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http://www.azgs.az.gov
inquiries@azgs.az.gov

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PRINTED: 11/06/2003

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: MORMON LAKE URANIUM CLAIMS

ALTERNATE NAMES:
PAN AMERICAN URANIUM
PROMONTORY BUTTE URANIUM

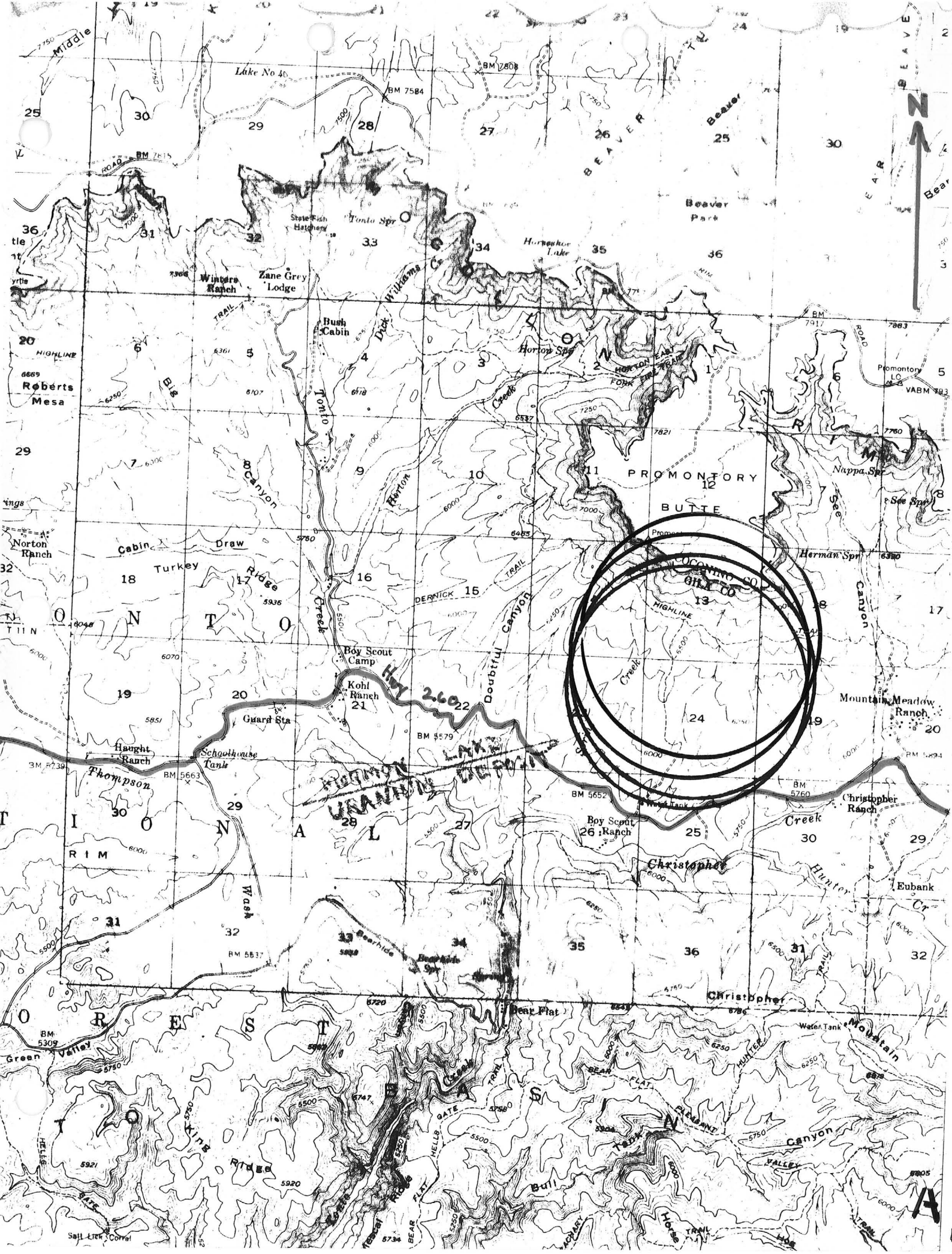
GILA COUNTY MILS NUMBER: 528

LOCATION: TOWNSHIP 11 N RANGE 12 E SECTION 24 QUARTER C
LATITUDE: N 34DEG 19MIN 40SEC LONGITUDE: W 111DEG 02MIN 20SEC
TOPO MAP NAME: PROMONTORY BUTTE - 15 MIN

CURRENT STATUS: OTHER

COMMODITY:
URANIUM
SPECIMENS PYRITE
SHARK DUNG

BIBLIOGRAPHY:
ADMMR MORMON LAKE URANIUM CLAIMS FILE
ADMMR PAN AMERICAN MINES INC FILE
MSHA YELLOW SHEETS
CLAIMS EXTENDED INTO SER 13, 14 & 23
MCCOLLY, R.A., 1982, USBM MLA 139-82, HELLS-GATE ROADLESS AREA, 12 P.
SCARBOROUGH, R., AGSU OFR 81-1, P. 184
SCARBOROUGH, R,. DOE GJBX143-81, P 184


Middle
Lake No 40
BM 7584
BM 7808
BM 7815
ROAD
BEAVER
Beaver
Beaver Park
State Fish Hatchery
Tonto Spr
Horseshoe Lake
Winters Ranch
Zane Grey Lodge
TRAIL
Bush Cabin
Dick Williams Cr
HIGHLINE
Roberts Mesa
Big
Tonto
Creek
Horton Spr
HORTON EAST FORK FIRE TRAIL
Promontory LO
VABM 7913
Canyon
Horton
PROMONTORY
BUTTE
Nappa Spr
See Spr
See
Norton Ranch
Cabin
Draw
Turkey
Ridge
Herman Spr
COCONINO CO
GILA CO
DERNICK
TRAIL
Doubtful Canyon
Boy Scout Camp
Kohl Ranch
Hwy 260
Guard Sta
Mountain Meadow Ranch
Haught Ranch
Schoolhouse Tank
Thompson
BM 5663
BM 5579
HORTON CREEK DIVERSION
BM 5652
Water Tank
Christopher Ranch
Boy Scout Ranch
Christopher
Hunter
Eubank
RIM
Wash
BM 5837
Bearhide
Bear Flat
Water Tank
Mountain
Green
Valley
BM 5309
HUNTER
BEAR FLAT
GATE
HELLS
PLEASANT
Canyon
VALLEY
Bull
Horse
TRAIL
Salt Lick Corral
BEAR
ACHAMEY
N

PROMONTORY BUTTE (Neptune; Myrtle; Brush; and Hot Rock Claims)

LOC: NW¼, NE¼ and near center Sec. 24, T11N, R12E

QUAD: Promontory Butte 15'; Holbrook NTMS

DEVL: Short adit; large open cut; numerous small cuts; drilling programs in 1970's.

PROD: Less than 500 tons of low grade ore from Neptune property in 1979.

RAD: 40X

ANAL: 0.07% e U_3O_8; 0.07% U_3O_8; 55% $CaCO_3$

GEOL: Uraninite and Copper carbonates in gray sandy shales associated with limestone pebble conglomerate lenses and interbedded sandy redbeds, ascribed to Naco-Supai Fm. Abundant carbonized plant remains noted.

REF: PRR-A-55
Finch, W. (1967)
Peirce, H. and others (1977)
Blazey, E. (1971)

Q RANCH CLAIMS

LOC: SW¼ of SW¼ Sec. 15, T8N, R15E, 1.8 miles due south of Q Ranch headquarters.

RAINBOW

LOC: NW¼ SE¼ Sec. 32, T5N, R14E, on small nose just south of Oak Creek

QUAD: Rockinstraw Mtn. 15'; Mesa NTMS

DEVL: 70 ft. adit

ANAL: 0.50% e U_3O_8

GEOL: Metatorbernite along fractures with disseminated pyrite and some graphite. One foot zone trends NNE in partly recrystallized black facies, Dripping Spring Quartzite.

REF: PRR-AP-179
Granger, H. and Raup, R. (1969a & b, 1959)
Schwartz, R. (1957, RME-2071)

RAMON

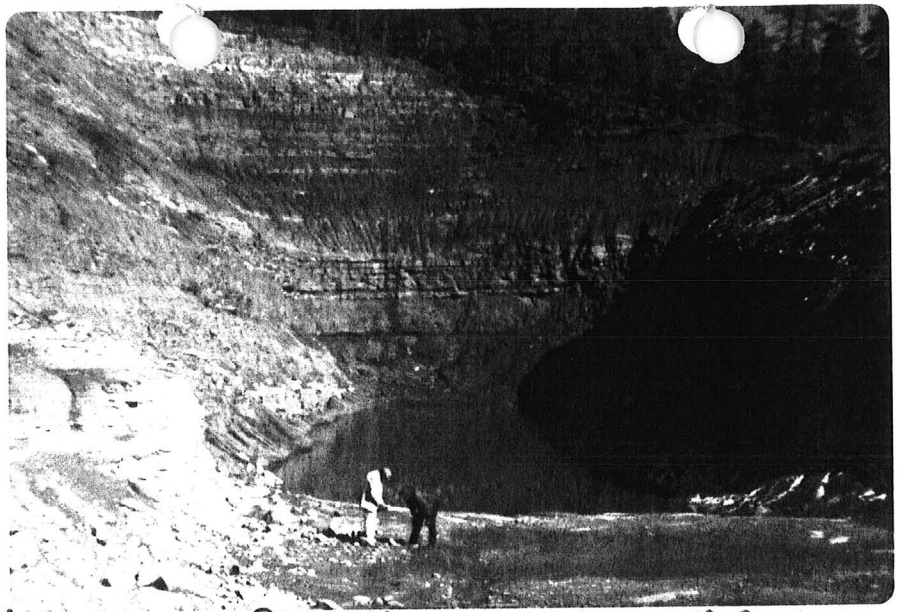
LOC: 33°13-14'N, 110° 49-50'W, about one mile east of Pioneer Pass Road - Pinal Mtns.

QUAD: El Capitan Mtn. 7½'; Mesa NTMS

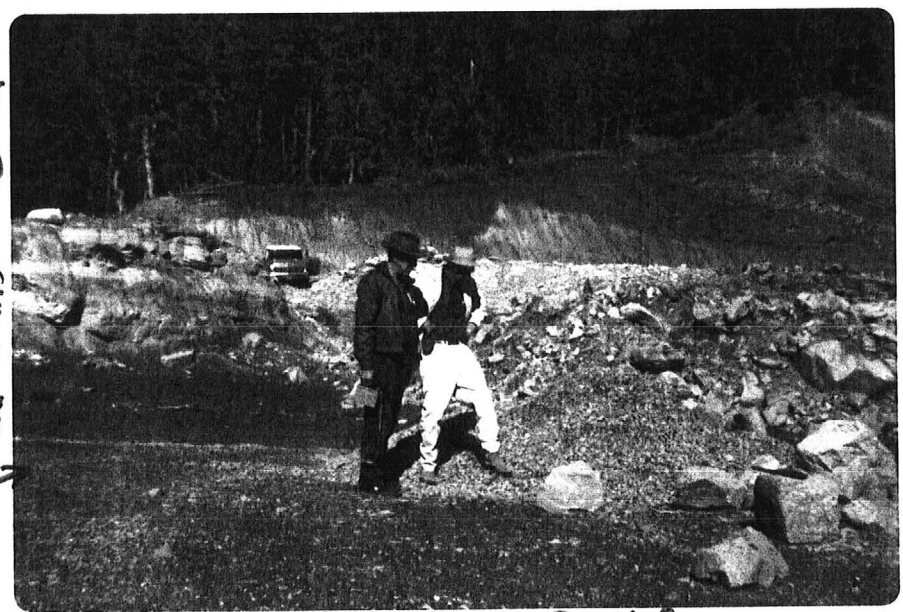
RAD: 4X

GEOL: Dripping Spring Quartzite, with some limonite staining and striking N70°W, dip 30° 5W.

SCARBOROUGH, R., RADIOACTIVE OCCUR + URANIUM PRODUCTION IN AZ. AGS OFR 81-1 + DOE GJBX-143, 81



North End of PIT. MORMON LAKE U_3O_8



MR. TOM SKIDMORE

ORE? DEPOSIT - MORMON LAKE U_3O_8

MORMON LAKE U_3O_8

SAMPLED ORE PILE.— S. END OF PIT

MORMON LAKE U CLAIMS f.
GILA CO.

United States Department of Agriculture
Forest Service
Payson Ranger District
1009 E. Highway 260
Payson, AZ 85541
Phone: 928.474.7900
Fax: 928.474.7999

File Code: 2810
Date: August 4, 2005

Dear Interested Party:

The Payson Ranger District is seeking comment on a proposed uranium exploration drilling project on the slopes of the Mogollon Rim at Promontory Butte. The Forest Service completed restoration of the old "Promontory Uranium Exploration Pit" (Ace Claim group) and closed out the access road from Highway 260 to the pit in 2003 and 2004. However, the area is still open to mining entry.

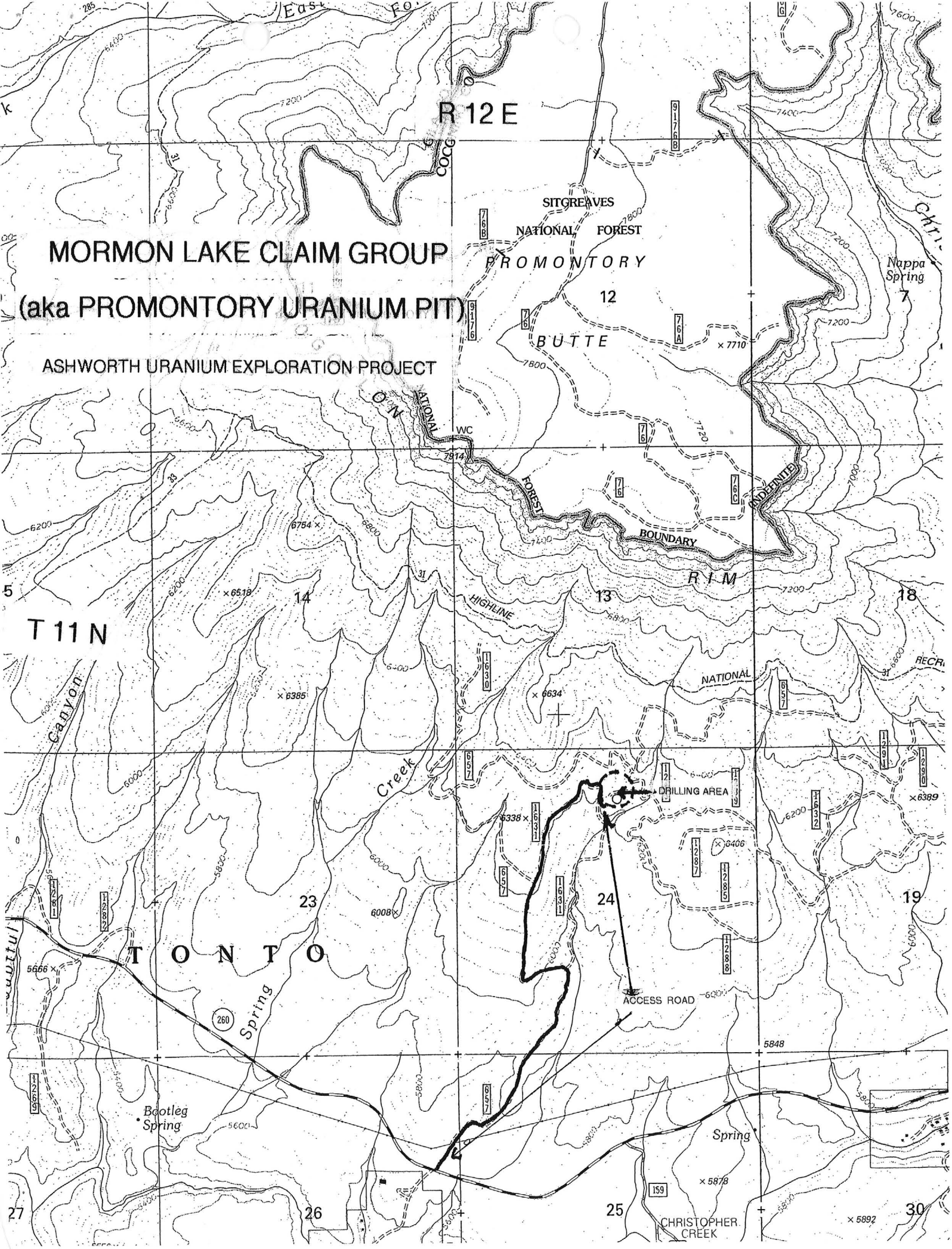
Clive Ashworth, Ashworth Explorations, Ltd. has submitted a Plan of Operations to reopen the access road and drill twelve 95 foot deep, 5 inch diameter holes to test for a potential uranium ore body.

It is anticipated that following the drilling operations the exploration holes will be closed and the access road rehabilitated and re-closed. A reclamation bond sufficient to insure the rehabilitation will be assessed and must be posted prior to conducting the proposed exploration activities.

If you have any concerns or comments regarding this proposal please submit them in writing to the Payson District Ranger , Attn: Rod Byers, 1009 E. Hwy 260, Payson, AZ 85541. Substantive comments will be considered in the environmental analysis. Comments must be submitted by August 26, 2005. For further information, please call Rod Byers at (928) 474-7932.

Sincerely,

Robert Adrian
for EDWARD E. ARMENTA
District Ranger


MORMON LAKE CLAIM GROUP
(aka PROMONTORY URANIUM PIT)
ASHWORTH URANIUM EXPLORATION PROJECT
R 12 E
T 11 N
SITGREAVES
NATIONAL FOREST
PROMONTORY
BUTTE
BOUNDARY
RIM
HIGHLINE
NATIONAL
FOREST
INDEFINITE
DRILLING AREA
ACCESS ROAD
TONTO
Creek
Canyon
Spring
Bootleg Spring
Nappa Spring
CHRISTOPHER CREEK
12
13
14
18
19
23
24
25
26
27
30
7
5
WC
7914
7710
6754
6518
6385
6634
6389
6338
6406
6008
5666
5848
5878
5892
260
159

RECONNAISSANCE GEOLOGICAL REPORT

MORMON LAKE URANIUM CLAIMS IN

GILA AND COCONINO COUNTIES, ARIZ.

11/15/72

by
M.H.Jones, geologist

MELVIN H. JONES
Mining Geologist
Box 1, Montello, Nevada 89830

Box 406
Wickenburg, Arizona.
November 15, 1972

RECONNAISSANCE GEOLOGICAL INVESTIGATION OF THE MORMON LAKE URANIUM DEPOSIT NEAR PAYSON, ARIZONA.

At the request of Mr. Howard S. Gable, Box 946, Kansas City Missouri, the undersigned made a reconnaissance geology examination of the Mormon Lake Uranium claims on November 9, 1972 (with later review of available records). Accompanying the writer was Mr. Thomas H. Skidmore (PO box 1455, Payson, Ariz.) representative of Central Mining Corporation, 3003 N. Central Ave., Phoenix, Arizona (purported owner of the claims), and Mr. Robert Olinger, Yarnell, Arizona (a friend along for the ride).

The property consists of 235 mining claims and straddles a promontory butte between Gila and Coconino Counties in the Tonto National forest. The area examined is immediately below the rim of the famous Mogollon rim. To get to this uranium deposit, one takes Arizona hwy 260 from Payson heading East. At 17 miles, a sign anounces A.C.Scout turnoff (to the right). There is an obscure gate on the left side (North) and this leads to the property. A short distance within the gate and one is on the claims. About 1½ miles upgrade on this road in the forested area and one comes to a large open pit on claim "Second Chance No.1". This is apparently where a major effort has been made in exploration and development work.

GEOLOGY.

As mentioned earlier, I am informed that the major portion of the claims are immediately below the Mogollon rim. The Mogollon rim, according to most authorities, was formed during a sharp uplift of the Mogollon highlands during the middle Triassic time (Nevadian Revolution). The facies of the rim is Cococino sandstones and this formation can be readily observed from the mentioned exploration pit. However, it will be seen that the Cococino changes near the bottom of the facies, at this location, and the bottom strata could well be Hermit Shale. And as observed from a distance, this appears to be the same type rock that is on the claims bearing uranium (close examination was not possible due to my short visit). Both of these formations are Permian (200 million years,plus,in age). The uranium is the mineral Pitchblende (Uraninite) and this is in a rock that is a conglomerate (or breccia in some samples I've looked at) composed of limestone fragments that have been compressed and cemented solidly in mass. The strange part of this proposition is that uraninite is supposed to be primary ore, yet, here it is in metamorphosed sedimentary rocks (but this is not uncommon).

It is recalled that the well known "Orphan mine" (uranium) in the Grand Canyon produced pitchblende, and this mine was in a

diatreme in the Coconino, Hermit, and Supai formations. Most mining claims in Arizona do not carry pitchblende.

HISTORY

Relative to this study, a review of past records and reports is most pertinent, but I found that they add up to a general confusion. A thick file of reports and supporting data was loaned to me on a temporary basis, and perusal of the same gave the following information. Previous owners of the claims(or portions of them are:

Mr. Huston Phillips
Neptune mine
Southern Union Oil Production, Dallas, Texas
Central Mining Corporation, Phoenix, Arizona
Pan American Mines, Ltd., Phoenix, Arizona

The mentioned companies did some drilling, but this is a confused situation with incomplete or fragmentary reports, or no documentation at all. Pan American Mines drilled 11 holes on sides of a pit during a first phase and 8 holes during a second phase on 2 claims (out of 235 total claims ??). Of the mentioned 11 drill holes, some show nil in U_3O_8; then DH 11 had 1.34% U_3O_8 with a thickness of 28.5 feet at a depth of 56 feet; other DH's ranged from .12% to .63% U_3O_8. Dr.Marcel Morin (DSc-geology), apparently in charge of the Pan American effort, outlines in his report the great difficulties with this drilling, and internal problems within the company in connection with this drilling program. He states 39 holes were drilled before 1971, plus 15 more holes during earlier exploration. He further says he did not find out how many of these holes were cored, and that no real evaluation could be made with the method of sampling. A confusing situation indeed. He states "diamond drilling turned out to be catastrophic". He recommends spending $240,570.00 additional money for development. Dr. Morin's report is dated December 14, 1971.

In an earlier report by Dr. Paul H. Johnson (PhD)(Mining engineering and metallurgy) dated April 19,1971. At the pit area Dr. Johnson says that a pile of material sampled by him had .35% U_3O_8, or 7 lbs per ton. He recommends that his own patented(?) process of leaching and concentrating the uranium ores be used. He uses alkaline chemicals such as combinations of Na_2CO_3, $NaHCO_3$, and $KMNO_4$ He states that Union Production (Dallas) came up with proven ore reserves of 152,100 tons of 1.06% in a bed 13 feet thick. Dr. Johnson says that $1,750,000. is needed to put the property in operation with a rate of 500 tons a day. Broken down it would be:

$150,000.00	exploration
500,000.00	leaching plant
700,000.00	mine plant
150,000.00	accessory facilities
250,000.00	for reserve and marketing

Operating costs total $10.50 per ton ($7.50 mining-$3.00 processing) He further says that gross return from recoverable values would be $124.00 per ton, which leaves $113.50 per ton profit, or $17,300,000. on blocked out ore reserves. The leaching plant will cost $600.00 to $1000.00 per ton per day of daily capacity.

Dr. Johnson's outline makes a lot of sense to the writer, however it can be seen that he would be most interested in putting his own mill on the property, and the proven reserves would be most

questionable.

I neglected to mention earlier, that Dr. Morin comes up with an excess of 4 million tons of uranium bearing material from the surface to a maximum depth of 170 feet. He says the average final grade is still undetermined but, from the known results, could be expected to be between 5 and 10 pounds of uranium oxide (.25 to .50%), a grade favorably comparable and even higher than those of several existing producers.

Attached to Drs. Johnson and Morin reports are massive studies of assaying and mineralology by Hazen Research, Inc. of Golden, Colo., and Hawley and Hawley, Tucson, Arizona (assayers and sample referees), as well as maps and drill hole data. The undersigned, has copied the maps and drill hole data and they are enclosed with this report as exhibits.

Now comes a sorry side of this alledged mining venture. In the office of Department of Mineral Reserves, Phoenix, Arizona they have a large file of newspaper clippings pertaining to this property. It appears that Pan American Mines, Ltd., primarily based on the Mormon Lake uranium claims (plus a Cu and Mo property at Wickieup, Arizona) went on the stock market of the Canadian Stock Exchange. Apparently Pan American has issued about 3,000,000 shares of stock and it zoomed from $1.00 per share up to $12.00 a share based on Dr. Morin's reports of fabulous rich uranium reserves (4 million tons). Later, the people began to get suspicious and this stock was removed from trading from the exchange. Mr. Pat Brawley (president-Pan American), Mr. Floyd Bleak (Vice-president) and Mr. Howard Eckersley (formerly with Howard Hughes enterprises) have been indited and summons issued for their arrest by the Canadian government on charges of fraud, publishing a false prospectus and conspiracy. All of these actions are currently pending and action was taken to extradite these individuals from the U.S. for trial. I understand Mr. Brawley lives in Phoenix. This case has been written up extensively in the Wall Street Journal and other newspapers, but from what I have read in the accounts, the fraud is failure to declare in the prospectus some $600,000. in debits, the issuance of about 1 million more shares that was not authorized, and matters of this sort. I fail to see any reflection on the quality or quantity of uranium in the Mormon lake property, at least, in the accounts that I have read. Some copies of these clippingsare attached to this report.

OTHER CONSIDERATIONS

As has been indicated elsewhere, only 1 day was spent on the property and this amounts to only a cursory physical examination of the claims. While at the pit area, some time was spent walking around with the geiger counter endeavoring to find locations with high gamma ray radiation. It had snowed several days before and the snow had melted so that it was a muddy mess, with standing water in the low spots. There were what appeared to be 2 large ore stockpiles, and 2 small ones. No readings were found that indicated any material higher than .10% U_3O_8 (assuming the uranium is in equilibium). Two samples were taken, the one from the most Southerly stockpile, the other was a chip sample taken on the West side of the pit, 150 yards from the Northern extremity. During the checking of the area with the Geiger counter, at one point the probe

was placed down an old drill hole. It turned out that this hole was largely full of water and the geiger counter ceased functioning. Fortunately Mr. Olinger had his Geiger counter along and we were able to finish the testing. Earlier, we compared readings on the two instruments and they were about the same.

ECONOMIC CONSIDERATIONS

Mr. Skidmore assured me that Central Mining Corporation now owns the claims (and not Pan American Mines, Ltd). He says they want $50,000,000.00 for the property, but tho't they might make a deal for say, $100,000.00 down and a royalty from a company that might actively operate the mine.

In reading over the mentioned reports, it is noted that as far as proven ore is involved, a statement is made that there is 156,000 tons of "proven" ore at 1.06% U_3O_8 at a thickness of 13 feet. This is about 20 million dollars at todays prices.

CONCLUSIONS

The Mormon Lake uranium property is an enigma. I am disappointend in not finding higher values in the purported stockpiles in the pit area. Maybe all of the valuable ore was hauled away, but I would be most doubtful about this.

The reports of Dr. Paul H Johnson and Dr. Marcel Morin are almost overwhelming in the quantities of rich ore that they have come up with. Yet it is the opinion of the writer that they must be discounted. I am reasonably sure that the major part of the sampling and assaying was honest, but something is wrong.

Possibly in drilling, the cores and/or cuttings represent small pods that were not extensive on the sides, and these pods do not represent large beds or lenses, as interpreted by Drs. Morin and Johnson.

It appears that the drilling data by Southern Union Gas company is most valid and I would be inclined to accept this information in preference to other drilling data. Then again, when the drilling showed the alledged rich ore beds, why did Southern Union give up the claims ?

In the interest of expeditiously completing this report, I have not included the assay information on the two samples taken from the pit. When they are received, they will be attached to this report.

RECOMMENDATION

Anyone seriously looking for a good uranium property should gamble $10,000.00 on the Mormon Lake claims to confirm or reject some of the drilling data already in evidence. A drilling rig with air compressor should be contracted for to ream out or blow out some of the holes already drilled. Then Century, or some other logging firm, should re-test the holes. A few confirming holes should be drilled in adjacent areas.

Melvin H. Jones

MELVIN H JONES
Mining Geologist

I N C L O S U R E S

A - Map of the Mormon Lake uranium claims

B - Map of the pit area and drill holes

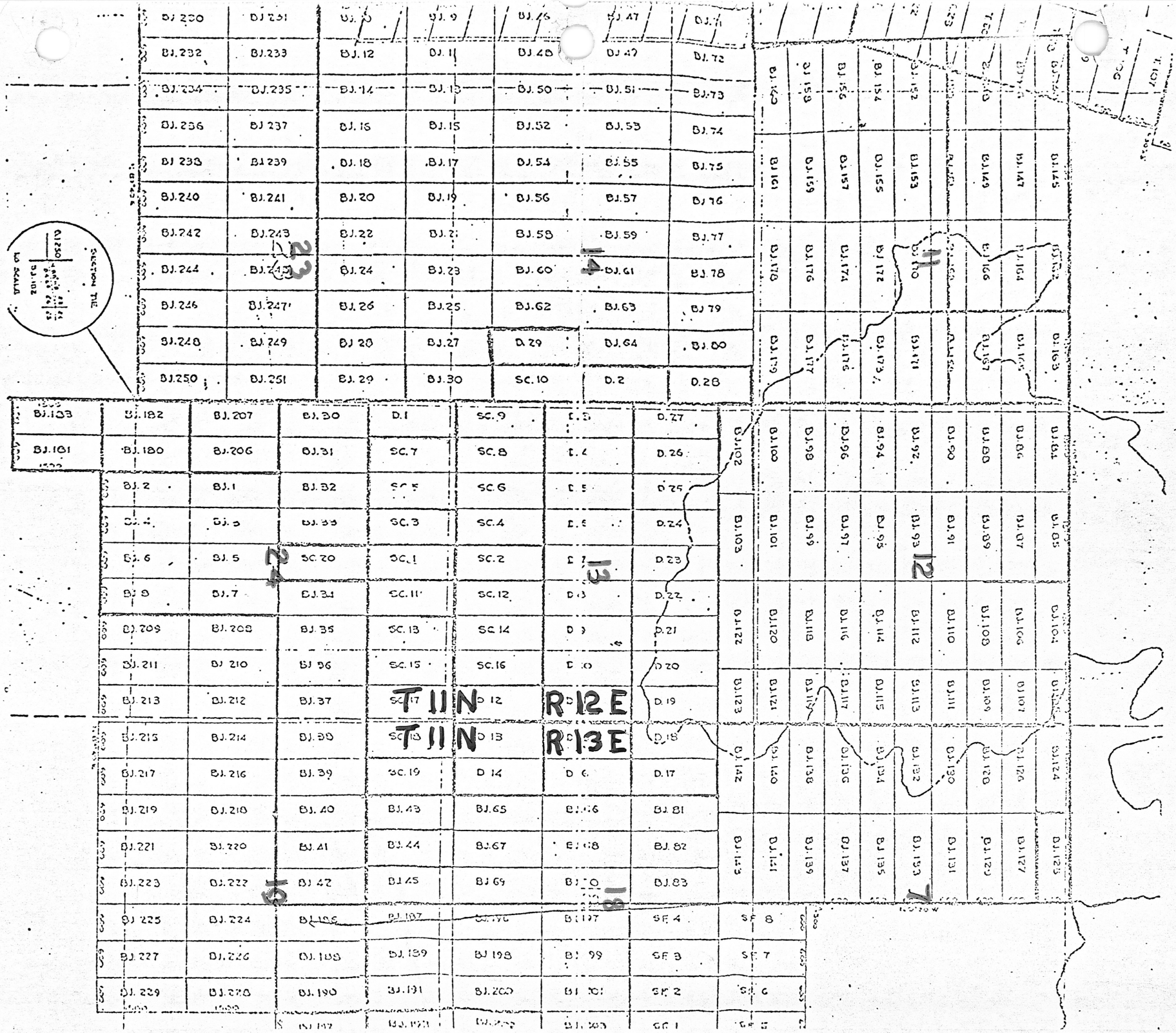
C - Data on drilling pre-1971 (from Dr. Morin's report)

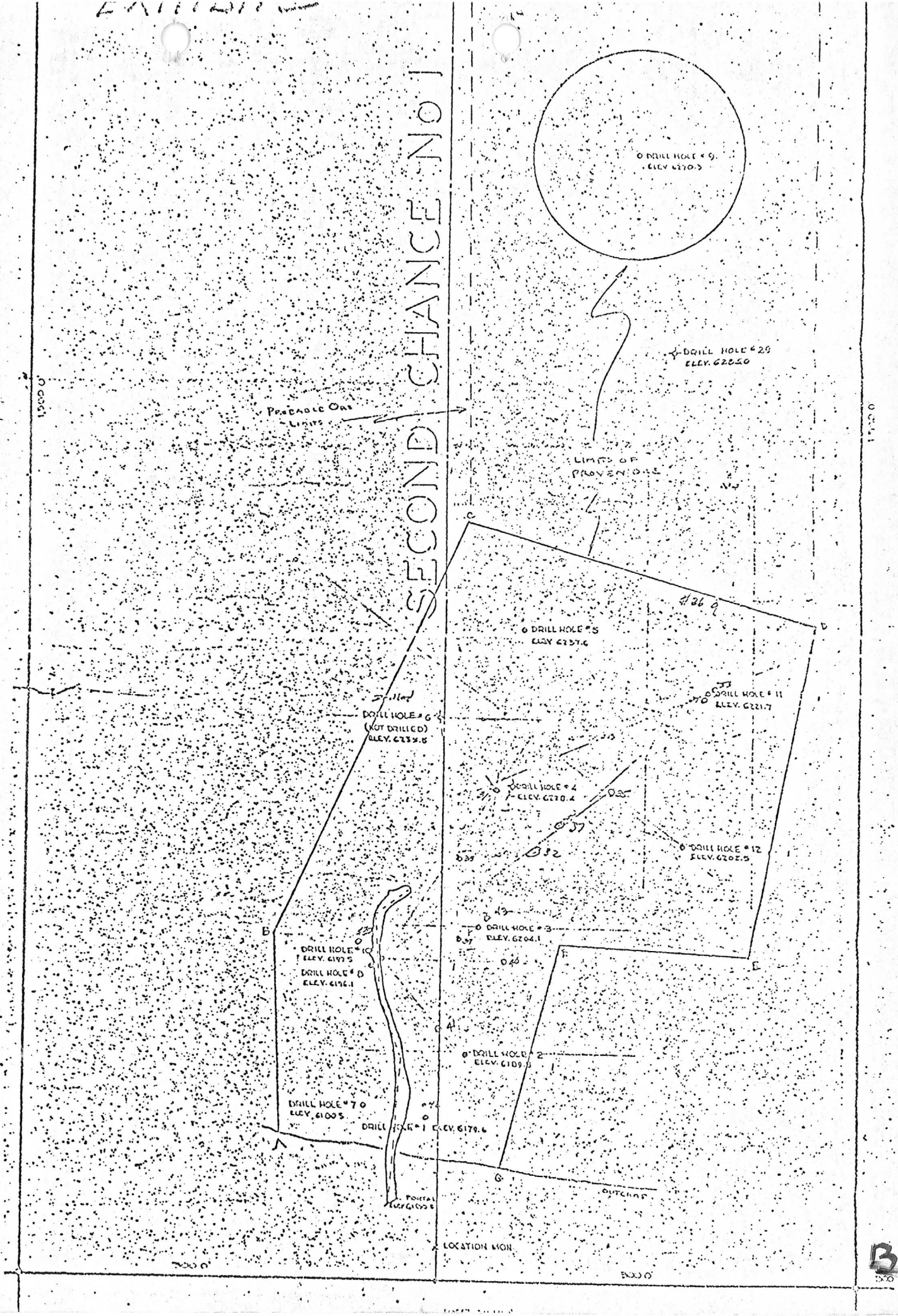
D - Data on drilling by Pan-American (Dr.Morin in charge)

E - Drill hole data by Southern Union Gas Co (4 sheets)

F - Assay(Supco DH#1) by Hazen Research, Inc

G - Newspaper clippings (3 sheets)


T11N R12E
T11N R13E
SECTION TIE
NO SCALE


SECOND CHANCE NO 1
DRILL HOLE # 9.
ELEV. 6270.3
DRILL HOLE # 29
ELEV. 6285.0
PROBABLE ORE LIMITS
LIMITS OF PROVEN ORE
DRILL HOLE # 5
ELEV. 6257.6
DRILL HOLE # 11
ELEV. 6221.7
DRILL HOLE # 6
(NOT DRILLED)
ELEV. 6238.8
DRILL HOLE # 4
ELEV. 6270.4
DRILL HOLE # 12
ELEV. 6202.5
DRILL HOLE # 3
ELEV. 6204.1
DRILL HOLE # 10
ELEV. 6197.5
DRILL HOLE # 8
ELEV. 6196.1
DRILL HOLE # 2
ELEV. 6109.3
DRILL HOLE # 7
ELEV. 6100.5
DRILL HOLE # 1 ELEV. 6179.6
POSSIBLE ELEV. 6100.5
OUTCROP
LOCATION MON.
A
B
C
D
E
F
G
500.0'
500.0'
1500.0'
1500.0'

Drillin Pre 1971

Hole	Claim	U_3O_8 %	Interval Depth in ft.	Thickness ft.	Probe anomalies	Altitude collar
1	SC-1	0.21	28.3 - 32.2	3.9	15 - 37	6179.6
2	SC-1	0.39	39.1 - 46.8	7.7	15 - 45	6189.6
3	SC-1	0.63	59.1 - 69.8	10.7	6 - 68	6204.1
4	SC-1	lost hole	- -	-	- -	6228.4
5	SC-1	0.48	106 - 127.6	21.6	105 - 120	6257.6
6	SC-1				65 - 87(weak)	
7	SC-1	0.45	23.0 - 33.5	10.5	15 - 25	6180.5
8	SC-1	0.14	30.5 - 32.1	1.6	13 - 31	6196.1
9	SC-1	0.60	169.0 - 209	40	nil	6270.3
10	SC-1	0.52	40.0 - 45.0	15	40 - 50	6197.5
11	SC-1	1.34	56.0 - 84.0	28.5	55 - 82	6221.7
12	SC-1	0.69	55.0 - 58.8	3.8	29 - 53	6202.5
13	BJ-43	nil			37 (Peak)	6209.9
14	BJ-43	0.32	38.4 - 42.9	4.5	40 - 56	6231.5
15	SC-19	lost hole	- -	-	12 - 17(weak)	6190.6
16	SC-15	0.12	88.4 - 91.5	3.1	nil	
		0.39	129.8 - 134.1	4.3	nil	6339.5
		0.53	144.7 - 149.0	4.3	nil	
17	SC-15	0.15	150.0 - 160.1	10.1	nil	6348.7
18	SC-15	0.28	99.5 - 99.9	0.4	nil	6336.8
19	SC-15	no data			nil	6342.3
20	SC-15	0.61	101.0 - 107.0	6.0	nil	6343.2
29	SC-1	no data			nil	6285.0
30	SC-1	nil			37 - 52	6202.0
31	SC-1	no data				6228.5
32	SC-1	0.098	73 - 74	1.0	65 - 75	6213.2
33	SC-1	nil			67 - 82	6221.9
34	SC-1	nil				6220.9
35	SC-1	nil			73 - 78(weak)	6219.6
36	SC-1	no data			92 - 117(weak)	6258.3
37	SC-1	nil			67 - 76	6214.9
38	SC-1	no data			63 (Peak)	6213.2
39	SC-1	nil			49 - 55	6200.8
40	SC-1	nil to 57 ft.				6198.2
41	SC-1	no data			35 - 47	6192.4
42	SC-1	nil			14 - 30	6180.7
43	SC-1	0.14	58.0 - 64.2	6.2		6330.8

Drilling 1971

The results of the drilling done in 1971 are as follows:

Phase I

Hole no.	Claim	Interval Depth in ft.	Footage	U_3O_8 %
26N-3	BJ-34	25 - 35	10	0.75
30N-3	SC-11, BJ-34	25 - 40	15	0.33
34N-3	SC-11	30 - 45	15	0.59
30N-4	SC-1, 11, 20 and BJ-34	25 - 40	15	0.50
34N-4	SC-1, 11	25 - 50	25	0.92
34N-6	SC-3	50 - 80	30	1.04
38N-6	SC-3	65 - 95	30	2.02
30N-7	SC-3, 5	15 - 35	20	0.41
34N-7	SC-3, 5	65 - 100	35	2.35
30N-11	D-1	15 - 30	15	0.22
34N-11	D-1	55 - 80	25	0.38

Phase II

26N-8	BJ-32	113 -124	11	0.136
38N-8	SC-5	154 -177	23	0.28
26N-9	BJ-31	85 -94	9	0.295
38N-9	SC-7	143.5-173	29.5	0.107
34N-7W-6	SC-3, 5	56.5 -77	20.5	0.36
34N-6W-B	SC-3	44 -47.5	3.5	0.252 (lost hole)
38N-7	SC-3, 5	not assayed		
30N-8	SC-5	" "		
34N-8	SC-5	" "		

Diamond Drilling

38N-5	SC-1	nil
38N-6W-B	SC-3	nil
34N-7W-B	SC-3, 5	few inches not assayed

.....10

D

able 1. Drillhole data on Southern Uni Gas Company's holes 1,2,3,5,7,8,9,10,

Drill Hole #		Inches	U_3O_8 %	X	U_3O_8 % Average
1.	29' 3" to 30'	9	1.04	936	
	33' 1" to 39'	71	.51	3621	
	39' 9" to 40' 8"	11	.06	66	
	Barren zones	37	.00	00	
		128		4623	.36
2.	39' ½" - 41' ½"	24	.05	120	
	42' 1½" - 43' 8"	19	.57	1083	
	43' 8" - 44' 9½"	14	.52	728	
	Barren zones	13	.00	00	
		70		1931	.27
3.	60' 7" - 61' 1"	4	.13	52	
	61' 1" - 61' 11"	10	.04	40	
	62' 4" - 63' 0"	8	1.00	800	
	63' - 65' 6"	30	.04	120	
	65' 6" - 69' 10"	52	1.40	7280	
	Barren zones	5	.00	00	
		109		8292	.76
5.	106' 3" - 106' 4"	1	26.00	2600	
	115' - 116'	12	.01	12	
	122' 5" - 122' 6"	1	12.00	1200	
	123' - 123' 1"	1	28.00	2800	
	123' 8" - 123' 9"	1	32.00	3200	
	126' 4" - 126' 5"	1	14.00	1400	
	126' 9" - 126' 10"	1	17.00	1700	
	127' - 127' 8"	8	.07	56	
	Barren zones	231	.00	00	
		257		12968	.51

Table 1. (continued)

Drill Hole #		Inches	U_3O_8 %	X	U_3O_8 % Average
7.	23' - 24' 9"	21	2.90	6090	
	24' 9" 30' 11"	74	.02	148	
	30' 11" 33' 5"	30	.42	1260	
	Barren zones	00	.00	00	
		125		7498	.60
8.	32' sack	10	1.70	1700	
	28' 3½" - 28' 11½"	8	.05	40	
	28' 11½" - 31' 5"	30	.003	09	
	31' 5" - 32'	7	.07	49	
		55		1798	.32
9.	169' 8" - 169' 10"	2	10.80	2160	
	169' 10" - 174' 9"	59	.01	59	
	174' 9" - 174' 11"	2	27.70	5540	
	174' 11" - 175' 9"	10	.03	30	
	175' 9" - 175' 11"	2	22.00	4400	
	175' 11" - 176' 7"	8	.03	24	
	176' 7" - 176' 9"	2	44.50	8900	
	176' 9" - 176' 10"	1	.05	05	
	176' 10" - 177'	2	24.80	4960	
	177' - 178' 2½"	14	.03	42	
	178' 2½" - 178' 9½"	7	23.10	16170	
	178' 9½" - 179' 10"	13	.02	26	
	179' 10" - 180'	2	8.33	1666	
	180' - 181'	12	.02	24	
		136		44006	3.23

Table 1. (continued)

Drill Hole #		Inches	U_3O_8 %	X	U_3O_8 % Average
9.	200' 2" - 200' 3"	1	4.84	484	
	200' 3" - 202' 6"	27	.00	00	
	202' 6" - 202' 9"	3	2.45	735	
	202' 9" - 203' 1"	3	.00	00	
	203' 1" - 203' 5"	4	1.41	564	
		38		1783	.47
10.	40' - 45'	60	.55	3300	
		60	.55	3300	.55
11.	59' 9" - 59' 10½"	2	5.75	1150	
	59' 10½" - 65' 3½"	65	.01	65	
	65' 3½" - 65' 6½"	3	7.58	2274	
	65' 6½" - 66' 3"	9	.02	18	
	66' 3" - 66' 9½"	7	44.70	31290	
	66' 9½" - 67'	2	.08	16	
	67 - 69' 1½"	25	.01	25	
	69' 1½" - 70' 5"	15	6.80	10200	
	70' 5" - 71"	7	.02	14	
	71' - 74'	36	.00	00	
	74' - 78' 7"	55	.01	55	
	78' 7" - 80'	17	.03	51	
	80' - 81'	12	.08	96	
	81' - 82' 1"	13	.00	00	
	82' 1" - 82' 6"	4	.82	328	
	83' 1" - 83' 8"	7	2.49	1743	
		279		47325	1.70

ble 1. (continued)

Drill Hole #		Inches	U_3O_8 %	X	U_3O_8 % Average
12.	42' 7" - 42' 9"	2	.72	144	
	42' 9" - 45'	27	.01	27	
		29		171	.59
	58' 3" - 58' 6"	3	7.50	2250	
	58' 6" - 58' 7"	1	.06	06	
	58' 7" - 79' @ ½"	120	.11	1320	
		124		3576	.29
	Total Inches	1410		137271	.97
	Average Depth	141			

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 279-4549

REPORT OF ANALYSIS

To: Mr. Art Thompson
Western Mining Company
Fidelity Union Tower
Dallas, Texas 75201

Date: October 22, 1968

HRI Project No. 442
HRI Series No. 1527

Supco Drill Hole #1

Analysis No.	Sample Designation	Element	Weight Percent
1527-16	29'3"-30'0"	Copper	0.011
		Zinc	0.014
		Lead	0.042
		Arsenic	0.008
		Iron	4.2
		Cobalt	0.006
		Nickel	0.009
		Rubidium	0.036
		Barium	1.2
		Strontium	0.13
		Titanium	0.12
		Zirconium	0.050
		Vanadium	0.016
		Chromium	0.007
		Uranium	0.66
		Manganese	0.37
		Yttrium	0.010

By: J. Kent Perry
Geological Engineer

G

(Dr. Morin)

CENTRAL MINING CORP.

MORMON LAKE

URANIUM PROPERTY

ARIZONA

DONATED BY MEL JONES ESTATE

74

Dr. MARCEL MORIN, Eng.
CONSULTING GEOLOGIST

1018 GRENOBLE AVE
QUEBEC 10, QUE.
TEL.: (418) 653-0658

PAN AMERICAN MINES Ltd.

REPORT OF APPRAISAL

ON THE

MORMON LAKE URANIUM PROPERTY
GILA AND COCONINO COUNTIES
ARIZONA, U.S.A.

BY

MARCEL MORIN, ENG.

QUEBEC
1971

Dr. MARCEL MORIN, Eng.
CONSULTING GEOLOGIST

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TABLE OF CONTENTS

INTRODUCTION 1

PROPERTY 2

ACCESS 2

POWER AND WATER RESOURCES 2

PREVIOUS WORK - 3

Pre 1971 3

PAN AMERICAN MINES' DRILLING PROGRAM - 3

FIRST PHASE 3

SECOND PHASE 4

DIAMOND DRILLING 4

PROBE 4

DIFFICULTIES 5

GEOLOGY 5

RESULTS OF DRILLING Pre 1971 6

TABLE OF DRILLING Pre 1971 8

DISCUSSION OF RESULTS 10

MINERALIZATION 10

CONCLUSION 11

RECOMMENDATIONS 12

COST ESTIMATE 13

REFERENCES 14

CENTRAL MINING CORPORATION
3003 No. Central Ave.
Suite 2309
Phoenix, Arizona

TABLE OF CONTENTS

Pictures

Geologists and Engineers Reports

a) Marcel Morin, Consulting Geologist

b) Paul H. Johnson, PhD

Table I - Assay Reports

Table II - Drilling and Assay

Exhibit I - Maps

Exhibit II - Mineralogy Report - Hazen Research, Inc.

Exhibit III- Mining Claim - Certificates of Title

CERTIFICATE

I, Marcel Morin, residing at 1018 Grenoble Avenue, Sainte-Foy, in the Province of Quebec, hereby certify:

1. THAT I am a graduate of Laval University with the degrees of Bachelor in Applied Sciences, Master of Sciences and Doctor ès Sciences (Geology) and have been practising since 1956.

2. THAT I am a member of the Corporation of Engineers of the Province of Quebec and a Fellow of the Geological Association of Canada.

3. THAT I have no interest direct or indirect nor do I expect to receive any in the mining claims mentioned in the reports and in the securities of Pan American Mines Ltd.

4. THAT the accompanying reports are based on all the information available for work performed on the properties, work done by myself and personal examination of the documents.

Quebec City, June 1st, 1971.

(Signed) MARCEL MORIN, Eng.

CONSULTING GEOLOGIST

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PAN AMERICAN MINES LTD.

REPORT OF APPRAISAL

ON THE

MORMON LAKE URANIUM PROPERTY

GILA AND COCONINO COUNTIES

ARIZONA, U.S.A.

Introduction

Following the acquisition of Central Mining Corporation early in June of this year, an exploratory drilling program was carried out on the Mormon Lake Uranium property in central Arizona between July and October. The results confirm the extension of a sedimentary uranium-bearing layer which crops out along the side of the hill in an East-West direction and dips 10 degrees to the North towards the Mogollon rim.

The tonnage indicated is in excess of 4 million tons of uranium-bearing material from the surface to a maximum depth of 170 feet to the top of the layer. The average final grade is still undetermined but, from the known results, could be expected to be between 5 and 10 pounds of uranium oxide per ton, a grade favorably comparable and even higher than those of several existing producers.

Moreover, documents received early in November 1971 on work done by a former owner of the property confirm the presence of the uranium-bearing layer with intersections similar to those obtained during the last drilling.

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All the data are reviewed in this report, including a detailed account of the work done. Further development work, consisting of additional drilling and bulk sampling, is required before the information could be treated and analyzed in a feasibility study which would be preparatory to a full exploitation of the uranium-bearing zone.

Property

The property consists of 235 mining claims covering an area of about 4,700 acres. It straddles the Promontory Butte, a feature of the Mogollon rim on the boundary between Gila and Coconino counties in the Tonto National forest.

Access

The property may be reached easily from the paved highway between Payson and Heber. A secondary road branches from the highway to reach the area of the main workings about one mile to the North.

Power and Water Resources

Two transmission lines serve the area, one along the highway and the other crossing the country about 4 miles to the West. Enough power would be available for a complete mining operation.

Water is not scarce in that forested part of the State and could be obtained from either wells or streams nearby.

.....3

Previous Work

Pre 1971:

During the course of the exploration program, it was found out that the property once belonged to Neptune Mine, an American company formed to develop the property until it was presumably returned to the original owners. This company is reported to have done considerable drilling. Shipments of uranium-bearing material were made before 1956 to a custom mill. It is purported that all this information is filed with the U.S. Atomic Energy Commission, but is is not certain that it could be obtained without permission from the Authorities of the possibly defunct company.

In 1968, the property was assigned to Southern Union Oil Production Company of Dallas, Texas. This company carried out an airborne survey (radiometric and magnetic), detailed radiometric surveys and did much drilling. Results available, although possibly still incomplete, are given in the tables of this report. The results of bulk samples taken in the pit have not yet been supplied, although they exist. Along with the results, it is understood that a certain amount of mill testing has been done.

Pan American Mines' Drilling Program

The company's drilling program is divided into two phases because of the changes in the method of collecting the samples.

First phase:

A total of eleven holes were drilled on either sides of the main pit, two of which were immediately East of the Western pit.

.....4

They are in claims S.C. 1 and D. 1 and in zones in which the expected depth to the uranium-bearing layer was shallow enough to be within reach of the light air track equipment used.

A small percussion drill was used in combination with a 900 Gardner-Denver compressor. A canvas laid out on the ground collected all the chips which were transferred into bags at every 5 foot interval. This canvas was carefully cleaned between samples.

Second phase:

The light equipment broke down early in August and drilling was resumed during the first part of September. Heavier equipment was used in order to drill to depths close to 200 feet. The hole was collared with a pipe with a rubber seal around the drill rods. At the collar, compressed air was injected into a T which forced the cuttings into a conical collector via a rubber hose. From the collector, the cuttings were falling into a plastic bag attached at the bottom. A total of 8 holes were drilled during this second phase.

Diamond Drilling

3 holes were drilled with HQ wire line equipment giving a core diameter of 2½ inches. Two of the holes were drilled adjacent to air track holes to test the recovery and to establish correlations. One hole was on a new site not drilled previously.

Probe

Although a crew was hired from Scintrex to run the probe

in all the holes, this part of the program was not executed because of internal problems.

Difficulties

As in customary practice in most projects, Phase 1 drilling was done under the direct supervision of a field manager appointed by the company and no need was felt for special precaution. Phase II, including diamond drilling, was carried out under my direct supervision with the assistance of two samplers hired from Hawley & Hawley of Tucson, Arizona. This extra precaution was taken only to satisfy doubts created in some circles on the validity of the results. The extra supervision and the use of diamond drilling at this early stage caused, likely justified, unrest among certain American interested parties because of the greater expenses involved and the reported failure to obtain satisfactory results in previous diamond drilling programs. All this combined with internal problems slowed down the work to such an extent that all operations had to be stopped in early October.

Geology

The rocks within the zone investigated consist of dominantly pink siltstone and sandstone with few narrow light grey interbeds. The basal part of the uranium-bearing layer is the limestone conglomerate with a quartzose matrix, often associated with grey, impure sandstone. The layers may not be continuous for any great distance along the strike or down dip. Instead, interfingering and

several facies changes may be expected, as indicated by the results of drilling. Also, all these units, especially the limestone conglomerate, show strong cross-bedding.

On the basis of the information available, it would seem that the uranium-bearing layer has an East-West strike, parallel to that of the overlying sandstone. Whether it is a deltaic type of deposit or stream channel cannot be ascertained at this stage.

Results of Drilling Pre 1971

The data on 36 out of 39 holes known holes drilled before 1971 were received by the Authorities of the company early in November 1971. It is gathered from personal communications that about 15 more holes would have been drilled during the earlier exploration. They are listed in the following table with assay results, depths, collar elevation where available and approximate location of anomalous peaks on probe logs. All these holes are also shown on the map accompanying this report to compare with drill sites of the 1971 program.

It is not known how many of these holes were actually cored so that no real evaluation can be made of this method of sampling.

7 holes for which assays were negative did give peaks on the logs with amplitudes and widths comparable to those from the holes

with the highest uranium contents. They are holes: M.L. 30, 32, 33, 35, 37, 39 and 42.

5 holes, which returned what could be considered as ore grade sections, did not cause any reaction on the probe. It may be that the instrument was defective or the uranium values are erratic and none was left in the holes to be detected. This second hypothesis does not appear to be realistic. These holes are M.L. 9, 16, 17, 18 and 20.

Ten holes, M.L. 1, 2, 3, 5, 7, 8, 10, 11, 12 and 14 gave good assay results with partial or complete corresponding intervals on the results of the probe as shown by the footages given in the table.

Cross sections drawn on the basis of the results of this earlier drilling confirm the presence of a layer of uranium-bearing material dipping to the North with considerable variations in depths to the top. However, some of the variations could have resulted from losses in the recovery of the samples or material.

The main pit was dug at about the centre of claim Second Chance No. 1 in the main zone investigated by drilling. Much of the adit is now dug out in the pit.

The results of assays of bulk samples taken from the pit have not yet been made available. Assays on a pile of crushed material was reported to contain 0.35 per cent uranium oxide or 7 pounds per ton by P. Johnson.

.....8

Drilli Pre 1971

Hole	Claim	U_3O_8 %	Interval Depth in ft.	Thickness ft.	Probe anomalies	Altitude collar
1	SC-1	0.21	28.3 - 32.2	3.9	15 - 37	6179.6
2	SC-1	0.39	39.1 - 46.8	7.7	15 - 45	6189.6
3	SC-1	0.63	59.1 - 69.8	10.7	6 - 68	6204.1
4	SC-1	lost hole	- -	-	- -	6228.4
5	SC-1	0.48	106 - 127.6	21.6	105 - 120	6257.6
6	SC-1				65 - 87(weak)	
7	SC-1	0.45	23.0 - 33.5	10.5	15 - 25	6180.5
8	SC-1	0.14	30.5 - 32.1	1.6	13 - 31	6196.1
9	SC-1	0.60	169.0 - 209	40	nil	6270.3
10	SC-1	0.52	40.0 - 45.0	15	40 - 50	6197.5
11	SC-1	1.34	56.0 - 84.0	28.5	55 - 82	6221.7
12	SC-1	0.69	55.0 - 58.8	3.8	29 - 53	6202.5
13	BJ-43	nil			37 (Peak)	6209.9
14	BJ-43	0.32	38.4 - 42.9	4.5	40 - 56	6231.5
15	SC-19	lost hole	- -	-	12 - 17(weak)	6190.6
16	SC-15	0.12	88.4 - 91.5	3.1	nil	
		0.39	129.8 - 134.1	4.3	nil	6339.5
		0.53	144.7 - 149.0	4.3	nil	
17	SC-15	0.15	150.0 - 160.1	10.1	nil	6348.7
18	SC-15	0.28	99.5 - 99.9	0.4	nil	6336.8
19	SC-15	no data			nil	6342.3
20	SC-15	0.61	101.0 - 107.0	6.0	nil	6343.2
29	SC-1	no data			nil	6285.0
30	SC-1	nil			37 - 52	6202.0
31	SC-1	no data				6228.5
32	SC-1	0.098	73 - 74	1.0	65 - 75	6213.2
33	SC-1	nil			67 - 82	6221.9
34	SC-1	nil				6220.9
35	SC-1	nil			73 - 78(weak)	6219.6
36	SC-1	no data			92 - 117(weak)	6258.3
37	SC-1	nil			67 - 76	6214.9
38	SC-1	no data			63 (Peak)	6213.2
39	SC-1	nil			49 - 55	6200.8
40	SC-1	nil to 57 ft.				6198.2
41	SC-1	no data			35 - 47	6192.4
42	SC-1	nil			14 - 30	6180.7
43	SC-1	0.14	58.0 - 64.2	6.2		6330.8

Drilling 1971

The results of the drilling done in 1971 are as follows:

Phase I

Hole no.	Claim	Interval Depth in ft.	Footage	U_3O_8 %
26N-3	BJ-34	25 - 35	10	0.75
30N-3	SC-11, BJ-34	25 - 40	15	0.33
34N-3	SC-11	30 - 45	15	0.59
30N-4	SC-1, 11, 20 and BJ-34	25 - 40	15	0.50
34N-4	SC-1, 11	25 - 50	25	0.92
34N-6	SC-3	50 - 80	30	1.04
38N-6	SC-3	65 - 95	30	2.02
30N-7	SC-3, 5	15 - 35	20	0.41
34N-7	SC-3, 5	65 - 100	35	2.35
30N-11	D-1	15 - 30	15	0.22
34N-11	D-1	55 - 80	25	0.38

Phase II

26N-8	BJ-32	113 -124	11	0.136
38N-8	SC-5	154 -177	23	0.28
26N-9	BJ-31	85 -94	9	0.295
38N-9	SC-7	143.5-173	29.5	0.107
34N-7W-6	SC-3, 5	56.5 -77	20.5	0.36
34N-6W-B	SC-3	44 -47.5	3.5	0.252 (lost hole)
38N-7	SC-3, 5		not assayed	
30N-8	SC-5		" "	
34N-8	SC-5		" "	

Diamond Drilling

38N-5	SC-1	nil
38N-6W-B	SC-3	nil
34N-7W-B	SC-3, 5	few inches not assayed

.....10

Differences in the results between the two types of equipment may correspond to the irregular and erratic distribution of the uranium. Also, they may give respectively higher and lower grades by enrichement or dilution. Only comparison with results of bulk samples will give the answer on the representativeness of the sampling methods. The use of a probe to calculate contents would only be valid if the initial results were carefully controlled. Differences in elevations to the top of the layer could be the results of carelessness in measurements during Phase I or simply a reflection of the actual situation.

Diamond drilling turned out to be catastrophic. Hole 38N-6W-B gave negative results, except for one small piece of pitchblende in the red sandstone. Other pitchblende fragments in the conglomerate had to be rejected. Hole 38N-6W-B, which was drilled next to hole 38N-6, also returned negative results. Again, one piece of pitchblende at 77 feet had to be discarded. Finally, a few inches of radioactive conglomerate were obtained in hole 34N-7W-B again suggesting that the uranium distribution could be erratic or, worse, that because of the nature of the mineralization, core drilling would be an unreliable method of sampling, as reported from previous experience. This latter explanation is very possible and also very likely from a geological standpoint.

Mineralization

Enough studies have been made to determine that pitchblende is the only uranium mineral present on the property. It has been demonstrated to occur in the interstices between the fragments

.....11

conglomerate and as partial replacement of follis wood fragments. It may also be seen in stringers associated with carbonaceous material or as platings along certain beds in the dirty sandstone.

The essential point is that pitchblende occurs in a non-metamorphosed sedimentary layer and that its distribution is still not very well known.

Because of the solubility of uranium, it could be advanced that much of the original material deposited has been reorganized by dissolution and precipitation during the lithification processes. Also, because of the shallow depth of the zone, leaching be weathering could explain several of the variations observed in the depth to the top of the layer and even the erratic distribution of the mineralisation. Secondary carbonate could have acted both as protective or leaching agents in the weathering processes. Although the area is now forested, the depth of alteration by weathering could be quite variable and also deeper than the zone investigated.

Conclusion

The results of the two known drilling programs indicate beyond any doubt the presence of a uranium-bearing layer of substantial size. This sedimentary zone lies at an average depth of about 80 feet under the surface, varying from 0 to a maximum of 170 feet.

This layer could occur in a deltaic environment or in a

stream channel, possibly braided with barren zones or lenses. The study on the origin of the deposit at this stage would be purely academic, although it could be quite important for future exploration.

The average grade is still not established because of conditions particular to the deposit. The various drilling methods used up to now have served the purpose of indicating the presence of the mineralization, but may not have been too reliable on the grade. It is quite possible that only bulk sampling taken at certain intervals would be the only safe method to obtain the average grade, a practice not uncommon for several metallic deposits. Further drilling, expluding diamond drilling, may be used mainly to study variations in the thickness of the zone or to determine the minable thickness.

The tonnage of 4 million tons mentioned earlier in the report is based on a length of 2,400 feet investigated by a width of 1,000 feet, to include the zone to the edge of the exposure and the wider sections at both ends, with an average thickness of 20 feet. A factor of 12 cubic feet per ton has been used and it gives a figure about 3 per cent greater than a factor of 12.5.

Recommendations

Before a feasibility study may be undertaken and a final decision be made on the exploitation of the uranium-bearing layer,

.....13

further exploration is required to determine its average thickness and grade.

First, 50-foot drilling pattern should be carried out on three cross sections within the area already investigated. This would consist of about 50 holes at an average depth of 150 feet. As a next step, bulk samples should be extracted in intervening sections to determine the average grade either by stripping and mining or from adits driven into the side of the hill.

Elevation controls and probing of all the holes would provide necessary additional information for a correct evaluation of the property.

Cost estimate

The cost of the development program would be as follows:

1.	Drilling of 50 holes - 7,500 ft. @ $5./ft.	$37,500.00
2.	Assaying - 200 samples @ $6.00	1,200.00
3.	Bulk sampling - 2,500 ft. @ $60./ft.	150,000.00
4.	Engineering	20,000.00
5.	Miscellaneous expenses - traveling, board and lodging, etc...	10,000.00
6.	Contingencies - 10 per cent	21,870.00
		$240,570.00

Quebec City, December 14th, 1971

Marcel Morin, Eng.

Dr MARCEL MORIN, Ing.
GEOLOGUE - CONSEIL
CONSULTING GEOLOGIST

REFERENCES

1. Mineralogical Investigations on the Mormon Lake Uranium Deposit be Personel of Hazen Research Inc., Denver, Colorado.

2. Comparison of M.L. 43 with Earlier Drill Holes, Mormon Lake Project for Southern Union Production Co., Hazen Research Inc., by J.K. Perry and J.L. Lake

3. File on Mormon Lake Project:

   a) Location Maps
   b) Map of Adit on Second Chance no. 1 by D.R. Williamson
   c) Geologic Sections, Second Chance no. 1 Claim
   d) Geologic Section, Second Chance no. 15 Claim
   e) Location Map of Geologic Sections in Second Chance nos. 1, 11, 13 and 15
   f) Photogeology Map by Hazen Research Inc.
   g) Interpretation Report, Airborne Geophysical Survey in Central Arizona for Southern Union Production Co., Aero Service Corp. of Philadelphia, C.E. Curtis
   h) Aeromagnetic Survey Map, Sheets 1, 2, 3
   i) 10 Isorad Maps
   j) Anomaly Map of Net Radiation
   k) Table of Results
   l) Assays on 32 Holes by Hazen Research Inc.
   m) Probe logs of 29 holes by Century Geophysical Corp.
   n) Ground Survey by W.J. Cheek, C. Eng.
   o) Claim Map by W.J. Cheek, C. Eng.

* * * * * * * *

EVALUATION REPORT ON

I. THE MORMON LAKE URANIUM DEPOSIT, GILA COUNTY, ARIZONA

II. METALLURGICAL TREATMENT OF THE MORMON LAKE URANIUM ORE IN A JOHNSON LEACHING REACTOR

III. THE ECONOMICS OF MINING AND PROCESSING THE MORMON LAKE URANIUM ORES

April 19, 1971
Fierro, New Mexico

by

Paul H. Johnson, PhD
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M. S. Thesis, Rinsing and Drainage of Magnetite Media from Fine Coal, Univ. of Wash, 1957.

"Dissolution and Roasting Techniques for Extracting Cesium from Pollucite Ores", USBM RI 6387, 1964.

"The Underground Autoclave and its Applications to Hydrometallurgy", Paper presented at the 94th Annual Meeting of AIME, Chicago, Illinois, Feb. 14-18, 1965.

"The Production of Acid-Ferric Sulphate Solutions for Chemical Mining", Paper presented at the Pacific Southwest Mineral Industry Conference of AIME, May 5-7, 1965.

"Acid-Ferric Sulfate Solutions For Chemical Mining", Mining Engineering, August, 1965.

Ph. D. Thesis, An Investigation of Vertical, Gas-Agitated Autoclave Design and Functioning (Part I), The Dissolution of Sulphides in a Vertical, Air-Agitated Autoclave (Part II), University of Utah, 1967.

U. S. Patent No. 3,264,099, "Hydro-Metallurgical Method and Apparatus". Also patented or patent applications filed in approximately 20 foreign countries.

"Pyrite Leaching of a Beryllium Ore in an Air-Agitated Autoclave", Paper presented at 96th Annual Meeting of the A. I. M. E. Los Angeles, California, February 19-23, 1967.

"Chemical Mining - Theoretical and Practical Aspects", Paper presented at Fall Meeting of A. I. M. E., Las Vegas, Nevada 1967.

"Theoretical and Practical Studies on Dump Leaching", Paper presented at Fall Meeting of A. I. M. E., Minneapolis, Minn. Also published in Trans. A. I. M. E. 1970.

"Chemical Mining - A Study of Leaching Agents", Circular 99. N.M.B.M. Socorro, N.M.

"Leaching Studies on Oxide and Sulfide Copper Ores Under Heap Leaching Conditions", Paper to be presented at Annual A.I.M.E. Meeting, February 1970.

U.S. Patent Pending "Method and Apparatus for Leaching Fine and Coarse Ores" 1969-1970.

Numerous contract research reports for clients of New Mexico Tech Research Foundation.

WORK EXPERIENCE

U.S. Bureau of Mines, Research Metallurgist, 2 yrs. 8 mo. equivalent full time.

H.E. Johnson & Associates, Metallurgical Research Organization, Chief Metallurgist, 2 yrs. 11 mos.

Various small mining companies, Vice President, Chief Engineer, Research Engineer, Manager, 3 yrs.

New Mexico Bureau of Mines, Metallurgist, 3½ yrs.
General Partner, Johnson Research & Development, Ltd. and President, Cobre Mines, Inc. 1 year.

FIELDS OF EXPERIENCE

Metallurgical Research
- Hydrometallurgy (atmospheric and pressure leaching)
- Mineral Beneficiation (flotation, gravity, heavy media, magnetic etc.)
- Ion Exchange
- Solvent Extraction
- Radioactive Tracer Analysis
- Pyrometallurgy (roasting, sintering, chloridizing etc.)
- Process Testing
- Process Equipment Design and Testing

Metallurgical Field Experience
- Design, Testing, Construction and Operation of Flotation, Gravity and Leaching Plants.

Mining Experience
- Design, Construction and Management of Underground and Open Pit Mining Plants.

Managerial Experience in Mining and Metallurgical Plants

EXTRACURRICULAR ACTIVITIES

Member, American Institute of Mining, Metallurgical and Petroleum Engineers, Member, Lions International

SUMMARY AND CONCLUSIONS

The Mormon Lake uranium deposit near Payson, Arizona represents a discovery of major proporations. Extensive drilling has outlined sufficient tonnage of high quality ore to warrant development of the property by means of a new, low-cost leaching process. Cost estimates have been made on the basis of a 500 ton-per-day mine and processing plant.

Sufficient ore has been developed on the Mormon Lake property to justify the construction and operation of a mine and Johnson leaching plant. In one of several known mineralized areas, Southern Union Production Company has drilled out a proven ore reserve of 152,100 tons of 1.06% U_3O_8 ore in a bed that averages 13 feet thick. Geologic conditions are extremely favorable for the development of a very large amount of high quality ore on this property.

The Johnson leaching reactor and process represents a new concept in the treatment of uranium ores. Bascially, this process and apparatus is a counter-flow leaching process wherein crushed uranium ore is leached with carbonate-bicarbonate leach solutions over a relatively long leaching period and under optimum conditions of leach. This technique produces a salable uranium product at the mine-site and requires very low capital investment and operating costs.

Cost estimates indicate that about $1,750,000 will be needed to put this property into complete operation at a rate of about 500 tons per day. Of this $1,750,000 approximately $150,000 would be spent for additional exploration, $500,000 for the leaching

plant, $700,000 for the mine plant, $150,000 for accessory facilities on the property, and $250,000 for a reserve and for marketing expenses.

Operating costs would amount to a total of approximately $10.50 per ton of ore. Seven dollars and 50 cents of this amount would be the mining costs and the remaining $3.00 would be the processing and overhead costs. The gross recoverable value of the proven ore reserve is calculated to be $124. per ton. This amount, less the operating costs, would leave a net profit before taxes of $113.50 per ton or $17,300,000 on the blocked-out ore reserves. Potentially, this property could produce many times this amount of profit.

THE MORMON LAKE URANIUM DEPOSIT, GILA COUNTY, ARIZONA

by
Paul H. Johnson, PhD

Introduction

The Mormon Lake Uranium Deposit is located in Central Arizona, 17 miles East of the town of Payson. Access to the property is made by traveling on highway 160 to a point about 5 miles East of the Krohle Ranch and thence North on a dirt road for about one mile to the southeast portion of the property.

The property consists of 235 unpatented mining claims. The attached claims map (Exhibit 1) shows the location of these claims.

The property is located in a gentle mountainous area covered by pine and juniper trees. Water can be obtained for mining operations from two perennial streams that flow through the property or from the existing mine workings. Paved roads lie on both the southern and northern borders of the property and a 3-phase electrical power line crosses the property within a mile of the Second Chance No. 1 Claim. The climate is quite mild and conducive to a year-round operation. Payson would be the nearest source of labor and supplies.

History of Property

The original discovery of the Mormon Lake uranium property was made in 1956 by Lee and Houston Phillips. During their period of ownership a considerable amount of exploration work was done.

The closing of a government uranium buying station in the area and the slow-down of the uranium industry in the early '60's prevented these men from further developing the property.

The property was acquired in 1968 by the Southern Union Production Company, a wholly owned subsidiary of Southern Union Gas Company (NYSE). During their period of ownership, 57 holes were drilled and documented (Exhibit 2, & Table 1). Hazen Research, Inc. of Golden, Colorado conducted a mineralogical study (Exhibit 3) on the property for the Southern Union Production Company. Also, about 150,000 tons of overburden was removed from a portion of the orebody on the Second Chance (SC) No. 1 Claim.

The property is presently owned by Central Mining Corporation. Copies of certificates of title are attached (Exhibit 4).

Mineralogy

The mineralogy of the Mormon Lake deposit is well covered in the report "Mineralogy of the Mormon Lake Uranium Deposit, Gila County, Arizona", by Hazen Research, Inc., (Exhibit 3).

Ore Geology

Inasmuch as the Hazen report does not fully describe the geology of the ore zones, a brief description is given herein.

The host rock for the uranium mineralization is a limestone pebble conglomerate bed that dips about 8° to the North under the Mogollon Rim. Uranium occurs within this conglomerate bed as a series of interbedded thin seams of pitchblende. Generally, these

layers of thin, high-grade pitchblende are confined to one or more horizons in the conglomerate, and as such, constitute one or more beds of minable thickness and grade.

Uranium mineralization appears to be quite widespread on this property. It is found almost continuously along the exposed conglomerate outcrop for a distance of two to three miles as well as in most of the recorded drill holes.

Exploration

A considerable amount of exploration has been done on this property. Unfortunately, only about half of the drilling that has been done can be documented.

The original discoverers of this property, Lee and Houston Phillips, are said to have drilled approximately 50 holes in the area of claims SC 1, 3, 5, 11, 13 and 15 and to have outlined an orebody of high quality ore amounting to 2 to 3 million tons. The AEC was supposed to have accredited them with an orebody of 150,000 tons of proven ore. Also, one 700 foot drillhole at the North end of claim D9 is purported to have intersected 22 feet of 1% U_3O_8 ore. This hole is located 4,500 feet northeast of the orebody presently outlined on the SC 1 Claim. The discoverers also penetrated the orebody on the SC 1 Claim with a 235 foot adit.

The Southern Union Production Company is reported to have drilled 57 holes in the deposit. Drill data are available on only about half of these holes. (Exhibit 2 & Table 1). Mr. Art Thompson of the Southern Union Production Company has stated that he feels

that the drilling should have covered a wider area instead of placing most of the drill holes in one small area. He also is of the opinion that the property has a very good potential.

The Hazen Research report suggests that the pitchblende was deposited from high temperature hydrothermal solutions. This observation and the fact that the orebodies on the Second Chance (SC) No. 1 Claim becomes thicker and higher in grade with depth, suggest that the uranium source channels may eventually be found on the property.

Twenty-eight additional radioactive anomalies have been located on this geologic structure over a distance of twenty-five miles.

Ore Reserves

Proven ore reserves have been calculated from the Southern Union Production Company's drill data for the ore deposit on the Second Chance No. 1 Claim. Although drill holes showed ore to exist on other claims, insufficient drilling has been done in these areas to warrant the calculation of ore reserves.

As is shown by Exhibit 2, the proven ore is bounded by the area ABCDEFG and a circle of 75' radius around drill hole #9. Area ABCDEFG has an area of influence of 110420 square feet, an average thickness of 11.45', an average weighted grade of .75% U_3O_8 and a tonnage of 126,500 tons. The circular area around drill hole #9 has an area of influence of 17,672 square feet, an average total thickness of 14.50' in two layers, an average weighted grade of 2.59% U_3O_8 and a tonnage of 25,600 tons.

The total proven tonnage is calculated as 152,100 tons at an average weighted grade of 1.06% U_3O_8. This amounts to a proven reserve of 3,200,000 pounds of uranium, worth approximately $20,000,000.

The potential of the unproven ores on this property is very great, probably many times that of the above figure.

Conclusions and Recommendations

The Mormon Lake uranium deposits represent a new uranium district of great potential. Uranium occurs over large areas of this property as numerous, thin, near-horizontal, seams of pitchblende in a parrallel limestone pebble conglomerate bed. Ore strata are often of minable thicknesses and of excellent grade.

Proven ore reserves in a single mineralized area amount to 152,100 tons of 1.06% U_3O_8 ore, or 3,230,000 pounds of U_3O_8. Probable and potential ore reserves are very large.

It is recommended that a large number of inexpensive percussion drill holes be drilled on a large grid pattern to outline the major areas in which ore occurs on the property. Additional holes should then be drilled in the better areas to establish the continuity of the individual ore zones. Radiometric assaying may possible be used in assaying most of the drill cuttings from these holes. About $150,000 should be budgeted for this exploration.

METALLURGICAL TREATMENT OF THE MORMON LAKE URANIUM ORE IN A JOHNSON LEACHING REACTOR

by
Paul H. Johnson, PhD

Introduction

A new method and apparatus for leaching uranium ores has been recently developed by this author. The principal attributes of this system are; (1) the high degree of metal recovery that can be achieved on most uranium ores, (2) the extremely low capital investment costs of the system (about $600 to $1,000 per ton per day of daily capacity), and (3) the very low operating costs (about $2.00 per ton).

This leaching reactor is essentially a column-like vessel wherein crushed ore is contacted with leaching fluids. Patents are pending on this new invention in the United States and in many foreign countries.

Extensive laboratory, pilot plant and prototype plant testwork has been conducted on this invention. At the present time a 1,000 ton-per-day oxide-copper plant is going into operation at Fierro, New Mexico that uses this new metallurgical principle.

Laboratory Test Procedures

Two eight-day column leaching tests were conducted on the Mormon Lake ore. In one test (JRU1) the ore was minus 4 mesh in size and in the other (JRU 2), a minus 5/8" ore was used. In each test, 6,000 grams of ore (.374% U_3O_8) was column leached at 70° C with 2,000 ml/day of solution containing 8% Na_2CO_3, 2% $NaHCO_3$ and 5

grams/liter of $KMNO_4$. Oxygen was bubbled upward through the column continuously.

Results

The following table describes the results of these two tests.

Test	Recovery in 3 Days %	Recovery in 8 Days %
JRU 1	72	76
JRU	80-84	80-84

Three different methods may be used to increase this recovery to a value above 90%. One method is to leach the ore under more severe leach conditions in the column, i.e., 80 or 90° C temperatures, a longer leach or more severe oxidation conditions. Another method is to draw off about 10% of the heavy tailings that contain most of the unleached uranium from the bottom of the tailings discharge line as the waste tailings are discharged from the leaching reactor. Periodically, this material would be recrushed and recirculated to leaching in the leaching reactor. Both jig and table tests have been made on the JRU 2 tailings, to duplicate the gravity separation described above. This technique resulted in the overall recovery being raised to about 93%. A third technique for additional recovery is to leach the tailings from the leaching reactor by downward percolation under atmospheric conditions in the tailings pond over a long period of time. A separate leaching test has indicated that an additional 9% recovery or about 90% overall recovery can be achieved by this method. Any one or more of these techniques

could be used to achieve a higher degree of recovery than the recovery that was obtained in the above-mentioned tests.

Conclusions

Laboratory testing has indicated that a recovery in excess of 90% can be achieved on the Mormon Lake uranium ores when they are treated at a coarse size in the Johnson Leaching Reactor.

THE ECONOMICS OF MINING AND PROCESSING THE MORMON LAKE URANIUM ORES

by
Paul H. Johnson, PhD

Introduction

The economics of developing and operating the Mormon Lake uranium property need to be examined carefully. The four major capital investment items are those of exploration, the mine plant, the processing plant and the auxillary facilities. Operating costs fall into the broad categories of mining, processing, and overhead. When these costs are established, an idea of the profit potential of the project can be ascertained.

Capital Investment Costs

Exploration - it is estimated that approximately $150,000 will be required for a detailed exploration program on the Mormon Lake property. This exploration work will serve to expand the ore reserves and will provide information that is pertinent to the design and location of the mine and any additional processing plants.

Mine Plant Costs - This estimate is highly dependent on several factors, i.e., what size of mining plant is required, where the mining is done, the size of the orebodies and the type of mining process that will be used. It is estimated that the cost of initial development work and mine equipment for a mine plant of this size will be in the range of $500,000 to $800,000. This, of course, is strictly an estimate based on the cost of other similiar underground mine plants.

Processing Plant Costs - A Johnson leaching reactor plant of 500 ton-per-day capacity will cost about $1,000 per ton per day capacity at the Payson location. Hence, about $500,000 will be needed to build this plant and put it into operation.

Auxillary Facilities and Miscellaneous Costs - A certain amount of roads, power lines, water lines, living accomodations, buildings, etc., are necessary for the construction and operation of a major mining operation. About $150,000 should be budgeted for these items and $250,000 should be in reserve for the initial startup and Marketing costs.

Total Capital Investment Costs - An estimate of the total investment costs for a 300 to 500 ton per day mining and processing operation at Payson are as follows:

Item	Amount
Exploration	$ 150,000
Johnson Leaching Reactor (300 to 500 ton per day)	500,000
Mine Plant (300 to 500 ton per day)	700,000
Auxillary Facilities	150,000
Reserve for Startup and Marketing	250,000
Total	$1,750,000

Operational Costs

Mining - Mining costs should be in the range of $3.00 per ton to $10.00 per ton. A good figure for underground mining under the conditions prevalent at the Mormon Lake property is $7.50 per ton.

Processing - Processing costs at a 500 ton per day rate in the Johnson Leaching Reactor should be in the range of $2.00 to $3.00 per ton of ore.

Overhead and Miscellaneous - These costs will be as much as $.50 per ton of ore.