Mineral	Modal %	Modal % correct	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	H_2O+	H_2O-	P_2O_5	F
Hornblende	37.0	41.023	18.313	.398	4.082	2.026	7.076	.094	3.515	3.877	.635	.127	.943	.152	.004	.004
Andesine	48.0	43.480	25.262	0	11.496	.017	.065	0	.013	3.409	2.817	.478	.013	.026	0	0
Oligoclase																
Albite	.20	.179	.121	0	.037	0	0	0	0	.001	.020	.001	0	0	0	0
Microcline																
Orthoclase																
Biotite																
Muscovite																
Chlorite																
Quartz	9.80	8.787	8.787	0	0	0	0	0	0	0	0	0	0	0	0	0
Epidote	2.0	2.343	.865	0	.521	.356	.013	.017	0	.541	0	0	.027	.004	0	0
Sphene	2.0	2.418	.734	.857	.052	.060	0	.006	.002	.640	0	0	.022	.004	0	.016
Apatite																
Magnetite	1.0	1.769	.008	.053	0	1.121	.570	0	.007	.004	0	0	0	0	0	0
			54.090	1.308	16.188	3.580	7.724	.117	3.537	8.472	3.472	.606	1.005	.186	.004	.020

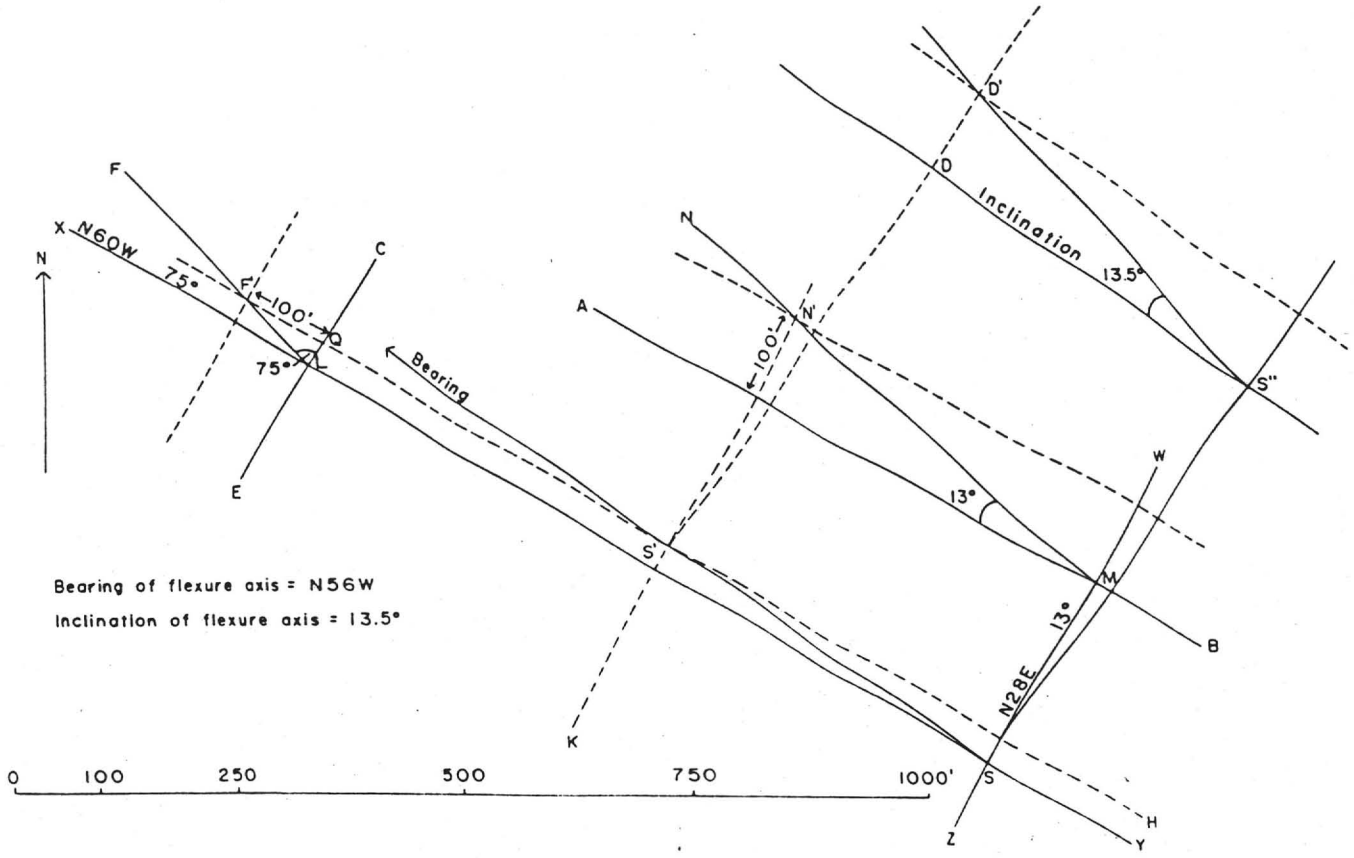
FPCmv45(2): 100.309 %

Mineral	Modal %	Modal % correct	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	H_2O+	H_2O-	P_2O_5	F
Hornblende	54.0	56.802	25356	.551	5.652	2.806	9.798	.131	4.868	5.368	.880	.176	1.306	.210	.006	.006
Andesine	35.49	30.50	17720	0	8.064	.012	.046	0	.009	2.391	1.976	.335	.009	.018	0	0
Oligoclase																
Albite	1.56	1.324	.892	0	.271	.001	0	0	.001	.011	.145	.005	.002	0	0	0
Microcline																
Orthoclase																
Biotite																
Muscovite	1.95	1.820	.881	.016	.494	.119	.015	0	0	0	.006	.204	.078	.003	0	0
Chlorite																
Quartz																
Epidote	2.0	2.223	.821	0	.495	.338	.013	.017	0	.514	0	0	.026	.003	0	0
Sphene	2.0	2.294	.696	.813	.049	.057	0	.006	.002	.607	0	0	.021	.004	0	.015
Apatite																
Magnetite	3.0	5.036	.024	.150	.001	3.193	1.624	0	.020	.011	0	0	0	0	0	0
			46390	1.530	15026	6.526	11496	.154	4.900	8.902	3.007	.720	1.442	.238	.006	.021

PPCmv46: 100.358 %

APPENDIX II

Geometric Construction of Flexure Axis
(Method from Badgley, 1959)


N
X
N60W
75°
F
F'
100'
Q
75°
C
E
Bearing
A
N
N'
100'
S'
K
D'
D
Inclination
13.5°
S''
W
13°
M
B
13°
N28E
S
Z
H
Y
0
100
250
500
750
1000'
Bearing of flexure axis = N56W
Inclination of flexure axis = 13.5°

CONTRACT:
MINERAL LEASE WITH OPTION
TO PURCHASE

MINERAL LEASE WITH OPTION TO PURCHASE

This MINERAL LEASE WITH OPTION TO PURCHASE, made this _____day of _____, 19_____, between HOWARD R. FRENCH and PHYLLIS V. FRENCH, husband and wife, of Phoenix, Arizona (hereinafter referred to as "Owner"), and _____ (hereinafter referred to as_____),

W I T N E S S E T H:

WHEREAS, Owner owns the mining claims described in Exhibit A attached hereto and by this reference made a part hereof which mining claims, together with all ores, minerals and mineral rights appurtenant thereto and the right to explore for, mine and remove the same, all water rights appurtenant thereto, all improvements, easements, licenses, rights of way and other interests appurtenant thereto (including any after acquired title of Owner) are hereinafter referred to as the "Property", and

WHEREAS, the parties hereto desire to enter into a mineral lease of the Property, permitting _____to have the exclusive and irrevocable option to purchase said Property,

NOW, THEREFORE, in consideration of the covenants and agreements hereinafter set forth, the parties hereto mutually agree as follows:

Section 1. Subject to _____'s right to terminate this Mineral Lease with Option to Purchase and all of its obligations hereunder as provided in Section 6 hereof, Owner hereby leases the Property to _____for a term of four (4) years and three (3) months from the date hereof ("Term") and grants to _____the exclusive and irrevocable option to purchase the Property at any time during the Term, and _____hereby accepts such lease and such option, all upon and subject to the terms and conditions hereinafter set forth.

Section 2. Effective on the date hereof, and thereafter until this Mineral Lease with Option to Purchase is terminated by _____ as provided in Section 6 hereof, or by Owner for the default of _____ as provided in Section 7 hereof, _____ _____ shall have the right to make geological investigations and geophysical surveys and other kinds of investigations and surveys, to drill on the Property by any means, and to have all the rights and privileges incident to ownership of the Property except the right to encumber or transfer the title thereto, including without limitation the right to mine underground and to strip on the surface, extract by leaching in place or any other means, remove, save, mill, concentrate, treat, ship and sell or otherwise dispose of ores, concentrates, minerals and mineral-bearing earth and rock and other products therefrom, and to engage in related operations with respect to all veins, lodes and mineral deposits contained in or on said Property, with the right to use all processes and to construct and maintain all works, buildings, plants, waterways, roads, telegraph and telephone and power lines, and all other structures, machinery and facilities which _____ may consider necessary or desirable for such mining, milling and concentrating and related operations.

Section 3. At any time during the Term _____ at its option may elect to purchase the Property for the sum of One Million Dollars ($1,000,000.00) less any payments theretofore made to Owner pursuant to Section 4 hereof. Payment of the purchase price shall be made out of production royalties, without interest, as provided in Section 8.

Section 4. Unless and until this Mineral Lease with Option to Purchase is terminated by _____ as provided in Section 6 hereof, or by Owner for the default of _____ as provided in Section 7 hereof, or unless and until _____ exercises its option to purchase the Property as provided in Section 3 hereof, _____ shall pay to Owner:

(a) a royalty of seven and one-half percent (7 1/2%) of the net smelter returns from all ores and mineral products taken by _____ from the Property and disposed of by it, provided, however, that each such royalty payment shall be reduced by all advanced royalties theretofore paid pursuant to subsection (b) hereof which have not been applied to reduce the amount of any prior royalty payment hereunder, and

(b) advanced royalties as follows:

on or before _____, 19_____,
five thousand dollars ($5,000.00);
on or before _____. 19 _____,
ten thousand dollars ($10,000.00);
on or before _____, 19_____,
twenty thousand dollars ($20,000.00);
on or before _____, 19 _____,
thirty thousand dollars ($30,000.00)

whether or not net smelter returns exist and whether or not any ores or minerals are taken from the Property or disposed of by _____.

The term "net smelter returns", wherever used herein, is hereby defined to mean the proceeds of metals derived from direct smelting ores, concentrates, precipitates and other products paid for by a smelter in accordance with the applicable smelting contract, less cost of transportation from mine to smelter. In the event that _____ markets refined metal or products other than those treated by a smelter, "net smelter returns" shall be deemed to mean the proceeds of the sale of such refined metal or other products less the cost of transportation from mine to market.

_____ agrees to make royalty payments on or before the fifteenth day of the month next following the month of receipt by _____ of payment from the smelter or other purchaser, and to accompany such payments with a statement of the manner in which said payments are calculated, and a duplicate smelter settlement sheet, together with other applicable data.

Nothing herein shall be construed to require _____ to mine or otherwise operate the Property.

Section 5. _____ shall perform work or make improvements on or for the benefit of the unpatented mining claims included in the Property for the assessment year ending _____, 19_____, and for each assessment year thereafter during which this Mineral Lease with Option to Purchase remains in effect, of a value and kind required by the laws of the United States providing for annual assessment work on unpatented claims. The parties agree that, for the purposes of this Mineral Lease with Option to Purchase, geological investigations, geochemical surveys,

geophysical surveys, or drilling, performed on any one or more of the mining claims included in the Property at a reasonable cost equivalent to not less than One Hundred Dollars ($100.00) per claim (or such other amount as may hereafter be required by law) will be deemed to be annual labor benefiting all of the unpatented mining claims in the Property and complying with the requirements of the laws of the United States. Nothing herein shall be construed as limiting _____'s right to perform other work or make improvements of a kind permitted by law in performance of the requirements of this Section. _____ shall make and file or record such reports as are required by applicable law. It is specifically understood and agreed that if this Mineral Lease with Option to Purchase is terminated by _____on or after a date which is less than three (3) months prior to the end of any assessment year which commences September 1, 19_____, or thereafter, and Owner is not then in default hereunder, _____ will nevertheless perform annual labor for such assessment year as hereinabove provided.

As used herein the term "assessment year" means the period from noon on September 1 of any year to noon on September 1 of the immediately succeeding calendar year, or such other period as may be hereafter provided by law.

_____ shall have no obligation to maintain, validate or preserve the unpatented mining claims included in the Property except as provided in Sections 5 and 12 hereof.

Section 6. _____ may at any time terminate this Mineral Lease with Option to Purchase by giving Owner at least thirty (30) days written notice that the Mineral Lease with Option to Purchase is terminated as of the date of termination specified in said written notice. In the event such notice of termination shall be given, the Mineral Lease with Option to Purchase shall terminate as to both parties on the effective date of termination specified in such notice. Upon such termination _____ shall surrender possession of the Property to Owner and shall have no further liability or obligation under this Mineral Lease with Option to Purchase (including, without limitation thereto, any liability to pay royalties required by the provisions of Section 4 hereof) except as otherwise provided in Section 5 and except for its obligation to pay its apportioned share of ad valorem taxes for the calendar year in which the Mineral Lease with Option to Purchase is terminated, as provided in Section

12 hereof, and any other obligations under said Section 12 which may have then accrued, and its obligation to pay any royalties then owed to Owner.

Section 7. Upon breach by _____ of any of its obligations hereunder, Owner shall notify _____ thereof in writing, setting forth the breach complained of, and if _____ is thus in default as claimed by Owner in such notice, and it does not initiate and diligently pursue steps to correct such default within thirty (30) days from date of the notice and in fact correct such default within ninety (90) days, Owner may terminate this Mineral Lease with Option to Purchase at any time during the continuance of such default by giving notice to _____ of such election to terminate. Upon termination of the Mineral Lease with Option to Purchase pursuant to this Section 7, _____ shall surrender possession of the Property to Owner, and thereafter neither party hereto shall have any further liability or obligation to the other (including, without limitation thereto, any liability of _____ to pay royalties required by the provisions of Section 4 hereof) except as otherwise provided in Section 5 and except for _____'s obligation to pay its apportioned share of ad valorem taxes for the calendar year in which the Mineral Lease with Option to Purchase is terminated, as provided in Section 12 hereof, and any other obligations under said Section 12 which may have then accrued, and its obligation to pay any royalties then owned to Owner.

Section 8. Upon receipt from _____ by Owner of a notice of exercise of option to purchase the Property, Owner shall execute and deliver to _____, and _____ shall accept and promptly record in the office of the Yavapai County, Arizona, Recorder, a deed conveying the Property to _____, in the form of Exhibit B hereto, reserving to Owner a royalty of seven and one-half percent (7 1/2%) of net smelter returns from all ores and mineral products taken from the Property and sold or otherwise disposed of, in an aggregate amount not to exceed the amount of the purchase price determined as provided in Section 3. Upon termination of the Mineral Lease with Option to Purchase for any reason other than exercise of the option to purchase the Property, _____ shall execute and deliver to Owner a quitclaim deed and relinquishment in the form of Exhibit C hereto.

Section 9. At any time during which this Mineral Lease with Option to Purchase is in effect, _____ may, in the name of Owner but at its own expense, relocate, amend, or apply for patent on any of the unpatented mining claims included in the Property, and such relocated,

amended and patented claims shall be deemed to be covered by the provisions of this Mineral Lease with Option to Purchase.

Section 10. _____ may at any time that this Mineral Lease with Option to Purchase is in effect install upon and remove from the Property any tools, machinery, equipment, and supplies owned or furnished by it. It is expressly understood and agreed that upon termination of this Mineral Lease with Option to Purchase for any reason, _____ may remove any such tools, machinery, equipment and supplies and such removal shall be at _____'s expense and shall be accomplished within one hundred eighty (180) days following such termination. However, upon termination of this Mineral Lease with Option to Purchase, _____ may not remove any underground timber or other supports installed by it and may not alter or restore any surface excavations or other surface workings, unless required to do so by applicable statutes, regulations or administrative orders. _____ may have a watchman on the Property during such a period.

As between the parties, it shall be the obligation of _____ to comply with all valid statutes, regulations and administrative orders relating to restoration of the surface of the Property to the extent the need for such restoration results from the operations of _____ hereunder.

Section 11. Upon termination of this Mineral Lease with Option to Purchase for any reason other than the payment by _____ to Owner of the purchase price at the times and in the amounts provided in Section 3 hereof, provided Owner is not then in default, _____ shall furnish Owner a copy of all drill hole logs and assays relating to the Property which it has acquired in its examination of the Property. Owner shall have the right to inspect the Property at any reasonable time.

Section 12. Until this Mineral Lease with Option to Purchase is terminated, _____ shall:

(a) pay on behalf of Owner all ad valorem taxes levied or assessed upon the Property and any improvements placed thereon by _____, commencing with taxes for the year 19_____, provided that upon termination of this Mineral Lease with Option to Purchase for any reason, taxes shall be apportioned between the parties on a calendar year basis for the year of such termination, Owner to pay that portion of such taxes applicable to that

part of the calendar year occurring after the termination hereof;

(b) assume all responsibility for personal injury to or death of any person or damage to property, resulting from the negligence or actionable fault of _____, its agents or employees, arising out of its exploration and development work or mining or other operations on or in connection with the Property and _____ does hereby indemnify and hold harmless Owner of and from any liability or obligation arising out of such injury or damage;

(c) pay for all labor and materials used by it on or in connection with the Property, and it does hereby indemnify and hold harmless Owner of and from any liens resulting therefrom.

Owner may post a Notice of Non-Liability on the Property, as provided by law, and _____ shall use its best efforts to keep said notice posted while it is in the possession of said Property, but _____ may change the location of such notice from time to time to the extent required to prevent unreasonable interference with the operations of _____.

Section 13. Owner represents and warrants that Owner is the sole owner of the mining claims included in the Property, that Owner is in possession and entitled to the possession of said mining claims, that Owner has not conveyed or encumbered said claims, and that there are no liens against said claims and that Owner holds title thereto free and clear of claims of creditors or persons claiming under them.

Without in any manner limiting or restricting any other right _____ may have against Owner, it is agreed that if at any time during the life of the Mineral Lease with Option to Purchase _____ or Owner shall discover any defect in the title to any of the mining claims included in the Property, including, without limitation, encumbrances and liens other than those resulting from acts or omissions of _____, Owner shall at Owner's sole expense remedy such defects. In the event Owner fails to remedy such defect or defects within a reasonable period of time, _____ may but shall not be required to do so and shall be reimbursed by Owner for any costs reasonably incurred by it in connection therewith, by deduction from royalty payments

if _____ so elects and by deduction from the purchase price as provided in Section 3 if the option to purchase is exercised by _____, provided, however, that any expense incurred after execution and delivery of a deed and prior to _____, 19_____, and not deducted from the purchase price, shall be repaid by Owner to _____.

In the event _____ exercises the option to purchase the Property, in addition to execution and delivery of a deed in the form of Exhibit B, Owner shall execute such other documents and perform such other acts as may be reasonably required to transfer complete title of the Property to _____ , including, but not limited to, a document in recordable form acknowledging payment of the reserved royalty at such time as the amount of the purchase price is fully paid out of royalties.

In the event of the repeal or substantial changes in the mining law in effect on the date hereof, _____ shall have whatever rights may be afforded to Owner under such law, including (but not limited to) whatever preferred right Owner may have to a lease from a governmental agency, subject, however, to the payment to Owner of the royalties prescribed in Section 4.

Section 14. All notices to _____ or Owner shall be in writing and may be delivered in person or sent by registered or certified mail, return receipt requested, addressed as herein set forth until any one party shall give notice to the other by registered or certified mail, return receipt requested, of any change of address which change of address, so communicated, shall thereafter be treated as the address of the party giving such notice. Notice shall be deemed delivered as of the date of mailing. Until a change of address is communicated as herein provided, notices shall be addressed as follows:

To Owner: Mr. Howard R. French
6407 W. Clouse Dr.
Phoenix, Arizona 85033

To

Section 15. Owner and _____ shall execute and acknowledge a Memorandum of Mineral Lease with Option to Purchase for purpose of recordation, which shall refer to and incorporate this Mineral Lease with Option to Purchase therein by reference.

Section 16. This Mineral Lease with Option to Purchase and all rights of _____ hereunder may be assigned by _____

to any financially responsible party, and such assignee shall succeed to all the rights and obligations of _____ hereunder as if originally named herein. The term "_____", whenever used herein, shall include any such assignee. The Property may be leased by _____ to any party, and Owner hereby consents to such leasing, provided that _____ shall continue to remain liable for all obligations hereunder.

The rights of Owner under this Mineral Lease with Option to Purchase may be assigned only with the prior written consent of _____ _____, which consent shall not be unreasonably withheld, and purported assignment without the consent of _____ shall be void.

In the event more than one person or entity are parties hereto as owners, the term "Owner" shall include all such persons and entities, and the obligations of Owner hereunder shall be joint and several.

Section 17. This instrument is a lease for a term from the date hereof to _____, (subject to termination as herein provided) with an option to purchase at any time during such term, and is not to be construed as a purchase contract, an option in gross, or otherwise than as a lease with option to purchase.

Section 18. This Mineral Lease with Option to Purchase shall inure to the benefit of and be binding upon the parties hereto, their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed this Mineral Lease with Option to Purchase the day and year first above written.

_____
Howard R. French

_____
Phyllis V. French

_____

By_____

Its_____

ATTEST:

_____

Its_____

These acknowledgments are a part of a Mineral Lease with Option to Purchase dated _____, 19_____, between HOWARD R. FRENCH and PHYLLIS V. FRENCH, husband and wife, and _____ _____, a corporation.

STATE OF ARIZONA)
) ss.
County of)

The foregoing instrument was acknowledged before me this _____day of _____, 19_____ by Howard R. French and Phyllis V. French.

_____
Notary Public

My Commission Expires:

_____

STATE OF ARIZONA)
) SS.
County of)

The foregoing instrument was acknowledged before me this _____day of _____, 19_____, by_____ _____of_____, on behalf of said corporation.

_____
Notary Public

My Commission Expires:

_____

D E E D

THIS INDENTURE, made this _____day of _____, 19_____, between HOWARD R. FRENCH and PHYLLIS V. FRENCH, husband and wife, Phoenix, Arizona, as Grantors, and _____, a corporation, as Grantee.

W I T N E S S E T H:

That Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable consideration, receipt of which is hereby acknowledged, do hereby grant and convey unto Grantee and to its successors and assigns forever the unpatented mining claims described in Exhibit A attached hereto and by this reference made part hereof, together with all ores, minerals and mineral rights appurtenant thereto, all water rights appurtenant thereto, all improvements, easements, licenses, rights of way and other interest appurtenant thereto (including any after acquired title of Grantors), hereby referred to as "Property".

Reserving unto Grantors, their heirs, personal representatives, and assigns forever a royalty of seven and one-half percent (7 1/2%) of the net smelter returns from all ores and mineral products taken by Grantee, its successors and assigns from the Property and sold or otherwise disposed of by it, until the aggregate amount of such royalty payments is equal to the sum of _____ Dollars ($_____), at which time the royalty shall cease and Grantors, their heirs, personal representatives and assigns, shall have no further interest of any kind in the Property.

The term "net smelter returns", wherever used herein, is hereby defined to mean the proceeds of metals derived from direct smelting ores, concentrates, precipitates and other products paid for by a smelter in accordance with the applicable smelting contract less cost of transportation from mine to smelter. In the event the Grantee markets refined metal or products other than those treated by a smelter, "net smelter returns" shall be deemed to mean the proceeds of the sale of such refined metal or other products less the cost of transportation from mine to market.

Grantee agrees to make royalty payments on or before the fifteenth day of the month next following the month of receipt by Grantee of payment from the smelter or other purchaser, and to accompany such payments with a

statement of the manner in which said payments are calculated, and a duplicate smelter settlement sheet, together with other applicable data.

Nothing herein shall be construed to require Grantee to mine or otherwise operate the Property.

To have and to hold unto the Grantee, its successors and assigns forever.

IN WITNESS WHEREOF Grantors have executed this Deed the day and year first above written.

_____
Howard R. French

_____
Phyllis V. French

STATE OF ARIZONA)
) ss.
County of)

The foregoing instrument was acknowledged before me this _____day of _____, 19_____, by Howard R. French and Phyllis V. French, husband and wife.

_____
Notary Public

My Commission Expires:

_____

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

That _____, a corporation, does hereby relinquish to HOWARD R. FRENCH and PHYLLIS V. FRENCH, husband and wife, that certain Mineral Lease with Option to Purchase dated _____ _____, 19_____, between said parties, a short form of which is recorded in the official records of Yavapai County, Arizona, in Docket _____, page_____thereof.

And said _____does hereby remise, release and quitclaim unto said HOWARD R. FRENCH and PHYLLIS V. FRENCH, all of its right, title and interest in and to the mining claims covered by said Mineral Lease with Option to Purchase.

IN WITNESS WHEREOF, _____ has executed this instrument this _____day of _____, 19_____.

_____

By_____

Its_____

ATTEST:

_____

Its_____

STATE OF ARIZONA)
) ss.
County of)

The foregoing instrument was acknowledged before me this _____day of _____, 19_____, by _____ as _____of _____, a corporation, on behalf of said corporation.

_____
Notary Public

My Commission Expires:

_____

M E M O

TO: C.A. O'Brien, R.R. Short, A.F. Budge, D.H. Allen

FROM: Don C. White

DATE: November 18, 1988

SUBJECT: Gold lode potential near the Golden Turkey tailings, Cleator, AZ.

Further to my memo of Sept. 29, 1988 on the Golden Turkey tailings, I have now been allowed to inspect old AmSelco files on the adjacent Penny-Rich property. Copies were retained by Paul Strobel, then project geologist for AmSelco, and are now in REDCO's Prescott files.

What I learned is that the gold grades are not so hot. There is a gossanous zone outcropping and carrying anomalous gold, mercury and base metals. Outcrop samples include a couple values up to 1.8 ppm Au (about 0.05 oz/t) but the average is less than 0.02 oz/t. AmSelco's drilling focused on the base metal potential mainly beneath the zone of oxidation (perhaps up to 100 feet deep). Of their 10-15 core holes, the only significant gold intercept was 4 ft. of about 0.2 oz/t (hole PR-75-2, 181'-185') with about 1% arsenic (probably arsenopyrite hosted) and negligible silver and base metals. Adjacent footages were barren, as were holes along strike both directions.

Thus the lode potential of Penny-Rich for leachable gold ores to accompany Golden Turkey tailings is virtually nil. Any consideration of the Golden Turkey's viability is going to have to depend on the tailings themselves.

If the estimated 60,000 tons of 0.04 oz/t gold tailings (based on one 60-ft series of 10 samples) may be considered economic and a deal seems reasonably obtainable from the owners, I shall be happy to further auger and quantify the tailings reserve.

DW:sk

M E M O

TO: C.A. O'Brien, R.R. Short, A.F. Budge, D.H. Allen

FROM: Don C. White

DATE: September 29, 1988

SUBJECT: Golden Turkey tailings, Cleator, Arizona

INTRODUCTION: Auriferous tailing from the Golden Turkey mine and mill lie just south of the Crown King Road about two miles east of Cleator (figure 1). Rumor has it that "quiet title" has just been obtained by four Phoenix attorneys known of by Harvey Smith who passed the idea to Carole. At Carole's request a brief evaluation was made.

I spent one full day, September 3rd, inspecting the area, sampling the dumps, augering the tailings and making the requisite visit with the new watchman.

DUMPS: The Golden Turkey Mine was a small quartz vein lode with locally high gold values associated with base metal sulfides and pyrite. This is borne out by the waste dumps, rumored to be the rejects of hand cobbing. Selected quartz fragments assay a quarter ounce gold per ton. Sulfidic-impregnated wall rock assays only .025 oz/t and the bulk of the dump, being neither quartz nor sulfidic, is probably barren country rock.

TAILINGS: The tailings vary in texture and in gold and silver content from one area to another. Three areas were hand augered, corresponding to the extremes of a rounded triangular tailings pile (see figure 2). In general, the more sandy or coarser grained tailings assay higher (about .04 oz/t). Indurated clayey material predominating to the east and at depth assays quite low (about .01 oz/t). There is some enrichment of gold in the very top-most tailings, probably by winnowing of fines, and perhaps by some dehydration wicking phenomenon. A surface grab sample assayed .069 oz/t.

Anderson (1972) states in his report (extract appended) that the Golden Turkey mill operated only from 1935 to 1942 and that "approximately 144,000 tons of ore was mined and milled." With that figure as a starting point we must deduct a large chunk for the erosion by Turkey Creek (figure 4).

Those tails remaining are likely no more than 100,000 tons. Of these, at least one third are clearly fines with subeconomic grades of .01 oz/t or less. Thus we have something like 60,000 tons still attractive.

That 60,000 tons may average about .041 oz/t Au and 0.7 oz/t Ag if the SW auger holes are representative. They were positioned to sample much of the roughly 60-foot face of the tails where eroded by Turkey Creek (figure 4). That sector of tails is generally quite sandy/coarse grained and probably very amenable to cyanidation and heap leaching.

OTHER TAILINGS: While 60,000 tons may not be enough to justify an operation (Carole ought to apply her economic/financial analyses) one can consider some possible add-ons. Immediately north of the Golden

Turkey is the Golden Belt Mine (figure 1) under separate ownership. It had its own mill and even took Golden Turkey ores for some pre-1935 intervals. Having had no permission to trespass there, I can just guess by viewing from a distance that there are at least 10,000 tons of tails there.

LODE POTENTIAL: Yet another consideration is AmSelco's discovery of an auriferous, pyritic lode just east of the Golden Turkey (figure 1). It was found by geophysics and drilling and was apparently too small and/or low grade for them but a couple hundred thousand tons of 0.1 oz/t isn't out of the question, depending on the dip (likely steep) and how far one can take an open cut. More particulars on their "Pennyrich" target are probably available if this becomes worth pursueing. The leachability of highly sulfidic ores, however, is likely not very great.

WATER: In addition to access being very good, a water supply is likely assured by the Golden Turkey underground workings. A brief effort in 1962 involved dewatering the shaft and Neil Miller (former watchman - ?) says "pumping 1,000 g.p.m. didn't touch it, 2,000 g.p.m. made slow progress," and that at only the 100 to 150 levels. Thus those upper workings should be able to supply plentiful process water to any operation.

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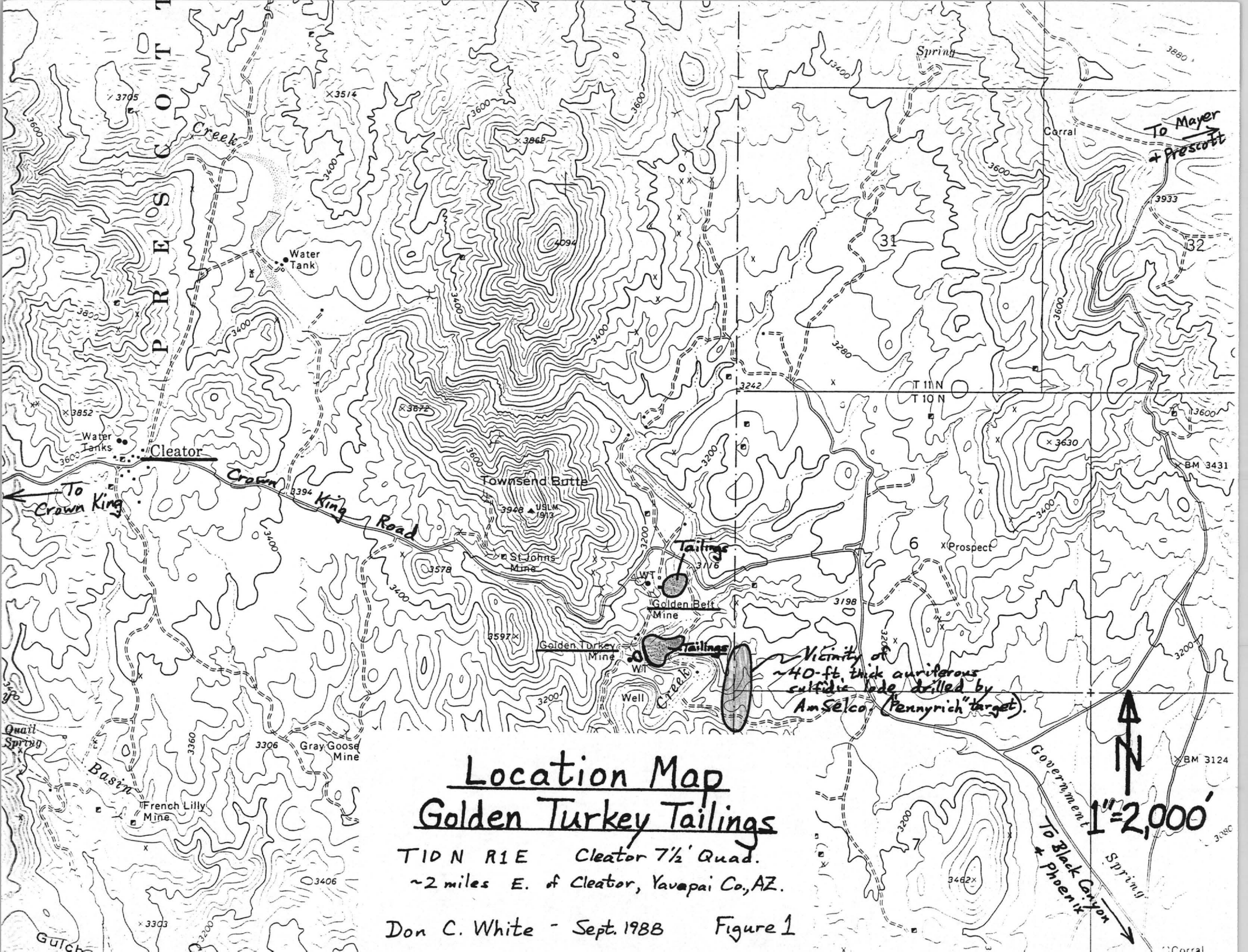
DW:sk

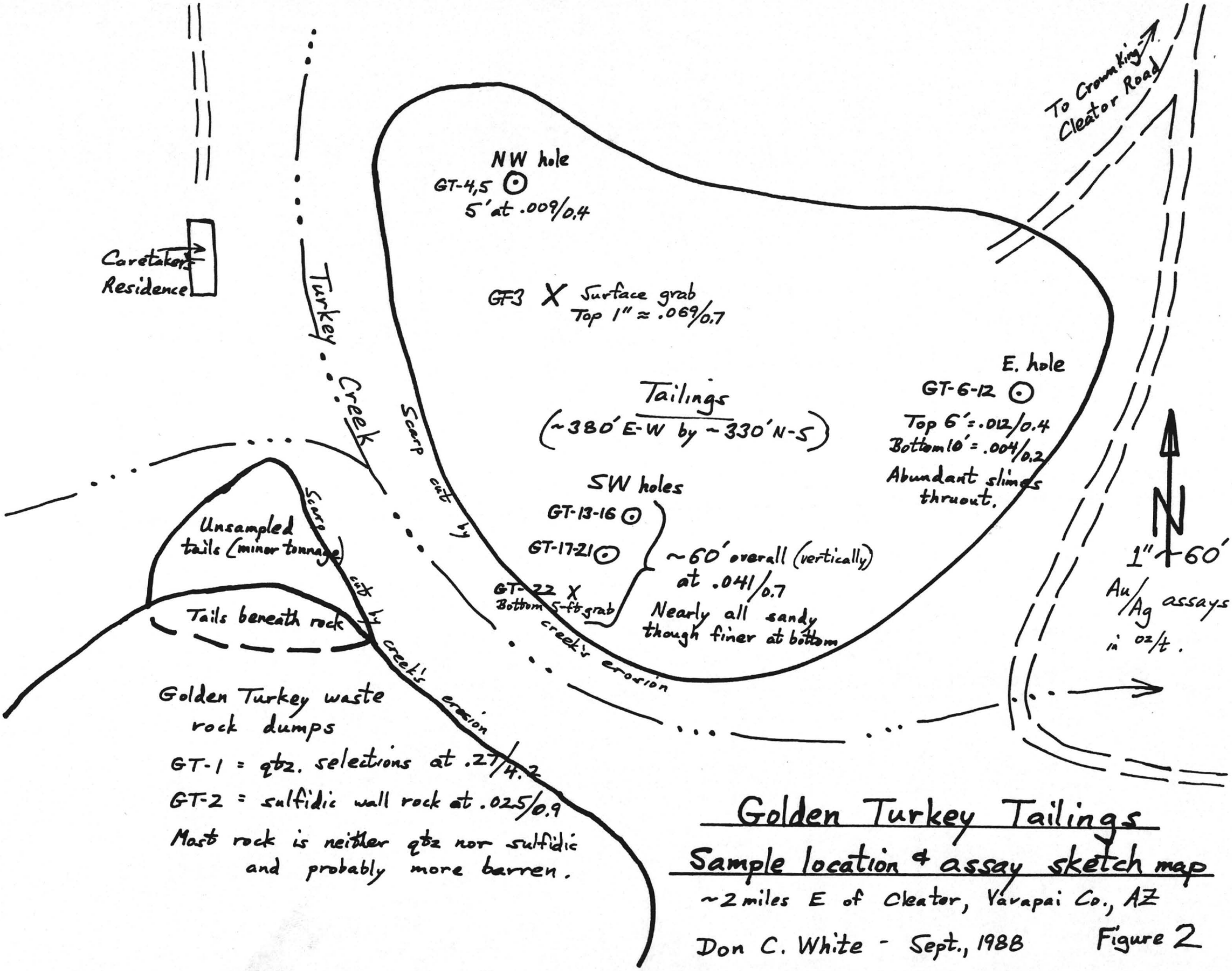


Location Map
Golden Turkey Tailings

T10N R1E Cleator 7½' Quad.

~2 miles E. of Cleator, Yavapai Co., AZ.

Don C. White - Sept. 1988 Figure 1



Golden Turkey Tailings

Sample location & assay sketch map

~2 miles E of Cleator, Yavapai Co., AZ

Don C. White - Sept., 1988

Figure 2

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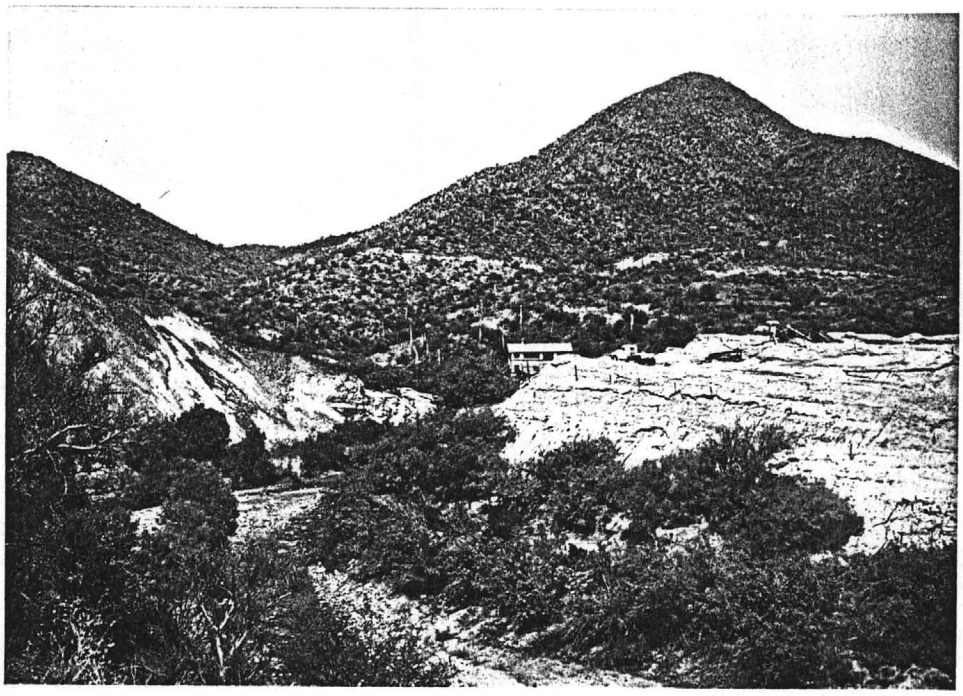

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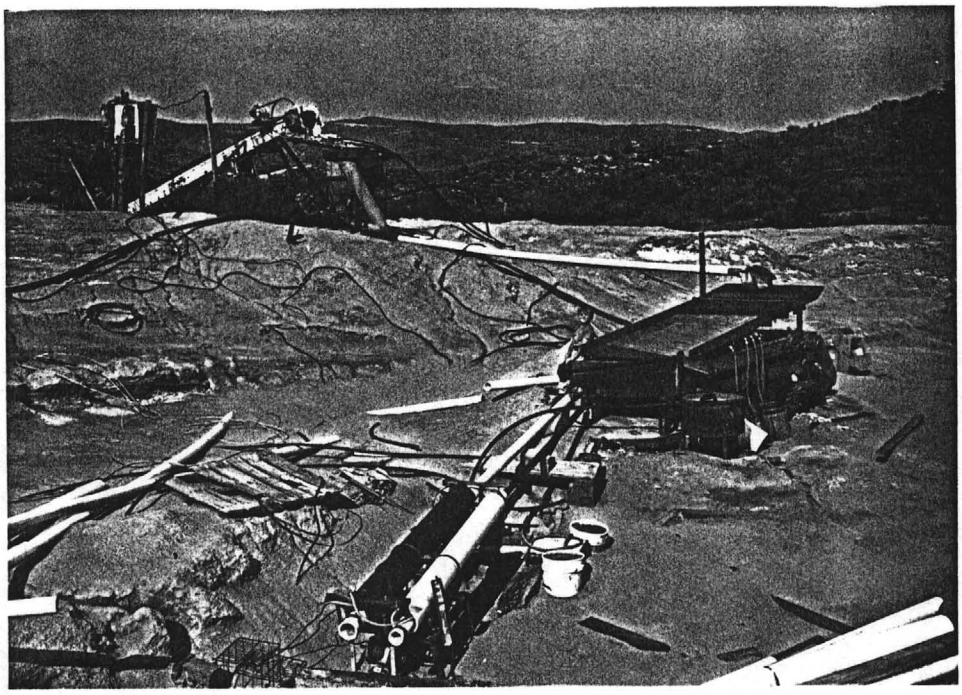

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IRON KING ASSAY INC.

12-Sep-88

LAB JOB #: AFB03015

ATTN: Carole A. O'Brien

Client name: A. F. Budge (Mining) Ltd.

No. Samples: 13
Date Received: 09-03-88
Submitted by: D. White

Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251

Phone number: 945-4360/778-3140

INVOICE ATTACHED

ANALYTICAL REPORT

Golden Turkey Samples

Client ID AFB03015	Lab ID	Fire Assay Au oz/ton	Ag oz/ton	
GT-1	3015- 1	0.276	4.25	Dump rock selected for qtz, ± py, spy
GT-2	3015- 2	0.025	0.89	Dump rock selected for schistose wall rock with disseminated euhedra py, spy
GT-3	3015- 3	0.069	0.73	Top ½ inch tails; coarse, sandy, much quartz; Au-enriched.
Break in sequence				
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GT-20	3015- 11	0.031	0.70	9-12'
GT-21	3015- 12	0.040	0.99	12-15'
GT-22	3015- 13	0.028	0.78	Grab from bottom 5 ft. tails next to Turkey Cr., SW corner of tailings pile.

REGISTERED ASSAYER
CERTIFICATE NO. 14815
ROBERT G. CROOK
Date Signed 9-12-88
ARIZONA, U.S.A.

IRON KING ASSAY INC.

28-Sep-88

LAB JOB #: AFB03108

ATTN: Carole A. O'Brien

Client name: A. F. Budge (Mining) Ltd.

No. Samples: 9
Date Received: 09-22-88
Submitted by: D. White

Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251-3504

Phone number: 945-4360/778-3140

INVOICE ATTACHED

ANALYTICAL REPORT

Additional Golden Turkey Tailings Samples

Client ID AFB03108	Lab ID	FA/AA Au oz/ton	Fire Assay Ag oz/ton		
GT-4	3108- 1	0.007	0.40	ϕ-3'	Auger hole to bedrock near NW corner of tails $\bar{x}$ = .009 Au/0.37 Ag
GT-5	3108- 2	0.011	0.34	3-5'	
GT-6	3108- 3	0.012	0.42	ϕ-2'	Auger hole at E extreme of tailing; very fine + clayey (slimes). Top 6' = .012/.37 Bottom 10' = .004/.18
GT-7	3108- 4	0.015	0.46	2-4'	
GT-8	3108- 5	0.010	0.24	4-6'	
GT-9	3108- 6	0.003	0.16	6-8'	
GT-10	3108- 7	0.006	0.25	8-10'	
GT-11	3108- 8	0.005	0.22	10-13'	
GT-12	3108- 9	0.004	<.10	13-16'	

REGISTERED ASSAYER CERTIFICATE NO. 14315 ROBERT G. CROOK Date Signed 9-30-88 ARIZONA, U.S.A.

Crook

Anderson, CA; 1972
U.S. G.S. Bulletin 1345

area, significant production has been reported only from the Blue Bell mine. The initial discovery of this deposit was probably made in the late 1870's, but as there were no rich surface ores, no mining was done until 1896. Early in the 20th century, a smelter was built at Humboldt, 12 miles due north, to treat ore from the Blue Bell mine, and by 1906, the mine was a major copper producer (Dunning, 1959, p. 349).

From 1896 to 1926, the Blue Bell mine operated intermittently, owing to changes in smelter ownership and instability of the copper market (Dunning, 1959, p. 350). During that period, 33,500 tons of copper was produced and in addition gold valued at $1 million and silver valued at $1.2 million, representing a total value of $14 million (Elsing and Heineman, 1936, p. 101), was produced. During the period 1944–48, L. L. Farnham mined oxidized copper ore from the top of one of the major ore shoots adjacent to the main shaft. More than 7,000 tons of ore was produced, averaging about 5 percent copper, largely in the form of cuprite and native copper, valued at about $150,000 (Dunning, 1959, p. 350; L. L. Farnham, written commun., May 25, 1965). The mine has been idle since 1948.

The Blue Bell ore body is one of several Precambrian massive sulfide deposits in the Yavapai Series in this general region; these deposits include the United Verde and United Verde Extension at Jerome, the Iron King at Humboldt, and several smaller deposits in the NW¼ Mayer quadrangle—the Lone Pine, Boggs, Iron Queen, and Hackberry (Anderson and Blacet, 1972a). The Blue Bell ore body is a series of overlapping lenses of granular pyrite and subordinate chalcopyrite that form a mineralized zone essentially conformable with the foliation in the Iron King Volcanics. The width of the zone is about 100 feet, and the developed length of the deposit is 1,600 feet. The ore shoots plunge steeply to the south (Lindgren, 1926, p. 143–144).

Quartz veins of Precambrian age in the Cordes area were reported by Lindgren (1926, p. 153, 156). These veins consist largely of glassy quartz with a small amount of sulfide minerals reported to contain gold and represented by a vein near Cleator. Jerome (1956, p. 125) states that the Hidden Treasure is one of the better representatives of this class of deposit in this area. According to Elsing and Heineman (1936, p. 102), the gold produced from the Hidden Treasure deposit was valued at $20,000.

The ore deposits south and east of Cleator, including the French Lily, Gray Goose, St. Johns, Golden Belt, Golden Turkey, and Silver Cord (pl. 1), are characterized by low-dipping vuggy

quartz veins containing arsenopyrite, galena, sphalerite, and silver minerals. Copper-bearing minerals are subordinate. Lindgren (1926, p. 153) and Jerome (1956, p. 126) refer to these deposits as "flat" veins because of their low dips. Lindgren (1926, p. 158) reports dips at the Silver Cord mine as "less than 20°."

Jerome (1956, p. 126) has suggested that the "flat" veins are probably related to "Mesozoic-Cenozoic(?)" intrusive rocks because locally mineralized rhyolite porphyry near Cleator occupies low-dipping structures. To the north, similar rhyolite porphyry dikes intrude granodiorite stocks dated isotopically as Late Cretaceous or early Tertiary (Anderson and Blacet, 1972a), supporting the suggestion that the "flat" veins are of this age (Laramide).

Reported production from the "flat" veins has been small. According to Dunning (1959, p. 360), the Golden Belt mine produced, between 1931 and 1933, gold valued at $65,000, silver valued at $10,000, and lead valued at $5,000. R. M. Lampton acquired the property in 1934, deepened the shaft, and mined 25,000 tons of gold ore between 1934 and 1939.

The Golden Turkey deposit was located before 1900 and a shaft 100 feet deep sunk, but there was no production until 1933, when 4,000 tons of ore was run through the adjoining Golden Belt mill. The inclined shaft was deepened to the 500-foot level, and a mill was built at the mine; between 1935 and 1942, approximately 144,000 tons of ore was mined and milled. According to Dunning (1956, p. 361), "The ore was quite low-grade, with values in gold, silver, and a little copper and lead. Careful management, however, succeeded in making a little profit." The mine closed down early in 1942.

Lindgren (1926, p. 158) reported that the Silver Cord vein contained silver and gold associated with some pyrite, galena, and chalcopyrite, and that by 1922, 20 or 30 carloads of shipping ore had been produced; some of it was valued at $40 per ton. Lindgren (1926, p. 159) stated that some ore was shipped from the French Lily mine in 1923, but the amount and value are not reported.

REFERENCES CITED

Anderson, C. A., 1967, Precambrian wrench fault in central Arizona, *in* Geological Survey research 1967: U.S. Geol. Survey Prof. Paper 575–C, p. C60–C65.

Moss M

Oro Belle
Tiger District

Wilson, E.D., et al
1967
AZ Bur. of Geol.
Bulletin 137
Golden
Turkey
et. al.

"The Cumberland mine is one mile north of Pine Flat and was last in operation about 1908. According to information o from T. Roach, of Pine Flat, this is a gold quartz vein st little east of north and dipping west. The shaft is 350 fe and there are short drifts. The shoot on the north is said continued to the lowest workings; it contains ore of $4(which was treated in a 10-stamp mill at Pine Flat. The reported as free and visible in places. The water level wa at a depth of 90 feet.

"It is probable that here, as in many other places, the tions became unfavorable when the workings reached t phide ore below water level. There is said to be placer in the vicinity of the Cumberland mine."

BLACK CANYON DISTRICT

The Black Canyon district comprises an area about 18 miles long by 8 miles wide that extends, between the eastern foot of the Bradshaw Mountains and the Agua Fria River, from the vicinity of Cordes on the north to the Maricopa County boundary on the south.

Here, a northward-trending belt of sedimentary Yavapai schist, about 2 miles wide, is intruded on the east and west by Bradshaw granite and on the east by a northward-trending strip of diorite. These formations floor a former valley and hilly pediment that is covered on the east by volcanic rocks and has been deeply dissected by the southward-flowing, meandering drainage system of Black Canyon. The elevation of the district ranges from 2,000 to 4,000 feet above sea level.

Lindgren[62] groups the gold-bearing veins of the Black Canyon district into two classes: (1) Pre-Cambrian quartz veins, mainly in the vicinity of Bumblebee and Bland Hill; and (2) quartz veins which dip at low angles and appear to be genetically connected with younger dikes of rhyolite-porphyry.

According to figures compiled by V. C. Heikes, of the U. S. Geological Survey, the Black Canyon district from 1904 to 1924, inclusive, produced $131,848 worth of gold, silver, lead, and copper. Of this amount $71,132 was gold of which a small percentage came from placers.

The pre-Cambrian veins, according to Lindgren, are of glassy quartz with free gold and some sulphides. They have furnished most of the gold for the placers of the district. He mentions the Cleator property, at Turkey Creek, and the Nigger Brown, Blanchiana, and Gillespie mines, south of Bumblebee, as having been worked in a small way.

GOLDEN TURKEY MINE

The Golden Turkey mine, held by H. C. Mitchell and associates, is on the west side of Turkey Creek, near the eastern foot of the

[62] Work cited, p. 153.

Bradshaw Mountains, at an elevation of about 3,000 feet. Via the Black Canyon Highway, the property is about 15 miles from Mayer, the nearest railway shipping point.

Some years ago, a 100-foot shaft was sunk on the property, but no production was made until 1933 when the workings were extended, and more than 4,000 tons of ore were run through the Golden Belt mill. The monthly yield was approximately two cars of concentrates containing gold and silver together with some zinc and a little copper. Several shipments of smelting ore also were made.

Here, pre-Cambrian schist strikes northward and dips almost vertically. The vein, which strikes northeastward and ranges in dip from 30° to less than 10° SE., occupies a fissure zone that is probably due to thrust faulting. As exposed, the vein ranges from a few inches to more than a foot in width and in places forms a branching lode several feet wide. The vein filling consists of very coarsely crystalline, milky to clear, glassy quartz together with rather abundant irregular masses and disseminations of pyrite, galena, and sphalerite. In places, a little chalcopyrite is present. The gold accompanies the sulphides, particularly the pyrite. The vein walls show rather intense sericitization and silification and in places contain disseminated metacrysts of practically barren pyrite.

When visited in January, 1934, developments consisted of a 500-foot inclined shaft and approximately 2,000 feet of workings. Most of the ore mined has come from below the 350-foot level, particularly where the vein flattens in dip. According to Mr. Mitchell,[63] the oxidized zone extended to a depth of approximately 250 feet on the incline.

GOLDEN BELT MINE[64]

The Golden Belt mine, held by the Golden Belt Mines, Inc., is a few hundred feet north of the Golden Turkey. Its original location is reported to have been made in 1873 by George Zika. Production prior to 1916, according to the local press, amounted to several hundred tons of ore of which part was shipped and part was milled. The present operators obtained this ground in 1931 prior to which time a small mill had been built and a little development work done. Subsequently, the mill has been rehabilitated and operated. In 1931, 134 tons of concentrates from 1,345 tons of ore were produced, and 107 tons of smelting ore were shipped.[65]

[63] Oral communication.

[64] In part abstracted from Minton, D. C., Cost of equipping and developing a small gold mine in the Bradshaw Mountains quadrangle, Yavapai County, Arizona: U. S. Bureau of Mines Information Circular 6735. 1933.

[65] U. S. Bureau of Mines Mineral Resources for 1931, Part I, p. 410.

Operations were continued through 1932 and 1933. Minton[66] states that the net smelter returns for 1931 and part of 1932 amounted to $891 on 106 tons of crude ore and $8,523 on 285 tons of concentrates. During 1933, ore from the Golden Turkey mine also was treated in the mill.

The geology of this mine is similar to that of the Golden Turkey. The prevailing rocks consist of pre-Cambrian schist, intruded by dikes of siliceous to basic porphyry. The Golden Belt vein, which strikes approximately N. 60° E. and dips from 10° to 23° SE., occurs within the fissure zone of a probable thrust fault. Minton[67] states that the vein, as exposed, ranges from a few inches to about 3 feet in width and carries from $5 to $40 in gold and from one to 10 ounces of silver per ton. In the upper portions of the mine, above the water level, the vein contains oxides of iron and lead and some free gold. Below the water level or 50 feet below the surface, galena and pyrite predominate, and the gold occurs mainly in the galena. The silver is asserted to be decreasing with depth.

In January, 1934, the mine was developed by an "irregular" inclined shaft, reported to be 800 feet in length, with several hundred feet of drifts and stopes. Minton states that the cost of sinking 150 feet of the incline amounted to $6.22 per foot. As the workings extend under Turkey Creek, considerable water has been encountered.

The Golden Belt flotation mill has a maximum capacity of 50 tons per day. Power is obtained from the Arizona Power Company.

SILVER CORD VEIN[68]

"About a mile southeast of Turkey Creek station is the Silver Cord vein, said to be traceable through six claims. It dips south or southeast at an angle of less than 20°. This vein contains both silver and gold, together with some pyrite, galena, and chalcopyrite. The deposit was operated for several years, and twenty or thirty carloads of shipping ore is said to have been produced. In 1912, it is reported, 224 tons was shipped containing $40.67 a ton in gold, silver, copper, and lead. Among the properties on the Silver Cord vein is the American Flag, or the Old Brooks mine. Mr. Cleator, of Turkey Creek station, states that he shipped about twelve carloads from this property. The first-class ore contained $75 to the ton; the second-class ore $18 or more."

The U. S. Mineral Resources state that a small production of ore containing silver, lead, gold, and copper was made by the Silver Cord mine in 1925, 1928, 1929, and 1930.

[66] Work cited, p. 10.

[67] Work cited, p. 3.

[68] Quoted from Lindgren, work cited, p. 158.

M E M O

TO: C.A. O'Brien, R.R. Short, A.F. Budge, D.H. Allen

FROM: Don C. White

DATE: September 29, 1988

SUBJECT: Golden Turkey tailings, Cleator, Arizona

INTRODUCTION: Auriferous tailing from the Golden Turkey mine and mill lie just south of the Crown King Road about two miles east of Cleator (figure 1). Rumor has it that "quiet title" has just been obtained by four Phoenix attorneys known of by Harvey Smith who passed the idea to Carole. At Carole's request a brief evaluation was made.

I spent one full day, September 3rd, inspecting the area, sampling the dumps, augering the tailings and making the requisite visit with the new watchman.

DUMPS: The Golden Turkey Mine was a small quartz vein lode with locally high gold values associated with base metal sulfides and pyrite. This is borne out by the waste dumps, rumored to be the rejects of hand cobbing. Selected quartz fragments assay a quarter ounce gold per ton. Sulfidic-impregnated wall rock assays only .025 oz/t and the bulk of the dump, being neither quartz nor sulfidic, is probably barren country rock.

TAILINGS: The tailings vary in texture and in gold and silver content from one area to another. Three areas were hand augered, corresponding to the extremes of a rounded triangular tailings pile (see figure 2). In general, the more sandy or coarser grained tailings assay higher (about .04 oz/t). Indurated clayey material predominating to the east and at depth assays quite low (about .01 oz/t). There is some enrichment of gold in the very top-most tailings, probably by winnowing of fines, and perhaps by some dehydration wicking phenomenon. A surface grab sample assayed .069 oz/t.

Anderson (1972) states in his report (extract appended) that the Golden Turkey mill operated only from 1935 to 1942 and that "approximately 144,000 tons of ore was mined and milled." With that figure as a starting point we must deduct a large chunk for the erosion by Turkey Creek (figure 4).

Those tails remaining are likely no more than 100,000 tons. Of these, at least one third are clearly fines with subeconomic grades of .01 oz/t or less. Thus we have something like 60,000 tons still attractive.

That 60,000 tons may average about .041 oz/t Au and 0.7 oz/t Ag if the SW auger holes are representative. They were positioned to sample much of the roughly 60-foot face of the tails where eroded by Turkey Creek (figure 4). That sector of tails is generally quite sandy/coarse grained and probably very amenable to cyanidation and heap leaching.

OTHER TAILINGS: While 60,000 tons may not be enough to justify an operation (Carole ought to apply her economic/financial analyses) one can consider some possible add-ons. Immediately north of the Golden

Turkey is the Golden Belt Mine (figure 1) under separate ownership. It had its own mill and even took Golden Turkey ores for some pre-1935 intervals. Having had no permission to trespass there, I can just guess by viewing from a distance that there are at least 10,000 tons of tails there.

LODE POTENTIAL: Yet another consideration is AmSelco's discovery of an auriferous, pyritic lode just east of the Golden Turkey (figure 1). It was found by geophysics and drilling and was apparently too small and/or low grade for them but a couple hundred thousand tons of 0.1 oz/t isn't out of the question, depending on the dip (likely steep) and how far one can take an open cut. More particulars on their "Pennyrich" target are probably available if this becomes worth pursueing. The leachability of highly sulfidic ores, however, is likely not very great.

WATER: In addition to access being very good, a water supply is likely assured by the Golden Turkey underground workings. A brief effort in 1962 involved dewatering the shaft and Neil Miller (former watchman - ?) says "pumping 1,000 g.p.m. didn't touch it, 2,000 g.p.m. made slow progress," and that at only the 100 to 150 levels. Thus those upper workings should be able to supply plentiful process water to any operation.

SUMMARY: Thus the Golden Turkey tailings may amount to about 60,000 tons of sandy, leachable .041 oz/t gold, 0.7 oz/t Ag. Some additional tails may be obtainable from the Golden Belt property and/or open pitable sulfidic lode gold ores from an adjacent virgin lode deposit. Access and water availability are attributes of the property.

RECOMMENDATIONS: Carole should perform enough financial review of this target to determine whether it is worth pursueing further. If so, the terms of a deal with the Golden Turkey owners, approaches on the Golden Belt tailings, and inquiries regarding the "Pennyrich" lode deposit can all be worked on. If still attractive, more sampling and metallurgical work will then be performed.

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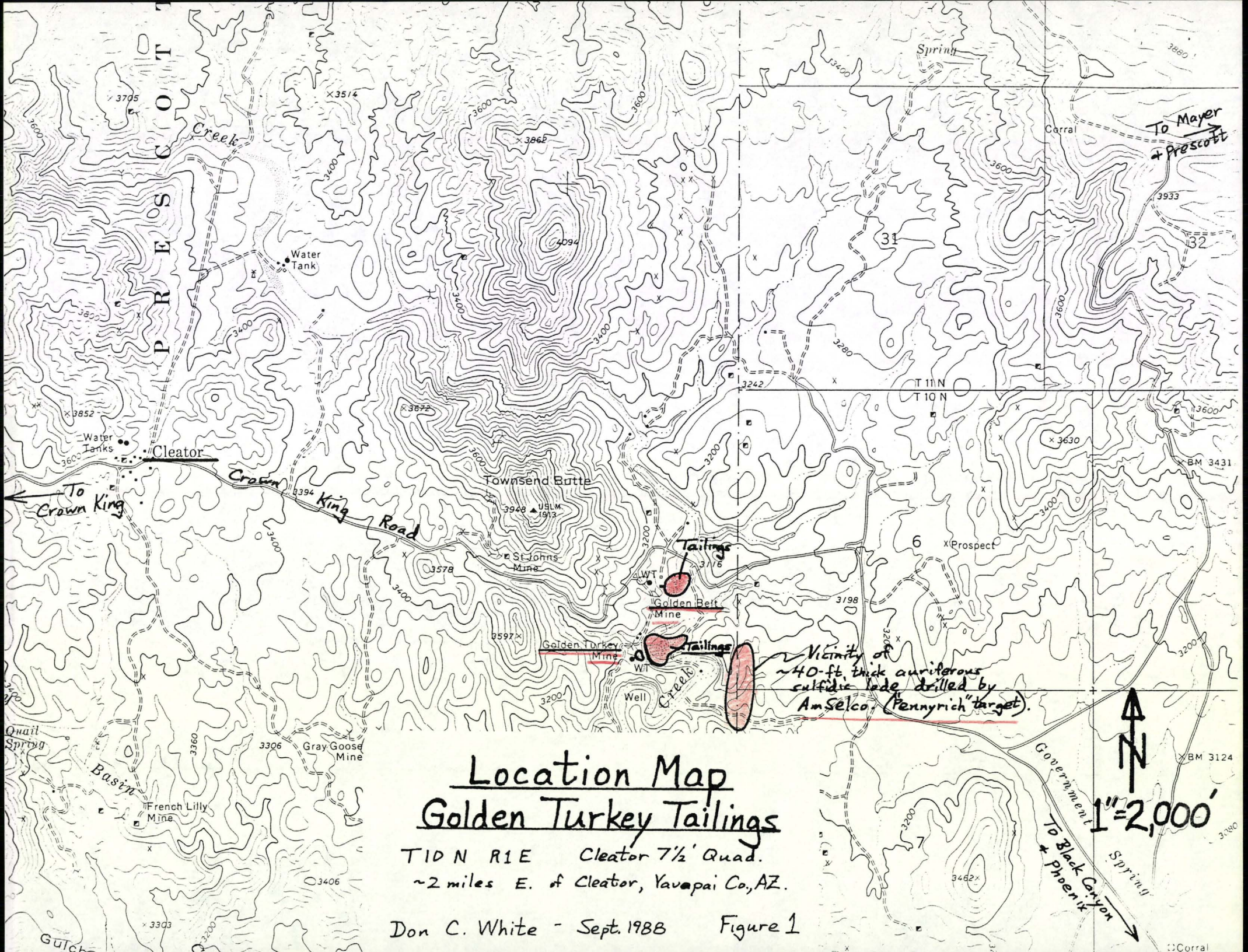

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Golden Turkey Tailings

T10N R1E Cleator 7½' Quad.

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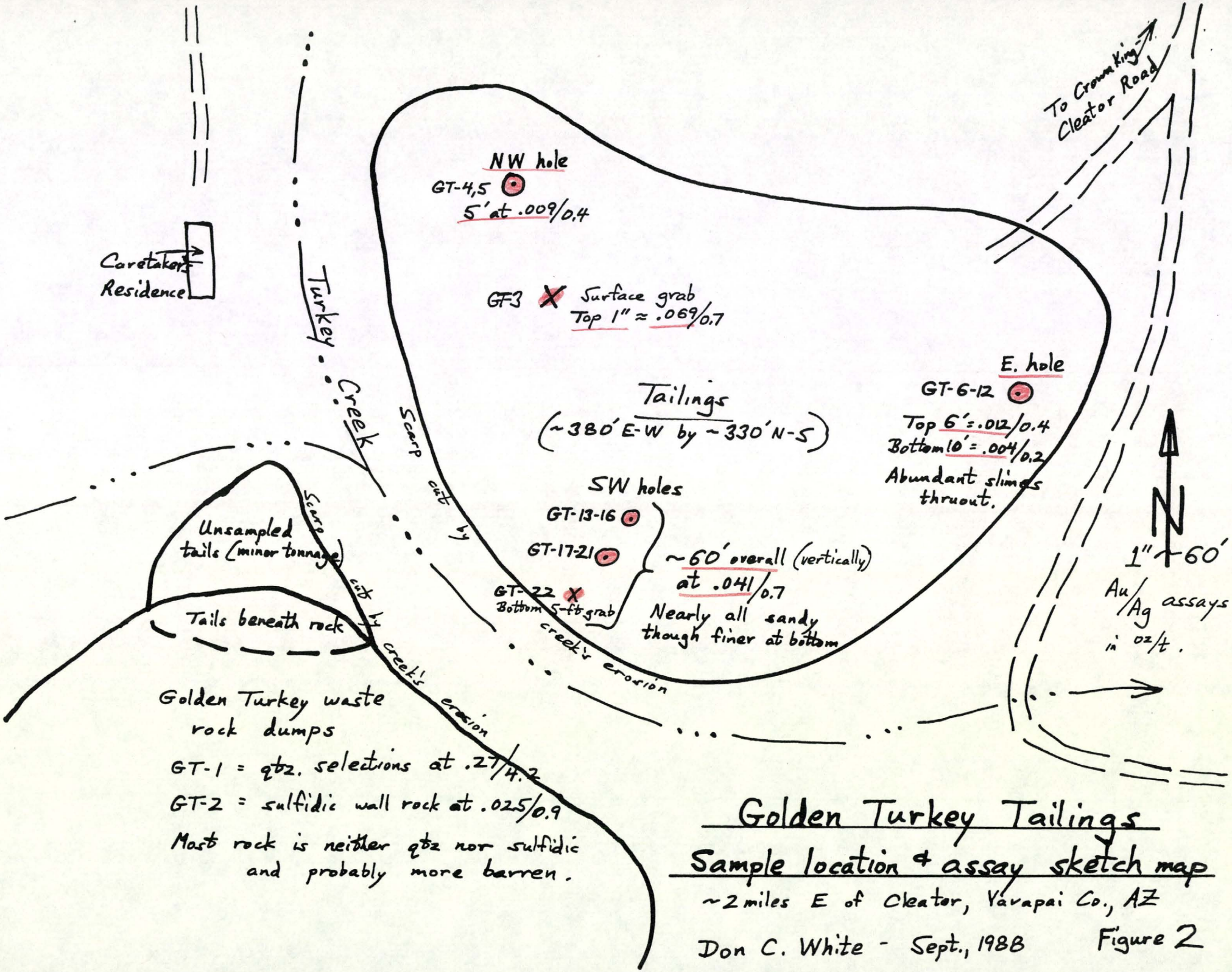
Don C. White - Sept. 1988 Figure 1



Golden Turkey Tailings

Sample location & assay sketch map

~2 miles E of Cleator, Yavapai Co., AZ

Don C. White - Sept., 1988

Figure 2

Figure 3: Golden Turkey dumps and tailings (center) visible S of road to Cleator and Crown King and at foot of Bradshaw Mtns.

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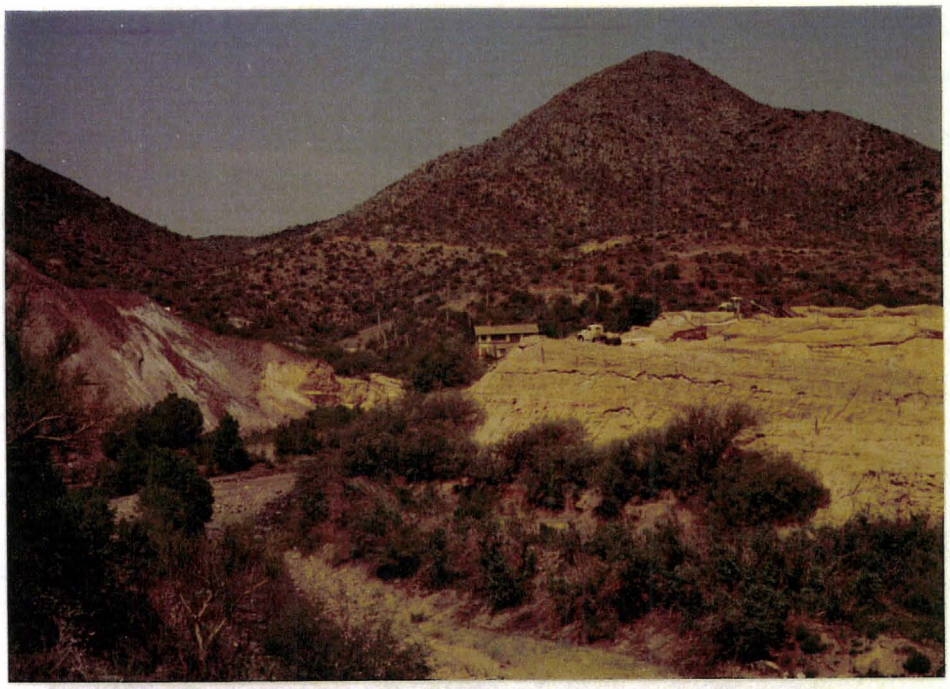

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IRON KING ASSAY INC.

12-Sep-88

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ATTN: Carole A. O'Brien

Client name: A. F. Budge (Mining) Ltd.

No. Samples: 13
Date Received: 09-03-88
Submitted by: D. White

Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251

Phone number: 945-4360/778-3140

INVOICE ATTACHED

ANALYTICAL REPORT

Golden Turkey Samples

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REGISTERED CERTIFICATE 10315 ROBERT G. CROOK Date Signed 9-12-88 ARIZONA, U.S.A.

IRON KING ASSAY INC.

28-Sep-88

LAB JOB #: AFB03108

ATTN: Carole A. O'Brien

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No. Samples: 9
Date Received: 09-22-88
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Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251-3504

Phone number: 945-4360/778-3140

INVOICE ATTACHED

ANALYTICAL REPORT

Additional Golden Turkey Tailings Samples

Client ID AFB03108	Lab ID	FA/AA Au oz/ton	Fire Assay Ag oz/ton		
GT-4	3108- 1	0.007	0.40	ϕ-3'	Auger hole to bedrock near NW corner of tails $\bar{X}$ = .009 Au/0.37 Ag
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GT-12	3108- 9	0.004	<.10	13-16'	

REGISTERED ASSAYER CERTIFICATE No. 14315 ROBERT G. CROOK Date Signed 9-28-88 ARIZONA, U.S.A.

Crook

Anderson, CA; 1972
U.S. G.S. Bulletin 1345

area, significant production has been reported only from the Blue Bell mine. The initial discovery of this deposit was probably made in the late 1870's, but as there were no rich surface ores, no mining was done until 1896. Early in the 20th century, a smelter was built at Humboldt, 12 miles due north, to treat ore from the Blue Bell mine, and by 1906, the mine was a major copper producer (Dunning, 1959, p. 349).

From 1896 to 1926, the Blue Bell mine operated intermittently, owing to changes in smelter ownership and instability of the copper market (Dunning, 1959, p. 350). During that period, 33,500 tons of copper was produced and in addition gold valued at $1 million and silver valued at $1.2 million, representing a total value of $14 million (Elsing and Heineman, 1936, p. 101), was produced. During the period 1944–48, L. L. Farnham mined oxidized copper ore from the top of one of the major ore shoots adjacent to the main shaft. More than 7,000 tons of ore was produced, averaging about 5 percent copper, largely in the form of cuprite and native copper, valued at about $150,000 (Dunning, 1959, p. 350; L. L. Farnham, written commun., May 25, 1965). The mine has been idle since 1948.

The Blue Bell ore body is one of several Precambrian massive sulfide deposits in the Yavapai Series in this general region; these deposits include the United Verde and United Verde Extension at Jerome, the Iron King at Humboldt, and several smaller deposits in the NW¼ Mayer quadrangle—the Lone Pine, Boggs, Iron Queen, and Hackberry (Anderson and Blacet, 1972a). The Blue Bell ore body is a series of overlapping lenses of granular pyrite and subordinate chalcopyrite that form a mineralized zone essentially conformable with the foliation in the Iron King Volcanics. The width of the zone is about 100 feet, and the developed length of the deposit is 1,600 feet. The ore shoots plunge steeply to the south (Lindgren, 1926, p. 143–144).

Quartz veins of Precambrian age in the Cordes area were reported by Lindgren (1926, p. 153, 156). These veins consist largely of glassy quartz with a small amount of sulfide minerals reported to contain gold and represented by a vein near Cleator. Jerome (1956, p. 125) states that the Hidden Treasure is one of the better representatives of this class of deposit in this area. According to Elsing and Heineman (1936, p. 102), the gold produced from the Hidden Treasure deposit was valued at $20,000.

The ore deposits south and east of Cleator, including the French Lily, Gray Goose, St. Johns, Golden Belt, Golden Turkey, and Silver Cord (pl. 1), are characterized by low-dipping vuggy

quartz veins containing arsenopyrite, galena, sphalerite, and silver minerals. Copper-bearing minerals are subordinate. Lindgren (1926, p. 153) and Jerome (1956, p. 126) refer to these deposits as "flat" veins because of their low dips. Lindgren (1926, p. 158) reports dips at the Silver Cord mine as "less than 20°."

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Reported production from the "flat" veins has been small. According to Dunning (1959, p. 360), the Golden Belt mine produced, between 1931 and 1933, gold valued at $65,000, silver valued at $10,000, and lead valued at $5,000. R. M. Lampton acquired the property in 1934, deepened the shaft, and mined 25,000 tons of gold ore between 1934 and 1939.

The Golden Turkey deposit was located before 1900 and a shaft 100 feet deep sunk, but there was no production until 1933, when 4,000 tons of ore was run through the adjoining Golden Belt mill. The inclined shaft was deepened to the 500-foot level, and a mill was built at the mine; between 1935 and 1942, approximately 144,000 tons of ore was mined and milled. According to Dunning (1956, p. 361), "The ore was quite low-grade, with values in gold, silver, and a little copper and lead. Careful management, however, succeeded in making a little profit." The mine closed down early in 1942.

Lindgren (1926, p. 158) reported that the Silver Cord vein contained silver and gold associated with some pyrite, galena, and chalcopyrite, and that by 1922, 20 or 30 carloads of shipping ore had been produced; some of it was valued at $40 per ton. Lindgren (1926, p. 159) stated that some ore was shipped from the French Lily mine in 1923, but the amount and value are not reported.

REFERENCES CITED

Anderson, C. A., 1967, Precambrian wrench fault in central Arizona, *in* Geological Survey research 1967: U.S. Geol. Survey Prof. Paper 575–C, p. C60–C65.

Moss M

Oro Belle
Tiger District

Wilson, E.D., et al.
1967
AZ Bur. of Geol.
Bulletin 137
Golden
Turkey
et. al.

"The Cumberland mine is one mile north of Pine Flat and was last in operation about 1908. According to information o from T. Roach, of Pine Flat, this is a gold quartz vein st little east of north and dipping west. The shaft is 350 fe and there are short drifts. The shoot on the north is said continued to the lowest workings; it contains ore of $4(which was treated in a 10-stamp mill at Pine Flat. The reported as free and visible in places. The water level wa at a depth of 90 feet.

"It is probable that here, as in many other places, the tions became unfavorable when the workings reached t phide ore below water level. There is said to be placer in the vicinity of the Cumberland mine."

BLACK CANYON DISTRICT

The Black Canyon district comprises an area about 18 miles long by 8 miles wide that extends, between the eastern foot of the Bradshaw Mountains and the Agua Fria River, from the vicinity of Cordes on the north to the Maricopa County boundary on the south.

Here, a northward-trending belt of sedimentary Yavapai schist, about 2 miles wide, is intruded on the east and west by Bradshaw granite and on the east by a northward-trending strip of diorite. These formations floor a former valley and hilly pediment that is covered on the east by volcanic rocks and has been deeply dissected by the southward-flowing, meandering drainage system of Black Canyon. The elevation of the district ranges from 2,000 to 4,000 feet above sea level.

Lindgren[62] groups the gold-bearing veins of the Black Canyon district into two classes: (1) Pre-Cambrian quartz veins, mainly in the vicinity of Bumblebee and Bland Hill; and (2) quartz veins which dip at low angles and appear to be genetically connected with younger dikes of rhyolite-porphyry.

According to figures compiled by V. C. Heikes, of the U. S. Geological Survey, the Black Canyon district from 1904 to 1924, inclusive, produced $131,848 worth of gold, silver, lead, and copper. Of this amount $71,132 was gold of which a small percentage came from placers.

The pre-Cambrian veins, according to Lindgren, are of glassy quartz with free gold and some sulphides. They have furnished most of the gold for the placers of the district. He mentions the Cleator property, at Turkey Creek, and the Nigger Brown, Blanchiana, and Gillespie mines, south of Bumblebee, as having been worked in a small way.

GOLDEN TURKEY MINE

The Golden Turkey mine, held by H. C. Mitchell and associates, is on the west side of Turkey Creek, near the eastern foot of the

[62] Work cited, p. 153.

Bradshaw Mountains, at an elevation of about 3,000 feet. Via the Black Canyon Highway, the property is about 15 miles from Mayer, the nearest railway shipping point.

Some years ago, a 100-foot shaft was sunk on the property, but no production was made until 1933 when the workings were extended, and more than 4,000 tons of ore were run through the Golden Belt mill. The monthly yield was approximately two cars of concentrates containing gold and silver together with some zinc and a little copper. Several shipments of smelting ore also were made.

Here, pre-Cambrian schist strikes northward and dips almost vertically. The vein, which strikes northeastward and ranges in dip from 30° to less than 10° SE., occupies a fissure zone that is probably due to thrust faulting. As exposed, the vein ranges from a few inches to more than a foot in width and in places forms a branching lode several feet wide. The vein filling consists of very coarsely crystalline, milky to clear, glassy quartz together with rather abundant irregular masses and disseminations of pyrite, galena, and sphalerite. In places, a little chalcopyrite is present. The gold accompanies the sulphides, particularly the pyrite. The vein walls show rather intense sericitization and silification and in places contain disseminated metacrysts of practically barren pyrite.

When visited in January, 1934, developments consisted of a 500-foot inclined shaft and approximately 2,000 feet of workings. Most of the ore mined has come from below the 350-foot level, particularly where the vein flattens in dip. According to Mr. Mitchell,[63] the oxidized zone extended to a depth of approximately 250 feet on the incline.

GOLDEN BELT MINE[64]

The Golden Belt mine, held by the Golden Belt Mines, Inc., is a few hundred feet north of the Golden Turkey. Its original location is reported to have been made in 1873 by George Zika. Production prior to 1916, according to the local press, amounted to several hundred tons of ore of which part was shipped and part was milled. The present operators obtained this ground in 1931 prior to which time a small mill had been built and a little development work done. Subsequently, the mill has been rehabilitated and operated. In 1931, 134 tons of concentrates from 1,345 tons of ore were produced, and 107 tons of smelting ore were shipped.[65]

[63] Oral communication.

[64] In part abstracted from Minton, D. C., Cost of equipping and developing a small gold mine in the Bradshaw Mountains quadrangle, Yavapai County, Arizona: U. S. Bureau of Mines Information Circular 6735. 1933.

[65] U. S. Bureau of Mines Mineral Resources for 1931, Part I, p. 410.

Operations were continued through 1932 and 1933. Minton[66] states that the net smelter returns for 1931 and part of 1932 amounted to $891 on 106 tons of crude ore and $8,523 on 285 tons of concentrates. During 1933, ore from the Golden Turkey mine also was treated in the mill.

The geology of this mine is similar to that of the Golden Turkey. The prevailing rocks consist of pre-Cambrian schist, intruded by dikes of siliceous to basic porphyry. The Golden Belt vein, which strikes approximately N. 60° E. and dips from 10° to 23° SE., occurs within the fissure zone of a probable thrust fault. Minton[67] states that the vein, as exposed, ranges from a few inches to about 3 feet in width and carries from $5 to $40 in gold and from one to 10 ounces of silver per ton. In the upper portions of the mine, above the water level, the vein contains oxides of iron and lead and some free gold. Below the water level or 50 feet below the surface, galena and pyrite predominate, and the gold occurs mainly in the galena. The silver is asserted to be decreasing with depth.

In January, 1934, the mine was developed by an irregular, inclined shaft, reported to be 800 feet in length, with several hundred feet of drifts and stopes. Minton states that the cost of sinking 150 feet of the incline amounted to $6.22 per foot. As the workings extend under Turkey Creek, considerable water has been encountered.

The Golden Belt flotation mill has a maximum capacity of 50 tons per day. Power is obtained from the Arizona Power Company.

SILVER CORD VEIN[68]

"About a mile southeast of Turkey Creek station is the Silver Cord vein, said to be traceable through six claims. It dips south or southeast at an angle of less than 20°. This vein contains both silver and gold, together with some pyrite, galena, and chalcopyrite. The deposit was operated for several years, and twenty or thirty carloads of shipping ore is said to have been produced. In 1912, it is reported, 224 tons was shipped containing $40.67 a ton in gold, silver, copper, and lead. Among the properties on the Silver Cord vein is the American Flag, or the Old Brooks mine. Mr. Cleator, of Turkey Creek station, states that he shipped about twelve carloads from this property. The first-class ore contained $75 to the ton; the second-class ore $18 or more."

The U. S. Mineral Resources state that a small production of ore containing silver, lead, gold, and copper was made by the Silver Cord mine in 1925, 1928, 1929, and 1930.

[66] Work cited, p. 10.

[67] Work cited, p. 3.

[68] Quoted from Lindgren, work cited, p. 158.

M E M O

TO: C.A. O'Brien, R.R. Short, A.F. Budge, D.H. Allen

FROM: Don C. White

DATE: September 29, 1988

SUBJECT: Golden Turkey tailings, Cleator, Arizona

INTRODUCTION: Auriferous tailing from the Golden Turkey mine and mill lie just south of the Crown King Road about two miles east of Cleator (figure 1). Rumor has it that "quiet title" has just been obtained by four Phoenix attorneys known of by Harvey Smith who passed the idea to Carole. At Carole's request a brief evaluation was made.

I spent one full day, September 3rd, inspecting the area, sampling the dumps, augering the tailings and making the requisite visit with the new watchman.

DUMPS: The Golden Turkey Mine was a small quartz vein lode with locally high gold values associated with base metal sulfides and pyrite. This is borne out by the waste dumps, rumored to be the rejects of hand cobbing. Selected quartz fragments assay a quarter ounce gold per ton. Sulfidic-impregnated wall rock assays only .025 oz/t and the bulk of the dump, being neither quartz nor sulfidic, is probably barren country rock.

TAILINGS: The tailings vary in texture and in gold and silver content from one area to another. Three areas were hand augered, corresponding to the extremes of a rounded triangular tailings pile (see figure 2). In general, the more sandy or coarser grained tailings assay higher (about .04 oz/t). Indurated clayey material predominating to the east and at depth assays quite low (about .01 oz/t). There is some enrichment of gold in the very top-most tailings, probably by winnowing of fines, and perhaps by some dehydration wicking phenomenon. A surface grab sample assayed .069 oz/t.

Anderson (1972) states in his report (extract appended) that the Golden Turkey mill operated only from 1935 to 1942 and that "approximately 144,000 tons of ore was mined and milled." With that figure as a starting point we must deduct a large chunk for the erosion by Turkey Creek (figure 4).

Those tails remaining are likely no more than 100,000 tons. Of these, at least one third are clearly fines with subeconomic grades of .01 oz/t or less. Thus we have something like 60,000 tons still attractive.

That 60,000 tons may average about .041 oz/t Au and 0.7 oz/t Ag if the SW auger holes are representative. They were positioned to sample much of the roughly 60-foot face of the tails where eroded by Turkey Creek (figure 4). That sector of tails is generally quite sandy/coarse grained and probably very amenable to cyanidation and heap leaching.

OTHER TAILINGS: While 60,000 tons may not be enough to justify an operation (Carole ought to apply her economic/financial analyses) one can consider some possible add-ons. Immediately north of the Golden

Turkey is the Golden Belt Mine (figure 1) under separate ownership. It had its own mill and even took Golden Turkey ores for some pre-1935 intervals. Having had no permission to trespass there, I can just guess by viewing from a distance that there are at least 10,000 tons of tails there.

LODE POTENTIAL: Yet another consideration is AmSelco's discovery of an auriferous, pyritic lode just east of the Golden Turkey (figure 1). It was found by geophysics and drilling and was apparently too small and/or low grade for them but a couple hundred thousand tons of 0.1 oz/t isn't out of the question, depending on the dip (likely steep) and how far one can take an open cut. More particulars on their "Pennyrich" target are probably available if this becomes worth pursueing. The leachability of highly sulfidic ores, however, is likely not very great.

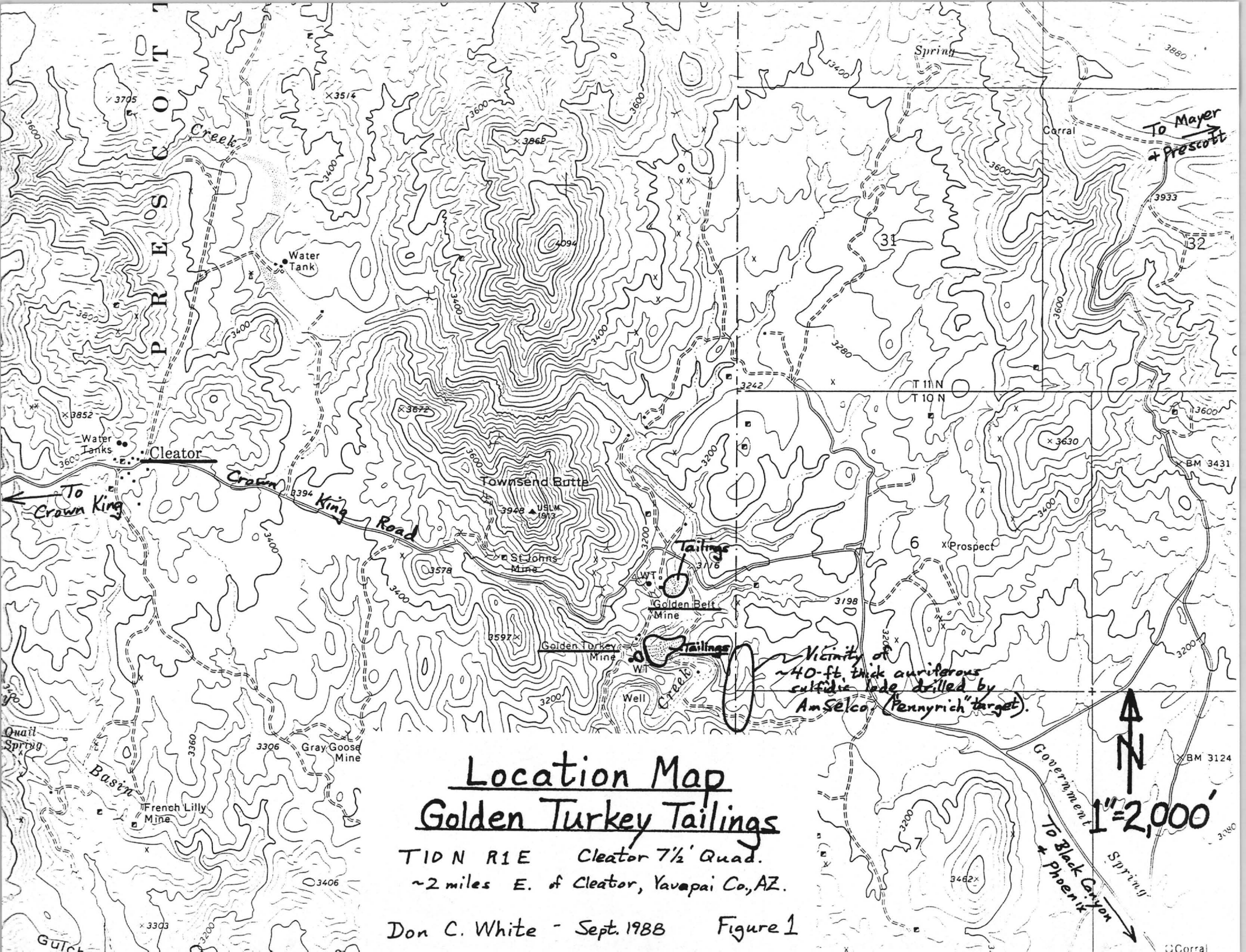
WATER: In addition to access being very good, a water supply is likely assured by the Golden Turkey underground workings. A brief effort in 1962 involved dewatering the shaft and Neil Miller (former watchman - ?) says "pumping 1,000 g.p.m. didn't touch it, 2,000 g.p.m. made slow progress," and that at only the 100 to 150 levels. Thus those upper workings should be able to supply plentiful process water to any operation.

SUMMARY: Thus the Golden Turkey tailings may amount to about 60,000 tons of sandy, leachable .041 oz/t gold, 0.7 oz/t Ag. Some additional tails may be obtainable from the Golden Belt property and/or open pitable sulfidic lode gold ores from an adjacent virgin lode deposit. Access and water availability are attributes of the property.

RECOMMENDATIONS: Carole should perform enough financial review of this target to determine whether it is worth pursueing further. If so, the terms of a deal with the Golden Turkey owners, approaches on the Golden Belt tailings, and inquiries regarding the "Pennyrich" lode deposit can all be worked on. If still attractive, more sampling and metallurgical work will then be performed.

DW:sk

Robert R Dimock Jr
V.P. BPM
Box 11248
SL Utah 84147

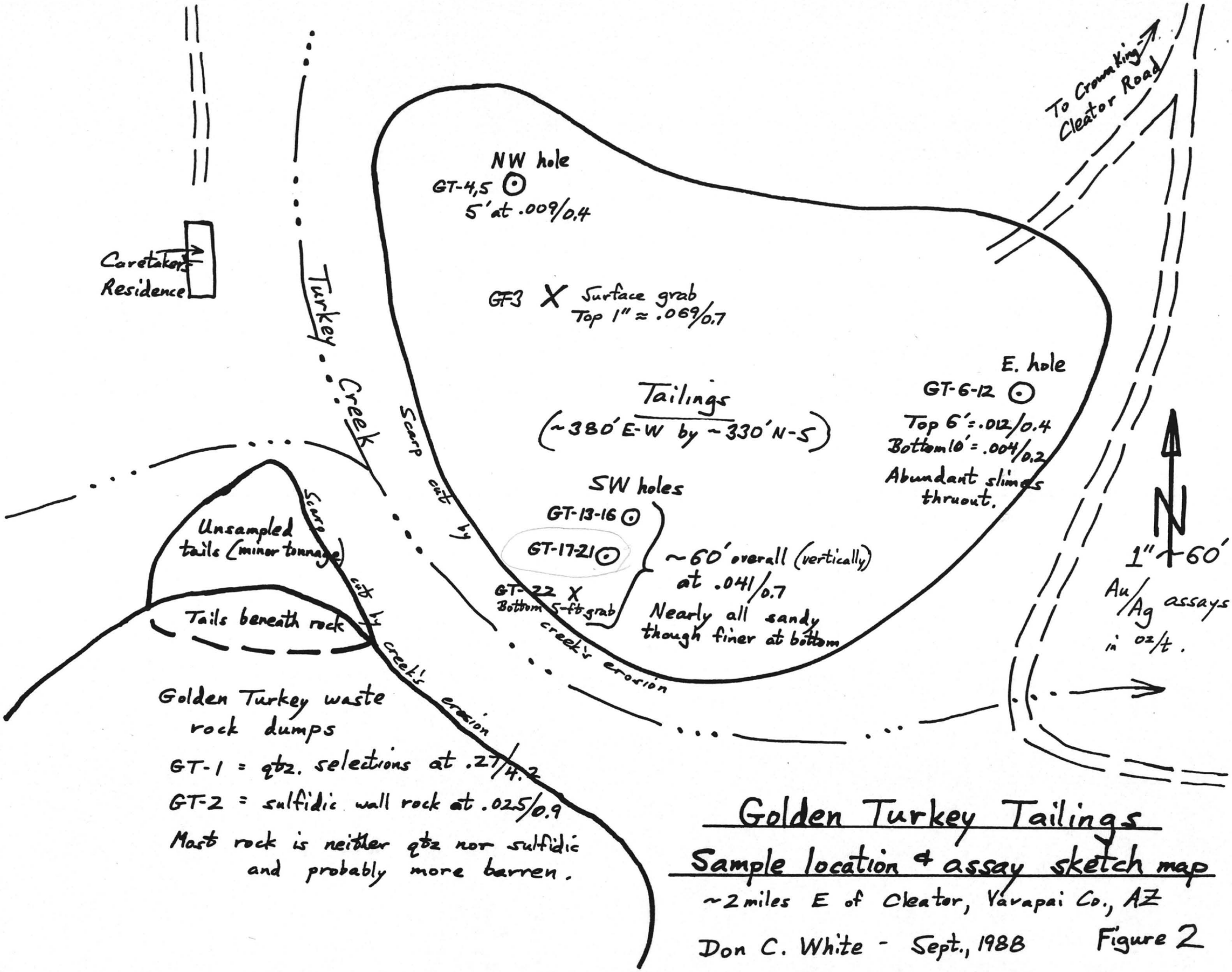


Location Map
Golden Turkey Tailings

T10N R1E Cleator 7½' Quad.

~2 miles E. of Cleator, Yavapai Co., AZ.

Don C. White - Sept. 1988 Figure 1



Golden Turkey Tailings

Sample location & assay sketch map

~2 miles E of Cleator, Yavapai Co., AZ

Don C. White - Sept., 1988

Figure 2

Figure 3: Golden Turkey dumps and tailings (center) visible S of road to Cleator and Crown King and at foot of Bradshaw Mtns.

Figure 4: View E across Turkey Creek to the main body of Golden Turkey tailings up to about 60 feet thick where eroded by the creek.

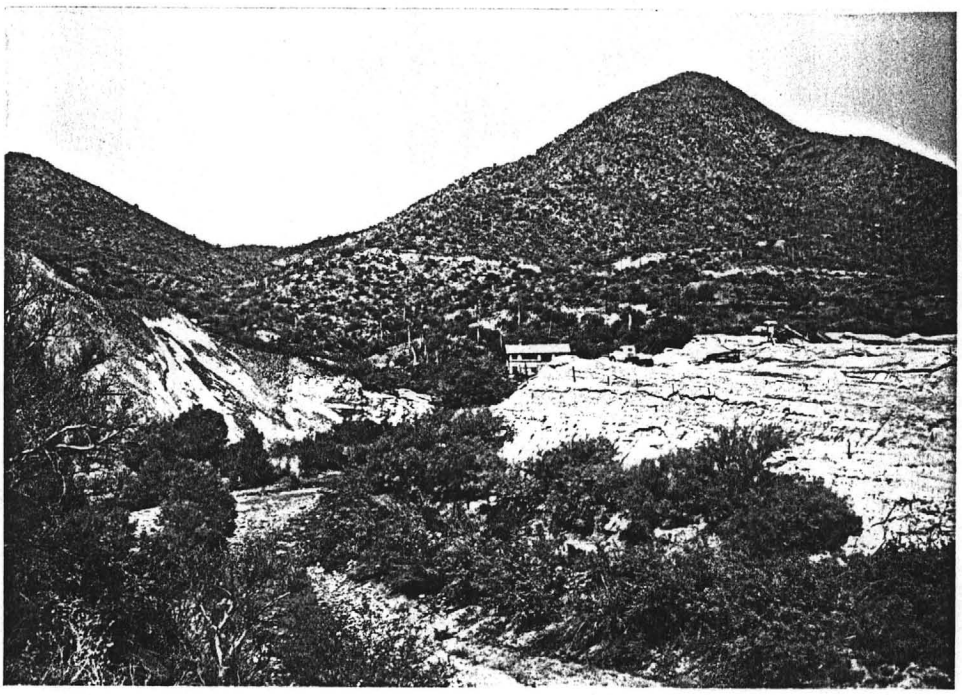


Figure 5: Looking W with Golden Turkey waste dumps on left, tailings on right, caretaker's residence in center.

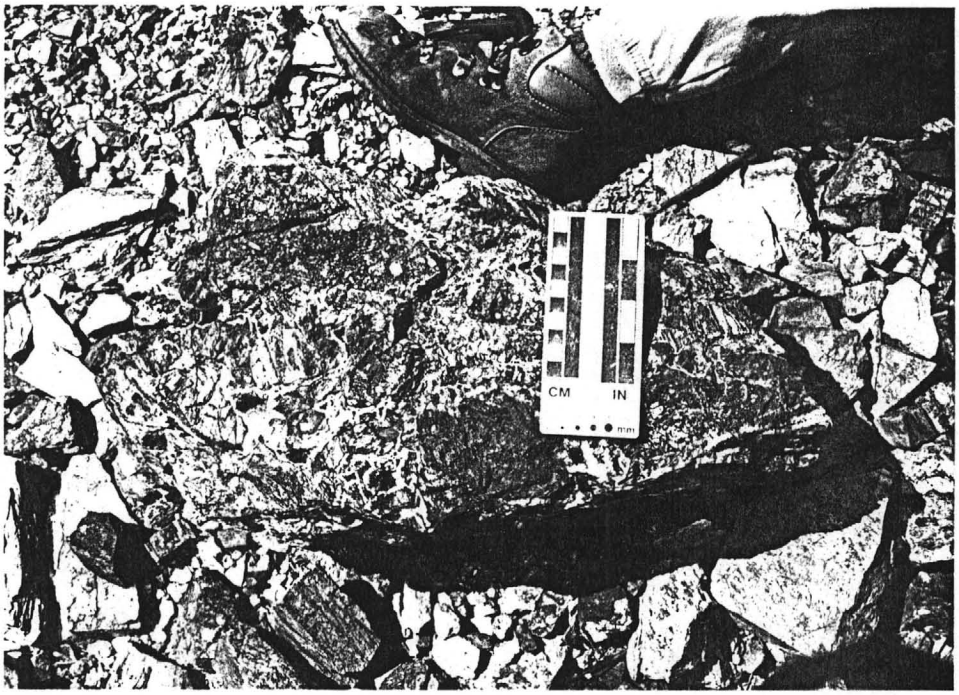
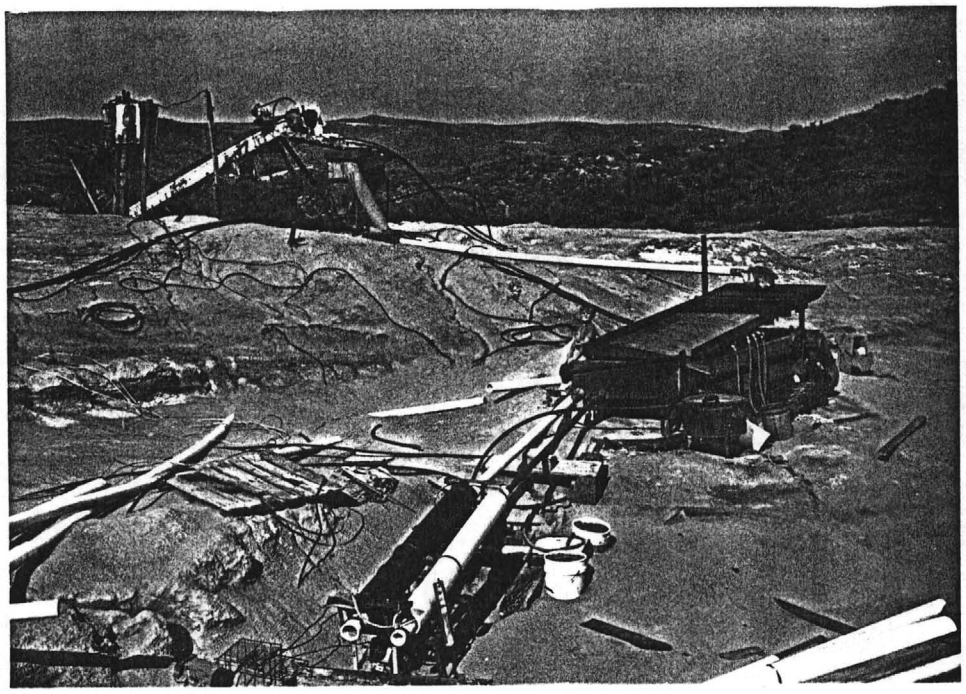


Figure 6: Golden Turkey mine dump rock indicates a quartz vein lode (quartz from dump assays 0.2 oz/t Au, ~4.0 oz/t Ag) with calcite and quartz healed brecciated wall rock (above) and sulfidic impregnations into the Precambrian wall rock (assaying ~0.05 oz/t Au, ~1.0 oz/t Ag).



Figures 7 and 8: Gravity concentrating table abandoned on top of tailings pile and old fashioned wooden stave-and-iron-ring "pipe" used to run the tailings from mill to present site.

IRON KING ASSAY INC.

12-Sep-88

LAB JOB #: AFB03015

ATTN: Carole A. O'Brien

Client name: A. F. Budge (Mining) Ltd.

No. Samples: 13
Date Received: 09-03-88
Submitted by: D. White

Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251

Phone number: 945-4360/778-3140

INVOICE ATTACHED

ANALYTICAL REPORT

Golden Turkey Samples

Client ID AFB03015	Lab ID	Fire Assay Au oz/ton	Fire Assay Ag oz/ton	
GT-1	3015- 1	42% 0.276 .116	4.25 2	Dump rock selected for qtz, ± py, sp
GT-2	3015- 2	68% 0.025 .017	0.89 .44	Dump rock selected for schistose wall rock with disseminated euhedra py, spy
GT-3	3015- 3	28% 0.069 .019	0.73 .22	Top ½ inch tails; coarse, sandy, much quartz; Au-enriched.
Break in sequence				
GT-13	3015- 4	59% 0.034 .018	0.61 .24	ϕ-3'
GT-14	3015- 5	33 0.043 .014	0.66 .16	3-6'
GT-15	3015- 6	34 0.041 .014	0.36 .12	6'-9'
GT-16	3015- 7	45 0.053 .024	0.54 .16	9-12'
GT-17	3015- 8	38 0.048 .018	0.94 .30	ϕ-3'
GT-18	3015- 9	41 0.049 .026	0.56 .34	3-6'
GT-19	3015- 10	44 0.045 .026	0.54 .38	6-9'
GT-20	3015- 11	100 0.031 .032	0.70 .58	9-12'
GT-21	3015- 12	95 0.040 .028	0.99 .64	12-15'
GT-22	3015- 13	100 0.028 .032	0.78 .34	Grab from bottom 5 ft. tails next to Turkey Cr., SW corner of tailings pile.

Hand auger holes in sequence of terraces near SW extreme of tailings, where eroded by Turkey Creek

Overall perhaps 60 ft (including unsampled intervals) averaging ~ 0.041 oz/t Au with ~ 0.67 oz/t Ag

REGISTERED ASSAYER
CERTIFICATE NO.
14513
ROBERT G. CROOK
Date Signed 9-12-88
ARIZONA, U.S.A.

IRON KING ASSAY INC.

28-Sep-88

LAB JOB #: AFB03108

ATTN: Carole A. O'Brien

Client name: A. F. Budge (Mining) Ltd.

No. Samples: 9
Date Received: 09-22-88
Submitted by: D. White

Billing address: 4301 N. 75th St.
Suite #101
Scottsdale, AZ 85251-3504

Phone number: 945-4360/778-3140

INVOICE ATTACHED

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REGISTERED ASSAYER CERTIFICATE NO. 14315 ROBERT G. CROOK Date Signed 9-29-88 ARIZONA, U.S.A.

Crook

Anderson; CA; 1972
US. GS.
Bulletin
1345

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The Blue Bell ore body is one of several Precambrian massive sulfide deposits in the Yavapai Series in this general region; these deposits include the United Verde and United Verde Extension at Jerome, the Iron King at Humboldt, and several smaller deposits in the NW¼ Mayer quadrangle—the Lone Pine, Boggs, Iron Queen, and Hackberry (Anderson and Blacet, 1972a). The Blue Bell ore body is a series of overlapping lenses of granular pyrite and subordinate chalcopyrite that form a mineralized zone essentially conformable with the foliation in the Iron King Volcanics. The width of the zone is about 100 feet, and the developed length of the deposit is 1,600 feet. The ore shoots plunge steeply to the south (Lindgren, 1926, p. 143–144).

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Reported production from the "flat" veins has been small. According to Dunning (1959, p. 360), the Golden Belt mine produced, between 1931 and 1933, gold valued at $65,000, silver valued at $10,000, and lead valued at $5,000. R. M. Lampton acquired the property in 1934, deepened the shaft, and mined 25,000 tons of gold ore between 1934 and 1939.

The Golden Turkey deposit was located before 1900 and a shaft 100 feet deep sunk, but there was no production until 1933, when 4,000 tons of ore was run through the adjoining Golden Belt mill. The inclined shaft was deepened to the 500-foot level, and a mill was built at the mine; between 1935 and 1942, approximately 144,000 tons of ore was mined and milled. According to Dunning (1956, p. 361), "The ore was quite low-grade, with values in gold, silver, and a little copper and lead. Careful management, however, succeeded in making a little profit." The mine closed down early in 1942.

Lindgren (1926, p. 158) reported that the Silver Cord vein contained silver and gold associated with some pyrite, galena, and chalcopyrite, and that by 1922, 20 or 30 carloads of shipping ore had been produced; some of it was valued at $40 per ton. Lindgren (1926, p. 159) stated that some ore was shipped from the French Lily mine in 1923, but the amount and value are not reported.

REFERENCES CITED

Anderson, C. A., 1967, Precambrian wrench fault in central Arizona, *in* Geological Survey research 1967: U.S. Geol. Survey Prof. Paper 575–C, p. C60–C65.

Moss M

Oro Belle
Tiger District

Wilson, E.D., et al
1967
AZ Bur. of Geol.
Bulletin 137
Golden
Turkey
et. al.

"The Cumberland mine is one mile north of Pine Flat and was last in operation about 1908. According to information obtained from T. Roach, of Pine Flat, this is a gold quartz vein stri[illegible] little east of north and dipping west. The shaft is 350 fe[illegible] and there are short drifts. The shoot on the north is said [illegible] continued to the lowest workings; it contains ore of $4[illegible] which was treated in a 10-stamp mill at Pine Flat. The [illegible] reported as free and visible in places. The water level wa[illegible] at a depth of 90 feet.

"It is probable that here, as in many other places, the [illegible]tions became unfavorable when the workings reached t[illegible] phide ore below water level. There is said to be placer [illegible] in the vicinity of the Cumberland mine."

BLACK CANYON DISTRICT

The Black Canyon district comprises an area about 18 miles long by 8 miles wide that extends, between the eastern foot of the Bradshaw Mountains and the Agua Fria River, from the vicinity of Cordes on the north to the Maricopa County boundary on the south.

Here, a northward-trending belt of sedimentary Yavapai schist, about 2 miles wide, is intruded on the east and west by Bradshaw granite and on the east by a northward-trending strip of diorite. These formations floor a former valley and hilly pediment that is covered on the east by volcanic rocks and has been deeply dissected by the southward-flowing, meandering drainage system of Black Canyon. The elevation of the district ranges from 2,000 to 4,000 feet above sea level.

Lindgren[62] groups the gold-bearing veins of the Black Canyon district into two classes: (1) Pre-Cambrian quartz veins, mainly in the vicinity of Bumblebee and Bland Hill; and (2) quartz veins which dip at low angles and appear to be genetically connected with younger dikes of rhyolite-porphyry.

According to figures compiled by V. C. Heikes, of the U. S. Geological Survey, the Black Canyon district from 1904 to 1924, inclusive, produced $131,848 worth of gold, silver, lead, and copper. Of this amount $71,132 was gold of which a small percentage came from placers.

The pre-Cambrian veins, according to Lindgren, are of glassy quartz with free gold and some sulphides. They have furnished most of the gold for the placers of the district. He mentions the Cleator property, at Turkey Creek, and the Nigger Brown, Blanchiana, and Gillespie mines, south of Bumblebee, as having been worked in a small way.

GOLDEN TURKEY MINE

The Golden Turkey mine, held by H. C. Mitchell and associates, is on the west side of Turkey Creek, near the eastern foot of the

[62] Work cited, p. 153.

Bradshaw Mountains, at an elevation of about 3,000 feet. Via the Black Canyon Highway, the property is about 15 miles from Mayer, the nearest railway shipping point.

Some years ago, a 100-foot shaft was sunk on the property, but no production was made until 1933 when the workings were extended, and more than 4,000 tons of ore were run through the Golden Belt mill. The monthly yield was approximately two cars of concentrates containing gold and silver together with some zinc and a little copper. Several shipments of smelting ore also were made.

Here, pre-Cambrian schist strikes northward and dips almost vertically. The vein, which strikes northeastward and ranges in dip from 30° to less than 10° SE., occupies a fissure zone that is probably due to thrust faulting. As exposed, the vein ranges from a few inches to more than a foot in width and in places forms a branching lode several feet wide. The vein filling consists of very coarsely crystalline, milky to clear, glassy quartz together with rather abundant irregular masses and disseminations of pyrite, galena, and sphalerite. In places, a little chalcopyrite is present. The gold accompanies the sulphides, particularly the pyrite. The vein walls show rather intense sericitization and silification and in places contain disseminated metacrysts of practically barren pyrite.

When visited in January, 1934, developments consisted of a 500-foot inclined shaft and approximately 2,000 feet of workings. Most of the ore mined has come from below the 350-foot level, particularly where the vein flattens in dip. According to Mr. Mitchell,[63] the oxidized zone extended to a depth of approximately 250 feet on the incline.

GOLDEN BELT MINE[64]

The Golden Belt mine, held by the Golden Belt Mines, Inc., is a few hundred feet north of the Golden Turkey. Its original location is reported to have been made in 1873 by George Zika. Production prior to 1916, according to the local press, amounted to several hundred tons of ore of which part was shipped and part was milled. The present operators obtained this ground in 1931 prior to which time a small mill had been built and a little development work done. Subsequently, the mill has been rehabilitated and operated. In 1931, 134 tons of concentrates from 1,345 tons of ore were produced, and 107 tons of smelting ore were shipped.[65]

[63] Oral communication.

[64] In part abstracted from Minton, D. C., Cost of equipping and developing a small gold mine in the Bradshaw Mountains quadrangle, Yavapai County, Arizona: U. S. Bureau of Mines Information Circular 6735. 1933.

[65] U. S. Bureau of Mines Mineral Resources for 1931, Part I, p. 410.

Operations were continued through 1932 and 1933. Minton[66] states that the net smelter returns for 1931 and part of 1932 amounted to $891 on 106 tons of crude ore and $8,523 on 285 tons of concentrates. During 1933, ore from the Golden Turkey mine also was treated in the mill.

The geology of this mine is similar to that of the Golden Turkey. The prevailing rocks consist of pre-Cambrian schist, intruded by dikes of siliceous to basic porphyry. The Golden Belt vein, which strikes approximately N. 60° E. and dips from 10° to 23° SE., occurs within the fissure zone of a probable thrust fault. Minton[67] states that the vein, as exposed, ranges from a few inches to about 3 feet in width and carries from $5 to $40 in gold and from one to 10 ounces of silver per ton. In the upper portions of the mine, above the water level, the vein contains oxides of iron and lead and some free gold. Below the water level or 50 feet below the surface, galena and pyrite predominate, and the gold occurs mainly in the galena. The silver is asserted to be decreasing with depth.

In January, 1934, the mine was developed by an "irregular" inclined shaft, reported to be 800 feet in length, with several hundred feet of drifts and stopes. Minton states that the cost of sinking 150 feet of the incline amounted to $6.22 per foot. As the workings extend under Turkey Creek, considerable water has been encountered.

The Golden Belt flotation mill has a maximum capacity of 50 tons per day. Power is obtained from the Arizona Power Company.

SILVER CORD VEIN[68]

"About a mile southeast of Turkey Creek station is the Silver Cord vein, said to be traceable through six claims. It dips south or southeast at an angle of less than 20°. This vein contains both silver and gold, together with some pyrite, galena, and chalcopyrite. The deposit was operated for several years, and twenty or thirty carloads of shipping ore is said to have been produced. In 1912, it is reported, 224 tons was shipped containing $40.67 a ton in gold, silver, copper, and lead. Among the properties on the Silver Cord vein is the American Flag, or the Old Brooks mine. Mr. Cleator, of Turkey Creek station, states that he shipped about twelve carloads from this property. The first-class ore contained $75 to the ton; the second-class ore $18 or more."

The U. S. Mineral Resources state that a small production of ore containing silver, lead, gold, and copper was made by the Silver Cord mine in 1925, 1928, 1929, and 1930.

[66] Work cited, p. 10.

[67] Work cited, p. 3.

[68] Quoted from Lindgren, work cited, p. 158.

M E M O

TO: C.A. O'Brien, R.R. Short, A.F. Budge, D.H. Allen

FROM: Don C. White

DATE: November 18, 1988

SUBJECT: Gold lode potential near the Golden Turkey tailings, Cleator, AZ.

Further to my memo of Sept. 29, 1988 on the Golden Turkey tailings, I have now been allowed to inspect old AmSelco files on the adjacent Penny-Rich property. Copies were retained by Paul Strobel, then project geologist for AmSelco, and are now in REDCO's Prescott files.

What I learned is that the gold grades are not so hot. There is a gossanous zone outcropping and carrying anomalous gold, mercury and base metals. Outcrop samples include a couple values up to 1.8 ppm Au (about 0.05 oz/t) but the average is less than 0.02 oz/t. AmSelco's drilling focused on the base metal potential mainly beneath the zone of oxidation (perhaps up to 100 feet deep). Of their 10-15 core holes, the only significant gold intercept was 4 ft. of about 0.2 oz/t (hole PR-75-2, 181'-185') with about 1% arsenic (probably arsenopyrite hosted) and negligible silver and base metals. Adjacent footages were barren, as were holes along strike both directions.

Thus the lode potential of Penny-Rich for leachable gold ores to accompany Golden Turkey tailings is virtually nil. Any consideration of the Golden Turkey's viability is going to have to depend on the tailings themselves.

If the estimated 60,000 tons of 0.04 oz/t gold tailings (based on one 60-ft series of 10 samples) may be considered economic and a deal seems reasonably obtainable from the owners, I shall be happy to further auger and quantify the tailings reserve.

DW:sk

CN SOLN

10/20

Bottle	Sample	Au		Ag		Free CN-		
#1	GT-13	.3	.018 ~~.009~~	4.2	.24 ~~.14~~	4.1	~~1.64~~	10.25
2	GT-14	.25	.014 ~~.007~~	2.6	.16 ~~.08~~	4.1	~~1.72~~	10.25
3	GT-15	.23	.014 ~~.007~~	2.0	.12 ~~.06~~	4.1	~~1.64~~	10.25
4	GT-16	.4	.024 ~~.017~~	2.7	.16 ~~.08~~	4.1	~~1.64~~	10.25
5	GT-17	.3	.018 ~~.009~~	5.1	.30 ~~.15~~	4.1	~~1.64~~	10.25
6	GT-18	.45	.026 ~~.013~~	5.8	.34 ~~.17~~	4.1	~~1.76~~	10.25
7	GT-19	.35	.020	6.5	.38 ~~.19~~	4.0		10
8	GT-20	.55	.032 ~~.016~~	10.0	.58 ~~.29~~	3.7		9.25
9	GT-21	.65	.038 ~~.019~~	11.0	.64 ~~.32~~	4.1		10.25
10	GT-22	.55	.032 ~~.016~~	5.9	.34 ~~.17~~	3.6		9
1	GT-1							
2	GT-2							
3	GT-3							
4	V 101788							
5	V 101888							
6	V 101920							

	Sample	Au	Ag	CN
1	GT - 1	.116	<1.1	9.25
2	2	.017	.44	9.75
3	3	.019	.22	9.75
4	17	.052	.13	9.5
5	18	.052	.19	9.5
6	19	.052	.16	9.5

Trem	.09	.44	.6
Preg	.07	.25	.8

18th -	7:20	4:00	41 gal/min	9 hr
	4:00 →		23 gal min	15 hr
19th	7:20	4:00	36 gal	9 hr
	4:00		23	
20	7:30	4:00	35 gal	9 hr
	4:00		23 gal	
21		12:30	23 gal	

(15)(3) + 5.5 Hr = 50.5 Hr

(9)(3)

37.3 gal/min
1.125

223.8 Tons/day
x 1.125
251.8
289.8
541.6 Tons
(38 oz Au)

2.1 days (23 g/m)

DAWSON
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P.O. Box 7685
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November 17, 1988

A. F. Budge Mining Ltd.
4301 North 75th Street
Suite 101
Scottsdale, Arizona 85251

Attention: Mr. Dale Allen

Subject: Results of Laboratory Testing on a Grab Sample Composite of Iron King Tailings. Our Project No. P-1611.

Gentlemen:

In accordance with discussions with Mr. Dale Allen during his visit to our laboratory November 1, 1988, various laboratory tests were performed on a grab sample composite of Iron King Tailings. These tests were performed to determine if the tailings are amenable to cyanidation or flotation for recovery of contained gold and silver values. Specific testwork performed included:

- Assay screen analysis of as-received head sample.
- Selective gold-silver-copper-lead sulfide flotation of a screened (-35 mesh) sample.
- Bulk sulfide flotation of a screened (-35 mesh) sample.
- Cyanide leach of a screened (-35 mesh) sample, followed by flotation of sulfides from the leach residue with amine.

I. Sample Description And Head Analysis

Two separate tailings grab samples weighing five kilograms each were submitted to our laboratory November 1, 1988, by Mr. Dale Allen and assigned our Lot No. P-1611. These samples contained approximately ten percent moisture and consisted of fine, free flowing tailings and agglomerated clumps. These two samples were combined, air dried, and crushed through ¼ inch to break up the hardened clumps prior to testing. A head sample was not split out prior to testing, however, back-calculated heads from testwork are presented on the following page.

P-1611: A. F. Budge Mining
Head Assay Results: Iron King Tails

	Back-Calculated* Head Assay oz/ton		Wgt-%
	Au	Ag	Sulfide Sulfur
Iron King Composite Grab Sample	0.079	1.39	15.31

*Average of 3 tests

Visual examination of the sample under the binocular microscope indicated abundant fine pyrite (10-15 percent of the total sample). A few grains of bornite were also detected.

II. Test Results

Test results presented in this section are also included in individual test data sheets attached to the end of this report.

A. Summary

The pyrite in this sample of Iron King Tailings responds well to flotation in a naturally acid pulp of pH 2.4 using Phillips Chemical Orfom C-150. Unfortunately only 33 percent of the gold and 11 percent of the silver was contained in this product, indicating that most of the gold and silver is probably associated with non-sulfide minerals. Attempts to produce a selective sulfide concentrate containing sulfides other than pyrite were unsuccessful.

Approximately 62 percent of the gold (0.046 oz/ton of ore) and 22 percent of the silver (0.30 oz/ton of ore) was extracted by direct cyanidation of the minus 35 mesh fraction of the tailings. Cyanide and lime consumption was 7.8 and 78 pounds per ton of sample, respectively. The sample required screening at 35 mesh to remove agglomerated chunks which did not break down, even after 30 minutes agitation at 40 percent solids.

B. Head Assay Screen

This Iron King Tailings sample contains approximately 76 percent minus 325 mesh material. Most of the gold and silver is contained in this size fraction, as indicated on the following page.

P-1611: A. F. Budge Mining
Head Assay Screen Results (Test No. 4)

Screen Fraction Mesh	Weight, Grams	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag	Assay, Wgt-% Sulfide Sulfur
+100	42.4	5.10	0.026	<0.05	5.24
-100 +200	69.1	8.31	0.046	0.32	8.56
-200 +325	85.3	10.26	0.078	0.32	31.11
-325	634.9	76.34	0.112	2.17	18.66
Total (Calc)	831.7	100.00	0.099	1.72	18.42
Total (Test Feed)	1000.0		0.082	1.43	15.32

Between 17 and 18 percent of the tailings weight dissolved during wet screening. The water used in wet screening was dark brown in color and was quite acidic (pH ~4), indicating probable dissolution of iron salts.

C. Selective Flotation of Sulfides

Attempts to selectively float sulfides other than pyrite in an effort to produce a possible high grade gold and silver concentrate were unsuccessful. Approximately 140 lb/ton of lime was required to raise the flotation pulp pH from 2.3 to 5.5 prior to adding a small amount (0.005 lb/ton) of isopropyl xanthate. No sulfide flotation was achieved until 0.065 lb/ton xanthate was added. Unfortunately all the sulfides floated at this reagent addition and the test was discarded.

D. Bulk Sulfide Flotation

Bulk sulfide flotation of this Iron King Tailings composite without pH adjustment recovered 32 percent of the gold and 11 percent of the silver in a pyrite cleaner concentrate assaying 0.191 oz/ton gold and 1.05 oz/ton silver. Approximately 17 percent of the sample weight was recovered into this product, as indicated on the following page.

P-1611: A. F. Budge Mining
Bulk Sulfide Flotation Results (Test 5)

Product	Weight, Grams	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh	74.3	9.09	0.055	0.75	4.94	4.07
-35M. Cleaner Conc.	136.3	16.68	0.191	1.05	31.49	10.46
-35M. Cleaner Tails	27.1	3.32	0.165	3.41	5.41	6.75
-35M. Rougher Tails	579.3	70.91	0.083	1.86	58.16	78.72
Total (Calc.)	817.0	100.00	0.101	1.68	100.00	100.00
Total (Test Feed)	1000.0		0.083	1.37		

This test was performed at an unadjusted pulp pH of 2.4 using an acid resistant collector Orform C-150, manufactured by Phillips Chemical Company. This reagent produced a clean pyrite cleaner flotation concentrate, with very little sulfides in the flotation tailings. The low gold and silver content of the pyrite cleaner concentrate indicates significant gold and silver association with non-sulfide minerals.

Approximately 18 percent of the tailings weight dissolved during test work. Although the tailings sample was agitated at 40 percent solids for 30 minutes prior to testing, some agglomerates would not break down, and the pulp was therefore screened at 35 mesh prior to flotation.

E. Cyanidation And Flotation Of The Leach Residue

Cyanidation of a screened (minus 35 mesh) sample extracted 62 percent of the contained gold and 22 percent of the silver, as indicated on the following page.

P-1611: A. F. Budge Mining
Cyanidation Results (Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh*	7.8	0.056	0.67	5.60	3.54
Leach Solution	-	0.039	0.26	62.36	21.94
Leach Residue	92.2	0.027	1.19	32.04	74.53
Total	100.0	0.068	1.29	100.00	100.00

NaCN Consumed: 7.8 lb/ton sample
Lime Consumed: 77.9 lb/ton sample
*This fraction was not leached.

Some acid was washed from the sample by screening out the +35 mesh material. Therefore, the actual lime consumption projected for treating the total tailings sample would approach the 140 lb/ton figure calculated from the selective sulfide flotation test.

Approximately 31 percent of the gold and nine percent of the silver was recovered by bulk sulfide flotation of the cyanide leach residue.

P-1611: A. F. Budge Mining
Cyanide Leach Residue Flotation Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
No. 2 Cleaner Conc.	14.4	0.059	0.76	31.28	9.18
Combined Cleaner Tails	9.9	0.035	2.34	12.83	19.53
Rougher Tails	75.7	0.020	1.12	55.89	71.29
Total	100.0	0.027	1.19	100.00	100.00

This flotation concentrate was produced using 0.75 lb/ton Armac T (Tallow Amine Acetate Salt) at a pulp pH of 10.0.

III. Test Results

Results presented in this section are also included in Test Data Sheets attached to the end of this report.

A. Head Assay Screen

One thousand grams of sample was slurried at 40 percent solids in a high speed Waring blender for ten minutes to break up any clumps in the sample. The sample was then wet screened at 100, 200 and 325 mesh. Each fraction was dried, weighed and submitted for gold and silver assay.

B. Selective Sulfide Flotation

One thousand grams dry equivalent weight of sample was slurried at 40 percent solids, agitated for 30 minutes, and screened at 35 mesh. The minus 35 mesh fraction was conditioned five minutes in a 1000 gram Agitair flotation machine with 120 lb/ton hydrated lime to raise the pulp pH from 2.4 to 5.5. A small amount (0.005 lb/ton) of Cyanamid sodium isopropyl xanthate was added, and a rougher concentrate floated for one minute. Additional lime was added to the rougher tailings to maintain pH 5.5, and another 0.010 lb/ton xanthate added, however, no sulfide mineralization in the froth was noted until 0.065 lb/ton xanthate was added. This reagent addition floated all the pyrite in the sample, therefore, the test was discarded.

C. Bulk Sulfide Flotation

One thousand grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was conditioned for ten minutes in an Agitair flotation machine with 0.20 lb/ton Phillips Chemical Orfom C-150 Collector at a naturally acidic pulp pH of 2.4. A rougher concentrate was then floated for seven minutes using a small amount (0.038 lb/ton) of MIBC-F65 frother mixture to maintain a stable froth. The rougher concentrate was cleaned once for seven minutes without additional reagents.

D. Cyanidation And Flotation Of The Leach Residue

Approximately 932 grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was adjusted to pH 10.5 - 11.0 with hydrated lime and cyanide added to provide a leach solution containing ten lb NaCN per ton (initial concentration). The slurry was then bottle roll leached at 43 percent solids for 48 hours.

The slurry was weighed, filtered and the filter cake washed once and placed in a 1000 gram agitair flotation cell. The slurry was conditioned for five minutes with 0.5 lb/ton carboxymethylcellulose (CMC) slimes dispersant and 0.5 lb/ton Armac T (Tallow Amine Acetate). The pulp pH was 10.0. A rougher concentrate was then floated for six minutes. The rougher tailings were then conditioned for two minutes with another 0.25 lb/ton Armac T and a second rougher concentrate floated for three minutes. The rougher concentrates were combined and cleaned twice without additional reagents.

No further test work is planned on this sample.

If you have any questions or comments concerning this test work, please call.

Sincerely,

DAWSON METALLURGICAL LABORATORIES, INC.

Philip Thompson

Philip Thompson
Vice President

PT/fg

Enclosures

cc: Mr. Frank Millsaps
3865 Wasatch Blvd.
Room 2021
Salt Lake City, Utah 84109

DAWSON
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P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY MT

TEST NO. 1 NAME A. F. Budge (5' channel #2)

As received NaCN leach, filter and wash once with 500 ml H20. Sulfide float on washed residue.

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS			DISTRIBUTION				
				Au	Ag										
+35 mesh	144.1														
Amine Ro. Conc.	158.8			0.088	1.17										
Amine Ro. Tails	692.3														
Total (Calc)	995.2														

OPERATION				Leach	Leach		Screen	-35 mesh Cond.	Ro.	Ro. #1	Ro. #2			GRINDING PRODUCT	
TIME				1:00	2:00		At	5	1	2 - 2	2 - 4				
REAGENTS - LBS PER TON				Start	Stop		35 Mesh						MESH	%	
As received ore	gm	1100											+10		
Water	gm	900											+14		
Lime	gm		65.0										+20		
NaCN	gm			5.0									+28		
NaCN Titration													+35		
CaO Titration													+48		
KAX								0.010					+65		
Na_2Sio_3								1.0	Armact	0.5	0.5		+100		
									CMC	0.5			+150		
MACHINE													+200		
R.P.M.													+325		
pH		1.9		10.5	11.0			10.3					-325		
% SOLIDS															
TEMPERATURE															

REMARKS:

DAWSON
METALLURGICAL
LABORATORIES, INC.

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY PT

TEST NO. 2 NAME A. F. Budge Iron King

5' channel #2

Selective Ag-Cu-Pb flotation from -35 mesh screened sample, followed by bulk sulfide for pyrite

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS			DISTRIBUTION				
				DISCARD TEST - NO SELECTIVITY											

OPERATION		Screen At	-35 mesh Cond	No 1 Ro	No 2 Ro	No 3 Ro
TIME		35	5	1	2 - 2	2 - 5
REAGENTS - LBS PER TON						
Sample Wgt	1100					
Water - as required						
NAIPX			0.005		0.010	0.050
Lime			60.0		10.0	
Na_2Sio_3					1.0	
KAX						0.050
MACHINE			1000	1000	1000	1000
R.P.M.			800	800	800	800
pH		2.3	5.8	4.5	5.5	5.4
% SOLIDS						
TEMPERATURE						

MESH	GRINDING PRODUCT %
+10	
+14	
+20	
+28	
+35	
+48	
+65	
+100	
+150	
+200	
+325	
-325	

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 3 NAME A. F. Budge Iron King Comp

48 hour NaCN leach on -35 mesh material (with 10 lbs/ton NaCN soln, 50% solids)

Product	Weight	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	
+35mesh	68.0	0.056	0.67	0.0381	0.456	5.60	3.54	V1C
-35m Leach Solution	1087.1	0.039	0.26	0.4240	2.826	62.36	21.94	
-35m Leach Residue	806.9	0.027	1.19	0.2179	9.602	32.04	74.53	
Head Calculated	932.0	0.073	1.38	0.6799	12.884	100.00	100.00	

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	V1G
L.Res.#2 Cl. Conc.	115.9	14.36	0.059	0.76	0.0085	0.109	31.28	9.18	
L.Res.Comb Cl Tails	80.1	9.93	0.035	2.34	0.0035	0.232	12.83	19.53	
L.Res.Ro. Tails.	610.9	75.71	0.020	1.12	0.0151	0.848	55.89	71.29	
Head Calculated	806.9	100.00	0.027	1.19	0.0271	1.189	100.00	100.00	
L.Res.Rougher Con.		24.29	0.049	1.41	0.0119	0.341	44.11	28.71	

							Leach residue amine flot.						GRINDING PRODUCT	
OPERATION			Leach					Cond	#1 Ro.	#2 Ro.	Cl.	Cl.		
TIME			9:45	24 hr.		48 hr.		5	6	2 - 3	7	7		
REAGENTS - LBS PER TON			Start			Off								
												MESH	%	%
-35 mesh	932											+10		
Water	932											+14		
Lime		37.0			2.0							+20		
NaCN			4.67									+28		
NaCN Titration, lb/ton soln						1.42						+35		
CaO Titration, lb/ton soln						0.05						+48		
NaCN Consumed, lb/ton ore						7.8	Armact	0.5		0.25		+65		
Lime Consumed, lb/ton ore						77.9	CMC	0.5				+100		
												+150		
MACHINE								1000	1000	1000	500	+200		
R.P.M.								800	800	800	800	+325		
pH	2.2		11.2	10.3		10.6		10.0				-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 4 NAME A. F. Budge Iron King Comp

Assay Screen of -6 mesh sample

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	V1G
+100 mesh Head	42.4	5.10	0.026	0.02	0.0013	0.001	1.34	0.06	
100/200 mesh Head	69.1	8.31	0.046	0.32	0.0038	0.027	3.87	1.55	
200/325 mesh Head	85.3	10.26	0.078	0.32	0.0080	0.033	8.11	1.91	
-325 mesh Head	634.9	76.34	0.112	2.17	0.0855	1.657	86.67	96.48	
Head Calculated	1000.0*	100.00	0.082	1.43	0.0986	1.717	100.00	100.00	

*Approximately 16.8% of sample dissolved during assay screening.

OPERATION													GRINDING PRODUCT	
TIME														
REAGENTS - LBS PER TON														
												MESH	%	%
Ore -6 mesh	1000											+ 10		
												+ 14		
												+ 20		
												+ 28		
												+ 35		
												+ 48		
												+ 65		
												+ 100		
												+ 150		
MACHINE												+ 200		
R.P.M.												+ 325		
pH												-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/8/88
BY PT

TEST NO. 5 NAME A. F. Budge Iron King Tails

Bulk sulfide flotation for Au, Ag without slurry pH adjustment

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag
+35 mesh	74.3	9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35m Cleaner Conc.	136.3	16.68	0.191	1.05	0.0319	0.175	31.49	10.46
-35m Cleaner Tails.	27.1	3.32	0.165	3.41	0.0055	0.113	5.41	6.75
-35m Rougher Tails.	579.3	70.91	0.083	1.86	0.0589	1.319	58.16	78.72
Head Calculated	1000.0*	100.00	0.083	1.37	0.1012	1.675	100.00	100.00
Rougher Conc.		20.00	0.187	1.44	0.0373	0.288	36.90	17.21
+35 mesh		9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35 mesh		90.91	0.106	1.77	0.0962	1.607	95.06	95.93

V1G

*Approximately 18.3% of sample dissolved in flotation pulp.

OPERATION		Screen At	Cond.	Ro.	Cl.
TIME		35	10	7	5
REAGENTS - LBS PER TON		Mesh			
Sample		1000			
Water		2000			
Orfom C-150* (.007 gm/)			0.20		
MIBC - F65				0.038	
MACHINE			2000	2000	500
R.P.M.			800	800	800
pH		2.4	2.4	2.4	2.7
% SOLIDS					
TEMPERATURE					

-35 mesh

GRINDING PRODUCT		
MESH	%	%
+10		
+14		
+20		
+28		
+35		
+48		
+65		
+100		
+150		
+200		
+325		
-325		

REMARKS: *From Phillips Chemical Co.

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/11/88

Client Dawson Metallurgical Labs

Sample Identification	Oz / Ton Au	Oz / Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Test #4			
Iron King Comp.			
+100mesh	.026	<.05	
+200mesh	.046	.32	
+325mesh	.078	.32	
-325	.112	2.17	
Test #5			
Ro. Tail	.084	1.86	
	.082	1.86	
+35mesh	.056	.72	
	.053	.78	

Ronald Bianchi

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/14/88

Client Dawson Metallurgical Labs

Sample Identification	Oz/Ton Au	Oz/Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Test #5			
Cl. Tails	.153mg	3.17mg	
Cl. Conc.	.192	1.05	
	.190	1.05	
Test #3			
Iron King Comp.			
Leach Sol'n.	.039	.26	
	.038	.26	

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/15/88

Client Dawson Metallurgical Labs

Sample Identification	Oz/Ton Au	Oz/Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Iron King Comp.			
Leach Residues			
Test #3			
Ro. Tails	.020	1.12	
	.020	1.12	
Comb.Cl. Tail	.034	2.33	
	.036	2.34	
#2 Cl. Conc.	.060	.76	
	.057	.76	
+35mesh	.055	.67	
	.057	.66	
P-1601A			
A.F.Budge			
Head Samples			
2 A.T.Dup.			
Comp. #3			
Lower 15-B	.0295	<.05	
	.0290	<.05	
Upper 0-15'	.0330	<.05	
	.0315	<.05	
Comp. #4			
Lower Bottom	.0310	<.05	
	.0304	<.05	

Ronald Barrett

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/7/88

Client Dawson Metallurgical Labs

Sample Identification	Oz/Ton Au	Oz/Ton Ag	Remarks
P-1611			* Ounces per ton of 2000 lbs.
A.F.Budge			
Test #1			
5'Channez #2			
Amine Ro. Conc.	.088	1.15	
	.088	1.19	

Ronald Deanda

WESTERN ANALYTICAL, INC.
2417 South 2700 West
Salt Lake City, Utah 84119
(801) 973-9238

CERTIFICATE OF ANALYSIS

Nov. 17, 1988
P88-853 A
Your P-1611 A. F. Budge

DAWSON METALLURGICAL LABS
MR. HARMEL DAWSON
PO BOX 7685
MURRAY, UTAH 84107

Dear Mr. Dawson:

Transmitted herewith are the analytical data for the four samples delivered to our laboratory for Sulfide analysis.

Sample Number: Jeon King Company

SAMPLE IDENTIFICATION	Sulfide %
+ 325 mesh Test #4	31.11
+ 200 mesh Test #4	8.56
+ 100 mesh Test #4	5.24
- 325 mesh Test #4	18.66

David Armitage
DAVID ARMITAGE
for
E. H. PHILLIPS
Laboratory Director

Charges: $32.00

EHP/cp

DAWSON METALLURGICAL LABORATORIES, INC.

P.O. Box 7685
5217 Major Street
Murray, Utah 84107-0685
Phone: 801-262-0922

November 17, 1988

A. F. Budge Mining Ltd.
4301 North 75th Street
Suite 101
Scottsdale, Arizona 85251

Attention: Mr. Dale Allen

Subject: Results of Laboratory Testing on a Grab Sample Composite of Iron King Tailings. Our Project No. P-1611.

Gentlemen:

In accordance with discussions with Mr. Dale Allen during his visit to our laboratory November 1, 1988, various laboratory tests were performed on a grab sample composite of Iron King Tailings. These tests were performed to determine if the tailings are amenable to cyanidation or flotation for recovery of contained gold and silver values. Specific testwork performed included:

- Assay screen analysis of as-received head sample.
- Selective gold-silver-copper-lead sulfide flotation of a screened (-35 mesh) sample.
- Bulk sulfide flotation of a screened (-35 mesh) sample.
- Cyanide leach of a screened (-35 mesh) sample, followed by flotation of sulfides from the leach residue with amine.

I. Sample Description And Head Analysis

Two separate tailings grab samples weighing five kilograms each were submitted to our laboratory November 1, 1988, by Mr. Dale Allen and assigned our Lot No. P-1611. These samples contained approximately ten percent moisture and consisted of fine, free flowing tailings and agglomerated clumps. These two samples were combined, air dried, and crushed through ¼ inch to break up the hardened clumps prior to testing. A head sample was not split out prior to testing, however, back-calculated heads from testwork are presented on the following page.

P-1611: A. F. Budge Mining
Head Assay Results: Iron King Tails

	Back-Calculated* Head Assay oz/ton		Wgt-%
	Au	Ag	Sulfide Sulfur
Iron King Composite Grab Sample	0.079	1.39	15.31

*Average of 3 tests

Visual examination of the sample under the binocular microscope indicated abundant fine pyrite (10-15 percent of the total sample). A few grains of bornite were also detected.

II. Test Results

Test results presented in this section are also included in individual test data sheets attached to the end of this report.

A. Summary

The pyrite in this sample of Iron King Tailings responds well to flotation in a naturally acid pulp of pH 2.4 using Phillips Chemical Orfom C-150. Unfortunately only 33 percent of the gold and 11 percent of the silver was contained in this product, indicating that most of the gold and silver is probably associated with non-sulfide minerals. Attempts to produce a selective sulfide concentrate containing sulfides other than pyrite were unsuccessful.

Approximately 62 percent of the gold (0.046 oz/ton of ore) and 22 percent of the silver (0.30 oz/ton of ore) was extracted by direct cyanidation of the minus 35 mesh fraction of the tailings. Cyanide and lime consumption was 7.8 and 78 pounds per ton of sample, respectively. The sample required screening at 35 mesh to remove agglomerated chunks which did not break down, even after 30 minutes agitation at 40 percent solids.

B. Head Assay Screen

This Iron King Tailings sample contains approximately 76 percent minus 325 mesh material. Most of the gold and silver is contained in this size fraction, as indicated on the following page.

P-1611: A. F. Budge Mining
Head Assay Screen Results (Test No. 4)

Screen Fraction Mesh	Weight, Grams	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag	Assay, Wgt-% Sulfide Sulfur
+100	42.4	5.10	0.026	<0.05	5.24
-100 +200	69.1	8.31	0.046	0.32	8.56
-200 +325	85.3	10.26	0.078	0.32	31.11
-325	634.9	76.34	0.112	2.17	18.66
Total (Calc)	831.7	100.00	0.099	1.72	18.42
Total (Test Feed)	1000.0		0.082	1.43	15.32

Between 17 and 18 percent of the tailings weight dissolved during wet screening. The water used in wet screening was dark brown in color and was quite acidic (pH ~4), indicating probable dissolution of iron salts.

C. Selective Flotation of Sulfides

Attempts to selectively float sulfides other than pyrite in an effort to produce a possible high grade gold and silver concentrate were unsuccessful. Approximately 140 lb/ton of lime was required to raise the flotation pulp pH from 2.3 to 5.5 prior to adding a small amount (0.005 lb/ton) of isopropyl xanthate. No sulfide flotation was achieved until 0.065 lb/ton xanthate was added. Unfortunately all the sulfides floated at this reagent addition and the test was discarded.

D. Bulk Sulfide Flotation

Bulk sulfide flotation of this Iron King Tailings composite without pH adjustment recovered 32 percent of the gold and 11 percent of the silver in a pyrite cleaner concentrate assaying 0.191 oz/ton gold and 1.05 oz/ton silver. Approximately 17 percent of the sample weight was recovered into this product, as indicated on the following page.

P-1611: A. F. Budge Mining
Bulk Sulfide Flotation Results (Test 5)

Product	Weight, Grams	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh	74.3	9.09	0.055	0.75	4.94	4.07
-35M. Cleaner Conc.	136.3	16.68	0.191	1.05	31.49	10.46
-35M. Cleaner Tails	27.1	3.32	0.165	3.41	5.41	6.75
-35M. Rougher Tails	579.3	70.91	0.083	1.86	58.16	78.72
Total (Calc.)	817.0	100.00	0.101	1.68	100.00	100.00
Total (Test Feed)	1000.0		0.083	1.37		

This test was performed at an unadjusted pulp pH of 2.4 using an acid resistant collector Orform C-150, manufactured by Phillips Chemical Company. This reagent produced a clean pyrite cleaner flotation concentrate, with very little sulfides in the flotation tailings. The low gold and silver content of the pyrite cleaner concentrate indicates significant gold and silver association with non-sulfide minerals.

Approximately 18 percent of the tailings weight dissolved during test work. Although the tailings sample was agitated at 40 percent solids for 30 minutes prior to testing, some agglomerates would not break down, and the pulp was therefore screened at 35 mesh prior to flotation.

E. Cyanidation And Flotation Of The Leach Residue

Cyanidation of a screened (minus 35 mesh) sample extracted 62 percent of the contained gold and 22 percent of the silver, as indicated on the following page.

P-1611: A. F. Budge Mining
Cyanidation Results (Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh*	7.8	0.056	0.67	5.60	3.54
Leach Solution	-	0.039	0.26	62.36	21.94
Leach Residue	92.2	0.027	1.19	32.04	74.53
Total	100.0	0.068	1.29	100.00	100.00

NaCN Consumed: 7.8 lb/ton sample
Lime Consumed: 77.9 lb/ton sample
*This fraction was not leached.

Some acid was washed from the sample by screening out the +35 mesh material. Therefore, the actual lime consumption projected for treating the total tailings sample would approach the 140 lb/ton figure calculated from the selective sulfide flotation test.

Approximately 31 percent of the gold and nine percent of the silver was recovered by bulk sulfide flotation of the cyanide leach residue.

P-1611: A. F. Budge Mining
Cyanide Leach Residue Flotation Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
No. 2 Cleaner Conc.	14.4	0.059	0.76	31.28	9.18
Combined Cleaner Tails	9.9	0.035	2.34	12.83	19.53
Rougher Tails	75.7	0.020	1.12	55.89	71.29
Total	100.0	0.027	1.19	100.00	100.00

This flotation concentrate was produced using 0.75 lb/ton Armac T (Tallow Amine Acetate Salt) at a pulp pH of 10.0.

III. Test Results

Results presented in this section are also included in Test Data Sheets attached to the end of this report.

A. Head Assay Screen

One thousand grams of sample was slurried at 40 percent solids in a high speed Waring blender for ten minutes to break up any clumps in the sample. The sample was then wet screened at 100, 200 and 325 mesh. Each fraction was dried, weighed and submitted for gold and silver assay.

B. Selective Sulfide Flotation

One thousand grams dry equivalent weight of sample was slurried at 40 percent solids, agitated for 30 minutes, and screened at 35 mesh. The minus 35 mesh fraction was conditioned five minutes in a 1000 gram Agitair flotation machine with 120 lb/ton hydrated lime to raise the pulp pH from 2.4 to 5.5. A small amount (0.005 lb/ton) of Cyanamid sodium isopropyl xanthate was added, and a rougher concentrate floated for one minute. Additional lime was added to the rougher tailings to maintain pH 5.5, and another 0.010 lb/ton xanthate added, however, no sulfide mineralization in the froth was noted until 0.065 lb/ton xanthate was added. This reagent addition floated all the pyrite in the sample, therefore, the test was discarded.

C. Bulk Sulfide Flotation

One thousand grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was conditioned for ten minutes in an Agitair flotation machine with 0.20 lb/ton Phillips Chemical Orfom C-150 Collector at a naturally acidic pulp pH of 2.4. A rougher concentrate was then floated for seven minutes using a small amount (0.038 lb/ton) of MIBC-F65 frother mixture to maintain a stable froth. The rougher concentrate was cleaned once for seven minutes without additional reagents.

D. Cyanidation And Flotation Of The Leach Residue

Approximately 932 grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was adjusted to pH 10.5 - 11.0 with hydrated lime and cyanide added to provide a leach solution containing ten lb NaCN per ton (initial concentration). The slurry was then bottle roll leached at 43 percent solids for 48 hours.

The slurry was weighed, filtered and the filter cake washed once and placed in a 1000 gram agitair flotation cell. The slurry was conditioned for five minutes with 0.5 lb/ton carboxymethylcellulose (CMC) slimes dispersant and 0.5 lb/ton Armac T (Tallow Amine Acetate). The pulp pH was 10.0. A rougher concentrate was then floated for six minutes. The rougher tailings were then conditioned for two minutes with another 0.25 lb/ton Armac T and a second rougher concentrate floated for three minutes. The rougher concentrates were combined and cleaned twice without additional reagents.

No further test work is planned on this sample.

If you have any questions or comments concerning this test work, please call.

Sincerely,

DAWSON METALLURGICAL LABORATORIES, INC.

Philip Thompson

Philip Thompson
Vice President

PT/fg

Enclosures

cc: Mr. Frank Millsaps
3865 Wasatch Blvd.
Room 2021
Salt Lake City, Utah 84109

DAWSON
METALLURGICAL
LABORATORIES, INC.

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY MT

TEST NO. 1 NAME A. F. Budge (5' channel #2)

As received NaCN leach, filter and wash once with 500 ml H20. Sulfide float on washed residue.

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS				DISTRIBUTION				
				Au	Ag											
+35 mesh	144.1															
Amine Ro. Conc.	158.8			0.088	1.17											
Amine Ro. Tails	692.3															
Total (Calc)	995.2															

OPERATION				Leach	Leach		Screen	-35 mesh Cond.	Ro.	Ro. #1	Ro. #2			GRINDING PRODUCT	
TIME				1:00	2:00		At	5	1	2 - 2	2 - 4				
REAGENTS - LBS PER TON				Start	Stop		35 Mesh								
													MESH	%	
As received ore	gm	1100											+10		
Water	gm	900											+14		
Lime	gm		65.0										+20		
NaCN	gm			5.0									+28		
NaCN Titration													+35		
CaO Titration													+48		
KAX								0.010					+65		
Na_2Sio_3								1.0	Armact	0.5	0.5		+100		
									CMC	0.5			+150		
MACHINE													+200		
R.P.M.													+325		
pH		1.9		10.5	11.0			10.3					-325		
% SOLIDS															
TEMPERATURE															

REMARKS:

DAWSON
METALLURGICAL
LABORATORIES, INC.

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY PT

TEST NO. 2 NAME A. F. Budge Iron King 5' channel #2

Selective Ag-Cu-Pb flotation from -35 mesh screened sample, followed by bulk sulfide for pyrite

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS			DISTRIBUTION				
				DISCARD TEST - NO SELECTIVITY											

OPERATION		Screen At	-35 mesh Cond	No 1 Ro	No 2 Ro	No 3 Ro							GRINDING PRODUCT	
TIME		35	5	1	2 - 2	2 - 5								
REAGENTS - LBS PER TON														
Sample Wgt	1100											MESH	%	
Water - as required												+10		
NAIPX			0.005		0.010	0.050						+14		
Lime			60.0		10.0							+20		
Na_2Sio_3					1.0							+28		
KAX						0.050						+35		
												+48		
												+65		
												+100		
												+150		
MACHINE			1000	1000	1000	1000						+200		
R.P.M.			800	800	800	800						+325		
pH		2.3	5.8	4.5	5.5	5.4						-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 3 NAME A. F. Budge Iron King Comp

48 hour NaCN leach on -35 mesh material (with 10 lbs/ton NaCN soln, 50% solids)

Product	Weight	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	
+35mesh	68.0	0.056	0.67	0.0381	0.456	5.60	3.54	V1C
-35m Leach Solution	1087.1	0.039	0.26	0.4240	2.826	62.36	21.94	
-35m Leach Residue	806.9	0.027	1.19	0.2179	9.602	32.04	74.53	
Head Calculated	932.0	0.073	1.38	0.6799	12.884	100.00	100.00	

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	V1G
L.Res.#2 Cl. Conc.	115.9	14.36	0.059	0.76	0.0085	0.109	31.28	9.18	
L.Res.Comb Cl Tails	80.1	9.93	0.035	2.34	0.0035	0.232	12.83	19.53	
L.Res.Ro. Tails.	610.9	75.71	0.020	1.12	0.0151	0.848	55.89	71.29	
Head Calculated	806.9	100.00	0.027	1.19	0.0271	1.189	100.00	100.00	
L.Res.Rougher Con.		24.29	0.049	1.41	0.0119	0.341	44.11	28.71	

OPERATION			Leach				Leach residue amine flot.	Cond	#1 Ro.	#2 Ro.	Cl.	Cl.	GRINDING PRODUCT	
TIME			9:45	24 hr.		48 hr.		5	6	2 - 3	7	7		
REAGENTS - LBS PER TON			Start			Off								
												MESH	%	%
-35 mesh	932											+10		
Water	932											+14		
Lime		37.0			2.0							+20		
NaCN			4.67									+28		
NaCN Titration, lb/ton soln						1.42						+35		
CaO Titration, lb/ton soln						0.05						+48		
NaCN Consumed, lb/ton ore						7.8	Armact	0.5		0.25		+65		
Lime Consumed, lb/ton ore						77.9	CMC	0.5				+100		
												+150		
MACHINE								1000	1000	1000	500	+200		
R.P.M.								800	800	800	800	+325		
pH	2.2		11.2	10.3		10.6		10.0				-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 4 NAME A. F. Budge Iron King Comp

Assay Screen of -6 mesh sample

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	V1G
+100 mesh Head	42.4	5.10	0.026	0.02	0.0013	0.001	1.34	0.06	
100/200 mesh Head	69.1	8.31	0.046	0.32	0.0038	0.027	3.87	1.55	
200/325 mesh Head	85.3	10.26	0.078	0.32	0.0080	0.033	8.11	1.91	
-325 mesh Head	634.9	76.34	0.112	2.17	0.0855	1.657	86.67	96.48	
Head Calculated	1000.0*	100.00	0.082	1.43	0.0986	1.717	100.00	100.00	

*Approximately 16.8% of sample dissolved during assay screening.

OPERATION													GRINDING PRODUCT	
TIME														
REAGENTS - LBS PER TON														
												MESH	%	%
Ore -6 mesh	1000											+ 10		
												+ 14		
												+ 20		
												+ 28		
												+ 35		
												+ 48		
												+ 65		
												+ 100		
												+ 150		
MACHINE												+ 200		
R.P.M.												+ 325		
pH												-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/8/88
BY PT

TEST NO. 5 NAME A. F. Budge Iron King Tails

Bulk sulfide flotation for Au, Ag without slurry pH adjustment

V1G

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag
+35 mesh	74.3	9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35m Cleaner Conc.	136.3	16.68	0.191	1.05	0.0319	0.175	31.49	10.46
-35m Cleaner Tails.	27.1	3.32	0.165	3.41	0.0055	0.113	5.41	6.75
-35m Rougher Tails.	579.3	70.91	0.083	1.86	0.0589	1.319	58.16	78.72
Head Calculated	1000.0*	100.00	0.083	1.37	0.1012	1.675	100.00	100.00
Rougher Conc.		20.00	0.187	1.44	0.0373	0.288	36.90	17.21
+35 mesh		9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35 mesh		90.91	0.106	1.77	0.0962	1.607	95.06	95.93

*Approximately 18.3% of sample dissolved in flotation pulp.

OPERATION		Screen At	Cond.	Ro.	Cl.
TIME		35	10	7	5
REAGENTS - LBS PER TON		Mesh			
Sample		1000			
Water		2000			
Orfom C-150* (.007 gm/)			0.20		
MIBC - F65				0.038	
MACHINE			2000	2000	500
R.P.M.			800	800	800
pH		2.4	2.4	2.4	2.7
% SOLIDS					
TEMPERATURE					

-35 mesh

GRINDING PRODUCT MESH	%	%
+10		
+14		
+20		
+28		
+35		
+48		
+65		
+100		
+150		
+200		
+325		
-325		

REMARKS: *From Phillips Chemical Co.

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/11/88

Client Dawson Metallurgical Labs

Sample Identification	Oz / Ton Au	Oz / Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Test #4			
Iron King Comp.			
+100mesh	.026	<.05	
+200mesh	.046	.32	
+325mesh	.078	.32	
-325	.112	2.17	
Test #5			
Ro. Tail	.084	1.86	
	.082	1.86	
+35mesh	.056	.72	
	.053	.78	

Ronald Bianchi

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/14/88

Client Dawson Metallurgical Labs

Sample Identification	Oz / Ton Au	Oz / Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Test #5			
Cl. Tails	.153mg	3.17mg	
Cl. Conc.	.192	1.05	
	.190	1.05	
Test #3			
Iron King Comp.			
Leach Sol'n.	.039	.26	
	.038	.26	

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/15/88

Client Dawson Metallurgical Labs

Sample Identification	Oz / Ton Au	Oz / Ton Ag	Remarks
			* Ounces per ton of 2000 lbs.
P-1611			
A.F.Budge			
Iron King Comp.			
Leach Residues			
Test #3			
Ro. Tails	.020	1.12	
	.020	1.12	
Comb.Cl. Tail	.034	2.33	
	.036	2.34	
#2 Cl. Conc.	.060	.76	
	.057	.76	
+35mesh	.055	.67	
	.057	.66	
P-1601A			
A.F.Budge			
Head Samples			
2 A.T.Dup.			
Comp. #3			
Lower 15-B	.0295	<.05	
	.0290	<.05	
Upper 0-15'	.0330	<.05	
	.0315	<.05	
Comp. #4			
Lower Bottom	.0310	<.05	
	.0304	<.05	

Ronald Bieneki

ASSAY REPORT SHEET

ASSAY LAB, INC.
1376 W. 8040 So. Unit #4
West Jordan, Utah 84084

Date Received _____ Date Reported 11/7/88

Client Dawson Metallurgical Labs

Sample Identification	Oz/Ton Au	Oz/Ton Ag	Remarks
P-1611			* Ounces per ton of 2000 lbs.
A.F.Budge			
Test #1			
5'Channez #2			
Amine Ro. Conc.	.088	1.15	
	.088	1.19	

Ronald Bianchi

WESTERN ANALYTICAL, INC.
2417 South 2700 West
Salt Lake City, Utah 84119
(801) 973-9238

CERTIFICATE OF ANALYSIS

Nov. 17, 1988
P88-853 A
Your P-1611 A. F. Budge

DAWSON METALLURGICAL LABS
MR. HARMEL DAWSON
PO BOX 7685
MURRAY, UTAH 84107

Dear Mr. Dawson:

Transmitted herewith are the analytical data for the four samples delivered to our laboratory for Sulfide analysis.

Sample Number: Jeon King Company

SAMPLE IDENTIFICATION	Sulfide %
+ 325 mesh Test #4	31.11
+ 200 mesh Test #4	8.56
+ 100 mesh Test #4	5.24
- 325 mesh Test #4	18.66

David Armitage
DAVID ARMITAGE
for
E. H. PHILLIPS
Laboratory Director

Charges: $32.00

EHP/cp

M E M O

TO: Dale Allen
cc: C.A. O'Brien, R.R. Short, A.F. Budge

FROM: Don White

DATE: October 22, 1988

SUBJECT: Iron King Mine Tailings

Forwarded with Ron Short were two samples, each about 10 pounds, of the tailings at the Iron King Mine. Each is a five-foot vertical channel of a different bench on the very large pile which displays an overall height in excess of 100 feet. So they can not be considered representative of the whole but are unoxidized, subsurface camples as you requested.

Accompanying is my Dec. 18, 1986 memo, some notes on the the tailings chemistry, other's work, and ownership, and some news articles on the Ironite operation utilizing the tailings now.

Five million tons of 0.055 oz/t Au looks enticing, but it's a tough nut to crack. Let me know if anything else will be of help.

DW:sk

M E M O

TO: Ben F. Dickerson, III, Carole A. O'Brien

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SUBJECT: Possible applicability of a new gold leaching process to the Iron King tailings.

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What is at stake is a surface pile of 5 million tons grading:

.055	oz/t	Au
.7	oz/t	Ag
.05	%	Cu
.25-.5	%	Rb
1.0	%	Zn
.5-.75	%	As

It has been looked at by Rosario, Eagle Pitcher, and Metallgesellschaft in the last decade or so but none have been able to economically liberate the gold from its pyrite host. Homestake metallurgists have done that now by a hot, pressurized, acidified, oxygenated cyanide leach process. Their feed contains 3-4% sulfides averaging .15 oz/t Au. They add sulfuric acid to reduce the pH to 1, pressurize the system to 350 p.s.i, add pure oxygen, and steam heat.

Of course this system is very corrosive, requiring specially fabricated titanium process equipment. But the oxidized product it yields is amenable to conventional cyanide recovery. The process is proven and the methods and equipment have been tested. I think it may be worth some inquiries regarding the process availability.

The other consideration is the tailings availability. If interested, I could pursue some inquiries on that. My understanding is that they are available for lease or sublease right now.

Let me know whether this idea has enough merit to pursue for Budge or anyone else.

DW:sk

Iron King Tailings

From discussion with Bob Crook, I.K. Assay office, 11-8-85
during visit by/with Doug Dunnett of Ranger Exploration (Australia)

Resource: 5 million tons @

	.05 % Cu
.055 oz/t Au	.25-.5 % Pb
.7 oz/t Ag	1.0 % Zn
	.5-.75 % As

Previously studies by: Rosario, Eagle Picher, Metallgesellschaft.

Metallgesellschaft recently dropped its lease and it is now controlled by Mettex, owned by Hinze Brungs of Phoenix — Ironite operation, etc.
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12-16-86 Idea of applying McLaughlin Mine's pressurized, acidified oxygenated cyanide leach system to I.K. tails.

20 mt. @ .15 originally (18 mil. tonnes @ .145 now)

Ore @ 3-4 % sulfides + H_2SO_4 + P + steam + O_2 ⇒
pH = 1 P = 350 p.s.i.
oxidized product amenable to conventional cyanide recovery
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Iron King Mine spurring economy

Courier - Oct 2, 1988

Humboldt has had little to talk about for more features

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oxidized product amenable to conventional cyanide recovery
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See Mine, page 6

● Mine

Mine replenishing earth

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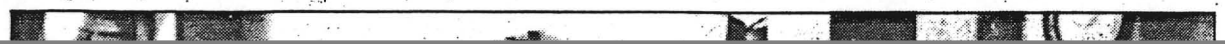


DAWSON METALLURGICAL LABORATORIES, INC.

P.O. Box 7685
5217 Major Street
Murray, Utah 84107-0685
Phone: 801-262-0922

November 17, 1988

A. F. Budge Mining Ltd.
4301 North 75th Street
Suite 101
Scottsdale, Arizona 85251

Attention: Mr. Dale Allen

Subject: Results of Laboratory Testing on a Grab Sample Composite of Iron King Tailings. Our Project No. P-1611.

Gentlemen:

In accordance with discussions with Mr. Dale Allen during his visit to our laboratory November 1, 1988, various laboratory tests were performed on a grab sample composite of Iron King Tailings. These tests were performed to determine if the tailings are amenable to cyanidation or flotation for recovery of contained gold and silver values. Specific testwork performed included:

- Assay screen analysis of as-received head sample.
- Selective gold-silver-copper-lead sulfide flotation of a screened (-35 mesh) sample.
- Bulk sulfide flotation of a screened (-35 mesh) sample.
- Cyanide leach of a screened (-35 mesh) sample, followed by flotation of sulfides from the leach residue with amine.

I. Sample Description And Head Analysis

Two separate tailings grab samples weighing five kilograms each were submitted to our laboratory November 1, 1988, by Mr. Dale Allen and assigned our Lot No. P-1611. These samples contained approximately ten percent moisture and consisted of fine, free flowing tailings and agglomerated clumps. These two samples were combined, air dried, and crushed through $\frac{1}{4}$ inch to break up the hardened clumps prior to testing. A head sample was not split out prior to testing, however, back-calculated heads from testwork are presented on the following page.

P-1611: A. F. Budge Mining
Head Assay Results: Iron King Tails

	Back-Calculated* Head Assay oz/ton	
	Au	Ag
Iron King Composite Grab Sample	0.079	1.39

*Average of 3 tests

Visual examination of the sample under the binocular microscope indicated abundant fine pyrite (10-15 percent of the total sample). A few grains of bornite were also detected.

II. Test Results

Test results presented in this section are also included in individual test data sheets attached to the end of this report.

A. Summary

The pyrite in this sample of Iron King Tailings responds well to flotation in a naturally acid pulp of pH 2.4 using Phillips Chemical Orfom C-150. Unfortunately only 33 percent of the gold and 11 percent of the silver was contained in this product, indicating that most of the gold and silver is probably associated with non-sulfide minerals. Attempts to produce a selective sulfide concentrate containing sulfides other than pyrite were unsuccessful.

Approximately 62 percent of the gold (0.046 oz/ton of ore) and 22 percent of the silver (0.30 oz/ton of ore) was extracted by direct cyanidation of the minus 35 mesh fraction of the tailings. Cyanide and lime consumption was 7.8 and 78 pounds per ton of sample, respectively. The sample required screening at 35 mesh to remove agglomerated chunks which did not break down, even after 30 minutes agitation at 40 percent solids.

B. Head Assay Screen

This Iron King Tailings sample contains approximately 76 percent minus 325 mesh material. Most of the gold and silver is contained in this size fraction, as indicated on the following page.

P-1611: A. F. Budge Mining
Head Assay Screen Results (Test No. 4)

Screen Fraction Mesh	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag
+100	5.10	0.026	<0.05
-100 +200	8.31	0.046	0.32
-200 +325	10.26	0.078	0.32
-325	76.34	0.112	2.17
Total	100.00	0.082	1.43

Between 17 and 18 percent of the tailings weight dissolved during wet screening. The water used in wet screening was dark brown in color and was quite acidic (pH ~4), indicating probable dissolution of iron salts.

C. Selective Flotation of Sulfides

Attempts to selectively float sulfides other than pyrite in an effort to produce a possible high grade gold and silver concentrate were unsuccessful. Approximately 140 lb/ton of lime was required to raise the flotation pulp pH from 2.3 to 5.5 prior to adding a small amount (0.005 lb/ton) of isopropyl xanthate. No sulfide flotation was achieved until 0.065 lb/ton xanthate was added. Unfortunately all the sulfides floated at this reagent addition and the test was discarded.

D. Bulk Sulfide Flotation

Bulk sulfide flotation of this Iron King Tailings composite without pH adjustment recovered 32 percent of the gold and 11 percent of the silver in a pyrite cleaner concentrate assaying 0.191 oz/ton gold and 1.05 oz/ton silver. Approximately 17 percent of the sample weight was recovered into this product, as indicated on the following page.

P-1611: A. F. Budge Mining
Bulk Sulfide Flotation Results (Test 5)

Product	Weight Percent	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh	9.09	0.055	0.75	4.94	4.07
-35M. Cleaner Conc.	16.68	0.191	1.05	31.49	10.46
-35M. Cleaner Tails	3.32	0.165	3.41	5.41	6.75
-35M. Rougher Tails	70.91	0.083	1.86	58.16	78.72
Total (Calc.)	100.00	0.083	1.37	100.00	100.00

This test was performed at an unadjusted pulp pH of 2.4 using an acid resistant collector Orform C-150, manufactured by Phillips Chemical Company. This reagent produced a clean pyrite cleaner flotation concentrate, with very little sulfides in the flotation tailings. The low gold and silver content of the pyrite cleaner concentrate indicates significant gold and silver association with non-sulfide minerals.

Approximately 18 percent of the tailings weight dissolved during test work. Although the tailings sample was agitated at 40 percent solids for 30 minutes prior to testing, some agglomerates would not break down, and the pulp was therefore screened at 35 mesh prior to flotation.

E. Cyanidation And Flotation Of The Leach Residue

Cyanidation of a screened (minus 35 mesh) sample extracted 62 percent of the contained gold and 22 percent of the silver, as indicated on the following page.

P-1611: A. F. Budge Mining
Cyanidation Results (Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
+35 Mesh*	7.8	0.056	0.67	5.60	3.54
Leach Solution	-	0.039	0.26	62.36	21.94
Leach Residue	92.2	0.027	1.19	32.04	74.53
Total	100.0	0.068	1.29	100.00	100.00

NaCN Consumed: 7.8 lb/ton sample
Lime Consumed: 77.9 lb/ton sample
*This fraction was not leached.

Some acid was washed from the sample by screening out the +35 mesh material. Therefore, the actual lime consumption projected for treating the total tailings sample would approach the 140 lb/ton figure calculated from the selective sulfide flotation test.

Approximately 31 percent of the gold and nine percent of the silver was recovered by bulk sulfide flotation of the cyanide leach residue.

P-1611: A. F. Budge Mining
Cyanide Leach Residue Flotation Test 3)

Product	WGT %	Assay, oz/ton Au	Assay, oz/ton Ag	Distribution, % Au	Distribution, % Ag
No. 2 Cleaner Conc.	14.4	0.059	0.76	31.28	9.18
Combined Cleaner Tails	9.9	0.035	2.34	12.83	19.53
Rougher Tails	75.7	0.020	1.12	55.89	71.29
Total	100.0	0.027	1.19	100.00	100.00

This flotation concentrate was produced using 0.75 lb/ton Armac T (Tallow Amine Acetate Salt) at a pulp pH of 10.0.

III. Test Results

Results presented in this section are also included in Test Data Sheets attached to the end of this report.

A. Head Assay Screen

One thousand grams of sample was slurried at 40 percent solids in a high speed Waring blender for ten minutes to break up any clumps in the sample. The sample was then wet screened at 100, 200 and 325 mesh. Each fraction was dried, weighed and submitted for gold and silver assay.

B. Selective Sulfide Flotation

One thousand grams dry equivalent weight of sample was slurried at 40 percent solids, agitated for 30 minutes, and screened at 35 mesh. The minus 35 mesh fraction was conditioned five minutes in a 1000 gram Agitair flotation machine with 120 lb/ton hydrated lime to raise the pulp pH from 2.4 to 5.5. A small amount (0.005 lb/ton) of Cyanamid sodium isopropyl xanthate was added, and a rougher concentrate floated for one minute. Additional lime was added to the rougher tailings to maintain pH 5.5, and another 0.010 lb/ton xanthate added, however, no sulfide mineralization in the froth was noted until 0.065 lb/ton xanthate was added. This reagent addition floated all the pyrite in the sample, therefore, the test was discarded.

C. Bulk Sulfide Flotation

One thousand grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was conditioned for ten minutes in an Agitair flotation machine with 0.20 lb/ton Phillips Chemical Orfom C-150 Collector at a naturally acidic pulp pH of 2.4. A rougher concentrate was then floated for seven minutes using a small amount (0.038 lb/ton) of MIBC-F65 frother mixture to maintain a stable froth. The rougher concentrate was cleaned once for seven minutes without additional reagents.

D. Cyanidation And Flotation Of The Leach Residue

Approximately 932 grams of sample was slurried and screened at 35 mesh as previously described. The minus 35 mesh material was adjusted to pH 10.5 - 11.0 with hydrated lime and cyanide added to provide a leach solution containing ten lb NaCN per ton (initial concentration). The slurry was then bottle roll leached at 43 percent solids for 48 hours.

The slurry was weighed, filtered and the filter cake washed once and placed in a 1000 gram agitair flotation cell. The slurry was conditioned for five minutes with 0.5 lb/ton carboxymethylcellulose (CMC) slimes dispersant and 0.5 lb/ton Armac T (Tallow Amine Acetate). The pulp pH was 10.0. A rougher concentrate was then floated for six minutes. The rougher tailings were then conditioned for two minutes with another 0.25 lb/ton Armac T and a second rougher concentrate floated for three minutes. The rougher concentrates were combined and cleaned twice without additional reagents.

No further test work is planned on this sample.

If you have any questions or comments concerning this test work, please call.

Sincerely,

DAWSON METALLURGICAL LABORATORIES, INC.

Philip Thompson
Vice President

PT/fg

Enclosures

cc: Mr. Frank Millsaps
3865 Wasatch Blvd.
Room 2021
Salt Lake City, Utah 84109

DAWSON
METALLURGICAL
LABORATORIES, INC.

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY MT

TEST NO. 1 NAME A. F. Budge (5' channel #2)

As received NaCN leach, filter and wash once with 500 ml H20. Sulfide float on washed residue.

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS			DISTRIBUTION				
				Au	Ag										
+35 mesh	144.1														
Amine Ro. Conc.	158.8			0.088	1.17										
Amine Ro. Tails	692.3														
Total (Calc)	995.2														

OPERATION				Leach	Leach		Screen	-35 mesh Cond.	Ro.	Ro. #1	Ro. #2			GRINDING PRODUCT	
TIME				1:00	2:00		At	5	1	2 - 2	2 - 4				
REAGENTS - LBS PER TON				Start	Stop		35 Mesh								
													MESH	%	
As received ore	gm	1100											+10		
Water	gm	900											+14		
Lime	gm		65.0										+20		
NaCN	gm			5.0									+28		
NaCN Titration													+35		
CaO Titration													+48		
KAX								0.010					+65		
Na_2Sio_3								1.0	Armact	0.5	0.5		+100		
									CMC	0.5			+150		
MACHINE													+200		
R.P.M.													+325		
pH		1.9		10.5	11.0			10.3					-325		
% SOLIDS															
TEMPERATURE															

REMARKS:

DAWSON
METALLURGICAL
LABORATORIES, INC.

P. O. Box 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/1/88
BY PT

TEST NO. 2 NAME A. F. Budge Iron King 5' channel #2

Selective Ag-Cu-Pb flotation from -35 mesh screened sample, followed by bulk sulfide for pyrite

PRODUCT	Weight	PERCENT WEIGHT	ASSAY					UNITS			DISTRIBUTION				
				DISCARD TEST - NO SELECTIVITY											

OPERATION		Screen At	-35 mesh Cond	No 1 Ro	No 2 Ro	No 3 Ro
TIME		35	5	1	2 - 2	2 - 5
REAGENTS - LBS PER TON						
Sample Wgt	1100					
Water - as required						
NAIPX			0.005		0.010	0.050
Lime			60.0		10.0	
Na_2Sio_3					1.0	
KAX						0.050
MACHINE			1000	1000	1000	1000
R.P.M.			800	800	800	800
pH		2.3	5.8	4.5	5.5	5.4
% SOLIDS						
TEMPERATURE						

GRINDING PRODUCT	
MESH	%
+10	
+14	
+20	
+28	
+35	
+48	
+65	
+100	
+150	
+200	
+325	
-325	

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 3 NAME A. F. Budge Iron King Comp

48 hour NaCN leach on -35 mesh material (with 10 lbs/ton NaCN soln, 50% solids)

Product	Weight	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	
+35mesh	68.0	0.056	0.67	0.0381	0.456	5.60	3.54	V1C
-35m Leach Solution	1087.1	0.039	0.26	0.4240	2.826	62.36	21.94	
-35m Leach Residue	806.9	0.027	1.19	0.2179	9.602	32.04	74.53	
Head Calculated	932.0	0.073	1.38	0.6799	12.884	100.00	100.00	

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag	V1G
L.Res.#2 Cl. Conc.	115.9	14.36	0.059	0.76	0.0085	0.109	31.28	9.18	
L.Res.Comb Cl Tails	80.1	9.93	0.035	2.34	0.0035	0.232	12.83	19.53	
L.Res.Ro. Tails.	610.9	75.71	0.020	1.12	0.0151	0.848	55.89	71.29	
Head Calculated	806.9	100.00	0.027	1.19	0.0271	1.189	100.00	100.00	
L.Res.Rougher Con.		24.29	0.049	1.41	0.0119	0.341	44.11	28.71	

								Leach residue amine flot.						GRINDING PRODUCT	
OPERATION			Leach					Cond	#1 Ro.	#2 Ro.	Cl.	Cl.			
TIME			9:45	24 hr.		48 hr.		5	6	2 - 3	7	7			
REAGENTS - LBS PER TON			Start			Off									
												MESH		%	%
-35 mesh	932											+10			
Water	932											+14			
Lime		37.0			2.0							+20			
NaCN			4.67									+28			
NaCN Titration, lb/ton soln						1.42						+35			
CaO Titration, lb/ton soln						0.05						+48			
NaCN Consumed, lb/ton ore						7.8	Armact	0.5		0.25		+65			
Lime Consumed, lb/ton ore						77.9	CMC	0.5				+100			
												+150			
MACHINE								1000	1000	1000	500	+200			
R.P.M.								800	800	800	800	+325			
pH	2.2		11.2	10.3		10.6		10.0				-325			
% SOLIDS															
TEMPERATURE															

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/7/88
BY MT

TEST NO. 4 NAME A. F. Budge Iron King Comp

Assay Screen of -6 mesh sample

Product	Weight	% Wt.	Assay		Units		Distribution		V1G
			Au	Ag	Au	Ag	Au	Ag	
+100 mesh Head	42.4	5.10	0.026	0.02	0.0013	0.001	1.34	0.06	
100/200 mesh Head	69.1	8.31	0.046	0.32	0.0038	0.027	3.87	1.55	
200/325 mesh Head	85.3	10.26	0.078	0.32	0.0080	0.033	8.11	1.91	
-325 mesh Head	634.9	76.34	0.112	2.17	0.0855	1.657	86.67	96.48	
Head Calculated	1000.0*	100.00	0.082	1.43	0.0986	1.717	100.00	100.00	

*Approximately 16.8% of sample dissolved during assay screening.

OPERATION													GRINDING PRODUCT	
TIME														
REAGENTS - LBS PER TON														
												MESH	%	%
Ore -6 mesh	1000											+10		
												+14		
												+20		
												+28		
												+35		
												+48		
												+65		
												+100		
												+150		
MACHINE												+200		
R.P.M.												+325		
pH												-325		
% SOLIDS														
TEMPERATURE														

REMARKS:

DAWSON METALLURGICAL LABORATORIES, INC.

P. O. BOX 7685
5217 Major Street
Murray, Utah 84107
Phone: 801-262-0922

PROJECT NO. P-1611
DATE 11/8/88
BY PT

TEST NO. 5 NAME A. F. Budge Iron King Tails

Bulk sulfide flotation for Au, Ag without slurry pH adjustment

Product	Weight	% Wt.	Assay Au	Assay Ag	Units Au	Units Ag	Distribution Au	Distribution Ag
+35 mesh	74.3	9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35m Cleaner Conc.	136.3	16.68	0.191	1.05	0.0319	0.175	31.49	10.46
-35m Cleaner Tails.	27.1	3.32	0.165	3.41	0.0055	0.113	5.41	6.75
-35m Rougher Tails.	579.3	70.91	0.083	1.86	0.0589	1.319	58.16	78.72
Head Calculated	1000.0*	100.00	0.083	1.37	0.1012	1.675	100.00	100.00
Rougher Conc.		20.00	0.187	1.44	0.0373	0.288	36.90	17.21
+35 mesh		9.09	0.055	0.75	0.0050	0.068	4.94	4.07
-35 mesh		90.91	0.106	1.77	0.0962	1.607	95.06	95.93

V1G

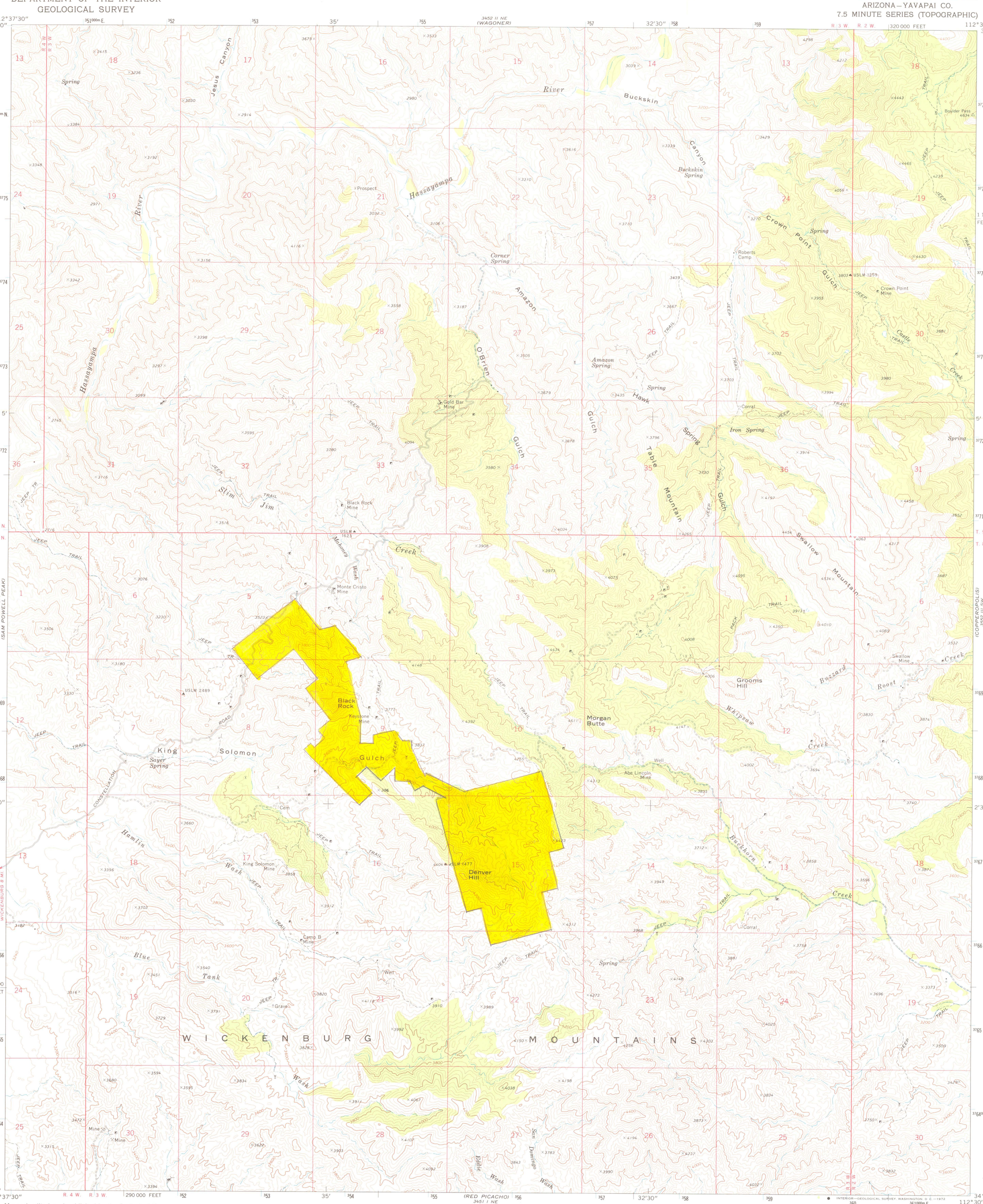
*Approximately 18.3% of sample dissolved in flotation pulp.

OPERATION		Screen At	Cond.	Ro.	Cl.								GRINDING PRODUCT	
TIME		35	10	7	5									
REAGENTS - LBS PER TON		Mesh												
Sample		1000										MESH	%	%
Water		2000										+ 10		
Orfom C-150* (.007 gm/)			0.20									+ 14		
MIBC - F65				0.038								+ 20		
												+ 28		
												+ 35		
												+ 48		
												+ 65		
												+ 100		
												+ 150		
MACHINE			2000	2000	500							+ 200		
R.P.M.			800	800	800							+ 325		
pH		2.4	2.4	2.4	2.7							-325		
% SOLIDS														
TEMPERATURE														

REMARKS: *From Phillips Chemical Co.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MORGAN BUTTE QUADRANGLE
ARIZONA—YAVAPAI CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

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

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

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

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

MORGAN BUTTE, ARIZ.
N3400—W11230/7.5

1969

AMS 3452 II SE—SERIES V898

ARIZONA ROAD MAP

A dramatic sunrise from Mt. Graham, near Safford. David Muench (I-11)

ISSUED FOR FREE DISTRIBUTION BY ARIZONA HIGHWAYS MAGAZINE
Produced in 1982 by Arizona Highways Magazine

POINTS OF INTEREST THROUGHOUT ARIZONA

F-3 ALAMO LAKE STATE PARK – A 4,900-acre park featuring a 500-acre fishing and water-sport lake. On Bill Williams River. 38 miles north of Wenden.

G-8 APACHE TRAIL – Beginning at Apache Junction, 34 miles east of Phoenix, this world-famous trail winds through rugged mountain scenery to Globe. Highlights include high dams and sparkling lakes on the Salt River.

I-8 ARIZONA-SONORA DESERT MUSEUM – In the Tucson Mountains. 16 miles west of Tucson. Features exhibits of desert flora and fauna. Also nature trails and live animal collection.

L-11 BISBEE – Once an important copper mining center. The 1880's town is uniquely photographable. Copper Queen Hotel is a Victorian treasure. Scene of annual bike races. Mine tour available.

B-12 CANYON DE CHELLY NATIONAL MONUMENT – Near the New Mexico border. Beautiful, rugged canyon country. Indian ruins. Tours available.

I-7 CASA GRANDE RUINS NATIONAL MONUMENT – Well-preserved ruins of a four-story Indian structure, perhaps an ancient observatory. Near Coolidge.

I-12 CHIRICAHUA NATIONAL MONUMENT – Extraordinary weathered-rock sculptures. Located in southeastern Arizona, north of Douglas.

K-11 COCHISE STRONGHOLD – Ten and one-half miles from US 666, in the scenic Dragoon Mountains. For many years a hiding place of the famous Apache chief.

I-9 COLOSSAL CAVE – One of the state's limestone wonders. 28 miles southeast of Tucson. Daily tours.

L-10 CORONADO NATIONAL MONUMENT – The site where Coronado and his conquistadores first entered the U.S., in 1540, in search of the Seven Cities of Cibola.

G-12 CORONADO TRAIL – Scenic trail said to have been followed by Coronado in his search for Cibola. US 666 from Clifton to Alpine.

H-6 DESERT BOTANICAL GARDEN – Outstanding displays of desert plant life in a natural setting.

K-10 FORT HUACHUCA – Important territorial outpost. Now a strategic communications base for the US Army. Museum open to the public.

E-7 FORT VERDE HISTORIC PARK – Located in Camp Verde. Century old military base played a key role in subduing the Apaches in the 1870's. Museum, officers homes open to public.

A-7 GLEN CANYON DAM – A curved gravity structure on the Colorado River. The 700-foot-high dam holds back 210 miles of water in Lake Powell.

B-5,6 GRAND CANYON NATIONAL MONUMENT AND PARK – The world's greatest natural wonder. South Rim open all year. Tours, lodging available. North Rim closed during the winter.

B-5 HAVASUPAI INDIAN RESERVATION – Offers beautiful scenery, waterfalls in a remote section of the Grand Canyon. Home of the Havasupai Indian Tribe.

H-6 HEARD MUSEUM *(SEE PHOENIX INSET)* – Indian arts and crafts with special emphasis on Southwest tribes.

H-6 HERITAGE SQUARE *(SEE PHOENIX INSET)* – at 6th street and Monroe in Phoenix. Features the restored Victorian-styled Rosson House. The three-square-block park was set aside as an authentic representation of turn-of-the-century Phoenix.

B-1 HOOVER DAM – Located 72 miles northwest of Kingman. Largest of all federal reclamation projects, and one of the greatest feats of engineering. The 727-foot structure is the highest concrete dam in the U.S. Tours available.

C-10 HOPI VILLAGES – Walpi, Orraibi, Hotevilla, Shongopovi, etc. Annual Snake Dance held here late in August. Oraibi is believed to be the oldest, continuously inhabited village in North America, dating back to 1200 A.D.

E-6 JEROME – Historic copper mining town picturesquely located on a steep mountainside. Museum offers archeological, mining, and historical displays.

K-7 KITT PEAK NATIONAL OBSERVATORY – Numerous telescopes, largest being 158 inches. Famed McMath Solar Telescope also here. Tours available.

F-2 LAKE HAVASU STATE PARK – A unique 13,000-acre recreational spot on the Colorado River. Boating, fishing, swimming.

F-2 LONDON BRIDGE – Famed bridge transplanted to Lake Havasu City on the Colorado River.

F-12 LYMAN LAKE RECREATIONAL AREA – Over 160 acres of lake and camp grounds near St. Johns.

E-8 METEOR CRATER – One of Arizona's strangest geological wonders.

I-8 MISSION SAN XAVIER DEL BAC – Nine miles south of Tucson. One of the most beautiful missions in the Southwest. Established in 1700.

E-7 MONTEZUMA CASTLE NATIONAL MONUMENT – Unique Indian ruins located near Camp Verde, on I-17.

E-7 MONTEZUMA WELL – Cup-shaped lake 75 feet below the surrounding terrain. 1,750 feet in diameter. Fed by natural springs.

A-10 MONUMENT VALLEY – On Arizona-Utah border. 160 miles north and east of Flagstaff. Land of incredibly eroded buttes and peaks.

D-7 MUSEUM OF NORTHERN ARIZONA – Displays dealing with the natural history of Northern Arizona. Indian arts, and crafts. Scheduled Indian shows.

A-7 NAVAJO BRIDGE – Seven miles below historic Lees Ferry. Bridge floor is 467 feet above the water level of the Colorado River.

A-9 NAVAJO NATIONAL MONUMENT – Contains some of the best preserved Indian cliff dwellings in the world, in beautiful canyon settings.

L-9 NOGALES – Actually two cities divided by the international border. Popular for shopping and sampling the flavor of Mexico.

E-7 OAK CREEK CANYON – South of Flagstaff on 89A. A favorite spot for trout anglers and waders. Beautiful scenery. Especially colorful in the fall.

I-8 OLD TUCSON – In Tucson Mountain Park. 13 miles southwest of Tucson. Popular western movie set.

J-5 ORGAN PIPE CACTUS NATIONAL MONUMENT – South of Ajo and bordering on Mexico. Picturesque circle drives provide a beautiful view of the pristine desert and Organ Pipe cacti.

D-9 PAINTED DESERT – Multicolored ribbons of sand in gorgeous hues. May be seen from Interstate 40. Excellent vistas at Petrified Forest National Monument.

I-4 PAINTED ROCK STATE HISTORIC PARK – About 25 miles from Gila Bend. Offers an outstanding collection of Indian writings and rock paintings.

D-11 PETRIFIED FOREST NATIONAL PARK – Twenty miles east of Holbrook. Features petrified remains of prehistoric trees, some as long as 250 feet.

I-8 PICACHO PEAK STATE PARK – A desert mountain park in a scenic natural area between Phoenix and Tucson. Is 3,400 acres offer hiking and camping. Only battle of Civil War on Arizona soil was fought here.

I-8 PINAL PIONEER PARKWAY – A 30-mile billboard-free highway, US 89 from Oracle Junction through one of the state's most attractive Sonoran Desert areas. Signs identify major vegetation types.

G-6 PIONEER ARIZONA MUSEUM – A living history of Arizona in the 1880's. Twelve miles north of Phoenix on I-17.

A-5 PIPE SPRING NATIONAL MONUMENT – Mormon Fort on the Honeymoon Trail. One of Arizona's historical and picturesque spots on the Arizona Strip.

F-6 PRESCOTT TERRITORIAL CAPITAL – Historic gold-mining town and site of Arizona's first capital. Sharlot Hall Museum and Whiskey Row also here.

H-6 PUEBLO GRANDE *(SEE PHOENIX INSET)* – Ancient Hohokam Indian ruin and museum.

A-9 RAINBOW BRIDGE NATIONAL MONUMENT – Located 190 miles north of Flagstaff in Utah. Best viewed from Lake Powell. Tours available at Wahweap Marina.

J-9 SAGUARO NATIONAL MONUMENT – Two sections, one east and one west of Tucson, preserving one of the state's richest stands of Saguaro cactus.

G-9 SALT RIVER CANYON – Spectacular gorge with scenic approaches and lookout points, on US 60 north of Globe.

D-7 SAN FRANCISCO PEAKS – Home of the Hopi Kachinas and Snow Bowl Ski Resort. Near Flagstaff.

H-8 SOUTHWESTERN ARBORETUM – Between Florence Junction and Superior. Acres of beautiful desert plants from Arizona and around the world. Scenic walking trails, picnic area.

D-7 SUNSET CRATER NATIONAL MONUMENT – A huge cone-shaped volcanic crater near Flagstaff.

I-1 TERRITORIAL PRISON – Housed desperados for 33 years during territorial days. The prison in Yuma is now a state park.

G-8 THEODORE ROOSEVELT DAM – One of the first federal reclamation projects, located 79 miles from Phoenix, on the Apache Trail. The 273-feet-high dam forms a lake 25 miles in length.

K-10 TOMBSTONE – The "Town too tough to die" was a famous mining town. Home of Tombstone *Epitaph*, Birdcage Saloon, other historic sites.

G-8 TONTO NATIONAL MONUMENT – Prehistoric cliff dwelling in excellent state of preservation, located east of Roosevelt Dam on the Apache Trail.

K-8 TUBAC STATE PARK – One of the state's oldest communities, North of Nogales on I-19. Ruins of Spanish military post and old adobe mission.

K-8 TUMACACORI MISSION NATIONAL MONUMENT – Picturesque ruins of a mission established in 1690 by Father Kino.

E-6 TUZIGOOT NATIONAL MONUMENT – A pre-Columbian ruin from about A.D. 1300 Two miles east of Clarkdale.

D-7 WALNUT CANYON NATIONAL MONUMENT – Cliff dwellings in a beautiful canyon setting. Easy driving distance from Flagstaff.

D-6 WUPATKI NATIONAL MONUMENT – Over 35,000 acres of prehistoric Indian ruins, 25 miles north of Flagstaff on US 89.

State Flag
The copper star of Arizona, rising from a blue field in the face of a setting sun, is symbolic of the state's copper industry and continued growth. Blue and gold are the state colors. The blue is of the same shade as that of the flag of the United States.

State Seal
The state's key enterprises are symbolized on the face of Arizona's official seal: reclamation, farming, cattle raising, and mining. The year 1912 is the date Arizona was admitted to the Union. The motto *Ditat Deus* means God enriches.

State Flower
The state flower is the blossom of the saguaro or giant cactus, the largest cactus in the U.S. It grows to a height of 50 feet and lives up to 200 years. Its pure white, waxy flowers appear in May and June.

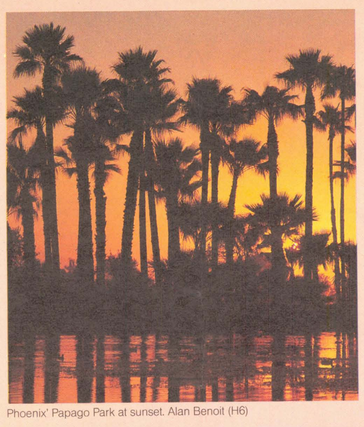
State Tree
The paloverde, one of the beautiful trees of the desert and desert foothill regions, is the state tree.

State Bird
Arizona's state bird, the cactus wren, is woody-brown in color with a speckled breast.

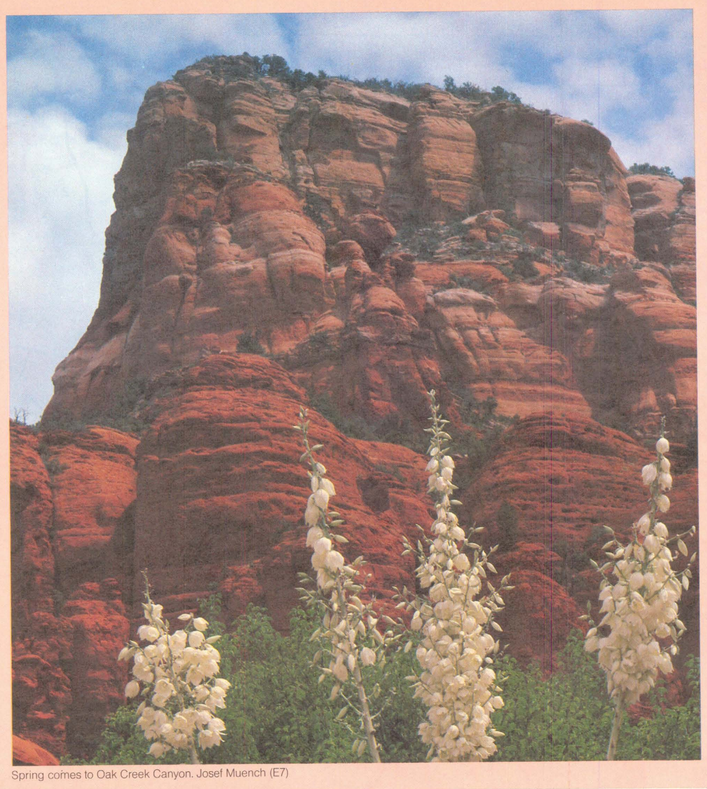
Official Neckwear
The bola tie, which originated in Arizona, is the state's official neckwear. And the silver bola, adorned with turquoise in a variety of patterns, is generally considered the official style.

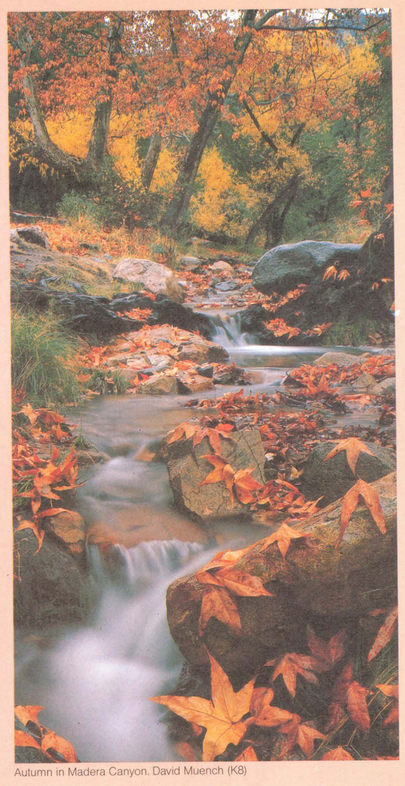
State Gem
Turquoise, the blue green waxy-surfaced stone used for centuries in Arizona Indian jewelry, is the state gem.

Arizona Highways Magazine
Since 1925, when the first issue rolled off the press, *Arizona Highways* magazine has been growing right along with the state. Each month, this beautiful large-format magazine brings 48 pages of color-filled scenic photography and fascinating articles of this gorgeous state to approximately a half-million subscribers in all 50 states and 132 foreign countries—and does it all without any advertising in any issue. Come and meet the people, explore the history, learn about the flora and fauna, travel to all the most picturesque spots, and find out about all the exciting things to see and do in Arizona, with *Arizona Highways* magazine. For subscription information, contact *Arizona Highways*, 2039 W. Lewis Ave., Phoenix, AZ 85009.


Phoenix' Papago Park at sunset. Alan Benoit (H6)

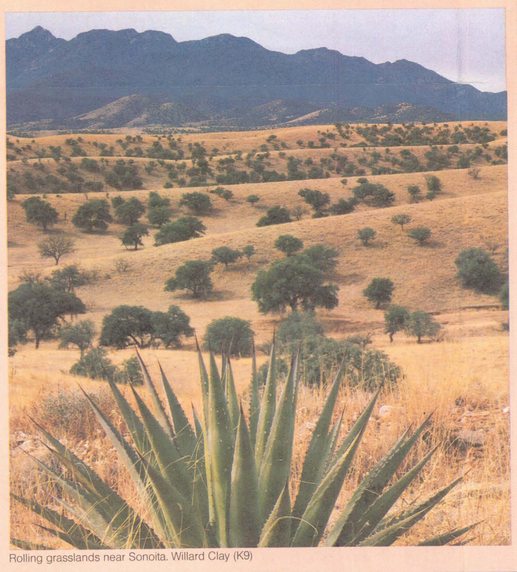
Vishnu Temple, Grand Canyon. Kaz Hagiwara (B6)


Spring comes to Oak Creek Canyon. Josef Muench (E7)

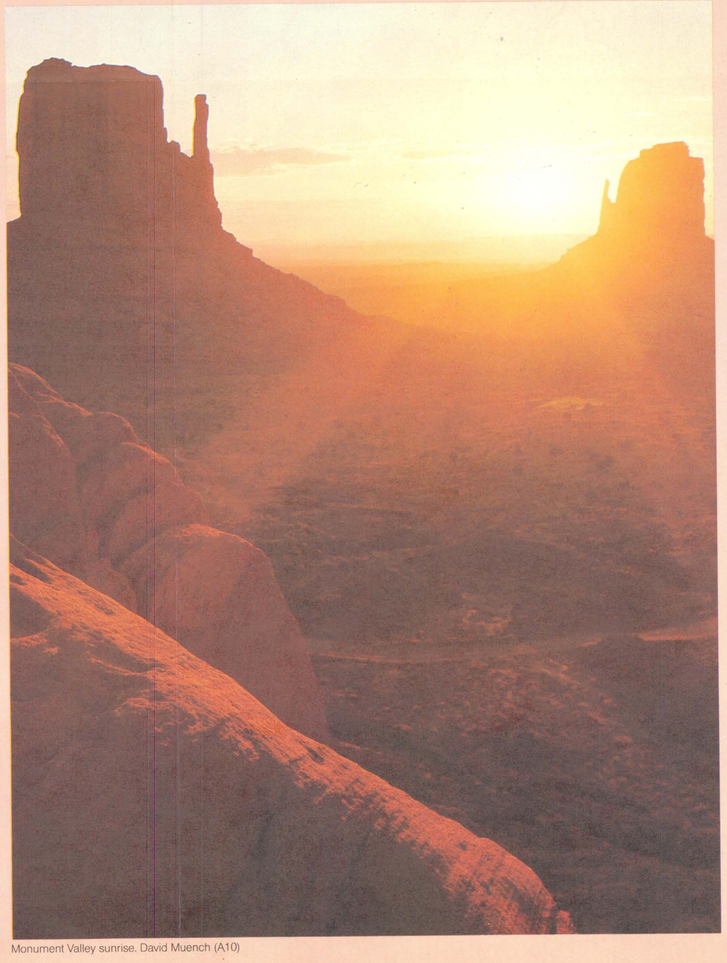

Autumn in Madera Canyon. David Muench (K8)

Hurricane Lake, White Mountains. Dick Dietrich (G11)

Rafting through Lava Falls. Michael Collier (C3)

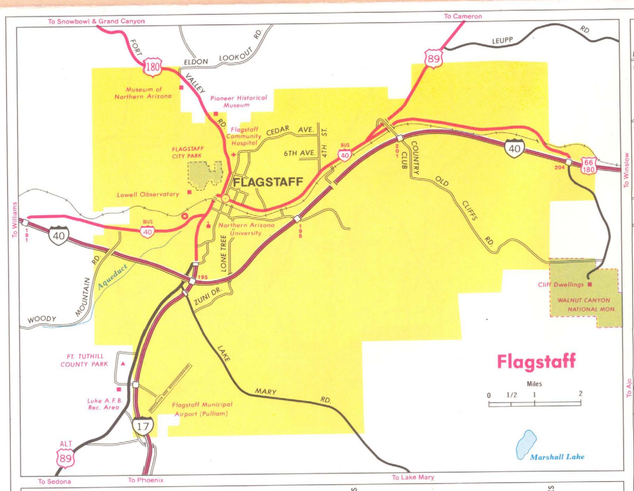

Rolling grasslands near Sonoita. Willard Clay (K9)

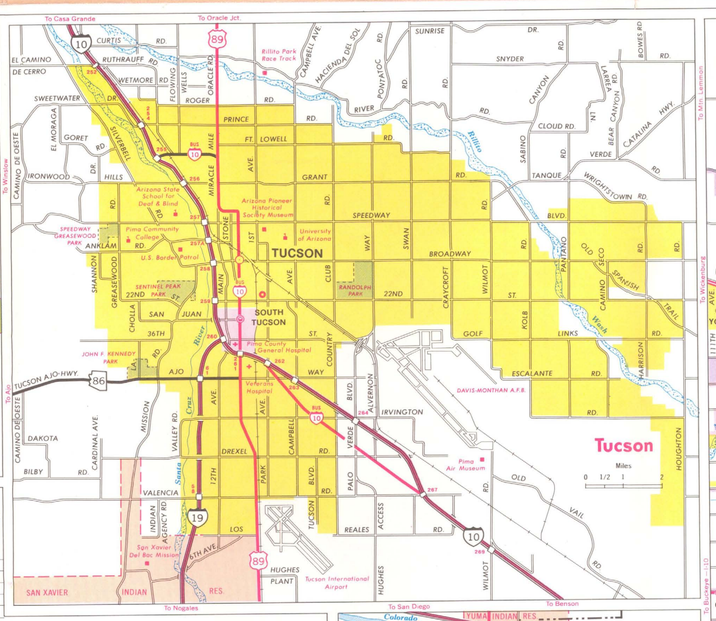
Sundown ceremony, Ft. Huachuca. Alan Benoit (K10)

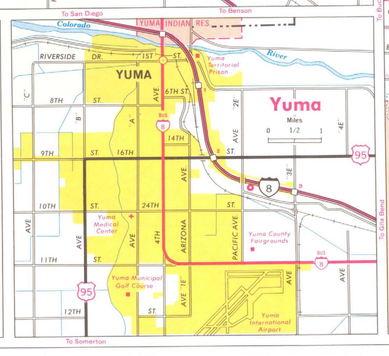

Monument Valley sunrise. David Muench (A10)

Sunflowers and the San Francisco Peaks. David Muench (D7)

PHOTOGRAPHS SHOWN HERE ARE FROM THE SCENIC MAGAZINE OF THE WEST
ARIZONA HIGHWAYS MAGAZINE







There are many more camp sites, commercial and tribal, throughout the State. Please check local listings.

For further information, contact:

OFFICE OF TOURISM
1700 W. Washington, Room 501
Phoenix, Az. 85007

ARIZONA STATE PARKS
1688 W. Adams, Room 122
Phoenix, Az. 85007

DEPARTMENT OF GAME & FISH
2222 W. Greenway Road
Phoenix, Az. 85023

NATIONAL PARKS & MONUMENTS
1115 N. 1st Street
Phoenix, Az. 85004

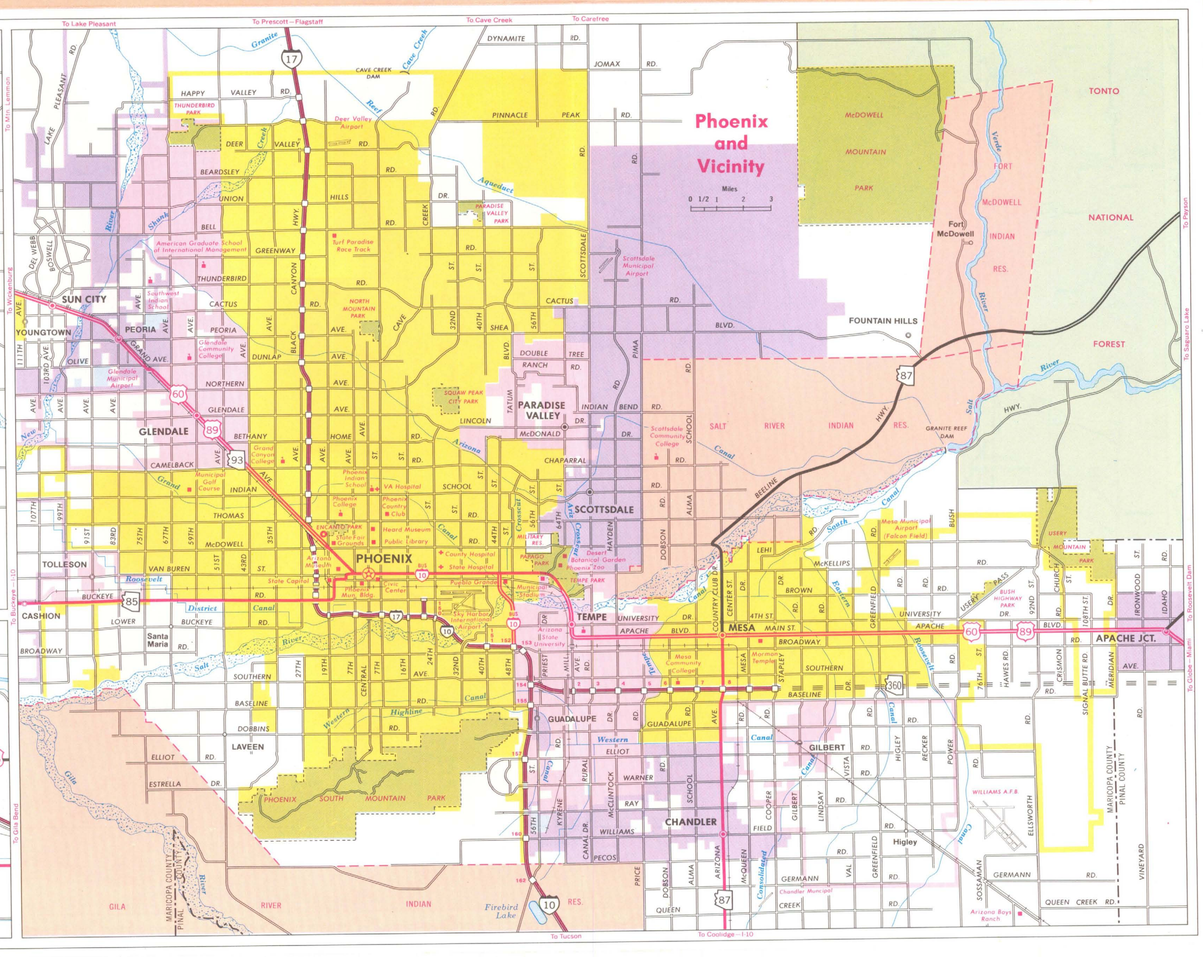
U.S. FOREST SERVICE
Contact Specific National Forest

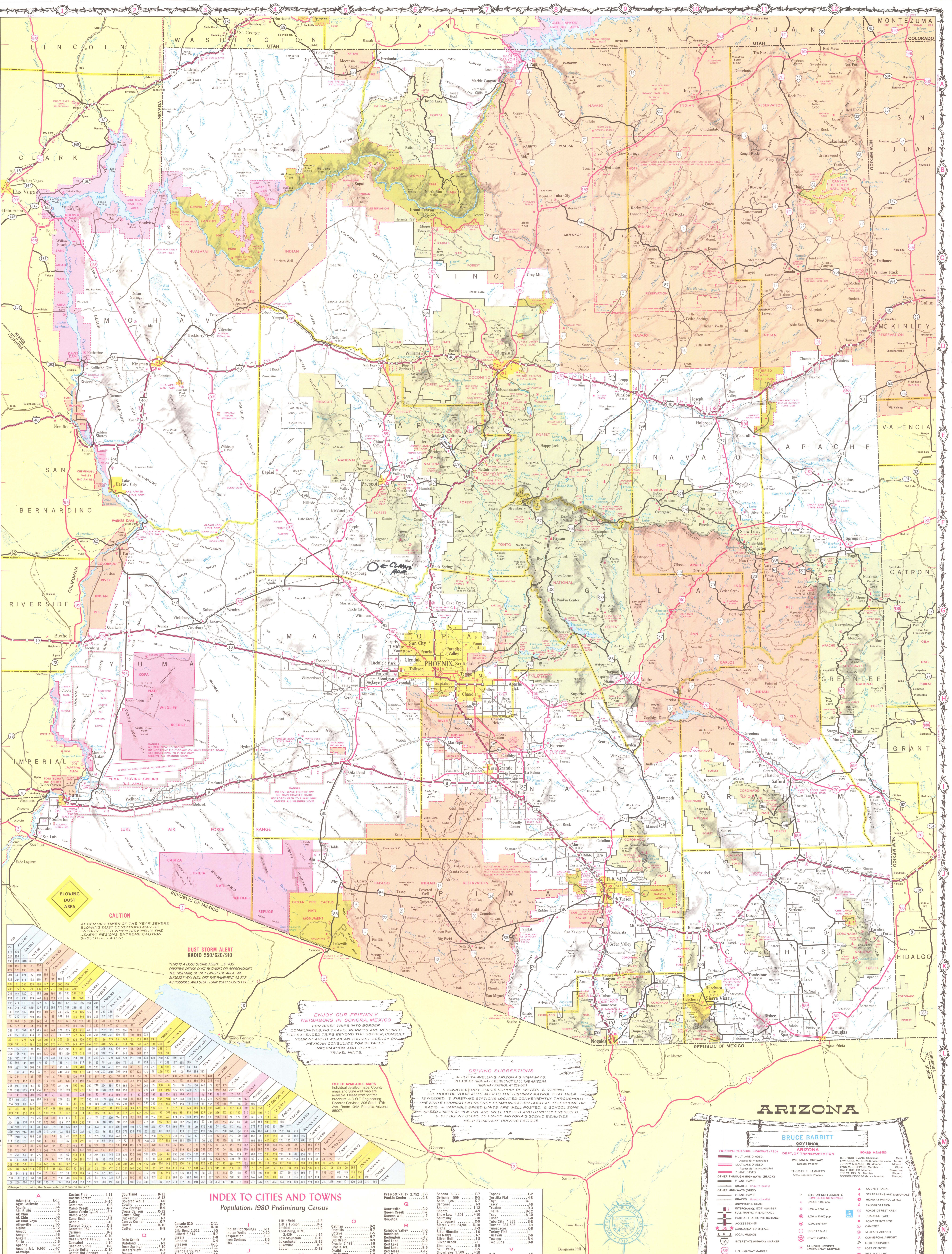
BUREAU OF LAND MANAGEMENT
2400 Valley National Bank Center
Phoenix, Az. 85073

Name	Map Location	Number of Units	Drinking Water	Boating	Fishing	Swimming
AH VILLA PARK	F-2	600	•	•	•	•
ALAMO LAKE	F-3	49	•	•	•	•
APACHE LAKE	G-8	12		•	•	•
ARCADIA CAMP	I-11	26	•			
ASHURST	E-8	51		•	•	
BANJO BILL	E-7	9	•		•	•
BARTLETT	G-7		•	•	•	•
BIG LAKE	G-12	170	•	•	•	•
BLUE RIDGE	E-8	10	•	•	•	
BOG SPRINGS	K-9	13	•			
BONITO	D-7	44	•			
BOOTLEGGER	E-7	10			•	
BOULDER BEACH	B-1	338	•	•	•	•
BUCKSKIN MTN.	F-2	48	•	•	•	•
BULLHEAD CO. PARK	D-1	100	•	•	•	•
BURNT CORRAL	G-8	17		•	•	
BURRO CREEK	F-4	20	•			
CAMP RUCKER	K-12	12	•			
CANYON POINT	F-9	78	•			
CAT TAIL COVE	F-2	90	•	•	•	•
CAVE SPRINGS	E-7	78	•		•	
CHEVELON CROSSING	E-9	8				
CHEVELON LAKE	E-9	8		•	•	
CHRISTOPHER CREEK	F-8	44	•		•	
CLEAR CREEK	E-8	20	•			
CLINTS WELL	E-8	8				
COCHISE STRONGHOLD	K-12	25	•			
COTTONWOOD	B-11	94	•			
CRYSTAL HILL	G-2	32				
DAIRY SPRINGS	E-7	48	•	•	•	
DeMOTTE	B-6	20	•			
DOUBLE SPRINGS	E-7	16	•	•	•	

Name	Map Location	Number of Units	Drinking Water	Boating	Fishing	Swimming
GILBERT RAY	J-8	118	•			
GRANITE BASIN	E-5	23	•	•	•	
GRANVILLE	H-12	9	•			
GREER REC. AREA	F-12			•		•
HILLTOP	F-6	37			•	•
HORSE PASTURE	G-8	14		•	•	
HORSETHIEF BASIN	F-6	42	•			
HUALAPAI MTN PARK	D-3	100	•			
JACOB LAKE	A-6	48	•			
JUAN MILLER	H-12	8				
K P CIENEGA	G-12	5	•			
KAIBAB LAKE	D-6	59		•	•	
KINNIKINICK LAKE	E-8	13		•	•	
KNOLL LAKE	F-8	42	•	•	•	•
LAGUNA DAM	I-2	100	•	•	•	•
LAKE VIEW	D-7	44		•	•	•
LAKESIDE	F-11	82	•			
LAKEVIEW	L-10	64	•	•	•	
LEE VALLEY	G-12				•	
LEES FERRY	A-8	56	•	•	•	•
LUNA LAKE	G-12	40		•	•	
LYMAN LAKE	F-12	46	•	•	•	•
LYNX LAKE	F-6	76	•	•	•	
MANZANITA	C-7	19	•		•	•
MOLINO BASIN	J-9	49	•			
NAVAJO NATL. MON	A-9	30	•			
NELSON RES.	F-12					
OAK CREEK REC AREA	E-7			•	•	
OAK FLAT	H-8	25				
ORGAN PIPE	K-5	208	•	•	•	
PATAGONIA LAKE	L-9	300	•	•	•	
PENA BLANCA	L-8		•	•	•	

Name	Map Location	Number of Units	Drinking Water	Boating	Fishing	Swimming
PICACHO PEAK	I-8	29	•			
PINAL MTN	I-11	27	•			
PINE FLAT	E-7	80	•		•	•
PINE GROVE	E-8	46	•	•	•	•
PIONEER PASS	H-9	27	•			
PITTSBURG POINT	F-2	718	•	•	•	•
PONDEROSA	F-8	611	•			
POWELL SPRINGS	E-6	10	•			
POTATO PATCH	E-6	14				
RIGGS FLAT	I-11	28	•	•	•	
ROCK CROSSING	E-8	35	•	•	•	
ROLFE C HOYER	F-12	70	•			
ROPER LAKE	I-11	24	•	•	•	•
ROSE CANYON	J-9	98	•			•
RUSTLER PARK	K-12	25	•			
SEVEN SPRINGS	G-7	23				
SHANNON	I-11	26	•			
SHOW LOW LAKE	F-10	100	•	•	•	•
SPENCER CANYON	I-9	77	•			
SQUAW LAKE	I-2	100	•	•	•	•
SUNNY FLAT	K-12	11	•			
TEN-X	C-6	70	•			
TORTILLA FLAT	H-8	77	•			
UPPER BLUE	G-12	2				
VIRGIN RIVER	A-3	115				
WAHWEAP	A-8	178	•	•	•	•
WHITE HORSE LAKE	D-6	80	•	•	•	
WHITE SPAR	F-6	60	•			
WINDY HILL	G-8				•	•
WINN	G-12	60	•			
WOLF CREEK	F-6	42	•			
WOODS CANYON	F-9	78	•	•	•	





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PRINCIPAL THROUGH HIGHWAYS (RED)
MULTILANE DIVIDED, Access fully controlled
MULTILANE DIVIDED, Access partially controlled
2 LANE, PAVED
OTHER THROUGH HIGHWAYS (BLACK)
2 LANE, PAVED
GRADED (Inquire locally)
OTHER HIGHWAYS (GREY)
2 LANE, PAVED
GRADED (Inquire locally)
UNIMPROVED ROAD
INTERCHANGE EXIT NUMBER
FULL TRAFFIC INTERCHANGE
PARTIAL TRAFFIC INTERCHANGE
ACCESS DENIED
CONSOLIDATED MILEAGE
LOCAL MILEAGE
INTERSTATE HIGHWAY MARKER
U.S. HIGHWAY MARKER
STATE HIGHWAY MARKER
INDIAN ROUTE

SITE OR SETTLEMENTS (LIMITED OR NO SERVICE)
UNDER 1,000 pop.
1,000 to 5,000 pop.
5,000 to 10,000 pop.
10,000 and over
COUNTY SEAT
STATE CAPITOL
24 HOUR HOSPITAL EMERGENCY SERVICE
FIRST-AID STATION

COUNTY PARKS
STATE PARKS AND MEMORIALS
HIGHWAY PATROL OFFICE
RANGER STATION
ROADSIDE REST AREA
ROADSIDE TABLE
POINT OF INTEREST
CAMPSITE
MILITARY AIRPORT
COMMERCIAL AIRPORT
OTHER AIRPORTS
PORT OF ENTRY
FISH HATCHERY
SKI AREA

Prepared by the
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SCALE OF MILES 0 5 10 20 30 40
SCALE OF KILOMETERS 0 8 16 32 48 64
ONE INCH EQUALS APPROXIMATELY 16 MILES

INDEX TO CITIES AND TOWNS

Population: 1980 Preliminary Census

A
Adamana E-11
Agua Caliente I-3
Aguila G-4
Ajo 5,159 ....J-5
Ak Chin I-6
Ak Chin J-6
Ak Chut Voya K-7
Allenville H-5
Alpine G-12
Amado K-8
Anegam J-6
Angell D-8
Anita C-6
Apache K-12
Apache Jct. 9,967 ....H-7
Aravaipa I-10
Aripine F-10
Arivaca K-8
Arivaca Jct. K-8
Arizona City I-7
Arlington H-5
Arsenic Tubs H-11
Artesa K-7
Artesia I-11
Ash Creek Ranch H-10
Ash Fork D-6
Ashurst I-11
Avondale 8,136 ....H-6
Aztec I-3

B
Bacobi C-9
Bagdad 2,317 ....E-4
Bapchule H-7
Beardsley G-6
Beaverhead G-12
Bellemont D-7
Benson 4,212 ....K-10
Bernardino K-12
Bidahochi D-10
Big Field K-6
Big Springs A-6
Bisbee 7,149 ....L-11
Bisbee Jct. L-11
Bitter Springs A-7
Black Canyon City F-6
Black Mountain B-11
Blue G-12
Blue Gap B-11
Blythe, Calif. 6,834 ....G-1
Bonita I-11
Boulder City, Nev. 9,627 ....C-1
Bouse G-2
Bowie J-12
Boys Ranch H-7
Brenda G-3
Bridgeport E-6
Bryce I-11
Buckeye 3,438 ....H-5
Bullhead City 1,422 ....D-1
Bumble Bee F-6
Bylas 1,179 ....H-10

C
Cababi J-7
Cactus Flat I-11
Cactus Forest I-8
Calva H-10
Cameron C-8
Camp Creek G-7
Camp Verde 1,114 ....E-7
Camp Wood E-5
Cane Beds A-5
Canelo L-10
Canyon Diablo D-8
Carefree 984 ....G-7
Carmen K-8
Carrizo G-10
Casa Grande 14,955 ....I-7
Cascabel J-10
Cashion 2,993 ....H-6
Castle Butte D-10
Castle Hot Springs G-6
Catalina 2,772 ....J-9
Cave Creek 1,577 ....G-7
Cazador L-12
Cedar Creek G-10
Cedar Ridge B-7
Cedar Springs D-10
Central I-11
Chambers D-12
Chandler 29,608 ....H-7
Chandler Heights H-7
Charco 27 ....J-5
Charleston K-10
Cherry E-6
Chilchinbito B-10
Childs F-7
Childs J-5
Chinle 2,808 ....B-11
Chino Valley 2,861 ....E-6
Chiricahua K-12
Chloride D-2
Chot Vaya J-7
Choulic K-7
Christmas H-9
Christopher Creek F-8
Chuichu I-7
Cibecue F-10
Cibola H-1
Circle City G-5
Clarkdale 1,515 ....E-6
Claypool 2,364 ....H-9
Clay Springs F-10
Cleator F-6
Clifton 4,256 ....H-12
Cochise J-11
Coldfield K-7
Colorado City A-5
Comobabi J-7
Concho F-11
Congress F-5
Constellation F-5
Continental K-9
Coolidge 6,859 ....I-8
Coolidge Dam H-9
Copper Mine A-8
Cordes F-6
Cordes Jct. F-6
Cornfields C-11
Cornville E-7
Cortaro J-8
Cottonwood 4,508 ....E-6
Cottonwood B-11
Courtland K-11
Cove A-12
Covered Wells J-6
Cowlic K-7
Cow Springs B-9
Cross Canyon C-12
Crown King F-6
Cuckelbur I-7
Currys Corner G-7
Curtis K-10
Cutter H-9

D
Date Creek F-5
Dateland I-3
Deer Springs F-10
Desert View C-7
Dewey F-6
Dilkon D-10
Dinnebito B-9
Dinnehotso A-11
Dolan Springs C-2
Dome I-2
Dos Cabezas J-11
Double Adobe L-11
Douglas 13,148 ....L-11
Dragoon J-10
Drake E-6
Dudleyville 1,211 ....I-9
Dugas F-7
Duncan 604 ....I-12
Duquesne L-9

E
Eagar 2,784 ....F-12
Eden I-11
Ehrenberg G-1
Eleven Mile Corner I-7
Elfrida K-11
Elgin K-9
El Mirage 4,315 ....G-6
Eloy 6,227 ....I-7

F
Fairbank K-10
Flagstaff 34,821 ....D-7
Florence 3,403 ....I-8
Florence Jct. H-8
Floy F-11
Fort Apache G-10
Fort Defiance 3,428 ....C-12
Fort Grant I-11
Fort Huachuca K-10
Ft. McDowell G-7
Fort Rock D-4
Fort Thomas H-11
Fountain Hills 2,773 ....G-7
Francisco Grande I-7
Franklin I-12
Fraziers Well C-4
Fredonia 1,038 ....A-5
Fresnal K-7
Fresnal Canyon K-7
Friendly Corner I-7

G
Gadsden I-1
Gallup, N.M. 14,596 ....C-12
Ganado 810 ....C-11
Geronimo H-10
Gila Bend 1,611 ....I-5
Gilbert 5,514 ....H-7
Gisela F-8
Gladden G-4
Gleeson K-11
Glenbar I-11
Glendale 92,797 ....H-6
Globe 6,642 ....H-9
Golden Shores E-2
Goldroad D-2
Goodwin F-6
Goodyear 2,730 ....H-6
Grand Canyon Village B-6
Granville H-12
Grasshopper F-9
Gray Mountain C-8
Greasewood B-12
Greasewood (Lower) D-11
Greaterville K-9
Green Valley 7,907 ....K-9
Greer G-12
Groom Creek F-6
Gu Vo J-5
Guadalupe 4,494 ....H-7
Gunsight J-5

H
Hackberry D-3
Haivana Nakya K-7
Hannigan Meadow G-12
Happy Jack E-8
Harcuvar G-3
Hard Rocks C-9
Harshaw L-9
Hassayampa H-5
Hawley Lake G-11
Hayden 1,215 ....I-9
Heber F-9
Henderson, Nev. B-1
Hereford L-10
Hermits Rest C-6
Hickiwan J-6
Higley H-7
Hillside F-5
Hilltop K-12
Hindu Canyon C-3
Holbrook 5,768 ....E-10
Hon Dah F-11
Honeymoon H-12
Hope G-3
Hotevilla 3,009 ....C-9
Houck D-12
House Rock A-6
Huachuca City 1,692 ....K-10
Hualapai Hilltop B-5
Humboldt F-6
Hunters Point C-12
Hyder I-3

I
Indian Hot Springs H-11
Indian Wells D-10
Inspiration H-9
Iron Springs E-5
Itak K-7

J
Jackrabbit I-7
Jacob Lake A-6
Jadito C-10
Jakes Corner G-8
Jerome 411 ....E-6
Johnson J-10
Joseph City E-10

K
Kaibab A-6
Kaibab Lodge B-6
Kaibito A-8
Kaihon Kug K-6
Kaka J-6
Kanab, Utah 2,132 ....A-5
Kansas Settlement J-11
Katherine D-1
Kayenta 3,292 ....A-10
Keams Canyon C-10
Kearny 2,639 ....H-9
Kelvin H-8
Kingman 9,242 ....D-2
Kings Ranch H-8
Kin-Li-Chee C-12
Kirkland F-5
Kirkland Jct. F-5
Klagetoh D-11
Klondyke I-10
Kohatk I-7
Kohls Ranch F-8
Kots Kug K-6
Kui Tatk J-6
Kupk K-6

L
Lake Havasu City 15,925 ....F-2
Lake Montezuma E-7
Lakeside 1,336 ....F-11
La Palma I-7
Las Vegas, Nev. 162,960 ....B-1
Laveen H-6
Lees Ferry A-7
Leupp D-9
Leupp Corner D-9
Liberty H-6
Lincon J-7
Linden F-10
Litchfield Park 3,660 ....H-6
Littlefield A-3
Little Tucson K-7
Lochiel L-9
Lordsburg, N.M. 3,429 ....J-12
Low Mountain C-10
Lukachukai B-12
Lukeville K-5
Lupton D-12

M
Madera Canyon K-9
Mammoth 1,911 ....I-9
Many Farms 1,881 ....B-11
Marana 1,685 ....J-8
Marble Canyon A-7
Maricopa H-6
Martinez Lake I-2
Maverick G-11
Mayer F-6
McConnico D-2
McGuireville E-7
McNary 483 ....F-11
McNeal K-11
Meadview C-2
Menager Dam K-5
Mesa 149,328 ....H-7
Mesquite, Nev. A-2
Mexican Water A-11
Miami 2,705 ....H-9
Mobile H-6
Moccasin A-5
Moenave B-8
Moenkopi 675 ....B-8
Mohawk I-3
Moqui C-6
Morenci 2,731 ....H-12
Mormon Lake E-8
Morristown G-5
Mt. Trumbull B-4
Mt. View K-9
Mountainaire D-7
Munds Park E-7

N
Naco L-11
Navajo D-11
Navajo Station C-11
Nazlini C-12
Needles, Calif. 4,115 ....E-1
Nelson D-4
Newfield K-7
New River G-6
Nicksville L-10
Nogales 15,721 ....L-9
Noila K-7
North Komelik J-7
North Rim B-6
Nutrioso G-12

O
Oatman D-2
Ocotillo H-7
Octave F-5
Olberg H-7
Old Oraibi C-9
Oracle 2,483 ....I-9
Oracle Jct. I-9
Oraibi C-9
Oro Blanco L-8
Oro Valley 1,504 ....J-9
Overgaard F-9

P
Page 4,880 ....A-8
Page Springs E-7
Palm Canyon H-2
Paloma I-5
Palominas L-10
Palo Verde H-5
Palo Verde Stand J-6
Pan Tak K-7
Pantano K-9
Papago Farms K-6
Paradise K-12
Paradise Valley 11,176 ....H-7
Parker 2,542 ....F-2
Parks D-7
Patagonia 976 ....K-9
Paulden E-6
Paul Spur L-11
Payson 5,058 ....F-8
Peach Springs C-4
Pearce K-11
Peeples Valley F-5
Peoria 12,223 ....G-6
Peridot H-10
Perkinsville E-6
Perryville H-6
Phoenix 781,443 ....H-6
Pia Oik K-5
Picacho I-8
Pierce B-2
Pima 1,583 ....I-11
Pine F-8
Pinedale F-10
Pine Springs D-6
Pine Springs D-12
Pinetop 1,527 ....F-11
Pinon B-10
Pinon F-11
Pirtleville 1,422 ....L-11
Pisinimo K-6
Point of Pines H-11
Polacca C-10
Pomerene K-10
Portal K-12
Poston G-2
Prescott 20,081 ....F-6
Prescott Valley 2,752 ....E-6
Punkin Center G-8

Q
Quartzsite G-2
Queen Creek H-7
Queens Well J-7
Quijotoa J-6

R
Rainbow Valley H-6
Randolph I-7
Redington J-10
Red Lake D-9
Red Lake D-6
Red Lake B-9
Red Mesa A-12
Red Rock I-8
Red Rock A-12
Rillito J-8
Riverside H-9
Riviera 8,931 ....D-1
Rock Point A-11
Rock Springs F-6
Rocky Ridge B-9
Roll I-3
Roosevelt G-8
Rose Well C-5
Rough Rock B-11
Round Rock B-12
Ruby L-8
Rye F-8

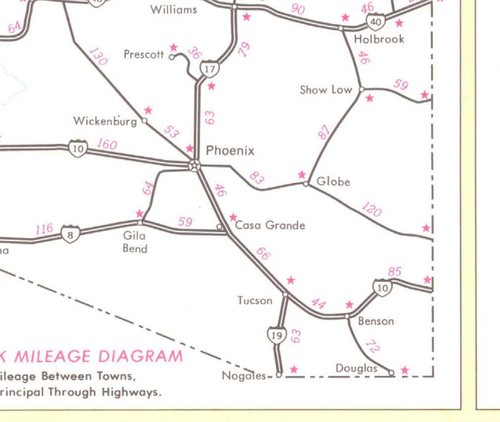
S
Sacaton 1,953 ....H-7
Safford 7,022 ....I-11
Saguaro J-7
Sahuarita K-9
St. David K-10
St. George, Utah 11,330 ....A-3
St. Johns 3,403 ....F-12
St. Johns Mission H-6
St. Michaels C-12
Salina Springs C-11
Salome G-3
San Carlos 2,658 ....H-10
Sanders D-12
Sand Springs C-9
San Jose I-11
San Louis J-6
San Luis 1,957 ....I-1
San Luis J-7
San Manuel 5,433 ....I-9
San Miguel K-7
San Pedro J-7
San Simon J-12
Santa Cruz K-6
Santa Rosa J-6
Santa Rosa Ranch J-7
San Xavier K-8
Sasabe L-7
Sawmill G-10
Sawmill C-11
Scottsdale 88,193 ....H-7
Seba Dalkai D-10
Second Mesa C-9
Sedona 5,372 ....E-7
Seligman 509 ....D-5
Sells 1,861 ....K-7
Sentinel I-3
Sheldon I-12
Shonto A-9
Show Low 4,301 ....F-10
Shumway F-10
Shungopavi C-9
Sierra Vista 24,901 ....K-10
Signal F-3
Sikul Himatle J-6
Sil Nakya J-7
Silver Bell J-8
Silver Creek F-11
Simmons E-5
Skull Valley F-5
Snowflake 3,509 ....F-10
Solomon I-11
Somerton 5,467 ....I-1
Sonoita K-9
South Komelik K-7
South Tucson 6,542 ....J-9
Springerville 1,440 ....F-12
Stanfield I-7
Stanton F-5
Stargo 1,048 ....H-12
Star Valley F-8
Steamboat C-11
Stone Cabin H-2
Strawberry F-7
Summerhaven J-9
Sun City 40,566 ....G-6
Sundad H-4
Sunflower G-8
Sunizona K-11
Sunnyside L-10
Sunrise D-9
Sunrise C-11
Sunset J-10
Sunsites 854 ....K-11
Sun Valley E-10
Supai B-5
Superior 4,597 ....H-8
Surprise 3,716 ....G-6
Sweetwater A-12
Swift Trail Jct. I-11

T
Tacna I-3
Tanque I-11
Tanque Verde J-9
Taylor 1,907 ....F-10
Teas Toh D-10
Teec Nos Pos A-12
Tempe 106,306 ....H-7
Temple Bar B-2
Tes Nez Iha A-11
Thatcher 3,363 ....I-11
The Gap B-8
Three Points (Robles Jct.) J-8
Tolleson 4,381 ....H-6
Tombstone 1,648 ....K-10
Tonalea B-9
Tonopah H-5
Tonto Village F-8
Topawa K-7
Topock E-2
Tortilla Flat H-8
Toyei C-11
Tracy J-6
Truxton D-3
Tsaile B-12
Tsegi A-10
Tuba City 4,999 ....B-8
Tubac K-8
Tucson 331,506 ....J-9
Tumacacori K-8
Turkey Flat I-11
Tusayan C-6
Tuweep B-4
Two Guns D-8

V
Vail J-9
Vainom Kug K-6
Valentine D-3
Valle C-6
Valley Farms I-8
Valley Store B-11
Vamori K-7
Vaya Chin J-6
Ventana J-6
Vermilion Cliffs A-7
Vernon F-11
Vicksburg G-3
Vicksburg Jct. G-3

W
Wagoner F-5
Walker F-6
Washington Camp L-9
Webb K-11
Wellton 910 ....I-2
Wenden G-3
White Cone C-10
White Hills C-2
Whiteriver 3,103 ....G-11
Why J-5
Wickenburg 3,536 ....G-5
Wide Ruin D-12
Wikieup E-3
Wilhoit F-5
Willcox 3,101 ....J-11
Williams 2,269 ....D-6
Willow Beach C-1
Window Rock 2,221 ....C-12
Winkelman 1,060 ....I-9
Winona D-8
Winslow 7,931 ....E-9
Wintersburg H-5
Wittmann G-5
Wolf Hole A-3
Woodruff E-10

Y
Yampai D-4
Yarnell F-5
Yava F-5
York I-12
Young F-9
Youngtown 2,224 ....G-6
Yucca E-2
Yuma 41,806 ....I-1

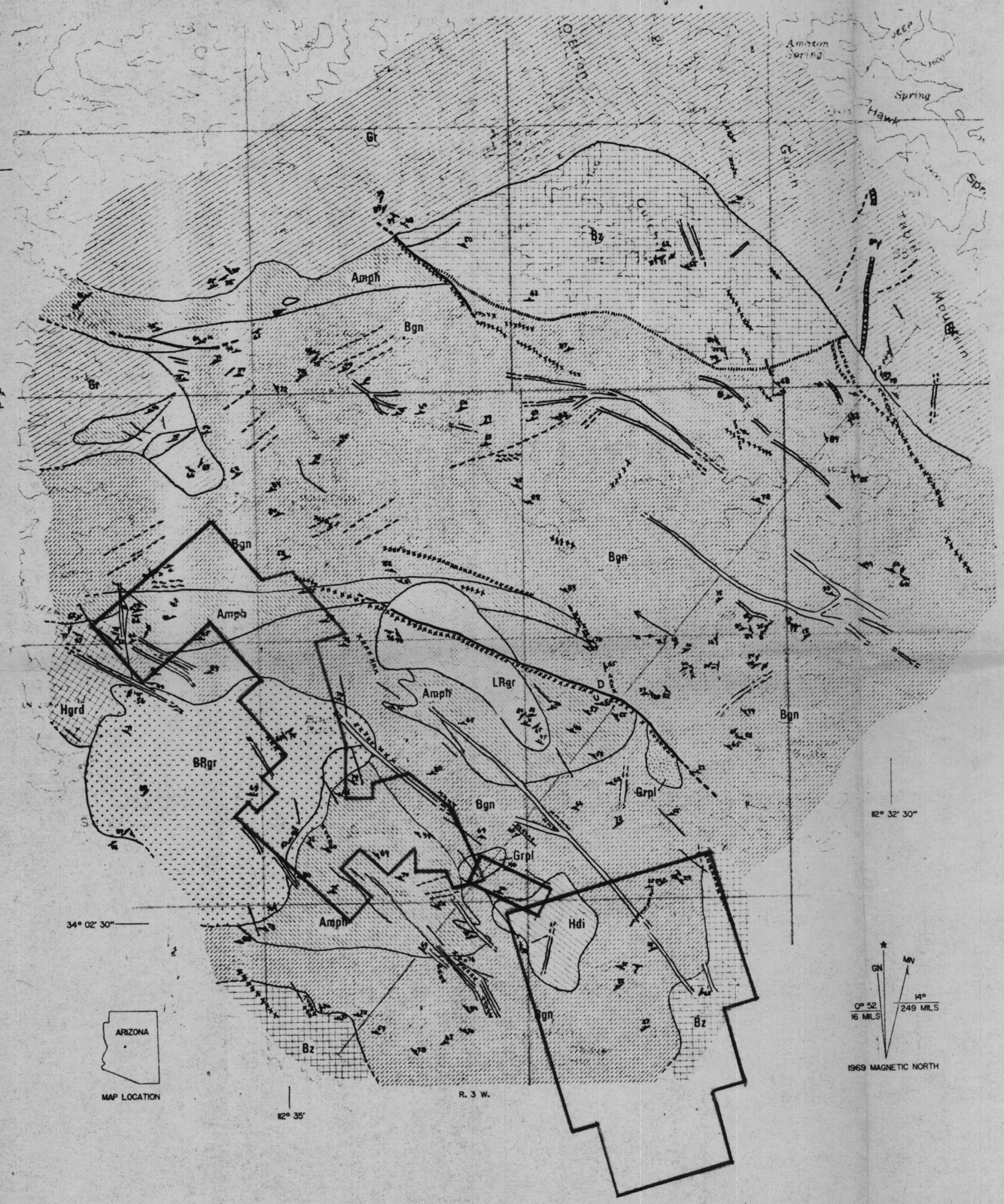


QUICK MILEAGE DIAGRAM
Mileage Between Towns, over Principal Through Highways.

Enjoy ARIZONA RADIO STATIONS and keep informed about weather and road conditions

City	Station	AM	FM
Apache Junction	KSTM		FM 107.1
Bisbee	KSUN	1230	
Bisbee	KZMK		FM 92.1
Black Canyon City	KUET	710	
Bullhead	KBAS	1490	
Bullhead City	KRHS		FM 102.3
Casa Grande	KPIN	1260	
Casa Grande	KSAA		FM 105.5
Chandler	KMLE		FM 107.9
Clifton	KCUZ	1490	
Coolidge	KCKY	1150	
Coolidge	KOEZ		FM 103.9
Cottonwood	KCRJ		FM 95.9
Cottonwood	KVRD	1600	
Douglas	KAPR	930	
Douglas	KDAP	1450	
Douglas	KKRK		FM 95.3
Flagstaff	KAFF	930	
Flagstaff	KCLS	600	
Flagstaff	KFLG		FM 92.9
Flagstaff	KNAU		FM 88.5
Flagstaff	KZKZ	690	
Glendale	KJJJ		FM 92.3
Glendale	KLFF	1360	
Globe	KIKO		FM 100.3
Globe	KGJM	1240	
Green Valley	KGVY	1080	
Holbrook	KDJI	1270	
Kingman	KAAA	1230	
Kingman	KZZZ		FM 92.7
Lake Havasu City	KFWJ	980	
Lake Havasu City	KRFM		FM 95.9
Mesa	KDJQ	1510	
Mesa	KDKB		FM 93.3
Mesa	KZZP	1310	FM 104.7
Miami	KIKO	1340	
Nogales	KAYN		FM 98.3
Nogales	KFBR	1340	
Page	KPGE	1340	
Page	KXAZ		FM 93.5
Parker	KMDX		FM 99.3
Parker	KZUL	1380	
Phoenix	KARZ	960	
Phoenix	KASA	1540	
Phoenix	KBBC		FM 98.7
Phoenix	KFLR	1230	
Phoenix	KHEP	1280	FM 101.5
Phoenix	KIFN	860	
Phoenix	KJJJ	910	
Phoenix	KMCR		FM 91.5
Phoenix	KMEO	740	FM 96.9
Phoenix	KNIX		FM 102.5
Phoenix	KOOL		FM 94.5
Phoenix	KOY	550	
Phoenix	KPHX	1480	
Phoenix	KQYT		FM 95.5
Phoenix	KTAR	620	
Phoenix	KXIV	1400	
Prescott	KAHM		FM 103.9
Prescott	KNOT	1450	FM 98.3
Prescott	KYCA	1490	
Safford	KATO	1230	
Safford	KXKQ		FM 98.3
Scottsdale	KOPA		FM 100.7
Scottsdale	KXAM	1440	
Sedona	KAZM	780	
Show Low	KVSL	1450	
Show Low	KVWM	970	FM 93.5
Sierra Vista	KSVA	1470	
Sierra Vista	KTAN	1420	
Sierra Vista	KTAZ		FM 100.9
Sun City	KWAO		FM 106.3
Tempe	KNIX	1580	
Tempe	KUKQ	1060	
Tempe	KUPD		FM 97.9
Thatcher	KFMM		FM 99.1
Tolleson	KRDS	1190	
Tolleson	KXEG	1010	
Tuba City	KTBA	1050	
Tucson	KAIR	1490	
Tucson	KCEE	790	
Tucson	KCUB	1290	
Tucson	KVOI	690	
Tucson	KFLT	1450	
Tucson	KHYT	1330	
Tucson	KIKX	580	
Tucson	KJYK		FM 94.9
Tucson	KMGX	940	
Tucson	KNDE		FM 99.5
Tucson	KRQQ		FM 93.7
Tucson	KTKT	990	FM 96.1
Tucson	KTUC	1400	
Tucson	KUAT	1550	FM 90.5
Tucson	KWFM		FM 92.9
Tucson	KXEW	1600	
Wickenburg	KUUK	1250	
Willcox	KHIL	1250	
Willcox	KWCX		FM 98.3
Window Rock	KHAC	1110	
Winslow	KINO	1230	
Yuma	KAWC	1320	
Yuma	KBLU	560	
Yuma	KJOK		FM 93.1
Yuma	KTTI		FM 95.1
Yuma	KVOY	1400	

GEOLOGIC MAP OF THE MORGAN BUTTE AREA, YAVAPAI COUNTY, ARIZONA



EXPLANATION

Tertiary

- Trp — Rhyolite Porphyry Dikes
- Tmd — Mafic Dikes
- Thv — Hydrothermal Vein Ore and/or Alteration

PreCambrian

- Bz — Border zone, a complex mixture of large xenoliths and granitic material
- Gr — Biotite Granite
- BRgr — Black Rock Biotite Granite/Hornblende Biotite Quartz Diorite
- Grpl — Small Granitic Plutons
- LRgr — Long Ridge Biotite Granite
- Hgrd — Hornblende Biotite Granodiorite
- Hornblende Diorite Dike
- Hdi — Hornblende Diorite
- Bgn — Biotite Gneiss
- Amph — Amphibolite/Hornblende Gneiss

- Strike and Dip of Foliation
- Strike and Dip of Joints
- Primary Flow Foliation
- Lineation and Drag Folds
- Gradational Contact
- Contact
- Fault
- Granitic Dike
- Shear Zone
- Flexure Axis

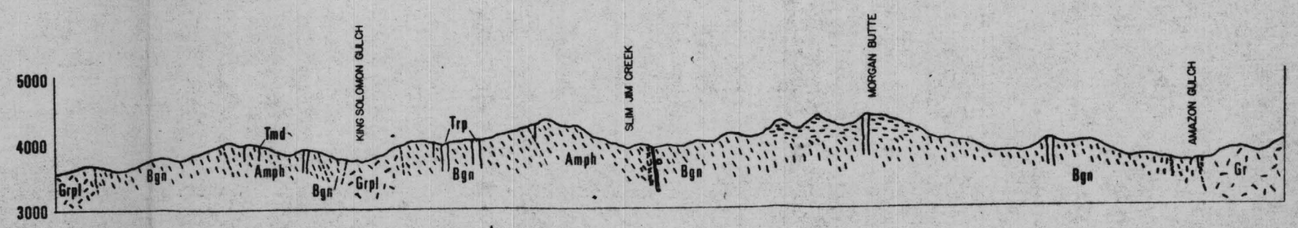
Geology By David Shattuck Gray 1980-81

0 — 1 Mile

0 — 1 Kilometer

SCALE

Contour Interval 40 Feet



GEOLOGIC CROSS SECTION