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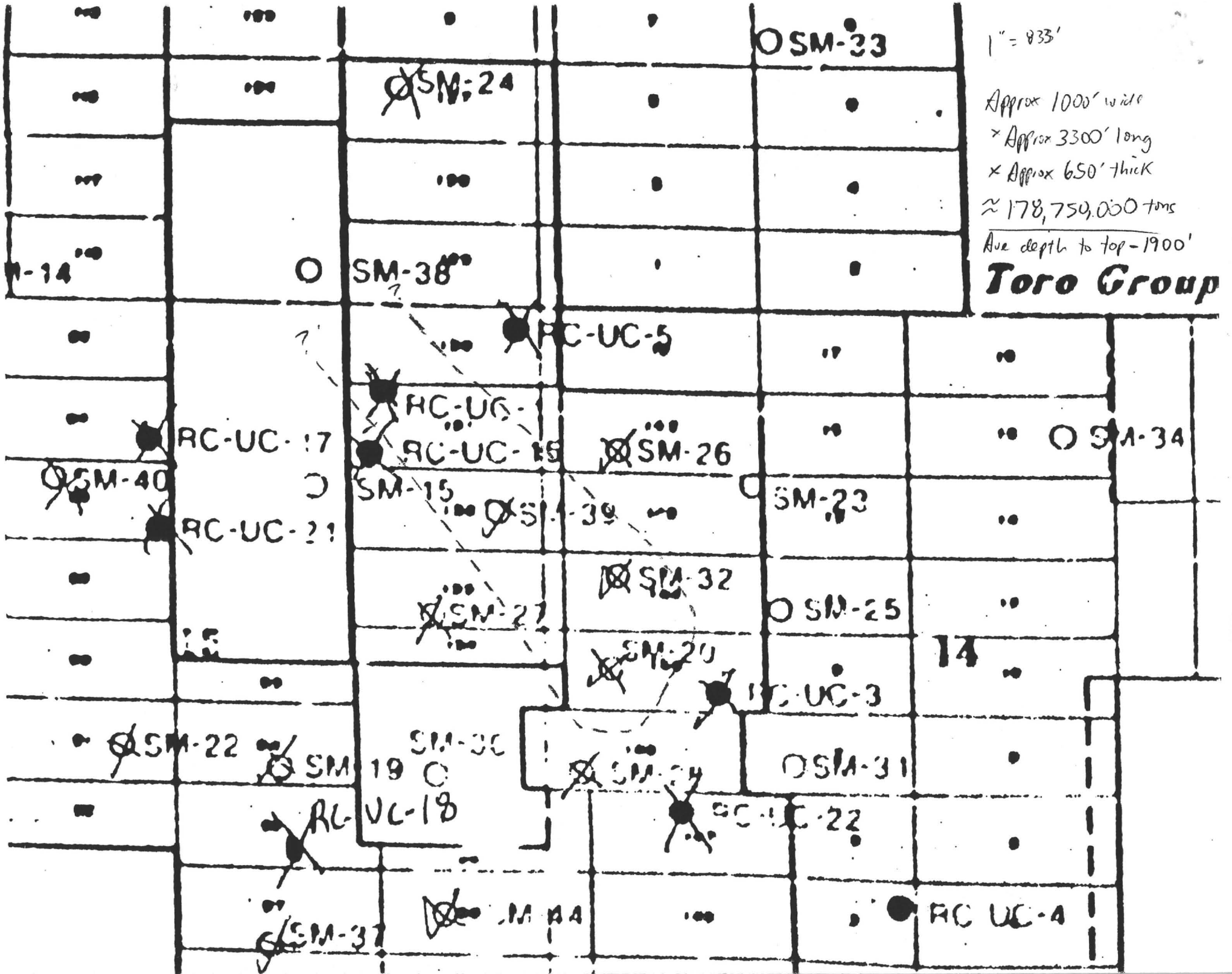

1" = 833'
Approx 1000' wide
× Approx 3300' long
× Approx 650' thick
≈ 178,750,000 tons
Ave depth to top - 1900'
Toro Group
SM-33
SM-24
SM-38
RC-UC-5
RC-UC-6
RC-UC-17
RC-UC-16
SM-26
SM-40
SM-15
SM-39
SM-23
RC-UC-21
SM-32
SM-21
SM-25
SM-20
RC-UC-3
SM-22
SM-19
SM-30
RC-UC-18
SM-31
SM-29
RC-UC-22
SM-31
SM-34
RC-UC-4

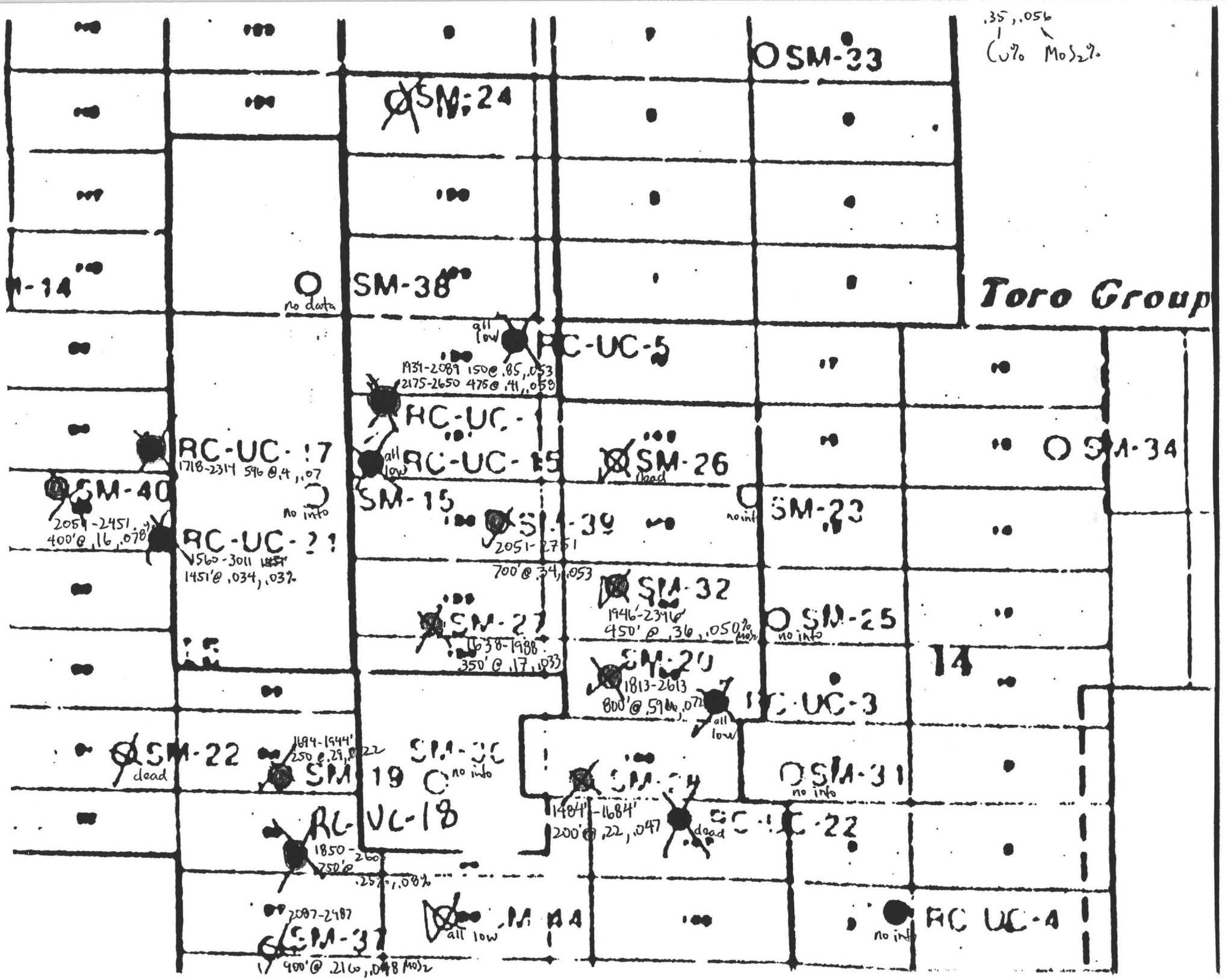
To: Mike Gustin
From. Gary Parkison

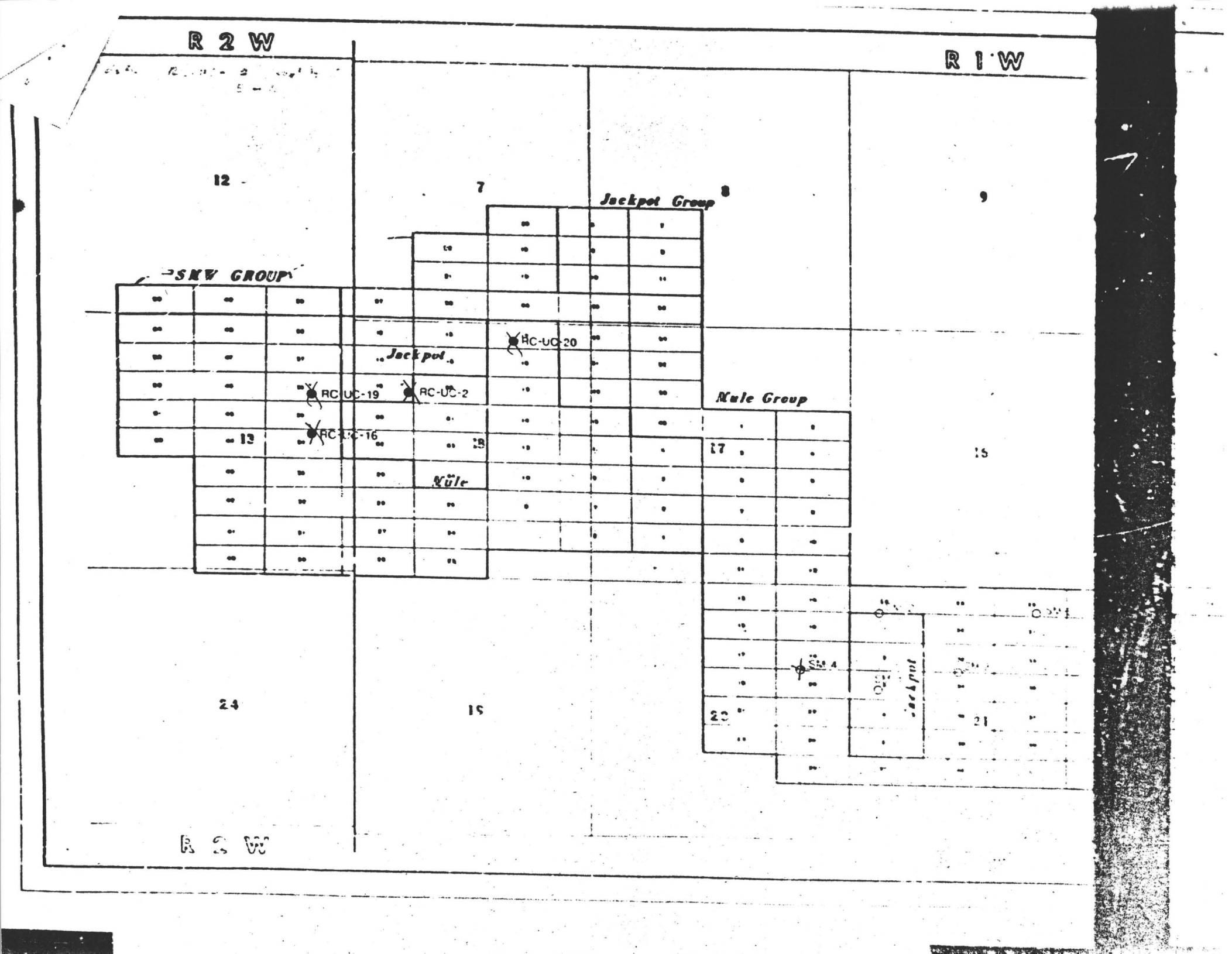
Info re the Sleep Mountain AKA Castle Copper Property

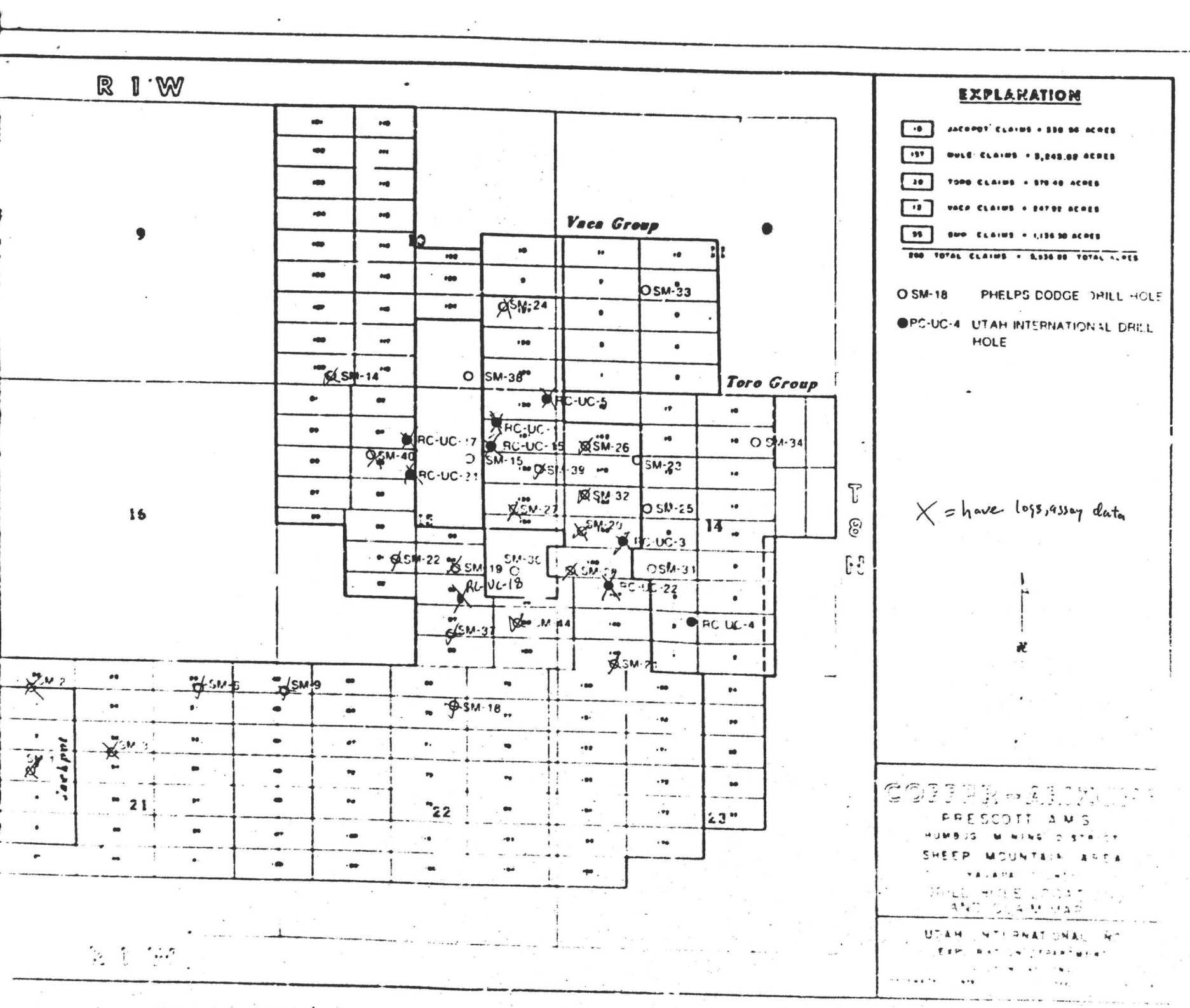
FILE:
SHEEP MOUNTAIN
(AKA Castle Copper)

YAVAPAI CO, AZ

See 12+13 T8N R2W
See 7,8,10,14,15,17,18,20 T8N R1W


.35, .056
Cu% MoS2%
SM-33
SM-24
SM-38
no data
all low
RC-UC-5
1931-2089 150@ .85, .053
2175-2650 476@ .41, .059
Toro Group
RC-UC-17
1718-2314 596@ .4, .07
RC-UC-15
SM-26
dead
SM-34
SM-40
2054-2451
400'@ .16, .078%
no info
SM-15
SM-39
2051-2751
700'@ .34, .053
SM-23
no info
RC-UC-21
2560-3011
1451'@ .034, .037%
SM-32
1946-2396
450'@ .36, .050% MoS2
SM-25
no info
SM-27
1638-1988
350'@ .17, .033
SM-20
1813-2613
800'@ .59, .07
all low
RC-UC-3
14
SM-22
dead
1694-1944'
250'@ .29, .022
SM-19
no info
SM-30
RC-UC-18
1850-2600
750'@ .25%, .08%
1484'-1684'
200'@ .22, .047
dead
SM-31
no info
RC-UC-22
2087-2487
SM-37
400'@ .216, .048 MoS2
all low
RC-UC-4
no info


R 2 W
R 1 W
12
7
8
9
Jackpot Group
SKW GROUP
RC-UC-20
Jackpot
RC-UC-19
RC-UC-2
RC-UC-16
Mule Group
13
18
17
15
Mule
24
19
20
21
Jackpot
SM-4
R 2 W


R 1 W
Vaca Group
Toro Group
SM-14
SM-38
SM-33
SM-24
RC-UC-5
RC-UC-17
RC-UC-15
SM-26
SM-34
SM-40
SM-15
SM-39
SM-23
RC-UC-21
SM-32
SM-27
SM-25
SM-20
RC-UC-3
SM-22
SM-19
SM-30
SM-29
SM-31
RC-UC-18
RC-UC-22
SM-37
SM-44
RC-UC-4
SM-21
SM-2
SM-5
SM-9
SM-18
SM-3
21
22
23
9
16
14
T 8 S
EXPLANATION
JACKPOT CLAIMS • 330.00 ACRES
BULL CLAIMS • 3,060.00 ACRES
TODD CLAIMS • 570.40 ACRES
VACA CLAIMS • 207.02 ACRES
SMD CLAIMS • 1,136.30 ACRES
TOTAL CLAIMS • 5,036.00 TOTAL ACRES
O SM-18 PHELPS DODGE DRILL HOLE
● RC-UC-4 UTAH INTERNATIONAL DRILL HOLE
X = have logs, assay data
PRESCOTT AMS
SHEEP MOUNTAIN AREA
UTAH INTERNATIONAL INC.

.072% MoS_2 @ $4/lb = $5.76

.59% Cu @ $100/ton = $11.80

$17.50 = equiv. .98% Cu

SM-20 1500' × 1000' × 800' = 100,000,000 tons @ .59, .072

UC-1 1500' × 1,000' × 600' = 75,000,000 tons @ .52, .058

~~GT product~~ ~~325~~

$ UC-1

Cu GT products ~~325~~

		Cu	MoS_2	Thick
	UC-1	$325	35.6	625'
	SM-39	238	37.1	700
	SM-32	162	22.5	450
	SM-20	472	57.6	800
		1197	152.8	2575

.465 Ave Cu 650' Ave Thick

.059 Ave MoS_2

@ $1.00 Cu, $4.00 Mo

.465 = $9.30

1.18 lbs = 4.72

$14.02/ton

= equiv. Cu grade of .70% Cu

AZ DEPT MINES & MINERAL RESOURCES

SHEEP MOUNTAIN PROPERTY T8N, R2W Sec 13 YAVAPAI COUNTY

FPK Memo 12/18/61: Kenneth Smith, 120 S. Ext. Rd., Mesa, Arizona said that his group's Sheep Mountain Property was the one recently drilled by Phelps Dodge. They put down 48 holes to as much as 2200 feet deep and developed a large tonnage of low grade copper molybdenum ore.

FTJ WR 10/18/68: It is reported that Utah Construction and Mining Company had pulled out of Sheep Mountains Prospect near the Champie Ranch.

KAP WR 7/29/83: Ken Smith inquired about the use of drilling as assessment work. He reported he has the group of claims known as the Sheep Mountain Copper Property in the Castle Hot Springs area; that it is a copper-molybdenum property and that is has just been returned to him by Utah International after 16 years. The claims consist of the Toro 1-32 in all or parts of Sections 14, and 23 T8N R1W; and Vaca 1-12 in Sections 10 & 11, T8N R1W and the SMW 1-50 in Sections 7,11, 17 & 18 T8N R1W and Sections 12, 13, & 24, T8N R2W. (AMC 42977 thru AMC 43071). The BLM microfiche still lists Utah International, 550 California Street, San Francisco, California 94104 as the holder of the claims.

OUR LAST ADDRESS FOR

NJN WR 8/26/83: Ken P. Smith, 137 E. 2nd Ave., Mesa, AZ 85202, Phone 834-5029, called and reported that he and Ralph Davis own the Jackpot #1-16 and Mule #1-194 claims located in T8N R2W Sec. 12, 13, and T8N R1W Sec, 7, 8, 10, 14, 15, 17, 18, 20, 21, 22, 23, Yavapai County (Champe ranch or someone controls the surface but mineral rights are federal). These claims cover the Sheep Mountain Prospect which he reports is a copper porphry deposit containing 300-400 million tons of approximately 1% copper. Part of the deposit is nearly 2000' below the surface. Utah International has leased this property for 18 years but recently has dropped it. Mr. Smith is currently seeking another major to pick it up. Anyone interested should contact Mr. Smith as he has Utah International's drilling data on the property.

NJN WR 5/10/85: Ernest Ahrens of Noranda reported he visited Mr. Smith owner of the Sheep Mountain Property (f) Yavapai County. Mr. Ahrens did not get to copy Utah International data. Apparently, Mr. Smith is worried that proliferation of the data may lead to claim jumping. A review of the drill logs indicated 150 million tons with the top of the main ore body 1500' below the surface.

AN ADDITIONAL 13 MICROFICHE CARDS CONTAINS GEOLOGIC GEOPHYSICS, DRILL, ASSAY AND LOCATION MAPS IS IN THE FILE

HEWLETT MANAGEMENT
7051 No. Oracle Road
Casas Adobes Center
Tucson, Arizona

☆ Exploration
☆ Mineral Property Evaluation

Office
297-2871 — 682

October 29, 1966

SHEEP MOUNTAIN COPPER DEPOSIT

Summary

1. Minerals:
   - A. Chalcocite
   - B. Chalcopyrite
   - C. Bornite
   - D. Covellite
   - E. Some azurite and malachite
   - F. Native Cu
   - G. MoS_2
   - H. Pyrite
2. Type of deposit:

   Copper and moly mineralization in faulted complex of granites, diorites, diabase, ~~genesis~~ gneiss and porphyry. It is about 1500 feet to the top of the ore zones. The ore zone is about 1100 feet thick and is vertically continuous for block caving.

3. Ore Reserves (computed by RFH):

   A. Grade

      Cu = 0.4913

      MoS_2 = 0.077

      Copper Equivalents (4-6:1) 0.30-0.88

   B. Tonnage

      159,063,465 tons ore

4. Terms (Proposed by Owners):

   A. Initial $50,000 payment for work option of 6 months

   B. Advance minimum royalty of $50,000 per 6 months .

   C. Royalty of 5% net smelter return for life of property.

   D. No end price.

HEWLETT MANAGEMENT
7051 No. Oracle Road
Casas Adobes Center
Tucson, Arizona
Phone
297-2071 — 602

☆ Exploration
☆ Mineral Property Evaluation

October 29, 1966

Details

1. Sheep Mountain is being presented by R. F. Hewlett (consultant)

2. The Sheep Mountain deposit has been presented to R. F. Hewlett by;

   A. Ralph Davis
   528 South Extension Road
   Mesa, Arizona
   (602)-969-0300
   B. K. P. Smith
   120 South Extension Road
   Mesa, Arizona

3. Owners of the property are Mr. Ralph Davis and K. P. Smith described above.

4. There are 173 federal claims and 1 1/2 sections of state leases in the Sheep Mountain property. The state land are sections 16 and the east 1/2 of section 9.

5. Claim locations - see maps 1 & 2

6. There has been no past production.

7. The previous work on the property was performed by the Phelps Dodge Corporation - who staked most of the claims, performed geochemical, geophysical & geological work and did drilling - then dropped their option and the claims and data reverted back to the original owners.

Data

1. Geological

   A. Surface map (map 3)

   B. Geology for core (not included) but summarized on assay logs.

2. Geophysical

   A. Traverse lines shown on map 3

   B. Induced polarization and resistivity data shown in figures 1-14.

3. Geochemical

   A. Locations shown in map 3

   B. Geochemical values shown on following page - letter

4. Assay

   A. Assays and composite geology in following pages (drill holes 1-44)

Consultants Evaluation

1. Computed ore reserves:

The ore reserves were computed by compositing the assay data into 50 foot vertical levels (bottom elevations 2750 to -550). The mineralized zone however is between 1000 and -100 feet elevation. Copper and MoS_2 values were treated using a copper equivalence. The ore outlines are shown in plate 1. The computed ore reserves are shown in Tables 1 and 2.

2. Value of deposit - financial:

Costs at San Manuel for block caving;

Total Mining $1.50-$1.68, (11/7/66)

where maximum cost is 12¢/# recovered Cu and for their grade of 0.70;

$$\left(\frac{14\#}{\text{Ton}}\right)\left(\frac{12¢}{\#}\right) = \$1.68/\text{Ton}.$$

Therefore, costs are estimated:

Underground mining	$1.50-2.25/ton
Milling	0.69/ton
General Administrative	0.40/ton
Smelting, Freight & Refining	9¢/# recv. Cu

Therefore, the range is $2.30-$3.34 for Mining, Milling, and General.

2. Value of deposit - financial (cont.):

Gross value of the deposit is (at 93% recovery):

(159,063,465)(0.799)(18.60)($0.35) =
$851,006,080.30

based on a copper equivalents grade of 0.799% Cu or $5.3501 per ton of ore at 36¢ Cu.

Within practical limits the cost per pound of recovered copper (moly in Cu equivalents) is:

$$\frac{\text{Mining, Milling \& General + \$0.09 / \# recovered Cu (Grade Ore)(18.63)}}{\text{Ton Ore}}$$

Mining Cost Per Ton Ore	Production Cost per lb. of Recovered Cu	Gross Profit per lb. Revocered Cu.
1.50	26.40¢	9.60¢
1.70	27.81¢	8.19¢
2.25	31.44¢	4.56¢

Using 8.19¢ gross profit, the overall expected net profit should be at least 4¢ per pound, rea izing that initial year taxes would be small due to the Allowable write-off, such as:

1. Pre-production expenses
2. Development
3. Capital acquisitions
4. Depletion
5. Depreciation, etc.

For the ore tonnage (159,063,465 tons), using a copper recovery of 93% and a copper equivalents grade of 0.799, the ore runs 14.3614# Cu per ton, or: 2,363,905,779 # Cu. At 4¢ per pound average profit the net profit is: $9,455,623,116.

Note: Copper equivalents computation

1. Mo selling price = $1.50-1.74 #
2. Cu selling price = 36¢/#
3. Mo= 0.67 MoS_2
4. MoS_2 is not smelted and therefore saves about an equivalent of 6¢/# copper.

2.. Value of deposit - Financial (cont.):

From the above, the ratio is about 4.67:1. Bear Creek Mining Company (Kennecott) stated that they are presently using 5:1, and that 4:1 was toconservative. However, note I used 4:1.

3. Conclusions:

A. Proven ore tonnage

B. Good potential in west part of property

C. Good potential on state land

D. Good potential on patented ground interior to claims.

4. Recommendations:

A. Review of my report, assumptions, and calculations

B. Offer a reduced sum for the deposit;

Basis:

Assuming the deposit will be mined;

Year	Capital Required	Activity
1	$ 200,000	Exploration - drilling
2	800,000	Exploration - drilling
3	25,000,000	Shaft sinking & underground development
4	40,000,000	Underground development & mill construction
5	40,000,000	Underground development & smelter
	$ 106,000,000	

This corresponds to the capital requirements for San Manuel, which was $109,000,000. The general breakdown was:

Mill & Smelter - - - - - - -	$50,000,000
Underground Development - -	59,000,000
	$109,000,000

The government loaned $70,000,000 and San Manuel carried the remaining $39,000,000. However, insurance companies as Prudential - repaid the government loan ($70 million) and presently carries that portion of the loan. Therefore, I would suggest the following terms to the owners:

Time	Money Paid by OXY
0-Initial	$15,000 for initial work option for 3 months
End 3 months	$25,000 for 6 months
End 9 months	$10,000 for 3 months
End first year (Total).....	$50,000 for year
Expected first year costs (Total)	$250,000 for year
Second year till production	$40,000 per year

Production:

4% N.S.R. to 1,000,000

3% N.S.R. to 2,000,000

2% N.S.R. to 3,000,000

1% N.S.R. to 4,000,000

½% N.S.R. to 5,000,000

TABLE 1. Computation of Average Cu and MoS_2 Grades and Confidence Limits for Sheep Mountain.

LEVELS	COPPER		MoS_2	
	Averace	95% Confidence Interval	Average	95% Confidence Interval
1000 to -100	0.4913	0.437-0.546	0.077	0.064 - 0.090

TABLE 2. Computation of Copper Equivalents for Cu - MoS_2 Values

LEVELS	AVERAGE COPPER	AVERAGE ~~MOLY~~ MoS_2	COPPER EQUIVALENTS FACTOR (for Mo) 4.1	5.1
1000 to -100	0.491	0.077	0.799 ~~incorrect for Mo~~	0.873
		average Mo: 0.046	0.185 + 0.491 = 0.676	0.230 + 0.491 = 0.721

TABLE 3. Tonnage and [illegible] Limit Grades by Level for Sheep Mountain

Level	Total Tonnage	Lower Limit, 95% Confidence		Rock Type
		Average Grade/Ton Cu	Average Grade/Ton MoS_2	
1000	2,382,281.66	0.086	0.130	Granite
950				
900	2,813,160.70	0.326	0.034	Faulted Granite
850				
800	6,450,373.33	0.353	0.065	Granite Genesis & Faulted Granite Porphyry
750	9,263,333.34	0.362	0.023	Faulted Granite - Granite Genesis
700	4,597,606.50	0.198	0.070	Diorite - Granite Comp.
650	6,175,889.33	0.388	0.083	Granite - Diorite Genesis & Granite Porphyry
600	3,013,323.66	1.627	0.006	Faulted Granite Porphyry
550	11,734,194.20	0.623	0.061	Diorite & Granite Genesis Granite Prphy / Meta-Diorite
500	12,694,803.63	0.354	0.063	Diorite - Granite Cop. Faulted Granite Porphyry Faulted Meta-Diorite
450	12,626,262.63	0.316	0.048	Granite Porphyry Faulted Granite & Diorite
400	12,21[illegible],536.67	0.454	0.076	Granite Genesis Faulted Diorite
350	11,802,310.71	0.395	0.075	Granite Complex Diorite & Faulted Diorite
300	10,293,143.67	0.361	0.053	Diabase / Granite Genesis Meta-Diorite

TABLE 2. (page 2)

Level	Total Tonnage	Lower Limit, 95% Confidence: Average Grade/Ton Cu	Lower Limit, 95% Confidence: Average Grade/Ton MoS_2	Rock Type
250	9,575,559.95	0.395	0.063	Faulted Genesis & Diorite, Diabase
200	10,842,116.78	0.348	0.057	Faulted Genesis & Diorite & Diabase
150	5,489,679.41	0.436	0.074	Faulted Genesis & Diorite
100	6,244,510.33	0.402	0.092	Granite Genesis & Diorite
+50	5,626,921.37	0.392	0.033	Granite, Diorite Genesis & Faulted Diorite
0	5,489,679.41	0.359	0.074	Faulted Diorite Genesis & Diorite
-50	5,626,921.37	0.228	0.070	Faulted Granite & Diroite -- Diroite --
-100	3,499,670.62	0.130	0.130	Diorite
TOTALS:	159,063,465.02	0.437	0.064	

SHEEP MOUNTAIN PROJECT

YAVAPAI COUNTY, ARIZONA

CERTIFICATE OF ASSAY

HOLE SM-44

Footage Interval	% Copper	Av. Cu. 50 Foot Interval	Composite Assays 50 Foot Interval % MoS_2	% Sulfur	Oz. Gold	Oz. Silver
1972 - 1977	0.210					
1977 - 1982	0.240					
1982 - 1992	0.160					
1992 - 2002	0.095					
2002 - 2012	0.105					
2012 - 2022	0.105	0.138				
2022 - 2032	0.114					
2032 - 2042	0.093					
2042 - 2052	0.130					
2052 - 2062	0.140					
2062 - 2072	0.130	0.121				
2072 - 2082	0.130					
2082 - 2092	0.120					
2092 - 2102	0.100					
2102 - 2112	0.130					
2112 - 2122	0.130	0.122				
2122 - 2132	0.093					
2132 - 2142	0.110					
2142 - 2152	0.093					
2152 - 2162	0.093					
2162 - 2172	0.170	0.112				
2172 - 2182	0.120					
2182 - 2192	0.150					
2192 - 2202	0.084					
2202 - 2212	0.093					
2212 - 2222	0.120	0.113				
2222 - 2232	0.084					
2232 - 2242	0.100					
2242 - 2252	0.093					
2252 - 2262	0.240					
2262 - 2272	0.047	0.113				

Footage Interval	% Copper	Av. Cu. 50 Foot Interval	Composite Assays 50 Foot Interval			
			% MoS_2	% Sulfur	Oz. Gold	Oz. Silver
2272 - 2282	0.075					
2282 - 2292	0.056					
2292 - 2302	0.056					
2302 - 2312	0.075					
2312 - 2322	0.065	0.065				
2322 - 2332	0.066					
2332 - 2342	0.103					
2342 - 2352	0.065					
2352 - 2362	0.130					
2362 - 2372	0.075	0.088	0.018	2.34	-	-
2372 - 2382	0.103					
2382 - 2392	0.166					
2392 - 2402	0.122					
2402 - 2412	0.112					
2412 - 2422	0.143	0.127	0.018	2.74	-	-
2422 - 2432	0.112					
2432 - 2442	0.149					
2442 - 2450	0.067	0.112	0.032	2.61		

Total Depth 2450'

ATTACHMENT

Phelps Dodge data

IP results and geochem (map)	1" = 1000'
Geology map Sheep Mtn Project	1" = 1000'
Geophysical coverage (index map)	1" = 1000'
Induced polarization and resistivity, Figs 1 through 14 inclusive	1" = 1200'
Copy of drill logs Sheep Mts Project	

Richard F. Hewlett & Assoc. Evaluation Oct. 1966

Utah International data

Sheep Mtn Project drill logs	RC-UC - 1, 2, 3
Sheep Mtn Project drill logs	RC-UC - 5, 15, 17
Sheep Mtn Project drill logs	RC-UC - 18, 21, 22
Sheep Mtn Project drill logs	RC-UC - 16, 19, 20
Notice to Terminate	Nov. 16, 1982
Notice of Abandonment of certain unpatented mining claims	
2 each drill hole maps	1" = 2000'

The drill hole locations and roads were surveyed by Robert Shaw Engineering Company. The owners have not received the engineering data.

ORCANA RESOURCES LIMITED

news release

405 - 121 Richmond Street West•Toronto•Ontario•M5H 2K1

February 1, 1993

YAMANA ?

SUMMARY

CASTLE COPPER PROPERTY - DRILL HOLE CC-2 ENCOUNTERS 706 FEET OF CU-MoS_2 MINERALIZATION BETWEEN 1893.8 - 2600.0 FEET, STOPPING IN CU-MoS_2 MINERALIZATION. BOTH HOLES CC-1 AND CC-2 CONFIRM BOURNE'S MINERAL INVENTORY AND SUGGEST ZONE CONTINUES A FURTHER 10,000 FEET WHICH COULD TRIPLE PRESENT MINERAL INVENTORY.

HIGHER GRADE INTERCEPTS IN HOLE CC-2

•Copper Blanket Zone
18.4 feet grading 1.55% Cu Equiv., or 33.0 feet 1.09% Cu Equiv.

•Primary Copper Zones
323 feet grading 0.42% Cu Equiv.

Include: 24.0 feet grading 0.52% Cu Equiv.
20.0 feet grading 0.47% Cu Equiv.
32.0 feet grading 0.54% Cu Equiv.
39.0 feet grading 0.66% Cu Equiv.
25.0 feet grading 0.56% Cu Equiv.

OTHER ACQUISITIONS IN PROGRESS:

- A LARGE OPEN PIT PORPHYRY COPPER DEPOSIT OUTSIDE CANADA
- FOUR LARGE KIMBERLITE PIPES IN THE U.S.A.

The Board of Directors is pleased to announce the completion of a two drill hole program. Results of hole CC-2 are described below and highlighted in Table 1.

This initial drilling program has confirmed Bourne's geological assessment of mineral inventory in which Mr. Bourne projected a tabular enriched copper-bearing body continuous between holes rather than a complex of moderately dipping enriched copper-bearing shears or channels. Mr. Bourne estimates mineral inventory at 39.4 million tons grading 1.27% Cu and 0.04% MoS_2 (1.40% Cu Equiv.) and Watts Griffis and McOuat (WGM) at 28.0 million tons grading 1.6% Cu and 0.04% MoS_2 (1.72% Cu Equiv.)

At the recommendation of Mr. Bourne drill holes, CC-1 and CC-2, were located in the vicinity of a previous drill hole SM-39, where the enriched copper blanket is known to be thinner. Drilling has yet to be carried out in the vicinity of the thickest portion of the enriched copper blanket encountered in hole SM-20 where 120 feet grading 1.70% Cu and 0.038% MoS_2 (1.81% Cu Equiv.) was intersected.

Drill hole CC-2, sited 400 feet southeast of hole SM-39, encountered an enriched copper blanket running 1.00% Cu and 0.029% MoS_2 (1.10% Cu Equiv.) over a thickness of 33 feet. Within this a 18.4 foot section ran 1.49% Cu and 0.19% MoS_2 (1.55% Cu Equiv.) A 74 foot section above this copper blanket, between 1997 and 2071 feet, appears to have been locally oxidized and leached. The enriched copper zone in CC-2 correlates well with the copper blanket reported in hole SM-39 reported to run 1.66% Cu and 0.048% MoS_2 (1.80% Cu Equiv.) over 30 feet.

A correlation of Orcana's drilling results with those of previous workers and reported for the first time in a News Release dated November 13, 1992, suggests that the main enriched copper blanket continues westerly following the rim of the intrusive both along its north and south boundaries for a combined distance of about 10,000 feet. If such is the case there is an excellent possibility of tripling Bourne's present mineral inventory through additional exploratory drilling.

Planning is underway for a second phase drilling program which will test the continuation of the supergene/hypogene copper mineralization in the vicinity of hole SM-20 and to the northwest and southwest of the main copper zone where drilling could triple of the present mineral inventory.

On other fronts, Orcana is currently negotiating an option agreement to acquire a significant open-pit porphyry copper deposit located outside of Canada.

TABLE 1

DRILL HOLE CC-2 - ASSAY RESULTS

Interval - Feet	Length - Feet	% Cu	% MoS_2	% Cu Equiv
0-1893.8	1893.8 - Flat Lying Tertiary Volcanics			
1893.8 - 2600.0	706.2	0.27	0.033	0.37
Enriched Copper Blanket				
1997.4 - 2104.0	106.6	0.51	0.016	0.56
Includes				
2071.0 - 2104.0	33.0	1.00	0.029	1.09
or				
2071.0 - 2089.4	18.4	1.49	0.019	1.55
Lower Hypogene Zones				
2277.0 - 2600.0	323.0	0.27	0.051	0.42
Includes				
2277.0 - 2301.0	24.0	0.18	0.113	0.52
2339.0 - 2359.0	20.0	0.14	0.11	0.47
2404.83 - 2437.0	32.2	0.35	0.064	0.54
2482.0 - 2521.0	39.0	0.54	0.039	0.66
2574.7 - 2600.0	25.3	0.40	0.054	0.56

ORCANA RESOURCES LIMITED

news release

Suite 405 - 121 Richmond Street West
Toronto, Ontario • M5H 2K1
Telephone (416) 364-2015

November 13, 1992

CASTLE COPPER PROPERTY - DRILL HOLE CC-1A ENCOUNTERS 774 FEET OF CU-MoS_2 MINERALIZATION BETWEEN 1776-2550 FEET, STOPPING IN CU-MoS_2 MINERALIZATION. IT CONFIRMS SUPERGENE COPPER BLANKET IS CONTINUOUS AND ENHANCES CONFIDENCE IN MINERAL INVENTORY. IT ALSO SUGGESTS ENRICHED COPPER ZONE EXTENDS FURTHER 5-7000 FEET WESTERLY BOTH ALONG THE NORTH AND SOUTH RIM OF THE INTRUSIVE.

HIGHER GRADE INTERCEPTS ARE:

Copper Blanket Zone
48.6 ft. grading 1.20% Cu Equiv, or 114.0 ft. 0.97% Cu Equiv

Primary Copper Zones
36.5 ft. grading 1.11% Cu Equiv, or 165.0 ft. 0.75% Cu Equiv
74.3 ft. grading 0.64% Cu Equiv

The Board of Directors is pleased to announce the results of Hole CC-1A completed to test the Castle Copper deposit located 50 miles northwest of Phoenix, Arizona. Total depth of hole is 2550 feet with the lower 774 feet being Cu-MoS_2 bearing-the hole was stopped in Cu-MoS_2.

The geological information obtained from Hole CC-1A is extremely positive in that it not only indicates that Bourne's geological assessment of the mineral inventory is correct but that the main enriched copper blanket in all likelihood continues westerly following the rim of the intrusive both along its north and south boundaries for a distance of 5-7000 feet.

The enriched copper blanket appears to lie within and outward from a higher grade molybdenite zone which borders the intrusive.

The substantial tonnage of primary copper molybdenum mineralization below the main supergene enriched blanket is immense as shown by results from Hole CC-1A and is estimated to hold about 150 million tons grading 0.54% Cu, 0.077% MoS_2 (0.78% Cu Equiv) (see Table 2 for details). The possibility of adding substantially to both the current mineral inventory of enriched sulphide copper molybdenum as well as that of lower primary copper molybdenum along the westerly rim of the intrusive is extremely promising, possibly expanding these reserves by a factor of 3.

The Castle Copper Property was acquired by Orcana. Mr. Don Bourne, an independent geological consultant, evaluated the property and completed a mineral inventory on the deep, flat lying supergene copper (chalcocite) molybdenum blanket utilizing available geological data and results of five widely spaced drill holes. The blanket is at a depth of about 2,000 feet. The mineral inventory outlined by Mr. Bourne is as follows:

	TONS	% Cu	% MoS_2
PROVEN	15,002,232	1.17	0.047
PROBABLE	14,070,869	1.17	0.047
SUBTOTAL	29,073,101	1.17	0.047
POSSIBLE	10,361,383	1.55	0.037
TOTALS	39,434,484	1.27	0.044

Watts, Griffis and McOuat (WGM) recently completed a preliminary economic valuation of the main supergene copper blanket and results were very favourable. After reviewing Bourne's mineral inventory WGM estimated a drill indicated mineral inventory of about 28.1 million tons grading 1.6% Cu and 0.04% MoS_2 by concentrating on the chalcocite rich zone.

Mr. Bourne further assumed that these five intersections represented a tabular body continuous between drill holes rather than a complex of enriched shear zones or channels. Mr. Bourne recommended a program of fill-in drilling, the first phase to consist of two holes, each 2550 feet in length.

The first drill hole of Phase One intersected the supergene sulphide copper blanket at the predicted depth of 1960 feet, confirming that the intercept represents a tabular body continuous between drill holes rather than a complex of enriched shear zones or channels. Thus, the confidence level in the tabulated mineral inventory stated above has been greatly enhanced.

The hole intercepted, as shown in Table 1, 26.6 feet of 1.12% Cu, 0.07% MoS_2 (1.33% Cu Equiv), or 48.6 feet of 0.91% Cu, 0.10% MoS_2 (1.20% Cu Equiv), or 114.0 feet of 0.74%, 0.076% MoS_2 (0.97% Cu Equiv). The higher grade molybdenite encountered in CC-1A has enhanced the overall molybdenite values of the mineral inventory.

The sulphide mineralization encountered in the hole consists primarily of chalcocite, chalcopyrite and molybdenite. Pyrite occurs sporadically in minor amounts. Thus, it is likely that the copper concentrate will be of premium quality, grading possibly in the 30 - 35% range. This will command a much lower smelting charge per pound of copper processed.

ON BEHALF OF THE BOARD

Raymond J. Mongeau
Vice President & Director

For further information contact:

Mr. Raymond J. Mongeau, Vice President & Director, (416) 364-2015

THE INFORMATION CONTAINED IN THIS RELEASE WAS PREPARED BY RAYMOND MONGEAU FOR THE COMPANY. THE VANCOUVER STOCK EXCHANGE HAS NEITHER APPROVED NOR DISAPPROVED OF THE INFORMATION CONTAINED HEREIN.

ORCANA RESOURCES LIMITED

CASTLE COPPER PROPERTY
ASSAY RESULTS

TABLE 1

Drill Hole CC-1A Total Depth - 2550 ft

Interval - ft	Thickness - ft	
0 - 1776.0	1776.0	- flat lying tertiary volcanics
1776.0 - 1960.0	184.0	- Oxide Zone - leached upper 100 feet, lower 84 ft average 0.25% Cu

Enriched Chalcocite Blanket

Interval - ft	Thickness - ft	% Cu	% MoS_2	% Cu Equiv
1960.0 - 2074.0	114.0	0.74	0.076	0.97
Within: 1999.0 - 2047.6	48.6	0.91	0.10	1.20
Within: 2021.0 - 2047.6	26.6	1.12	0.07	1.33

Lower Hypogene Zones

Interval - ft	Thickness - ft	% Cu	% MoS_2	% Cu Equiv
2040.3 - 2306.0	165.7	0.55	0.067	0.75
Within: 2177.8 - 2214.3	36.5	0.86	0.083	1.11
2475.7 - 2550.0	74.3	0.37	0.09	0.64

TABLE 2

Estimated Possible Mineral Inventory of Primary Copper Molybdenum Mineralization below the Supergene Enriched Blanket

Hole No.	Width - ft	% Cu	% MoS_2	% Cu Equiv
SM-20	100.0	0.53	0.078	0.76
	290.0	0.46	0.086	0.72
SM-39	40.0	0.50	0.05	0.65
	40.0	0.50	0.041	0.62
RC-UC-1	180.0	0.44	0.044	0.57
	32.0	0.82	0.043	0.95
	31.0	0.41	0.076	0.64
CC-1A (recent)	165.0	0.55	0.067	0.75
	74.3	0.37	0.090	0.64
Average Thickness	213.0	0.543	0.077	0.78

Possible Tonnage: 213.0' x 1,000' x 5,000' = 107,500,000 Tons

TABLE 3

Estimated Possible Mineral Inventory West of the Main Enriched Copper (Chalcocite) Blanket

1. This area is west of DDH-RC-UC-1 and rims the northwest side of the intrusive for a distance of 7000 feet

An area immediately north of RC-UC-17 covering 1000 ft x 5000 ft and possibly 400 feet in total thickness is an excellent target to explore for a potential 150,000,000 million tons of combined supergene enriched and primary copper mineralization. Note previous drilling did not test this favourable area.

DDH-UC-17 reports exceptionally high molybdenite values and numerous weak supergene enriched copper zone within the rim of the intrusive and this suggests that a prominent copper zone likely exists immediately to the north of UC-17 rimming this higher grade molybdenite zone.

Table 3 cont'd

Intercept - Thickness ft	% Cu	% MoS_2	% Cu Equiv
820.5	0.31	0.10	0.61
Better Intercepts:			
52.0	0.29	0.182	0.84
29.5	0.56	0.083	0.81
Within: 8.27	0.95	0.192	1.53
59.3	0.51	0.05	0.65
64.7	0.65	0.083	0.90
115.0	0.21	0.167	0.71
73.0	0.20	0.167	0.71

2. An area 5000 feet southwest of Hole PD-20, rimming the south side of the intrusive, near Holes PD-13 and PD-19.

Holes PD-29, PD-13 and PD-19 intercepted narrow, weak supergene chalcocite zones and higher MoS_2 values suggesting that those holes are located too far north within the intrusive but close to a copper enriched zone. An area south of these holes, not covered by previous drilling, may contain between 15 - 20 million tons of supergene enriched copper and substantial tonnage of lower primary copper mineralization.

Drill Hole No.	Intercept ft.	Width ft.	% Cu	% MoS_2	% Cu Equiv
PD-29	-	10.0	0.84	-	
	-	50.0	0.53	0.05	0.68
	-	100.0	0.13	0.12	0.49
PD-13	1715 - 1735	20.0	0.85	0.096	1.14
	1915 - 2065	150.0	0.476	0.055	0.64
Within:	1945 - 1975	30.0	0.675	0.052	0.83
	2025 - 2045	20.0	0.70	0.066	0.90
	2215 - 2245	30.0	0.73	0.07	0.94
	2215 - 2265	50.0	0.613	0.07	0.82
PD-19	1704 - 1714	10.0	2.62	0.006	-
	1764 - 1794	30.0	.483	0.016	0.53

CAMBIOR

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Oct 18th, 93
DATE

DESTINATAIRE / DESTINATION

Michael Gustin
NOM / NAME

TÉLÉCOPIEUR / # TELECOPIER

Kemo
COMPAGNIE / COMPANY

EXPÉDITEUR / SENDER

Jean Boissonnault
NOM / NAME

1–819–825–0342
TÉLÉCOPIEUR / # TELECOPIER

Mesa File
Castle Copper
Yavapai Co, AZ
T 2 N, R 1 W Secs
10, 11, 14, 15, 17, 20–23

Thanks!

MESSAGE

30 pages
the rest will follow

NOMBRE DE PAGES INCLUANT CELLE–CI
NUMBER OF PAGES INCLUDING THIS ONE

BONNE JOURNÉE!
HAVE A NICE DAY!

Cambior Montréal – Téléphone: (514) 878–9166 – Télécopieur: (514) 878–3324
Télex: 055–60930

Copie FAX @ : M. Gustin

ORCANA
RESOURCES LIMITED

October 15, 1993

CAMBIOR EXPLORATION INC.
1075, 3e Avenue Est
C.P. 9999
Val d'Or, Quebec
J9P 6M1

ATTENTION: JEAN BOISSONNAULT, V.P. EXPLORATION

Dear Mr. Boissonnault;

RE: CASTLE COPPER PROPERTY

Please find enclosed, information pertaining to the Castle Copper Property as requested.

Yours very truly,

Barry Mchale per: Dan Crawford.

BARRY MCHALE
V.P. EXPLORATION

KBM/sc
encls.

121 Richmond Street West, Suite 405, Toronto, Ontario M5H 2K1
Tel: (416) 364-2015 Fax: (416) 364-2178

ORCANA
RESOURCES LIMITED

THE CASTLE COPPER PROPERTY

HISTORY OF THE CASTLE COPPER PROPERTY

The Southwest U.S.A., especially Arizona, is known to be richly endowed with exceptionally large and profitable porphyry copper deposits. Exploration for copper began in the latter half of the 1800's when demand for copper accelerated as a result of a rapidly expanding world industrial base. By the mid 1960's, Arizona was supplying over 60% of all copper produced in the United States.

The original claims of the Castle Copper property were staked in the 1960's by two Arizona prospectors who subsequently optioned the claims to the Phelps Dodge Corporation. Phelps Dodge carried out a substantial widely-spaced drilling program in the area and identified extensive porphyry type copper molybdenum mineralization, including a flat lying supergene chalcocite (copper) blanket at a vertical depth of approximately 2000 feet. Utah International Inc. (now merged with BHP Minerals) explored the area during the 1968-1981 period. Two new drill holes north of the Phelps Dodge drilling area extended the original northern limit of this supergene copper blanket. The northern and western extent of this deposit is still open. Utah International, unable to continue their option payments to the prospectors due to financial difficulties, relinquished the property.

The Castle Copper Corporation acquired the property by staking in 1990 and subsequently sold the property to Orcana Resources Limited. Mr. Mongeau gathered and reviewed the records of the Phelps Dodge Corporation and Utah International Inc. and he concluded that the property has significant economic potential which merits additional exploration expenditures. Upon completion of Mr. Mongeau's report, consulting geologist Donald A. Bourne was retained to carry out an estimate of ore reserves and grade and recommended further work. An independent geological and engineering firm, Watts, Griffis & McOuat Limited, was commissioned to carry out a preliminary economic evaluation of the property, based on the geological data and mineral inventory parameters set out by Mr. Bourne.

PURCHASE AGREEMENT

Orcana Resources Limited purchased 141 mining claims from Castle Copper Company, a private Arizona company owned by Messrs. Mongeau, Tait, Hartnett and Black, four directors of Orcana, at its cost. Castle Copper staked these claims in the summer of 1990 at a cost of $59,427.52. Castle Copper obtained technical geological information from BHP Utah, a major copper mining company that had done work on the property in the past. In exchange for providing the data, Castle Copper undertook to give BHP Utah a first right of refusal in the event that Orcana offers an interest in the property to a major mining company.

The agreement dated March 31, 1992, between Orcana Resources Limited and Castle Copper Company provides for the payment to Castle Copper the sum of $59,427.42, 50,000 common shares and a 3% Net Smelter Return Royalty. The agreement also provides that upon completion of the first phase of the work program recommended by Mr. Bourne that Orcana deliver to Castle Copper 50,000 common shares. Similarily, upon completion of the second phase of the work program recommended by Mr. Bourne, that Orcana will deliver to Castle Copper a further 100,000 common shares. Upon making a decision to put the property into production, Orcana must deliver to Castle Copper a further 400,000 common shares.

The agreement is structured in such a way that Castle Copper Company will receive the cost of staking and 50,000 shares of the company. The vendors will receive the bulk of their compensation if, as and when the property is put into production.

MINERAL INVENTORY AND ECONOMIC EVALUATION

The consulting firm of Watts, Griffis & McOuat (WGM) have completed a preliminary economic evaluation of the deposit employing a combination of their own mining/processing cost models, consulting geologist Bourne's mineral inventory estimate and estimated processing costs provided by EHA Engineering Ltd., a consulting metallurgical company. The results of WGM's evaluation are detailed in point form in Tables 1 and 2 in this report.

MINERAL INVENTORY

WGM's study indicates that the Castle Copper deposit contains a drill indicated mineral inventory of approximately 28,110,000 tons of chalcocite ore grading 1.6% Cu and 0.04% MOS2. The depth of the zone is 2000 feet. Additonal large tonnage of lower grade hypergene (primary) copper-molybdenum mineralization exists below the above indicated zone.

Bourne reports the drill indicated copper-molybdenum mineral inventory identified by four drill holes to date on the Castle Copper property occurs as a tabular continuous northwesterly striking zone. These four vertical drill holes that identified this enriched chalcocite blanket are widely spaced and are anywhere from 700-1000 feet apart. A major fill-in drilling program recommended by consulting geologist Donald Bourne is required to move these reserves to the proven category

ECONOMIC EVALUATION

According to WGM, it appears that the most economically attractive extraction method is the utilization of a room and pillar mining method with a double ramp access with one ramp for servicing the underground and the other ramp for production utilizing a conveyor system. Milling is to utilize the conventional flotation process. The cost of the double ramp is estimated at $8,000,000 and the cost of the conveyor system is estimated at $4,000,000.

Based on a production rate of 10,000 tons per day, or 2.5 million tons annually, the net present value (NPV) based on a very conservative discounted cash flow rate of 15% and after all taxes are taken into consideration, is US $44 million. At a production rate of 8,000 tons per day, or 2.0 million tons annually, the NPV declines to US $25 million. This supergene zone also contains 0.04% M_0S_2 (molybdenite) and revenue provisions for this metal are not included. Additionally, no revenue provisions derived from precious metal values are included although silver credits are expected. This economic model report indicates that an attractive 15% rate of return could be achieved at an average copper price of $0.94/lb. Revenues derived from production would support the 10,000 tons per day operation on a break even level at a copper price of $0.68/lb.

DRILLING PROGRAM AND MINERAL INVENTORY UPDATE

The Phase 1 drilling program on the Castle Copper property as recommended by Mr. Bourne and Watts, Griffis & McOuat, has begun and full consideration has been given regarding the implementation of a second phase major drilling program. Watts, Griffis & McOuat (WGM) recently completed a preliminary evaluation of the main supergene copper blanket after reviewing Bourne's mineral inventory. WGM estimated a drill indicated mineral inventory of about 28.1 million tons grading 1.6% Cu and 0.04% M_0S_2 by concentrating on the chalcocite rich zone.

INITIAL RESULTS OF PHASE I DRILLING PROGRAM

The first drill hole of the Castle Copper property CC-1A, is located between holes PD-20 and PD-39 on the eastern rim of the intrusive. Drilling encountered 774 feet of copper-molybdenite mineralization between 1776-2550 feet and stopped in modest copper molybdenite mineralization. It confirms that the supergene copper blanket is continuous and enhances the confidence in the mineral inventory.

As outlined in Table 3, the better intercepts are:

48.6 feet grading 1.20% Cu Equiv,
or 114.0 ft. 0.97% Cu Equiv

36.5 ft. grading 1.11 Cu Equiv,
or 165.0 feet 0.75% Cu Equiv

74.3 ft. grading 0.64% Cu Equiv

The hole intersected the supergene sulphide copper blanket at the predicted depth of 1960 feet, confirming that the intercept, as outlined by Donald A. Bourne, represents a tablular body continuous between drill holes rather than a complex of enriched shear zones or channels.

The geological information obtained from hole CC-1A is extremely positive: in relation to the results of previously drilled holes in the area, it indicates that Bourne's geological assessment of the mineral inventory is assured and that the main enriched copper blanket (with its underlying extensive primary copper sulphide zones) in all likelihood, continues westerly following the rim of the intrusive, both along its north and south borders for a distance of approximately 6000 feet. The higher grade molybdenite encountered in CC-1A has enhanced the overall molybdenite values of the mineral inventory.

The substantial tonnage of primary copper and molybdenum sulphide mineralization below the main supergene enriched copper blanket is immense as shown by results from hole CC-1A and other previous drill holes, and is estimated to contain the following mineral inventory:

MINERAL INVENTORY

	Tons	% Cu	$\%MoS_2$	% Cu Equiv
MAIN SUPERGENE ZONE				
Drill Indicated	35,000,000	1.60	0.045	
PRIMARY COPPER ZONE				
Below Main Supergene Blanket				
Drill Indicated	108,000,000*	0.50	0.077	
TOTAL	128,000,000	0.84	0.070	0.97 E
SUPERGENE AND PRIMARY COPPER ZONE				
Northwest side of Intrusive, Near Hole UC-17				
Potential	150,000,000**	0.84	0.070	1.05 E
SUPERGENE AND PRIMARY COPPER ZONE				
Southwest side of Intrusive, near Holes PD-13 and PD-19				
Potential	150,000,000**	0.84	0.070	1.05 E
TOTAL	428,000,000	0.84	0.70	1.05 E

* See Table 4 for details ** See Table 5 for details

Table 6 compares the projected production, operating costs and operating profit at Castle Copper based on the production schedule of the main supergene copper blanket and the underlying lower grade primary copper zone with that of a similar underground mine in Arizona, namely the San Manuel Copper Mine owned by Magma Copper Company.

This comparison table reveals that Castle Copper would benefit most by establishing a larger underground operation even though the average ore grade of the mineral inventory will be much lower. Thus, it would be most appropriate for management to proceed with an exploration program to establish additional reserves prior to committing further funds to a fill-in drilling program on the main supergene zone.

In order to maintain its aggressive long term goal of developing into a major mining concern, Orcana Resources Limited will continue its strategic acquisition program. At the time of publication, management has started negotiating an agreement for the acquisition of a large porphyry type copper property in Senora, Mexico.

CASTLE COPPER PROPERTY, YAVAPAI COUNTY, ARIZONA, U.S.A.

TABLE 1

RESULTS OF A PRELIMINARY ECONOMIC EVALUATION BY THE CONSULTING FIRM OF WATTS GRIFFIS & MCOUAT LIMITED, TORONTO, ONTARIO, CANADA

(1) 40 million tons of ore grading 1.6% Cu and 0.04% MoS_2 based upon results by Mr. Don Bourne, an independent geological consultant.

(2) Continuity of grade and the average thickness of mineralization.

(3) Room and pillar mining method. Ore extraction recovery of 85%.

(4) 10% dilution of ore reserves at 0% grade.

(5) Optional production rate of (a) 8,000 tons per day, equivalent to 2.0 million tons per year or (b) 10,000 tons per day equivalent to 2.5 million tons per year.

(6) Utilization of two 12,000 foot ramps, one for access and the other for conveyor haulage, separated by 100 feet horizontally with cross cuts every 400 feet; ramp and cross cut dimension is 20 ft. x 15 ft.; 1800 foot vertical depth from portal evaluation to mineralization; grade of ramp = 15%.

(7) Access to and clearing of mine and mill sites in place.

(8) Processing method used – sulphide flotation. Cost estimate by the metallurgical consultant firm of EHA Engineering. Flotation concentrate grade % Cu – 30; flotation recovery of copper % – 88.

(9) 150 miles to the nearest custom smelter.

(10) Applicability of capital and operating costs estimates derived from power curves.

(11) Three (3) year pre-production period.

(12) 100% equity financing.

(13) Combined State and Federal Tax rate of 20% for production years 1-3 years and 51% thereafter.

(14) Discounted Cash Flow Rate of 15% used in estimating Net Present Value (NPV).

(15) Average metal price of US $1.20/lb copper and US $2.10/lb molybdenite (F.O.B. – mill).

CASTLE COPPER PROPERTY, YAVAPAI COUNTY, ARIZONA, U.S.A.

TABLE 2

RESULTS OF A PRELIMINARY ECONOMIC EVALUATION BY THE CONSULTING FIRM OF WATTS GRIFFIS & MCOUAT LIMITED, TORONTO, ONTARIO, CANADA

CAPITAL AND OPERATING COSTS ESTIMATES AND NET PRESENT VALUE

Based upon the parameters outlined under Table 1, Watts Griffis and McOuat summarizes below the estimated capital and operating costs based on two differing production rates, one being 8,000 tons per day (2.0 million tons per year) and the other 10,000 tons per day (2.5 million tons per year):

Economic Model Cost Parameters
– 2.0 Million Tons Per Year –

Mine		Mill		Total	
Capital	Operating/ton	Capital	Operating/ton	Capital	Operating/ton
$48,817,000	$5.60	$43,212,000	$4.30	$87,029,000	$9.90

– 2.5 million Tons Per Year –

Mine		Mill		Total	
Capital	Operating/ton	Capital	Operating/ton	Capital	Operating/ton
$50,603,000	$5.40	$49,403,000	$4.00	$100,006,000	$9.40

CASTLE COPPER PROPERTY

ASSAY RESULTS

TABLE 3

Drill Hole CC-1A Total Depth – 2550 ft

Interval – ft	Thickness – ft
0 – 1776.0	1776.0 – flat lying tertiary volcanics
1776.0 – 1960.0	184.0 – Oxide Zone – leached upper 100 feet, lower 84 ft average 0.25% Cu

Enriched Chalcocite Blanket

Interval – ft	Thickness – ft	% Cu	% MoS_2	% Cu Equiv
1960.0 – 2074.0	114.0	0.74	0.076	0.97
Within:				
1999.0 – 2047.6	48.6	0.91	0.10	1.20
Within:				
2021.0 – 2047.6	26.6	1.12	0.07	1.33

Lower Hypogene Zones

Interval – ft	Thickness – ft	% Cu	% MoS_2	% Cu Equiv
2140.3 – 2306.0	165.7	0.55	0.067	0.75
Within:				
2177.8 – 2214.3	36.5	0.86	0.083	1.11
2475.7 – 2550.0	74.3	0.37	0.09	0.64

CASTLE COPPER PROPERTY

ASSAY RESULTS

TABLE 4

Estimated Possible Mineral Inventory of Primary Copper Molybdenum Mineralization below the Supergene Enriched Blanket

Hole No.	Width - Ft	% Cu	% MoS_2	% Cu Equiv
SM-20	100.0	0.53	0.078	0.76
	290.0	0.46	0.086	0.72
SM-39	40.0	0.50	0.05	0.65
	40.0	0.50	0.041	0.62
RC-UC-1	180.0	0.44	0.044	0.57
	32.0	0.82	0.043	0.95
CC-1A (recent)	165.0	0.55	0.067	0.75
Average Thickness	187.0	0.55	0.077	0.73

Possible Tonnage: 211.8' x 1,000' x 5,000' = 107,500,000 Tons

CASTLE COPPER PROPERTY

ASSAY RESULTS

TABLE 5

Estimated Possible Mineral Inventory West of the Main Enriched Copper (Chalcocite) Blanket

1. This area is west of DDH-RC-UC-1 and rims the northwest side of the intrusive for a distance of 7000 feet

An area immediately north of RC-UC-17 covering 1000 ft x 5000 ft and possibly 400 feet in total thickness is an excellent target to explore for a potential 150,000,000 million tons of combined supergene enriched and primary copper mineralization. Note previous drilling did not test this favourable area.

DDH-UC-17 reports exceptionally high molybdenite values and numerous weak supergene enriched copper zone within the rim of the intrusive and this suggests that a prominent copper zone likely exists immediately to the north of UC-17 rimming this higher grade molybdenite zone.

Intercept – Thickness ft	% Cu	% MoS_2	% Cu Equiv
820.5	0.31	0.10	0.61
Better Intercepts:			
52.0	0.29	0.182	0.84
29.5	0.56	0.083	0.81
Within: 8.27	0.95	0.192	1.53
59.3	0.51	0.05	0.65
64.7	0.65	0.083	0.90
115.0	0.21	0.167	0.71
73.0	0.20	0.167	0.71

2. An area 5000 feet southwest of Hole PD-20, rimming the south side of the intrusive, near Holes PD-13 and PD-19.

Holes PD-29, PD-13 and PD-19 intercepted narrow, weak supergene chalcocite zones and higher MoS_2 values suggesting that those holes are located too far north within the intrusive but close to a copper enriched zone. An area south of these holes, not covered by previous drilling, may contain between 15 - 20 million tons of supergene enriched copper and substantial tonnage of lower primary copper mineralization.

Drill Hole No.	Intercept ft.	Width ft.	% Cu	% MoS_2	% Cu Equiv
PD-29	—	10.0	0.84	—	
	—	50.0	0.53	0.05	0.68
	—	100.0	0.15	0.12	0.49
PD-13	1715 – 1735	20.0	0.85	0.096	1.14
	1915 – 2065	150.0	0.476	0.055	0.64
Within:	1945 – 1975	30.0	0.675	0.052	0.83
	2025 – 2045	20.0	0.70	0.066	0.90
	2215 – 2245	30.0	0.73	0.07	0.94
	2215 – 2265	50.0	0.613	0.07	0.82
PD-19	1704 – 1714	10.0	2.62	0.006	—
	1764 – 1794	30.0	.483	0.016	0.53

TABLE 6

THE CASTLE COPPER DEPOSIT

COMPARING CASTLE COPPER'S PROJECTED PRODUCTION, OPERATING COSTS AND OPERATING PROFIT WITH THAT OF THE UNDERGROUND SAN MANUEL MINE OF THE MAGMA COPPER COMPANY.

– Dollars in US Funds –

PRODUCTION AND COST DATA	SAN MANUEL	CASTLE COPPER STATUS 1*	CASTLE COPPER STATUS 2**
Ore Reserves (Million Tons)	400	40	360
Mine Life – years	25	16	25
Grade	0.71% Cu	1.60% Cu 0.044% $Mo S_2$	0.84% Cu 0.07% $Mo S_2$ 1.00% Cu Equiv
Tons – Mining/day	45,000	10,000	40,000
Mining/year	16.0 million	2.5 million	14.4 million
Tons – Milling/day	45,000	7,000	40,000
Milling/year		2.5 million	14.4 million
Mining Method	Block Caving	Room & Pillar	Block Caving and Room and Pillar
Mining Dilution	10%	10%	10%
Milling Recovery	90%	90%	90%
Concentrate Grade: % Cu	29.5	30.0	30.0
Smelter Recovery: % Cu	96.5	95.0	95.0
Total Operating Cost/ton	$5.95	$9.40	$7.35
– Direct Mining/ton	$3.65	$5.40	$4.60
Milling/ton	$2.30	$4.00	$2.75
Smelting & Refining Cost/ton	$1.83	$2.30	$2.30
Precious Metal Recovery/ton	$0.20	$0.20	$0.20
PROJECTED REVENUE AND OPERATING PROFIT			
Annual Revenue[1]/ton	$11.50	$24.20	$15.25
Less Cost/ton	7.78	11.20	9.65
Operating Profit/ton	$ 3.72	$13.00	$ 5.60
Annual Operating Profit	$59.0 million	$32.5 million	$80.6 million

[1]Based on a Copper price – $1.00 US per lb
Based on $Mo S_2$ price – $2.50 US per lb
*Based on Watts Griffis McOuat Preliminary Economic Evaluation Report on the enriched copper blanket only
**Based on known geology and widely spaced drill holes – mineral inventory and grade are very preliminary in nature.

TABLE 7

REVISED MINERAL INVENTORY

	Tons	% Cu	% $Mo S_2$	% Cu Equiv
Main Supergene Zone				
Drill Indicated	35,000,000	1.60	0.045	
Primary Copper Zone - Below Main Supergene Blanket				
Drill Indicated	93,000,000	0.55	0.077	
TOTAL MAIN ZONE	128,000,000	0.84	0.070	
Supergene and Primary Copper Zone - Northwest side of intrusive, near Hole UC-17				
Potential	150,000,000	0.84	0.070	1.05E
Supergene and Primary Copper Zone - Southwest side of intrusive, near Holes PD-13 and PD-19				
Potential	150,000,000	0.84	0.070	1.05E
GRAND TOTAL	**428,000,000**	**0.84**	**0.070**	**1.05E**

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LISTED
VANCOUVER STOCK EXHANGE

TRADING SYMBOL
OCN

A PRELIMINARY ECONOMIC EVALUATION OF THE CASTLE COPPER PROPERTY HUMBUG MINING DISTRICT YAVAPAI COUNTY, ARIZONA

FOR
ORCANA RESOURCES LIMITED
TORONTO, ONTARIO
CANADA

Toronto, Ontario
May 29, 1992

Watts, Griffis and McOuat Limited
Consulting Geologists and Engineers

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APPENDICES
Volume II

1. SUMMARY

Watts, Griffis and McOuat Limited (WGM) was requested by Orcana Resources Limited (Orcana) to carry out a preliminary economic evaluation of a project to explore the supergene copper mineralization of the Castle Copper property in Arizona owned by Orcana.

WGM has relied on the discussion of the geology and the development of a mineral inventory supplied by an independent geological consultant (Bourne, 1992) in addition to processing cost models developed by EHA Engineering Ltd (EHA). WGM has developed mining costs, based on Bourne's report, and incorporated these along with the processing models to estimate the economic viability of the deposit to determine if additional exploration expenditures are warranted.

Several mining and processing alternatives were investigated and it appears that the most economically attractive combination is that of ramp (decline) access with production using a conveyor system, and conventional flotation processing. This mine/processing model indicates that, from a potential of 30-40 million tons of ore grading 1.6% Cu contained in supergene copper minerals, the deposit has an estimated after tax, net present value in the range of $25 million to $44 million. This supergene copper zone also contains 0.04% MoS_2 and precious metals. No provision has been made for precious metal credits in this evaluation.

This economic model indicates that a reasonable rate of return will be achieved at a copper price of $0.94/lb but that revenues from the deposit will support the operation at a copper price of $0.68/lb. The possibility of decreasing estimated capital costs, by partial substitution of refurbished equipment, may further enhance the project economics. Capital and operating costs should be investigated in greater detail.

Our analysis also indicates a positive net present value of $11 million if the mineralization were to be processed using a solvent extraction-electrowining (SX-EW) recovery method with the 2.5 million tons of ore per year treated on heap leach pads. With this method, no precious metal or MoS_2 credits would be realized.

WGM concurs with Bourne's recommendation for a Phase I drill program and considers that, based on this preliminary economic analysis, the property has a significant economic potential which merits additional exploration expenditures.

2. INTRODUCTION

WGM was requested by the management of Orcana to carry out a preliminary economic evaluation of the Castle Copper property, specifically the supergene copper mineralization, located in Arizona. The purpose of this evaluation is to determine the economic viability of additional exploration on the Castle Copper property based on a mineral deposit model developed by an independent geological consultant (Bourne, 1992).

WGM has relied upon reports, drill logs and other data supplied to us by Orcana in addition to WGM reports relevant to this assignment, and reports by various government organizations.

Conceptual capital and operating cost data, suitable for assessing the merits of additional exploration, were developed for different mining alternatives using formulae developed by various government and private agencies as well as factoring techniques on a mining unit basis. Comparisons of these data were made with capital and operating cost data from producing or near producing mines that have been published in various technical journals.

Capital and operating cost data for the processing models for the property were developed by EHA. These data were incorporated into the overall economic models and EHA's report is included as an appendix to this report. EHA investigated cost data for five different processing methods thought to be applicable to the type of mineralization contained in the supergene copper deposit of the Castle Copper property.

Geological data and mineral inventory parameters for the Castle Copper deposit were derived from a report to Orcana by Donald A. Bourne, consulting geologist. Minor modifications to the mineral inventory parameters were made by WGM and incorporated into this report for the purposes of the economic evaluation. Bourne's 1992 report recommends additional drilling of the Castle Copper deposit to delineate and confirm the estimated mineral inventory.

3. LOCATION, ACCESS, INFRASTRUCTURE

3.1 LOCATION

The Castle Copper property is located in south central Yavapai, Arizona, approximately 50 miles northwest of the city of Phoenix. It is centered on latitude 34°00'N and longitude 112°30'W. The property is central to a triangle formed by the highways connecting Phoenix, Prescott and Wickenburg. Figure 1 indicates the general location of the property.

3.2 ACCESS

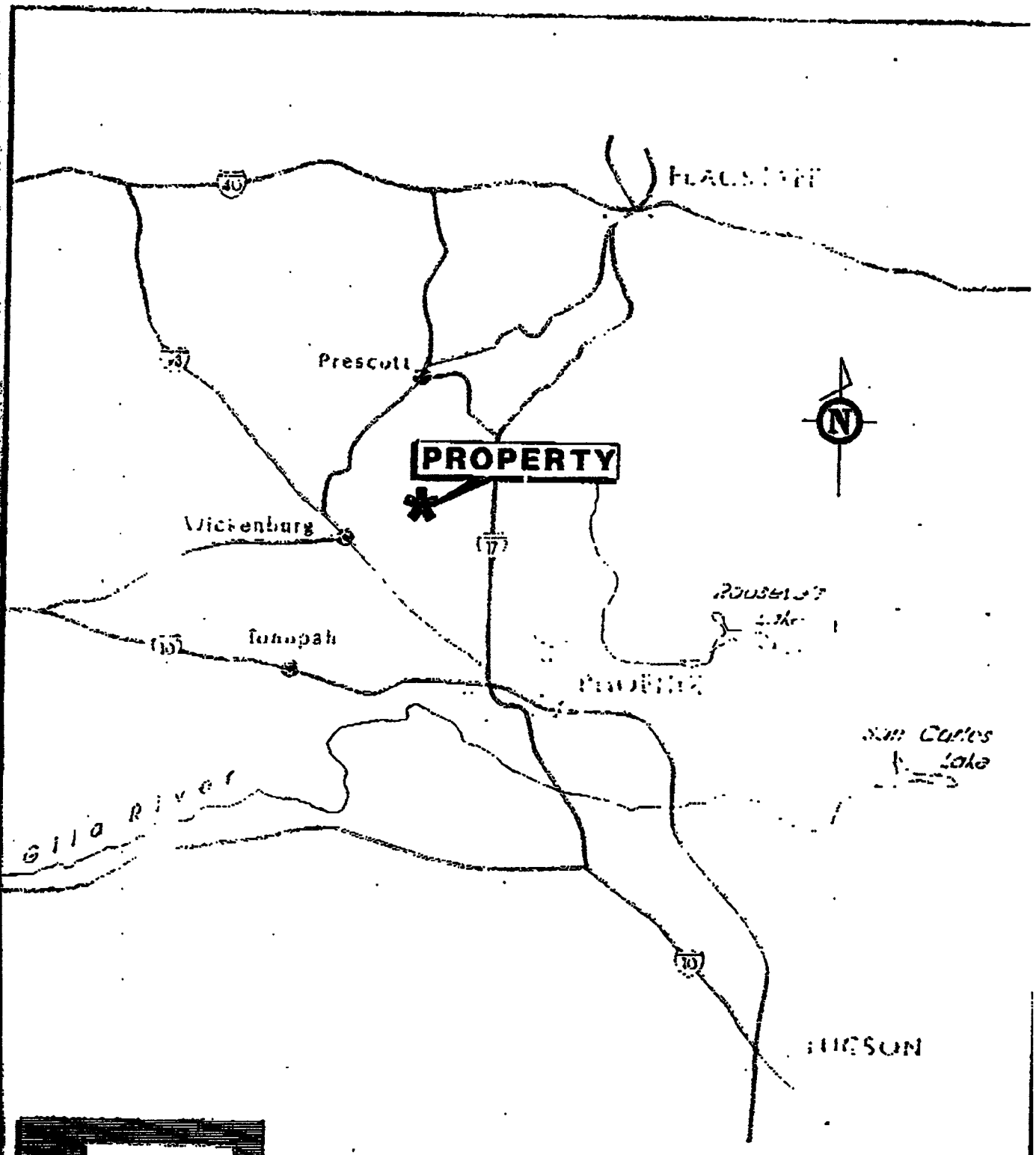
The property can be reached by driving north of Phoenix on Highway 17 to the Castle Hot Springs turn-off. Well maintained gravel roads give ready access to most portions of the property from the turn-off. The climate is typically arid with sparse vegetation consisting of cactus and a variety of desert shrubs and small trees.

3.3 INFRASTRUCTURE

There is abundance of skilled manpower available from the city of Phoenix as well as from Wickenburg and Prescott. There is no utility power available on the property but, if economically viable, utility power could be obtained from power lines near Highways 17 or 89.

The availability of water underlying the property is unknown but it is thought that the water table should be no more than 200-300 feet in depth from the lower (2,400 foot) elevations.

The copper smelter (Ray unit) of Asarco is located at Hayden, Arizona, south of Phoenix and may be available for custom smelting of copper concentrate. This smelter has a production capacity of 400,000 tons per year with a 900 ton per day acid plant. The smelter met all significant environmental constraints when last operated in 1982. The trucking distance from the property to the smelter at Hayden is approximately 150 miles. Other smelters readily accessible by road and/or rail are; in Arizona (Ajo-Phelps Dodge; Inspiration-Cyprus Miami; Morenci-Phelps Dodge; San Manuel-Magma Copper); and in New Mexico (Playas-Phelps Dodge; Hurley-Phelps Dodge/Mitsubishi). In addition, there is the possiblity of shipping the concentrate to Japan.



ORCANA RESOURCES LIMITED

CASTLE COPPER PROPERTY

HUMBUG MINING DISTRICT
YAVAPAI COUNTY, ARIZONA, U.S.A.

LOCATION MAP

Figure 1

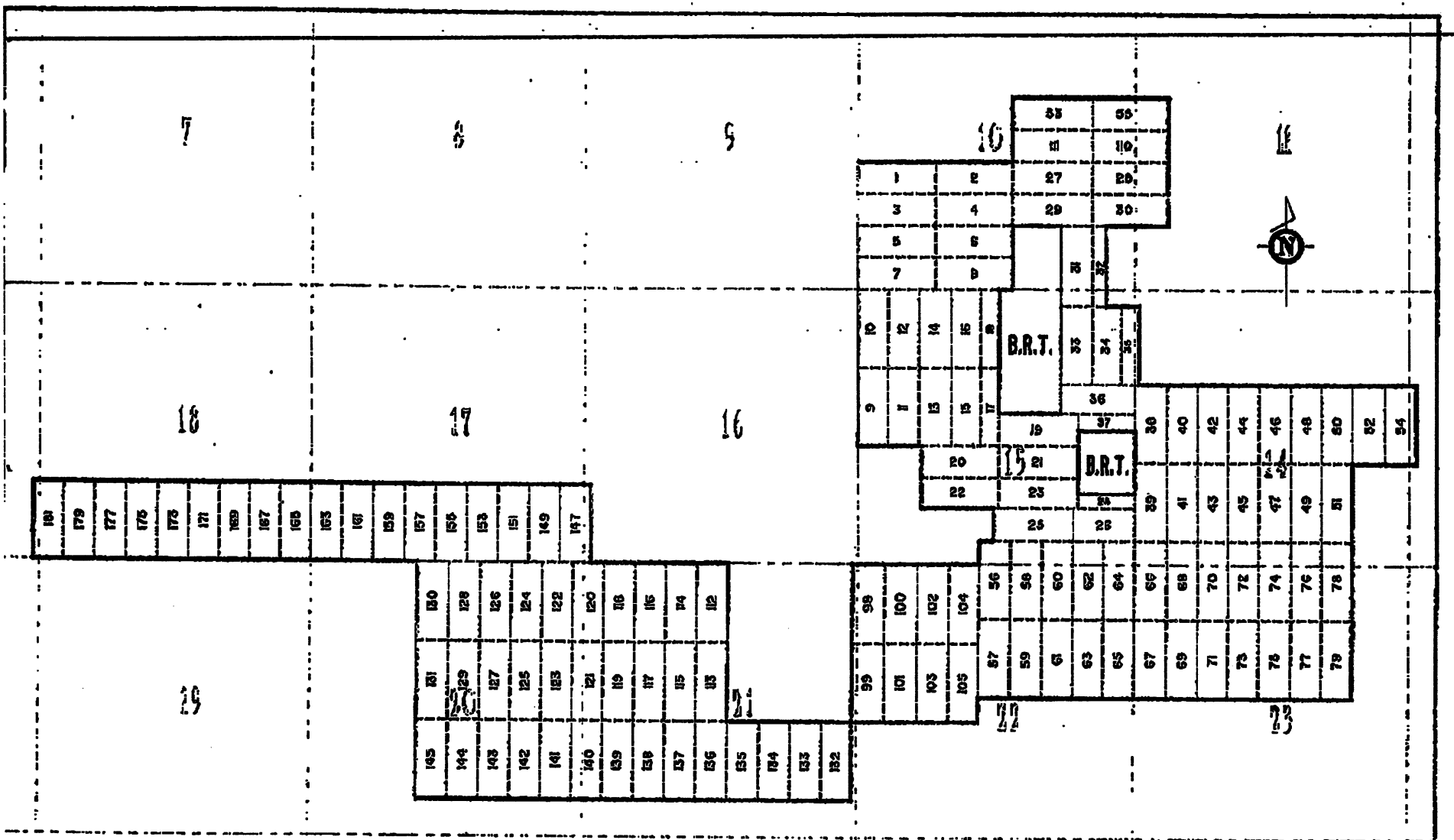
4. PROPERTY DESCRIPTION

The Castle Copper property is comprised of a block of 141 unpatented lode claims covering approximately 2,500 acres. The claims are located (Figure 2) in Sections 10, 11, 14, 15, 17, 20, 21, 22 and 23 of Township 8 North, Range 1 West and in Section 13, Township 8 North, Range 2 West in the south-central portion of Yavapai County, Arizona, U.S.A. Bourne (Appendix 1) prepared a listing of the individual claims (Table 1).

The Castle Copper property is not situated in a National Park or designated conservation area and it is believed that there will be minimal environmental impact or other restrictions which would interfere with exploration or development.

TABLE 1
List of Claims

Section	Name	Number	Total
10	Ray	1-8,27, 29, 53, 111	12
10, 11	Ray	28, 30, 55, 110	4
10, 15	Ray	31-32	2
15	Ray	9-26, 33-34, 36-37	22
14, 15	Ray	35	1
14	Ray	38-52	15
13, 14	Ray	54	1
15, 22	Ray	56, 58, 60, 62, 64	5
22	Ray	57, 59, 61, 63, 65, 100-105	11
14, 23	Ray	66, 68, 70, 72, 74, 76, 78	7
23	Ray	37, 39, 71, 73, 75, 77, 79	7
21, 23	Ray	98-99	2
21	Ray	112-119, 132-139	16
20, 21	Ray	120-121, 140	3
20	Ray	122-131, 141-145	15
17	Ray	149, 151, 153, 155, 157, 159, 161	7
16, 17	Ray	147	1
17, 18	Ray	163	1
18	Ray	165, 167, 169, 171, 173, 175, 177, 179	8
18 (R1W), 13 (R2W)	Ray	181	1
Total			141



ORCANA RESOURCES LIMITED

CASTLE COPPER PROPERTY

Tp.6 N., R.1 W., HUMBUG MINING DIST.
YAVAPAI COUNTY, ARIZONA, U.S.A.

CLAIM MAP

0 1000 2000 4000

NOTE,

CLAIM NUMBERS WITH 'RAV' PREFIX NOT PLOTTED

Figure 2

5. HISTORY

The original claims in the area were staked in the 1960s by two Arizona prospectors, Davis and Williams (see Bourne's report for additional detail and exploration results). During 1963 to 1966, Phelps Dodge Corporation (PD) explored the property. During this period PD drilled some 44,000 feet in rotary/core holes in an effort to delineate possible mineralization beneath a Tertiary volcanic cap overlying weakly mineralized Precambrian strata within the general area surrounding the Castle Copper property. Complete results of the drill program are not covered in Bourne's report, as his study and other studies commissioned by Orcana deal specifically with the supergene copper mineralization of the Castle property. WGM notes that three of the drill holes defining the mineral inventory of the Castle Copper supergene copper deposit were drilled by PD.

From 1966 to 1967 Bear Creek Mining Company, Kennecott's exploration subsidiary, leased the land and drilled 3,620 feet in two holes. Neither hole intersected ore grade mineralization and Bear Creek dropped the lease.

During the period 1968-1981, Utah International Inc. (Utah) entered into a lease agreement to explore the area. Utah conducted geological and geochemical surveys and drilled 21,241 feet in rotary/core holes before dropping the lease, prior to its merger with BHP Minerals. For the reasons noted above for the PD drill program, Bourne does not report detailed results of this exploration program. One of the drill holes used in Bourne's mineral inventory estimate was drilled by Utah. See Bourne's report for details on drill hole results and mineral inventory estimates.

Castle Copper Inc., a private Arizona company, acquired the ground by staking in June 1990.

6. GEOLOGY AND MINERALIZATION

6.1 GEOLOGY

The area of the supergene copper "blanket" mineralization is overlain by a thick (1,500-2,000 foot) cover of Tertiary volcanic and lesser sedimentary rocks. Pre-Tertiary geology and structures have been interpreted from the results of various drill programs. The oldest rocks underlying the Tertiary units are thought to be Precambrian schists (Yavapai Series) that have been intruded by granite/diorite rocks of the Bradshaw Complex. The Sheep Mountain Stock, of Laramide (?) age, intrudes the Precambrian rocks. Figure 3 indicates the general geology of the rocks underlying the Tertiary units in the area comprising the Castle Copper property.

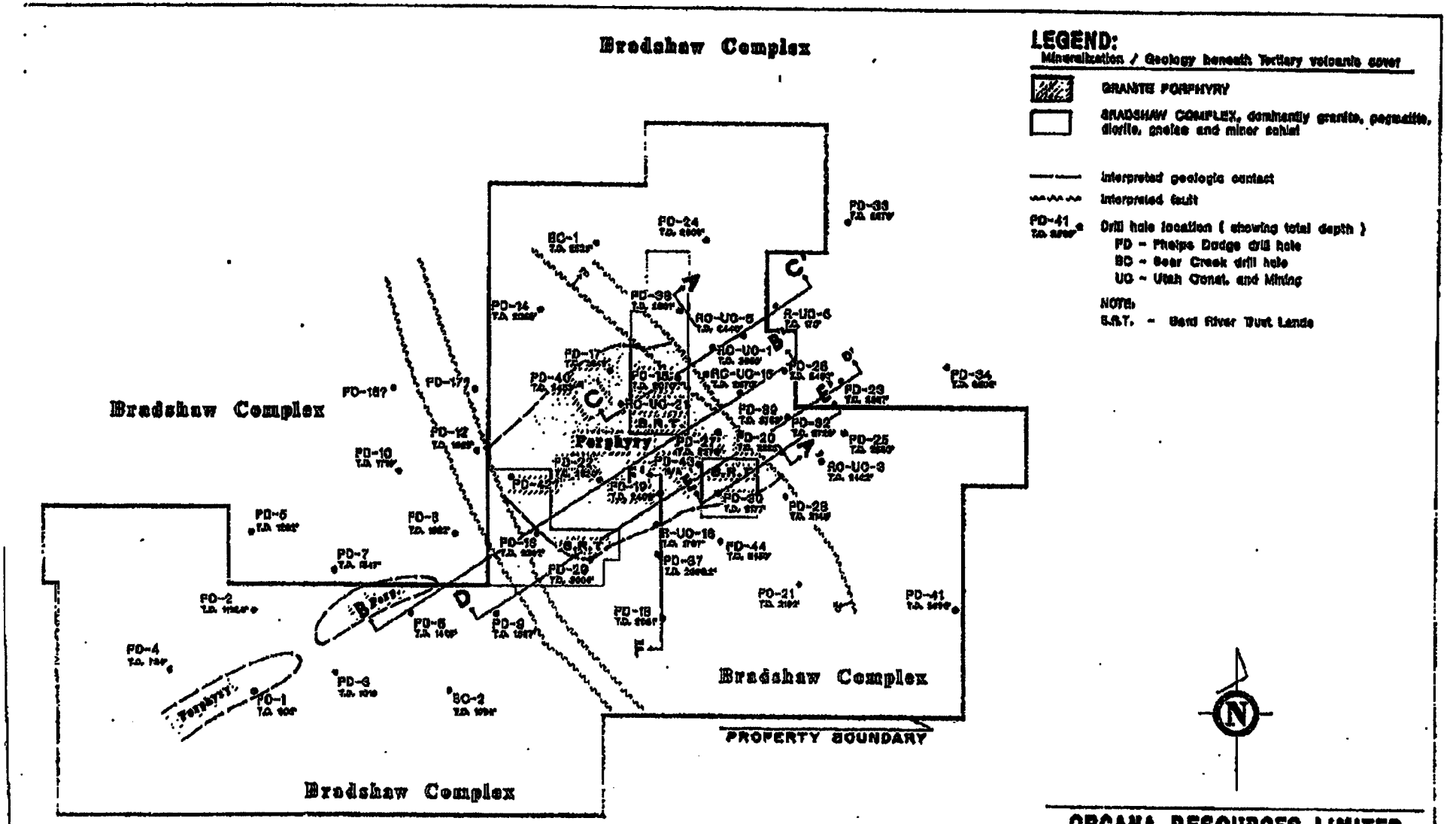
The reader is referred to the report by Bourne for additional details concerning the geology and mineralization of the Castle Copper property (see Appendix 1).

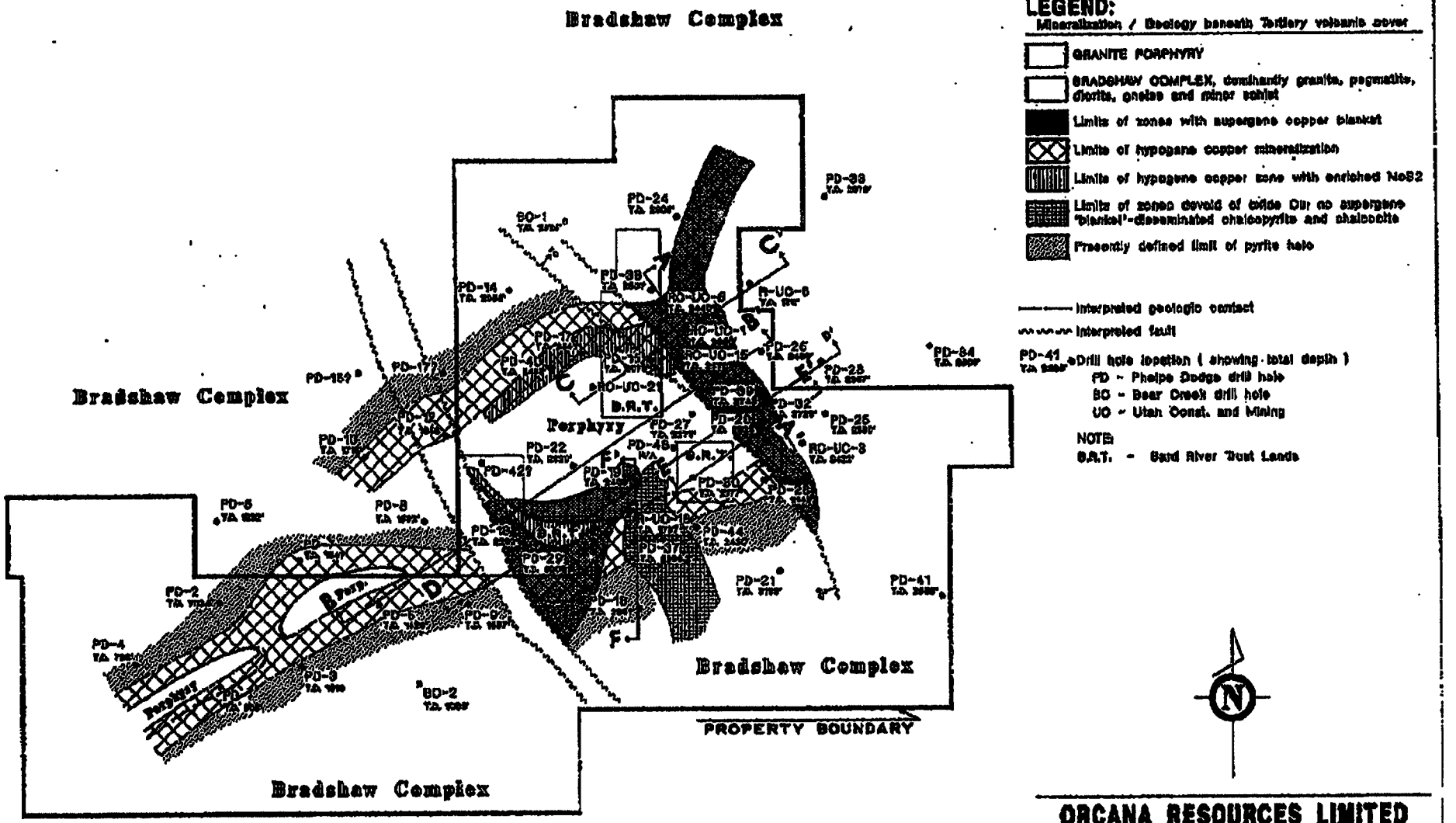
6.2 MINERALIZATION

Sulphide mineralization related to the Sheep Mountain Stock is widespread and underlies an area of three to four square miles. Figure 4 indicates the location of the mineralization underlying the Castle Copper property.

The hypogene (primary) mineralization comprises a typical suite of porphyry copper-molybdenum minerals: pyrite, chalcopyrite and molybdenite. Post-mineralization events formed a zone of supergene enrichment, usually overlain by a zone of oxidation. The zone comprising the supergene "blanket" is generally enriched in the copper minerals; chalcocite, bornite, covellite, with associated pyrite and molybdenite. The oxide zone mineralization usually consists of native copper, copper oxides and carbonates with minor pyrite and molybdenite.

Disseminated chalcocite may be present in minor amounts in the hypogene mineral zone for several hundred feet below the supergene "blanket". Figure 5 shows the typical vertical distribution of mineralization at the Castle Copper deposit.





LEGEND:

Mineralization / Geology beneath Tertiary volcanic cover

- GRANITE PORPHYRY
- BRADSHAW COMPLEX, dominantly granite, pegmatite, diorite, gneiss and minor schist
- Limits of zones with supergene copper blanket
- Limits of hypogene copper mineralization
- Limits of hypogene copper zone with enriched MoS2
- Limits of zones devoid of oxide Cu: no supergene 'blanket'-disseminated chalcopyrite and chalcocite
- Presently defined limit of pyrite halo

——— Interpreted geologic contact

~~~~ Interpreted fault

PD-41 T.D. 2665' ● Drill hole location (showing total depth)

PD ~ Phelps Dodge drill hole

SC ~ Bear Creek drill hole

UC ~ Utah Const. and Mining

NOTE:

B.R.T. ~ Sand River Trust Lands

N

ORCANA RESOURCES LIMITED

CASTLE COPPER PROPERTY

HUMBUG MINING DISTRICT
YAVAPAI COUNTY, ARIZONA, U.S.A.

ZONES OF MINERALIZATION

0 1000 2000 3000 4000

FEET

Work by: TRIGON GEOLOGICAL LTD. Nov. 1992
C.A.D. by: SUSAN A. SMITH Nov. 1992

Figure 4
~~~~

Castle Copper Property

Drillhole PD 20 Mineralization

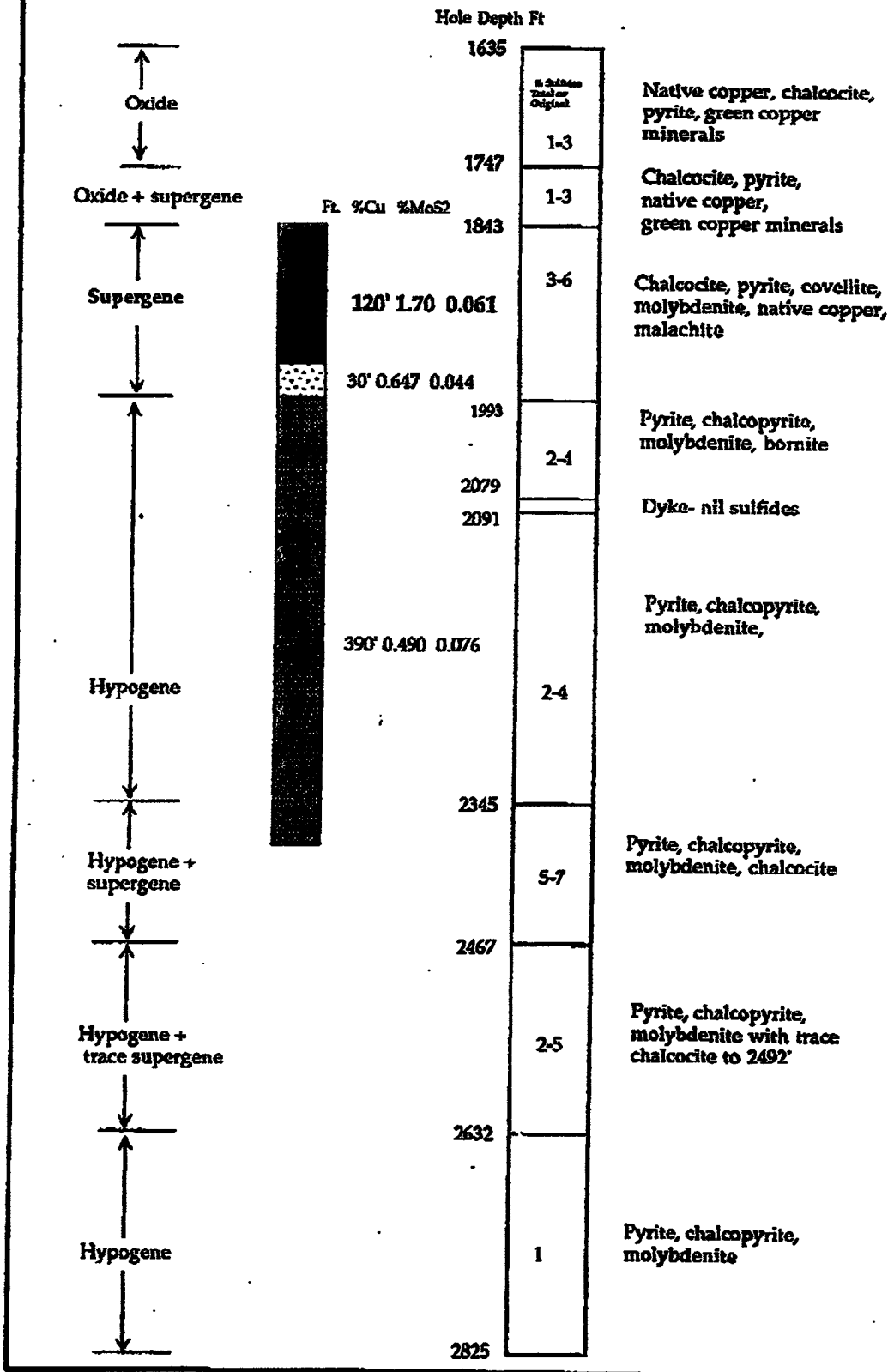


Figure 5

7. MINERAL INVENTORY

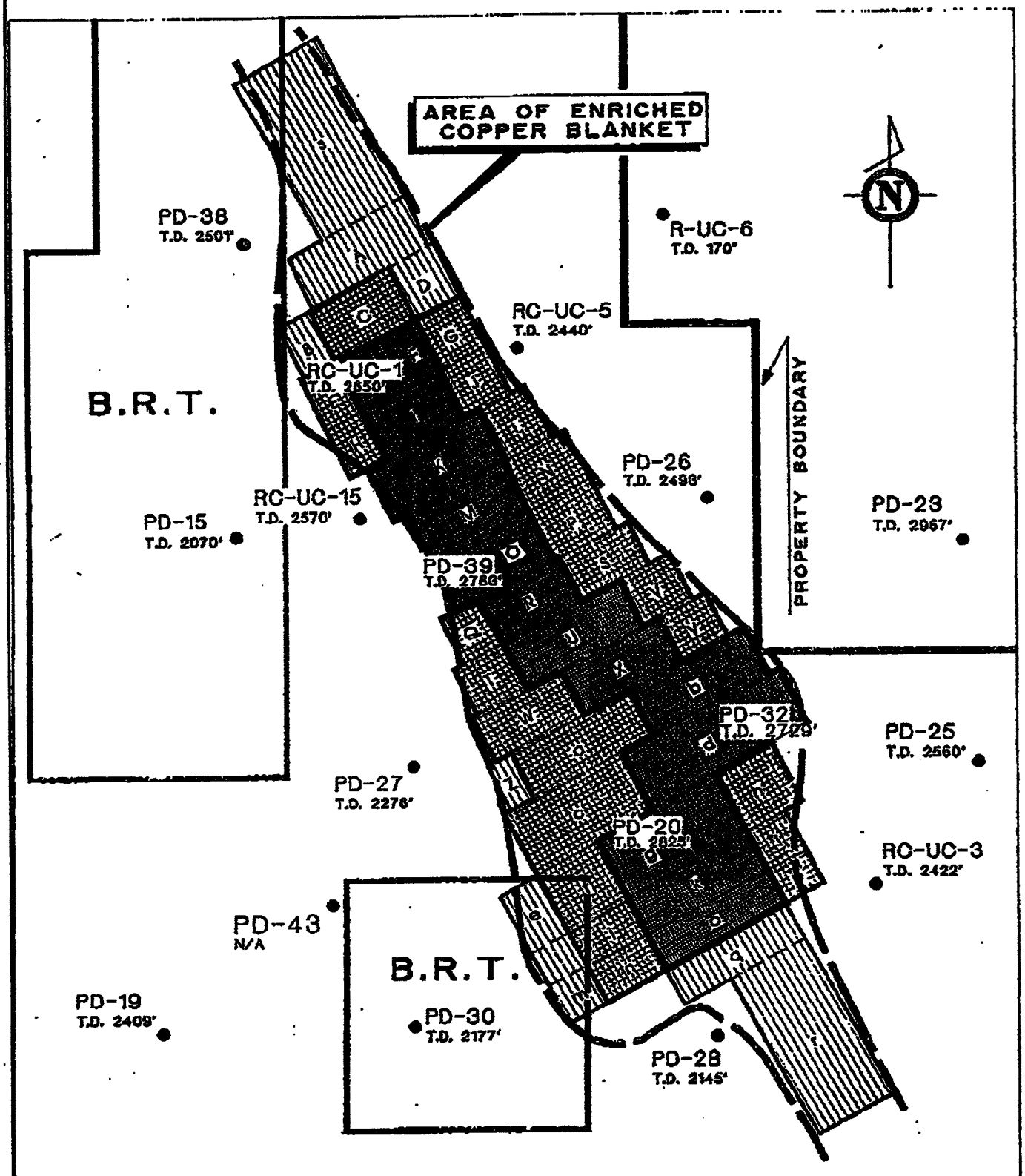
Four widely spaced drill holes intersected enriched (chalcocite, minor bornite) mineralization along a 5,500 foot by 1,100 foot wide northwest trending zone (Castle Copper supergene "blanket"), at an average depth of 1,975 feet, which appears to follow the Cow Creek fault. The average thickness of this zone is approximately 90 feet and is underlain by primary copper/molybdenum mineralization in a zone up to 390 feet thick grading 0.49% Cu (Figure 5).

Below the latter zone, the mineralization continues to an indeterminate depth but the grade drops off to 0.10% to 0.15% Cu. Better molybdenum values appear to correlate with better copper grades. The sulphide distribution appears to be spatially related to the Sheep Mountain Stock. Although the core of the stock contains less than 1% sulphides, an additional 1% to 3% sulphides has been introduced along the margins of the stock.

Bourne estimates, based on the four drill holes (see Figures 6 and 7), that there is a mineral inventory of approximately 39,434,000 tons grading 1.27% Cu and 0.044% MoS_2. The mineral inventory is divided into drill indicated "proven", "probable" and "possible" categories (Figure 6). Bourne assumes that the supergene mineralization in drill intersections represents a tabular body continuous between drill holes (a "blanket" deposit) rather than discrete shear zones or channels. He recommends that, for a Phase I exploration program, two additional rotary/core holes be drilled to further define the mineralization.

After reviewing the drill logs and noting the visual estimates of the type of copper bearing minerals, WGM recalculated the mineral inventory using Bourne's block parameters. Assayed intervals were reduced to minimize the inclusion of primary sulphide mineralization in the mineral inventory. WGM estimates that the Castle Copper deposit contains a drill indicated mineral inventory of approximately 28,110,000 tons grading 1.6% Cu and 0.04% MoS_2. The mineral inventory estimated by WGM, based on the area of the blocks defined by Bourne, is shown in Appendix 2.

WGM prefers to use the term "drill indicated" for our estimate, without reference to categories. However, based on the available data and Bourne's deposit model, WGM believes that the Castle Copper deposit represents a significant body of flat lying supergene copper.



DRILL INDICATED MINERAL INVENTORY

- Proven
- Probable
- Possible
- Area of enriched copper blanket
- PD-44 ● Drill hole location & number

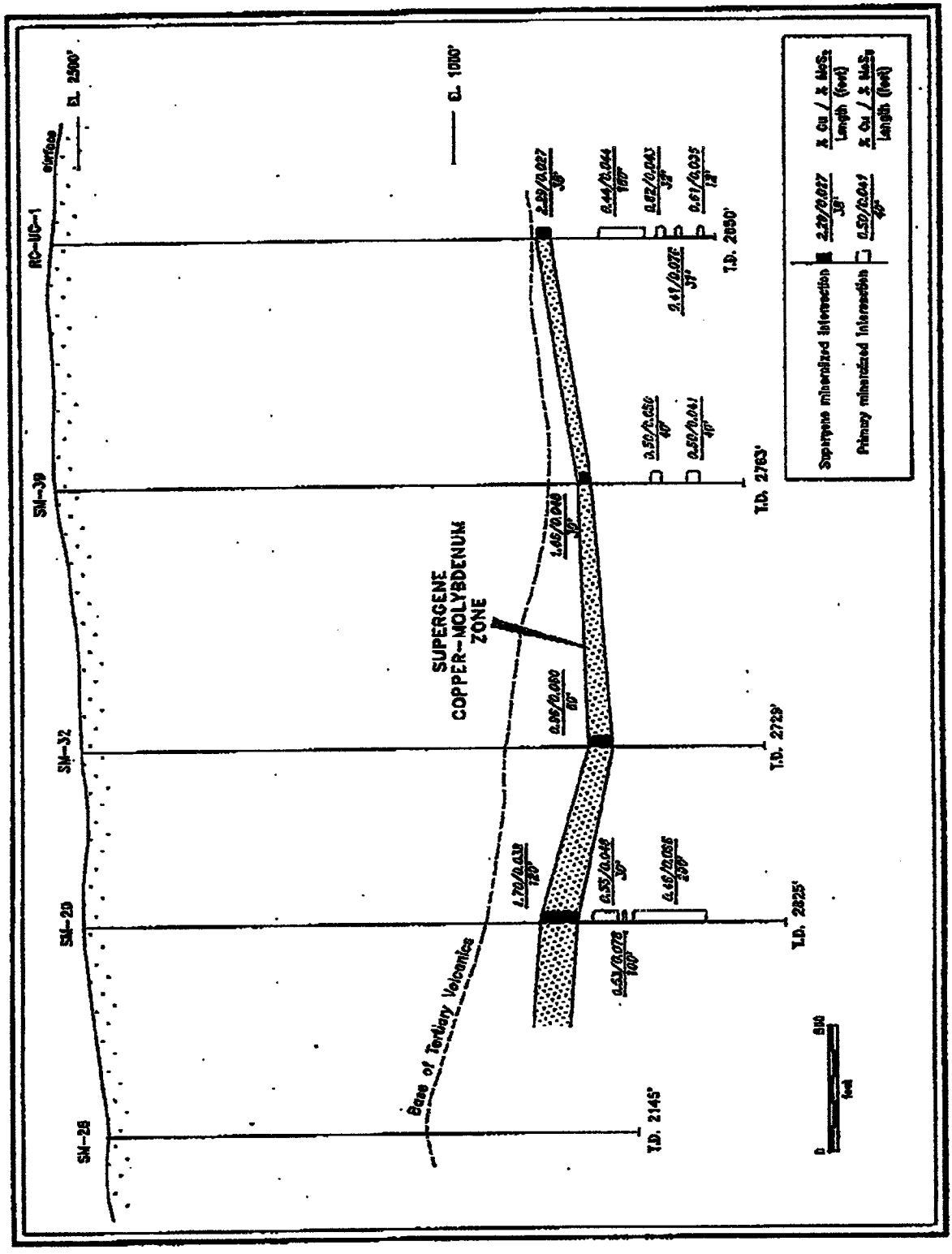
ORCANA RESOURCES LIMITED

CASTLE COPPER PROPERTY

HEBATIC MINING DISTRICT
YAVAPAI COUNTY, ARIZONA, U.S.A.

DRILL PLAN & SUPERGENE COPPER ZONE

Figure 7
Schematic Longitudinal Section - Supergene Zone



We believe that there is ample opportunity to increase the mineral resource defined to date. For instance, the estimated mineral inventory does not take into account the significant drill hole UC-5 (approximately 15 feet grading 1.5% Cu). We concur with Bourne's recommendation for a Phase I program to better define the mineralization in the supergene zone and to increase confidence in its continuity. Infill drilling, as well as drilling of the periphery of the deposit, will be required to delineate the mineralization prior to a program of underground exploration.

8. MINING

8.1 MINING METHODS

No data are available to assess the geotechnical characteristics of the Castle Copper deposit, consequently mining methods thought to be applicable to this deposit are based solely on the presumed geometry of the mineralized zone. Two stoping methods thought to be applicable to this deposit are room and pillar and block caving. Due to the relatively critical geotechnical requirements for the successful application of the block caving method and the relatively thin (≈90 feet) mineralized zone, WGM believes that a room and pillar stoping method is more appropriate.

The room and pillar model incorporates the use of jumbo drills for production and drift development. Ore and waste are assumed to be moved with front-end loaders, scoop trams and trucks. Support is provided by rock bolts as well as pillars. In the latter stages of the mine life pillars are assumed to be recovered and the ore extraction recovery is 85%. Dilution is assumed to be 10%.

8.2 ACCESS/PRODUCTION

Several methods of access to, and production of, the mineralization have been investigated. The primary access/production methods assessed for the property are: a) shaft (access-production); b) shaft (production)/decline (access); and c) decline (access-production).

The top of the mineralization lies at an average depth below surface of 1,975 feet and the mineralized zone has an average weighted thickness (by area of influence) of approximately 90 feet. The average elevation of the surface is approximately 2,700 feet above sea level.

A shaft (access/production) is usually considered more appropriate at this depth, however if capital costs for the ramp are equivalent to that of a shaft WGM believes that this would be the optimum access/production route due to increased flexibility and lower operating costs.

The estimated optimal rate of mining production ranges from 8,000 to 10,000 tons/day or 2,000,000 to 2,500,000 tons/year based on 250 working days per annum.

Capital and operating cost estimates for the shaft/shaft, ramp/shaft and ramp/ramp access and production facilities are presented below. It is assumed that there are no physical or geotechnical considerations that would impact on these alternatives.

9. PROCESSING

Capital and operating costs for various processing scenarios were developed by EHA. WGM has incorporated EHA's cost estimates for the various processing scenarios in the overall economic evaluation. EHA's report is contained in this report as Appendix 3.

The processing scenarios, for which EHA estimated capital and operating costs at production capacities of 2,000,000 and 2,500,000 tons of ore/year, include:

1) Grind-Float-Roast-Leach-Electrowin (RLE);

2) Grind-Float-Pressure Leach-Electrowin (PLE);

3) Grind-Float-Ammonia Leach-Electrowin (NH_3);

4) Heap Leach-Solvent Extraction-Electrowin (SX-EW); and

5) Grind-Float-Filter-Ship Concentrate to Smelter (FLOAT).

To our knowledge, the metallurgical characteristics of the mineralization have not been investigated in any detail, consequently various scenarios were modeled to indicate the range of processing alternatives. A review of the drill logs indicates that visual identification of copper mineralization within the the zone of interest is primarily supergene in origin. The copper minerals noted include chalcocite, bornite, minor copper oxides and native copper.

10. ECONOMIC EVALUATION

10.1 MINING

Based on Bourne's report, WGM has made some simplified assumptions regarding the parameters to be used in an economic model of the deposit. These parameters are:

- an average head grade of 1.6% Cu and 0.04% MoS_2;
- tonnage of 40,000,000 tons;
- access to and clearing of mine and mill sites in place;
- metal prices constant at $US 1.20/lb Cu and $US 2.10/lb MoS_2;
- a room and pillar mining method appropriate for the deposit;
- continuity of grade and the average thickness of the mineralization;
- applicability of capital and operating cost estimates derived from power curves; and
- 10% dilution at zero% grade.

Mine capital and operating costs were derived from various sources including a USBM publication and computer program, models developed by a mining cost service and published cost data. These costs were compared to determine their consistency and a judgment made regarding their applicability to the present study. The various cost data which were considered most critical to the development of an economic model are discussed below.

A room and pillar mining method is thought to be most appropriate for this deposit. As noted in Section 8.1, several access/production openings were investigated for the deposit. Capital cost estimates, created by Mining Costs Service (MCS) in 1991, of a ramp access combined with shaft production appears to be similar to a ramp access/production mine model developed by WGM. Analyses of capital and operating cost models indicates that two straight ramps, one for access combined with a separate conveyor ramp for production, have a significant operating cost savings over a shaft production facility. An additional benefit to ramp/conveyor production is that it permits more flexibility in designing mine layout and operation. Mining models discussed in the remainder of this report are therefore restricted to ramp access and production by truck haulage and conveyor haulage.

All the costs are approximate and thought to be within ± 25-30% of actual costs. The model is believed to be of sufficient accuracy upon which to base a recommendation for further exploration expenditures.

Table 2 summarizes WGM's estimate of the capital and operating cost data developed for this study. Operating costs are given in terms of $US/ton of ore. All costs are in December, 1991 United States dollars ($US).

TABLE 2

WGM Mining Capital and Operating Cost Summary

Production Tons/Day	Ramp Access Capital	Ramp Access Operating	Shaft Access Capital	Shaft Access Operating
8,000	$34,492,000	$8.2	$50,784,000	$12.2
9,000	37,215,000	8.1	54,328,000	12.0
10,000	39,833,000	7.9	57,718,000	11.9

Cost estimates of the models developed by WGM were compared to a MCS model in order to check the validity of the assumptions and the estimated costs. The parameters of the MCS model, after conversion to per ton equivalent operating costs and 5% inflation of all costs, (Table 3) are based on:

- 9,400 tons ore/day production;
- Top slicing with jumbo drills and bench drilling with air-track drills;
- Shaft haulage of ore to surface;
- No crushing costs are included;
- Shaft and decline entry to 1,900 feet deep.

TABLE 3

MCS - Room & Pillar Shaft Haulage Mine

9,400 tons ore/day

Cost Center	Capital	Operating ($/ton)
Total	$58,058,000	6.1

Although the MCS model (Table 3) is not directly comparable to the model developed by WGM (Table 2), there is sufficient similarity to validate the cost models.

A factor in accounting for the capital and operating cost variances is the assumption in the MCS model of a combination shaft (haulage) and decline (access) for mining. Using WGM's 10,000 ton/day model (Table 2), it is apparent that WGM's estimated operating cost lies between $1.89/ton to $5.80/ton more than the MCS operating cost while WGM's capital costs are approximately $0.340 million (shaft) to $18.225 million lower than the MCS model. For the purpose of this study we have not analyzed this discrepancy in detail.

WGM has estimated the costs of a dual ramp system, with conveyor haulage, for access and production. Our estimate is based on a modification of the MCS model in which we have eliminated the capital and operating costs associated with a shaft and substituted our estimate of capital and operating costs associated with an additional ramp and a conveyor system. WGM's estimate of a dual ramp/conveyor haulage and access cost model has the effect of reducing capital and operating costs (Table 4). Development of this mining alternative is based on the following assumptions:

- 1,800 foot vertical depth, from portal elevation, to mineralization;
- 15% grade for ramps;
- Two 12,000 foot long ramps, one for access and the other for conveyor haulage, separated by 100 feet horizontally with cross cuts every 400 feet; and
- ramp and cross cut dimensions of 20 feet by 15 feet.

TABLE 4

WGM Capital & Operating Costs - Dual Ramp/Conveyor

Production Rate	Capital	Operating
2,000,000/year	$43,817,000	$5.6/ton
2,500,000/year	50,603,000	5.4/ton

10.2 PROCESSING

WGM has incorporated capital and operating costs for only two of the processing alternatives developed by EHA (see Appendix 3) as being the most economically viable. A summary of these costs are shown in Table 5 below.

TABLE 5
Processing Costs

Process	SX-EW	FLOAT
2 million tons/year		
Capital Cost ($000)	51,708	43,212
Operating Cost ($/ton)	5.8	4.3
2.5 million tons/year		
Capital Cost ($000)	60,903	49,403
Operating Cost ($/ton)	5.2	4.0

Processing alternatives noted in Table 5 are identified as:

SX-EW: Heap Leach-Solvent Extraction-Electrowin
FLOAT: Grind-Float-Filter-Ship Concentrate to Smelter

Details of the derivation of these costs are shown in Appendix 3.

10.3 ECONOMICS

The mining methods used in this study are dual ramp/conveyor, other mining methods are thought to be less economically attractive. The processing methods used are SX-EW and conventional flotation (FLOAT).

Simple discounted cash flow-rate of return (DCF-ROR) analyses are used only to indicate the relative merits of the various mining/process alternatives. We have developed simplified economic models based on the parameters noted in the Tables 4 and 5. Our analysis is restricted to the mining costs we have developed for a dual ramp (one for access and the other for conveyor haulage) combined with room and pillar stoping. It is WGM's opinion that the range of capital and operating costs, shown below in Table 6, are reasonable given the variability of the different sources of costs models.

TABLE 6

Economic Model Cost Parameters

Mine		Mill		Total	
Capital	Operating	Capital	Operating	Capital	Operating
$48,817,000 [1]	$5.6/ton	$43,212,000	$4.3/ton	$87,029,000	$9.9/ton
$48,817,000 [2]	5.6/ton	51,708,000	5.8/ton	95,525,000	11.4/ton
$50,603,000 [3]	5.4/ton	49,403,000	4.0/ton	100,006,000	9.4/ton
$50,603,000 [4]	5.8/ton	60,903,000	5.2/ton	111,506,000	10.6/ton

Notes: [1] Case 1 - FLOAT processing, 2.0M TPY
[2] Case 2 - SX-EW processing, 2.0M TPY
[3] Case 3 - FLOAT processing, 2.5M TPY
[4] Case 4 - SX-EW processing, 2.5M TPY

The following assumptions are used in the economic analyses of the deposit:

- constant metal prices of $1.20/lb Cu (in concentrate), $1.10/lb Cu (cathode copper F.O.B. mill) and $2.10/lb MoS_2 (F.O.B. mill);
- truck transportation charges of $0.10/ton-mile;
- 150 miles to nearest custom smelter;
- 3 year preproduction period;
- 100% equity financing;
- a hurdle rate (discount factor) of 15% is used to estimate NPV;
- precious metals are not recovered at all, nor is molybdenum in the SX-EW process; and
- combined state and federal tax rate is 51% beginning in the first year of production.

Revenues are derived from the above metal prices and the tabulated metal production from 2,000,000 tons of ore/year (p.12, Appendix 3) and 2,500,000 ton of ore/year (p.13, Appendix 3) for the relevant processes. Net smelter return per ton of ore is based on approximately 71% of the contained copper (FLOAT process) while 100% of the MoS_2 is paid F.O.B at the mine site. For cathode copper (SX-EW process), 100% of the copper is paid for F.O.B. the mine site.

The estimated net present values (NPVs) for the various mining/processing alternatives of Table 6 are indicated in Table 7.

TABLE 7

Net Present Value - Operating Alternatives

($ Millions)

Case		NPV (15%)
1	Flotation Processing - 2.0M TPY	$25.00
2	SX-EW Processing - 2.0M TPY	(3.04)
3	Flotation Processing - 2.5M TPY	44.13
4	SX-EW Processing - 2.5M TPY	11.26

In deriving the models dealing with SX-EW processing (Cases 2 and 4), no allowance was made for the delay in producing copper associated with heap leach processes. This would have the effect of lowering the estimated NPVs for Cases 2 and 4.

The relative effect of changes in capital and operating costs on NPVs for the mining/processing alternatives is shown in Table 8. It is apparent from this table that projected NPVs are most sensitive to changes in operating costs and that the relative increase in capital costs (Cases 1 to 3 and 2 to 4) is more than offset by the relative decrease in operating costs respectively.

TABLE 8

Effect of Costs on NPV

Case	Change in Capital Cost (%)	Change in Operating Cost (%)	NPV (@15%)
1-3	+14.3	-5.3	+76.5
2-4	+16.7	-7.5	+470.4

In considering these economic models, it must be kept in mind that they only indicate the relative merits of the various alternatives given the underlying assumptions. As an additional check on the validity of the assumptions, industry "rules-of-thumb" were applied to the estimated annual gross (NSR) revenue. These rules are:

1) Investment should be less than 2.5 times the annual revenue; and
2) Cash operating costs should be less than 50% of the annual revenue.

These rules-of-thumb generally indicate the viability of a potential mine, in lieu of detailed analyses, to generate a reasonable rate of return on investment (approximately 15% ROI). Application of these rules quickly indicate, in a preliminary economic analysis, where to focus attention in refining capital and operating costs. Table 9 tabulates the application of these rules to the estimated economic parameters of the Castle Copper deposit.

TABLE 9

Investment Rules of Thumb

Tons Per Year (Millions)		Est. Gross Rev. ($ millions/year)	Max. Invest. Rule 1 ($ millions)	Max. Op. Cost Rule 2 ($ millions/year)
2.0	SX-EW	$46.1	$115.3	$23.1
	FLOAT	52.7	131.6	26.4
2.5	SX-EW	57.6	144.0	28.8
	FLOAT	65.9	164.7	33.0

Estimated capital costs (Table 6), for all cases, are less than the maximum indicated by application of Rule 1, but application of Rule 2 to Case 2 (SX-EW @ 2.0M TPY with approximately $23.7M/year operating costs) indicates that this alternative is not viable.

Cases 1, 3 and 4 all have estimated annual operating costs less than the maximum indicated by application of Rule 2 and this is reflected in their estimated NPVs at a 15% discount factor (Table 7).

As the most economically viable alternative (Table 7), Case 3 was investigated further to determine the effect of metal price (Cu) on NPV. Copper price was varied from $0.90 to $1.00/lb Cu. The results of this analysis are shown in Figure 7. This figure indicates that, for Case 3, a copper price between $0.94 and $0.95/lb Cu is required for an investment break-even price. Investment break-even price gives a NPV of zero dollars at the required rate of return on investment (hurdle rate).

It is evident, from the steep slope of the curve (Figure 7), that the model is very sensitive to metal price. This figure indicates that a ± $0.05 Cu price change means an increase of approximately $7M or a decrease of $12M in the estimated NPV.

Figure 8 is a graph of the break-even (no return on investment) price of copper. This figure indicates that the break-even copper price, for Case 3, lies between $0.675 and $0.680/lb Cu. Figures 7 and 8 indicate that, given the model parameters, copper price may vary from approximately $0.95/lb Cu to $0.71/lb Cu to cover a range from a minimum return on investment to maintaining operations without infusion of additional capital.

Given near term projections of world copper supply and demand, and consequently copper prices, this preliminary economic analysis indicates that the deposit is economically viable, assuming the applicability of the financial and technical parameters of the model. It should be noted that any decrease in capital or operating costs will increase the NPV and decrease the break-even copper price of the mine/process economic model.

In terms of capital or operating cost reduction, the most likely area of cost reduction is associated with capital costs. Both mining and processing capital costs have been developed on the basis of acquisition of new equipment. It is likely that capital costs might be reduced by 15% to 20% by the acquisition of refurbished equipment. If this cost reduction is possible, there will likely be a significant increase in NPV for all of the cases modeled.

Figure 8
Investment Breakeven Copper Price

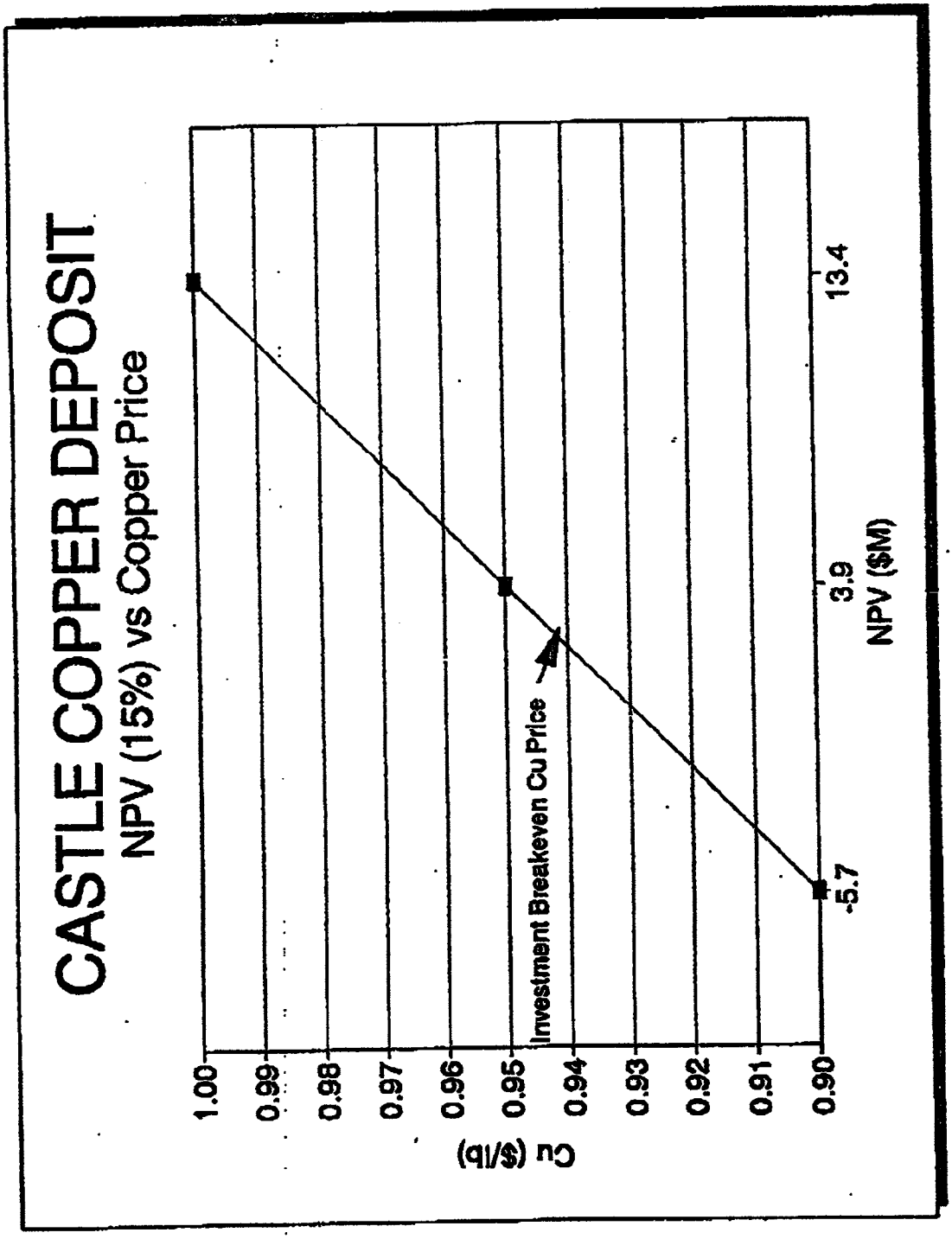
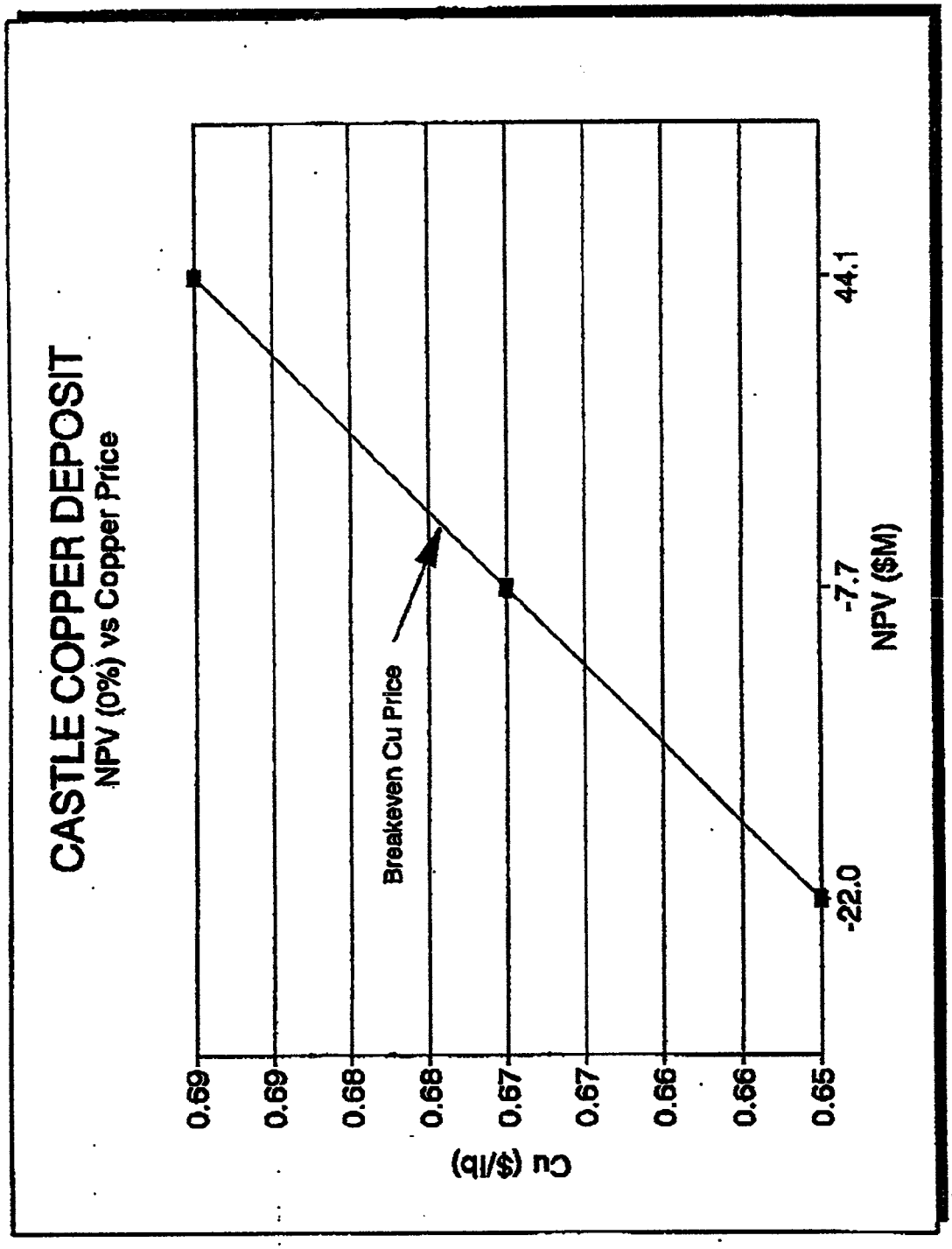


Figure 9
Breakeven Copper Price



11. CONCLUSIONS

Preliminary economic analyses of the Castle Copper deposit indicate that the expenditure of additional exploration funds is merited to determine the extent of the mineralized zone and its geotechnical and structural characteristics. The magnitude of the estimated net present values, using a 15% discount factor, for the various mining/processing alternatives ranges from approximately -$3.0M to $44.1M and, while not definitive, certainly indicate that additional exploration expenditures are justified.

This preliminary analysis indicates that conventional flotation processing is a more viable alternative than solvent extraction-electrowin processing. Mining by the room and pillar method appears viable but the capital and operating costs associated with the production/access workings (ramp vs. shaft) will have to be investigated in more detail. At the level of analysis of this study, it appears that ramp (decline) access with conveyor haulage is viable for this deposit despite the relatively great depth to the mineralized zone.

In deriving the estimated net present values no expenditures were incorporated for the amount of exploration needed to delineate the deposit to the point of a feasibility study. Such expenditures will have the effect of decreasing the estimated net present values associated with the economic models. It is our opinion that any such decrease, due to inclusion of a significant exploration budget, will still justify the allocation of the exploration funds recommended by Bourne.

The most viable economic model indicates that a reasonable rate of return will be achieved at a copper price of $0.94/lb but that revenue from the deposit will support operation at a copper price of $0.68/lb. The possibility of decreasing estimated capital costs, by partial substitution of refurbished equipment, may further enhance the project economics.

WGM recommends that Orcana pursue exploration of the deposit, as outlined by Bourne, in an effort to further define the technical and economic characteristics of the deposit.

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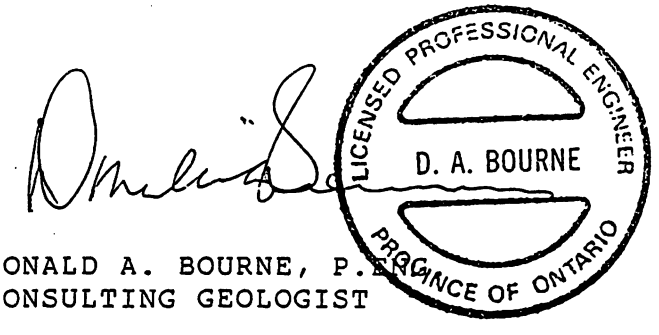
(1991) — Mining Cost Service by Western Mine Engineering. Updated periodically.

WGM — Various internal documents and reports.

REPORT ON
GEOLOGY AND MINERAL INVENTORY
CASTLE COPPER-MOLYBDENUM PROPERTY
SHEEP MOUNTAIN EAST AREA
HUMBUG MINING DISTRICT
YAVAPAI COUNTY, ARIZONA
U.S.A.

FOR

ORCANA RESOURCES LIMITED
TORONTO, ONTARIO
CANADA



SCARBOROUGH, ONTARIO
AUGUST 27, 1990

DONALD A. BOURNE, P.ENG.
CONSULTING GEOLOGIST

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SUMMARY

The Castle Copper-Molybdenum Property consists of 141 unpatented lode mining claims covering approximately 2,500 acres located in the Sheep Mountain East area about 50 miles northwest of Phoenix in south central Arizona, U.S.A. The property was acquired to cover a zone of enriched copper-molybdenum mineralization within and adjacent to a composite stock of Laramide (?) age which forms part of an extremely large mineralized system covering 3 or 4 square miles in aereal extent. Excess smelting capacity is available within trucking distance for custom treatment of copper concentrates.

The oldest rocks of the area are biotite schists of the Yavapai Series of Precambrian age cut by foliated granite alaskite and diorite of the Bradshaw complex also Precambrian in age. Intrusive into these rocks is the Sheep Mountain Stock, a composite body of Laramide (?) age which forms a slightly elongated dome measuring 3,400 feet by 2,300 feet whose long axis strikes N45° W and plunges 50° northwest. The copper-molybdenum mineralization on the Castle property appears to be related to this stock. Unconformably overlying the Precambrian and Laramide (?) rocks is a series of mid-Tertiary volcanic flows and pyroclastics from 1,500 to 2,200 feet thick which cover the entire Sheep Mountain East area. Post-mineral andesite dykes which are probable feeders for the overlying lavas cut both the Precambrian and Laramide (?) rocks along the eastern margin of the stock.

The mineral system at Sheep Mountain East is an extremely large one with significant sulphide mineralization having been identified over 3 or 4 square miles although the better copper-molybdenum appears to be located within or adjacent to the Sheep Mountain Stock. Hypogene sulphide mineralization

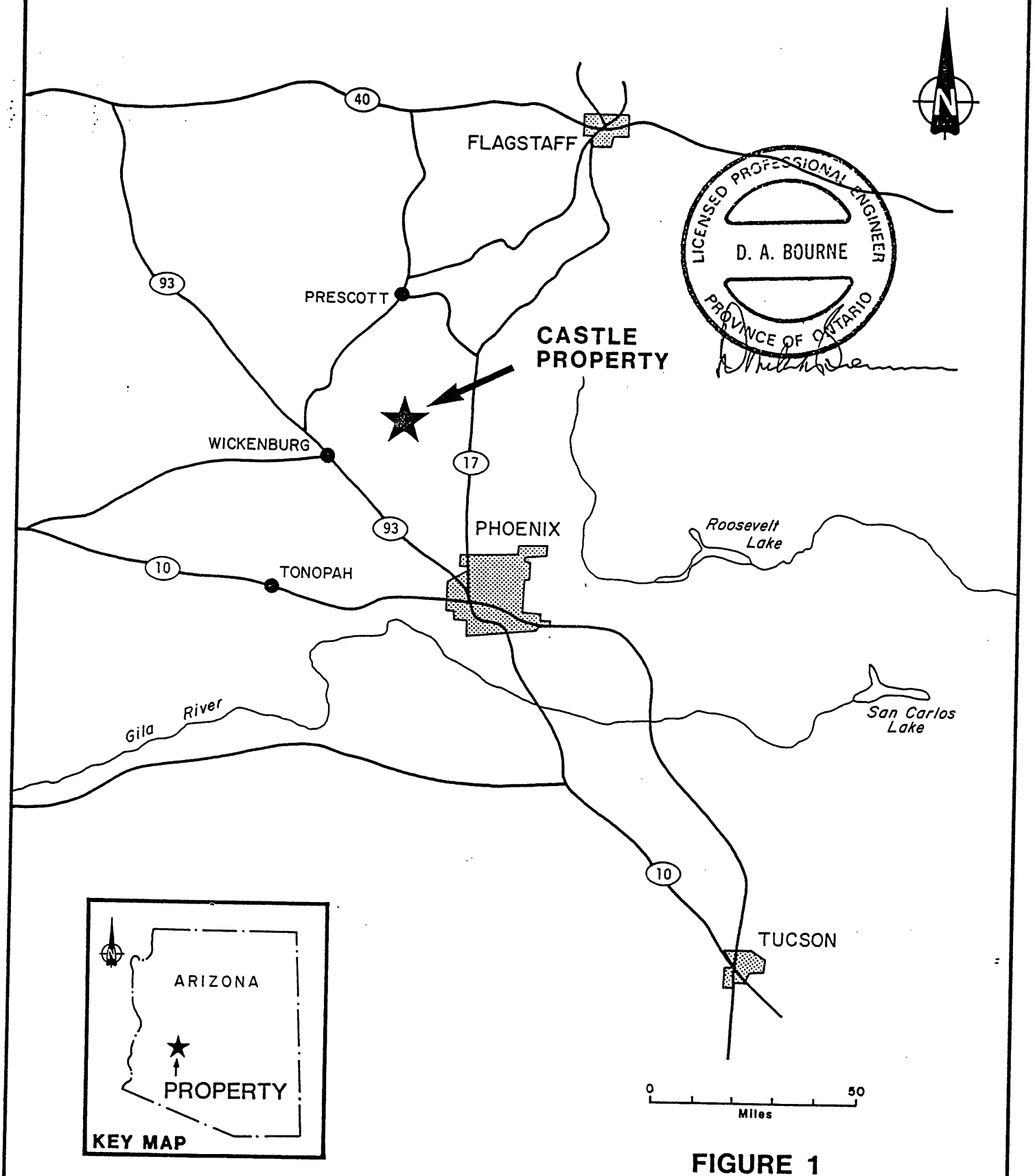


FIGURE 1

LOCATION MAP
CASTLE PROPERTY
YAVAPAI COUNTY, ARIZONA, U.S.A.

August 27, 1990

consists principally of pyrite with lesser chalcopyrite and molybdenite. Minor amounts of galena, sphalerite, magnetite and specularite are present locally.

The drill indicated copper-molybdenum mineral inventory identified to date on the Castle property occurs in a northwesterly striking zone measuring 5,500 feet in length by 1,100 feet wide and has been intersected in 4 holes drilled by previous operators. The drill-indicated mineral inventory as calculated by the writer is summarized as follows:

	TONS	% CU	TXCU	% MoS_2	TXMoS_2
PROVEN	15,002,232	1.17	17,562,298	0.047	701,261
PROBABLE	14,070,869	1.17	16,459,752	0.047	655,998
SUB TOTAL	29,073,101	1.17	34,022,050	0.047	1,357,259
POSSIBLE	10,361,383	1.55	16,032,858	0.037	383,806
TOTALS	39,434,484	1.27	50,054,908	0.044	1,741,065

It is assumed that the intersections of supergene enriched copper-molybdenum mineralization used in the calculations represent a tabular body continuous between drill holes rather than a complex of enriched shear zones or channels.

The writer recommends a program of fill-in rotary/core drilling to further define the mineral inventory position coupled with metallurgical test work on drill core in order to bring the Castle property to the prefeasibility stage. The proposed program is divided into two parts, the total cost of which is estimated at $2,022,500 U.S.

PROPERTY DESCRIPTION

The Castle copper-molybdenum property centered on latitude 34° 00'N and longitude 112° 30'W consists of a block of 141 unpatented lode claims covering approximately 2,500 acres located in Sections 10, 11, 14, 15, 17, 20, 21, 22 and 23 in Township 8 North, Range 1 West, Gila and Salt River Meridian, in the south central part of Yavapai County, Arizona, U.S.A. The claims are numbered as follows:

SECTION 10 (12 claims)

RAY 1	RAY 5	RAY 27
2	6	29
3	7	53
4	8	111

SECTIONS 10 AND 11 (4 claims)

RAY 28
30
55
110

SECTIONS 10 AND 15 (2 claims)

RAY 31
32

SECTION 15 (22 claims)

RAY 9	RAY 15	RAY 21	RAY 33
10	16	23	34
11	17	23	36
12	18	24	37
13	19	25	
14	20	26	

SECTIONS 14 AND 15 (1 claim)

RAY 35

Bourne Geological Services

FIGURE 2

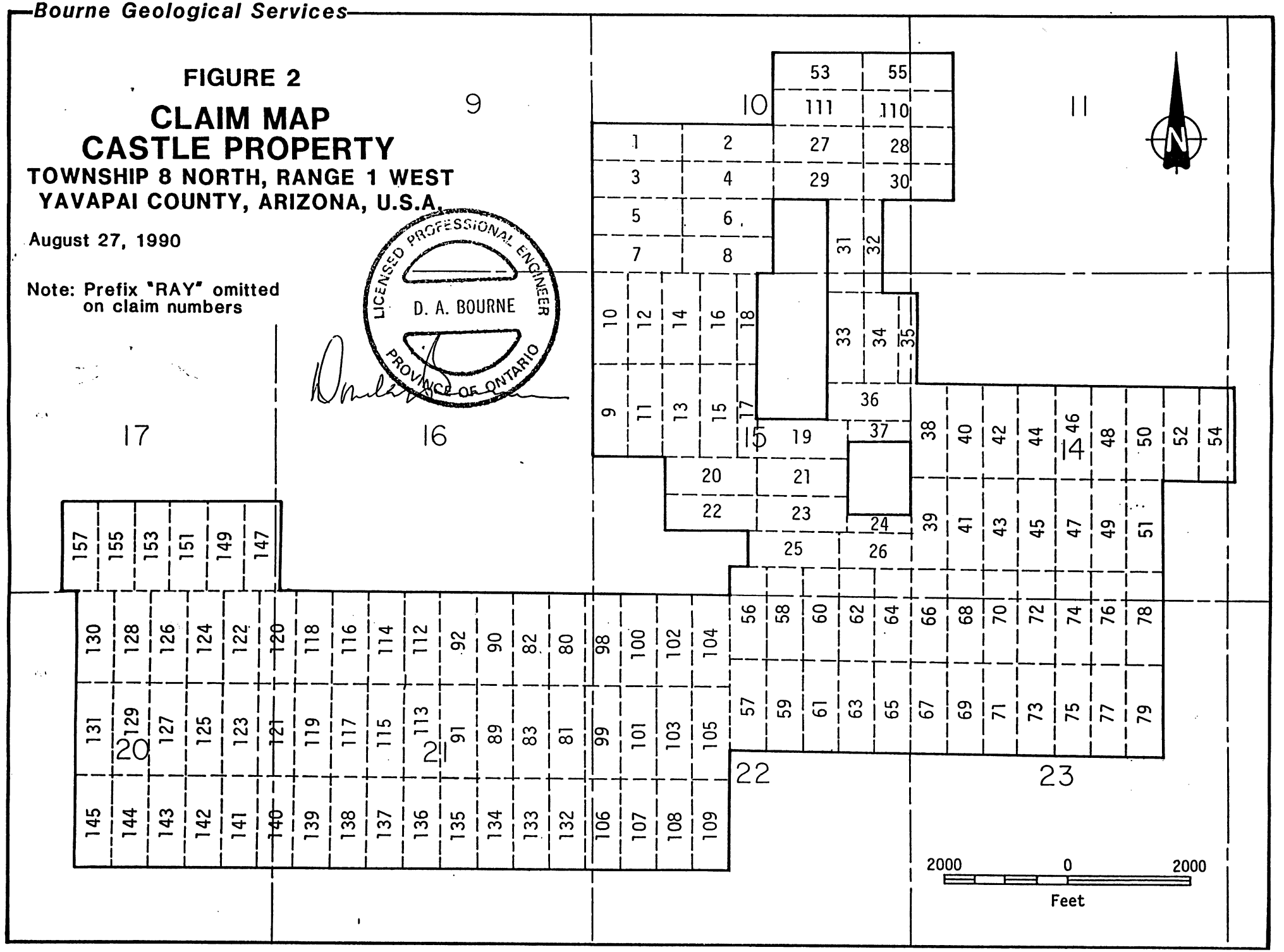
CLAIM MAP
CASTLE PROPERTY

TOWNSHIP 8 NORTH, RANGE 1 WEST
YAVAPAI COUNTY, ARIZONA, U.S.A.

August 27, 1990

Note: Prefix "RAY" omitted on claim numbers

LICENSED PROFESSIONAL ENGINEER
D. A. BOURNE
PROVINCE OF ONTARIO



SECTION 14 (15 claims)

RAY 38	RAY 43	RAY 48
39	44	49
40	45	50
41	46	51
42	47	52

SECTIONS 13 AND 14 (1 claim)

RAY 54

SECTIONS 15 AND 22 (5 claims)

RAY 56	RAY 62
58	64
60	

SECTION 22 (14 claims)

RAY 57	RAY 100	RAY 105
59	101	107
61	102	108
63	103	109
65	104	

SECTIONS 14 and 23 (7 claims)

RAY 66	RAY 74
68	76
70	78
72	

SECTION 23 (7 claims)

RAY 67	RAY 75
69	77
71	79
73	

SECTIONS 21 AND 22 (3 claims)

RAY 98
99
106

SECTION 21 (24 claims)

RAY 80	RAY 91	RAY 116	RAY 134
81	92	117	135
82	112	118	136
83	113	119	137
89	114	132	138
90	115	133	139

SECTIONS 20 AND 21 (3 claims)

RAY 120
121
140

SECTION 20 (15 claims)

RAY 122	RAY 127	RAY 141
123	128	142
124	129	143
125	130	144
126	131	145

SECTION 17 (6 claims)

RAY 147	RAY 153
149	155
151	157

TOTAL NUMBER OF CLAIMS = 141

Ownership of the minerals is held by the Federal Government through the Bureau of Land Management. Federal statutes provide that not less than $100 worth of labour shall be performed or improvements made on each mining claim during

each year in order to maintain the property in good standing. A lode mining claim on public lands may be brought to lease

> "...after at least $500 worth of work has been done upon it, for $5.00 per acre or fraction of an acre, plus various fees" (Butler, 1967, p.237).

As the Castle property is not in a national park or designated conservation area, there are no environmental or other restrictions which would interfere with exploration and development of the claim group.

The following report is based on data made available to the writer including copies of the original diamond drill logs, assay sheets, geological maps and reports of Phelps Dodge and Utah International both of whom carried out work on the Castle property. As the copper-molybdenum mineralization is not exposed on surface but lies beneath a 1,500 foot capping of post-mineral volcanics, a site examination was not considered necessary although the writer is familiar with the general area having carried out property examinations southwest of Wickenburg in Maricopa County.

LOCATION, ACCESS, LOCAL RESOURCES

The Castle property lies about 50 miles northwest of Phoenix, the major metropolitan centre in south-central Arizona at an elevation of between 2,600 and 3,000 feet above sea level. It can conveniently be reached by driving north on highway 17 to the Castle Hot Springs turn-off from which well-maintained gravel roads give ready access to all parts of the claim group. The climate is typically dry and arid with sparse vegetation consisting of cactus and low shrubs.

Of the several copper smelters remaining in Arizona, only three are currently being operated. Asarco's Hayden smelter and Cyprus' smelter at Miami have been brought into compliance with air pollution constraints and Magma's smelter at San Manuel has been retrofitted with an Outokumpu flash furnace to bring it into compliance. The Ray unit of Asarco at Hayden with a 400,000 ton year smelter and 900 ton per day acid plant met all significant environmental constraints when last operated in 1982 and is available for custom smelting of copper concentrates (Beard, 1989, p.8).

SHEEP MOUNTAIN EAST HISTORY

The original claims in the area were staked in the early 1960s by two Arizona prospectors, Davis and Williams, who located unpatented lode claims over weakly mineralized Precambrian strata exposed in two small "windows" in Tertiary volcanics in the Sheep Mountain West area.

1963-1966 Phelps Dodge Corporation drilled approximately 44,000 feet in 38 rotary/core holes to explore for possible mineralization beneath the post-mineral Tertiary volcanic capping. They began drilling adjacent to the weakly mineralized "windows" in the Sheep Mountain West area and gradually worked eastward to the Sheep Mountain East area.

> "It should be noted that the Phelps Dodge geologists favored continuation of the project, but the terms of the agreement with Davis and Williams were such that the property payments had become too high to justify further efforts" (Hoyt and Ascencios, 1981, p.1).

1966-1967 Bear Creek Mining Company leased the property and drilled 3,620 feet in 2 holes. Neither of these holes intersected ore and the Company dropped its lease in 1967.

1968-1981 Utah International Inc. entered into a lease agreement to continue exploration of the Sheep Mountain East area. During the period the Company carried out geological mapping at a scale of 1 inch to 400 feet, completed 21,241 feet of rotary/core drilling in 8 holes, conducted geochemical and thin section analyses plus fluid inclusion studies from selected drill core, all at a cost of approximately $825,000. Utah International dropped its lease agreement on the property prior to its merger with BHP Minerals.

SHEEP MOUNTAIN EAST GEOLOGY

As the only consolidated rocks exposed in the Sheep Mountain East area are gently dipping volcanics of Tertiary age, all data concerning the geology, structure and mineralization of the older underlying rocks have come from diamond drilling.

The oldest rocks of the area are biotite schists of the Yavapai Series of Precambrian age cut by foliated granite alaskite and diorite of the Bradshaw complex also Precambrian in age. Both the intrusive complex and schists are in turn cut by diabase dykes of Precambrian age.

Intrusive into the Precambrian rocks is the Sheep Mountain Stock, a composite body of Laramide (?) age which was possibly intruded as three main phases each with its own textural characteristics. The copper-molybdenum mineralization appears

to be related to this stock. It is a slightly elongated dome measuring 3,400 feet by 2,300 feet whose long axis strikes N 45°W and plunges approximately 50° northwest. The stock appears to be composite in nature with the bulk of the pluton consisting of quartz monzonite porphyry as an outer shell apparently enveloping a biotite quartz latite porphyry which in turn appears to be intruded by a younger quartz latite porphyry at depth.

SHEEP MOUNTAIN EAST STRUCTURE

A major fault zone, the Cow Creek Fault, strikes N 45°W and dips steeply northeasterly along the eastern edge of the Sheep Mountain stock. Although the displacement is unknown, the fault appears to show normal movement with Precambrian rocks to the east moving down relative to those on the west. A 200 foot wide andesite dyke of Tertiary age has been intruded along this fault zone at the northeastern contact of the Sheep Mountain stock. Some shearing and brecciation have been noted in the dyke indicating post-dyke movement along the fault. It is believed that the Cow Creek Fault is an old structural feature possibly Precambrian in age but with several periods of movement. It is further believed that this fault acted as a zone of weakness and helped influence the emplacement of the Sheep Mountain stock.

Rocks of Precambrian age which outcrop two miles southwest and one mile northeast of the Sheep Mountain East area show northeast striking, steeply dipping schistosity and foliation. In addition, these same rocks are cut by several narrow northeast trending quartz latite porphyry dykes of Laramide (?) age. It is believed that these dykes

mark a vague Precambrian structural weakness which appears to have helped localize the Sheep Mountain stock at its intersection with the Cow Creek Fault zone.

From diamond drill hole data, the southwestern edge of the Sheep Mountain stock is marked by a 400 foot wide fault zone, termed the West Fault, which strikes N 60°W and dips from 50° to 60° northeasterly. It generally parallels the Cow Creek Fault and is believed to be part of the same system.

About two miles west of the Sheep Mountain stock, a strong, steeply dipping fault zone striking N 50°W is exposed near Ash Creek and is termed the Ash Creek Fault. It shows normal movement with volcanics of Tertiary age on the hangingwall being down faulted into contact with Precambrian strata on the footwall. The southeast continuation of this fault is indicated in Phelps Dodge drill hole SM-9 which shown post-volcanic dip-slip movement in the order of 1,400 feet.

Drill hole information and pre-volcanic topography strongly suggest the existence of a steeply dipping, north striking post-mineral (?) fault zone through the centre of the Sheep Mountain stock.

> "The significance of this fault zone is not fully understood but it is believed to be a complimentary shear to the Cow Creek, West, and Ash Creek fault zones. If this is the case, the movement on the Cow Creek, West, and Ash Creek fault zones, as determined by stress analysis, is left lateral, normal displacement. Additionally, the same stress analysis shows a northeast-trending tensional direction which corresponds with the trend of the Laramide? porphyry dikes" (Hoyt and Ascencios, 1981, p.7).

SHEEP MOUNTAIN EAST ALTERATION

The associated alteration assemblages and their characteristic minerals are:

Potassic	- quartz, K-spar, biotite, and locally calcite
Argillic	- quartz, clay
Phyllic	- quartz, sericite, pyrite
Propylitic	- chlorite

Both alteration and mineral assemblages show a distinct relationship to the Sheep Mountain stock although their interrelationship is not clear.

Potassic alteration is best developed within and adjacent to the Sheep Mountain stock as stockwork veinlets and selvages of K-spar with lesser biotite and local calcite. Host rock chemistry governs whether K-spar or biotite is formed as Precambrian diabase and diorite readily host biotite while Precambrian granite and Laramide (?) porphyries normally host K-spar. Potassic alteration intensity appears to be strongest along the porphyry contacts.

Argillic alteration is strongest within and along the southern and eastern margin of the Sheep Mountain stock. It occurs as selective replacement of plagioclase feldspar most often within a halo surrounding quartz - K-spar veinlets. Overlapping of these halos produces a zone of pervasive argillic alteration. The mineralogy of the clay minerals has not been fully determined but is believed to be mainly montmorillonite and kaolinite.

Propylitic alteration has only been identified in four holes on the far east, north and south edges of the argillic zone and thus appears to form an incomplete halo surrounding

the latter. Chlorite is the most diagnostic mineral of the prophylitic zone but K-spar and clay are also present.

Phyllic alteration is the youngest of all the alteration assemblages and occurs erratically throughout the Sheep Mountain area in varying degrees of intensity. It is found as fracture controlled, overprint, destructive alteration composed of quartz with coarse-grained sericite and pyrite as veinlets varying from ½ to 1 inch in width.

SHEEP MOUNTAIN EAST MINERALIZATION

The mineral system at Sheep Mountain East is an extremely large one with significant sulphide mineralization having been identified over an area of 3 or 4 square miles although the better grade mineralization appears to be located within or adjacent to the Sheep Mountain stock.

Hypogene sulphide mineralization consists principally of pyrite with lesser chalcopyrite and molybdenite. Minor amounts of galena, sphalerite, magnetite and specularite are present locally. Pyrite and chalcopyrite occur predominately as discrete grains associated with quartz in randomly oriented veinlets up to ½ inch in width. Molybdenite occurs in a similar manner and also as a coating or "paint" along fractures with or without quartz.

> "At least 400 to 800 ppm Cu is present nearly everywhere in premineral rocks at Sheep Mountain East. Indeed, up to 0.25% Cu is not uncommon in intervals in many holes throughout the area. However, the best copper mineralization has been intercepted in Precambrian rocks adjacent to the eastern contact of the Sheep Mountain stock. Phelps Dodge drill hole SM-20 contains the best copper values which have been cut at Sheep Mountain to date. In this hole, about 120 ft of enriched ore averaging 1.70% Cu, plus an additional 550 ft of primary ore with some supergene? ore averaging 0.46% Cu, were cut before the hole was bottomed in about 0.10% Cu. This hole plus holes SM-28, 32, and 39 appear to outline

> a narrow, 2500-ft-long, northwest-trending zone of better copper mineralization. this zone which appears to follow the Cow Creek fault zone contains an average of 50 to 70 ft of enriched ore averaging greater than 1% Cu. The primary ore plus some supergene? ore below this enriched zone appear to average about 425 ft thick and grade 0.35% Cu. The Cow Creek fault zone is believed to have played a vital role in the formation of copper enrichment in this zone. Better molybdenum values generally follow the better copper values and average about 0.05 to 0.07% MoS_2. Below this zone values drop to about 0.10% to 0.15% Cu and 0.02% to 0.04% MoS_2" (Hoyt and Ascencios, 1981, pp.8-9).

Total sulphide distribution appears to be spatially related to the Sheep Mountain stock. Although the core of this pluton contains only 1% or less total sulphides, an additional 1% to 3% total sulphide content has been introduced into the stock margins and adjacent wall rock to form a zone approximately 1,000 feet wide which except for the western contact, nearly surrounds the stock. Beyond this zone, total sulphide content drops to less than 1%.

SHEEP MOUNTAIN EAST GEOCHEMISTRY

A total of 61 composite samples of drill core was taken by Utah International and assayed for Au, Ag, Rb, K_2O, Sn and WO_3 as well as for Cu and MoS_2. The samples were taken from rocks showing varying degrees of potassic and argillic alteration as well as from zones of intense silicification in quartz veinlet stockworks.

> "Results of these assays indicate that none of the elements mentioned occurs in anomalous concentrations. Additionally,no pattern could be established for the correlation of metal ratios nor were any of the elements or their ratios correlative with the hydrothermal alteration assemblages. Distribution appears wholly erratic.
>
> "High molybdenum and copper values commonly occur together, although exceptions to this relationship are many. In general,better molybdenum and copper

values appear to ring the Sheep Mountain stock; however, molybdenum more faithfully reflects this relationship than does copper. Additionally, molybdenum more commonly is associated with high K-spar-altered host rock" (Hoyt and Ascencios, 1981, p.15).

MINERAL INVENTORY

The drill indicated copper-molybdenum mineral inventory identified to date on the Castle property occurs in a northwesterly striking zone which appears to follow the Cow Creek Fault along the eastern margin of the Sheep Mountain stock. The zone measures 5,500 feet long by 1,100 feet wide and has been intersected by drill holes UC-1, SM-20, SM-32 and SM-39 spaced from 750 to 1,000 feet apart. Copies of the original logs, sampling intervals and assay sheets for each of these holes were made available to the writer.

In the following drill indicated mineral inventory calculation, the writer has weighted the individual intersections and sampling results from these logs and assay sheets to obtain an average for each hole. In general, the copper values represent individual 10 foot core lengths while molybdenum values, expressed as MoS_2, are composite assays taken over 50 foot intervals. Blocks were drawn around each drill hole and the tonnage obtained using a factor of 11.2 cubic feet per ton calculated by the writer from the specific gravity of the host rocks and assuming 5% sulphides. It is further assumed that these intersections of supergene enriched copper-molybdenum mineralization represent a tabular body continuous between drill holes rather than a complex of enriched shear zones or channels. The drill indicated mineral inventory for the Castle property is summarized as follows:

	TONS	% CU	TXCU	% MoS_2	TXMoS_2
PROVEN	15,002,232	1.17	17,562,298	0.047	701,261
PROBABLE	14,070,869	1.17	16,459,752	0.047	655,998
SUB TOTAL	29,073,101	1.17	34,022,050	0.047	1,357,259
POSSIBLE	10,361,383	1.55	16,032,858	0.037	383,806
TOTALS	39,434.484	1.27	50,054,908	0.044	1,741,065

The weighted averages for copper and MoS_2 for each of the four drill holes used in the mineral inventory calculation are shown on pages 19 and 20. The individual blocks are shown on Figure 5 (in back pocket) and the weighted averages for each block are shown on pages 21, 22 and 23. A composite longitudinal section, Figure 4 (in back pocket), illustrates the enriched Cu-MoS_2 intersection in each hole and its relationship to the base of the overlying mid-Tertiary volcanics. Also shown on this section are intersections of primary hypogene copper-molybdenum mineralization beneath the enriched supergene blanket indicating the widespread nature of sulphide mineralization in the Sheep Mountain East area.

CONCLUSIONS AND RECOMMENDATIONS

The Castle copper-malybdenum property consists of 141 unpatented lode mining claims covering approximately 2,500 acres located in the Sheep Mountain East area about 50 miles northwest of Phoenix, Arizona, U.S.A. The property was acquired to cover a zone of enriched copper-molybdenum mineralization within and adjacent to a composite stock of Laramide (?) age intrusive into Precambrian biotite schists and granitic to dioritic rocks.

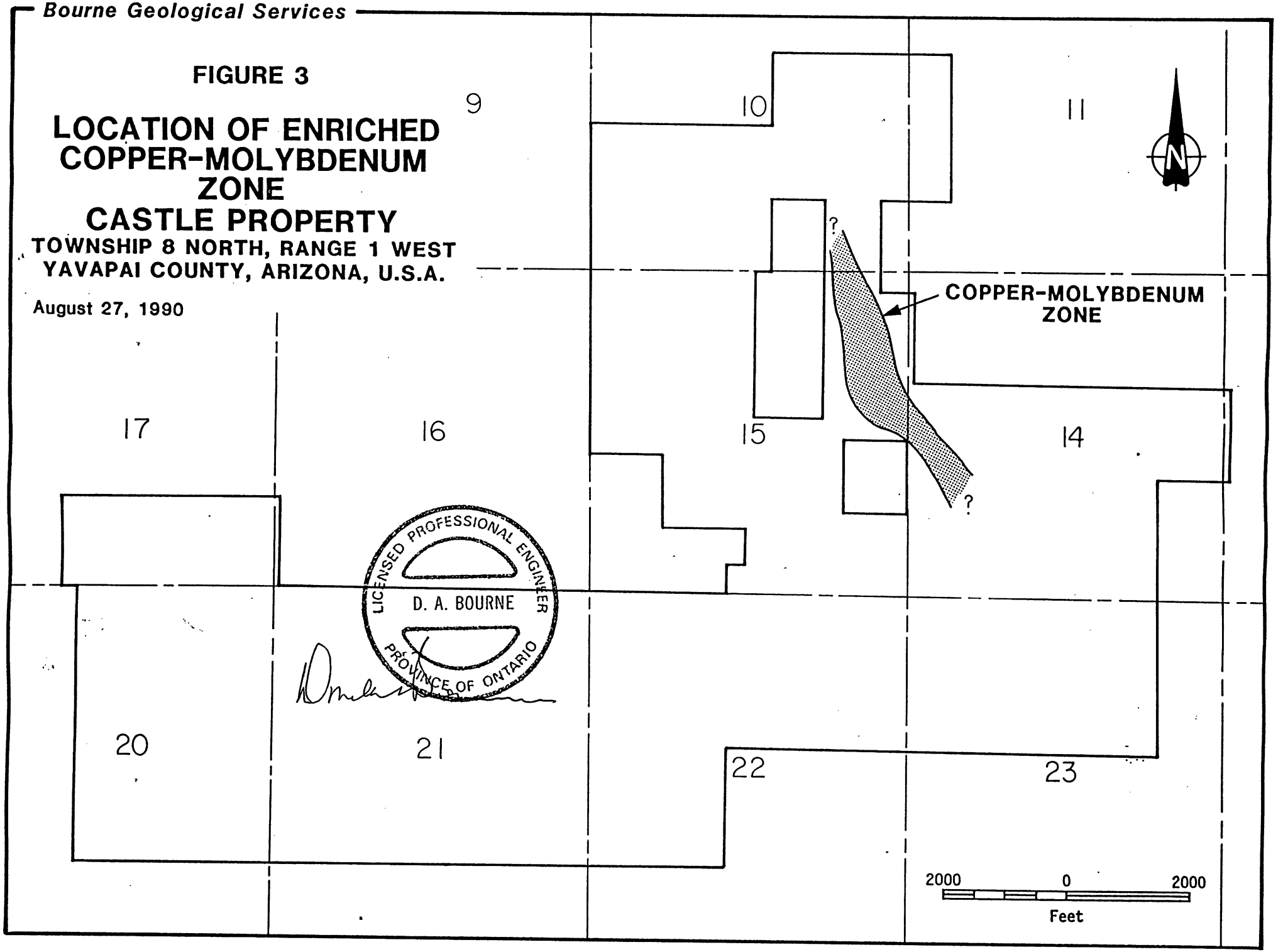
Bourne Geological Services

FIGURE 3

LOCATION OF ENRICHED COPPER-MOLYBDENUM ZONE CASTLE PROPERTY

TOWNSHIP 8 NORTH, RANGE 1 WEST
YAVAPAI COUNTY, ARIZONA, U.S.A.

August 27, 1990



DIAMOND DRILL DATA FOR DRILL INDICATED MINERAL INVENTORY CALCULATIONS CASTLE COPPER-MOLYBDENUM PROPERTY YAVAPAI COUNTY, ARIZONA

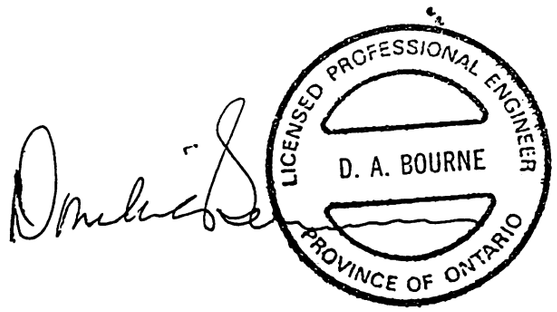
HOLE NO.	INTERSECTION FROM	TO	LENGTH	% CU	TXCU	% MoS_2	TXMoS_2
UC-1	1942'	1952'	10.0'	0.85	8.50	0.038	0.380
	1952	1962	10.0	1.24	12.40	0.038	0.380
	1962	1965	3.0	1.80	5.40	0.014	0.042
	1965	1971	6.0	0.16	0.96	0.010	0.060
	1971	1973	2.0	1.88	3.76	0.011	0.022
	1973	1980	7.0	6.74	47.18	0.013	0.091
	1980	1990	10.0	1.36	13.60	0.043	0.430
	1990	1995	5.0	0.76	3.80	0.029	0.145
			53.0'	1.80	95.60	0.029	1.550
SM-39	2091'	2101'	10.0'	0.45	4.50	0.020	0.20
	2101	2111	10.0	0.48	4.80	0.048	0.48
	2111	2121	10.0	1.21	12.10	0.048	0.48
	2121	2131	10.0	3.26	32.60	0.048	0.48
	2131	2141	10.0	0.51	5.10	0.048	0.48
			50.0'	1.18	59.10	0.042	2.12
SM-32	1986'	1996'	10.0'	0.56	5.60	0.036	0.360
	1996	2006	10.0	1.95	19.50	0.046	0.460
	2006	2016	10.0	1.28	12.80	0.046	0.460
	2016	2026	10.0	1.10	11.00	0.046	0.460
	2026	2036	10.0	0.41	4.10	0.046	0.460
	2036	2046	10.0	0.38	3.80	0.046	0.460
	2046	2056	10.0	0.76	7.60	0.082	0.820
	2056	2066	10.0	0.48	4.80	0.082	0.820
	2066	2076	10.0	0.49	4.90	0.082	0.820
	2076	2086	10.0	0.37	3.70	0.082	0.820
	2086	2096	10.0	0.63	6.30	0.082	0.820
	2096	2006	10.0	0.36	3.60	0.052	0.520
	2106	2116	10.0	0.53	5.30	0.052	0.520
			130.0'	0.72	93.00	0.060	7.800

DIAMOND DRILL DATA
FOR DRILL INDICATED
MINERAL INVENTORY CALCULATIONS
CASTLE COPPER-MOLYBDENUM PROPERTY
YAVAPAI COUNTY, ARIZONA

HOLE NO.	INTERSECTION FROM	TO	LENGTH	% CU	TXCU	% MoS_2	TXMoS_2
SM-20	1843'	1853'	10.0'	1.93	19.30	0.062	0.620
	1853	1863	10.0	1.13	11.30	0.062	0.620
	1863	1873	10.0	2.78	27.80	0.006	0.060
	1873	1883	10.0	1.40	14.00	0.006	0.060
	1883	1893	10.0	1.29	12.90	0.006	0.060
	1893	1903	10.0	0.95	9.50	0.006	0.060
	1903	1913	10.0	1.69	16.90	0.006	0.060
	1913	1923	10.0	1.72	17.20	0.061	0.610
	1923	1933	10.0	2.79	27.90	0.061	0.610
	1933	1943	10.0	1.81	18.10	0.061	0.610
	1943	1953	10.0	1.86	18.60	0.061	0.610
	1953	1963	10.0	1.08	10.80	0.061	0.610
	1963	1973	10.0	0.43	4.30	0.044	0.440
	1973	1983	10.0	0.77	7.70	0.044	0.440
	1983	1993	10.0	0.74	7.40	0.044	0.440
			150.0'	1.49	223.70	0.039	5.910

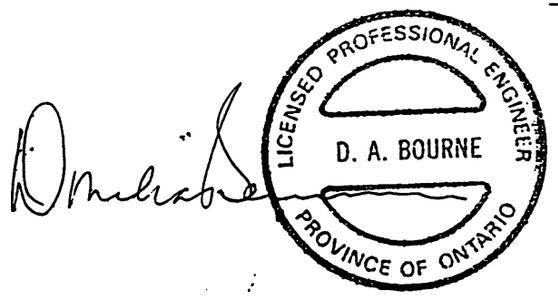
MINERAL INVENTORY CALCULATION
DRILL INDICATED
POSSIBLE ORE
CASTLE COPPER-MOLYBDENUM PROPERTY
YAVAPAI COUNTY, ARIZONA, U.S.A.

BLOCK	NE/SW	NW/SE	VERT	VOL(FT^3)	TONS	% CU	TXCU	MoS_2	% TX MoS_2	HOLE NO.
A	600	250	53.0	7,950,000	709,821	1.80	1,277,678	0.029	20,585	RC-UC-1
B	150	250	53.0	1,987,500	177,455	1.80	319,419	0.029	5,146	"
D	200	250	53.0	2,659,000	236,607	1.80	425,893	0.029	6,862	"
Z	100	250	130.0	3,250,000	290,179	0.72	208,929	0.060	17,411	SM-32
e	200	300	150.0	9,000,000	803,571	1.49	1,197,321	0.039	31,339	SM-20
i	200	175	150.0	5,250,000	468,750	1.49	698,438	0.039	18,281	"
m	200	175	150.0	5,250,000	468,750	1.49	698,438	0.039	18,281	"
q	600	175	150.0	15,750,000	1,406,250	1.49	2,095,313	0.039	54,844	"
r	400	800	150.0	48,000,000	4,285,714	1.49	6,385,714	0.039	167,143	SM-2-
s	400	800	53.0	16,960,000	1,514,286	1.80	2,725,715	0.029	43,914	RC-UC-1
			TOTALS		10,361,383	1.55	16,032,858	0.037	383,806	



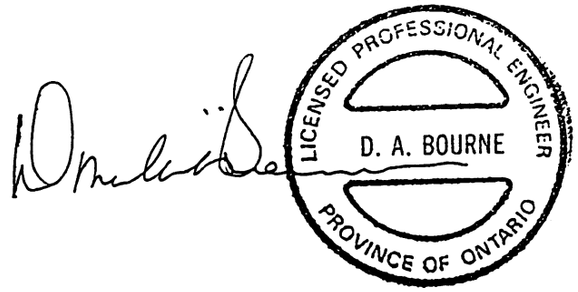
MINERAL INVENTORY CALCULATION
DRILL INDICATED
PROBABLE ORE
CASTLE COPPER-MOLYBDENUM PROPERTY
YAVAPAI COUNTY, ARIZONA, U.S.A.

BLOCK	NE/SW	NW/SE	VERT	VOL(FT^3)	TONS	% CU	TXCU	% MoS_2	TXMoS_2	HOLE NO.
C	400	250	53.0	5,300,000	473,214	1.80	851,785	0.029	13,723	RC-UC-1
E	150	250	53.0	1,987,500	177,455	1.80	319,419	0.029	5,146	"
G	250	250	53.0	3,312,500	295,759	1.80	532,366	0.029	8,577	"
H	175	250	53.0	2,318,750	207,031	1.80	372,656	0.029	6,004	"
J	225	250	53.0	2,981,250	266,183	1.80	479,129	0.029	7,719	"
L	225	250	53.0	2,981,250	266,183	1.80	479,129	0.029	7,719	"
N	300	250	50.0	3,750,000	334,821	1.18	395,089	0.042	14,062	SM-39
P	300	250	50.0	3,750,000	334,821	1.18	395,089	0.042	14,062	"
Q	200	250	50.0	2,500,000	223,214	1.18	263,393	0.042	9,375	"
S	350	250	50.0	4,375,000	390,625	1.18	460,938	0.042	16,406	"
T	250	250	50.0	3,125,000	279,018	1.18	329,241	0.042	11,719	"
V	250	250	50.0	3,125,000	279,018	1.18	329,241	0.042	11,719	
W	450	250	130.0	14,625,000	1,305,804	0.72	940,179	0.060	78,348	SM-32
Y	225	250	130.0	7,312,500	652,902	0.72	470,039	0.060	39,174	"
a	600	250	130.0	19,500,000	1,741,071	0.72	1,253,571	0.060	104,464	"
c	600	300	130.0	23,400,000	2,089,286	0.72	1,504,286	0.060	125,357	SM-32
f	300	300	150.0	13,500,000	1,205,357	1.49	1,795,982	0.039	47,009	SM-20
h	300	300	150.0	13,500,000	1,205,357	1.49	1,795,982	0.039	47,009	"
j	300	175	150.0	7,875,000	703,125	1.49	1,047,656	0.039	24,422	"
l	200	175	150.0	5,250,000	468,750	1.49	698,438	0.039	18,281	"
n	300	175	150.0	7,875,000	703,125	1.49	1,047,656	0.039	27,422	"
p	200	175	150	5,250,000	468,750	1.49	698,438	0.039	18,281	"
				TOTALS	14,070,869	1.17	16,459,752	0.047	655,998	



MINERAL INVENTORY CALCULATION
DRILL INDICATED
PROVEN ORE
CASTLE COPPER-MOLYBDENUM PROPERTY
YAVAPAI COUNTY, ARIZONA, U.S.A.

BLOCK	NE/SW	NW/SE	VERT	VOL(FT^3)	TONS	% CU	TXCU	% MoS_2	TXMoS_2	HOLE NO.
F	400	250	53.0	5,300,000	473,214	1.80	851,785	0 029	13,723	RC-UC-1
I	400	250	53.0	5,300,000	473,214	1.80	851,785	0.029	13,723	"
K	550	250	53.0	7,287,500	650,670	1.80	1,171,206	0.029	18,869	"
M	500	250	50.0	6,250,000	558,036	1.18	658,482	0.042	23,438	SM-39
O	500	250	50.0	6,250,000	558,036	1.18	658,482	0.042	23,438	"
R	400	250	50.0	5,000,000	446,429	1.18	526,786	0.042	18,750	"
U	575	250	50.0	7,187,500	641,741	1.18	757,254	0.042	26,953	"
X	500	250	130.0	16,250,000	1,450,893	0.72	1,044,643	0.060	87,054	SM-32
b	600	250	130.0	19,500,000	1,741,071	0.72	1,253,571	0.060	104,464	"
d	800	300	130.0	31,200,000	2,785,714	0.72	2,005,714	0.060	167,143	"
g	600	300	150.0	27,000,000	2,410,714	1.49	3,591,964	0.039	94,018	SM-20
k	600	175	150.0	15,750,000	1,406,250	1.49	2,095,313	0.039	54,844	"
O	600	175	150.0	15,750,000	1,406,250	1.49	2,095,313	0.039	54,844	"
				TOTALS	15,002,232	1.17	17,562,298	0.047	701,261	



The Sheep Mountain Stock is a composite body of Laramide (?) age which forms a slightly elongated dome measuring 3,400 feet by 2,300 feet whose long axis strikes N45° W and plunges 50° northwest. The copper-molybdenum mineralization on the Castle property appears to be related to this stock. Unconformably overlying the Precambrian and Laramide (?) rocks is a series of mid-Tertiary volcanic flows and pyroclastics from 1,500 to 2,200 feet thick which cover the entire Sheep Mountain East area.

The mineral system in the Sheep Mountain East area is an extremely large one with significant sulphide mineralization occuring over 3 or 4 square miles although the better grade copper-molybdenum values forming the drill indicated mineral inventory on the Castle property appear to be located within or adjacent to the Sheep Mountain Stock. Hypogene sulphide mineralization consists principally of pyrite with lesser chalcopyrite and molybdenite. Minor amounts of galena, sphalerite, magnetite and specularite are present locally.

The drill indicated copper-molybdenum mineral inventory identified to date on the Castle property occurs in a northwesterly striking zone which appears to follow the Cow Creek Fault along the eastern margin of the Sheep Mountain Stock. The zone measures 5,500 feet long by 1,100 feet wide and has been intersected by four drill holes spaced from 750 to 1,000 feet apart. In the mineral inventory calculation, it is assumed that these intersections of supergene enriched copper-molybdenum mineralization represent a tabular body continuous between drill holes rather than a complex of enriched shear zones or channels. The drill indicated mineral inventory for the Castle property is summarized as follows:

	TONS	% CU	TXCU	% MoS_2	TXMoS_2
PROVEN	15,002,232	1.17	17,562,298	0.047	701,261
PROBABLE	14,070,869	1.17	16,459,752	0.047	655,998
SUB TOTAL	29,073,101	1.17	34,022,050	0.047	1,357,259
POSSIBLE	10,361,383	1.55	16,032,858	0.037	383,806
TOTALS	39,434.484	1.27	50,054,908	0.044	1,741,065

As can be seen from Figure 4, there are substantial widths of primary copper-molybdenum mineralization below the supergene enriched blanket. Although perhaps of some future interest, no attempt has been made by the writer to calculate a tonnage for this material. Selected examples of this type of material are as follows:

HOLE NO.	INT.	% CU	% MoS_2
SM-20	100.0'	0.53	0.078
	290.0	0.46	0.086
SM-39	40.0	0.50	0.050
	40.0	0.50	0.041
UC-1	180.0	0.44	0.044
	32.0	0.82	0.043
	31.0	0.41	0.076

The writer recommends a program of fill-in rotary/core drilling and metallurgical test work for the Castle property. Phase I would consist of 5 holes each 2,500 feet in length, the upper 1,000 feet of each hole to be drilled using a rotary bit at a cost of $10 per foot, the remaining 1,500 feet of each hole to be cored at a cost of $35 per foot. The estimated cost of Phase I is $325,000 U.S. Phase II of the proposed work program would consist of an additional 19 rotary/core holes each 2,500 feet in length to be drilled in the same manner as those in Phase I plus a program of metallurgical test work on the drill

core. The estimated cost of Phase II is $1,697,500 U.S. The proposed location of the collar of each of the rotary/core holes is shown in Figure 5 although it is understood that the locations may have to be altered as drilling results dictate. The total cost of the proposed work program is estimated at $2,022,500 U.S.

COST ESTIMATES (U.S. FUNDS)

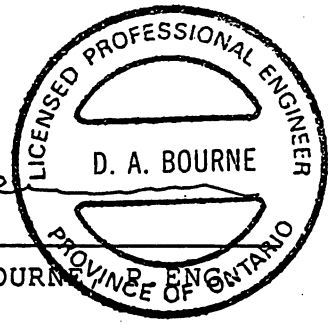
PHASE I

1. Mobilization and demobilization	$ 2,000
2. Diamond drilling: 5 holes each 2,500 feet in length, 0.0 to 1,000 feet rotary drilling @ $10 per foot, 1,000 to 2,500 feet core drilling @ $35 per foot to include contract price, splitting, logging, assaying	312,500
3. Site clean-up	2,500
4. Report, typing drill logs and report, drafting, printing	8,000
PHASE I	$ 325,000

PHASE II

1. Diamond drilling: 19 holes each 2,500 feet in length, 0.0 to 1,000 feet rotary drilling @ $10 per foot, 1,000 to 2,500 feet core drilling @ $35 per foot to include contract price, splitting, logging, assaying	$ 1,187,500
2. Metallurgical test work	500,000
3. Final report	$ 10,000
PHASE II	$ 1,697,500
TOTAL ESTIMATED COST	$ 2,022,500

Respectfully submitted,



DONALD A. BOURNE, P. ENG.

SCARBOROUGH, ONTARIO
AUGUST 27, 1990

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Hoyt, J.W. and Ascencios, A.

1981 Sheep Mountain Cu-Mo Project, Yavapai Co., Arizona. Private report for Utah International Inc.

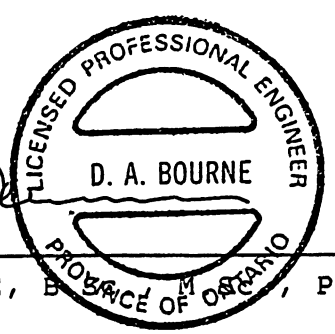
CERTIFICATE TO ACCOMPANY REPORT ON GEOLOGY AND MINERAL INVENTORY, CASTLE COPPER-MOLYBDENUM PROPERTY, SHEEP MOUNTAIN EAST AREA, HUMBUG MINING DISTRICT, YAVAPAI COUNTY, ARIZONA, U.S.A. FOR ORCANA RESOURCES LIMITED, TORONTO, ONTARIO, CANADA DATED AUGUST 27, 1990.

I, Donald A. Bourne of SCARBOROUGH, Ontario certify:

1. That I am a Professional Engineer and Consulting Geologist and reside at 16 Oakworth Crescent in the City of SCARBOROUGH in the Province of Ontario.
2. That I am a graduate of McMaster University and hold the degrees B.Sc. and M.Sc. in Honours Geology received in 1950 and 1951 respectively.
3. That I am a member of The Association of Professional Engineers of the Province of Ontario.
4. That I have practiced my profession as a geologist since 1951.
5. That I have no interest direct or indirect in the Castle Copper-Molybdenum Property nor in the securities of Orcana Resources Limited nor do I expect to receive any.
6. That the accompanying report is based on a review of copies of original reports, diamond drill logs, assay sheet and geological maps made available to the writer. A site examination has not been made.
7. That this certificate covers claim numbers:

RAY 1	- RAY 83	both	inclusive
RAY 89	- RAY 92	"	"
RAY 98	- RAY 145	"	"
RAY 147		RAY 153	
RAY 149		RAY 155	
RAY 151		RAY 157	

   all inclusive, being all the claims held by Orcana Resources Limited referred to in the accompanying report.
8. That I hereby consent to the inclusion of this report in the Prospectus, Statement of Material Facts or any amendment thereto, or any other regulatory filing of Orcana Resources Limited.



DONALD A. BOURNE, B.Sc., M.Sc., P.ENG.

SCARBOROUGH, ONTARIO
AUGUST 27, 1990

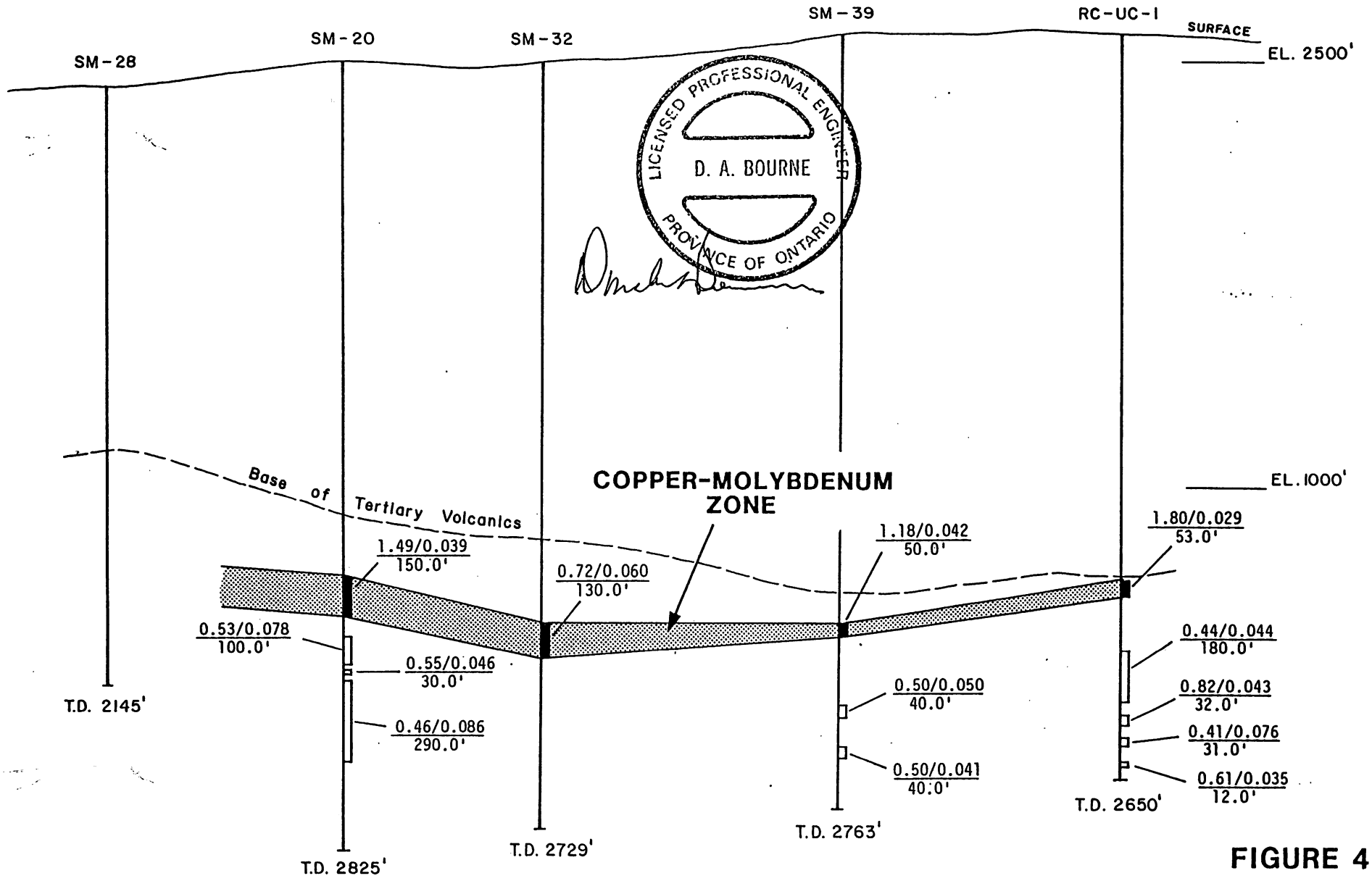
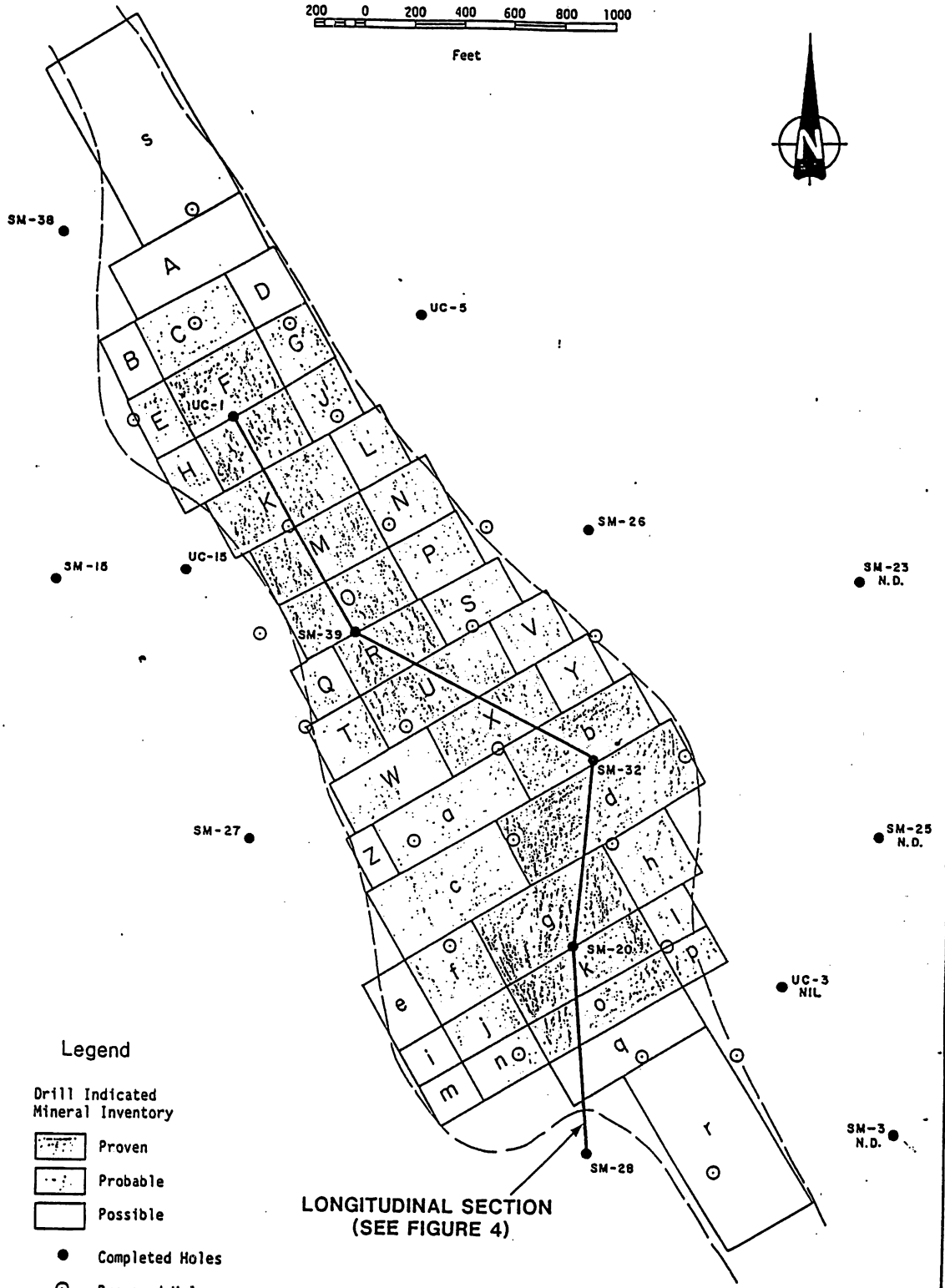


FIGURE 4

COMPOSITE LONGITUDINAL SECTION COPPER-MOLYBDENUM ZONE CASTLE PROPERTY

YAVAPAI COUNTY, ARIZONA, U.S.A.

August 27, 1990



LICENSED PROFESSIONAL ENGINEER
D. A. BOURNE
PROVINCE OF ONTARIO

FIGURE 5

MINERAL INVENTORY
CASTLE COPPER-MOLYBDENUM DEPOSIT
DIAMOND DRILL PLAN MAP
AND LOCATION OF
COPPER-MOLYBDENUM ZONE

YAVAPAI COUNTY, ARIZONA

ROOM & PILLAR

A "MINE - FORECAST" EVALUATION

NAME OF PROPERTY:

CASTLE Cu-Mo

REPORT PREPARED BY:

J. STEERS

DATE OF REPORT PREPARATION:

31-JUL-90

SECTION I - INTRODUCTION

This worksheet was prepared by: J. STEERS
The property being evaluated is known as: CASTLE Cu-Mo
Date that this worksheet was prepared: 31-JUL-90
Metals present and prices chosen(Cdn.$!)

Copper(Cdn$/	$1.41
Moly(Cdn$/lb	$6.05

INCLUDES $1.50 PER TON FOR PRECIOUS METALS NET

Tonnage estimate: 40,000,000 Tonnes

Grade estimate:

Gold		g/mt.
Silver		g/mt.
Copper	1.25	%
Lead		%
Zinc		%
Moly	0.07	%MoS2

****

These are the basic parameters
chosen to describe the property
under evaluation.

SECTION II - MINING PARAMETERS:

Average stoping width of the ore zone	30.00	metres
General dip of the ore zone	0	Degrees
Maximum depth below surface	700	metres
Relatively competent rocks	2	
ROOM AND PILLAR UNDERGROUND MINING CASE:		
Calculated dilution factor:	7.1	%
Assumed recovery factor:	70	%
Recoverable ore reserves:	29,975,570	Tonnes

With a grade of:

Au	Ag gpt
0.00	0.00
Cu%	Pb%
1.17	0.00
Zn%	MoS2%
0.00	0.06

Calculated annual mine capacity:	1,895,608	Tonnes/year
Hence mine lifetime is:	16.0	Years

++

The mining method has been chosen and the main characteristics of the ore zone of relevance to mine operation defined.A recoverable grade and tonnage is arrived at and an optimum mining rate is suggested.

SECTION III - MILLING PARAMETERS Copper(+/-Au & Ag)- Molybdenite ores

COPPER CONCENTRATE:		
Calculated mill recovery:	93.82	% for Cu.
Calculated mill recovery:	100.00	% for Ag.
Calculated mill recovery:	100.00	% for Au.
Assumed grade of Cu in the concentrate:	28.50	%Cu
Calculated grade of Ag in the concentrate	0.00	gms/tn.Ag
Calculated grade of Au in the concentrate	0.00	gms/tn.Au
Recoverable metals per year -	20,765	Tonnes of Cu
Recoverable metals per year -	0	Grams of Ag
Recoverable metals per year -	0	Grams of Au
Tonnes of concentrate produced per year -	72,859	Tonnes
NET SMELTER VALUE	$714.33	/Tonne
CONCENTRATE TRANSPORTATION COSTS:		
Rail freight distance:	120	kms.
Road freight distance:	60.00	kms.
Ocean Transport (Choice #):	5	
Number of transfer points:	1	
Transportation cost :	$33.79	/Tonne conc.
ANNUAL REVENUE AT THE MINE SITE:	$49,583,674	
MOLYBDENITE CONCENTRATE		
Calculated Mill Recovery:	43.57	% for MoS2
Assumed grade of MoS2 in concentrate:	80	%MoS2
Recoverable metals per year -	501	tns of MoS2
Tonnes of concentrate produced per year -	627	tonnes
NET SMELTER VALUE	$10,670.26	/Tonne
CONCENTRATE TRANSPORTATION COSTS:		
Rail freight distance:	120	kms.
Road freight distance:	60.00	kms.
Ocean Transport (Choice #):	5	
Number of transfer points:	1	
Transportation cost :	$33.79	/Tonne conc.
ANNUAL REVENUE AT THE MINE SITE:	$6,667,306	
TOTAL ANNUAL REVENUE AT THE MINE SITE:	$56,250,980	

****

Based on the ore type selected
the metal recoveries are defined
and the Annual Revenue at the mine
site is calculated.

SECTION IV - ESTIMATION OF OPERATING COSTS

Daily mined tonnage (5d/wk)-	7291	Tns/day(Ore)
Daily milled tonnage (7d/wk) -	5193	Tns/day
Mine operating costs:		
Labour Cost - (Room and Pillar)	$2.27	/Tonne
Supplies Cost - (Room and Pillar)	$3.72	/Tonne
Mill Operating Costs:		
Labour Cost	$1.99	/Tonne
Supplies Cost	$2.55	/Tonne
EMPLOYEES REQUIRED:-		
Operating Personell - (Mine):		
Room and Pillar Mining:		
Development	17	
Stoping	54	
Mine Service	14	
Maintenance	15	
Mine Staff	19	
TOTAL	119	
Operating Personell - (Mill)		
complex sulphide mills	59	
Administration and Gnl. Services:		
Electrical Services	7	
Plant Serv. & Roads	7	
Townsite	7	
Gnl. Admin.	12	
TOTAL EMPLOYEES REQUIRED:	212	
Admin & Gnl Services -Operating Costs/dy.		
Electrical Services	$871	
Surface Plant Services	$704	
Camp Employees Wages	$640	
Fringe Benefits	$775	
Supplies	$922	
Camp Operating Cost	$2,881	
Gnl Admin Expenses	$1,280	
Electric Power	$11,819	
TOTAL	$19,892	
Admin & GnlServ Cost	$3.83	/Tonne(Ore)
TOTAL ANNUAL OPERATING COSTS:	$27,216,930	

****

Based on the selected mining method and type of ore an estimate is made of operating costs and number of employees required.

SECTION V - PROCESS PLANT,CAPITAL COST ESTIMATION:

Plant-Site Clearing and Mass Excavation	
Relatively flat site:	$969,324
Concrete Foundations and detailed excavations	
Concrete poured to solid rock:	$2,743,936
Crushing Plant,Coarse Ore Storage and Conveyors:	$6,173,855
Concentrator Building	
Mild climate:	$4,115,903
Grinding Section and Fine Ore Storage	
Medium ores (70% -200#):	$9,320,945
Flotation and/or Processing Section	
Flotation-complex base metal ores	$3,883,727
Thickening and filtering Section	
Complex base metal ores	$1,371,968
Concentrate Storage and Loading	$1,028,824
CAPITAL COST OF PROCESS PLANT:	$28,579,658

****

Taking into account the climatic and site conditions an appropriate estimate is made for the mill capital cost.

SECTION VI - MINE, CAPITAL COST ESTIMATION.

UNDERGROUND MINE CASE

Timbered shaft		
Area:	30.9	sq.m
Cost of shaft sinking	$11,252,326	
Hoisting Plant sizing and Cost:		
Drum diameter	4.4	metres
Hoisting Speed	858.0	m/min
Motor Horsepower	5,366.0	HP
Area of Hoistroom	994.7	sq.m
Headframe Height	59.8	metres
Weight of structural steel	1,251,661	Kg.
Cost of erecting Headframe complex	$5,667,922	
Cost of installing hoist	$781,552	
Cost of Hoistroom	$2,529,600	
Cost of Hoist Equipment	$4,692,906	
Preproduction Mine Development costs:		
Drifts,ramps,raises(as drifting equiv.)	14,228	metres
Cost of Mine Development	$11,948,380	
Compressor capacity	12,651	CFM
Compressor installation cost	$234,171	
Compressor purchase price	$1,273,235	
Equipment cost & installation	$12,003,952	
Cost of Maintenance Facilities	$2,275,788	

CAPITAL COST OF UNDERGROUND MINE $52,659,832

****

Based on the mining method selected and the daily mining rate,pre-production capital costs for the mine itself are estimated.

SECTION VII-PLANT UTILITIES AND GENERAL SERVICES,CAPITAL COST ESTIMATION

Existing utility services	
Peak	20,972 KW
Substation	$1,804,634
Loc Dist.	$3,093,657
Cost of power line extension:	$107,934
Tailings Storage	$1,097,574
Water Supply	
Reclaim water required	856 GPM
Cost of reclaim water pumps	$310,225
Cost of General Plant Services	$1,044,071
Kms of road to be constructed	10
Cost of access road construction	$1,259,230
Townsite/Accommodation costs	$1,523,556
UTILITIES AND GENERAL SERVICES CAPITAL COST	$10,240,883

****

Depending on information provided on power availability,need for road provision,commuting distance from nearest community and the determined daily milling rate,an appropriate estimate is made for the cost of providing mine utilities and general services.

SECTION - VIII PROJECT OVERHEAD COSTS

Feasibility studies,design engineering and technical planning	$7,318,430
Project supervision,contract management,expediting and general construction facilities,including camp costs:	$9,148,037
Administration,accounting,legal and pre-production employment of key operating staff:	$6,403,626
TOTAL PROJECT OVERHEAD COSTS	$22,870,093

****

SECTION IX - SUSTAINING CAPITAL COSTS

Mill Sustaining capital cost	$154,715 /Year
Mine Sustaining Capital Cost	$4,533,505 /Year
TOTAL SUSTAINING CAPITAL COST	$4,688,219

****

Project overhead costs are taken to be a fixed percentage of direct project costs.

Annual sustaining capital costs are those required to keep mine and mill equipment in good order during the production period.

1) 5200 TONNES/DAY

****

SECTION X - SUMMARY

****

Property Name:.....	CASTLE Cu-Mo
Ore Type.....	Copper - Molybdenite ore
Mining Method used.....	Room and Pillar
Recoverable Ore Reserves.....	29,975,570 Tonnes
Mining Rate (of ore) per day.....	7,291 Tonnes
Milling Rate per day.....	5,193 Tonnes
Mine Lifetime.....	16.0 Years
Annual Revenue at the Minesite.....	$56,250,980
Annual Operating Costs.....	$27,216,930
Capital Cost of Mill.....	$28,579,658
Capital Cost of Mine.....	$52,659,832
Capital Cost of Utilities and Services.....	$10,240,883
Project Overhead Costs.....	$22,870,093
Working Capital Required (3 mos operating)...	$6,804,232
Total Pre-Production Capital Cost.....	$114,350,465
Preproduction (yrs).....	5
Payback (years).....	5

CASH FLOW DISTRIBUTION SUMMARY
CASTLE Cu-Mo

YEAR #---->	1	2	3	4	5
ANN.REV--->	0.00	0.00	0.00	0.00	0.00
OP.COSTS-->	0.00	0.00	0.00	0.00	0.00
CAPITAL--->	22.87	22.87	22.87	22.87	22.87
SUST.CAP-->	0.00	0.00	0.00	0.00	0.00
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	(22.87)	(22.87)	(22.87)	(22.87)	(22.87)

YEAR #---->	6	7	8	9	10
ANN.REV--->	56.25	56.25	56.25	56.25	56.25
OP.COSTS-->	27.22	27.22	27.22	27.22	27.22
CAPITAL--->	0.00				
SUST.CAP-->	4.69	4.69	4.69	4.69	4.69
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	24.35	24.35	24.35	24.35	24.35

YEAR #---->	11	12	13	14	15
ANN.REV--->	56.25	56.25	56.25	56.25	56.25
OP.COSTS-->	27.22	27.22	27.22	27.22	27.22
CAPITAL--->					
SUST.CAP-->	4.69	4.69	4.69	4.69	4.69
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	24.35	24.35	24.35	24.35	24.35

YEAR #---->	16	17	18	19	20	TOTAL
ANN.REV--->	56.25	56.25	56.25	56.25	56.25	843.76
OP.COSTS-->	27.22	27.22	27.22	27.22	27.22	408.25
CAPITAL--->						114.35
SUST.CAP-->	4.69	4.69	4.69	4.69	4.69	70.32
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	24.35	24.35	24.35	24.35	24.35	250.84

SUMMARY FINANCIAL STATISTICS

Net Present Values of the
Cash Flow at various discount
rates:

NPV@8%-->	$50.51 Million
NPV@10%->	$28.28 Million
NPV@12%->	$11.65 Million
NPV@14%->	($0.85)Million
NPV@16%->	($10.26)Million

The "Internal Rate of Return"
or Discounted Cash Flow
Rate of Return:

DCFROR--> 13.84 %(IRR)

****

SECTION X - SUMMARY

****

Property Name:.....	CASTLE Cu-Mo	
Ore Type.....	Copper - Molybdenite ore	
Mining Method used.....	Room and Pillar	
Recoverable Ore Reserves.....	29,975,570	Tonnes
Mining Rate (of ore) per day.....	10,000	Tonnes
Milling Rate per day.....	7,123	Tonnes
Mine Lifetime.....	12.0	Years
Annual Revenue at the Minesite.....	$77,153,353	
Annual Operating Costs.....	$34,148,810	
Capital Cost of Mill.....	$34,410,351	
Capital Cost of Mine.....	$61,107,292	
Capital Cost of Utilities and Services.....	$11,976,756	
Project Overhead Costs.....	$18,274,048	
Working Capital Required (3 mos operating)...	$8,537,203	
Total Pre-Production Capital Cost.....	$125,768,447	

2) 7200 TONNES/DAY

Preproduction (yrs).....	5
Payback (years).....	3

CASH FLOW DISTRIBUTION SUMMARY
CASTLE Cu-Mo

YEAR #---->	1	2	3	4	5	6
ANN.REV--->	0.00	0.00	0.00	0.00	0.00	77.15
OP.COSTS-->	0.00	0.00	0.00	0.00	0.00	34.15
CAPITAL--->	25.15	25.15	25.15	25.15	25.15	0.00
SUST.CAP-->	0.00	0.00	0.00	0.00	0.00	5.81
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	(25.15)	(25.15)	(25.15)	(25.15)	(25.15)	37.20

NPV@8%--> $92.66 Million
NPV@10%-> $63.71 Million
NPV@12%-> $41.32 Million
NPV@14%-> $23.92 Million
NPV@16%-> $10.37 Million
DCFROR--> 17.95 %(IRR)

##10,000 TONNES/DAY

7	8	9	10	11	12	13	14
77.15	77.15	77.15	77.15	77.15	77.15	77.15	77.15
34.15	34.15	34.15	34.15	34.15	34.15	34.15	34.15
5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37.20	37.20	37.20	37.20	37.20	37.20	37.20	37.20

15	16	17	18	19	20	TOTAL
77.15	77.15	77.15	0.00	0.00	0.00	925.84
34.15	34.15	34.15	0.00	0.00	0.00	409.79
						125.77
5.81	5.81	5.81	0.00	0.00	0.00	69.68
0.00	0.00	8.54	0.00	0.00	0.00	8.54

15	16	17	18	19	20	TOTAL
77.15	77.15	77.15	0.00	0.00	0.00	925.84
34.15	34.15	34.15	0.00	0.00	0.00	409.79
						125.77
5.81	5.81	5.81	0.00	0.00	0.00	69.68
0.00	0.00	8.54	0.00	0.00	0.00	8.54

37.20	37.20	45.74	0.00	0.00	0.00	329.15

SECTION X - SUMMARY

Property Name.....	CASTLE Cu-Mo
Ore Type.....	Copper - Molybdenite ore
Mining Method used.....	Room and Pillar
Recoverable Ore Reserves.....	29,975,570 Tonnes
Mining Rate (of ore) per day.....	10,000 Tonnes
Milling Rate per day.....	7,123 Tonnes
Mine Lifetime.....	12.0 Years
Annual Revenue at the Minesite.....	$77,153,353
Annual Operating Costs.....	$34,148,810
Capital Cost of Mill.....	$34,410,351
Capital Cost of Mine.....	$61,107,292
Capital Cost of Utilities and Services.....	$11,976,756
Project Overhead Costs.....	$18,274,048
Working Capital Required (3 mos operating)...	$8,537,203
Total Pre-Production Capital Cost.....	$125,768,447
Preproduction (yrs).....	4
Payback (years).....	3

CASH FLOW DISTRIBUTION SUMMARY
CASTLE Cu-Mo

YEAR $---->	1	2	3	4	5	6
ANN.REV--->	0.00	0.00	0.00	0.00	77.15	77.15
OP.COSTS-->	0.00	0.00	0.00	0.00	34.15	34.15
CAPITAL--->	31.44	31.44	31.44	31.44	0.00	0.00
SUST.CAP-->	0.00	0.00	0.00	0.00	5.81	5.81
WORK.CAP-->	0.00	0.00	0.00	0.00	0.00	0.00
CASH FLOW->	(31.44)	(31.44)	(31.44)	(31.44)	37.20	37.20

NPV@8%-->	$104.40 Million
NPV@10%->	$75.31 Million
NPV@12%->	$52.33 Million
NPV@14%->	$34.10 Million
NPV@16%->	$19.58 Million
DCFROR-->	19.69 %(IRR)

**10,000 TONNES/DAY 4 YRS PREPRODUCTION

7	8	9	10	11	12	13	14
77.15	77.15	77.15	77.15	77.15	77.15	77.15	77.15
34.15	34.15	34.15	34.15	34.15	34.15	34.15	34.15
5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37.20	37.20	37.20	37.20	37.20	37.20	37.20	37.20

15	16	17	18	19	20	TOTAL
77.15	77.15	0.00	0.00	0.00	0.00	925.84
34.15	34.15	0.00	0.00	0.00	0.00	409.79
						125.77
5.81	5.81	0.00	0.00	0.00	0.00	69.68
0.00	8.54	0.00	0.00	0.00	0.00	8.54
37.20	45.74	0.00	0.00	0.00	0.00	329.15

CAMBIOR USA, INC.

October 18, 1990

Mr. Raymond J. Mongeau
ORCANA RESOURCES LTD.
121 Richmond Street West
Suite 405
Toronto, Ontario
Canada M5H 2K6

RE: Castle Copper Molybdenite Deposit
Yavapai County, Arizona

Dear Mr. Mongeau:

Thank you for submitting your Castle Copper-Molybdenum Property situated in Arizona. We have reviewed the material submitted. Based on our review, Cambior has decided not to pursue the evaluation of the Castle Copper property.

Thank you for considering Cambior as a potential partner in furthering the development of your mineral property.

Yours truly,

CAMBIOR USA, INC.

Michel Drouin
Exploration Manager

MD:lat

cc: J. Boissonnault

230 South Rock Blvd., Suite 23, Reno, Nevada 89502-2345
702-786-5189 Fax 702-786-4549

ORCANA RESOURCES LIMITED

405 416-364-2015
SUITE ~~904~~ • 121 RICHMOND STREET WEST • TORONTO • ONTARIO • M5H 2K6 • TELEPHONE ~~416 947 9500~~

September 19, 1990

Cambior Inc.
Suite 1075
3rd Ave. East
Val d'Or, P.Q.
J9P 6M1

Attention: Mr. J. Boissonnault → Michel Drouin
Vice President of Exploration

Dear Mr. Boissonnault

We wish to present you an attractive exploration and development package consisting of a large supergene enriched copper blanket deposit averaging about 100 ft. in thickness within a large copper-molybdenum system located about 50 miles northwest of Phoenix, Arizona.

The enriched copper sulphide blanket has inferred ore reserves estimated at 40 million tons grading 1.27% copper, 0.047% molybdenite and carrying very low values in gold and silver. These reserves are based on the results of widely spaced vertical drill holes. Fill-in drilling along a fault zone should augment the copper grade. An additional 60 - 100 million tons grading 0.50 - 0.65% Cu. and 0.06% MoS_2 exist below this blanket. Other favourable exploration targets to locate similar enriched copper zones within the widespread hypogene copper-molybdenum mineralization are known to exist as well.

The copper blanket is at a depth of 2200 feet and is amenable only to underground mining. An underground bulk mining method probably similar to that utilized by Magma Copper at its large underground San Manuel Mine near Tuscon, Arizona is envisioned. This mine processes 45,000 tons of ore per day at an average grade of 0.65% Cu. and presently generates a healthy cash flow.

John Steers Consulting Ltd. conducted a quick economic evaluation of the copper blanket zone only and returned positive results. The blanket zone is made up largely of chalcocite and therefore, would lend itself to higher grade concentrates.

In addition to the above there exist known favourable porphyry copper targets of shallow origin further to the west which also require immediate attention.

I have enclosed reports on the enriched blanket only. If you wish to pursue this further I would only be too pleased to meet with you to present you with the details.

Yours very truly

Raymond J. Mongeau
Encl.

MEMO

Date: July 24, 1990

To: Mr. J.A. Tait/Mr. R.J. Mongeau

From: J.E. Steers

Subject: Castle Copper- Molybdenum Property, Arizona

Further to your request I have reviewed the extant data on the above captioned property, in particular, the exploration records of work carried out by Phelps Dodge Corporation (PD), 1963-1966, Bear Creek Mining Co., 1966-7, and Utah International Inc. (UIC), 1960-1980.

An excellent summary of the work carried out to date and an excellent description of the detailed geology is contained in a UIC Progress Report dated Sept 29, 1980.

Basically this large property (141 unpatented lode mining claims, 2500 acres) located about 50 miles northwest of Phoenix Arizona is underlain by a Precambrian complex of biotite schists of the Yavapi Series intruded by foliated alaskite granite and diorite of the Bradshaw Complex. The Sheep Mountain composite, believed to be of Laramide age, is intrusive into the above rocks forming an elongate domal structure about 3400 feet by 2300 feet, the long axis of which has a N45°W strike and a northwest plunge of about 50°. Unconformably overlying the Precambrian and Laramide rocks are series of mid-Tertiary volcanic flow and pyroclastic rocks some 1500 to 2200 thick which cover the entire Sheep Mountain East area. Post-mineral andesitic dikes, probable feeders for the volcanic complex cut all rocks along the eastern margin of the stock.

A large mineral system some 3 to 4 square miles in area contains significant sulphide mineralization. Two zones of (1) molybdenum-copper mineralization and (2) copper-molybdenum mineralization are associated with the northern and northeastern margin of the Sheep Creek intrusive. Various tonnage-grade estimates have been attempted for the two zones with a wide variety of parameters for cut-off grades, Cu-MoS_2 equivalents, areas of influence with an emphasis on total tonnage have yielded geological reserves from 100 million tons to several 100 million tons for both zones of low grade Cu-MoS_2.

Of particular importance, I believe, is the supergene enriched portion of zone 2, along the northeastern margin of the intrusion, in apparent association with NW trending Cow Creek Fault. Here 4 drill holes indicate an area some 5500 feet long by 1100 feet wide with an average drill indicated thickness of 87.5 feet and an average grade of greater than 1% Cu and 0.05 to 0.07% MoS_2. Most of the copper occurs as chalcocite which would produce a superior concentrate, if mined and milled to that produced from

chalcopyrite.

Utilizing a factor of 11.2 cubic ft. to the ton (as did PD & UIC) an volume of 5500 x 1100 x 80 ft. would contain in excess of 40 million tons, in a configuration probably amenable to bulk underground mining methods such as room and pillar or vertical crater retreat.

It is believed that a 2 phase rotary/core drilling program be carried out. Probable costs would be phase I $6-700,000 and phase II. about $1,500,000.

It is believed that the above programs would be relatively low risk ones which would help define the geometry of the deposit, increase the confidence level of the reserve estimate, provide material for mineralogical and metallurgical tests and bring the project to the pre-feasibility stage.

A successful 2 phase program would considerably enhance the project at which time a joint venture with a major could be contemplated to accomplish the requisite underground exploration and development.

The property would still have a number of other, "grass-roots" targets defined by UIC.

It is recommended that the data be compiled and an up to date reserve calculation be carried out using cut-off grades compatible with to-days metal prices and that the grades be expressed as %Cu and %MoS_2 and not as Cu equivalents.

Respectfully submitted,

J.E. Steers P. Eng.

REGISTERED PROFESSIONAL ENGINEER
J.E. STEERS
PROVINCE OF ONTARIO

AN EVALUATION REPORT

OF

THE CASTLE COPPER MOLYBDENITE DEPOSIT

SHEEP MOUNTAIN EAST AREA

YAVAPAI COUNTY, ARIZONA

BY

RAYMOND J. MONGEAU

JULY, 1990

SUMMARY

The Castle Copper Molybdenite deposit, a porphyry-type, copper deposit typical of that found in the southwest United States is located about 50 kilometers from Phoenix in Arizona. It is located on one of the largest porphyry-type copper-bearing sulphide mineralized systems in Arizona.

The supergene copper sulphide blanket within a large primary copper-molybdenite system is estimated to contain 40-50 million tons grading 1.25% Cu and 0.08% MoS_2. By including the lower portion of this blanket, inferred ore reserves stand at 200 million tons grading 0.55% Cu and 0.069% MoS_2. As shown in a separate evaluation report by John Steers Consulting, this deposit which is located at a depth of about 1500 feet and amenable to underground bulk mining appears to be economical at today's copper price. A major fill-in drilling program is, however, necessary to establish proven and probable ore reserves.

On a larger scale inferred ore reserves stand at 700 million tons grading 0.26% Cu and 0.056% MoS_2, or 400 million tons grading 0.334% Cu and 0.068% MoS_2. A portion of this zone is reported to contain 140 million tons grading 0.30% Cu and 0.10% MoS_2. This deposit underlies a thick (1200') post mineralized volcanic cap and therefore cannot be considered for open pit mining at this time.

An attractive exploration target also exists southwest of the Cow Creek zone along the West Fault where it intercepts the primary copper-molybdenite mineralization. Another similarly enriched secondary copper zone likely exists here and could contain an additional 15 million tons of 1.25% copper and 0.06% MoS_2.

It is known that copper leaching has been thorough in the vicinity of favourable structures such as faults. Considering the extensiveness of the primary copper-molybdenite mineralization and the number of faults in the area other attractive secondary enriched copper deposits likely exist on the property.

INTRODUCTION

Upon the completion of an evaluation study of copper properties in Arizona and its recommendation the writer acquired the Castle porphyry copper-molybdenite deposit located in Yavapai County near Phoenix. This deposit warrants serious exploration and fill-in drilling. At the current copper price of $1.10 - 1.25 US per pound this deposit appears to be economical, assuming, fill-in drilling is successful. The writer refers to an Economic Evaluation by John Steers Consulting Inc., enclosed with this report.

PREVIOUS WORK

The porphyry type copper-molybdenite mineralization identified by widely spaced, vertical diamond drilling (750 to 2000 ft apart) was carried out by Phelps Dodge during the 1960's and BHP-Utah during the 1970's and 1980's. Very little time and money was spent on the property by BHP-Utah during the 12 years they held the property. The previous drilling covered a large area of about 3-4 square miles.

The better grade primary (hypogene) copper-molybdenite mineralization appears to be localized along a contact between a monzonite porphyry intrusive and Precambrian rocks. It forms an envelope about 1000 and 2000 feet in width. A strong, but likely irregular, supergene copper sulphide blanket high in copper values has been traced along the eastern portion of the quartz monzonite intrusive located in the Sheep Mountain East Area (see Maps 1 and 2).

Attempts have been conducted by previous workers at estimating inferred ore reserves from widely spaced drill holes and these are summarized below:

Year	Ore Reserves-Tons	Cu %	MoS_2 %	Cu Equivalent %
1967	91,068,114	0.74	0.065	0.92
1969	40,000,000	-	-	1.25
"	90,000,000	-	-	0.90
"	74,600,000	0.60	0.07	0.71
"	17,500,000	1.29	0.058	1.41
"	790,000,000	0.245	0.037	0.318
1971-5	103,000,000	0.55	0.07	-
1981				
Copper Zone	91,000,000	0.74	0.065	1.00
Moly Zone	140,000,000	0.30	0.10	

CURRENT EVALUATION

An evaluation of the drill results in the vicinity of the supergene (secondary) copper sulphide blanket located along the Cow Creek fault zone (see Maps 1, 2 and 3 for details) indicates that there exists a great opportunity to define by fill-in drilling a richer copper zone amendable to underground bulk mining.

The degree of copper leaching in the area appears to have been rather complete and extensive having removed and concentrated copper by a multiple of between 5 to 10 times. The fact that the primary copper-molybdenite mineralization is extensive suggest that other similar supergene copper sulphide blankets likely exist in the area.

On the assumption that the secondary enriched copper continues along this fault zone (see Map 3) this area is estimated to contain 40-50 million tons grading 1.25% Cu and 0.06% MoS_2. By taking in the lower grade portion of this zone, reserves would stand at about 200 million tons grading 0.55% Cu and 0.069% MoS_2. No doubt, a major fill-in drilling program is necessary to establish more accurately tonnage and grade.

Based on the same premises as above an area in the vicinity of holes UC-18, SM-30, SM-37 and SM-44 should be seriously explored. At this juncture the northwest-trending West fault meets another north-trending fault with both faults intersecting the hypogene copper-molybdenite horizon. One should expect the existence of a rather thick supergene copper sulphide blanket at this juncture. Please note that the adjacent holes, namely SM-44 carries 0.11% Cu and 0.03% MoS_2 over 476 feet; UC-18, 0.20% Cu and 0.073% MoS_2 over 1052 feet; SM-30, 0.12% Cu and 0.10% MoS_2 over 558 feet; and SM-37, 0.23% Cu and 0.038% MoS_2 over 1258 feet. The potential enriched copper tonnage in this area (see Map 3) is 15 million tons of similar grade, being 1.20% Cu and 0.06% MoS_2.

The secondary sulphide copper mineral that constitutes most of the copper in the upper supergene sulphide blanket is chalcocite. Chalcocite is also found in lesser quantities at depth especially under the supergene blanket. It is interesting to note that holes SM-27, SM-44 and UC-18 and SM-19 carry low quantities of chalcocite over a wide width, suggesting that leaching was widespread in the general vicinity.

Since the predominant secondary copper sulphide mineral that makes up the supergene enriched copper sulphide blanket is chalcocite, it suggests that a leaching method may be available for extracting most of the copper, whether by in-situ method or by vat leaching of the ore after extraction from underground. This should be investigated as it could greatly reduce the cost of producing copper.

The size and horizontal configuration of the Castle Copper deposit described above lends itself to cheap underground bulk mining. An example of this is Magma's San Manuel copper deposit located just north of Tucson, Arizona. It has been operating since 1956 and currently mines 45,000 tons of ore per day utilizing an underground block caving method. Today the technology has greatly been improved utilizing new mining methods and more efficient and larger equipment. The San Manuel mine is currently generating a healthy cash flow at a mining grade of 0.72% copper.

The evaluation also reveals that a large, low grade copper-molybdenite deposit exists in the area. Results of widely spaced drill holes indicate inferred ore reserves of 700 million tons grading 0.26% Cu and 0.056% MoS_2 (see Map 3, Areas A, B and C and Table 1) or 400 million tons grading 0.334% Cu and 0.068% MoS_2 (Map 3, Areas A and B only). Obviously more detailed drilling is necessary to determine more accurately the true tonnage and grade.

As tabulated below a number of large open-pit copper-molybdenite mines in operation today in the southwestern United States that are generating large cash flows have similar ore reserve tonnage and grade. However, the Castle Copper deposit underlies a thick post-mineralized volcanic cap at least 1200 feet thick and therefore cannot be considered for open-pit mining at this time.

Mine	Ore Reserves	Average Grade	
Cyprus Mineral		Cu %	% MoS_2
Bagdad	707	0.42	0.035
Sierrita	562	0.34	0.062
Miami	252	0.43	-
Asarco			
Continental	420	0.28	0.072

EXPLORATION PROGRAM AND ESTIMATED COST

As shown on Map 3 a total of 30 deep diamond drill holes totalling 75,000 feet is recommended to bring this deposit to the pre-feasibility stage. A total of 23 fill-in drill holes is recommended for the main enriched copper zone along the Cow Creek fault and seven additional drill holes in the vicinity of the West fault zone. This program is estimated to cost $5.0 million to complete. It also includes $500,000 for metallurgical testing. It does not include drilling of the main molybdenite zone located to the northwest, deep exploration drilling of Area B, or fill-in drilling of Area C.

TABLE 1

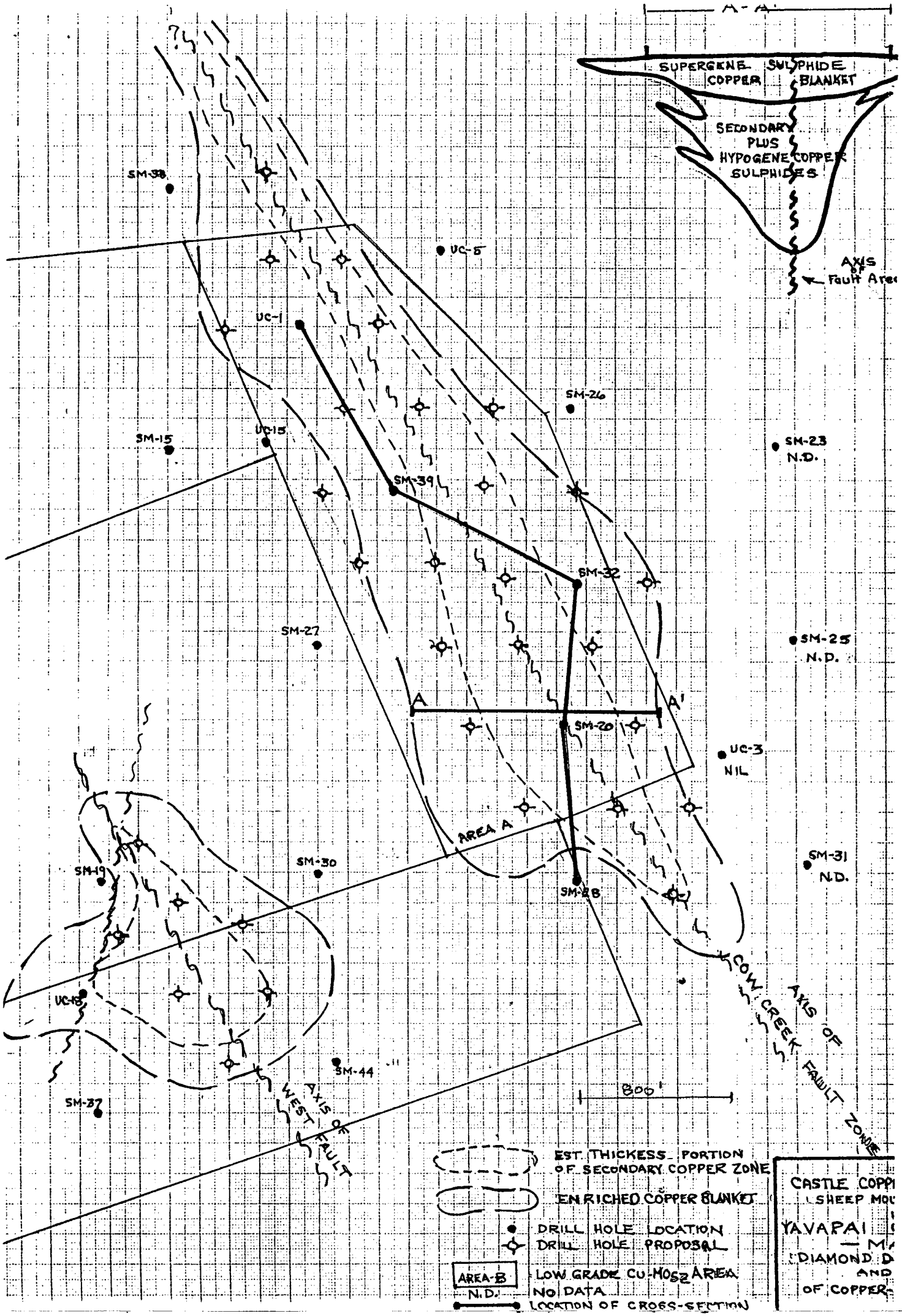
SELECTED DIAMOD DRILL ASSAY RESULTS

DDH NO.	THICKNESS FT	% CU	% MOS_2
UC-1	715	0.45	0.065
UC-5	240	0.23	0.005[-1]
UC-15	327	0.095	0.062
UC-17	832	0.36	0.109
UC-18	1052	0.20	0.073
SM-19	604	0.15	0.031
SM-20	1026	0.48	0.065
SM-22	390	0.025	0.011
SM-26	271	0.09	0.032
SM-27	810	0.10	0.027
SM-28	400	0.13	0.044
SM-30	558	0.12	0.10
SM-32	530	0.29	0.038
SM-37	1253	0.23	0.038
SM-39	600	0.37	0.052
SM-40	585	0.15	0.074
SM-44	478	0.11	0.03

[-1] Higher grade section: 50 ft. average 0.60% Cu

HIGH GRADE SECONDARY COPPER ZONE

DDH NO.	THICKNESS FT	% CU	% MOS_2
UC-1	65	1.57	0.057
SM-20	150	1.49	0.063
SM-32	130	0.72	0.062
SM-39	50	1.18	0.053


A - A'
SUPERGENE COPPER SULPHIDE BLANKET
SECONDARY PLUS HYPOGENE COPPER SULPHIDES
AXIS OF Fault Area
SM-38
UC-5
UC-1
SM-26
SM-15
UC-15
SM-23
N.D.
SM-39
SM-32
SM-27
SM-25
N.D.
A
A'
SM-20
UC-3
NIL
AREA A
SM-19
SM-30
SM-28
SM-31
N.D.
COW CREEK FAULT ZONE
AXIS OF
UC-18
SM-44
800'
SM-37
AXIS OF WEST FAULT
EST. THICKESS PORTION OF SECONDARY COPPER ZONE
ENRICHED COPPER BLANKET
DRILL HOLE LOCATION
DRILL HOLE PROPOSAL
AREA-B
LOW GRADE CU-MOS2 AREA
N.D.
NO DATA
LOCATION OF CROSS-SECTION
CASTLE COPP
SHEEP MO
YAVAPAI
DIAMOND D
AND
OF COPPER-


Gold
Gulch
Lucky Day Knob
Prospect
Mines
USLM
BM 5972
Rodenhouse
Wash
BM 4838
BM 4767
Mine
Wash
USLM No. 3
USLM No. 2
Graves
Rodenhouse
JEEP TRAIL
Clifton
Mines
Skinner Spring
FLAT
CLIFTON
CLIFTON HILLS
Jerry Spring
Goshute
Wash
Goshute Spring
East Well Spring
Wild Goose Spring
Minnehaha Spring
Mines
Monocco Mine
Mine
Mines
Montezuma Peak
BM 5948
PONY EXPRESS AND OVERLAND ST

Gold Gulch
Lucky Day Knob
Prospect
Mines
Mine
Wash
Rodenhouse
BM 4828
BM 3972
USLM
USLM No. 3
USLM No. 2
Graves
Clifton
Mines
Jurry Spring
Goshute
Goshute Spring
East Well Spring
Wild Goose Spring
Minnehaha Spring
Monocco Mine
Montezuma Peak
TRAIL
JEEP
Skinner Spring
FLAT
CLIFTON
HILLS
BM 5948
PONY EXPRESS AND OVERLAND STAGE
16
15
14
13
21
22
23
24
28
27
26
25
33
34
35
36
31
32
33

CYPRUS
Metals Company

Cyprus Metals Exploration
1320 Freeport Blvd., Suite 106
Sparks, Nevada 89431
702-358-0533
Fax 358-0587

June 29, 1995

Mr. Herb Duer
Desert Pacific Exploration
12475 Overbrook Drive
Reno, NV 89511

Dear Herb:

Accompanying this letter you will find the following:

1. 1"=1,000' sample map with outlines of the pre-Cambrian exposures
2. 1"=2,000' map showing the exposures of pre-Cambrian, the principal normal faults, PD's geochem sampling, and possible copper oxide zones
3. 1"=1,000' cross section thru UC-2 and UC-20 showing possible extension to Ash Creek
4. Descriptions of Cyprus generated samples
5. Geochem results from Cyprus samples

As you know, Bill Stanley thinks the section 18 copper oxide occurrence does not have the size potential required by Cyprus (100 to 200 million tons) given the limitations of stripping off the overlying volcanic rocks. A geologic potential of 40 to 50 million tons with a 2:1 stripping ratio is indicated from the surface exposures and drill holes UC-2 and UC-20. The mineralization appears to trend NE across the NW up-thrown block of pre-Cambrian and is cored by a zone of cupriferous quartz veins near the old exploration shafts. Sampling these quartz veins may give some good copper grades. I am intrigued by the possible extension of the UC-2 mineralization toward the northeast to the Ash Creek exposure of pre-Cambrian. I also think that UC-20 caught the upper enriched intercept of 0.78% Cu and that drilling deeper through a barren gap indicated in UC-2 would of intercepted the 200' thickness of 0.3% Cu. I am uncertain about the continuation of the UC-2 mineralization to the southwest.

The SM-1 mineralization in section 21 appears to have too much Tertiary cover.
I will be in the office July 10 to 14 if you would like to go over the details.

Sincerely,
Hank
Hank Ohlin

SHEEP MOUNTAIN COPPER-MOLYBDENUM PORPHYRY SYSTEM

YAVAPAI COUNTY, ARIZONA

LOCATION

This property is located in T8N, R1W Sections 14-22 in Yavapai County, Arizona with reasonable access to most of the property by way of dirt-to-gravel roads.

PROPERTY

78 unpatented mining claims and State lease on one section (still acquiring land)

OWNERSHIP

Desert Pacific Exploration
12475 Overbrook Drive
Reno, Nevada 89511
Tel (702) 853-7015
Fax (702) 853-7014

HISTORICAL WORK

The Property was discovered in the mid to late 50's in section 18 where mineralization outcrops. From 1963 to 1983 three major mining groups drilled a total of 67 rotary\core holes totaling over 100,000 feet. The property was subsequently dropped due to a lack of interest in copper deposits by most major mining concerns in 1984. It came to DPE's attention that the claims had become invalid when the previous owners failed to pay their filing fees with the BLM by August 31st, 1994. In accord with Federal requirements governing private surface and federal mineral ownership, DPE has acquired a land position covering the part of the resource area. We are still in the negotiating phase for certain key parcels. The following is a summary of the drilling to date:

1963-67	Phelps-Dodge	44 rotary\core holes for >50,000'
1967	Bear Creek	3 core holes for a total of >3620'
1968-82	Utah Construction	22 rotary\core holes for >35,000'
1989-94	Orcana	2 rotary\core holes for 3500'.

GEOLOGY AND MINERALIZATION

PreCambrian rocks that partially host the deposit are intruded by a Laramide age stock. The mineralization is mostly covered by post-mineral volcanics, mainly basalt. Depth to mineralization varies from surface showings to 2000' below basalt cover. Copper-moly mineralization is hosted in PreCambrian rocks as a halo up to 2000' wide around the intrusive as well as within the intrusive.

The "main resource area" hosts the bulk of the known reserves. The Cow Creek structure seems to have localized an enriched copper zone with minimum dimensions of 3600' in length and 1000' in width.

Structures appear to have localized higher grade copper in four separate areas within three miles of the "main resource area". The zones are defined by one to five holes and need further work to define the size potential in these areas. Drilling has been carried out on a minimum of 750' spacing in the "main resource area" and 2000' centers or greater in the other areas. Several attempts have been made by Kennecott, Phelps-Dodge and Utah International to calculate the resource. The most repeated numbers are as follows:

- 90 million tons grading 0.75% Cu and 0.065% MoS_2 in the copper zone (incl. 40 million tons grading 1.25% Cu in chalcocite blanket). This zone is referred to as the "Main Resource Area".

- 140 million tons grading 0.3% Cu and 0.1% MoS_2 in the moly zone. This resource comprises parts of Areas 1 and 2.

- 800 million tons grading 0.3% Cu and 0.07% MoS_2 which includes all of section 14 and 15.

The higher grade copper zone has a significant resource of chalcocite as an enriched blanket. Silver and gold are present in negligible quantities, but have not been fully evaluated. Areas 3 and 4 (discussed below) are not included in any of the above resources.

TARGETS

The **"Main Resource Area"** is marked on the north end by holes UC 1 and UC 5. At present we have no data for hole SM 38. The south end is defined by hole SM 20. Further south, hole SM 28 has 100' of .34% copper and hole SM 29 has a significant intercept of enriched copper. Holes UC 4, UC 22 and SM 31 were not drilled deep enough. Drill spacing is roughly on 750' centers in this area. The "main resource area" defined to date is deep and would need to be evaluated as either an insitu leach operation or an underground block caving operation. I believe the above resource can easily be doubled with work in the following areas:

- Drilling between holes SM 20, SM 28 and SM 29. Deepen holes UC 22 and UC 4.

- Drilling between holes UC 1 and UC 5. Drilling North of UC 1.

- Infill drilling between UC 1 and SM 20.

Area 1 is centered around hole UC 17. Hole UC 17 has 550 feet grading .4% Cu and 950 feet grading .11% MoS_2. UC 40 has mineralization in the last 30' grading 0.33% Cu, but includes grades of 0.08% MoS_2 over 530 feet. SM 15 is reported to be mineralized, but we do not have the data at present. Follow-up between holes SM 15, SM 38, SM 40 and UC 17 may significantly increase the resources of copper and moly in the Sheep Mountain property. Exploration potential north, west and east of UC 17 is open for 2000 feet.

Area 2 consists of holes SM 13, 19, 30, and 37 and UC 18. This area has lower copper values and overall higher moly values. Follow up drilling between holes SM 13, 19, 30, and 37 and UC 18 may show another enriched copper blanket (SM 19, SM 30, UC 18) buried below the basalt. This area is about 3/4 mile west of the "main resource area".

Area 3 lies about two miles WSW of the "main resource area". This anomaly is defined by holes SM 1, 2, 6, 7, and 9. Mineralization is shallow but low grade to date. An enriched zone is indicated by holes SM 1 and SM 2. Outcrops of PreCambrian rocks are mineralized and phyllicaly altered. This area could develop into a further resource area with significant tonnage closer to the surface than the main resource.

Area 4 is about four miles west of the main resource area. Drill holes UC 2, 16, 17 and 20 define the anomaly. Outcropping mineralization in two separate areas independent of the drilling, are also present. The southerly outcrop shows copper oxide in phyllic altered schist with stockwork quartz veining and copper oxide. The northerly outcrop is composed of phyllic altered granite with copper oxide on shears and disseminated within the rock. Shallow intercepts of .75% copper over 20 feet and .3% over 200 feet were encountered in hole UC 2. Hole UC 20 also has 15 feet of .78% copper but may not have been deep enough to encounter thicker intercepts of lower grade. Drilling is recommended around hole UC 2, UC 16 and UC 20 to further define the shallow (<600') values encountered here.

In early May Cyprus visited the property and mapped between Areas 4 and 5. Cyprus believes these areas are a single zone or grabben along a WNW mineralized fault zone. sample results are pending.

CONCLUSIONS

The Sheep Mountain porphyry system is a significant mineralized system covering at least six square miles. The eastern portion is enriched in both copper and molybdenum and is buried under >1500 feet of post mineral basalt. This area should be reviewed for insitu leaching or mining by block caving practices. The southerly and westerly portions are outcropping with only shallow cover. The mineralization is limited to copper only. These areas should be evaluated for their copper oxide potential as well as it's lower grade sulphide potential.

DATA AVAILABLE

Drill logs and assays for 70% of the holes are available. IP data from Phelps Dodge is also available. Cross sections and a basement contour map showing depth to mineralization were obtained. Surface outcrop mapping of PreCambrian outcrops and drill hole location maps are also available.

HD 5\95

Sheep Mountain Drill Hole Information

Main Resource Area

Hole Number	Total Depth	Mineralized Interval	Copper Grade	MoS_2 Grade
SM 20	2825'	1843-1963	1.7%	.061%
		1963-1993	.65%	.044%
		1993-2383	.49%	.076%
SM 32	2729'	1986-2096	.78%	.06%
SM 39	2763'	2091-2141	1.26%	.048%
UC 1	2650'	1942-2007	1.50%	.027%
		2007-2650	.4%	.05%
SM 28	2145'	1884-1984	.34%	.04%
		1331-1984		.04%
UC 5	2445'	1965-1985	1.20%	0.04%
UC 3	2422'	1920-1925	.75%	
		2075-2085	.4%	
SM 27	2276'	1668-1838	.2%	.04%
		1928-1978	.32%	.04%
SM 29	2595'	Unknown	chalcocite	?
UC 4	1768'	lost hole	no basement	
UC 22	707'	lost hole	no basement	
SM 38		No Data		

Area 1

SM 40	2453'	1920-2453		.09%
		2423-2453	.33%	.12%
UC 17	2540'	1710-2264	.40%	.11%
UC 21	3011'	1560-3011		.02%
SM 15		No Data		

Area 2

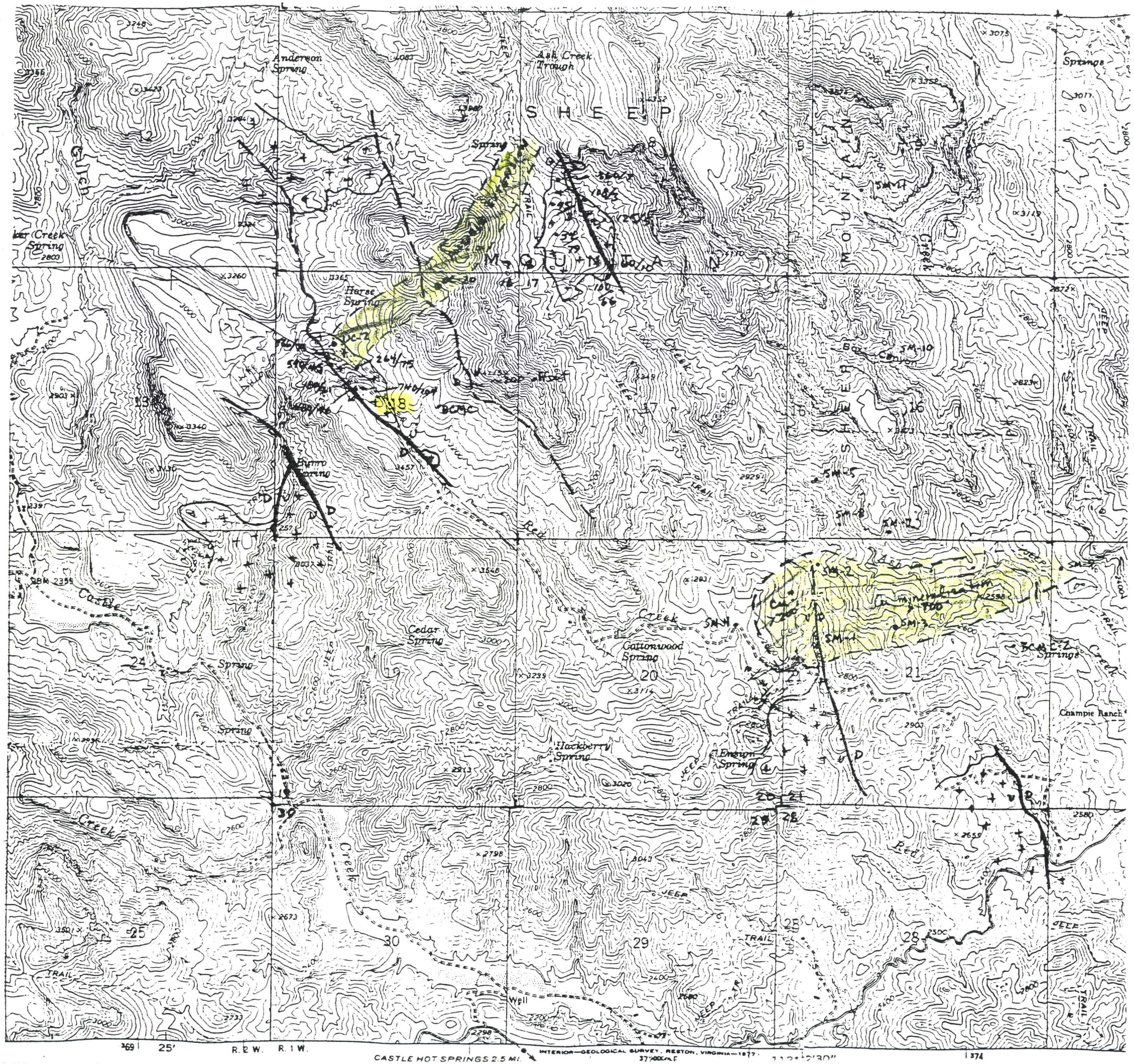
SM 13	No Data		Chalcocite and CuS_2	
SM 19	2409'	1704-1714	2.6%	0.05%
		1744-1794	.44%	0.04%
SM 30	2177'	1600-2177	.12%	.1%
SM 37	2998'	2087-2237	.35%	0.04%
UC 18	2845'	1800-2845	significant copper >.4%	0.07%
SM 44	2450'	1972-2272	.12%	.07%
SM 43	No Data			
SM 41	No Data			

Area 3

SM 1	905'	200-240	.43%	
		580-650	.15%	
SM 2	1112'	867-877	.46%	
		977-1027	.15%	
SM 3	1012'	779-829	.1%	
SM 6	1426'	? -989	.35%	
SM 9	1537	775-815	.22%	.027%
		855-915	.27%	.027%
		955-995	.23%	.027%
SM 7 and 8		No Data		

Area 4

UC 2	976	250-270	.75%	
		325-525	.35%	
UC 16	1840'	1786-1840	.25%	
UC 20	975'	917-932	.78%	



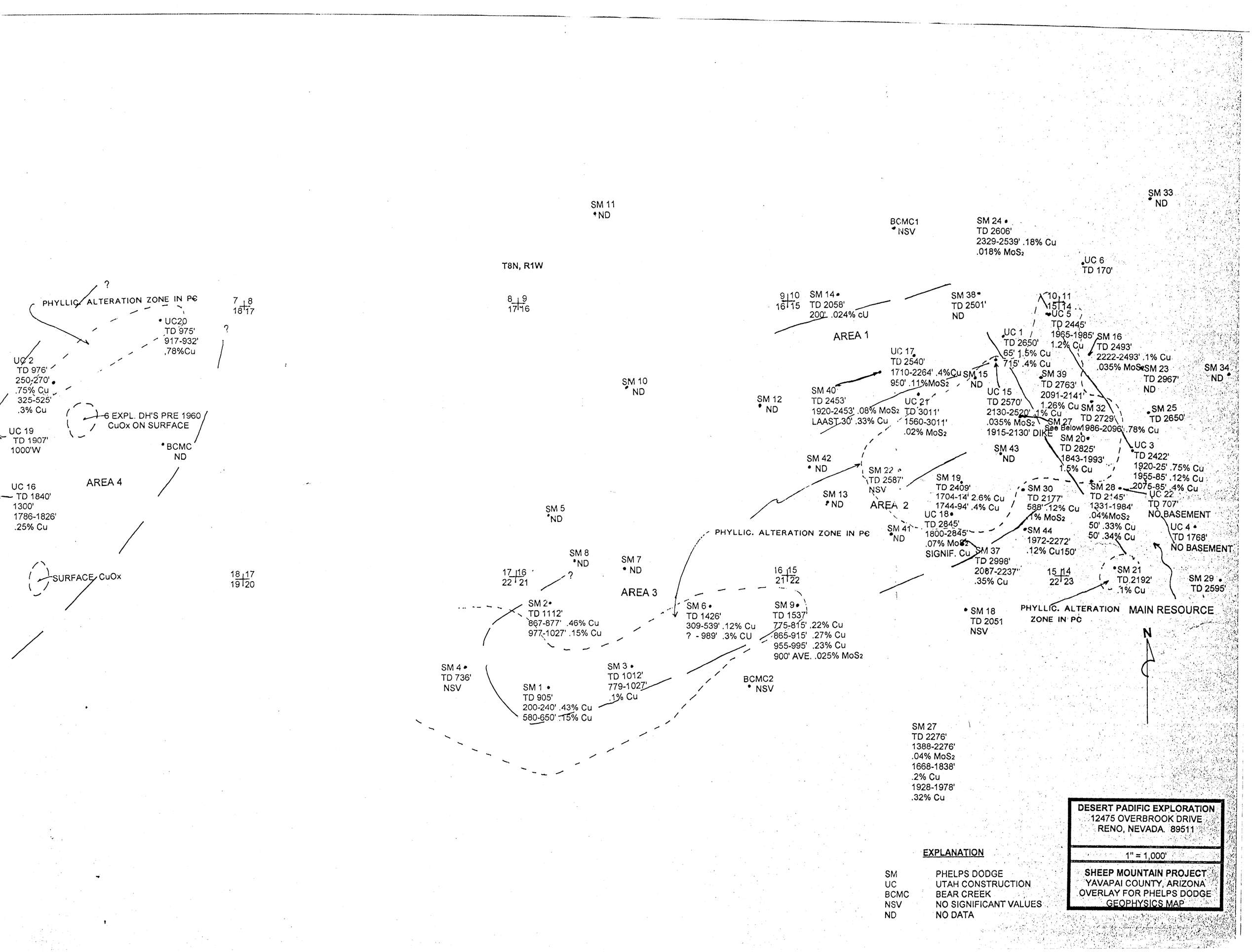
SHEEP MTN PROJECT
YAVAPAI COUNTY, AZ
1" = 2000'
OVERLAY SHOWING EXPOSURES OF PRE-CAMBRIAN GRANITE & GNEISS

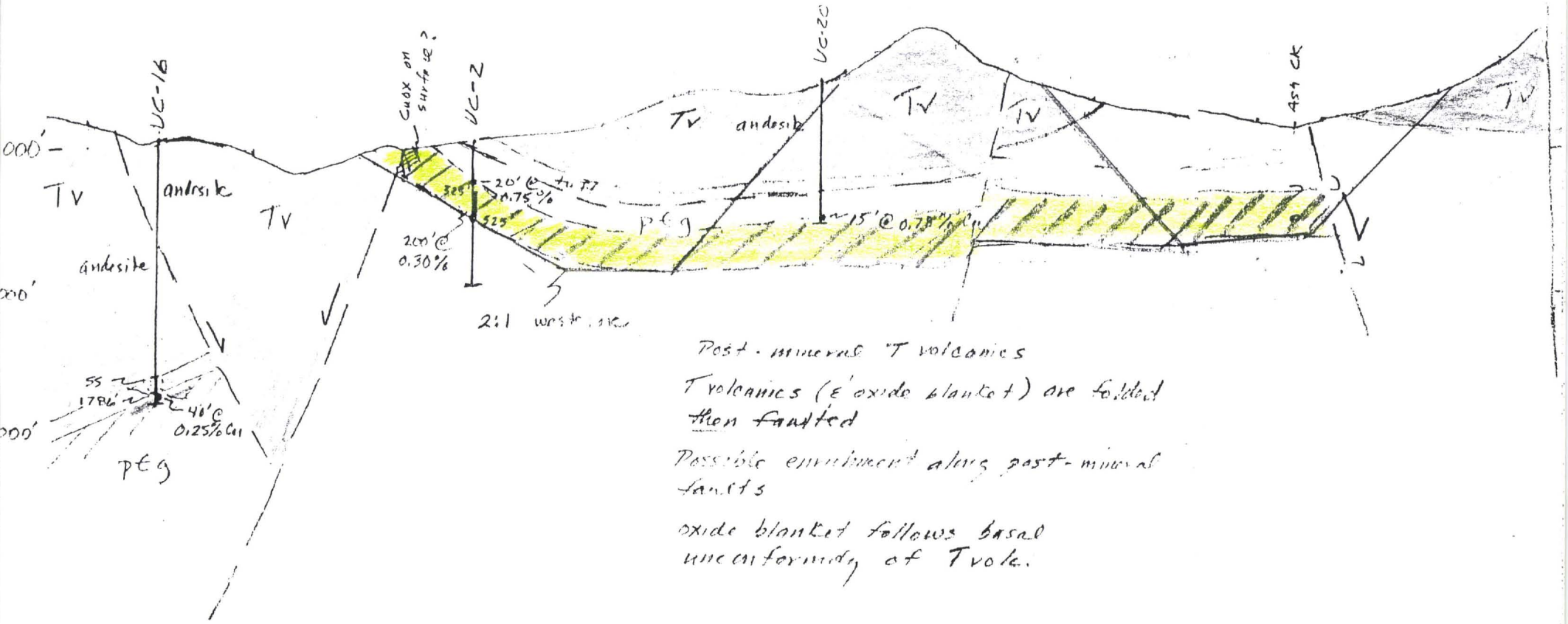
+ + Pre-Cambrian granite & gneiss

copper oxide at surface

PD GEOCHEM SAMPLING
360/7 Cu ppm/Mo ppm

1" = 1,000' SAMPLE MAP
COPPEROPOLIS & COLUMBIA QUADS
T 8N
R 1W


T8N, R1W
SM 11
ND
SM 10
ND
BCMC1
NSV
SM 24
TD 2606'
2329-2539' .18% Cu
.018% MoS2
SM 33
ND
UC 6
TD 170'
SM 14
TD 2058'
200' .024% cU
SM 38
TD 2501'
ND
AREA 1
UC 1
TD 2650'
65' 1.5% Cu
715' .4% Cu
UC 5
TD 2445'
1965-1985'
1.2% Cu
SM 16
TD 2493'
2222-2493' .1% Cu
.035% MoS2
UC 17
TD 2540'
1710-2264' .4%Cu
950' .11%MoS2
SM 15
ND
SM 39
TD 2763'
2091-2141'
1.26% Cu
SM 23
TD 2967'
ND
SM 34
ND
SM 40
TD 2453'
1920-2453' .08% MoS2
LAAST 30' .33% Cu
SM 12
ND
UC 21
TD 3011'
1560-3011'
.02% MoS2
UC 15
TD 2570'
2130-2520' .1% Cu
.035% MoS2
1915-2130' DIKE
SM 32
TD 2729'
See Below
1986-2096' .78% Cu
SM 25
TD 2650'
SM 27
SM 20
TD 2825'
1843-1993'
1.5% Cu
SM 43
ND
UC 3
TD 2422'
1920-25' .75% Cu
1955-85' .12% Cu
2075-85' .4% Cu
SM 42
ND
SM 22
TD 2587'
NSV
SM 19
TD 2409'
1704-14' 2.6% Cu
1744-94' .4% Cu
SM 30
TD 2177'
588' .12% Cu
.1% MoS2
SM 28
TD 2145'
1331-1984'
.04%MoS2
50' .33% Cu
50' .34% Cu
UC 22
TD 707'
NO BASEMENT
UC 4
TD 1768'
NO BASEMENT
SM 13
ND
AREA 2
UC 18
TD 2845'
1800-2845'
.07% MoS2
SIGNIF. Cu
SM 41
ND
SM 44
1972-2272'
.12% Cu150'
SM 37
TD 2998'
2087-2237'
.35% Cu
SM 21
TD 2192'
.1% Cu
SM 29
TD 2595'
SM 18
TD 2051
NSV
PHYLLIC. ALTERATION ZONE IN PC
MAIN RESOURCE
PHYLLIC. ALTERATION ZONE IN PC
SM 5
ND
SM 8
ND
SM 7
ND
AREA 3
SM 2
TD 1112'
867-877' .46% Cu
977-1027' .15% Cu
SM 6
TD 1426'
309-539' .12% Cu
? - 989' .3% CU
SM 9
TD 1537'
775-815' .22% Cu
865-915' .27% Cu
955-995' .23% Cu
900' AVE. .025% MoS2
SM 4
TD 736'
NSV
SM 1
TD 905'
200-240' .43% Cu
580-650' .15% Cu
SM 3
TD 1012'
779-1027'
.1% Cu
BCMC2
NSV
N
SM 27
TD 2276'
1388-2276'
.04% MoS2
1668-1838'
.2% Cu
1928-1978'
.32% Cu
PHYLLIC. ALTERATION ZONE IN PC
UC 2
TD 976'
250-270'
.75% Cu
325-525'
.3% Cu
UC20
TD 975'
917-932'
.78%Cu
6 EXPL. DH'S PRE 1960
CuOx ON SURFACE
UC 19
TD 1907'
1000'W
BCMC
ND
AREA 4
UC 16
TD 1840'
1300'
1786-1826'
.25% Cu
SURFACE CuOx
DESERT PADIFIC EXPLORATION
12475 OVERBROOK DRIVE
RENO, NEVADA. 89511
1" = 1,000'
SHEEP MOUNTAIN PROJECT
YAVAPAI COUNTY, ARIZONA
OVERLAY FOR PHELPS DODGE
GEOPHYSICS MAP
EXPLANATION
SM PHELPS DODGE
UC UTAH CONSTRUCTION
BCMC BEAR CREEK
NSV NO SIGNIFICANT VALUES
ND NO DATA

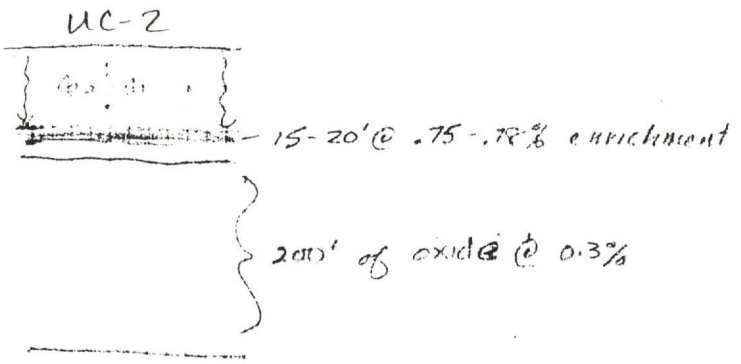


Post-mineral Tvolcanics

Tvolcanics (& oxide blanket) are folded then faulted

Possible enrichment along post-mineral faults

oxide blanket follows basal unconformity of Tvols.



SM95-01 low. o.c. in road of m.gr., biot qtz monz.
bleached white - ~~mod.~~ strg. arg. alt,
hem along fracts - mod. strg., o.c. just 30'
assoc. of Tert. volc., hem. may be related
to fault? contact., possible MZ or Tert
intrusive here! Strgest joint set @ N30E ~90°

SM95-02 o.c. ~30' x 20', near drill pad of SM-1
well fract'd qtz monz? w/ strg hem & Cuox
along fracts. Strong argillic alt., ksp-bucf?
veining (c.gr), dissem sulf → Cuox + Mnox?
o.c. surrounded by Tert. volc. -
- more o.c. across ck to east w/ qtz veins (?)
trending N20E ~90°
- up ck 30' on west side a depositional contact
of tufaceous lithic ss overlies qtz monz.
- oc. to east in dacite? tuff shows prominent
fault slicks oriented N27-30W 37-40N

SM95-03 o.c. 40' up creek from SM95-02
- qtz-ser-hem (after py) stockwork w/
argillic overprint? - esp. of plag away
from ½"-1" qtz ser veins
no Cuox

ENDURO
WATERPROOF
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SM95-04 - fresh? biot. qtz monz exposed
along ck bank, minor hem along fracts
- sample for whole rock

6301 A dump sample from cuts
in pre€ g w/ biot-rich mafic dike
biot-rich dike hosts exotic Cuox
qtz veins cross both pre€ g & dike
sericite envelopes in pre€ g w/ hem

ENDURO
WATERPROOF
PRINTED IN U.S.A.

CYPRUS MINERALS COMPANY
1320 Freeport Blvd., Suite 106
Sparks, NV 89431
(702) 358-0533

NO. 06299 A

Sampled by: HNO
Date: 5/3/95

Sample Character: (Rock Chip) Float Subcrop Dump Stream Sediment Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples: Core Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc.)]
Width:

two o.c. pre-€ granite
qtz-hem stockwork, weaker sericit
then to NW - strong hem hem
secondary? biotite veins/selvages
// quartz vein

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Sparks, NV 89431
(702) 358-0533

NO. 06298 A

Sampled by: HNO
Date: 5/3/95

Sample Character: (Rock Chip) Float Subcrop Dump Stream Sediment Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples: Core Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc
Width:

Roadcut - pE gran
cut by sub-parallel ½ qtz-sul-
veins, fgr sericite pervasive in gran
wk hem // im, local chrysocolla
stain
roadcut immediate
- area to east may of been leached
of Cu

veins trend N18W 25S

CYPRUS MINERALS COMPANY
1320 Freeport Blvd., Suite 106
Sparks, NV 89431
(702) 358-0533

NO. 06300 A

Sampled by:
Date:

Sample Character: (Rock Chip) Float Subcrop Dump Stream Sediment Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples: Core Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc
Width:

prominent o.c. of pre granite
qtz veining, sericite alt'd,
wk-mod hem after py?
o.c. is east of Cu ox occurrence
across canyon
¼" qtz veins trend N45E ~90°

CYPRUS MINERALS COMPANY
1320 Freeport Blvd., Suite 106
Sparks, NV 89431
(702) 358-0533

NO. 06295 A

Sampled by: HNO
Date: 5/9/95

Sample Character
Rock Chip | Float | Subcrop
Dump | Stream Sediment | Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples
Core | Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:
just 20' NE of fault w/ tert rhyolite

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc.)]
Width:

low ac. of mod-c-gr, pre€ granite
- strong qtz-ser-py (hem/lim)
w/ chrysocolla stain
6" qtz 10' to North
strikes North ~ 80°E dip

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(702) 358-0533

NO. 06294 A

Sampled by: HNO
Date: 5/9

Sample Character
Rock Chip | Float | Subcrop
Dump | Stream Sediment | Soil

Property/Project: CASTLE [redacted]/SHEE-
County:
State:
Section:
Township:
Range:

Drilling Samples
Core | Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:
Volc Rx SW of U C-2 ar

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc
Width:

biot-qtz rhyolite tuff
~ N70W 15N
cut by 3 sets of ¼" veins of
white sugy qtz - little or no Fe
- select sample qtz
vein + along fract in N30W ~ 30

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Sparks, NV 89431
(702) 358-0533

NO. 06297 A

Sampled by: HNO
Date: 5/9/95

Sample Character
Rock Chip | Float | Subcrop
Dump | Stream Sediment | Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples
Core | Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc.)]
Width:

Roadcut east & down slope of 6276A
strong fracts @ N35W 80S
// to normal? fault to west
fracts cut qtz stockwork in
pre€ gran, no Cu ox here, mod-strong
hem & yellow brown limo
Sample in stockwork area
- local areas of pegmatitic qtz-Ksp
- avoided sampling this

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Sparks, NV 89431
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NO. 06296 A

Sampled by: HNO
Date: 5/2/95

Sample Character
Rock Chip | Float | Subcrop
Dump | Stream Sediment | Soil

Property/Project:
County:
State:
Section:
Township:
Range:

Drilling Samples
Core | Drill Cuttings
Hole#____ From/To:
Length:

Sample Location:

SAMPLE DESCRIPTION
[Rock Type, Color, Alteration, Mineralization (oxides, sulfides, veins, etc
Width:

lrm c.g. pre€ granite - lrw biotite
vein / selvages of fract's
strong qtz-ser-py (hem-lim)
w/ wk chrysocolla wash as in 6275
prom N30W fract's w/ vert-70 N.
biot along fract's @ shallow dip
? cgr sericite?
N-S 22°W

Chemex Labs, Inc.

Analytical Chemists * Geochemists * Registered Assayers

994 Glendale Ave., Unit 3, Sparks
Nevada, U.S.A. 89431
PHONE: 702-356-5395 FAX: 702-355-0179

To: CYPRUS GOLD
DIVISION OF CYPRUS MINERALS
1320 FREEPORT BLVD., SUITE 106
SPARKS, NEVADA
89431

Project : Sheep
Comments: Attn: Bill Stanley CC: Hank Ohlin

Page Number :1
Total Pages :1
Certificate Date: 22-MAY-95
Invoice No. :I9516726
P.O. Number :
Account :DOG

CERTIFICATE OF ANALYSIS A9516726

SAMPLE	PREP CODE		Au ppb FA+AA	Ag ppm Aqua R	As ppm	Bi ppm	Cu ppm	Cd ppm	Hg ppb	Mo ppm	Pb ppm	Sb ppm	Se ppm	Zn ppm		
6294 A	205	226	< 5	< 0.2	4	0.2	12	< 0.1	20	1	5	< 0.2	< 0.2	20		
6295 A	205	226	< 5	< 0.2	124	0.1	>10000	< 0.1	20	23	15	6.2	< 0.2	29		
6296 A	205	226	< 5	< 0.2	84	< 0.1	9100	< 0.1	20	56	8	3.0	< 0.2	14		
6297 A	205	226	< 5	< 0.2	60	0.3	112	< 0.1	20	42	4	0.6	< 0.2	8		
6298 A	205	226	< 5	< 0.2	102	0.8	4050	< 0.1	20	119	6	2.0	< 0.2	17		
6299 A	205	226	< 5	< 0.2	8	0.2	82	< 0.1	10	38	5	0.2	< 0.2	15		
6300 A	205	226	< 5	< 0.2	18	0.2	25	< 0.1	50	18	4	8.2	< 0.2	12		
6301 A	205	226	< 5	< 0.2	314	2.2	>10000	1.3	70	52	3	4.0	< 0.2	180		
SM 95-01	205	226	< 5	< 0.2	14	0.5	92	< 0.1	220	< 1	4	< 0.2	< 0.2	2		
SM 95-02	205	226	< 5	< 0.2	8	< 0.1	>10000	< 0.1	90	2	< 1	0.2	< 0.2	8		
SM 95-03	205	226	< 5	< 0.2	8	0.3	205	< 0.1	880	12	< 1	0.4	< 0.2	4		
SM 95-04	205	226	< 5	< 0.2	30	0.4	21	< 0.1	50	1	5	1.6	< 0.2	24		

CERTIFICATION: Hank Buchler