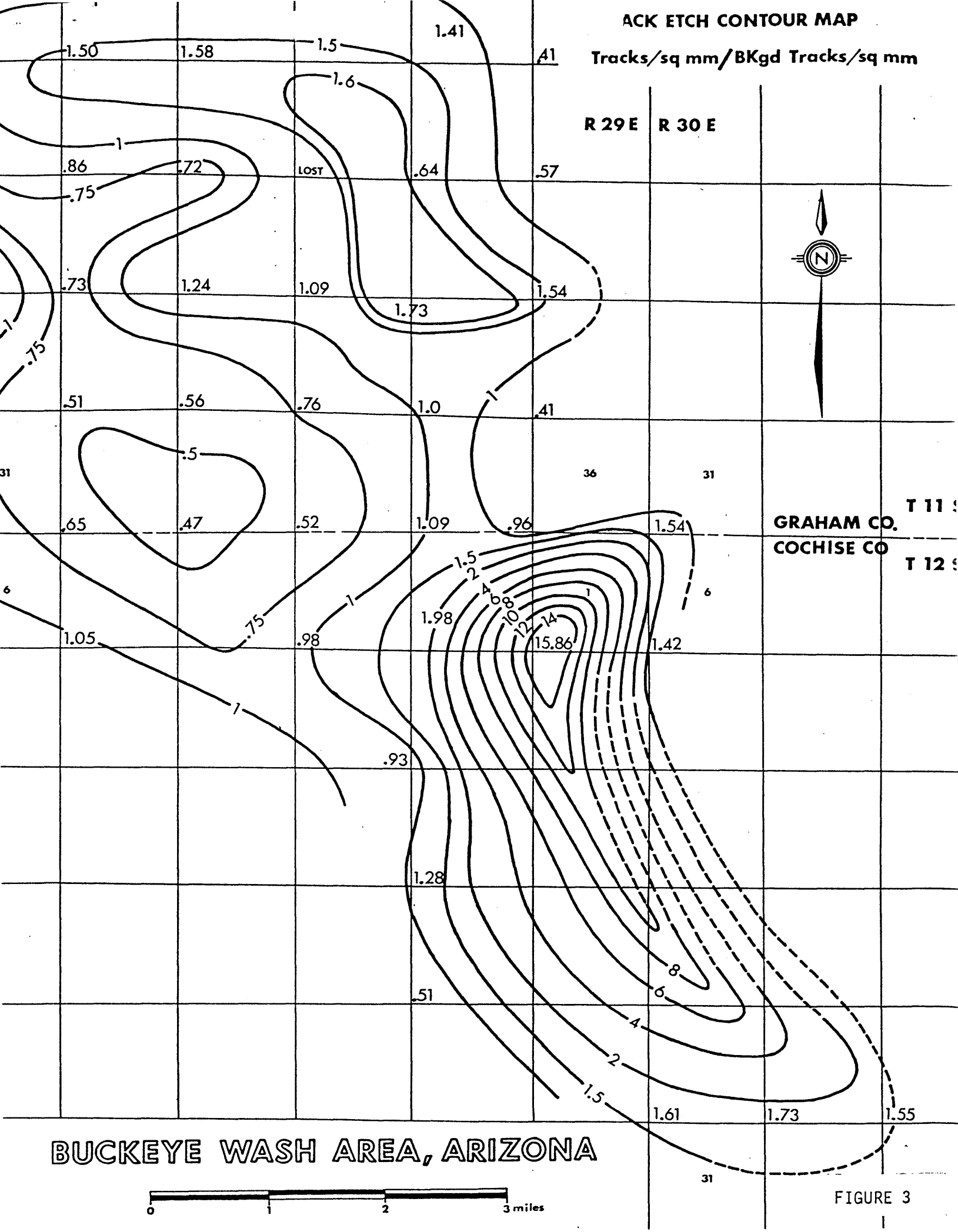

ACK ETCH CONTOUR MAP
Tracks/sq mm/BKgd Tracks/sq mm
R 29 E
R 30 E
N
GRAHAM CO.
COCHISE CO
T 11
T 12
LOST
1.41
1.50
1.58
1.5
.41
1.6
1
.86
.72
.64
.57
.75
.73
1.24
1.09
1.54
1.73
.51
.56
.76
1.0
.41
.5
31
36
31
.65
.47
.52
1.09
.96
1.54
6
6
1.5
2
4
6
8
10
12
14
15.86
1.98
1.05
.98
1.42
.75
1
.93
1.28
.51
8
6
4
2
1.5
1.61
1.73
1.55
31
BUCKEYE WASH AREA, ARIZONA
0
1
2
3 miles

FIGURE 3

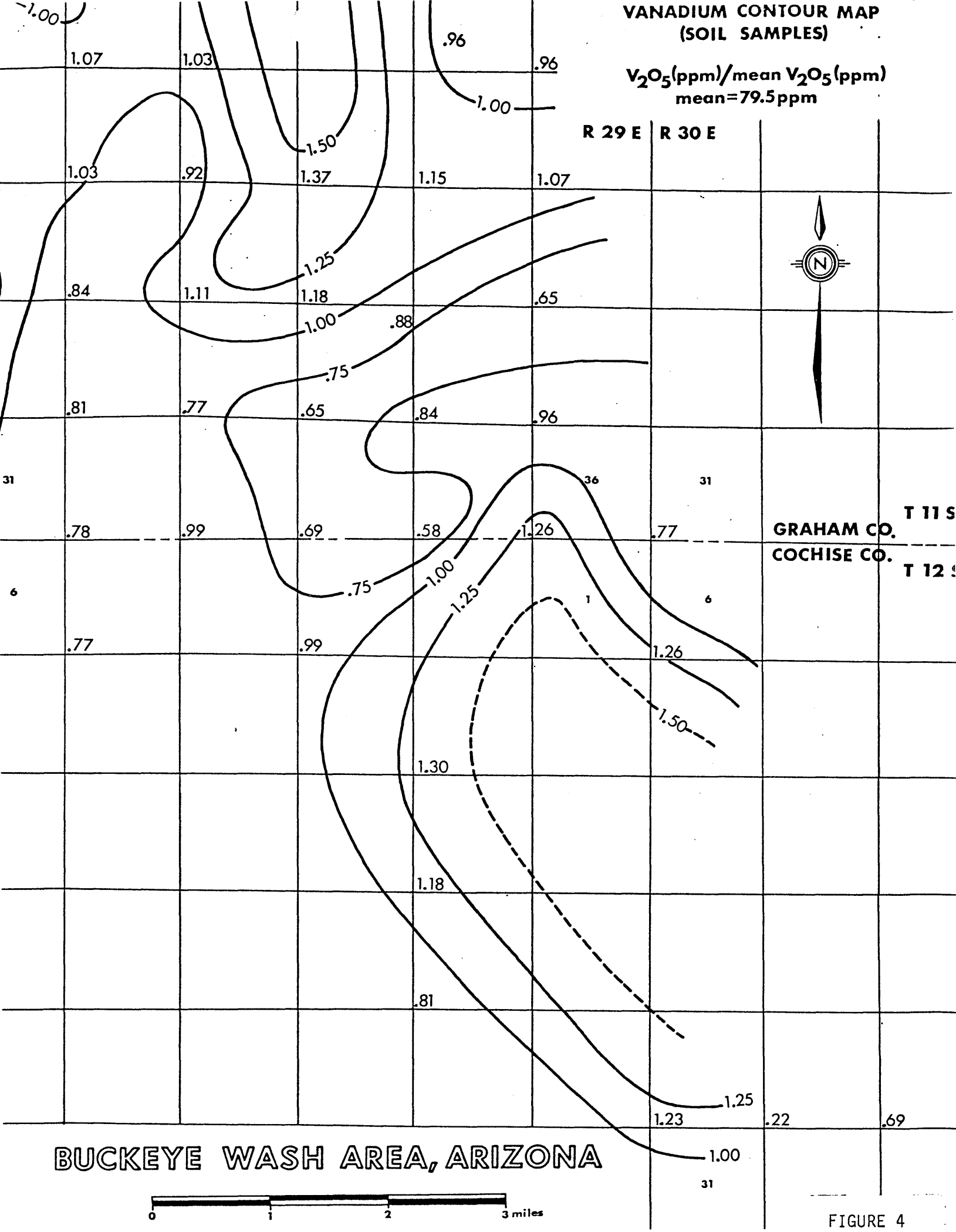

VANADIUM CONTOUR MAP
(SOIL SAMPLES)
V_2O_5(ppm)/mean V_2O_5(ppm)
mean=79.5 ppm
R 29 E
R 30 E
N
T 11 S
T 12 S
GRAHAM CO.
COCHISE CO.
BUCKEYE WASH AREA, ARIZONA
0
1
2
3 miles

FIGURE 4

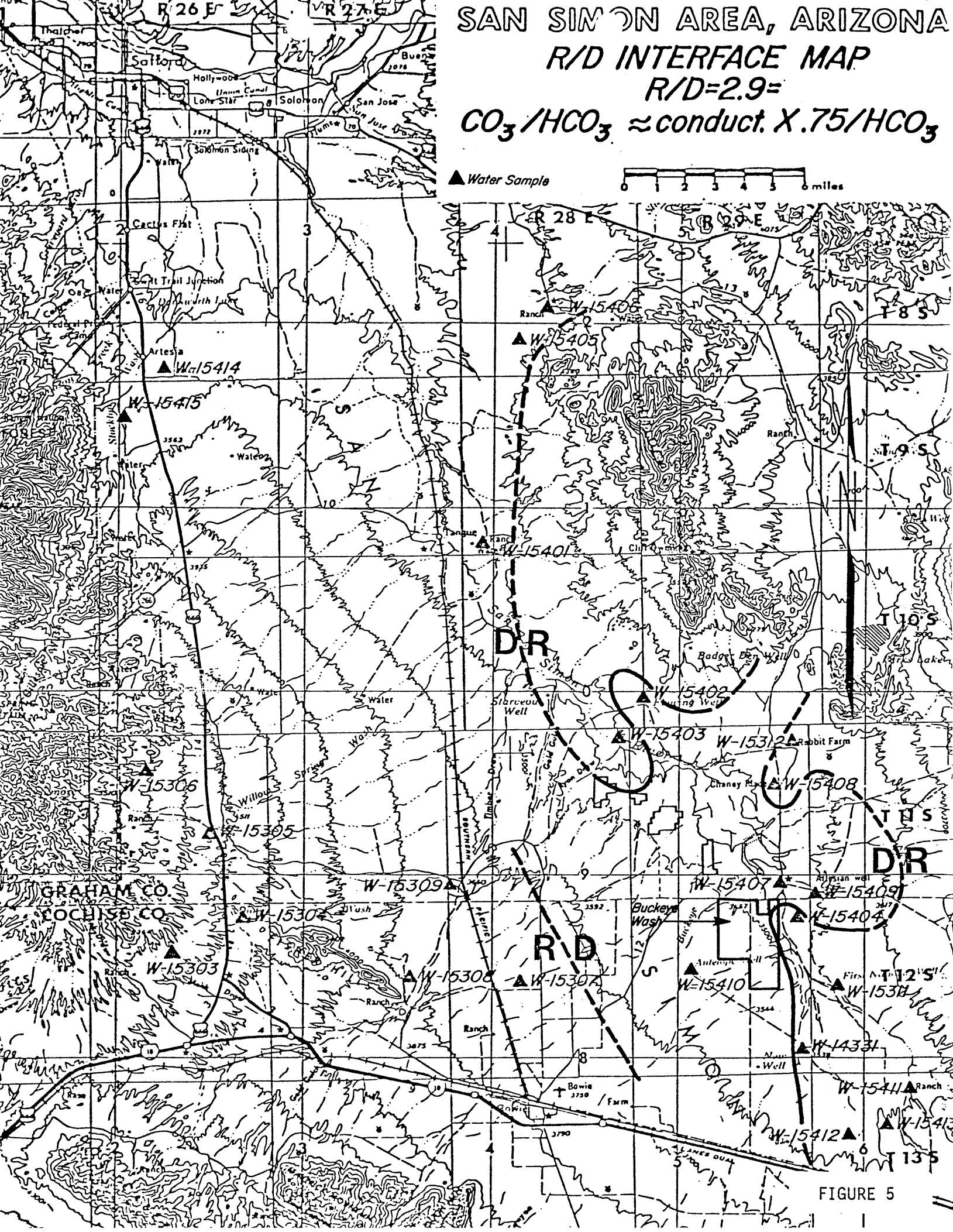

SAN SIMON AREA, ARIZONA
R/D INTERFACE MAP
R/D=2.9=
$CO_3/HCO_3 \approx$ conduct. X .75/HCO_3
Water Sample
0 1 2 3 4 5 6 miles
R 26 E
R 27 E
R 28 E
R 29 E
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
W-15414
W-15415
W-15405
W-15406
W-15401
W-15402
W-15403
W-15312
W-15408
W-15306
W-15305
W-15309
W-15302
W-15303
W-15306
W-15307
W-15407
W-15409
W-15404
W-15410
W-15311
W-14331
W-15411
W-15412
D R
R D
GRAHAM CO.
COCHISE CO.
Buckeye Wash
Starvout Well
Rabbit Farm
Artesia
Cactus Flat
Solomon
Bowie

FIGURE 5

SAN SIMON AREA, ARIZONA
WATER ANALYSIS
VANADIUM CONTOUR MAP
C.I.=10ppb

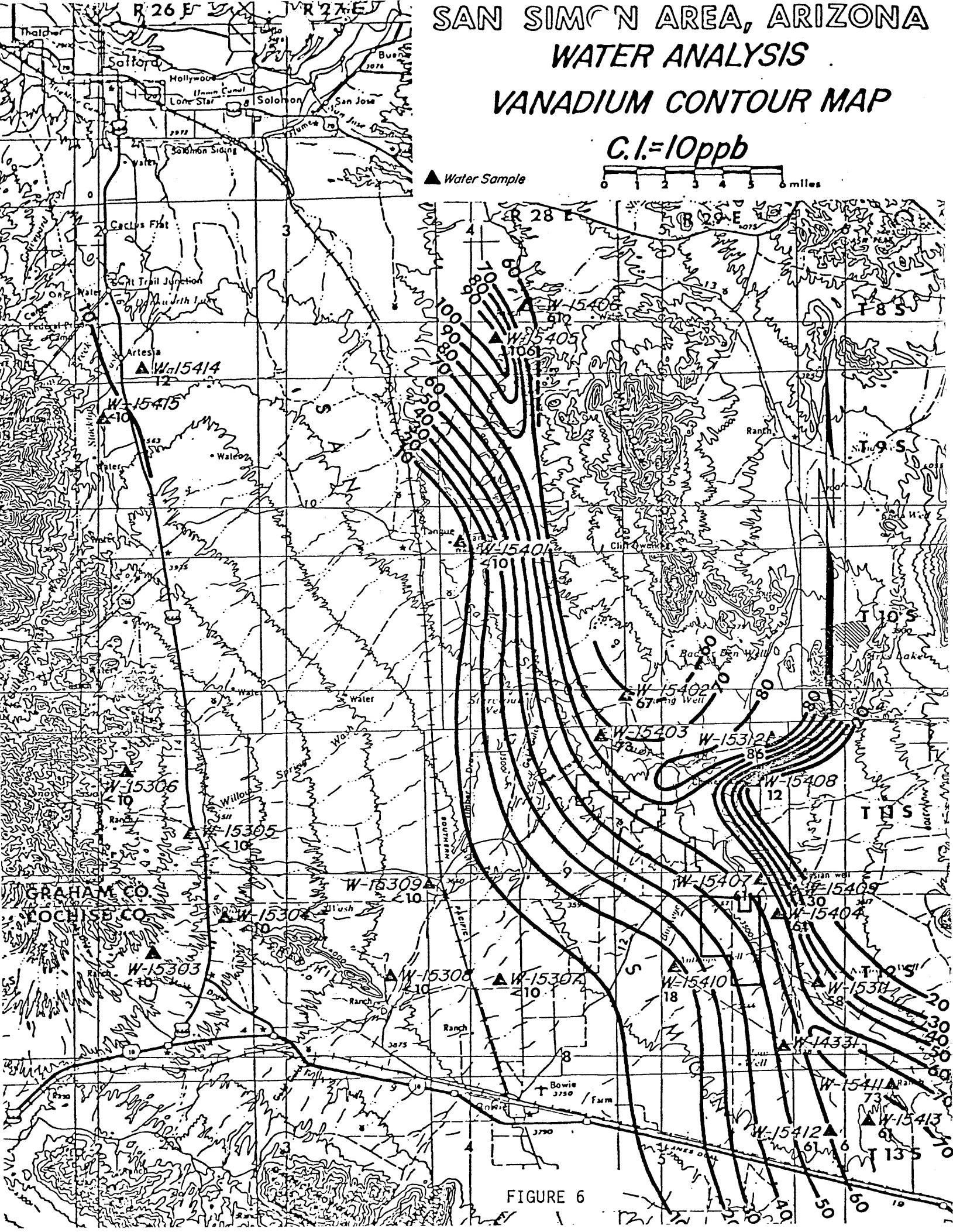


FIGURE 6

SAN SIMON AREA, ARIZONA
WATER ANALYSIS
SULFATE CONTOUR MAP

C.I.= 1ppm

▲ Water Sample

0 1 2 3 4 5 6 miles

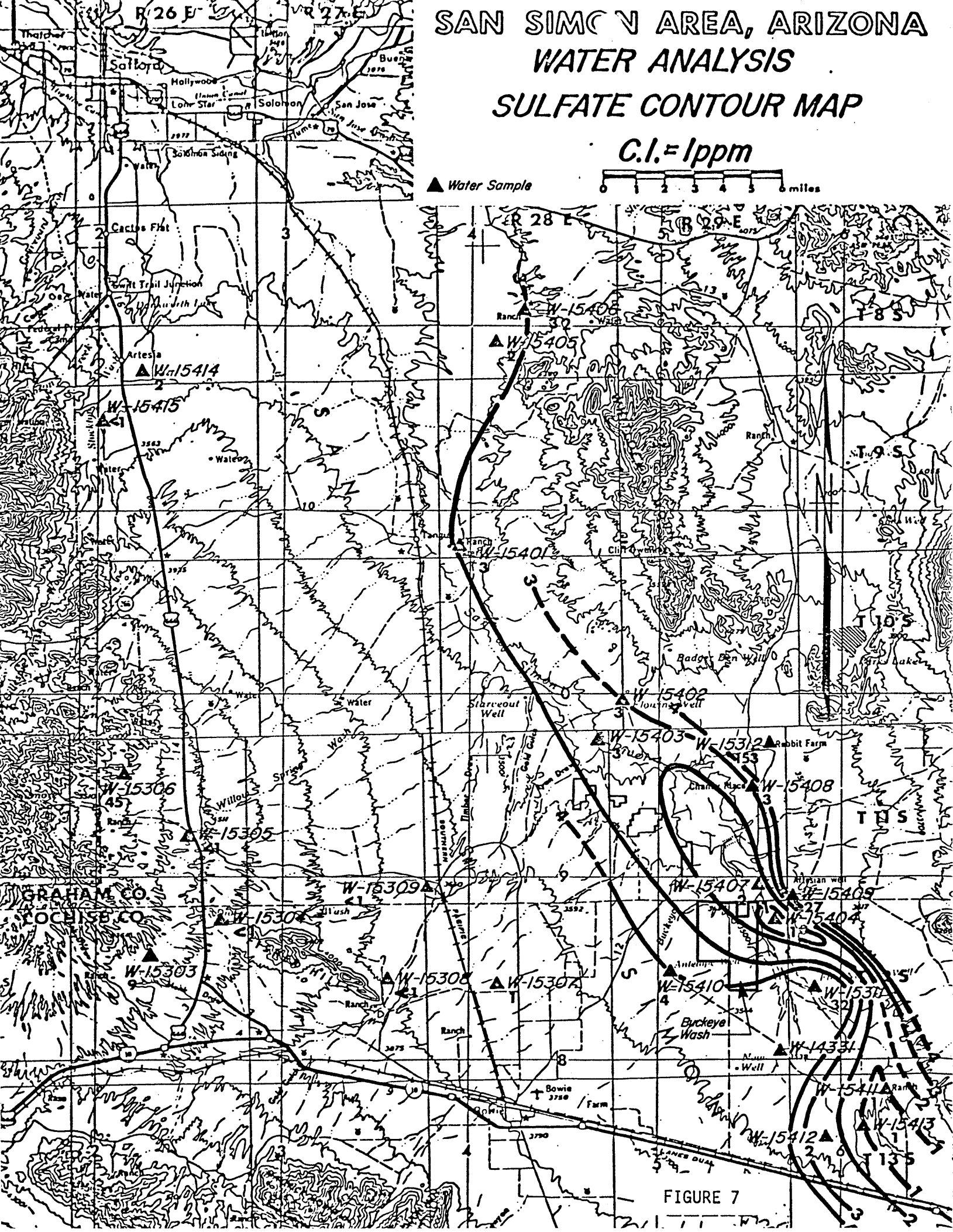


FIGURE 7

SAN SIMON AREA, ARIZONA
WATER ANALYSIS
CHLORIDE CONTOUR MAP

C.I.=50ppm

▲ Water Sample

0 1 2 3 4 5 6 miles

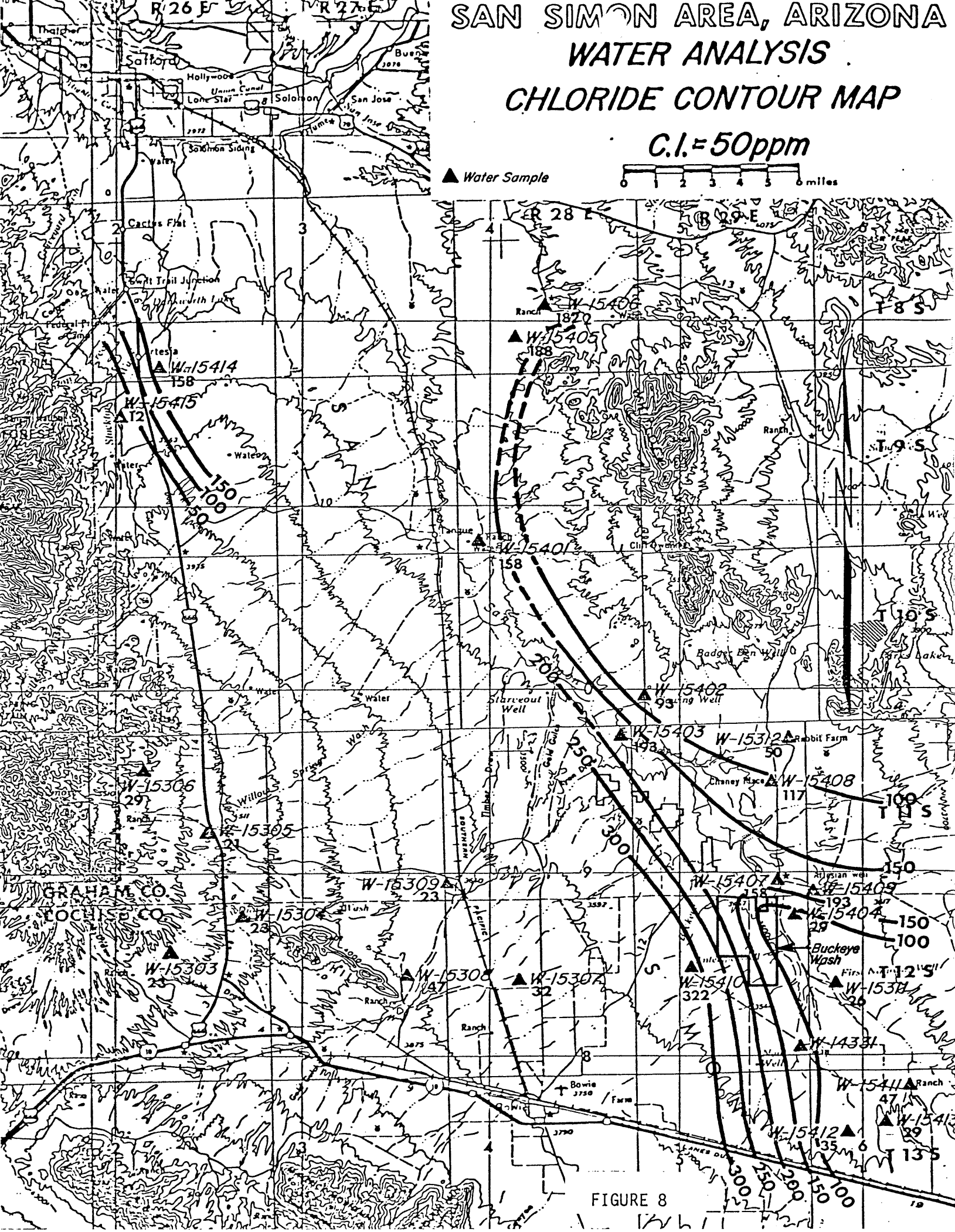


FIGURE 8

SAN SIMON AREA, ARIZONA
WATER ANALYSIS
LITHIUM CONTOUR MAP
C.I.=100ppb

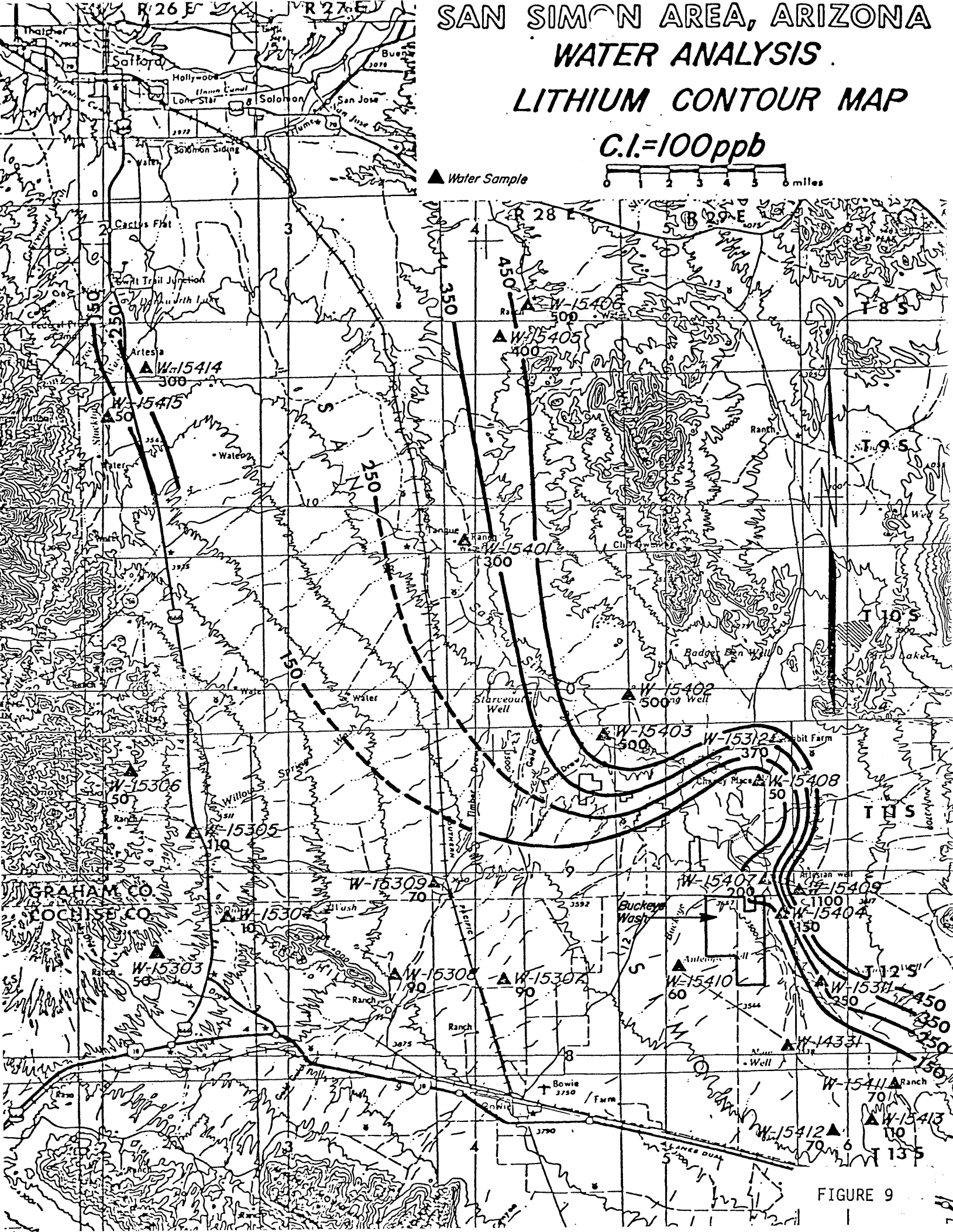


FIGURE 9

SAN SIMON AREA, ARIZONA
WATER ANALYSIS
URANIUM MAP
(ppb)

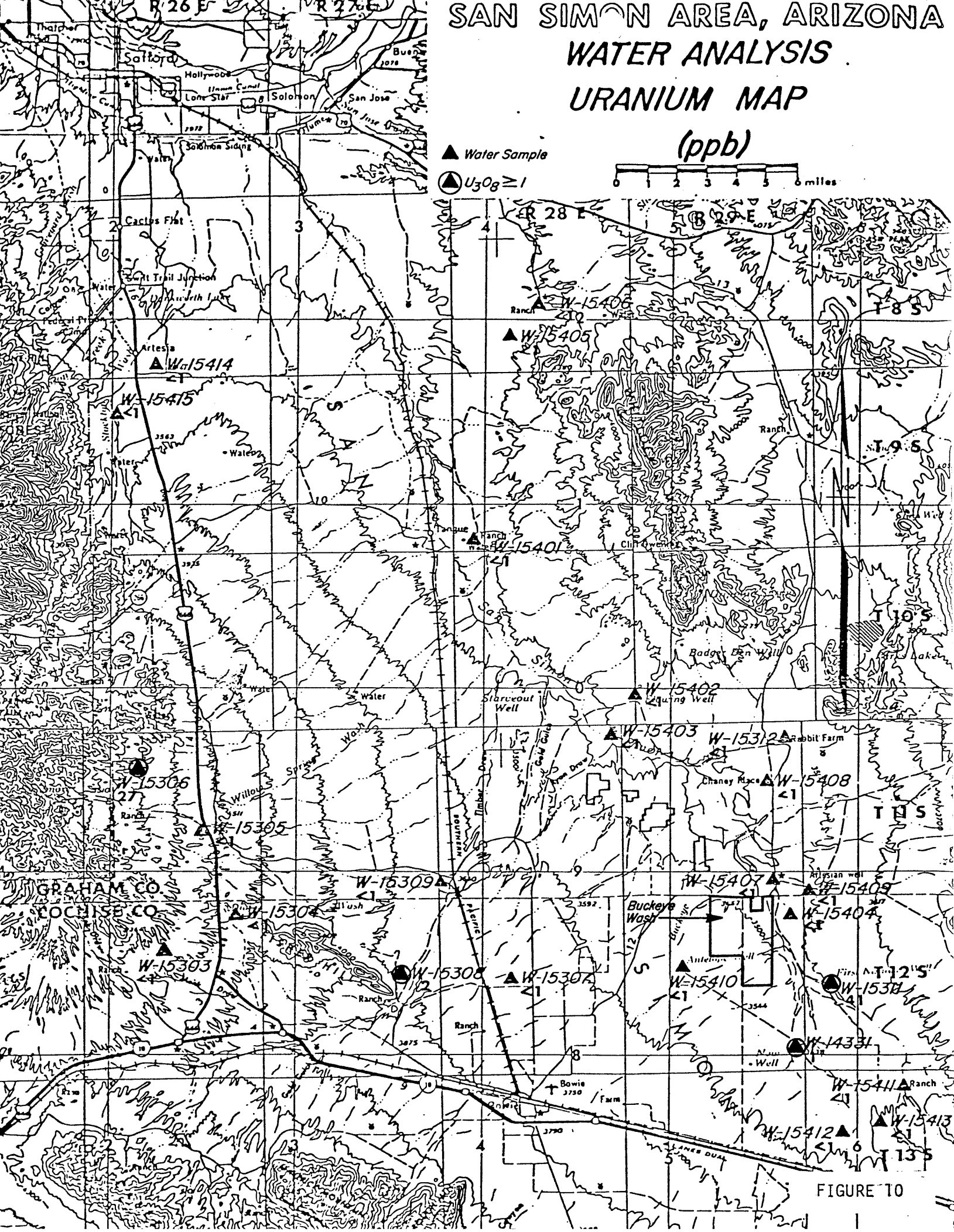


FIGURE 10

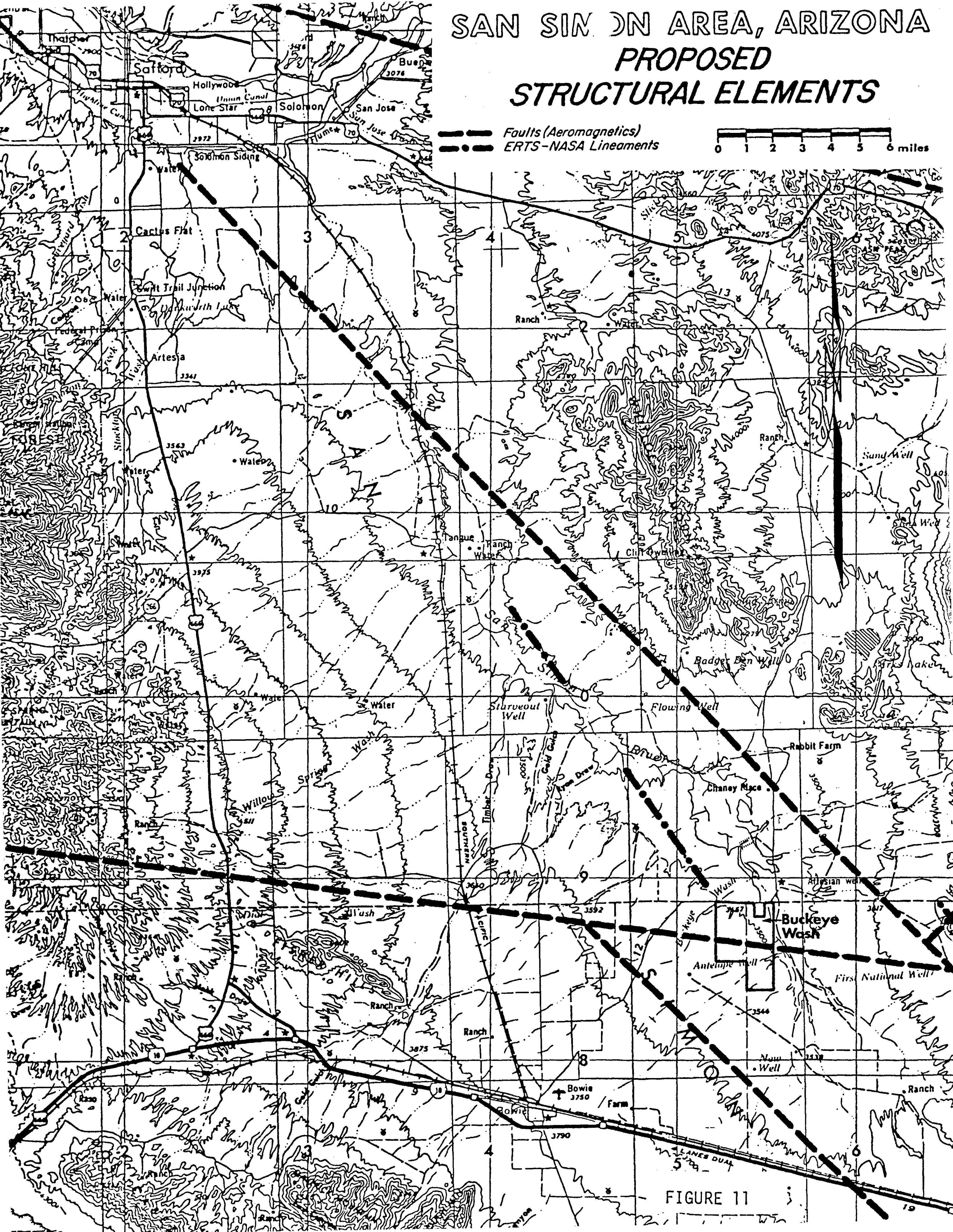

SAN SIMON AREA, ARIZONA
PROPOSED
STRUCTURAL ELEMENTS
Faults (Aeromagnetics)
ERTS-NASA Lineaments
0 1 2 3 4 5 6 miles
Thatcher
Safford
Hollywood
Lone Star
Solomon
San Jose
Solomon Siding
Cactus Flat
Swift Trail Junction
Artesia
Ranch
Water
Tanque
Badger Den Well
Starveout Well
Flowing Well
Rabbit Farm
Cheney Place
Artesian well
Buckeye Wash
Antelope Well
First National Well
New Well
Bowie
Farm
Sand Well

FIGURE 11

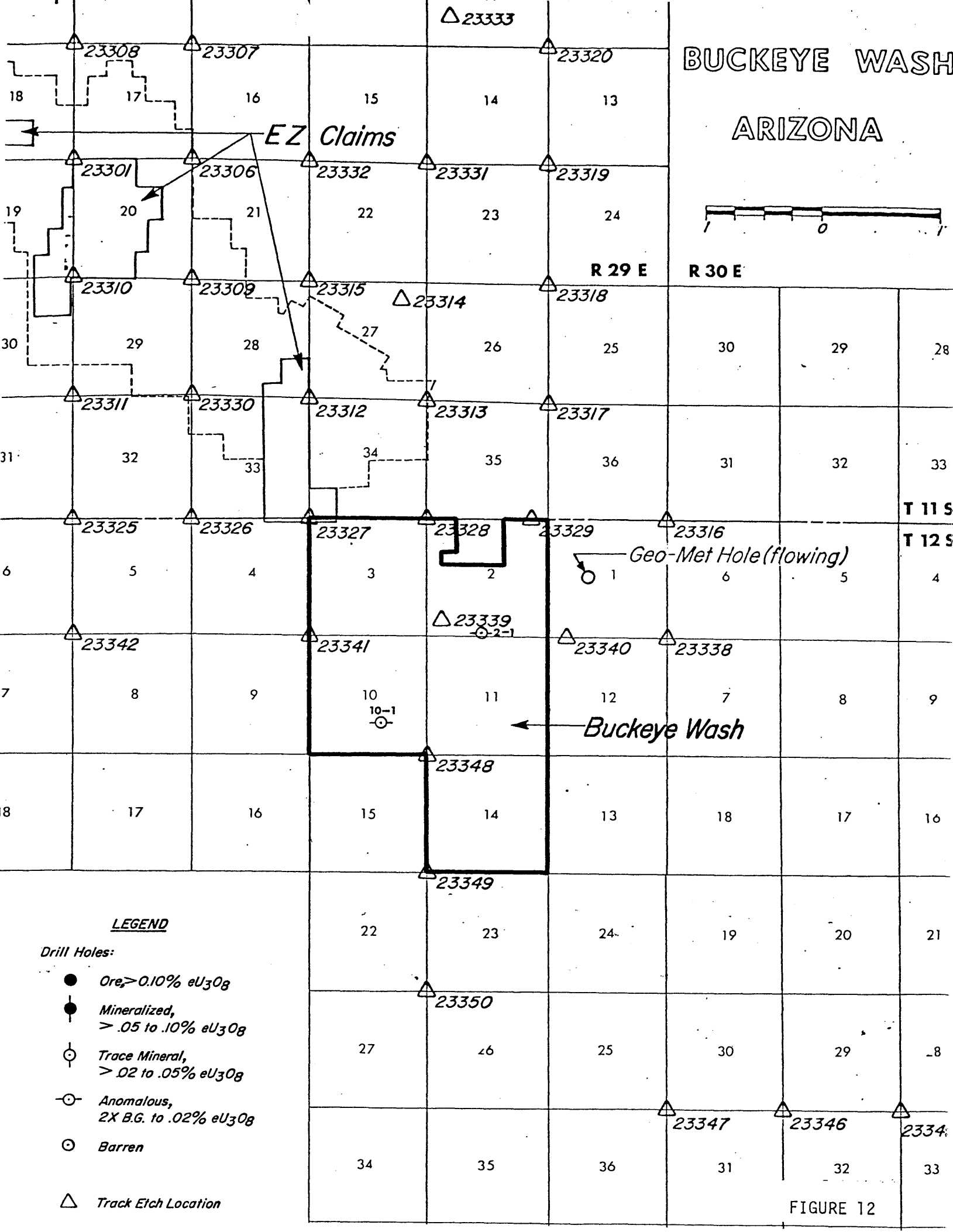

BUCKEYE WASH
ARIZONA
EZ Claims
Geo-Met Hole (flowing)
Buckeye Wash
R 29 E
R 30 E
T 11 S
T 12 S
23333
23308
23307
23320
23301
23306
23332
23331
23319
23310
23309
23315
23314
23318
23311
23330
23312
23313
23317
23325
23326
23327
23328
23329
23316
23339
23342
23341
23340
23338
23348
23349
23350
23347
23346
LEGEND
Drill Holes:
Ore, >0.10% eU3O8
Mineralized, > .05 to .10% eU3O8
Trace Mineral, > .02 to .05% eU3O8
Anomalous, 2X B.G. to .02% eU3O8
Barren
Track Etch Location

FIGURE 12

UC 149-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METAL DIVISION • 1820 SAN PEDRO N.E., SUITE 11, ALBUQUERQUE, NEW MEXICO 87110

To (Name) Record
Division Metals
Location

Date August 2, 1977

Originating Dept. J.P. Lastra

Answering letter date

Copy to W.A. Street

Subject Longyear Invoice 1344
Buckeye Wash, Arizona

Buckeye Wash, Arizona

Hole No: 2-12-29-1 (Partial) and 10-12-29-1

Driller: Longyear Company

Listed below are those items and/or charges in question with respect to Longyear Invoice 1344:

1) No documentation was received to reflect the use of 2 bags of Cal-Seal on hole 2-12-29-1. No mention is made in the Daily Drill Reports concerning the use of this material. Therefore, this item must be omitted until documentation is provided.

2) Original Daily Drill Reports show 85 total hours for the water truck drivers and not the 91 hours shown on the invoice. On the June 2nd original Drill Report no hours are shown for D. Wilson; however, on the invoice copy of the drill report 5 hours are shown for Wilson. Charges must be made in accordance with the original drill reports.

Subject: Longyear Invoice 1344
Buckeye Wash, Arizona

3) Amount credited on hourly rate charges was adjusted prior to payment of Invoice 1160. Therefore, no credit should be made on Invoice 1344.

4) All reaming charges are at an hourly rate of $60/Hr. and present contract information does not include additional $1.00/ft. charges. Therefore, the additional $1.00/ft. reaming charge has been deleted from this invoice.

INVOICE
1344

Longyear

LONGYEAR COMPANY
General Offices: 925 Delaware Street S. E.
Minneapolis, Minnesota 55414, USA
Box 1368, Minneapolis, Minnesota 55440, USA
Telephone (612) 331-1331

11 July 1977
Union Carbide Corp.
PO Box 1029
Grand Junction
CO 81501

RECEIVED AUG 3 1977 Albuquerque Office

TERMS: PAYMENT DUE ON OR BEFORE

31 July 1977

Exploratory drill ng carried out during June 1977 in vicinity of Bowie, AZ as per our agreement dated May 20, 1977
We hereby certify that the work covered by this invoice was performed in compliance with all requirements of the Fair Labor Standards Act of 1938, as amended.

Footage drilled or reamed	(see attached) Item #4	15318.00	$15,529.00
Hourly rate charge	" " Item #3	1610.00	1,480.00
Supplies used	" " Item #1	1421.47	1,464.22
AZ state sales tax 5% of 1,464.22	of 1421.47	71.07	73.21
Handling charge for supplies 10% of 655.72	of 612.97 57.10	61.30 60.82	65.57
Water truck rental 1 - 6 days @ 16.67		100.02	100.02
Water truck rental 1 - 6 days @ 26.67		160.02	160.02
Water truck miles 342 miles @ .30¢ per mile		102.60	102.60
Water truck driver hours 91 hrs @ 9.25	Item #2 85 hrs @ 9.25	786.25	841.75
Demobilization 1 rotary rig		640.00	640.00
Revised total J.P. Lastra OK for Payment		20270.25	$20,456.39

LONGYEAR COMPANY
"FOOTAGE DRILLED OR REAMED"

Month June, 1977 Contract Bonie R

Hole No.	Bit Size	DRILLING: Non-Core	Over-burden	Diamond	Reaming	FOOTAGE SUMMARY: From	To	Footage	Rate Per Foot	Amount
10-12-29-1	5 5/8	X				0	105	105	6.95	729.75
(4) ✓	7 7/8				X	0	105	105	1.00	105.00
✓	5 5/8-5 1/4	X				105	500	395	6.95	2745.25
✓	5 1/4	✓				500	1000	500	7.25	3625.00
✓	✓	X				1000	1500	500	7.75	3875.00
✓	✓	✓				1500	2000	500	8.60	4300.00
✓	✓	✓				2000	2005	5	8.60	43.00
(4) 2-12-29-1	7 7/8				X	0	106	106	1.00	106.00
						5105	7110	2005		15,318 Rec-[illegible]
TOTAL:							2005			15,529.00

HOURLY RATE CHARGE
LONGYEAR COMPANY

MONTH June, 19 77

CONTRACT Bowie R

Hole No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Price	Amount
-12-29-1	Moving	1																															1	45.00	45.00
	Reaming		5																														5	60.00	300.00
	Cementing		1				1																										2	55.00	110.00
	Coring		8																														8	45.00	360.00
	Hole Ring					4	8																										12	55.00	660.00
	Survey						3																										3	45.00	135.00
																																			1610.00
-7-77	[illegible]	[illegible]																							13			[illegible]					13	10.00	130.00
(3)		(45.00/hr. - Stand by 45.00/hr. - Credit 10.00/hr.)																																	
																																	Revised JPL	1610.00
Total																																			1480.00

MONTH June, 1922

SUPPLIES USED
LONGYEAR COMPANY

CONTRACT Bowie R'

Hole No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Price	Amount
12-29-1	Cement	10																															10	4.10	41.00
12-29-1	QuikGel	6																															6	4.50	27.00
	Cement		10				10																										20	4.39	87.8
	CC-16			2	2	1																											5	19.07	95.35
	Dextrid			1		1																											2	49.94	99.88
	SodaAsh				1																												1	16.69	16.69
	Cellex				1	1																											2	120.23	240.46
12-29-1	Cal-Seal		(1)																														2	21.16	42.32
																																	Revised	608.18	650.50
																				1% Surcharge on 521.70													Revised 5%	4.79	5.22
																													479.38					612.97	655.72
12-29-1	Casing - 7"																																105'	7.70	808.50
																																		Revised	1421.47
Total																																			1464.22

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT

Contract: Bowie R Date: 6-1 (MONTH DAY) 19 77 Drill 15W (TYPE) 1142 (DRILL NO.) 1 (TRUCK NO.)

Location: Bowie AZ. Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	~~[illegible]~~			5 5/8	0							
	10-12-29-1											
Aft B				5 5/8	0	105						
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling		4	
Handling Rod (bit)	4		
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole	1		
Rigging Up - Rigging Down	3		
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		gel		6	

OTHER

Water hauling 68 miles 3 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Laursen	8	R. Padilla	11
B	R. Rock Hill	8	D. Bridges	8		
C						

Remarks: Laydown pipe - Move - Rigup (A)
Drill to 105' (B)
Please [illegible]

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-2-77 19 (MONTH DAY) Drill: 15W (TYPE) / 1142 (DRILL NO.) / (TRUCK NO.)

Location: Bowie Az Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	17-17-29-1			7 7/8	0	105			105		7"	105
Aft B					105							
Nite C					105	320			215			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	2		8
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing	(5)		
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods	(1)		
- Prep Hole & Grout		(8)	
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland	94#		10		
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling 24 miles 3 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #
Bit changes: Size Serial # Depth
(Include first bit in hole)

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs
A	S. WILSON	8	S. JAUREGUI	8	R PADILLA	8
B	B. HEALTH	8	B. W. HEALTH	8	(2)	
C	R ROCKHILL	8	R. BRIDGES	8		

Remarks: REAM TO 105 place 1 CEMENT CASING

Daily Drill Report from original copy supplied at drill site

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-2-77 (MONTH DAY) 19 Drill 15W (TYPE) / 1142 (DRILL NO.) / (TRUCK NO.)

Location: Bowie Az Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	10-17-29-7			7 7/8	0	105			105		7"	105
Aft B					105							
Nite C					105	320			215			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	2		8
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (0 to 105)			
Casing — Placing	5		
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods	1		
- Prep Hole & Grout			
- Setting		8	
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland	94#	5x	10		
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling 24 miles 3 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Jaursen	8	R. Padilla	8
B	B. Healty	8	B.W. Healty	8	D. Wilson	5
C	R. Rosthill	8	B. Bridges	8		

Remarks: Ream to 105 place & cement casing
D. Wilson 5 hrs

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie P Date: 6-3- 19 77 Drill 15SW 1142 1
MONTH DAY TYPE DRILL NO. TRUCK NO.

Location: Bowie AZ Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Core Recovered	Total Casing in Hole: Size	Footage
Day A	2 5-12-2	4-7		5 5/8	320	495			175			
Aft B				5 1/8	495				160			
Nite C				1495	995				340			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	5	6	7
Handling Rod (bit)		1	1
Rock Bit - Overburden			
Reaming (to)			
Casing – Placing			
– Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud	2	1	
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Equip Repair	1		
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		CC-16	2		
		Dextrod	1		

OTHER

Water hauling 80 miles 8 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description
Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Jansen	8	R. Padilla	8
B	B. Health	8	Bub Health	8	D. Wilson	8
C	R. Rock hill	8	B. Bridges	8		

Remarks:

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R. Date: 6-4-71 (MONTH DAY) 19 Drill: 15H (TYPE) 1 (DRILL NO.) 1 (TRUCK NO.)

Location: Bowie Az. Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	7-12-29-1			5 1/8	995	1330			335			
Aft B					1330	1440			110			
Nite C					1440	1535			95			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	7	5	5
Handling Rod (bit)		3	
Rock Bit - Overburden			
Reaming (to)			
Casing – Placing			
– Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
equip. repair	1		3
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		Soda ash	1		
		CC-16	2		
		Celle x	1		

OTHER

Water hauling 100 miles 10 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth
5 1/8	27110	1330

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Laursen	8	R. Padilla	8
B	S. Health	8	B.W. Health	8	O. Wilson Jr.	8 10
C	R. Rockhill	8	R. Bridges	8		

Remarks:
(8) pull back 400' pump repair

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie 13 Date: 6-5-19 77 Drill 15W / 11112 /
MONTH DAY TYPE DRILL NO. TRUCK NO.

Location: Bowie AZ. Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Core Recovered	Total Casing in Hole: Size	Footage
Day A	10-12-29-1			5 7/8	1535	1705			170			
Aft B	10-12-29-1			5 7/8	1705	1930			225			
Nite C	10-12-21-1			5 7/8	1930	2005			75			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	4	7	4
Handling Rod (bit)	2		
Rock Bit - Overburden			
Reaming (to)			
Casing – Placing			
– Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, ~~Lost Circulation~~			(4)
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Pump Repair	2		
		1	
Pump			
Total Hours	8	8	8
Driller's Initials		BH	RPR

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		Cellex	1		
		CC-16	1		
		Dexpred	1		

OTHER

Water hauling 50 miles 5 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth
5 7/8		1535

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Lawson	8	R. Padilla	8
B	Bob Health	8	B.W. Health	8	D. Wilson	8
C	Riley P. Rockhill	8	Brian Brinsen	8		

Remarks: A. Repair pump 2 hrs
C- TD 2005' mix mud, circ. & cond hole 7 hrs

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-6- (MONTH DAY) 19 77 Drill 15W (TYPE) 1142 (DRILL NO.) 1 (TRUCK NO.)

Location: Bowie - 92 Foreman's Signature: Stan Wilson

1-10 29-1

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	10-12-29		1	5½x	200	5 - t.d						
Aft B												
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling			
Handling Rod (bit)		2	
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods		(1)	
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down		2	
Mix Mud			
Condition Hole, Lost Circulation	(8)		
Surveying, Inclination Test		(5)	
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland		Cement	10		
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling 20 miles 2 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description

Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Larson	8	R. Dallia	
B		8	[illegible]	8	K. [illegible]	
C						

Remarks: (A) Short trip to condition hole [illegible] — Cleaning hole [illegible] to 110' to surface

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie P Date: 6-7 (MONTH DAY) 19 77 Drill 15W / 1142 / (TYPE / DRILL NO. / TRUCK NO.)

Location: Bowie AZ Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	~~1-10 24~~											
Aft B												
			DEMOBILIZATION									
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling			
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (to)			
Casing – Placing			
– Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization	10	10	
Other (Explain)			
Total Hours	10	10	
Driller's Initials			

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling _____ miles _____ loads
Core boxes: _____ size/ _____ no.
Length of waterline: _____
Lost tools: Description _____

Lost bits: Size _____ Serial no. _____
Depth: _____ ft. Hole # _____
Casing lost or left in hole: Size _____ ft. _____
for Client _____ Hole # _____
Longco _____ Hole # _____

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	10	Steve Thompson	10	[illegible]	[illegible]
B	B. Heath	10	Brian Bridges	10		
C			B. W. Heath	10		

Remarks: Mobilization - Bowie AZ to [illegible]

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-10-77 19 ___ Drill 15 W 1 1142 1
MONTH DAY TYPE DRILL NO. TRUCK NO.

Location: Bowie AZ Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A												
Aft B												
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling			
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours			
Driller's Initials			

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling ___ miles ___ loads
Core boxes: ___ size/ ___ no.
Length of waterline: ___
Lost tools: Description ___

Lost bits: Size ___ Serial no. ___
Depth: ___ ft. Hole # ___
Casing lost or left in hole: Size ___ ft. ___
for Client ___ Hole # ___
Longco ___ Hole # ___

Bit changes: (Include first bit in hole)

Size	Serial #	Depth

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	Swilson	8	[illegible]	4		
B	B. Heath	4	B. W. Heath	4		
C						

Remarks: Make Rig Free Tucson AZ To Johnson [illegible]

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

MPLS. OFFICE

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-1 (MONTH / DAY) 19 77 Drill 15W (TYPE) / 1142 (DRILL NO.) / (TRUCK NO.)

Location: Bowie AZ. Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	10-12-29-2			5 5/8	0							
	10-12-29-1											
Aft B				5 5/8	0	105						
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling		8	
Handling Rod (bit)	4		
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole	1		
Rigging Up - Rigging Down	3		
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8		
Driller's Initials	SW		

Supplies Consumed

Description	Product Name	Size	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud		50#			
Mud		100#			
Other (Describe)	gel			6	

OTHER

Water hauling 68 miles 3 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description
Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #
Bit changes: Size Serial # Depth
(Include first bit)
Other:

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Iaurson	8	R. Padilla	11
B	R. Rock Hill	8	D. Bridges	8		
C						

Remarks: Laydown pipe - Move - Rigup (A)
Drill to 105' (D)
Plug # 10-12-29-1 Cement @ 110' filled to Surface

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-2-77 (MONTH DAY) 19 ___ Drill 15W (TYPE) / 1142 (DRILL NO.) / (TRUCK NO.)

Location: Bowie Az Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Core Recovered	Total Casing in Hole: Size	Footage
Day A	10-17-29-1			7 7/8	0	105			105		7"	105
Aft B					105							
Nite C					105	320			215			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	2	8	
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing	5		
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods	1		
- Prep Hole & Grout			
- Setting		8	
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Product Name	Day	Aft.	Nite
Description / Size	Number of Units		
Portland 94#	10		
Lumnite			
Calseal			
Mud 50#			
Mud 100#			
Other (Describe)			

OTHER

Water hauling 24 miles 3 loads

Core boxes: size/ no.

Length of waterline:

Lost tools: Description

Lost bits: Size Serial no.

Depth: ft. Hole #

Casing lost or left in hole: Size ft.

for Client Hole #

Longco Hole #

Bit changes: Size Serial # Depth

(Include first bit in hole)

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Jaursen	8	R. Padilla	8
B	B. W. Healty	8	B. W. Healty	8		
C	R Rock Hill	8	R Bridges	8		

Remarks: Ream to 105 place 1 cement casing

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie P Date: 6-3- 19 77 Drill 15W / 1142 /
MONTH DAY TYPE DRILL NO. TRUCK NO.

Location: Bowie Az. Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Core Recovered	Total Casing in Hole: Size	Footage
Day A	10-12-29	-7		5 7/8	320	495			175			
Aft B				5 7/8	495				160			
Nite C				495	995				340			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	5	6	7
Handling Rod (bit)			
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud	2		
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Product Size	Product Name	Day	Aft.	Nite
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		CC-16	2		
		Dexted	1		

OTHER

Water hauling 80 miles 8 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description
Lost bits: Size Serial no. Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #
Bit changes: Size Serial # Depth
(Include first bit in hole)

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Jaursen	8	R. Padilla	8
B	R. Health	8	R.W. Health	8	D. Wilson	8
C	R Rock hill	8	R. Bridges	8		

Remarks:

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R. Date: 6-4-77 (MONTH DAY) 19 ___ Drill: 15W (TYPE) 1142 (DRILL NO.) 1 (TRUCK NO.)

Location: Bowie Az. Foreman's Signature: [signature]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	13-11-29-1			5/8	995	1330			335			
Aft B					1330	1440			110			
Nite C					1440	1535			95			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	7	5	5
Handling Rod (bit)		3	
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, Lost Circulation			
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
equip. Repair	1	3	
Total Hours	8	8	8
Driller's Initials	SW		

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
		Soda ash	1		
		CC-16	2		
		Celtex	1		

OTHER

Water hauling 100 miles 10 loads

Core boxes: size/ no.

Length of waterline:

Lost tools: Description

Lost bits: Size Serial no.

Depth: ft. Hole #

Casing lost or left in hole: Size ft.

for Client Hole #

Longco Hole #

Bit changes: (Include first bit in hole) Size 5/8 Serial # 7210 Depth 1330

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Laursen	8	R. Padilla	8
B	B. Health	8	B.W. Health	8	O. Wilson Jr.	10
C	R. Rock hill	8	R. Bridges	8		

Remarks: (5) pullback 400' pump Repair

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R Date: 6-5-19 77 Drill 15W 1 1142 1
MONTH DAY TYPE DRILL NO. TRUCK NO.

Location: Bowie Az. Foreman's Signature: [illegible]

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Core Recovered	Total Casing in Hole: Size	Footage
Day A	10-12-29-1			5 1/8	1535	1705			170			
Aft B	10-12-29-1			5 1/8	1705	1930			225			
Nite C	10-12-29-1			5 1/8	1930	2005			75			

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling	4	7	4
Handling Rod (bit)	2		
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods			
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down			
Mix Mud			
Condition Hole, ~~Lost Circulation~~			(4)
Surveying, Inclination Test			
Mobilization/Demobilization			
Other (Explain)			
Equip. Repair	2	7	
Pump			
Total Hours		8	
Driller's Initials		BH	RR

Supplies Consumed: Description	Product Name	Size	Day	Aft.	Nite
			Number of Units		
Portland					
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					
	Cellex		1		
	CC-16		1		
	Dextrid		1		

OTHER
Water hauling 58 miles 5 loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description
Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft
for Client Hole #
Longco Hole #
Bit changes: Size Serial # Depth
(Include first bit in hole) 5 1/8 1535

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	S. Larson	8	R. Padilla	8
B	Bob Heath	8	B.W. Heath	8	D. Wilson	8
C	Riley D. Rockhill	8	Brian Briggs	8		

Remarks: A. Repair pump. 2 hrs
C- TD 2005' mix mud, circ. & cond hole 7 hrs

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

LONGYEAR COMPANY
Contracting Division
General Office
Minneapolis, Minnesota 55414

"DAILY DRILL REPORT"

Contract: Bowie R. Date: 6-6- (MONTH DAY) 19 77 Drill 15W (TYPE) / 1142 (DRILL NO.) / (TRUCK NO.)

Location: Bowie - AZ. Foreman's Signature: Stan Wilson

Shift	Hole No.	Angle	Material Drilled	Bit Size & Type	Footage Summary: Drilling From	Drilling To	Reaming From	Reaming To	Feet: Drilled or Reamed	Feet: Core Recovered	Total Casing in Hole: Size	Total Casing in Hole: Footage
Day A	10-12-29-			5 1/8.	200	5 - T.D.						
Aft B												
Nite C												

Hourly Distribution	Day	Aft.	Nite
Core Drilling			
Handling Rod (change bit)			
Overburden - rock bit			
Collaring Hole - Dia. bit			
Rotary Drilling			
Handling Rod (bit)		2	
Rock Bit - Overburden			
Reaming (to)			
Casing — Placing			
— Pulling			
Delays - Client Acct.			
Cementing - Handling Rods		1	
- Prep Hole & Grout			
- Setting			
- Drilling			
Moving - Hole to Hole			
Rigging Up - Rigging Down		2	
Mix Mud			
Condition Hole, Lost Circulation	8		
Surveying, Inclination Test		3	
Mobilization/Demobilization			
Other (Explain)			
Total Hours	8	8	
Driller's Initials			

Supplies Consumed

Description	Size	Product Name	Day	Aft.	Nite
Portland		Cement	10		
Lumnite					
Calseal					
Mud	50#				
Mud	100#				
Other (Describe)					

OTHER

Water hauling miles loads
Core boxes: size/ no.
Length of waterline:
Lost tools: Description
Lost bits: Size Serial no.
Depth: ft. Hole #
Casing lost or left in hole: Size ft.
for Client Hole #
Longco Hole #
Bit changes: Size Serial # Depth
(Include first bit in hole)

Shift	DRILLERS	Hrs.	HELPERS	Hrs.	TRUCK DRIVERS	Hrs.
A	S. Wilson	8	B. Lawrsen	8	R. Dallia	8
B					R. Wilson	8
C						

Remarks: (A) Short trip to condition hole Circulate hole waiting for logger — Standby while logging Cement hole 110' to Surface

NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

CLIENT

DRILL HOLE SUMMARY

PROJECT Buckeye Wash DRILL HOLE NO. 10-12-29-1

Location Sec. 10 T 12S R 29E T.D. 2005'

County Cochise Date completed 6/6/77

State Arizona Collar Elev. Surveyed ____ Estimated 3520

- ☐ Barren
- ☑ Trace Mineral < 0.02 eU_3O_8
- ☐ Mineralized 0.02-0.10 eU_3O_8
- ☐ Ore > 0.10 eU_3O_8

U_3O_8 Assay

Assay No.	Interval	U_3O_8

U_3O_8 Mineralization

Interval Top	Bottom	Thickness	eU_3O_8
1461	1488	27	2 x Bkgd.

Observations and Pertinent Lithologic Descriptions of OBSS Unit

Include Formation name, interval, thickness, summary of lithologic description i.e., rock type, color, alteration, heavy minerals; opinion of favorability.

0 - 830 Gn + Bn mudstone

830 - 1330 Rd Bn gravels + course sand - subangular

1330 - 1461 sand Bn Bk medium grained

1461 - 1488 sand Bn Bk fine grained

1488 - 1586 sand Bn Bk medium grained

1586 - 1701 tuffaceous fine grained sand

1701 - 1930 Rd Bn gravels + course sand - subangular

1930 - 2005' sand Bn Bk course grained

Heavy Minerals

HOLE NO. 10-12-27-1

PROP. NO. 2578

DATE _____

SHEET 1 OF 3

INTERVAL	CONGLOMERATE	SANDSTONE	SILTSTONE	SHALE	MUDSTONE, CLAY	LIGHT	DARK	WHITE	GRAY	TAN	YELLOW	PINK	ORANGE	BROWN	RED	BLUE	GREEN	BLUE-GREEN	YELLOW-BROWN	RED-BROWN	PURPLE	BLACK	COURSE-GRAINED	MEDIUM-GRAINED	FINE-GRAINED	ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED	ABUNDANT	SPARSE	FRESH	PYRITE, MASSIVE	PYRITE, XTLS.	TARNISH, ETCHED	MAGNETITE	CARBON	ARKOSIC	QUARTZOSE	TUFF, TUFFACEOUS	INTERBEDDED	ALTERED	LIMONITIC	HEMATITIC	REDUCED	OXIDIZED
0 TO 40	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
40 TO 100	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP clusters	TE	MG	C	AK	QT	TF	IB	AL	LI	HE Abu.	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1200 TO 1340	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	small xtls. clusters	TE	MG Abundant	C	AK	QT	TF	IB	AL	LI	HE slight	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1340 TO 1360	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP clusters	TE	MG	C	AK	QT	TF	IB	AL	LI	HE very slight	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1360 TO 1400	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP clusters	TE	MG Abundant	C	AK	QT	TF	IB	AL	LI	HE slight	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1400 TO 1500	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	xtals + clusters	TE	MG Abundant	C	AK	QT	TF	IB	AL	LI	HE slight	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1440 TO 1500	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	xtals + clusters	TE	MG Abundant	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1500 TO 1570	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	xtals + clusters	TE	MG Abundant	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1570 TO 1620	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP clusters	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1620 TO 1700	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP small clusters	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1700 TO 1740	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	small clusters + xtals	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX

HOLE NO. 10-12-29-1

PROP. NO. 2578

DATE _____

SHEET 2 OF 2

INTERVAL	CONGLOMERATE	SANDSTONE	SILTSTONE	SHALE	MUDSTONE, CLAY	LIGHT	DARK	WHITE	GRAY	TAN	YELLOW	PINK	ORANGE	BROWN	RED	BLUE	GREEN	BLUE-GREEN	YELLOW-BROWN	RED-BROWN	PURPLE	BLACK	COURSE-GRAINED	MEDIUM-GRAINED	FINE-GRAINED	ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED	ABUNDANT	SPARSE	FRESH	PYRITE, MASSIVE	PYRITE, XTLS.	TARNISH, ETCHED	MAGNETITE	CARBON	ARKOSIC	QUARTZOSE	TUFF, TUFFACEOUS	INTERBEDDED	ALTERED	LIMONITIC	HEMATITIC	REDUCED	OXIDIZED
1740 TO 1800	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TP	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	[illegible]	[illegible]
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
____TO____	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX

HOLE NO. 10-12-29-2

PROP. NO. 2578

DATE 2/14/78

SHEET 1 OF 3

INTERVAL	CONGLOMERATE	SANDSTONE	SILTSTONE	SHALE	MUDSTONE, CLAY	LIGHT	DARK	WHITE	GRAY	TAN	YELLOW	PINK	ORANGE	BROWN	RED	BLUE	GREEN	BLUE-GREEN	YELLOW-BROWN	RED-BROWN	PURPLE	BLACK	COURSE-GRAINED	MEDIUM-GRAINED	FINE-GRAINED	ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED	ABUNDANT	SPARSE	FRESH	PYRITE, MASSIVE	PYRITE, XTLS.	TARNISH, ETCHED	MAGNETITE	CARBON	ARKOSIC	QUARTZOSE	TUFF, TUFFACEOUS	INTERBEDDED	ALTERED	LIMONITIC	HEMATITIC	REDUCED	OXIDIZED
0 TO 10	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
10 TO 15	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
15 TO 40	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
40 TO 50	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
50 TO 60	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	slight LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
60 TO 70	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
70 TO 85	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
85 TO 100	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
						zeolite Fragments																																								
100 TO 310	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
310 TO 330	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
330 TO 370	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
370 TO 665	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX

HOLE NO. 10-12-29-2

PROP. NO. 2578

DATE 2/15/78

SHEET 2 OF 3

INTERVAL	CONGLOMERATE	SANDSTONE	SILTSTONE	SHALE	MUDSTONE, CLAY	LIGHT	DARK	WHITE	GRAY	TAN	YELLOW	PINK	ORANGE	BROWN	RED	BLUE	GREEN	BLUE-GREEN	YELLOW-BROWN	RED-BROWN	PURPLE	BLACK	COURSE-GRAINED	MEDIUM-GRAINED	FINE-GRAINED	ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED	ABUNDANT	SPARSE	FRESH	PYRITE, MASSIVE	PYRITE, XTLS.	TARNISH, ETCHED	MAGNETITE	CARBON	ARKOSIC	QUARTZOSE	TUFF, TUFFACEOUS	INTERBEDDED	ALTERED	LIMONITIC	HEMATITIC	REDUCED	OXIDIZED
665 TO 805	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
805 TO 885	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
885 TO 930	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
930 TO 1010	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1010 TO 1020	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1020 TO 1080	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1080 TO 1090	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1090 TO 1240	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1240 TO 1250	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1250 TO 1300	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1300 TO 1400	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1400 TO 1420	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX

HOLE NO. 10-12-29-2

PROP. NO. 2578

DATE 2/16/78

SHEET 3 OF 3

INTERVAL	CONGLOMERATE	SANDSTONE	SILTSTONE	SHALE	MUDSTONE, CLAY	LIGHT	DARK	WHITE	GRAY	TAN	YELLOW	PINK	ORANGE	BROWN	RED	BLUE	GREEN	BLUE-GREEN	YELLOW-BROWN	RED-BROWN	PURPLE	BLACK	COURSE-GRAINED	MEDIUM-GRAINED	FINE-GRAINED	ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED	ABUNDANT	SPARSE	FRESH	PYRITE, MASSIVE	PYRITE, XTLS.	TARNISH, ETCHED	MAGNETITE	CARBON	ARKOSIC	QUARTZOSE	TUFF, TUFFACEOUS	INTERBEDDED	ALTERED	LIMONITIC	HEMATITIC	REDUCED	OXIDIZED
1420 TO 1470	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1470 TO 1600	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1600 TO 1700	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1700 TO 1750	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
1750 TO 1780	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
___ TO ___	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX
	CO	SS	ST	SH	MS	L	D	WH	GY	TN	YW	PK	OR	BN	RD	BL	GN	BG	YB	RB	PP	BK	CG	MG	FG	AN	SA	SR	R	AB	SP	FR	MP	XP	TE	MG	C	AK	QT	TF	IB	AL	LI	HE	RE	OX

Rhyolitic Frag

Rhyolitic Frag

Rhyolitic Frag

Rhyolitic Frag