

FINAL REPORT
GOVERNMENT CANYON EXAMINATION, UTAH

WILLIAM M. SHEPARD

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SUMMARY AND CONCLUSIONS

SUMMARY

The Government Canyon Examination area is located approximately 6 miles south of the Burgin shaft in Utah County, Utah.

Bear Creek geologists first visited Government Canyon in 1955 after the alteration in the area had been brought to our attention by geologists of the U. S. Geological Survey. Further attention was called to Government Canyon as a result of a report compiled by D. R. Cook at the Coordinating Unit of Bear Creek in 1958.

An alteration map of the area was made in 1956, and a geologic map in 1961. These studies were coordinated, insofar as possible, with East Tintic and Southwest Tintic work.

A total of 50 lode mining claims were staked in Government Canyon in 1958 and early 1959, and unsuccessful negotiations were conducted with J. A. Sylvester and associates, holders of ground to the east of our claims, during the spring of 1959. As of July, 1962, all or part of 35 of our unpatented claims were still valid.

An aeromagnetic survey was flown as a part of a larger survey of most of the East Tintic Mountains in early 1956.

Four geochemical surveys were carried out together with geochemical analysis of cuttings from a single rotary drill hole in the area. None of the samples analyzed indicated strikingly anomalous values.

A single 1977-foot rotary hole was drilled in August and September, 1960, on the Canyon 42 claim. This hole cost a total of \$7,717 or \$3.90 per foot.

Estimates indicate that a total of less than \$20,000 have been spent on the Government Canyon Examination since our first interest in this area.

CONCLUSIONS

During the six-year period since we first looked at the Government Canyon area, we have accomplished the following:

1) prepared a reconnaissance alteration map in 1956; 2) staked 50 lode mining claims in 1958 and 1959 of which 35 are still (July, 1962) valid; 3) sampled the area for geochemical analysis on at least four separate occasions; 4) drilled one 1977-foot rotary hole in 1960; and 5) prepared a geologic map of the area in 1961.

None of this work has shown features which would encourage any additional work at this time. Therefore, no further work at Government Canyon is recommended.

INTRODUCTION AND ACKNOWLEDGMENTS

INTRODUCTION

The primary purpose of this report is to assemble all of the data collected by the staff of the Rocky Mountain District while carrying out the Government Canyon Examination, and to summarize the results of, and conclusions from, this work.

The Government Canyon area is in Utah County, Utah, (Figure 1) and lies approximately 6 miles south of the Burgin shaft in the East Tintic mining district and due east of Sunrise Peak which is south of the Main Tintic mining district.

ACKNOWLEDGMENTS

As with most of our work, many individuals have contributed their ideas and efforts which combine to form our knowledge of the Government Canyon area. Included are Hal Morris of the U. S. Geological Survey, Jim Anderson, Bill Parry, Dave Duke and Ray Kent, temporary summer employees of the Rocky Mountain District, Jack Bush, Ray Gilbert, Tom Gustin, Frank Howd, Felix Mutschler, Dan Regan and Bill Shepard of the permanent Rocky Mountain District staff, and Bob Lehner and Doug Cook of the Coordinating Unit of Bear Creek. Each of these, as well as others, have contributed the ideas and facts which have been assembled into this report. At no time was any one of these individuals definitely assigned the Government Canyon work for exclusive and/or concentrated effort. Each contributed his efforts to the Government Canyon Examination while also assigned to other duties.

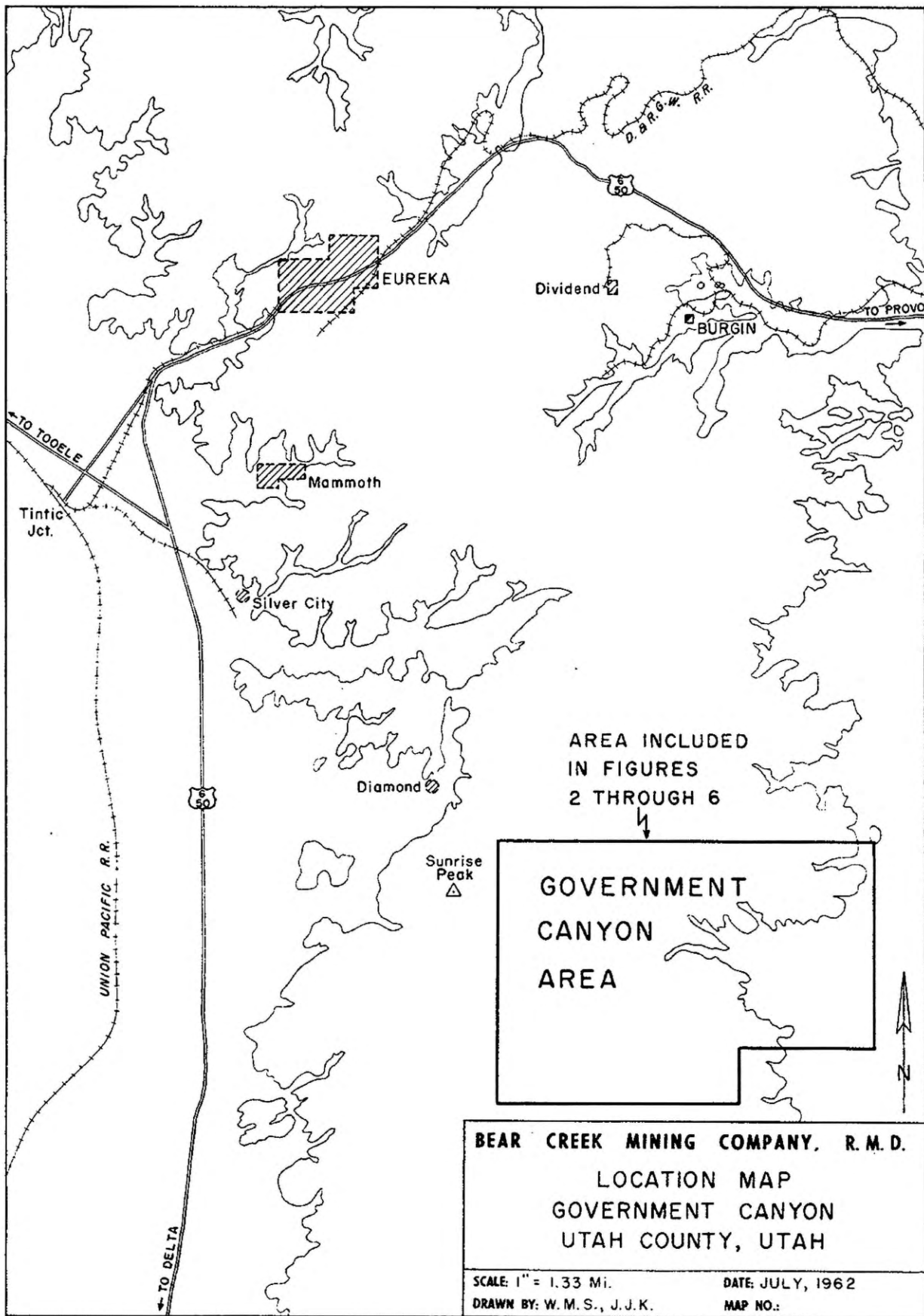


Figure 1

HISTORY

During the course of the Oquirrh Range Reconnaissance, begun in 1954, the Rocky Mountain District became interested in the Tintic mining districts, and, through our Jenny Lind Project, we established a foothold in these districts in 1955 and 1956. While this work was in progress, Hal Morris of the U. S. Geological Survey brought to our attention the existence of a large area of alteration south of the East Tintic district in the vicinity of Government Canyon. The area was visited briefly during 1955 and early 1956, and during a two-week period during June, 1956, Jim Anderson and Bill Parry, temporary summer employees of the Rocky Mountain District, prepared a reconnaissance alteration map of the area.

Work conducted during the summer and fall of 1958 by D. R. Cook in connection with the preparation of his report and folio entitled "Exploration Opportunities for Silver-Lead Replacement and Porphyry Copper Deposits in the East Tintic Mountains and Adjacent Areas" (2)* pointed to this area again. In this report, page 17, under the heading "Potential areas for the discovery of porphyry copper type orebodies", Cook makes the following statements:

"B-2, Government Canyon area. This target covers an extensive area of hydrothermal alteration including argillic, pyritic, chloritic, calcitic and jasperoid types. Copper mineralization is absent at surface, although some of the jasperoid bodies contain trace amounts of the metal.

"A broad magnetic 'high', bordering the Government Canyon area on the west, may reflect an intrusive stock concealed beneath the volcanic rocks. A re-entrant 'low' in this anomaly located in the center of the alteration area possibly suggests the destruction of magnetite."

* Numbers in parentheses refer to references listed in the Bibliography.

Receipt of Cook's report, and consideration of the data presented, led to the staking, in November and December, 1958, of 28 lode mining claims in Government Canyon.

During February and March, 1959, discussions were held with J. A. Sylvester and associates, holders of patented and unpatented lands to the east of, and adjacent to, the Bear Creek claims. These discussions failed to produce a working agreement covering the Sylvester ground.

Twenty-two additional contiguous lode mining claims were staked by Bear Creek geologists in Government Canyon during March, 1959.

Geochemical sampling of the Government Canyon area was carried out during the spring and summer of 1960 with the hope that this sampling would help with the location of specific drill sites within the generally altered area.

Two drill sites were prepared on the basis of the geochemical results, surface alteration and general accessibility and a single 1977-foot hole was drilled between August 26 and September 24, 1960. This hole was used as assessment work on the unpatented claims for the assessment years ending September 1, 1960, and September 1, 1961.

The most recent work accomplished by Bear Creek geologists at Government Canyon has been the preparation of a geologic map of the area by R. E. Lehner as a part of his Southwest Tintic Reconnaissance mapping program pursued during the summer and fall of 1961.

This report was assembled during the spring and summer of 1962 to make available all data on Government Canyon before unpatented claims held by Bear Creek lapsed on September 1, 1962.

GEOLOGY AND ALTERATION

GEOLOGY

The Government Canyon area lies to the south and east of the productive mining areas of the Main Tintic and East Tintic mining districts. The geology of this area was mapped by Bob Lehner (Figure 2) during the month of August, 1961, as a part of his Southwest Tintic Reconnaissance mapping.

In his monthly report to Ray Gilbert for August, 1961, Lehner stated:

"By the end of this month most of the area covered by our claim group in Government Canyon was mapped. The resulting geologic picture indicates a tuff unit [Older tuff] intruded by dikes and irregular intrusive bodies similar in appearance to the Sunrise Peak intrusive. Overlying is a greenish tuffaceous-agglomeratic unit [Younger agglomerate] which does not appear to be intruded by the dikes although this relationship is still open to question. A sequence of flows cover the tuffaceous-agglomeratic unit. Pediment gravels conceal most of the bedrock in the topographic re-entrant to Government Canyon."

This paragraph summarizes the geologic picture of Government Canyon as depicted by Lehner's work. This geologic picture is further clarified by the following quotation from Lindgren and Loughlin (3), page 57:

"Sunrise Peak, south of Diamond, is composed entirely of a uniform mass of dark-gray to greenish-gray porphyry, having the chemical composition of monzonite but ranging in texture from monzonite to latite. It is geologically one of the most significant rock masses in the quadrangle, for it shows the connection of flows with a second volcanic neck. The contacts around Sunrise Peak, where well exposed, are clearly intrusive. This relation is best shown in the canyons along the southeast and northeast bases of the peak, where vertical dikes of the Sunrise Peak rock project into the beds of tuff erupted from the first vent [Volcano Ridge vent]. As the tuff bounds Sunrise Peak on three sides the whole peak must be considered an intrusive mass. Many of the dikes on the nose of Volcano Ridge are similar in megascopic appearance and composition to the rock of Sunrise Peak and may be in part a product of the same eruption.

"The connection between the Sunrise Peak mass and undoubted surface flows is perfectly exposed along the east half of the peak [head of Left Hand Fork of Government Canyon]. On the southeast side the contacts with tuff and above this with the fine augite andesite are clearly marked, but above the andesite the Sunrise Peak rock continues across the saddle and forms the neighboring summits to the east. As the distance increases flow structure and brecciation typical of effusive lavas may be noted, but any changes in structure and texture are so gradual that texture alone cannot serve to indicate the intrusive or effusive nature of the rock. In fact, it is impossible to distinguish between hand specimens taken from the summit of Sunrise Peak and from the peaks and ridges immediately to the east or northeast, including the ridge northeast of Diamond."

The rocks of Government Canyon, therefore, are closely related to the volcanic activity centering in the Volcano Ridge - Sunrise Peak area. Considered in the light of the geologic picture of the entire district, it seems probable that most, if not all, of the units mapped by Lehner in the Government Canyon - Copperopolis Canyon area belong to the Laguna Springs latite volcanic series. This is a complex series of volcanic rocks, believed to have originated from vents in the Volcano Ridge - Sunrise Peak area. Morris (1), page 32, states that the Laguna Springs series may be subdivided into five units: 1) a basal tuff, 2) a lower flow series, 3) an intermediate tuff and agglomerate, 4) an upper flow series, and 5) a thick and extensive agglomerate. Just where in this series the more restricted units mapped by Lehner would correlate has not been determined, but it seems possible that in Government Canyon we may be dealing primarily with units 3) and 4), intruded by dikes and irregular bodies of related Sunrise Peak-type rock. Morris (1), page 35, further states:

"The monzonite porphyry of Sunrise Peak and related rocks closely resemble the flow rocks of the latite volcanic series in texture and composition, and probably represent shallow intrusives derived from the same general magma."

The Government Canyon drill hole penetrated a thick series of igneous rocks and apparently bottomed still within the Laguna Springs volcanic series. Seven core samples taken at intervals in this drill hole were examined in thin section by Dr. R. M. Honea at the University of Colorado. While each of these rocks was definitely identified as igneous in origin, intense alteration precluded a precise identification of the exact rock type in most cases. Several intervals of almost completely silicified material were also drilled in this hole.

Interbedded tuff and flow units, underlain by an agglomerate in the bottom 51 feet of the drill hole, may correlate with the Older tuff and Older agglomerate sequence mapped by Lehner across the range in Copperopolis Canyon. Below these units one might expect either sedimentary rocks, or the volcanic rocks of the Packard series.

ALTERATION

A reconnaissance alteration map of Government Canyon (Figure 3) was prepared by Jim Anderson and Bill Parry during the summer of 1956. A copy of their report is included as Appendix I to this report. They mapped alteration types as defined by Lovering (4) for the East Tintic district, although we fully realized that his alteration types might not be applicable anywhere outside of East Tintic.

The results of this mapping indicated that, at least as far as chloritic and calcitic alteration were concerned, these were not the same as those mapped at East Tintic. Chloritic alteration at East Tintic is associated with dolomitization of the sediments and is generally confined to the base of the volcanic series. Calcitic

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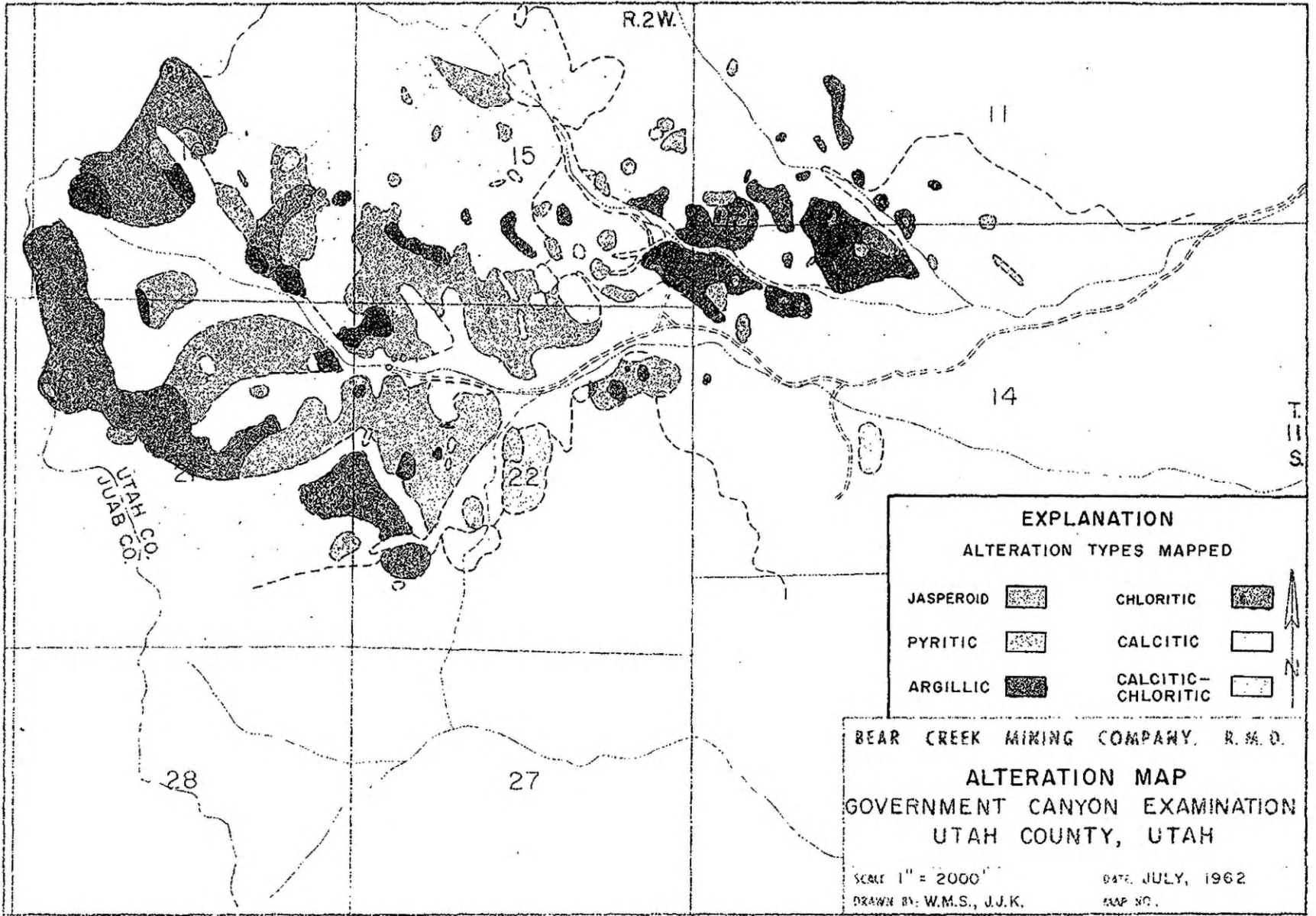


Figure 3

alteration at East Tintic is believed to be associated with the silicification of the sedimentary rocks, the displaced carbonate having been carried in solution and deposited in the overlying volcanics. At Government Canyon, the alteration mapped as chloritic and calcitic appears to be more of the propylitic-type, marginal to somewhat more intense argillic and pyritic alteration and to some silicification. The chloritic and calcitic alteration may be of deuteritic origin. Thus far, no carbonate rocks have been found at depth in Government Canyon; however, a number of blocks of carbonate rock must have been incorporated into the volcanic units and these blocks could have been the source of the carbonate mapped as calcitic alteration.

Thin section study of core from a depth of 369 feet in drill hole GC-1 showed the presence of considerable carbonate as partially assimilated limestone inclusions and by the effects of assimilation on the original minerals. This carbonate apparently came from material carried in by the volcanic eruptions.

Bob Lehner commented on the alteration at Government Canyon in his monthly report to Ray Gilbert for August, 1961, as follows:

"It is difficult to say to what extent the tuffs might have been altered prior to or during the period of intrusion, but field relationships indicate that the strongest alteration followed the intrusion of dikes and irregular bodies. It is strongest (silicification, pyritization, argillization) where the igneous intrusives are most abundant, and the agents causing the alteration must have followed similar channelways that the intrusives did. The intrusives are not everywhere altered. No copper mineralization was observed during the mapping.

"Two areas show a stronger degree of alteration than elsewhere in the Government Canyon area; one is

the general area of the drill-hole, the other is in the general area of the clay pits owned by Sylvester."

The field relations, therefore, indicate that the alteration at Government Canyon is probably related to the Sunrise Peak type intrusives and possibly not to mineralizing solutions of any kind. A large amount of pyrite was encountered in the drill hole which would seem to indicate the introduction of sulfur and possibly iron, but not necessarily of any economic minerals.

RESULTS OF EXPLORATION

CLAIM STAKING

During the fall of 1958, D. R. Cook's report (2) stimulated enough interest in the Government Canyon area to lead to the staking of 28 lode mining claims. These claims were located between November 19 and December 1, 1958, by Centennial Development Company of Eureka, Utah, for Bear Creek Mining Company and were numbered Canyons Nos. 1 through 26 and Fraction Nos. 1 and 2. This group of claims was contiguous on the west with land controlled by J. A. Sylvester and his associates (Figure 4).

On March 20 and 23, 1959, an additional 22 lode mining claims, Canyon 27 through 48 were located west of the original claim group.

As these claims were located during late 1958 and early 1959 in the State of Utah, where there is no discovery work requirement, there was no assessment requirement on the claims before the assessment year ending September 1, 1960. During the months of August and September, 1960, a drill hole was put down on the Canyon 42 lode mining claim, and this work (including road and drill site preparation) was applied as assessment work on the entire group of claims for the assessment year ending September 1, 1960.

During the fall of 1960, M. D. Regan began a property status study of the Tintic mining districts and the surrounding areas. As a result of this study he determined that Section 16, T. 11 S., R. 2 W., was a section belonging to the State of Utah, and therefore not open to staking. Consequently, all of our claims Canyon 27, 29, 31, 33, 35

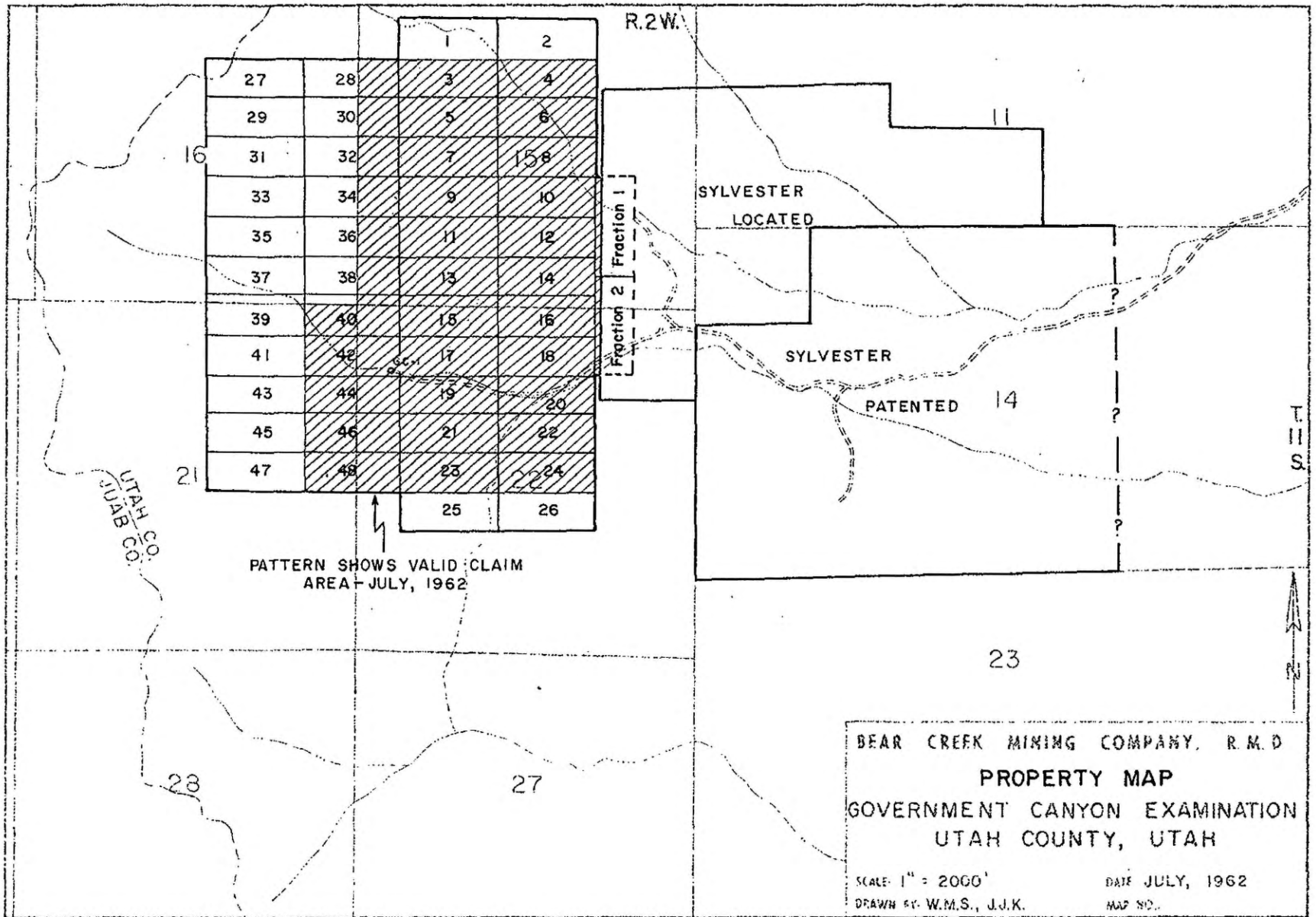


Figure 4

and 37, and a portion of Canyon 28, 30, 32, 34, 36, 38, 39 and 40 were invalid by reason of having been located within this State section.

Since the drilling had been continued into the month of September, 1960, a portion of the drilling cost was claimed as assessment work for the assessment year ending September 1, 1961. Sufficient expenditure was not available to maintain all of the valid claims in good standing, so the entire western line of claims as well as two claims at the northern and southern ends of the two easternmost lines were dropped.

The remaining 35 claims, numbered Canyon Nos. 3 through 24, Fraction Nos. 1 and 2, and Canyon 28, 30, 32, 34, 36, 38, 40, 42, 44, 46 and 48 are currently (July, 1962) valid until September 1, 1962.

PROPERTY NEGOTIATIONS

Several claim notices at the eastern end of Government Canyon were noted by Anderson and Parry during their alteration mapping in 1956. Some of these claims were controlled by J. A. Sylvester of Salt Lake City. A cursory property study in the fall of 1958, by Ray E. Gilbert, revealed the following patented and unpatented property in, and adjacent to, Government Canyon controlled by Sylvester as contained in Gilbert's notes:

Patented Ground

Section 14, T11S, R2W, Claims No. 4354 A.P.
Sold to M.B. Whitney, March, 1909, Salt Lake City.

He has 1-18 inclusive lots in section and east half of the SW/4.

Patent No. 11936 issued January 23, 1920; therefore have the mineral rights included. To Louis Thompson, Provo, Utah. Total 829.08 acres.

Located Claims

Keen 1 to 8 (incl.). Staked in 1954.

Diane, Diane 1, Diane 2. Staked in 1956.

Keene Ext., Keene Ext. 1, Keene Ext. 2. Staked in 1957.

Keno 1-8 incl.

Making a total of 22 claims.

On February 18, 1959, the following memorandum was written by Thomas N. Walthier, then Administrative Assistant to C. H. Burgess, then President of Bear Creek.

"Les Breckon called to say that he approached Mr. Sylvester at Ray Gilbert's request. Mr. Sylvester and some associates have decided to incorporate their interests in Government Canyon and do preliminary drilling before discussing the disposition of their mining claims. Les also informed me that Anaconda has been eagerly trying to option the Government Canyon claims since last October, but Les was assured by Sylvester that Kennecott would be given first opportunity.

"One of the principals with Sylvester is Chief Engineer with an Eastern steel company. Sylvester has written to him inquiring whether he would reconsider their plan of action and option the land to Bear Creek before they incorporate and before they drill the property. We should know this answer within a fortnight."

On Friday afternoon, March 6, 1959, a meeting was arranged with the Sylvester group which is summarized in Ray Gilbert's memorandum of March 9, 1959, as follows:

"On Friday afternoon, March 6, Burgess and Gilbert met with Jim Sylvester, Bill Sylvester, Bud Eagen and Howard Eagen to discuss a proposed agreement concerning the Government Canyon property south of Bear Creek's East Tintic property.

"Bud Eagen said that they had been thinking of a purchase option which would give Bear Creek a period in which to explore and develop the property, after which the value of any mineral deposit to be discovered would be determined by some pre-established formula, and that Bear Creek would then pay for its share of the property on the basis of this appraisal. The owners would have the right to retain an interest in the property or to sell their interest to Bear Creek.

"Burgess pointed out the difficulty of making an appraisal satisfactory to both parties and said that it was most unlikely that Bear Creek would consider a purchase option in which the sale was established upon completion of the exploratory work. He suggested instead an option in which the owners would receive an interest in an operating company if and when the property should be brought into production. The Eagens and Sylvesters said that they would like to discuss this among themselves before pursuing it further.

"The discussion returned to means of appraising an ore body along the lines first proposed by Bud Eagen, including the possibility of calling in an independent consultant to make the appraisal. Again it was pointed out that Bear Creek had considered this problem several times in the past and concluded that it is not workable as far as Bear Creek is concerned.

"Bud Eagen mentioned the desire of his group to have some sort of cash payment made within a year or two chiefly for the sentimental benefit of the aged father of Jim and Bill Sylvester. He suggested that the time of the payment be related to Bear Creek's proving the presence of commercial ore. The question as to what would constitute the proof of ore was not discussed.

"It was decided that another meeting should be held March 8 after the Sylvesters and Eagens had time to discuss the possibility of their participating in an operating company."

A later communication indicates that the date of April 6, 1959, was set for a final reply to Sylvester, and further correspondence,

following check sampling by Bear Creek on Sylvester's ground, indicates a final contact was made during July, 1959.

Although our file contains no written record of these final meetings, apparently no agreement was reached for optioning the Sylvester ground.

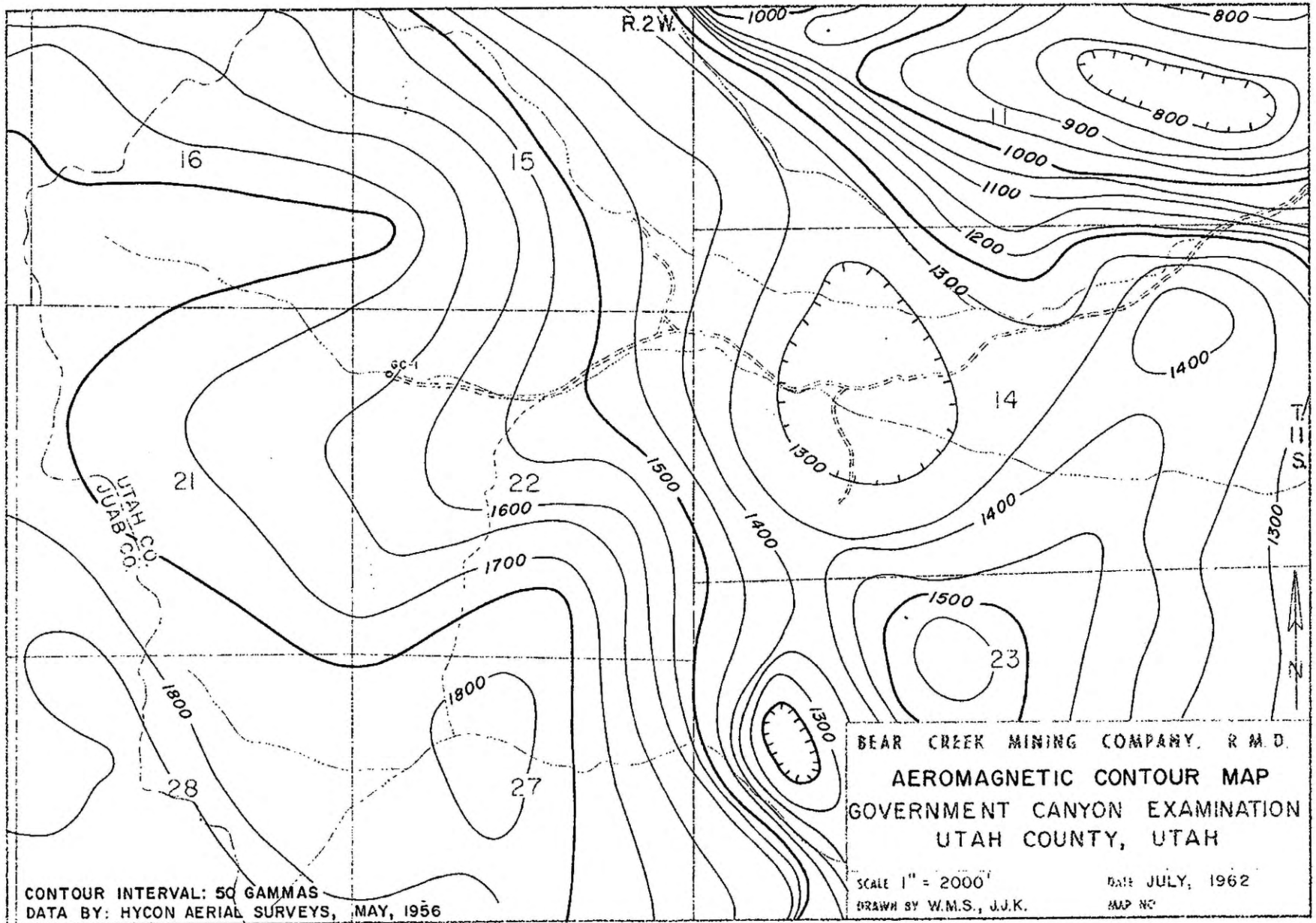
We are kept aware, indirectly, of Sylvester's continuing interest in his Government Canyon property, primarily through his infrequent approaches to drilling contractors in the Salt Lake area. Apparently, he has kept his unpatented claims valid, although evidence of actual work done on the ground is not apparent.

AEROMAGNETIC SURVEY

Government Canyon was included in the area covered by an aeromagnetic survey flown by Hycon Aerial Surveys (Figure 5) during May, 1956. A detailed analysis of this survey, programmed for 1962 by the Geophysics Division, has not yet been undertaken and the only analysis of these data is contained in D. R. Cook's 1958 report (2).

In this report Cook notes that Government Canyon is located on the eastward projection of a series of magnetic highs extending from the West Tintic Mountains across Tintic Valley to the vicinity of Copperopolis Canyon. In the Copperopolis Canyon area Cook notes:

"The broad magnetic high centered over Copperopolis Canyon is not a typical expression of volcanics thus suggesting that the flows in this area are underlain by a large intrusive. The simpler pattern may also be due to a greater plane-to-ground separation made necessary by the rugged topography. The small indentation on the northeast corner of the high corresponds with intensely altered volcanics in Government Canyon."



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Figure 5

In another section of this report, Cook also reports the lack of any magnetic expression over the Sunrise Peak intrusive, and suggests that this may be due to the fact that Sunrise Peak does not represent a deep-seated intrusive body. The lack of magnetic expression over Sunrise Peak type rocks exposed in Government Canyon is consistent with this interpretation.

GEOCHEMICAL SURVEYS

Four separate groups of samples have been collected for geochemical analysis from the Government Canyon area. The sample locations are shown on Figure 6. This location map shows that the majority of the samples were collected in the area of argillic alteration on the Sylvester land and in the area of pyritic alteration on the Bear Creek claims.

The first group of twenty samples was collected by Anderson and Parry during their alteration mapping in 1956. These samples were of jasperoids and "other favorable appearing rocks", and were analyzed colorimetrically for copper, lead and zinc and returned background values in all but one or two cases. These samples are listed in Table I in Appendix III.

Following the Bear Creek staking, and during the discussions with Sylvester, in March, 1959, a series of fifteen samples was collected by Mutschler from the Sylvester ground. These were analyzed by X-ray spectrograph for copper, barium, lead, manganese and zinc. These values are shown as Table II in Appendix III.

A second group of thirty-one samples was collected from the Sylvester ground by Dave Duke during June, 1959. This group of samples was taken to duplicate samples collected by Sylvester for

copper assay. These samples were analyzed by X-ray spectrograph for copper, lead and zinc, and were also assayed, at Union Assay in Salt Lake City, for copper. These values are shown as Table III in Appendix III.

A more complete set of samples was taken during the spring and summer of 1960 by Tom Gustin, Ray Kent and Dan Regan. During this program, rock samples were collected from the Bear Creek claim area with particular emphasis on areas of pyritic alteration. A total of ninety-eight samples was collected. These were analyzed by X-ray spectrograph in Denver for copper, lead, zinc and arsenic. In addition, fifteen of these samples were run colorimetrically as a check. Results from this sample group are shown as Table IV in Appendix III.

An additional fifty-eight samples from drill hole GC-1 were analyzed colorimetrically for copper, lead and zinc. These results are shown as Table V in Appendix III.

Consideration of the sample results seems to reveal that the Government Canyon area contains no striking anomalies in any of the elements tested. Some weakly anomalous values in zinc are present and the background for copper appears to be high (particularly in the Sylvester area), although this may be due primarily to the X-ray method of analysis utilized for most of the samples. Certainly the drill hole cuttings, which were analyzed colorimetrically, failed to reveal any anomalous values of note for the total depth of the drill hole.

Values for the various metals have not been presented, as plots of these data, on a larger scale, have apparently failed to reveal any trends or significant anomalies.

GEOLOGIC AND ALTERATION MAPPING

During the month of June, 1956, Jim Anderson and Bill Parry, temporary summer employees of the Rocky Mountain District, spent two weeks making a reconnaissance alteration map of the Government Canyon area. They attempted to apply Lovering's East Tintic alteration types in this work. A copy of their map is shown as Figure 3 and their report is included as Appendix I with this report. This report by Anderson and Parry contains a brief statement covering their field techniques.

During the month of August, 1961, Bob Lehner mapped the geology of the Government Canyon area as a part of his Southwest Tintic Reconnaissance mapping. A copy of this section of his map is shown as Figure 2 with this report. A total of 11-1/2 field days was spent on this work. The mapping was done directly on aerial photographs with the data transferred to a topographic base at a scale of 1:24,000 with the use of a sketchmaster projector.

DRILLING

A drilling program had been initiated at Bear Creek's East Tintic Project in August, 1960, and under the same contract a Failing 1500 rotary drill rig was moved from East Tintic to Government Canyon on August 25, 1960. A drill hole was collared on Bear Creek's Canyon 42 unpatented lode mining claim on August 26, and this hole was drilled to a total depth of 1977 feet by September 24. A copy of the Completion Report for this hole is included as Appendix V to this report.

The major drilling difficulty encountered was the extreme hardness of some of the silicified (jasperoid) sections. In several of these intervals the drilling rate was only about 1 foot per hour.

Overall, a rate of almost 39 feet per shift was maintained with the maximum footage for one shift being 170 feet (837'-1007' and 1267'-1437'); the minimum footage for one shift was 5 feet (1568'-1573').

The contract was written with a straight footage cost for the drilling with lost circulation material, water haulage, mud, casing etc. as additional charges. The original contract also provided for an additional charge for bits where costs exceeded 40¢/foot in certain sedimentary rocks. While drilling this hole in highly silicified volcanic rocks, this clause was modified to cover all bit costs in excess of 40¢/foot. Water for drilling was hauled from Elberta, Utah.

A breakdown of the costs for hole GC-1 is as follows:

	<u>Total</u>	<u>Per Ft.</u>
Footage Charges	\$ 5,358.00	\$ 2.71
Bit Costs (over 40¢/ft.)	892.50	.45
Mud and Cement	536.50	.27
Casing	63.75	.03
Water Hauling	329.88	.17
Cement Time (2 hrs.)	32.00	.02
Coring Time (28-1/2 hrs.)	456.00	.23
Survey Time (3 hrs.)	<u>48.00</u>	<u>.02</u>
TOTALS	\$ 7,716.63	\$ 3.90

A single survey measurement made with the Tro-Pari Surveying Instrument at 1800' indicated a bearing of N 39° E and an inclination of -84° at this depth. A maximum-reading thermometer placed in the hole at this same time was broken, so a temperature measurement was not obtained.

COSTS

While direct cost data were not kept for most of the Government Canyon work, the following estimates have been made of the charges to this Examination:

Salaries (estimated)	\$ 3,000
Expenses (estimated)	2,500
Claim Staking Contract	1,314
Roads and Drillsites	531
Drilling	7,717
Assays, Drafting (estimated)	<u>1,500</u>
TOTAL	\$16,562

While these estimated figures are admittedly very inexact, it is safe to assume that a total of less than \$20,000 has been spent on the Government Canyon Examination.

DISCUSSION OF EXPLORATION RESULTS

During the six-year period since we first looked at the Government Canyon area, we have accomplished the following: 1) prepared a reconnaissance alteration map in 1956, 2) staked 50 lode mining claims in 1958 and 1959 of which 35 are still (July, 1962) valid, 3) sampled the area for geochemical analysis on at least four separate occasions, 4) drilled one 1977-foot rotary hole in 1960, and 5) prepared a geologic map of the area in 1961. A more complete presentation of this work has been made in the preceding pages.

Any discussion of the Government Canyon Examination must take into consideration several unique factors which guided and affected this effort. First, and perhaps foremost, is the fact that this work has never been carried on as a separate, distinct enterprise. Because of physical proximity it has been handled as a poor relation to the East Tintic Project. Presumably it was included in the overall Tintic-East Tintic district work; practically, no-one was ever able to take much time to work on Government Canyon specifically. This lack of time for anything away from the boundaries of a specific project is further illustrated by the parallel case of Southwest Tintic which was not even visited, except in a very cursory manner, during our first five years at Tintic!

Second, one should realize that our inability, in early 1959, to reach a satisfactory agreement for acquisition of the Sylvester ground handicapped us by preventing an appraisal of the entire altered area since we controlled only the western part.

Third, our failure to prepare a geologic map of Government Canyon stemmed from our inability to recognize units within the canyon, and this was not achieved until a mapping program (inspired by the Southwest Tintic Reconnaissance) was initiated for the larger area including both Copperopolis and Government Canyons.

Therefore, this examination was carried out with several marks against it, almost from the start, and apparently only in the present report has an attempt been made to gather all of the information on Government Canyon into one spot and to appraise what we actually know about the area.

Our physical exploration at Government Canyon was confined to road building and improvement and to the drilling of hole GC-1, which was spotted using alteration, geochemical results and general accessibility as the bases for its location. Dan Regan had done some reconnaissance geologic mapping by this time, but we still did not have a good geologic picture. This came only after Bob Lehner's work. Concerning the drill hole location and geology, Bob made the following statements in his monthly report to Ray Gilbert for August, 1961:

"As I understand, the drill hole was spotted on the basis of geochemical information. On the basis of geological information I believe that it was positioned in as good a place as any. As a final assessment of the data that we have on Government Canyon the following factors can be stated: 1) Geology indicates strongest alteration of intrusives and tuff in the vicinity of the drill hole and no copper mineralization was noted, 2) Geochemical results of surface sampling do not lend much encouragement, and 3) Assay of core from drill hole showed no encouragement of copper mineralization with depth."

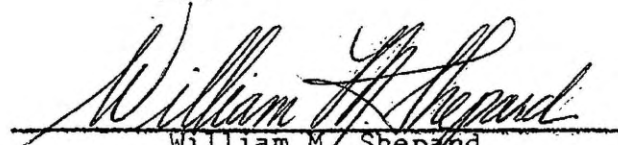
While Bob's last statement should be made to read: "3) Geochemical analyses of cuttings from drill hole.....", the thought is certainly correct (See Table V, Appendix III).

So, apparently we drilled at about the best location, all factors considered, that we could have chosen on the ground that we controlled. Similarly, most everyone seems to agree that the next spot to drill (and perhaps the best-looking spot in the canyon) lies on the Sylvester ground in the area of intense argillic alteration and close to mapped jasperoid masses. However, the fact also remains that no copper mineralization, and, in fact, no mineralization except pyrite has thus far been found in association with this substantial area of alteration.

Therefore, considering all of the data available to us as of this date, we can find nothing to encourage further work here other than the presence of a large area of alteration which, as such, we still do not fully understand. In the past few weeks we have learned of the presence of a competing organization, the Anaconda Company, apparently attempting an appraisal of the Sylvester ground to the east of our claims. Reportedly this appraisal includes the use of I.P. equipment and, perhaps, geologic mapping. It seems probable that areas mapped as pyritically altered should yield anomalous results to the I.P., but in the best-looking ground in our area of control this anomaly would not indicate the presence of any copper.

In view of all of the foregoing facts, we feel that any further work we might do at this time would be only in the nature of "holding the claims" in view of the fact that another organization has come into the picture. The only possible method of further analyzing the alteration at Government Canyon would seem to be by a study such as those undertaken by the Coordinating Unit which might show a more

favorable direction in which to concentrate further work, or uncover some subtle guides which we have failed to discover in our work. Therefore, no further work at Government Canyon is recommended at this time.


William M. Shepard
October 1, 1962

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- (3) Lindgren, W., and Loughlin, G. F., 1919, Geology and ore deposits of the Tintic mining district, Utah: U. S. Geol. Survey Prof. Paper 107, 282 p.
- (4) Lovering, T. S., and others, 1949, Alteration as related to ore deposits in the East Tintic district, Utah: Econ. Geology Monograph 1.

APPENDIX I

REPORT ON ALTERATION MAPPING IN GOVERNMENT CANYON

BY JAMES A. ANDERSON AND WILLIAM T. PARRY

JUNE, 1956

INTRODUCTION

The primary purpose of the project was to make a generalized alteration map of the volcanics in Government Canyon, showing any possible relations of alteration to structure, geochemical anomaly, elevation or depth in the volcanics. This work was done as a possible extension to the south of the present East Tintic Project.

Government Canyon is located six miles south of Highway 6-50 and is reached by way of (a) secondary road which begins 2.3 miles west of Elberta, Utah.

Elevations in the area concerned range from 5000 to 8000 feet. The topography is moderately rugged especially in the western end of the canyon. Most of the slopes are covered with sagebrush, juniper, and scrub maple with a few pinyon pines. The streams are intermittent and a number of small springs are present.

FIELD METHODS

Government Canyon was mapped during a period of two weeks. The mapping and field work was done by James A. Anderson and William T. Parry with the assistance of W. M. Shepard and D. R. Cook. One to twenty-four hundred scale contact print aerial photographs were covered with acetate and outcrops were marked directly upon the acetate. To aid in the location of points, a small portable stereoscope was used. Geochemical samples were taken at all likely outcrops.

All field work and sample locations were transferred from the acetate to the United States Geological Survey topographic map of Tintic Mountain, Utah, which was used as a base map.

DISCUSSION OF ALTERATION

"The stages of alteration (in the East Tintic District) include an early, questionably hydrothermal intra-volcanic near-surface alteration, and five subsequent stages of undoubted hydrothermal alteration: (1) the early barren stage; (2) the midbarren stage; (3) the late barren stage; (4) the early productive stage; and (5) the productive (ore) stage. In the early barren stage, limestone was

APPENDIX I (Continued)

altered to dolomite and the basal part of the volcanic series was chloritized. The midbarren stage is characterized by the development of clay minerals (argillic alteration) which is most extensive in the volcanic rocks but is also common in the calcareous rocks. The late barren stage alteration is characterized chiefly by jasperoid, barite, pyrite (pyritic alteration), and sparse chlorite in the sediments and by allophane-quartz, barite, cubic pyrite and calcite in the overlying volcanic rocks. The early productive stage is marked by the introduction of potash and minor clear quartz and pyritohedral pyrite. The productive stage was distinguished by the abundant precipitation of sulfides, sulfantimonides and sulfarsenides, some tellurides and gold, and very little gangue."¹

DISCUSSION OF ALTERATION TYPES

Argillic alteration is characterized by the replacement of phenocrysts and groundmass of volcanic rocks by clay and mica minerals in varying degrees of completeness.

Argillic alteration is mapped as such only when not accompanied by significant amounts of the other types of alteration. This type of alteration appears white on a freshly broken surface but occasionally weathers with a slight iron staining on the surface. Outcrop is generally quite poor due to the softness of the rock. The rock is medium fine-grained with minor small criss-crossing veinlets of iron staining. Many of the outcrops of this type are found in the lower part of the canyon.

Pyritic alteration may occur in two ways: (1) the direct introduction of iron sulfide into overlying volcanics; (2) iron released from femags in the volcanics unites with introduced hydrogen sulfide to form pyrite. These two types are indistinguishable in the area mapped.

Pyritic alteration is mapped when an outcrop of argillic alteration is found accompanied by large amounts of limonite staining. Limonite occurs as very abundant criss-crossing veinlets and occasionally concentric rings. Megascopic pyrite is frequently visible as contrasted to other areas of alteration where the pyrite has largely been weathered out. Outcrop is generally poor because of the large amounts of argillic alteration which is associated with this type of alteration.

Chloritic alteration is characterized by the selective replacement of the ferro-magnesian minerals by chlorite, chlorite seams, and quartz chlorite veins. "The chloritic alteration of the early barren stage is confined to the lower part of the volcanic section and has been found only in areas where hydrothermal dolomite is present below."²

¹ Lovering, T.S., and others, 1949, Alteration as related to ore deposits in the East Tintic district, Utah: Econ. Geol. Mon. 1, p.1-2.

² op cit, p. 23.

APPENDIX I (Continued)

This type of alteration is recognized from a distance and also at the outcrop by a definite green hue. In Government Canyon this type of alteration is associated with calcitic alteration. Calcitically altered portions of the volcanics are completely surrounded by chloritic alteration. Round inclusions of calcitic altered latite are commonly present in the areas of chloritic alteration. Outcrop is generally medium to poor. The rock weathers to a sandy textured mantle.

Calcitic alteration is characterized by the partial replacement of the feldspars and occasionally the feldspars by calcite. This type of alteration is the most difficult to distinguish. The rock has the same appearance as fresh latite and can be recognized only by the acid-saliva test. A freshly broken surface is coated with saliva, then 10% HCl is dropped on it. If the rock has been calcitically altered the small amounts of calcite will fizz. The saliva clears off all caliche and will trap the few bubbles which issue from the effervescing feldspars and feldspars. The outcrop is very good. This type of alteration occurs in the upper portions of the canyon. The texture and general appearance of the rock is identical with fresh latite.

Silicification is characterized by the partial or complete replacement of groundmass and phenocrysts by silica. Jasperoids are usually found in outcrop with no definite trend although several of the vein type are present. Jasperoids are massive light gray in color with megascopic pyrite or a flesh pink color with occasional pyrite present. Jasperoids are easily recognized by their hardness and resistance to erosion. Where much pyrite is present, abundant hematite and limonite is in evidence.

GEOCHEMICAL SAMPLING

Jasperoids were more completely sampled than any other type of outcrop. The most favorable spots in the outcrops were sampled (high graded). Calcite veins, silica or quartz veins and silicified sediments, and favorable zones in the pyritic alteration were also sampled. All prospects were sampled. Only two samples that were taken showed high geochemical anomaly. The higher anomaly occurred in a clay associated with a fissure-type jasperoid found in the Morgan Star tunnel. The other high occurred in a patch type jasperoid. The anomalies were copper highs with appreciable increase in lead or zinc.

CLAIMS FOUND

Recent claims are of two series. (1) The Kaolinite series of placer claims. The last assessment was done January through June of 1955 by W. Ray Burrison, Goshen, Utah. They are located in the southeast quarter of Section 15, T11S, R2W, Utah County, Utah. The claims

APPENDIX I (Continued)

include a fissure-type jasperoid at the contact of argillic alteration and fresh latite (Kaolinite Number One - Placer claim). (2) The Keen series quartz lode claims which were located by J. Sylvester in 1955. Other claims in the area are dated previous to 1935. No patent surveys of claims were in evidence.

APPENDIX II

CLAIM DATA

<u>Claim Name</u>	<u>Date of Location</u>	<u>Date</u>	<u>Recorded Book</u>	<u>Page</u>	<u>Locator</u>
Canyon No. 1	11-22-58	12-4-58	751	537	Bear Creek Mining Co.
Canyon No. 2	11-22-58	12-4-58	751	538	by E. Steele McIntyre
Canyon No. 3	11-21-58	12-4-58	796	539	"
Canyon No. 4	11-21-58	12-4-58	796	540	"
Canyon No. 5	11-21-58	12-4-58	751	541	"
Canyon No. 6	11-21-58	12-4-58	751	542	"
Canyon No. 7	11-20-58	12-4-58	751	543	"
Canyon No. 8	11-20-58	12-4-58	751	544	"
Canyon No. 9	11-19-58	12-4-58	751	545	"
Canyon No. 10	11-19-58	12-4-58	751	546	"
Canyon No. 11	11-19-58	12-4-58	751	547	"
Canyon No. 12	11-19-58	12-4-58	751	548	"
Canyon No. 13	11-19-58	12-4-58	751	549	"
Canyon No. 14	11-19-58	12-4-58	751	550	"
Canyon No. 15	11-22-58	12-4-58	751	551	"
Canyon No. 16	11-16-58	12-4-58	751	552	"
Canyon No. 17	11-24-58	12-4-58	751	553	"
Canyon No. 18	11-24-58	12-4-58	751	554	"
Canyon No. 19	11-19-58	12-4-58	751	555	"
Canyon No. 20	11-19-58	12-4-58	751	556	"
Canyon No. 21	11-24-58	12-4-58	751	557	"
Canyon No. 22	11-24-58	12-4-58	751	558	"
Canyon No. 23	11-24-58	12-4-58	751	559	"
Canyon No. 24	11-24-58	12-4-58	751	560	"
Canyon No. 25	11-25-58	12-4-58	751	561	"
Canyon No. 26	11-25-58	12-4-58	751	562	"
Canyon 27*	3-20-59	3-24-59	805	27-28	Bear Creek Mining Co.
Canyon 28*	3-20-59	3-24-59	805	28-29	by J.B. Bush & F.E.
Canyon 29*	3-20-59	3-24-59	805	29-30	Mutschler
Canyon 30*	3-20-59	3-24-59	805	31-32	"
Canyon 31*	3-20-59	3-24-59	805	32-33	"
Canyon 32*	3-20-59	3-24-59	805	33-34	"
Canyon 33*	3-20-59	3-24-59	805	35-36	"
Canyon 34*	3-20-59	3-24-59	805	36-37	"
Canyon 35*	3-20-59	3-24-59	805	37-38	"
Canyon 36*	3-20-59	3-24-59	805	39-40	"
Canyon 37*	3-20-59	3-24-59	808	40-41	"
Canyon 38*	3-20-59	3-24-59	805	41-42	"
Canyon 39*	3-20-59	3-24-59	805	43-44	"
Canyon 40*	3-20-59	3-24-59	805	44-45	"

APPENDIX II (Continued)

<u>Claim Name</u>	<u>Date of Location</u>	<u>Date</u>	<u>Recorded Book</u>	<u>Page</u>	<u>Locator</u>
Canyon 41	3-23-59	3-24-59	805	45-46	Bear Creek Mining Co.
Canyon 42	3-23-59	3-24-59	808	47-48	by J.B. Bush & F.E.
Canyon 43	3-23-59	3-24-59	805	48-49	Mutschler
Canyon 44	3-23-59	3-24-59	805	49-50	"
Canyon 45	3-23-59	3-24-59	805	51-52	"
Canyon 46	3-23-59	3-24-59	805	52-53	"
Canyon 47	3-23-59	3-24-59	805	53-54	"
Canyon 48	3-23-59	3-24-59	805	55-56	"
Fraction No. 1	12-1-58	12-4-58	751	563	Bear Creek Mining Co.
Fraction No. 2	12-1-58	12-4-58	751	564	by E. Steele McIntyre

* Invalid or partially invalid claim by reason of having been located within section belong to the State of Utah and therefore not open for location.

PROOFS OF LABOR

For all claims for the assessment year ending 9-1-60. Filed 9-29-60. Recorded in Book 844, Pages 407-408.

For 35 claims (Canyon No. 3 through Canyon No. 24, Fraction No. 1 and Fraction No. 2, Canyon 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, and 48) for the assessment year ending 9-1-61. Filed 11-15-60. Recorded in Book 844, Pages 469-470.

APPENDIX III

GEOCHEMICAL SAMPLE RESULTS

TABLE I

<u>Sample No.</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>Sample No.</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
8725	15	25	25	750-24	15	25	25
8726	35	50	25	2001	15	50	25
8727	35	50	25	2002	15	25	25
8728	15	25	50	2003	50	25	25
750-17	15	25	25	2004	15	25	25
750-18	15	25	25	2005	35	25	50
750-19	90	25	25	2006	15	25	25
750-20	15	25	25	2054	35	25	25
750-21	35	25	25	2055	35	25	75
750-22	15	50	25	2056	280	25	75

Samples collected by James A. Anderson and William T. Parry, summer, 1956. Analyzed by colorimetric methods in Denver Geochemical laboratory.

TABLE II

<u>Field No.</u>	<u>Cu</u>	<u>Ba</u>	<u>Pb</u>	<u>Mn</u>	<u>Zn</u>	<u>Location</u>
1	330	220	65	70	145	
2	165	130	0	55	70	Sylvester Prospect No. 6
3	120*	165	35	15	50	Sylvester Prospect No. 2
4	130	150	35	50	115	Sylvester Prospect No. 16
5	185	80	0	0	65	Sylvester Prospect No. 18
6	170	140	10	10	75	Sylvester Prospect No. 18
7	185*	215	50	25	115	
8	190	205	50	30	95	
9	205	310	85	220	155	Sylvester Prospect No. 5
10	250	190	40	55	115	
11	165	200	45	60	130	
12	395*	175	85	30	175	Morgan Star Tunnel Dump
13	285	195	105	50	115	Morgan Star Tunnel Dump
14	260	170	85	15	125	Morgan Star Tunnel Dump
15	170	155	0	480	145	

* Additional wet analyses: No. 3 - 186; No. 7 - 279; No. 12 - 484.

Samples collected by Felix E. Mutschler, March, 1959. Analyzed by X-ray spectrograph by M. L. Salmon, Denver, Colorado.

APPENDIX III (Continued)

TABLE III

<u>DGL No.</u>	<u>Field No.</u>	<u>Cu by Union Assay in %</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>Sylvester Sample No.</u>
21985	2601	0.031	330	0	20	Prospect
21986	2602	None	210	0	0	Prospect
21987	2603	0.031	350	0	20	53
21988	2604	0.044	240	0	0	19
21989	2605	0.044	260	0	0	64
21990	2606	0.037	150	0	0	3
21991	2607	0.063	200	0	80	4
21992	2608 & 2618	0.025	220	0	100	5 & 78
21993	2609	0.025	300	0	0	72
21994	2610	0.044	190	0	0	6
21995	2611	0.025	200	0	10	84
21996	2612	0.025	190	0	10	97
21997	2613	0.025	240	40	20	19
21998	2614	0.018	200	0	0	20
21999	2615	0.025	190	0	20	21
22000	2616	0.018	190	0	10	22
22001	2617	0.031	240	10	10	83
22002	2619	0.025	160	0	20	79
22003	2620	0.031	250	0	40	82
22004	2621	0.025	220	0	10	85
22005	2622	0.044	310	0	10	76
22006	2623	0.031	160	0	0	77
22007	2624	None	170	0	20	24
22008	2625	0.037	220	20	120	25
22009	2626	0.031	200	0	0	17
22010	2627	0.031	230	50	30	18
22011	2628	0.031	170	0	10	29
22012	2629	0.025	200	0	0	35
22013	2630	0.025	310	80	20	38
22014	2631	0.025	200	0	30	37

Samples collected by David A. Duke, June, 1959. Analyzed by X-ray spectrograph by M. L. Salmon, Denver, Colorado, and assayed by Union Assay Office, Salt Lake City, Utah.

APPENDIX III (Continued)

TABLE IV

<u>DGL No.</u>	<u>Field No.</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>As</u>	<u>Cu by Colorimetric</u>
29268	7601	120	Nil	120	Nil	
29269	7602	150	10	140	70	
29270	7603	140	Nil	110	Nil	
29271	7604	120	Nil	140	Nil	
29272	7605	120	Nil	90	Nil	
29273	7606	110	Nil	180	Nil	
29274	7607	40	20	100	10	
29275	7608	100	Nil	130	Nil	
29276	7609	140	Nil	110	Nil	
29277	7610	110	Nil	90	40	
29278	7611	100	20	90	10	
29279	7612	100	30	80	30	
29280	7613	140	Nil	40	Nil	
29281	7614	120	10	140	350	
29282	7615	140	10	200	40	
29283	7616	110	10	110	10	
29284	7617	180	Nil	110	30	
29285	7618	70	Nil	140	40	
29286	7619	30	20	70	10	
29287	7620	40	Nil	280	Nil	
29288	7621	50	Nil	140	Nil	
29289	7622	60	Nil	90	40	
29290	7623	100	Nil	90	Nil	
29291	7624	20	30	150	30	
29292	7625	20	20	60	Nil	
29293	7626	170	Nil	210	70	
29294	7627	180	Nil	150	Nil	
29295	7628	70	20	140	30	
29296	7629	30	20	160	10	
29297	7630	30	20	90	40	
29298	7631	180	40	640	40	
29299	7632	70	Nil	200	Nil	
29300	7633	100	Nil	40	60	
29301	7634	90	Nil	110	Nil	
29302	7635	70	Nil	180	Nil	
29303	7636	120	60	440	Nil	
29304	7637	150	550	2000	220	
29305	7638	180	160	3600	100	
29306	7639	80	20	200	40	95
29307	7640	110	Nil	140	Nil	
29308	7641	30	Nil	120	Nil	
29434	7642	100	Nil	150	Nil	35
29435	7643	130	Nil	180	Nil	
29436	7644	280	Nil	440	60	160
29437	7645	110	Nil	190	Nil	
29438	7646	100	Nil	200	Nil	
29439	7647	90	Nil	260	40	

APPENDIX III (Continued)

TABLE IV (Cont.)

<u>DGL No.</u>	<u>Field No.</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>As</u>	<u>Cu by Colorimetric</u>
29440	7648	80	Nil	270	60	20
29441	7649	120	30	160	10	
29442	7650	110	Nil	560	20	
29443	7651	200	Nil	160	Nil	105
29444	7652	120	Nil	150	20	
29445	7653	80	30	200	Nil	
29446	7654	130	20	110	130	
29447	7655	100	Nil	120	40	
29448	7656	220	Nil	70	80	
29449	7657	150	Nil	150	Nil	
29450	7658	110	Nil	220	Nil	
29451	7659	290	Nil	140	Nil	50
29452	7660	80	Nil	60	Nil	
29453	7661	130	Nil	90	Nil	
29454	7662	80	20	110	20	
29455	7663	160	Nil	110	Nil	
29456	7664	160	Nil	80	Nil	
29457	7665	160	40	160	Nil	
29458	7666	130	60	50	Nil	
29459	7667	130	Nil	150	Nil	
29460	7668	70	Nil	80	Nil	55
29461	7669	150	Nil	50	Nil	
29462	7670	140	Nil	180	Nil	
29463	7671	160	20	90	10	
29464	7672	160	Nil	220	Nil	
29465	7673	260	40	300	Nil	70
29466	7674	110	Nil	110	70	
29467	7675	90	50	130	Nil	
29468	7676	80	Nil	80	Nil	
29469	7677	220	Nil	320	Nil	
29470	7678	100	Nil	80	40	55
29471	7679	130	Nil	180	Nil	
29472	7680	120	Nil	160	Nil	
29473	7681	260	Nil	900	Nil	200
29788	7682	100	Nil	120	Nil	
29789	7683	130	Nil	110	Nil	
29790	7684	200	Nil	100	Nil	120
29791	7685	140	Nil	120	Nil	
29792	7686	110	Nil	90	Nil	
29793	7687	90	Nil	140	50	
29794	7688	60	Nil	80	Nil	30
29795	7689	150	Nil	150	Nil	
29796	7690	130	10	260	60	
29797	7691	40	Nil	70	Nil	
29798	7692	110	Nil	140	Nil	
29799	7693	100	Nil	130	Nil	
29800	7694	60	Nil	110	Nil	45
29801	7695	130	Nil	90	Nil	
29802	7696	180	Nil	160	Nil	
29803	7697	190	Nil	160	Nil	
29804	7698	110	Nil	110	Nil	95

Samples collected by M.D.Regan, T.A.Gustin, and R.Kent, June-July, 1960. Analyzed by X-ray spectrograph by M.L.Salmon, Denver, Colo. and by colorimetric methods for copper by Rky.Mtn.Geochemical Labs., Arvada, Colo.

APPENDIX III (Continued)

TABLE V

<u>Field No.</u>	<u>Depth</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
7735	61-101	20	35	15
7736	101-126	20	15	5
7737	126-146	25	45	10
7738	146-156	35	30	15
7731	156-166	45	25	10
7732	166-176	50	20	15
7733	176-186	35	85	15
7734	186-190	40	40	15
7739	190-198	20	50	40
7740	198-233	35	35	10
7741	233-273	15	30	15
7742	273-308	35	25	10
9405	308-348	25	25	10
9406	348-372	20	30	20
9407	372-410	45	20	20
9408	410-449	25	15	20
9409	449-457	20	40	25
9410	457-492	35	<u>20</u> 50	10
9411	492-532	35	30	15
9412	532-557	40	25	25
9413	557-597	35	30	20
9414	597-627	15	40	10
9415	627-667	25	30	15
9416	667-707	20	30	20
9440	707-743	20	80	20
9441	743-782	20	55	15
9442	782-822	30	45	30
9443	822-857	35	50	15
9444	857-867	30	35	20
9445	867-907	20	105	15
9446	907-947	25	60	20
9447	947-987	30	<u>60</u> 60	25
9448	987-1037	15	50	20
9449	1037-1072	35	75	25
9450	1072-1102	30	95	20
12518	1102-1142	30	50	45
12519	1142-1182	20	85	20
12520	1182-1222	25	65	25
12521	1222-1262	30	50	20
12522	1262-1307	25	120	20
12523	1307-1347	20	55	20
12524	1347-1387	20	75	20
12525	1387-1437	20	80	20

APPENDIX III (Continued)

TABLE V (Cont.)

<u>Field No.</u>	<u>Depth</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
12526	1437-1478	15	50 ⁸⁵	25
12527	1478-1518	10	70	25
12528	1518-1550	25	130	20
12543	1550-1589	30	110	20
12544	1589-1612	40	90	15
12545	1612-1652	40	60	20
12546	1652-1692	40	85	25
12547	1692-1732	50	65	30
12548	1732-1772	25	65	25
12549	1772-1812	40	55	30
12550	1812-1842	35	215	35
12601	1842-1882	40	65	25
12602	1882-1917	35	240	20
12603	1917-1962	35	255	25
12604	1962-1976	25	55 ¹¹⁰	20

Samples collected from drill hole cuttings from rotary drill hole GC-1 and analyzed by colorimetric methods by Rocky Mountain Geochemical Laboratories, Arvada, Colorado.

APPENDIX IV
COMPLETION REPORT
GOVERNMENT CANYON EXAMINATION, UTAH

HOLE: RDH GC-1

LOCATION: On Bear Creek Mining Company Canyon 42 unpatented lode mining claim.

COLLAR ELEVATION: 6180' (Est.)

TOTAL DEPTH: 1977' HOLE SIZE: 0-15', 7-7/8"; 15'-1977',
4-3/4".

CASING LEFT IN HOLE: 15' of 6" casing at collar.

TYPE OF EQUIPMENT: Truck-mounted Failing 1500 rotary drill.

CONTRACTOR: Boyles Bros. Drilling Co., Salt Lake City, Utah.

STARTED: August 25, 1960 COMPLETED: September 24, 1960

SHIFTS: 51 TOTAL COST: \$7,716.63 COST/FT.: \$3.90

REASON FOR DRILLING: To accomplish a test in the most highly altered rocks and most favorable geochemical anomaly on the Government Canyon claims and to test for the presence of sedimentary rocks at depth.

REASON FOR STOPPING: The capability of this drill was considered to be 2,000' in this situation. The absence of favorable rocks or mineralization to a depth of 1977' led to the abandonment of the drill hole at this depth.

SUMMARY AND UNUSUAL FEATURES: 0-7', Alluvium. Argillized and pyritized Laguna Springs latite 7'-51'. Quartz monzonite dike containing quartz, pink feldspar and magnetite, 51'-61'. Argillized and pyritized Laguna Springs latite 61'-151'. Dense, dark-gray jasperoid (silicified volcanic rock) containing cubic pyrite and magnetite 151'-166'. Quartz monzonite dike containing quartz, pink feldspar and magnetite 166'-176'. Dark gray to white jasperoid containing cubic pyrite, and locally magnetite and hematite 176'-392'. Monzonite dike containing pink feldspar and magnetite 392'-410'. Dark and light jasperoid containing pyrite and magnetite, with some argillization 410'-532'. Laguna Springs latite flows with weak pyritic and argillic alteration. Abundant magnetite with moderate amount of pyrite 532'-587'. Intense argillic and pyritic alteration in flows 587'-732'. Dark and light jasperoid with pyrite and magnetite 732'-757'. Monzonite dike with coarse pink feldspar and abundant magnetite 757'-770'. Dark jasperoid with pyrite and magnetite 770'-782'. Intensely altered Laguna Springs tuff showing argillic and pyritic alteration 782'-1017'. Weakly altered Laguna Springs tuff showing argillic and pyritic alteration 1017'-1063'. Moderately to strongly argillized Laguna Springs flows and tuffs. Intense pyritization with some pyritohedral pyrite present 1063'-1538'. Porphyritic Laguna Springs flows with red-brown to green groundmass.

APPENDIX IV (Continued)

COMPLETION REPORT, RDH GC-1
GOVERNMENT CANYON EXAMINATION, UTAH

Page 2

Moderate propylitic alteration 1538'-1692'. Intensely argillized and pyritized Laguna Springs tuff containing pyritohedral pyrite 1692'-1865'. Porphyritic Laguna Springs flows with green groundmass. Moderate propylitic alteration 1865-1926'. Gray Laguna Springs agglomerate containing argillized fragments 1926-1977'.

CORE TAKEN AT THESE DEPTHS: 208'-209'; 369'-370'; 484'-485.5'; 707'-710'; 1062'-1063.5'; 1518'-1519'; 1620'-1622'; 1976'-1977'.

DRILLING DIFFICULTIES: One shift moving to location. Drilled 7-7/8" to 15'. Set 15' of 6" casing. Hole started to make substantial flow of water at 36 feet. Some very hard, silicified intervals encountered. Very slow progress. Cemented with 2 sacks Cal Seal at 188'. Excessive bit wear in some intervals, very slow progress, as little as 1 foot per hour with a new bit. Better penetration from 1669'-1812'. One shift surveying with hole at depth of 1832'.

