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SECTION 1

PROJECT Kelvin-Hinbanco DRILL HOLE NO. 5-2 SCALE 1"=100' PAGE NO. 1 OF 1

LENGTH	ASSAYS (%) Cu	Mo	Au	Ag	Zn
0	.07				
	.02				
100					
	.01				
200					
	.01				
300	.02				
	.01				
400	.02				
	.03			0	
				0	
	.01				
500					
	.03			0	
	.015				

2000' elevation

Started: 11/15/68
completed: 11/20/68
6½ inch hammer bit
Location: 840' FWL & 1400' FSL, section 9, T.4S., R.13E., Pinal Co., Arizona
Collar elevation: 2133'

17' of 8 5/8" casing

below 2000' elevation = .0213 % Cu

582'

STRUCT. | ROCK

General Descripti

0-582': Precambrian (?) Quartz Monzonite unless otherwise noted.

23' - strong weathering

53' = base of surface weathering

diabase

PROJECT Kelvin-Miami DRILL HOLE 5-5 SCALE 1"=100' PAGE NO. 1 OF 1

Started: 11/21/68
completed: 12/6/68
6½" hammer bit to 642'
6¼" rock bit 642-1165'
Location: 170' FEL & 240' FSL, Sec 8, T.4S., R.13E., Pinal Co., Arizona
Collar elevation: 2170'

General Description

0-1165: Precambrian (??) Quartz Monzonite with diabase dikes (green).

Length	Cu	Mo	Au	Ag	Zn
	.05				
	.21				
2000' elevation					
	.02				
	.38				
	.18				
	.03				
1500-2000' elevation = .2422% Cu.					
	.06				
	.12	.0195	0	0	.03
			0	0	
			0	0	
	.512	.1084			1.52
			.005	.19	
		.0315	0	0	.14
	.096				.40
		.007			
1500' elevation					
160' = .322 Cu + .0796 Mo ≈ .720 Cu equivalent					
	.351	.0958	0	.053	2.00
	.0533	.0163			
	.06	.026			
	.08	.016	0	0	
					.26
	.1929	.0369	0	.023	
1000-1500' elevation = .1294% Cu.					
					.157
	.1084	.0267	0	0	
			0	0	.49
	.11	.008			
	.09	.007			
	.35	.008			
	.09	.007			
	.04	.003			
1030' elevation	.055	.004			

1165'

PROJECT Kelvin - Minbanco DRILL HOLE NO. J-1 SCALE 1" = 100' PAGE NO. 1 OF 1

LENGTH	ASSAYS (%) Cu	Mo	Au	Ag	Zn
	.04	<.001	0	0	
	.203				
	.07	<.001	0	.03	
100	.05				
	.04				
	.13	<.001	0	.04	
	.03				
200	.07				
	.072	.001	0	0	
	.420	.003	0	.007	.08
300		.011			
	.321	.003	0	.041	
		.003			
	.105				
400					
	.06				
500	.06				
	.08				

2000' elevation

started 9/11/68
completed 9/16/68
5 1/4 inch hammer bit
Location: 320' FWL & 1260 FSL
Section 9, T. 4 S., R. 13 E.
Pinal Co., Arizona
Collar elevation = 2085'

water →

below 2000' elevation ≈ .1541 % Cu

70' = 0.378% Cu

530'

native copper | copper oxides | Scattered | STRUCT. | ROCK

General Description

0-530': Precambrian (?) Quartz Monzonite unless otherwise noted.

diabase

DRILL HOLE RECORD

PROJECT Kelvin - Minbanco DRILL HOLE J-4 SCALE 1" = 100' PAGE NO. 1 OF 1

LENGTH	ASSAYS (%) Cu	Mo	Au	Ag	Zn
	.03				
	.07				
100	.04				
	.05				
200	.05				
	.02				
300	.02				
400	.05	.001	0	.04	
	.02				

2000' elevation

Started: 12/6/68
Completed: 12/9/68
6 1/2 inch hammer bit
Location: 520' FWL & 280' FNL, section 16, T4S., R13E., Pinal Co., Arizona
Collar elevation: 2305'

below 2000' elevation:
.0300 % Cu

426' –

STRUCT. | ROCK

General Description

Precambrian Quartz Monzonite (++) and diabase

32' base of intense surface weathering

DRILL HOLE RECORD

PROJECT Kelvin-Minbanco DRILL HOLE J-6 SCALE 1"=100' PAGE NO. 1 OF 1

LENGTH	Cu	Mo	Au	Ag	Zn
	.01				
	.01				
	.02				
	.01	.013			
	.01				
	<.01	.002			
	.02				
	.01	<.001			
	<.01				
	.10				
	.05				
	.01				
	.04				
	.01				
	<.01				
	.04				
	.045	<.001			
	.06				
	.01				
	.03				
	.043	.015	.01	0	.066
	.02				
	.02	.007			
	.01	.002			
	<.01				
	<.01	<.001			
	.025	.005	0	0	.03
	.06				
	.03	.002			

2000' elevation

1500' elevation

1000' elevation

12441'

Started: 12/13/68
Completed: 12/21/68
6½" hammer bit to 1184'
6¼" rock bit to 1244'
Location: 610' FEL & 760' FNL Sec. 17, T. 4S., R. 13E., Pinal Co., Arizona
Collar elevation: 2246'

1500'-2000' elevation ≈ .0246 % Cu.

1000'-1500' elevation ≈ .0272 % Cu.

STRUCT. ROCK

General Description

PROJECT Kelvin-Minbanco DRILL HOLE NO. J-7 SCALE 1"=100' PAGE NO. 1 OF 1

LENGTH	ASSAYS (%) Cu	Mo	Au	Ag	Zn
	.02				
100	.03	<.001			
	.025				
200					
2000' elevation					
300	.01	.002			
	.01				
400	<.01				
	.01				
500	.01	<.001			

started: 1/18/69
completed: 1/22/69
6½ inch hammer bit to 522'
rock bit to 581'
Location: 1130' FEL & 320' FSL
section 8, T.4S., R.13E.,
Pinal Co., Arizona
Collar elevation = 2290'

below 2000' elevation =
<.0100 % Cu

581'

STRUCT. ROCK

General Description

Precambrian (??) Quartz monzonite with minor diabase dikes.

50' = base of surface weathering

DRILL HOLE RECORD

PROJECT Kelvin-Minbanco DRILL HOL J-8 SCALE 1" = 100' PAGE NO. 1 OF

LENGTH	ASSAYS (%) Cu	Mo	Au	Ag	Zn
	.01				
	.02				
2000' elevation	.02	<.001	0	.01	.22
	.01				
	<.01				
	.03				
	.02	.001			.04
	.04				
	.03				
	.04				
	.03				
	.02				
736'			0	0	.50
	.065	.001			
1500' elevation	.03				
	.04				
	.04				

Started: 1/24/69
completed: 2/1/69
5 1/2" hammer bit to 762'
Rock bits to 972'
Location: 630' FWL & 210' FSL, sec. 9, T 4S., R 13E., Pinal Co., Arizona
Collar elevation: 2295'

1500'-2000' elevation ≈ .0395 % Cu

STRUCT. | ROCK | Fe Ox

General Description

0-972 : Precambrian (?) Quartz Monzonite with minor diabase dikes (green).

← approximate base of oxidation

└ first water

1 20 % limonite

972'

2000' elevation

1500' elevation

1000' elevation

500' elevation

sea level

1500'-2000' elevation ≈
.0250 % Cu

1000'-1500' elevation ≈
.0142 % Cu

500'-1000' elevation ≈
.01 % Cu

sea level-500' elevation ≈
.0360 % Cu

2320'

PROJECT KELVIN-TIPPERARY DRILL HOLE # 1 SCALE 1"=50' SHEET NO. 1 OF 4

LENGTH	ASSAYS % Cu	ASSAYS % Mo
0		
50		
100		
150	.017	.010
	.027	.010
	.418	.040
	.800	.069
	.097	.010
	.058	.010
	.064	.023
200		
250		
300		
350		

miscellaneous

LOCATION: 125' FSL & 300' FEL OF SECTION 8, T.4S., R.13E., PINAL CO., ARIZONA
TD = 1400' - ROTARY
MARCH 1970
6-5/8 CASING @ 52' Temp. Abd.

THIS LOG HAS BEEN MODIFIED FROM A LOG BY TIPPERARY RESOURCES - NO SAMPLES HAVE BEEN SEEN BY C.S.M.C. PERSONNEL.

35': .2126 Cu
.0246 Mo
.334 Cu equivalent

pyrite | chalcopyr | MoS_2 | Fe_2O_3 | Cu nat. | Cu | kaolin | sphaler. | bornite | qtz vns. | chlorite | STRUCT. | ROCK

General Description

Quaternary Alluvium (Qal) 0-34': medium coarse grained with fragments of granite, diabase, diorite and quartz.

Precambrian Oracle Granite (pCgr) 34-144' et.al. white quartz, orange orthoclase feldspar, trace biotite, 10%

Precambrian(?) Diabase (db), 144-153': black diabase dike with stringers of qtz with, chalcopyrite & pyrite.

Tertiary (?) Monzonite (Tm) 232-918': monzonite with 10% biotite, 20% feldspar 70% quartz, feldspars altered ±, traces of pyrite, biotite often in books.

From verbal descriptions by Tipperary this unit has the following composition:

quartz	: 62.5%	
plagioclase	: 17%	K-spar = 22.3% of total feldspar.
K-spar	: 4.9%	
biotite	: 6.6%	
chlorite	: 9%	

The composition plus surficial geologic mapping (ZELINSKI) indicate that this unit is most probably correlative with the Tertiary-Cretaceous (Laramide) Grayback Granodiorite.

PROJECT KELVIN - TIPPERARY DRILL HOLE [illegible] SCALE 1"=50' JE NO. 2 OF [illegible]

LENGTH	ASSAYS % Cu	ASSAYS % Mo	miscellaneous	FeS2	CuFeS2	MoS2	Fe2	Cu2	native Cu	Kaolin	sphaler.	bornite		grz. vns.	chlorite	STRUCT.	ROCK	General Description
400																		
450																		
500																	Tm	
550																		
600																		
650																	Tm	
700		.023 .184 .168 .068 .010	40': .1684 Mo .842 cu equivalent															

PROJECT KELVIN-TIPPERARY DRILL HOLE 1 SCALE 1"=50' PAGE NO. 3 OF 4

LENGTH	ASSAYS % Cu	ASSAYS % Mo	miscellaneous	FeS2	CuFeS2	MoS2	Fe Ox- Cu	native Cu	kaolin	sphalr.	bornite	qtz vns	chlorite	STRUCT.	ROCK	General Description
		.555														
		.329														
	.798	.087														
	.632	.073	40': .3905 Cu													
	.265	.019	.0368 Mo													
	.818	.032	.574 Cu equivalent													
	.363	.039														
	.076	.024														
	.114	.010														
800	.058	.010	80'= 0.708+													
850															Trz	
900																
950																
1000																
1050																
1100																

PROJECT KELVIN - TIPPERARY DRILL HOLE 1 SCALE 1" = 50' PAGE NO. 4 OF 4

LENGTH	ASSAYS % Cu	ASSAYS % Mo	ASSAYS	ASSAYS	ASSAYS	miscellaneous	FeS_2	$CuFeS_2$	MoS_2	Fe_2O_3	Cu oxide	native Cu	Kaolin	sphaler.	bornite	qtz. vns.	chlorite	STRUCT.	ROCK	General Description
1150																				
1200																				
1250																				
1300																				
1350																				
1400						1400' = TD														

PROJECT TIPPERARY-KELVIN DRILL HOLE T-1 SCALE 1" = 100' PAGE NO. 1 OF 2

LENGTH	ASSAYS % Cu	ASSAYS % Mo	STRUCT.	ROCK

Collar elevation = 2175'

100

.2116 | .0246 — 35' = 0.3346 Cu equivalent

200

300

400

500

600

700

.0772

PROJECT TIPPERARY-KELVIN DRILL HOLE No. T-1 SCALE 1" = 100' PAGE NO. 2 OF 2

LENGTH	ASSAYS % Cu	ASSAYS % Mo	STRUCT.	ROCK
		.4420		
	.3905	.0305		

80' = 0.6925 Cu equivalent

800

900

1000

1100

1200

1300

1400

SECTION 3

PROJECT KELVIN - TIPPERARY DRILL HOLE NO. 2 SCALE 1"=50' PAGE NO. 1 OF 5

LENGTH	ASSAYS % Cu	% Mo	% Cu (comp)	comp. Cu	miscellaneous
					LOCATION: 1260' FSL & 150 FWL OF SECTION 9, T 4S., R. 13 E., PINAL CO., ARIZONA. T.D. = 1625 ROTARY MARCH 1970
	.34				
	.03			.118	THIS LOG HAS BEEN MODIFIED FROM A LOG BY TIPPERARY RESOURCES. NO SAMPLES HAVE BEEN SEEN BY C.S.M.C. PERSONNEL
	.03				
50	.07				
	.03				
	.05			.032	
	.02				
	.02				Fe_2O_3 includes "limonite" & specularite
	.04				
	.02			.032	
	.04				
	.02				
100	.03				
	.05				
	.03				
	.02			.028	
	.03				
	.03				
	.03				
	.04			.026	
	.03				
	.01				
150	.02				
	.03				
	.03				
	.03			.034	
	.03				
	.04				
	.04				
	.03				
	.03			.028	
	.03				
	.03				
200	.02				
	.04				
	.05				
	.06			.048	
	.05				
	.04				
	.04				
	.03				
	.05			.082	
	.21				
250	.08				
	.03				
	.02				
	.02			.022	
	.02				
	.02				
	.03				
	.07				
	.02			.026	
	.02				
300	.02				
	.02				
	.02				
	.02			.022	
	.03				
	.02				
	.036				
	.084				
	.030			.042	
	.029				
350	.03				
	.032				
	.044				
	.074			.041	
	.030				
	.02				

Fe S2 | Cu Fe S2 | Mo S2 | Fe2 O3 | Cu | Fe3 O4 | sphalerite | bornite | chalcocite | qtz. vns. | epidote | chlorite | STRUCT. | ROCK

General Description

Quaternary Alluvium (0-32'): medium coarse grained with fragments of granite, diabase, diorite & quartz.

Precambrian Oracle Granite (pCgr):

Precambrian (?) Diabase (db): Tippera interpreted this unit to be Mesozoic

PROJECT Kelvin - Tipperary DRILL HOLE NO. 2 SCALE 1" = 50' PAGE NO. 2 OF 5

LENGTH	ASSAYS % Cu	% Mo	% Cu (comp.)	comp. Cu	miscellaneous
400	.363 .029 .028 .016 .058 .025 .013 .033 .016 .074 .018 .010 .010 .010 .014			.099	
				.032	
450	.023 .032 .052 .034 .025 .066 .116 .040 .067			.012	Tr. $CaCO_3$ in vn/f in db
				.033	
500	.086 .05 .118 .086 .027 .093 .159			.075	
				.075	25' = 0.0966 % Cu
550	.02 .03 .02 .03 .02 .02 .03 .04 .093 .032 .024 .019 .026			.052	
				.041	
600	.028 .02 .02 .03 .03 .03 .02 .054 .023			.026	
				.026	
650	.13 .03 .02 .042 .018 .029 .029 .072 .021			.066	
				.028	
700	.018 .040 .048 .038 .044 .028 .015 .022			.040	
				.029	
750	.016 .024 .018 .054 .208			.064	

FeS_2	$CuFeS_2$	MoS_2	Fe_2O_3	Cu	Fe_3O_4	sphaler.	bornite	chalcoc.	qtz. vns.	epidote	chlorite	STRUCT.	ROCK

General Descripti

Tertiary (?) Monzonite (Tm) } these units ma
Tertiary (?) diorite (Td) } be correlative
with the Tertiar
Cretaceous
Grayback Grano
diorite

PROJECT Kelvin-Tipperary DRILL HOLE NO. 2 SCALE 1"=50' SHEET NO. 3 OF 3

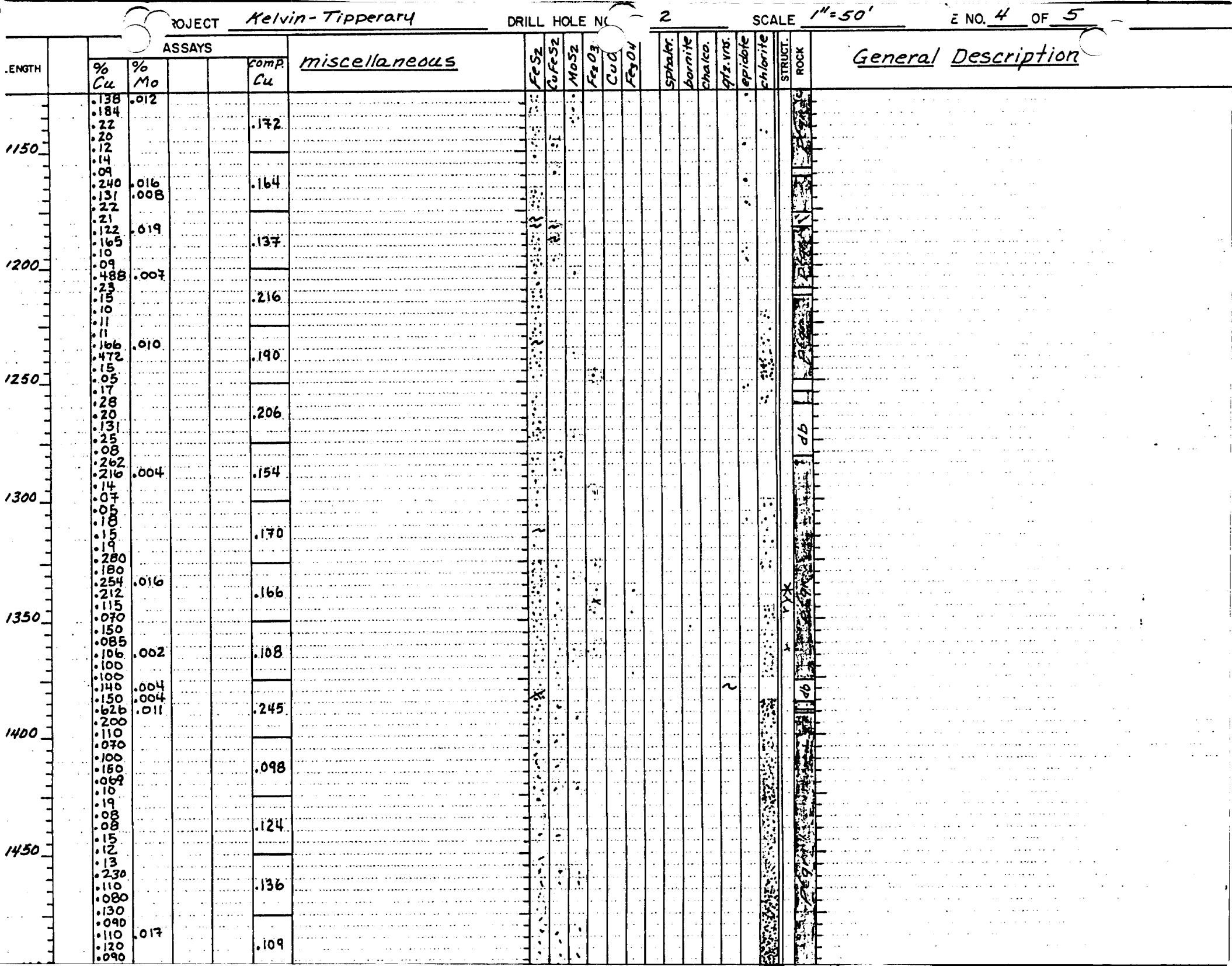
LENGTH	ASSAYS % Cu	ASSAYS % Mo	comp. Cu	miscellaneous	FeS_2	$CuFeS_2$	MoS_2	Fe_2O_3	Cu	Fe_3O_4	sphaler.	barnite	chalcor	qtz. vns.	epidote	chlorite	STRUCT.	ROCK
800	.084																	
	.018																	
	.041		.049															
	.039																	
	.064																	
	.050																	
	.036																	
	.049		.041															
	.030																	
	.040																	
	.048																	
	.048																	
	.075		.082															
	.106																	
	.132																	
	.094																	
	.026																	
	.110		.102															
	.15																	
850	.13																	
	.09																	
	.04																	
	.07		.066															
	.06																	
	.07																	
	.26																	
	.162	.025																
	.141	.016	.179															
	.192	.010																
900	.141	.010																
	.050	.010																
	.084	.010																
	.092	.010	.164															
	.088	.012																
	.504	.017																
	.160																	
	.102																	
	.029		.115															
	.132																	
950	.151																	
	.144																	
	.098																	
	.057		.087															
	.058																	
	.08	.003																
	.13																	
	.35																	
	.24		.182															
	.104																	
1000	.088																	
	.258																	
	.146																	
	.182		.136															
	.061																	
	.044																	
	.10																	
	.11																	
	.18		.146															
	.15																	
1050	.19																	
	.078	.004																
	.218																	
	.060		.107															
	.106																	
	.074																	
	.049																	
	.059																	
	.776	.010	.246															
	.133	.019																
1100	.214	.015																
	.08																	
	.10																	
	.15		.119															
	.12																	
	.144	.011																

General Description

Tertiary Quartz Diorite Porphyry (Tqdp)

PROJECT Kelvin-Tipperary DRILL HOLE NO. 2 SCALE 1"=50' PAGE NO. 4 OF 5

LENGTH	ASSAYS % Cu	ASSAYS % Mo	comp. Cu	miscellaneous
	.138	.012		
	.184			
	.22		.172	
	.20			
1150	.12			
	.14			
	.09			
	.240	.016	.164	
	.131	.008		
	.22			
	.21			
	.122	.019		
	.165		.137	
	.10			
1200	.09			
	.488	.007		
	.23			
	.15		.216	
	.10			
	.11			
	.11			
	.166	.010		
	.472		.190	
	.15			
1250	.05			
	.17			
	.28			
	.20		.206	
	.131			
	.25			
	.08			
	.262			
	.216	.004	.154	
	.14			
1300	.07			
	.05			
	.18			
	.15		.170	
	.19			
	.280			
	.180			
	.254	.016		
	.212		.166	
	.115			
1350	.070			
	.150			
	.085			
	.106	.002	.108	
	.100			
	.100			
	.140	.004		
	.150	.004		
	.626	.011	.245	
	.200			
1400	.110			
	.070			
	.100			
	.160		.098	
	.068			
	.10			
	.19			
	.08			
	.08		.124	
	.15			
1450	.12			
	.13			
	.230			
	.110		.136	
	.080			
	.130			
	.090			
	.110	.017		
	.120		.109	
	.090			



General Description

ROJECT [illegible] DRILL HOLE NC 2 SCALE [illegible] E NO. [illegible] OF [illegible]

LENGTH	ASSAYS % Cu	% Mo				miscellaneous
	.080					
	.100					
	.103				.108	
	.087					
	.168	.004				
	.150					
	.231					25' = 0.170 % Cu
	.167				.148	≈ 0.19 % Cu equivalent
	.132					
1550	.062					
	.053					
	.110	.003				
	.050	.002			.096	
	.160					
	.106					
	.195	.005				
	.178	.007				
	.160				.168	
	.245					
1600	.060					45' = 0.203 % Cu
	.180					≈ 0.23 % Cu equivalent
	.203					
	.299	.005			.247	
	.304	.004				

1625' is T.D.

FeS_2	$CuFeS_2$	MoS_2	Fe_2O_3	Cu	Fe_3O	sphaler.	bornite	chalco.	qtz. vns.	epidote	chlorite	STRUCT.	ROCK

General Descriptio[n]

PROJECT TIPPERARY-KELYIN DRILL HOLE NO. T-2 SCALE 1"=100' PAGE NO. 1 OF 3

LENGTH	ASSAYS % Cu						Cu > 0.1%	STRUCT.	ROCK
						Collar elevation = 2080'			
100									
200									
300									
400									
	.0469								
500									
600									
700									

PROJECT _____ DRILL HOLE NO. T-2 SCALE 1" = 100' PAGE NO. 3 OF 3

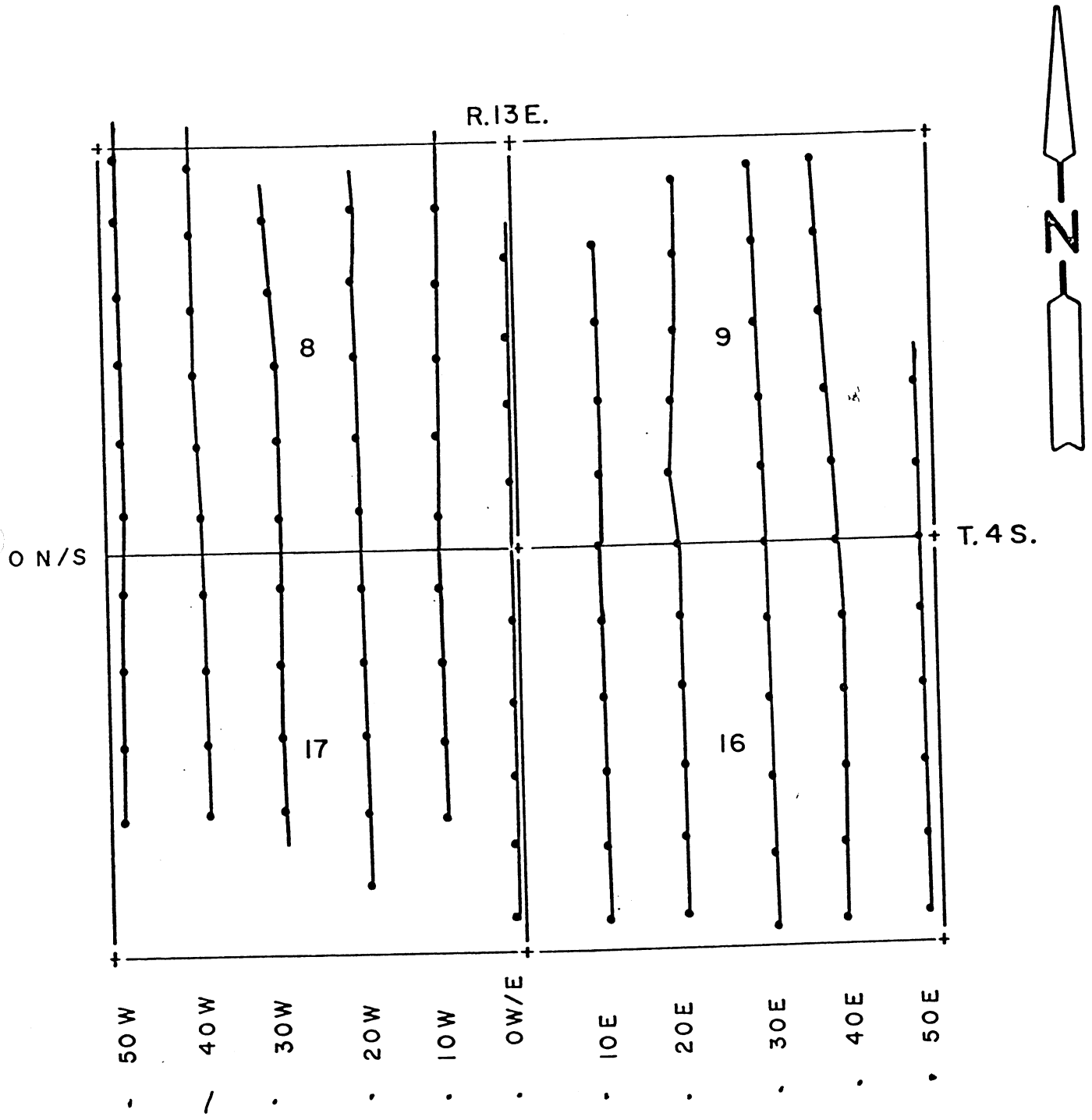
LENGTH	ASSAYS % Cu					Cu > 0.1%	STRUCT.	ROCK
1600								

SECTION 4

FILE NO.

CITIES SERVICE MINERALS CORPORATION

SCALE 1:24,000
DATE 29 JAN 74
DRAWN BY J.P.V.



TITLE KELVIN PROSPECT - INDUCED POLARIZATION LINES

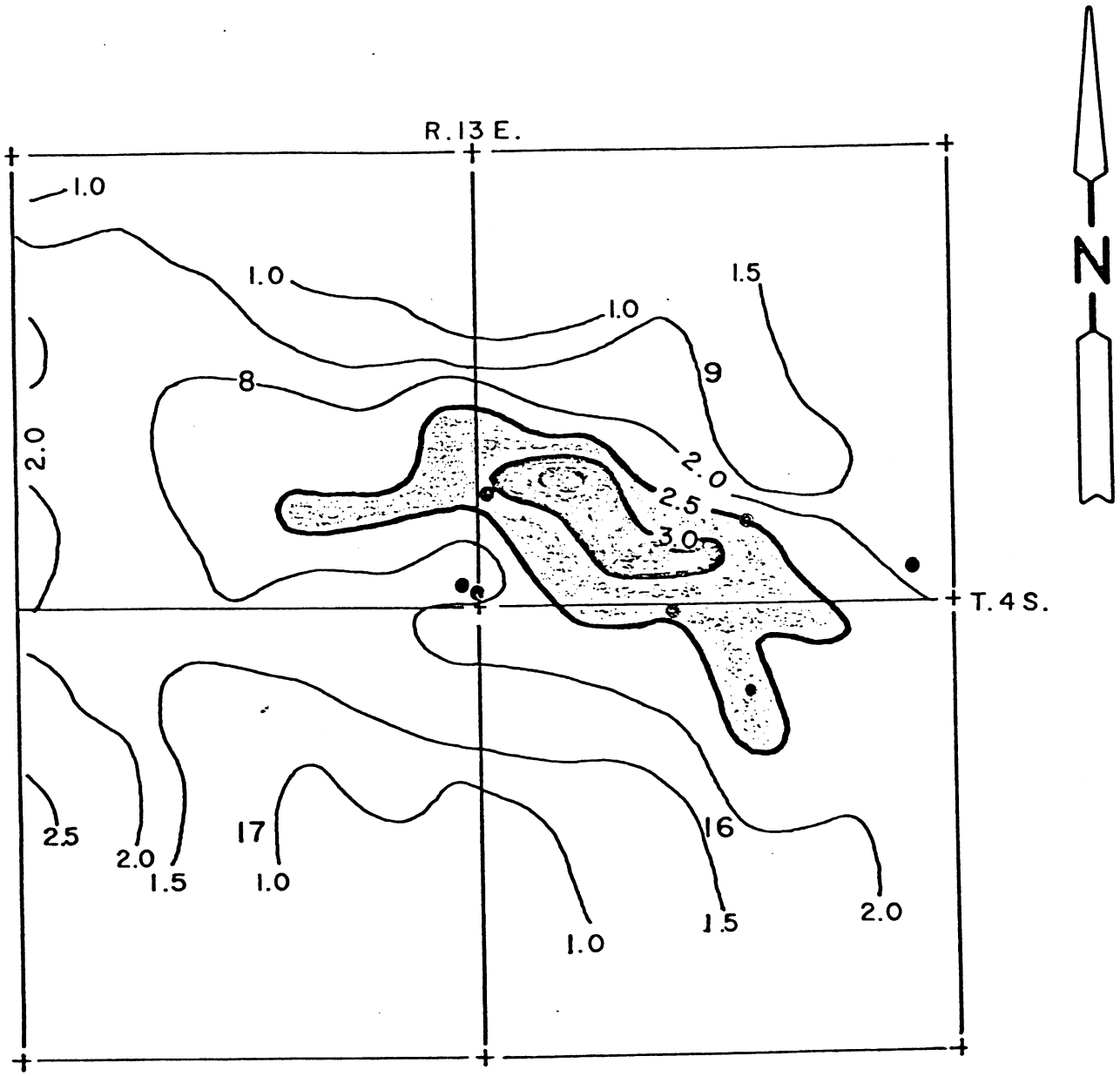
SKETCH NO. 5

Hollrichs Geoexploration Co. for Tipperary [illegible] - MAY 1970

FILE NO.

CITIES SERVICE MINERALS CORPORATION

SCALE 1:24,000
DATE 31 JAN 74
DRAWN BY J.P.V.



contour interval = 0.5 P.F.E.

● = existing drill hole

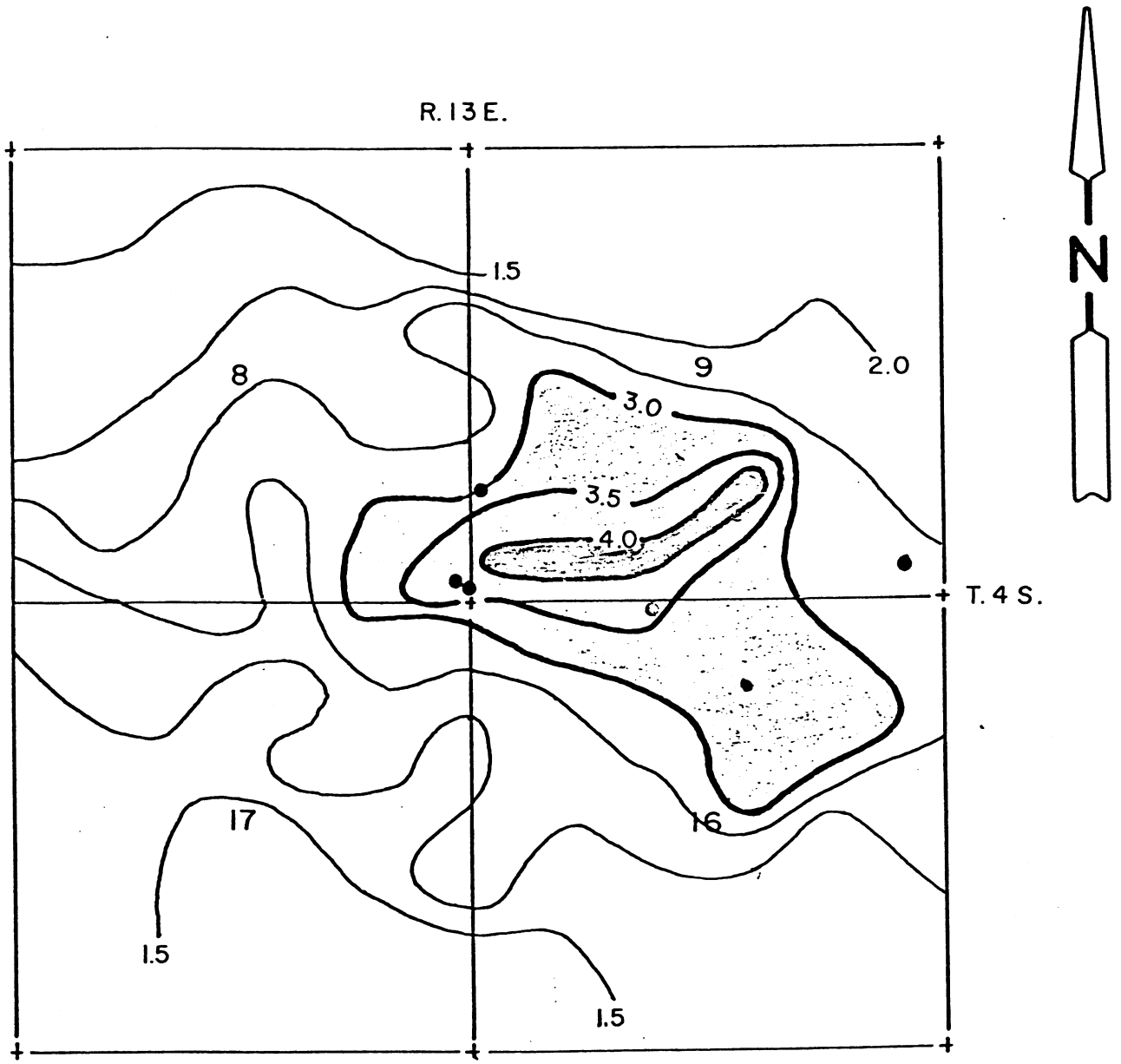
TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n" = 1 SKETCH NO. 6

(P.F.E. over 2.5 % in red)

FILE NO.

CITIES SERVICE MINERALS CORPORATION

SCALE 1: 24,000
DATE 29 JAN 74
DRAWN BY J.P.V.



contour interval = 0.5 P.F.E.

● = existing drill hole

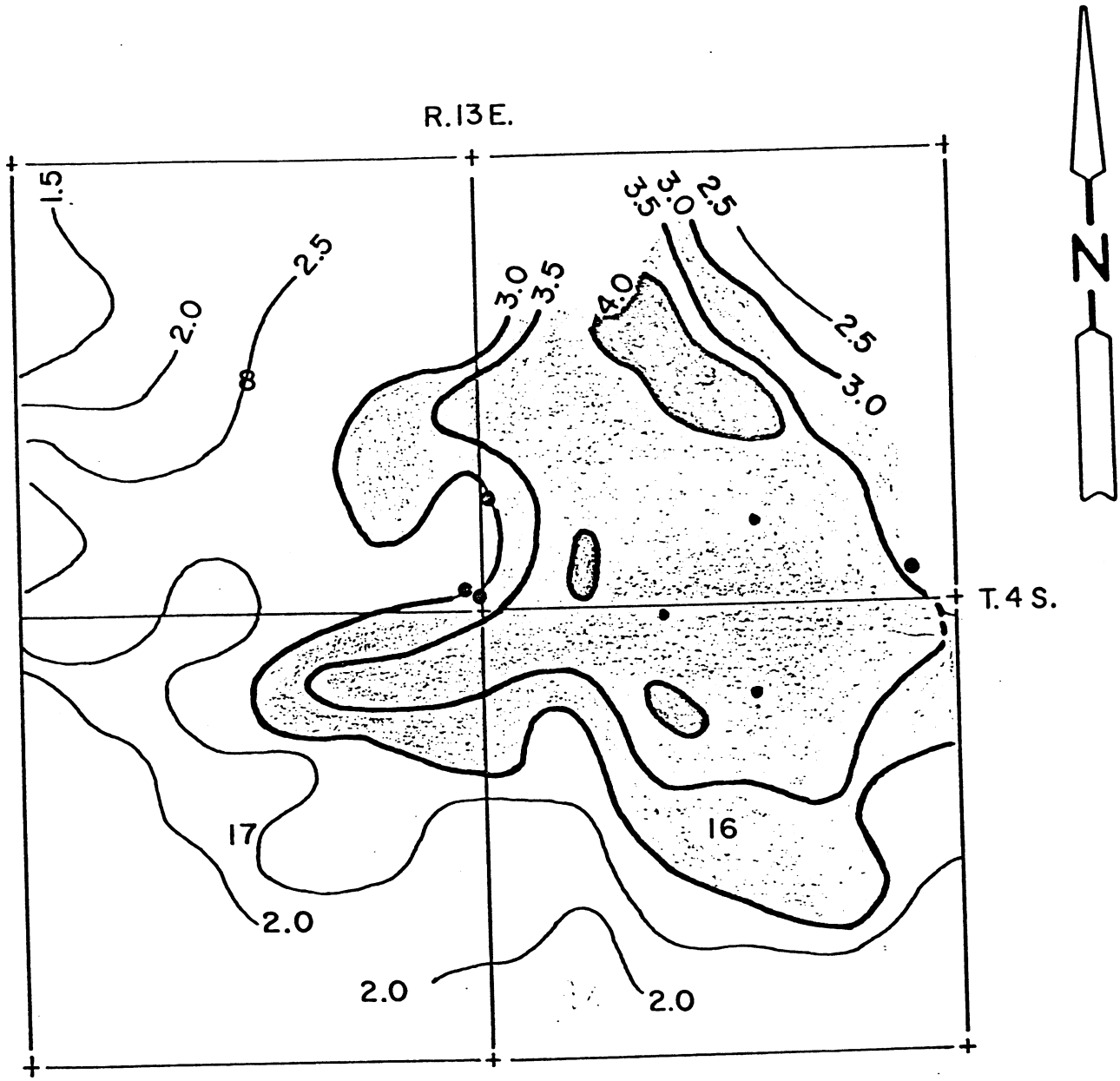
TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n"=3
(P.F.E. over 3% in red)

SKETCH NO. 7

FILE NO.

CITIES SERVICE MINERALS CORPORATION

SCALE 1" 24,000
DATE 30 JAN 74
DRAWN BY J.P.V.



contour interval = 0.5 P.F.E.

= existing drillhole

TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n" = 5 (P.F.E. over 3.0 % in red)

SKETCH NO. 8

$K_0/2\pi$ n=3

148 166 171 173 181 53 39 137
123 175 252 260 164 127 122 92 111 151
150
200
300
400
407 308 279 245 177 122 124 131 161 115
560 614 361 315 160 99 107 98 133 98 100
184 402 200 134 126 117 88 142 138 97 154
201 210 134 92 169 132 110 144 124 142 145
302 268 276 127 136 138 182 218 157 166 121
283 230 208 248 107 184 260 192 109 111 92
200
150
148 179 136 191 176 195 157 161 146 134 104
213 199 105 78 156 136 123 131 138 171 155

1"=1000'

47 0700

K&E 10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

SOUTH

NORTH

C1 C2 C3 C4 C5 C6 C7

Key plan

P.F.F. 0.3-3.0 Hz

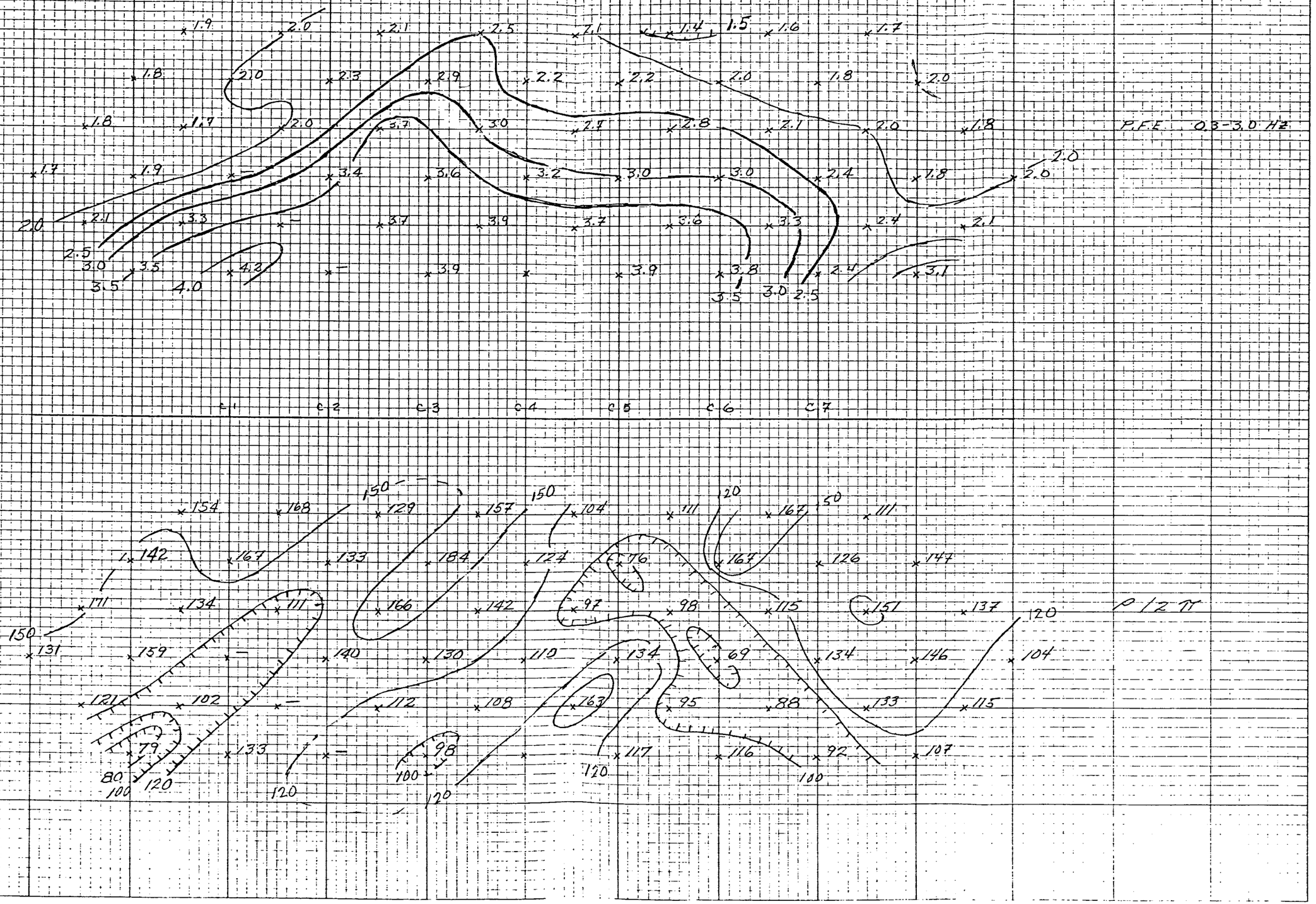
P.F.F.

SOUTH

C1 C2 C3 C4 C5 C6 C7

40E NORTH

P.F.E. 0.3-3.0 HZ



SOUTH

NORTH

C1 C2 C3 C4 C5 C6 C7

VVI #3

VVI #2

P.E.E.

0.3-3.0 Hz

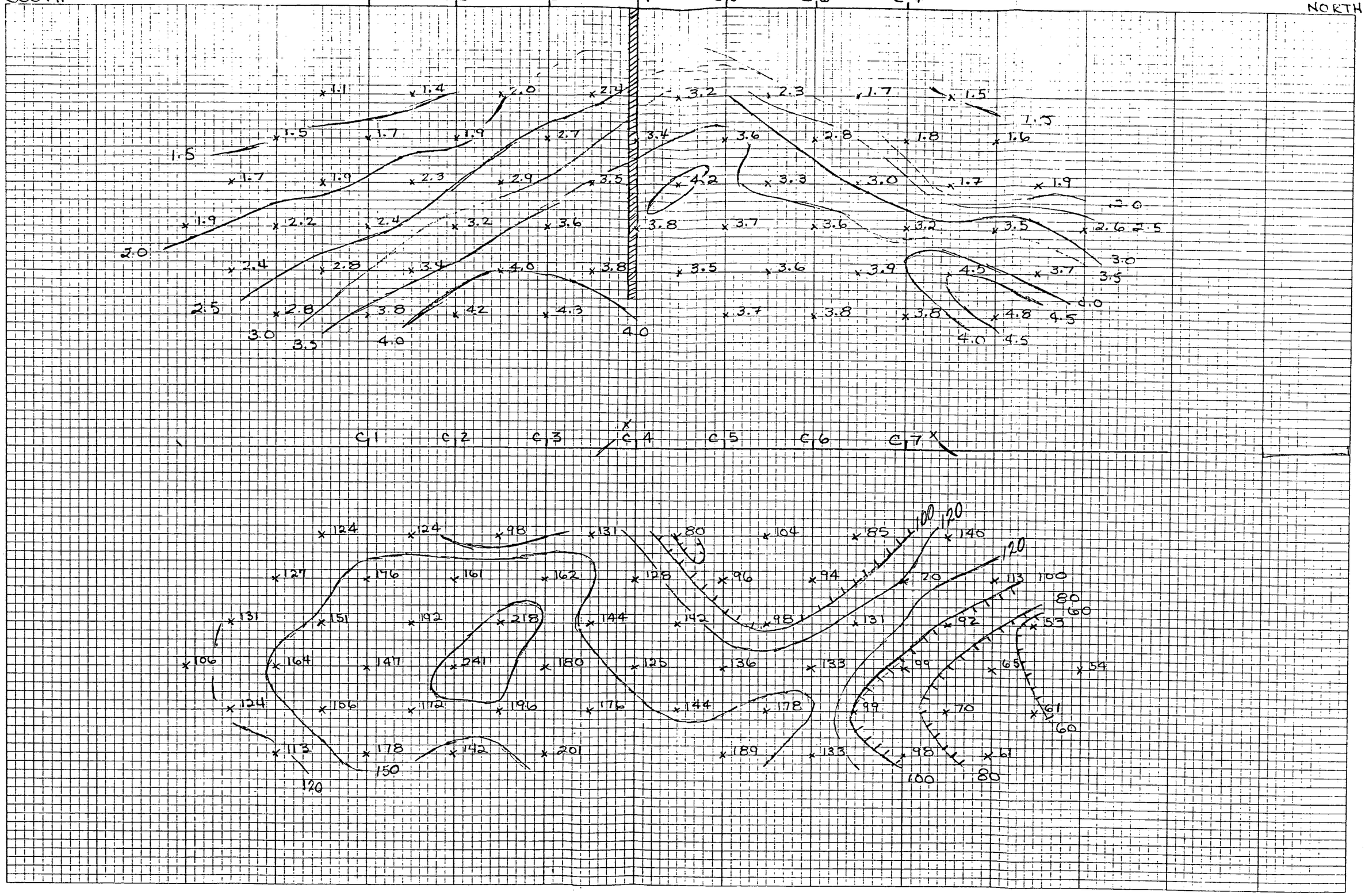
SOUTH

C 1 C 2 C 3 C 4 C 5 C 6 C 7

NORTH

CONC

J-1



SOUTH

NORTH

C1 C2 C3 C4 C5 C6 C7

P.F.E. 0.3-30 Hz

P 12 π

47 0700

K+E 10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

SOUTH

NORTH

C 1 C 2 C 3 KE-1 C 4 T-1 C 5 T-2 C 6 C 7

P.F.E. 0.3-3.0 HZ

Geoel. recc. drillholes

Plan

10W

SOUTH

C1 C2 C3 C4 C5 C6 C7

NORTH

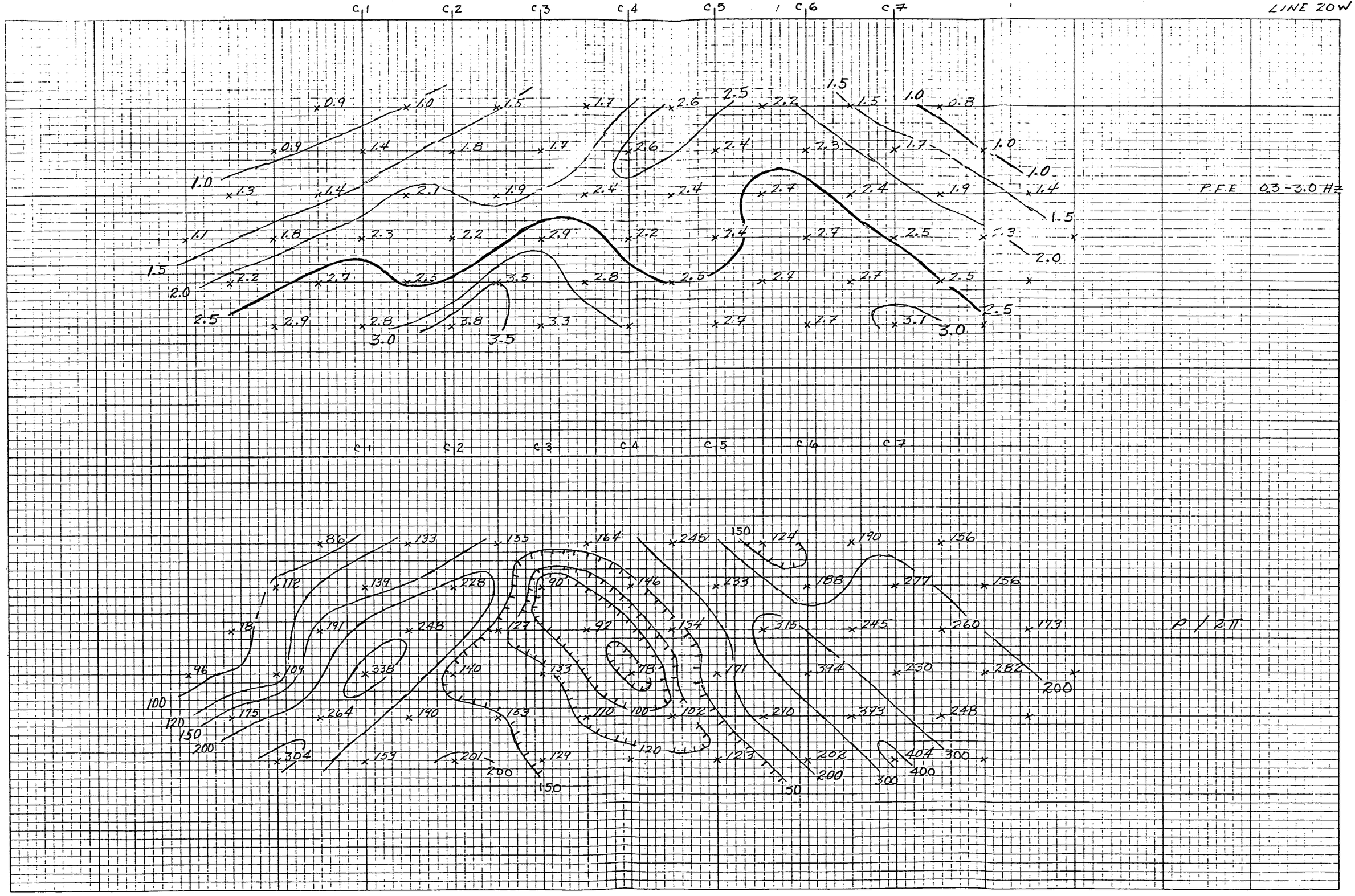
P.F.E. 0.3-3.0 Hz

C1 C2 C3 C4 C5 C6 C7

P/2π

47 0700

K&E 10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



LINE 30W

C1 C2 C3 C4 C5 C6 C7

PFE. 0.3-3.0 HZ

PFE

47 0700

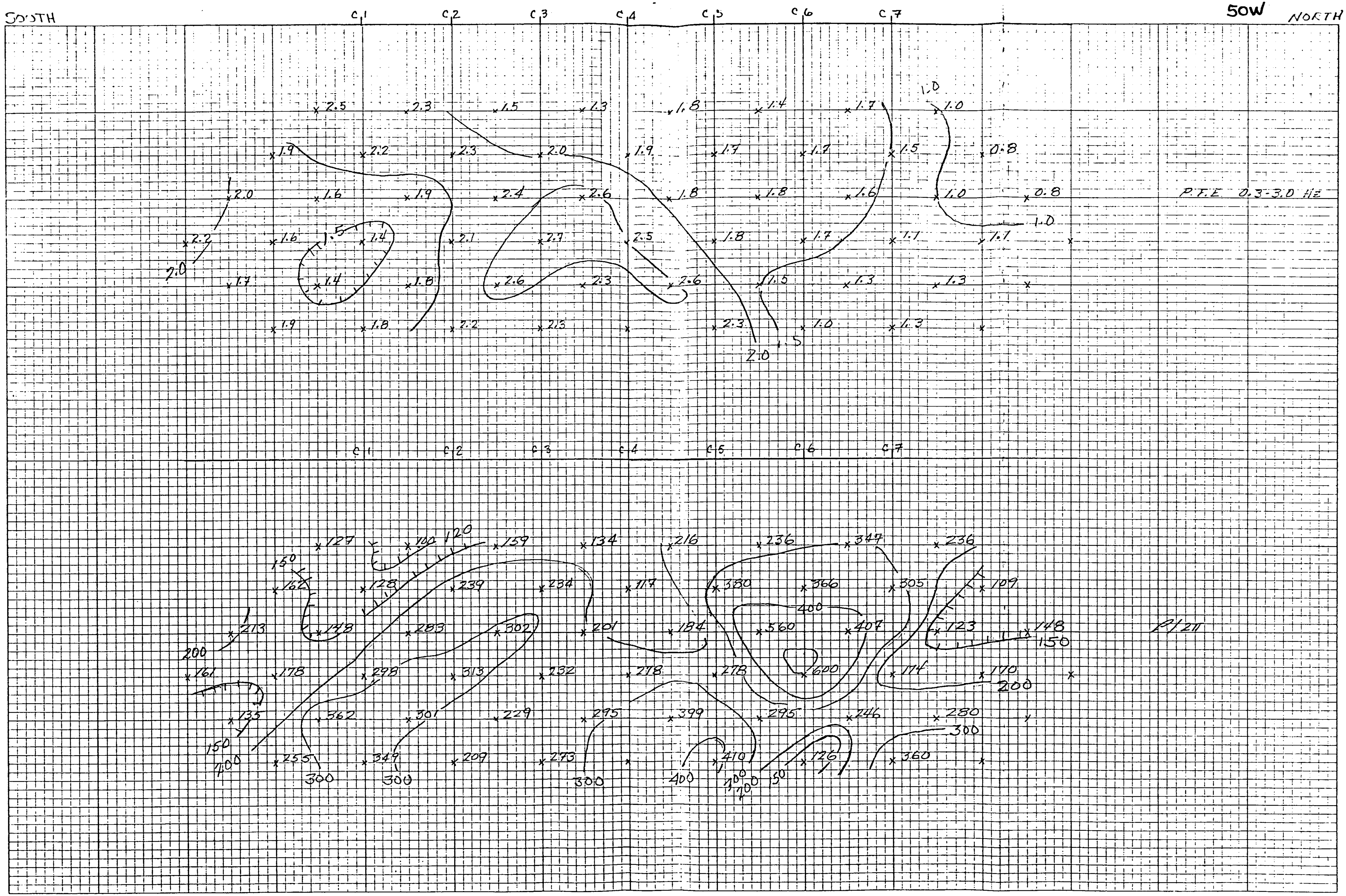
K&E 10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

SOUTH

NORTH

C 1 C 2 C 3 C 4 C 5 C 6 C 7

P.F.E. 0.3 - 3.0 Hz



PROJECT ATTAWAY DRILL HOLE NO. [illegible] SCALE 1" = 100' PAGE NO. 1 OF [illegible]

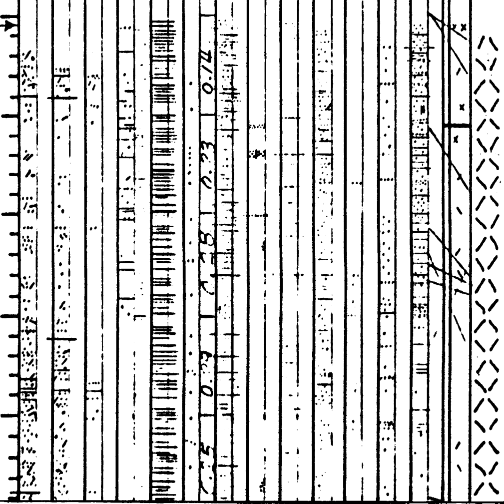
LENGTH	ASSAYS (%)					Mineralization & Miscellaneous	Chalcopyrite	Pyrite								STRUCT.	ROCK	Summary Lithology & [illegible]
	Cu	Mo	S															
100																		
200																		
300																		
400																		
500																		
600																		
700																		

LENGTH		ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
	.24	.0149	.0010	.0457	.101	1.3

Mineralization & Miscellaneous

1254' hole wedged off and reduced to BX wireline.

Chalcopyrite | Pyrite | Molybdenite | Limonite Zeolite | Quartz in Veins | Magnetite | Secondary K-feldspar | Secondary Biotite | Carbonate | Epidote | Green Sericite | White Sericite | Chlorite | STRUCT. | ROCK



Summary Lithology & Alteration Log

-1534': Paleocene Teacup Granodiorite: moderately porphyritic with phenocrysts of euhedral to subhedral light-colored plagioclase up to 0.4 inch in length; prominent light gray anhedral quartz up to 0.2 inch and euhedral biotite up to 0.1 inch in a medium grained groundmass of quartz, K-feldspar, minor biotite and rare hornblende (up to 0.05 inch). Magnetite content from 1254-1534 = 0.23%. Overall appearance is white to light gray when fresh. Color index approximately = 5 to 10. Correlative with Grayback Granodiorite of Schmidt.

% Fe_3O_4 (cmt.)	Cu	Mo	S	Calc. wt % sulfide	py/cp
.17	.0284	.0021	.1093	.233	1.8
.14	.1112	.0049	.3695	.802	1.5
.13	.0575	.0043	.1603	.357	1.2

Mineralization & Miscellaneous

noticable increase in pyrite below contact.

Zeolite Zone - orange stilbite (?) [illegible]. A second white - transparent zeolite possibly occurs below 1534, associated with CO_3-stilbite.

possible traces of bornite (or "tarnished" chalcopyrite

zone of apparent extremely poor core recovery

dark red-brown "limonite" occurs throughout interval 2100-2250 - occassionally along a slip or fracture but more often disseminated - possibly as a surface coating after sparse magnetite (some or all may have developed between time of drilling and time of logging.

bleb of sphalerite (?) trace bornite

nearly all sulfide mineralization occurs as fine disseminations. No true veins present. Occassional short discontinuous veinlets.

Summary [illegible]

1504: 2" of Tertiary [illegible] granodiorite [illegible] III (Continental [illegible] granodiorite. [illegible] contact [illegible] Teacup Granodiorite [illegible]

1534-1693: Precambrian Oracle Granite: porphyritic quartz monzonite containing numerous pink K-feldspar phenocrysts up to 1.5 inch in length (generally euhedral), plagioclase crystals generally euhedral average 0.25 inch to 0.5 inch in diameter, in a coarse to medium grained groundmass of quartz, K-feldspar, plagioclase, biotite and minor magnetite and hornblende. Upper contact at [illegible] to core axis.

Plagioclase generally [illegible] by secondary [illegible]spar - interior of phenocrysts are dark blue-green in color and are generally composed of green secondary biotite and sericite in varying ratios.

1693-1747: Tertiary-Cretaceous Granodiorite Porphyry II a medium to dark gray rock with approximately 50% phenocrysts of (in decreasing abundance) anhedral quartz up to 0.3 inch in diameter, euhedral to subhedral plagioclase up to 0.4 inch in length and euhedral to subhedral biotite up to 0.1 inch in diameter, in a fine-grained groundmass of the same minerals plus K-feldspar. Magnetite content = 0.20%. This unit generally exhibits distinct to indistinct chilled margins. There is a much more distinct variation in this unit between phenocryst & groundmass size than there is in the Teacup Granodiorite above.

1747-2028: Precambrian Oracle Granite:

1827-1873: 46' zone of abundant brick red limonite coating or partially coating fractures. Zinc 1820-1880 358 ppm (compared to 62 ppm above and 33 ppm below). possible location of "OTTGO" fault. Above this zone limonite is not strong and is often (but not always) associated with zeolite veinlets, [illegible] often appears as a "[illegible]" along fractures and as "[illegible]" [illegible] [illegible] generally along fractures.

Zone of [illegible]

zone of relatively abundant [illegible] secondary biotite - sometimes completely flooding matrix [illegible] - especially evident where hairline veinlets [illegible] phenocrysts.

rock strongly brecciated - chlorite [illegible] fractures.

2028-2046: Tertiary-Cretaceous Granodiorite Porphyry II

2046-2265: Precambrian Oracle Granite

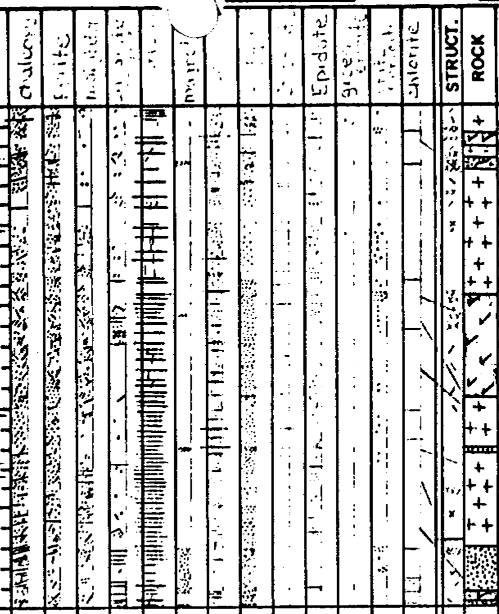
secondary [illegible]spar occurs mainly replacing edges of [illegible] phenocrysts. Biotite strongly chloritized.

width of [illegible] increase.

DRILL HOLE RECORD

PROJECT KELVIN DRILL HOLE NO. KE-1 SCALE 1" = 100' PAGE NO. 4 OF 4

DEPTH	% Fe_3O_4 (Cont.)	Cu	Mo	S	Calc. wt. % sulfide	Py/cp	Mineralization & Miscellaneous
00							blebs of bornite & chalcopyrite in quartz cut diabase
							pyrite & chalcopyrite generally occur in short discontinuous veinlets & as disseminations — no true veins.
00	0.25	.0492	.0122	.1597	.348	1.5	Strong [illegible] visible [illegible] below 2312 — occurs as disseminations, along short discontinuous veinlets and more commonly [illegible] in or discontinuously along milky quartz or quartz-CO_3 veins. Below [illegible] pyrite-chalcopyrite occurs similarly
							14 PPM Cobalt (compared to 8 PPM above
00							← = trace bornite



Summary [illegible]

2278-2283: Intimate mixture of [illegible] Granite and Fine-[illegible] Diabase.

2265-2270½, 2346-2395, 2494-2493 } Tertiary-Cretaceous Granodiorite Porphyry

2270½-2278, 2283-2346, 2395-2420, 2422-2470 } Precambrian Oracle Granite

2420-2422, 2470-2494, 2498-2500 } Precambrian Fine-Grained Diabase

0-1254 = NXWL
1254-2500 = BXWL

PROSPECT JOHNSON - ALVIN
HOLE NO. KE-1 LOCATION SECTION 17, TWP. 4S., R. 11E., 75' FNL & 230' FEL
STARTING DATE 2/5/72 COMPLETION DATE 5/2/72 COLLAR ELEV. ± 2195' BEARING N 0° E INCLINATION -60°
TOTAL LENGTH 2500' TOTAL DEPTH ± 2165' DRILLING CO. JOY MANUFACTURING DRILLER CYPRUS
SAMPLER GEOLOGIST CORE COND. (GOOD I, BROKEN /, CRUSHED —)

DATE	FOOTAGE	ELEV.	CORE WEIGHT	% RECOV.	LITHOLOGY	MINERALOGY: PY	CPY	CC	COV.	MO	KV	SULF.	EP	CHLOR.	SERPT	BRECC.	ASSAYS %: TOT. CU	OX. CU	ASSAYS PPM: Mo	% Pb	% Zn	REMARKS	CORE COND.
	0	2195			ORACLE GRANITE									/					4				
	5																						
	10													/									
	15																.008						
	20													/					4				
	25	2173															.026						
	30										/			/					4				
	35																.026						
	40										/			/					4				
	45																.026						
	50	2152									/	/		/					19				
	55																.053						
	60				MIGMATITE						/			—					19				
	65																.023						
	70										/								19				
	75	2130												/			.023						
	80										/	/		/					19				
	85																.023						
	90				ORACLE						/			/					19				
	95				GRANITE						/			/			.023						
	100	2108									/			/					7				
	105										/			/			.080						
	110										/			/					7				
	115										/			/			.021						
	120				DIABASE									/					7				
	125	2087												/			.021						
	130													/					7				
	135											/		/			.180						
	140													/					7				
	145																.035						
	150	2065			DIABASE							/		/					7				

SHEET NO. 1 OF 16

PROSPECT JOHNSON-KELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ

DATE	FOOTAGE	ELEV.	CORE WEIGHT	% RECOV.	LITHOLOGY	MINERALOGY PY	CPY	CC	CC/MO	KV	SULF	EPI DO	CHLOR	SERICT	BRECC	% ASSAYS PPM TOT CU.	OX. CU.	Mo	% Pb	% Zn	REMARKS	CORE COND.
	150	2065														↑		↑				
	155				DIABASE											.035		7				
	160															↑		↑				
	165															.035		7				
	170															↑		↑				
	175	2043														.016		45				
	180															↑		↑				
	185															.016		10				
	190															↑		↑				
	195															.016		10				
	200	2022														↑		↑				
	205															.208		10				
	210															↑		↑				
	215															.168		130				
	220															↑		↑				
	225	2000			ORACLE											.021		10				
	230				GRANITE											↑		↑				
	235															.021		2				
	240															↑		↑				
	245															.007		18				
	250	1979														↑		↑				
	255															.030		4				
	260															↑		↑				
	265															.120		4				
	270															↑		↑				
	275	1957														.037		4				
	280				DIABASE											↑		↑				
	285															.037		4				
	290				ORACLE											↑		↑				
	295				GRANITE											.006		4				
	300	1935														↑		↑				
	305															.031		4				
	310																					

PROSPECT JOHNSON - KELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ.

ATE	FOOTAGE	ELEV.	CORE WEIGHT	% RECOV.	LITHOLOGY	MINERALOGY: PY	CPY	CC	CCV	BAC	K-V	SULF.	EPIDO.	CHLOR.	SERICT	BRECC.	% ASSAYS PPH: TOT. CU	OX. CU	Mo	Pb	Zn	REMARKS	CORE COND.
	310				ORACLE												↑		↑				
	315				GRANITE												.004		4				
	320																↑		↑				
	325	1914															.004		4				
	330																↑		↑				
	335																.004		4				
	340																↑		↑				
	345																.004		4				
	350	1892			DIABASE												↑		↑				
	355																.068		4				
	360																↑		↑				
	365																.030		4				
	370																↑		↑				
	375	1870															.006		4				
	380																↑		↑				
	385																.006		4				
	390																↑		↑				
	395																.006		4				
	400	1849															↑		↑				
	405				GRAYBACK												.048		4				
	410				GRANODIORITE												↑		↑				
	415																.029		4				
	420				ORACLE												↑		↑				
	425	1827			GRANITE												.029		32				
	430																↑		↑				
	435																.029		32				
	440				GRAYBACK												↑		↑				
	445				GRANODIORITE												.029		32				
	450	1805															↑		↑				
	455																.029		5				
	460																↑		↑				
	465																.152		40				
	470																						

PROSPECT JOHNSON - NELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ

DATE	FOOTAGE	ELEV.	CORE WEIGHT	% RECOV.	LITHOLOGY	MINERALOGY: PY	CPY	CC	COV.	MO	K-V	SULF	EPI	DO	CHLOR	SERCIT	BRECC	% ASSAYS: TOT. CU	OX. CU.	PPM: Mo	% Pb	% Zn	REMARKS	CORE COND.
	470																	↑		↑				
	475	1784			GRAYBACK																			
	480				GRANODIO.													.012		14				
	485																	↑		↑				
	490																	.012		4				
	495																	↑		↑				
	500	1762																.012		45				
	505																	↑		↑	↑	↑		
	510																	.040		45				
	515																	↑		↑				
	520																	.040		190				
	525	1740																↑		↑	.018	.024		
	530																	.040		14				
	535				ORACLE													↑		↑				
	540				GRANITE													.021		5				
	545																	↑		↑				
	550	1719																.021		25				
	555																	↑		↑				
	560																	.021		15				
	565				GRAYBACK													↑		↑				
	570				GRANODIO.													.003		15				
	575	1697																↑		↑				
	580																	.044		5				
	585																	↑		↑				
	590																	.005		5				
	595																	↑		↑				
	600	1675																.005		5				
	605																	↑		↑	↑	↑		
	610																	.005		5				
	615																	↑		↑				
	620																	.005		5				
	625	1654																↑		↑	.005	.003		
	630																	.005		5				

PROSPECT JOHNSON-KELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ.

ATE	FOOTAGE	ELEV.	CORE WEIGHT	% BELOW	LITHOLOGY	MINERALOGY: PY	CPY	CC	COV	MO	K-V	SUL	EPI DO	CHLOR	SERICT	BRECC	% ASSAYS PPM: TOT. CU	OX. CU	Mo	Pb	Zn	REMARKS	CORE COND.
	630				GRAYBACK												↑		↑				
	635				GRANODIO.												.005		5				
	640																↑		↑				
	645																.005		5				
	650	1632															↑		↑				
	655																.005		5				
	660																↑		↑				
	665																.005		5				
	670																↑		↑				
	675	1610															.005		5				
	680																↑		↑				
	685																.005		5				
	690																↑		↑				
	695																.012		750				
	700	1589															↑		↑	↑	↑		
	705																.012		400				
	710																↑		↑				
	715																.036		720				
	720																↑		↑	.005	.020		
	725	1567															.014		10				
	730																↑		↑				
	735																.014		10				
	740																↑		↑				
	745																.014		60				
	750	1546															↑		↑				
	755				DIORITE												.014		4				
	760				MONZONITE																		
	765				PORPHYRY																		
	770																						
	775	1524																					
	780																						
	785																						
	790																						

PROSPECT JOHNSON-KELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ.

ATE	FOOTAGE	ELEV.	CORE WEIGHT	% RECOV.	LITHOLOGY	MINERALOGY: PY	CPY	CC	COV	XO	KV	SUB	EPI	CHLOR	SERICT	BRECC	ASSAYS: % TOT. CU	% OX. CU	ppm Mo	% Pb	% Zn	REMARKS	CORE COND.
	790				QUARTZ																		
	795				MONZONITE																		
	800	1502			PORPHYRY												↑		↑	↑	↑		
	805										/						.003		6				
	810																						
	815																						
	820																			.004	.005		
	825	1481			GRAYBACK						/												
	830																						
	835				QUARTZ																		
	840				MONZONITE																		
	845				PORPHYRY																		
	850	1459															↑		↑				
	855																.003		2				
	860																						
	865																						
	870																						
	875	1437																					
	880																						
	885																						
	890																						
	895																						
	900	1416															↑		↑	↑	↑		
	905																.002		3				
	910																↑		↑				
	915												/				.015		3				
	920													/			↑		↑	.005	.015		
	925	1394			GRAYBACK GRANODIO.									/			.004		3				
	930													/									
	935										—												
	940													/									
	945																						
	950	1372																					

PROSPECT JOHNSON - [illegible]ELVIN

HOLE NO KE-1 LOCATION PINAL CO., ARIZ.

DATE	FOOTAGE	ELEV.	CORE WEIGHT	LITHOLOGY	MINERALOGY PY	LPY	C	COO	ANG	KJ	SUL	EPI	DO	CHLOR	OXIDE	SULFIDE	% ASSAYS PPM TOT. CU	OX. CU	Mo	% Pb	% Zn	REMARKS
	950	1372																				
	955			GRAYBACK													.011		7			
	960			EPIDIO-																		
	965																					
	970																					
	975	1351																				
	980																					
	985																					
	990																					
	995																					
	1000	1329																				
	1005																.004		3			
	1010																					
	1015																.015		3			
	1020																			.003	.001	
	1025	1307																				
	1030																					
	1035																					
	1040																					
	1045																					
	1050	1286																				
	1055																.002		4			
	1060																					
	1065																					
	1070																					
	1075	1264																				
	1080																					
	1085																					
	1090																					
	1095																					
	1100	1242																				
	1105																.004		3			
	1110																					

SHEET NO. 7 OF 16

PROSPECT JOHNSON ELVIN

HOLE NO. KE-1 LOCATION PINAL CO., ARIZ.

FOOTAGE	ELEV.	CORE WEIGHT	LITHOLOGY	MINERALOGY	%	ASSAYS PPM	%	%	REMARKS
				PY	TOT CU	Mo	Pb	Zn	
1110					↑	↑			
1115									
1120			GRAYBACK		.004	3			
1125	1221		GRANODIO.				.006	.004	
1130									
1135									
1140									
1145					↑	↑			
1150	1199				.004	1			
1155					↑	↑			
1160					.080	16			
1165					↑	↑			
1170					.048	45			
1175	1177				↑	↑			
1180					.012	3			
1185					↑	↑			
1190					.012	3			
1195					↑	↑			
1200	1156				.004	3			
1205					↑	↑	↑	↑	
1210					.004	3			
1215					↑	↑			
1220					.004	3			
1225	1134				↑	↑	.006	.003	
1230					.047	20			
1235					↑	↑			
1240					.047	145			
1245					↑	↑			
1250	1112				.003	35			
1255					↑	↑			
1260					.003	3			
1265					↑	↑			
1270					.003	3			

CITIES SERVICE MINERALS CORP. KELVIN PROJECT - PINAL CO., ARIZONA HOLE KE-1 (CYPRUS - DECLINED 60°) ALL VALUES SMOOTHED WITH A FIVE POINT WEIGHTED RUNNING AVERAGE

LENGTH

COBALT (PPM) 0 50 100

MOLYBDENUM (PPM) 0 50 100 150

COPPER (PERCENT) 0 0.1 0.2 0.3 0.4

SULFUR (PERCENT) 0 1 2 3

MAGNETITE (PERCENT, VOL.) 0 1.0 2.0 3.0

ZINC (PPM) 0 100 200 300

PYRITE / CHALCOPYRITE .33 .5 1 2 3 4 5 6 7

SILVER (PPM) 0 2 4

0
400
800
1200
1600
2000
2400
2500

47 0700

K&E 10 X 10 TO THE INCH • 10 X 15 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

J. P. VROMAN 25 MAR 77

AMPAD EFFICIENCY LINE NO. 6636

CSMC KELYIN PROJECT
CYPRUS HOLE KE-1
FIVE POINT WEIGHTED RUNNING AVERAGES

											Cu x 1.8363	3 x Py x 0.53		
										weight %	4.2	5.02	5.18	
	1 % Cu	2 % Mo	3 % Zn	4 % S	5 PPM Ag	6 wt % py	7 Py/Cp	8 Py+Cp	9 PPM Co	10 Vol % Cp	11 Vol % Py	12 Vol % Pn	13 Mc
1240-1280 1	.0071	..0011	.0050	.023	2.6	.0302	1.5	.051	6.	.0130	.0161	.142	2.6
1280-1320 2	.0070	.0012	.0052	.025	2.4	.0337	1.7	.054	6.	.0129	.0179	.183	3.2
1320-1360 3	.0067	.0011	.0038	.021	2.3	.0270	1.4	.046	6.	.0123	.0144	.228	3.8
1360-1400 4	.0084	.0010	.0028	.022	2.6	.0249	1.0	.049	6.	.0154	.0132	.265	4.4
1400-1440 5	.0119	.0009	.0026	.031	3.0	.0363	1.1	.071	6.	.0219	.0193	.247	4.3
1440-1480 6	.0146	.0009	.0052	.048	2.7	.0614	1.5	.104	6.1	.0268	.0327	.250	4.6
1480-1520 7	.0176	.0010	.0095	.072	2.1	.1015	2.1	.152	6.2	.0323	.0540	.206	4.4
1520-1560 8	.0203	.0010	.0121	.101	1.7	.1504	2.6	.171	6.2	.0373	.0800	.174	4.4
1560-1600 9	.0211	.0015	.0086	.116	1.9	.1772	2.9	.238	5.6	.0387	.0943	.138	4.1
1600-1640 10	.0232	.0021	.0065	.111	2.6	.1639	2.4	.231	5.5	.0426	.0872	.145	4.1
1640-1680 11	.0273	.0027	.0067	.100	3.6	.1355	1.7	.214	6.2	.0501	.0721	.155	4.2
1680-1720 12	.0391	.0029	.0062	.113	3.8	.1376	1.2	.251	7.5	.0718	.0732	.186	5.0
1720-1760 13	.0615	.0034	.0068	.130	4.2	.1271	.72	.305	9.0	.1129	.0676	.187	5.5
1760-1800 14	.0894	.0041	.0118	.293	4.3	.3794	1.5	.638	9.3	.1642	.2018	.162	7.9
1800-1840 15	.1003	.0048	.0190	.338	4.1	.4430	1.5	.733	10.0	.1842	.2357	.147	8.5
1840-1880 16	.0962	.0057	.0186	.303	4.0	.3852	1.4	.663	12.1	.1767	.2049	.146	7.9
1880-1920 17	.0776	.0064	.0107	.222	3.8	.2688	1.2	.493	12.2	.1425	.1430	.140	6.4
1920-1960 18	.0680	.0068	.0053	.170	4.0	.1897	.97	.386	10.6	.1249	.1009	.142	5.5
1960-2000 19	.0624	.0056	.0042	.151	3.9	.1647	.91	.345	9.5	.1146	.0876	.177	5.7
2000-2040 20	.0600	.0037	.0055	.173	3.6	.2104	1.2	.384	10.5	.1102	.1119	.200	6.3
2040-2080 21	.0580	.0026	.0063	.197	3.2	.2593	1.5	.427	12.4	.1065	.1379	.161	6.1
2080-2120 22	.0508	.0025	.0064	.182	3.8	.2444	1.7	.391	10.4	.0933	.1300	.110	5.0
2120-2160 23	.0414	.0029	.0063	.153	4.1	.2081	1.7	.328	8.6	.0760	.1107	.073	3.9
2160-2200 24	.0416	.0035	.0047	.131	3.8	.1670	1.4	.287	8.1	.0764	.0888	.062	3.4
2200-2240 25	.0514	.0048	.0034	.134	3.7	.1570	1.1	.305	8.5	.0944	.0835	.052	3.4
2240-2280 26	.0596	.0070	.0030	.157	3.6	.1759	1.0	.348	9.1	.1094	.0936	.099	4.5
2280-2320 27	.0561	.0093	.0032	.153	3.9	.2104	1.3	.372	9.6	.1030	.1119	.138	5.3
2320-2360 28	.0506	.0103	.0037	.187	3.9	.2541	1.7	.400	9.1	.0929	.1352	.157	5.8
2360-2400 29	.0518	.0113	.0041	.194	3.5	.2657	1.8	.415	9.5	.0951	.1414	.176	6.2
2400-2440 30	.0580	.0117	.0043	.158	2.9	.1853	1.1	.353	11.2	.1065	.0986	.248	6.8
2440-2480 31	.0560	.0117	.0048	.122	2.9	.1224	0.76	.284	14.0	.1028	.0651	.395	8.4
2480-2500	.0538	.0088	.0057	.099	3.6	.0830	0.53	.238	18.4	.0988	.0442	.600	11.1

AMPAD EFFICIENCY.. LINE NO. 6636

1 TROY OUNCE = 34.286 PPM

* 1254-1280 not weighted

● 1780-1800 - Cuprus Assay used in composite

CSMC KELVIN PROJECT - HOLE KE-1 (CYPRUS)

INTERVAL	ASSAY 1 % Cu	2 wt. % CP	3 % S in CP	ASSAY 4 % S	5 % S in Py.	6 wt % Py	7 TOTAL SULFIDES	8 Py/CP	ASSAY 9 % Mo	10 Vol. % Fe_3O_4	ASSAY 11 % Zn	Skuline ASSAY 12 PPM Ag	ASSAY 13 PPM
* 1240-1280 1	.0060	.0173	.0061	.0145	.0084	.0157	.033	0.91	.0008	.10	.0034	<0.2	6.
1280-1320 2	.0100	.0289	.0101	.0410	.0309	.0578	.087	2.0	.0016	.18	.0089	<0.2	6.
1320-1360 3	.0037	.0107	.0037	.0145	.0108	.0202	.031	1.9	.0011	.24	.0017	<0.2	6.
1360-1400 4	.0052	.0150	.0052	.0095	.0043	.0080	.023	0.53	.0010	.28	.0029	<0.2	6.
1400-1440 5	.0168	.0485	.0170	.0370	.0200	.0374	.086	0.77	.0008	.29	.0020	<0.2	6.
1440-1480 6	.0118	.0341	.0119	.0405	.0285	.0535	.088	1.6	.0007	.28	.0018	<0.2	6.
1480-1520 7	.0162	.0469	.0163	.0595	.0432	.0808	.128	1.7	.0016	.16	.0083	<0.2	6.
1520-1560 8	.0262	.0757	.0264	.1162	.0898	.1680	.244	2.2	.0004	.22	.0242	0.2	7.
1560-1600 9	.0166	.0479	.0168	.1310	.1142	.2137	.262	4.5	.0013	.09	.0024	<0.2	5.
1600-1640 10	.0234	.0676	.0236	.1188	.0952	.1781	.246	2.6	.0020	.13	.0026	0.2	5.
1640-1680 11	.0266	.0768	.0268	.0820	.0552	.1033	.180	1.3	.0036	.13	.0112	<0.2	6.
1680-1720 12	.0286	.0826	.0289	.0980	.0691	.1293	.213	1.6	.0020	.22	.0061	<0.2	6.
1720-1760 13	.0498	.1438	.0503	.1098	.0595	.1113	.255	0.77	.0035	.22	.0032	<0.2	12.
1760-1800 14	.1125 ●	.3250	.1135	.3700	.2565	.4798	.805	1.5	.0041	.14	.0046	0.2	9.
1800-1840 15	.1001	.2891	.1010	.3970	.2960	.5538	.843	1.9	.0046	.12	.0288	0.5	6.
1840-1880 16	.1210	.3495	.1121	.3415	.2294	.4292	.779	1.2	.0059	.17	.0279	0.2	16.
1880-1920 17	.0534	.1542	.0539	.1652	.1113	.2082	.362	1.4	.0059	.16	.0026	0.2	13.
1920-1960 18	.0719	.2077	.0726	.1805	.1079	.2019	.410	1.0	.0086	.07	.0037	<0.2	11.
1960-2000 19	.0636	.1837	.0642	.1028	.0386	.0722	.256	0.39	.0062	.18	.0026	0.2	7.
2000-2040 20	.0520	.1502	.0525	.1578	.1053	.1970	.347	1.3	.0027	.30	.0068	<0.2	7.
2040-2080 21	.0678	.1958	.0684	.2678	.1994	.3730	.569	1.9	.0018	.13	.0070	0.3	21.
2080-2120 22	.0544	.1571	.0549	.1622	.1073	.2007	.358	1.3	.0026	.10	.0046	0.2	7.
2120-2160 23	.0327	.0945	.0330	.1615	.1285	.2404	.335	2.5	.0030	.06	.0096	0.2	7.
2160-2200 24	.0348	.1005	.0351	.1082	.0731	.1368	.237	1.4	.0030	.06	.0038	<0.2	9.
2200-2240 25	.0390	.1127	.0394	.1022	.0628	.1175	.244	1.0	.0042	.04	.0018	<0.2	8.
2240-2280 26	.0972	.2808	.0981	.2118	.1137	.2127	.494	0.76	.0061	.11	.0037	0.2	8.
2280-2320 27	.0448	.1294	.0452	.1335	.0883	.1652	.295	1.3	.0117	.13	.0031	<0.2	13.
2320-2360 28	.0432	.1248	.0436	.1710	.1274	.2384	.363	1.9	.0092	.17	.0024	<0.2	6.
2360-2400 29	.0446	.1288	.0450	.2790	.2340	.4378	.567	3.4	.0120	.18	.0066	<0.2	10.
2400-2440 30	.0761	.2198	.0768	.1250	.0482	.0902	.310	0.41	.0102	.15	.0029	<0.2	11.
2440-2480 31	.0480	.1386	.0484	.1095	.0611	.1143	.253	0.82	.0175	.30	.0041	<0.2	10.
2480-2500	.0529	.1528	.0534	.0870	.0336	.0628	.216	0.41	.0033	.87	.0073	0.2	25.

AMPAG EFFICIENCY, LINE NO. 6636

CYPRUS HOLE KE-1

M = moderate
S = strong
min = minor
tr = trace

L w/ JAH
EXXON 1580 .SZ

	PLAGIOCLASE							K-FELDSPAR							BIOTITE							COMMENTS		
	ser	chl	epi	CO_3	clay	qtz	biot	ser	chl	epi	CO_3	clay	qtz	biot	ser	chl	epi	CO_3	kaol	qtz	biot		12	13
1272 1																								
1283 2																								
1341 3																								
1349 4																								
1373 5																								
1400 6																								
1469 7																								
1512 8																								
1532 9																								
1536 10	W?							W-M								S		S						
1544 11	M			W	M											tr								
1559 12	M										tr													
1580 13	M										tr					S	S	S				minor ser 2nd biot units.		
1627 14	S				S			W													S	ser-CO_3 w/ trml units		
1640 15	S				S			W								W?		W?			M	qtz flooding w/ CO_3		
1652 16	min				W-M			min				W-M				S					min			
1676 17	S				S			W								W?		W?			S			
1693 18	tr				W																S			
1717 19	M				M											min?		min?			S			
1728 20	tr				W																M			
1761 21	S							M								tr								
1830 22	S							M								tr								
1874 23	?													M		W					S	qtz flooding		
1911 24																S					S	qtz flooding		
1932 25																S					S	"		
1952 26	?													M		W					M			
2036 27	tr				W																S			
2112 28	M							M										M						
2194 29	W						wK K-feld														M			
2260 30	S							W													tr			
2295 31	S?							tr							W	W		W						

CITIES SERVICE

INTEROFFICE LETTER

June 30, 1977

TO: J.P. Vroman

FROM: D.F. Denison

RE: X-ray analysis of pink vein material from hole KE-1: 1349'

The above noted material has been confirmed by X-ray analysis as being stilbite, as you suspected.

DFD/sc

SECTION 6

PROJECT KELVIN DRILL HOLE NO. KM-6 SCALE 1" = 100' PAGE NO. 1 OF 1

LENGTH		ASSAYS Cu	Mo	S	Co	Zn
100						
200		.0036	.0004	.0024	.0010	.0148
300						
400						
		.0086	.0006	.0037	.0016	.0278
500						

Mineralization & Miscellaneous

0-21: no core

trace to weak amounts of manganese stain along fractures.

trace copper oxides (blue)

trace amounts of manganese stain along fractures

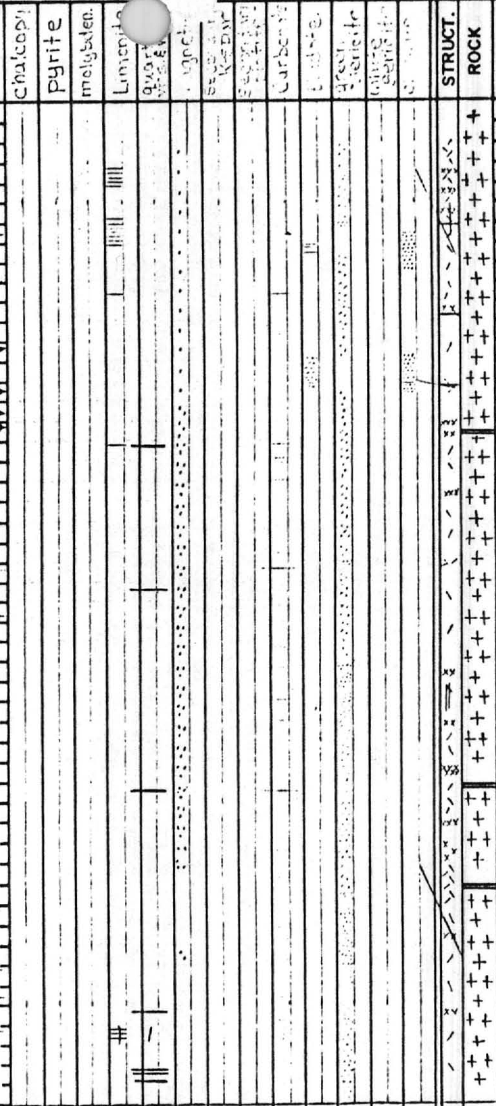
Manganese in short, discontinuous & irregularly shaped veins & veinlets (with secondary quartz) - may be a cementing material in brecciated Oracle Granite

488-497: 5' core missing.

LOGGED: September 2[illegible], 1975
BY: C.N. UPCHURCH & J.R. VROMAN

spudded: June 22, 1973
completed: July 6, 1973
bit size: NC 0-500'
driller: JOY MANUFACTURING
Collar: SE, SE, Sec. 9, T.4S., R13E. Pinal Co., Arizona
Collar elevation: 2200' ±
hole angle: vertical

thin section examination by: D.F. DENISON. 16 JAN 76



Summary Lithology & [illegible] Log

21-500: Precambrian Oracle Granite. [illegible] Porphyritic quartz [illegible] with numerous pink k-feldspar [illegible] crysts up to 1/4 inch in length together with some [illegible] smaller plagioclase [illegible] that are surrounded by a medium-grained quartz-plagioclase-k-feldspar matrix.

chlorite & epidote occur as alteration [illegible] & interstitial surrounding [illegible].

153-154 }
156-158 } Precambrian (?) aplite dikes cut Oracle Granite at 50° to core axis.
391-393 }

ALTERATION: k-feldspar is generally fresh [illegible] occasional dusting of sericite is present [illegible]. Plagioclase above 280' is fresh to weakly altered to sericite - below 280' it is generally strongly altered to sericite with some clay. Biotite is [illegible] fresh to moderately altered to chlorite. [illegible] where the plagioclase is strongly altered to sericite the biotite is also converted to sericite. Quartz extinction is generally weakly to [illegible] undulatory. [illegible] quartz & [illegible] in interstices is common [illegible] the interval. [illegible] "alteration" may be related to a local shear zone [illegible] manganese mineralization.

342-345½: [illegible] (?) [illegible] fine to medium grained [illegible] of plagioclase, quartz, and [illegible] biotite. [illegible] commonly [illegible] with the [illegible] biotite. Plagioclase [illegible] to iron stained sericite. May be [illegible] Tortilla Quartz Diorite (70.5 [illegible]).

NOTE: no visible pyrite, chalcopyrite, molybdenite or other sulfide minerals seen. Trace analyses indicate [illegible] accounted for [illegible] oxide form [illegible] that some [illegible] (or as a trace element [illegible]).

3441 East Milber

Phone 889-5161

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITES

SAMPLE SUBMITTED BY Cities Service Minerals

DATE March 20, 1976

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PERCENT LEAD	PERCENT ZINC	PPM--- MOLYBDENUM	PPM Sulphur
K-6 21-50			38			3	24
51-75			238			4	32
76-100			30			2	26
101-125			29			3	11
126-150			22			2	23
151-175			34			4	13
176-200			35			7	30
201-225			45			4	29
226-250			44			5	22
251-275			32			3	28
276-300			33			5	32
301-325			32			2	12
326-350			36			6	18
351-375			52			7	36
376-400			30			4	26
401-410			49			3	29
411-420			152			3	51
421-430			41			5	36
431-440			110			6	37
441-450			122			7	26
451-460			73			9	33
461-470			195			9	36
471-480			44			7	30
481-490			43			5	32
491-500			29			5	49

REGISTERED ASSAYER
STATE OF
Arizona U. S. A.
3/22/76

Invoice # 13486

CHARGES $ 212.50 248.15 TOTAL

ASSAYER-CHEMIST

SKYLINE LABS, INC.
Hawley & Hawley, Assayers and Chemists Division
1700 W. Grant Rd., P.O. Box 50106, Tucson, Arizona 85703
(602) 622-4836

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

CERTIFICATE OF ANALYSIS

ITEM NO.	SAMPLE IDENTIFICATION		Zn ppm	Co ppm
1	K-6	21-50	50	12
2		51-75	310	10
3		76-100	75	8
4		101-125	210	10
5		126-150	140	10
6		151-175	65	8
7		176-200	70	10
8		201-225	210	10
9		226-250	600	10
10		251-275	70	10
11		276-300	65	10
12		301-325	95	10
13		326-350	100	12
14		351-375	65	10
15		376-400	90	8
16		401-410	345	10
17		411-420	270	14
18		421-430	105	14
19		431-440	110	14
20		441-450	120	14
21		451-460	660	18
22		461-470	610	18
23		471-480	320	16
24		481-490	130	16
25	K-6	491-500	105	16

146 10 278 16

TO:
CITIES SERVICE MINERALS
2002 North Forbes Blvd., Suite 102
Tucson, Arizona 85705
Attn: James P. Vroman

REMARKS:
Trace analysis

CERTIFIED BY:

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK DATE SIGNED Arizona

DATE REC'D:	DATE COMPL.:	JOB NUMBER:
7/7/77	7/8/77	771591

CITIES SERVICE

INTER-OFFICE LETTER

January 16, 1976

TO: J.P. Vroman

FROM: D.F. Denison

SUBJECT: Petrographic Examination of 14 Thin Sections From Kerr-McGee's Kelvin DDH K-6

K-6 - 29 Feet

Fresh to weakly altered, slightly porphyritic quartz monzonite containing orthoclase and microcline. Plagioclase grains are slightly larger than the other feldspars and are weakly altered to sericite, mainly in core areas. Former mafics are generally composed of iron-stained chlorite with some fresh biotite remaining. Trace amounts of epidote were noted and traces of possible secondary biotite occur in K-feldspars. Otherwise the K-feldspars are fresh. Quartz extinction is fairly sharp. Traces of opaques - magnetite (?) - occur at former mafic sites.

K-6 - 61 Feet

Probably originally the same rock type now brecciated and silicified. The K-feldspars are still fresh but former plagioclase grains are strongly altered to sericite, as are former mafics. Strong iron-staining occurs in the cracks in the quartzand throughout the rock. Quartz shows strong undulatory extinction. Some opaques remain in veinlets.

K-6 - 119 Feet

Essentially the same as K-6 - 29 feet with more quartz. Plagioclase and biotite are slightly fresher. Some interstitial quartz and K-feldspar may be granulated. Quartz extinction is weakly undulatory.

K-6 - 130 Feet

A continuation of the slightly porphyritic quartz monzonite with interstices between grains filled with fine-grained (granulated (?)) quartz and K-feldspar. Plagioclase is very fresh. Clusters of epidote are abundant. Former mafic minerals have altered to epidote and iron-stained chlorite. Quartz extinction ranges from sharp to strongly undulatory.

K-6 - 231 Feet

Ditto, K-6 - 119 Feet, with interstitial, granulated quartz and K-feldspar.

K-6 - 234 Feet

This rock appears to be broken and crushed Oracle. Plagioclase is moderately to strongly altered to sericite and biotite has bleached to muscovite some of which is iron-stained. This iron-stained muscovite may be what was called siderite in hand specimen. Small patches of secondary biotite (?) and sericite occur in cracks in microcline. Quartz extinction varies from moderately to strongly undulatory. Strong iron-staining occurs along fractures. Numerous crushed fragments of quartz and K-feldspar were noted.

K-6 - 258 Feet

Very similar to K-6 - 29 Feet with some clusters of Tourmaline. One large microcline phenocryst dominates one end of the thin section. Quartz extinction varies from quite sharp to weakly undulatory.

K-6 - 296 Feet

A continuation of Oracle quartz monzonite with plagioclase ranging from fresh to moderately altered to sericite. Biotite varies from fresh to altered to muscovite some of which is iron-stained. Quartz extinction is generally weakly undulatory. Interstitial granulated quartz and K-feldspar continues.

K-6 - 330 Feet

Ditto, K-6 - 296 Feet.

K-6 - 342 Feet

Weakly altered quartz diorite containing interlocking grains of quartz biotite, and plagioclase. Staining indicates no K-feldspar is present. The texture is fine-grained. Plagioclase is fresh to altered to iron-stained sericite which appears very "dirty" in thin section. Biotite is fresh. Quartz extinction is weakly to moderately undulatory. Disseminated magnetite commonly occurs with biotite. This rock is in contact with, or contains an inclusion of, Oracle quartz monzonite.

K-6 - 411 Feet

Coarse-grained Oracle with plagioclase strongly altered to sericite and some clay. The K-feldspar again consists of both orthoclase and

microcline. Patches of sericite were noted in microcline. Mafics have bleached to muscovite. Quartz extinction is weakly to moderately undulatory.

K-6 - 463 Feet

Ditto, K-6 - 411 Feet, with iron-staining.

K-6 - 473 Feet

Ditto, K-6 - 411 Feet, although this rock is more broken and granulated.

K-6 - 485 Feet

Generally ditto, K-6 - 411 Feet. This rock is iron-stained and the amount of clay in the sericite-clay alteration of plagioclase has increased.

DFD/js

SECTION 7

THE KELVIN PROSPECT

AN EXPLORATION PROPOSAL

FEBRUARY 1974

JAMES P. VROMAN

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

ABSTRACT

The Kelvin prospect is located in the northern portion of the Tortilla Mountains and in the southern portion of Pinal County, Arizona. Kennecott's Ray mine, where 35,400 tons of 0.94% copper ore is mined daily, is located a few miles to the northeast.

The main rock type on the prospect is Precambrian granite. The granite has been intruded by quartz monzonite dikes that have been dated as Laramide in age. Since Laramide time the northern end of the Tortilla Mountains have been rotated ± 90° to the east. From this structural interpretation a porphyry copper model is developed in which a possible deposit has been turned on its side.

The prospect has been examined by other companies in the past. Their programs included geologic mapping, geophysical and geochemical surveying and drilling. One of those programs outlined an induced polarization anomaly. According to the present C.S.M.C. interpretation of all the available data neither the most favorable portion of induced polarization anomaly nor the most favorable portion of the geologic model has yet been tested by drilling.

A CE request for $75,000 is made to cover the cost of obtaining a land position and conducting a three hole drilling program in the prospect area.

LOCATION AND ACCESSIBILITY

The Kelvin Prospect is located in all or parts of Sections 8, 9, 16 and 17, T. 4 S., R. 13 E., Pinal County, Arizona. The prospect lies in the northern portion of the Tortilla Mountains and is approximately 60 miles north of Tucson, 17 miles east-northeast of Florence and within the area covered by the U. S. Geological Survey's Grayback 7 1/2 minute topographic quadrangle. The area forms a part of the Riverside Mining District which has also been known as the Mineral Creek or Kelvin Mining District.

From the bridge crossing the Gila River, approximately 1/2 mile south of Kelvin, the prospect is easily reached via a well maintained gravel road. From the bridge drive south and west approximately 3 miles to the A Diamond Ranch road and Southern Pacific Railroads access turnoff. Follow the railroad access road westerly for a distance of two miles to the entrance of Johnson Wash. A mine road extends south along the wash for a distance of one mile to the center of the property.

REGIONAL SETTING

The Kelvin Prospect is situated within the Ray-Sacaton Structural Belt (Figure 1) as defined by Schmidt (1971 b). Schmidt (1971 b) has defined this east-west trending belt on the basis of elongate quartz monzonite-granodiorite intrusive masses and numerous east-west sub-parallel dike swarms as well as similar trending mineralized fissure veins and limonite coated fractures.

This trend includes Kennecott's Ray open pit copper mine where 35,400 tons of ore averaging 0.94% copper and 79,600 tons of waste are being mined daily (Beall, 1973). Kennecott employs 2100 workers for its operations at Ray (Jett, 1972).

Two deposits located within the Belt are presently under development. Continental Oil Company has announced the discovery of 500 million tons of rock containing approximately 0.5% copper (Paydirt, 1972). It is believed that CONOCO is presently studying the feasability of bringing this deposit into production. American Smelting and Refining Company is presently removing overburden at their Sacaton operations where a 33 million ton orebody is being prepared for open pit mining and another 14 1/2 million ton orebody will be mined underground (Paydirt, 1973).

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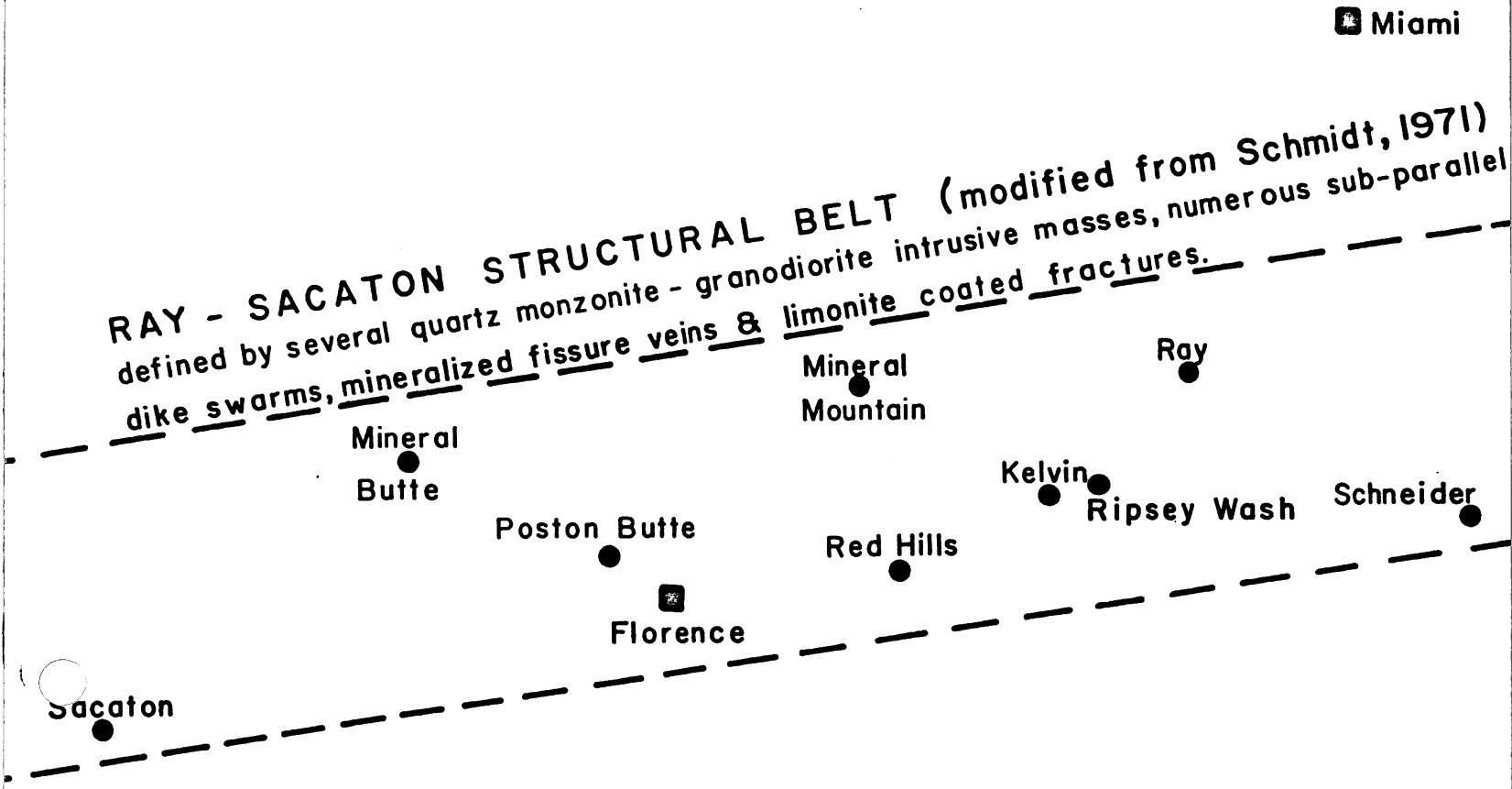

Major Production	Minor Production	Drilled Sub-marginal
Ray	Red Hills	Schneider

Major Developing	Prospects
Sacaton	Mineral Butte
Poston Butte	Mineral Mountain
	Kelvin
	Ripsey Wash

N

TITLE LOCATION MAP - KELVIN PROSPECTS RIPSEY WASH &

SKETCH NO. 1

Minor production within the belt has come from the Munsey Mine at Red Hills where up to 20 people have recently been employed in a small open pit mining and oxide copper leaching operation (Jett, 1971).

A large Sulfide copper mineral deposit known as Schneider Troy or Chilito is owned by Kennecott and is believed to be subeconomic at the present time.

Other prospects within the belt that have recieved considerable attention by others in the past include Mineral Mountain and Mineral Butte as well as the Kelvin Prospect.

GENERAL GEOLOGY OF THE KELVIN PROSPECT

The predominate rock type outcropping in the prospect area is the Precambrian Oracle Granite. The "granite" may more properly be termed a quartz monzonite and resembles the Ruin "granite" in the Globe-Miami area. "In hand speciman, the Oracle granite is characterized by numerous pink to red perthitic K-feldspar phenocrysits measuring up to 1 inch in diameter....Together with somewhat smaller plagloclase grains they are surrounded by a medium-grained quartz-plagioclase K-feldspar matrix. Because of this large grain size, the Oracle Granite weathers readily into a coarse regolith" (Schmidt, 1971 a, p. 18).

Several northerly striking diabase sills of younger Precambrian age have intruded the granitic basement complex. The term sill is used here even though the diabase intrusives appear dikelike on the geologic map (Figure 12 in pocket). There are two reasons for this terminology. First, the diabase sills are in general concordant with the dipping Younger Precambrian Sedimentary Apache Series rocks which are exposed outside of the immediate prospect area. Second, there is evidence that the entire northern end of the Tortilla Mountains have been rotated easterly in Post Miocene time (See "Structural Geology" below)- this means that the diabase intrusives were nearly horizontal at the time of their emplacement.

All of the Precambrian rocks have been intruded by dike swarms of Laramide age that trend east-northeasterly and which range in composition from quartz monzonite to quartz latite and rhyolite. The dikes are similar in composition and are probably related to the Grayback granodiorite stock which covers tens of square miles west of the prospect area. That stock has been dated at 62.9 $\pm$ 1.3 million years by the K-Ar method in the laboratory of Isotope Geochemistry at the University of Arizona. A

biotite quartz monzonite dike in the prospect area (SE4, SE4, SE4, Sec. 8, T.4 S., R. 13 E.) has been dated at 63.1 ± 1.3 million years by the same method. These dates are identical, within the limits of experimental error, to a date of 63 million years obtained from the Granite Mountain Prophyry Stock west of Ray which is considered to be the source for the mineralization at Kennecott's large copper deposit.

Several narrow and steeply dipping fissure veins cut the Laramide dikes and are probably a manifestation of the last phases of magmatic activity in the area during Laramide time.

Following Laramide time the area was covered by a series of Tertiary-Quaternary Sedimentary and tuffaceous deposits. Although these units have subsequently been removed they are exposed immediately outside the prospect area.

STRUCTURAL GEOLOGY OF THE NORTHERN END OF THE TORTILLA MOUNTAINS AND ITS POSSIBLE RELATIONSHIP TO THE KELVIN PROSPECT

Schmidt (1971,a) has done a detailed structural investigation of the northern end of the Tortilla Mountains. In his doctoral dissertation he presents strong evidence that the entire Tortilla Mountain range has been rotated to the east approximately 90°. The axis of rotation was approximately north-south or normal to the strike of the porphyry dike swarm and fissure veins. This rotation took place in post-miocene time and thus after the Laramide magmatic cycle was completed. Schmidt (1971, a) has found evidence for this rotation east and southeast of the Kelvin Prospect area. In these areas the sedimentary Hackberry sequence is in depositional contact with the underlying Precambrian Oracle Granite and Laramide intrusive rocks and it presently dips steeply to the east. The Hackberry Sequence has not been radiometrically age dated but it is clearly post Laramide and pre-Quaternary in age as it is unconformably overlain by the Gila conglomerate. It is believed that the Hackberry is Pliocene to Mid Miocene in age.

This structural interpretation is germane to any porphyry copper exploration in the Kelvin Prospect area. Figure 2 illustrates diagrammatically the structural development of the area and its relationship to a possible porphyry copper target within the prospect area. In pre-Laramide time the main rock type present in the area was the Precambrian Oracle Granite (Figure 2.1). During Laramide

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Generalized east-west cross sections showing structural development of the northern portion of the Tortilla Mountains and a hypothetical relationship to the Kelvin Prospect.

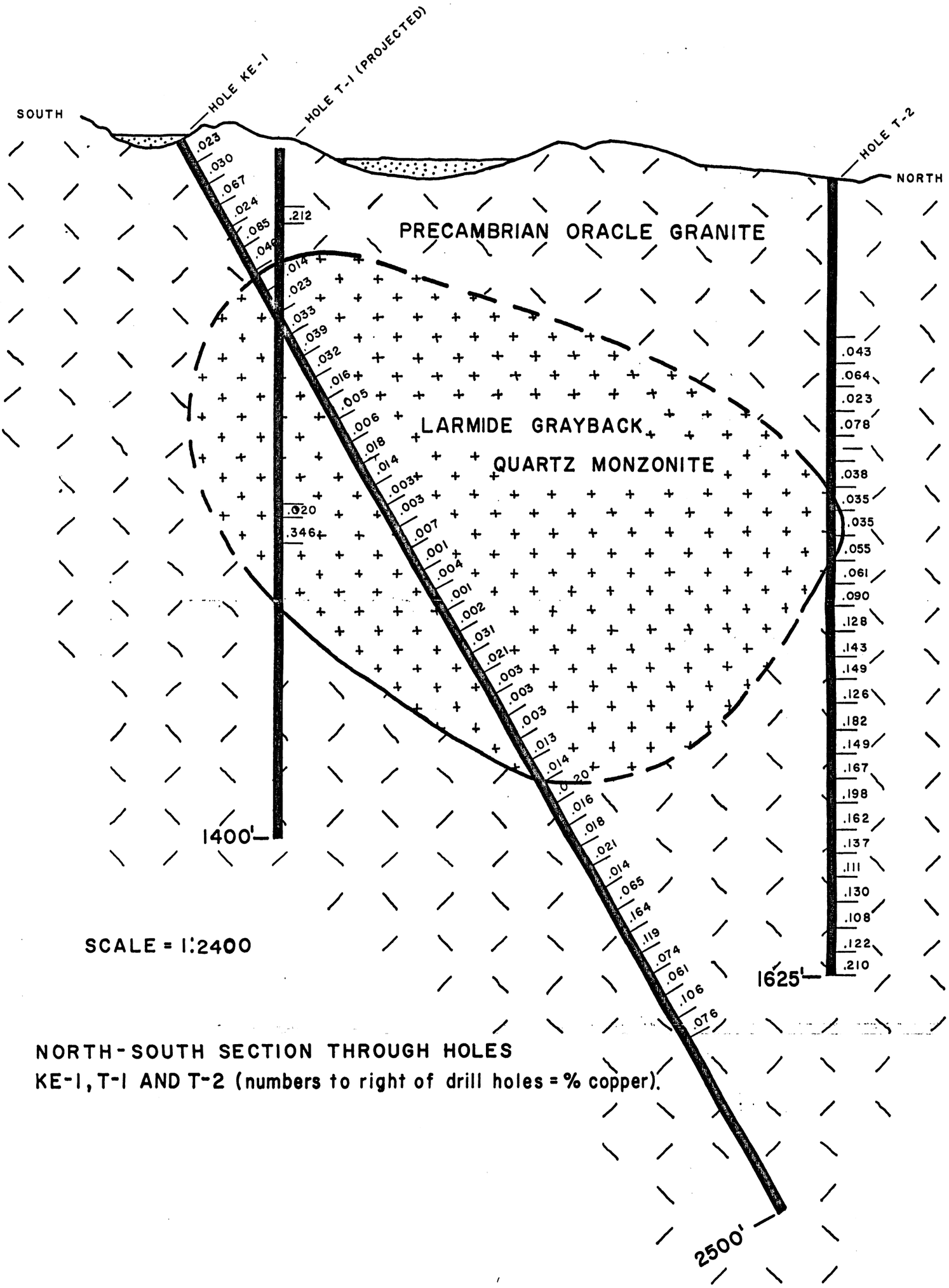
TITLE _____ SKETCH NO. 2

time the area was intruded by a mineralized quartz monzonite or granodiorite intrusive mass (Figure 2.2). This intrusive mass may have been an apophysis of the Grayback Pluton to the east and its original contact with the Oracle Granite was probably steep to vertical. The actual presence of this intrusive is indicated by the presence of the dated dike swarm and by prior drilling (see "past work" and Figure 3). Following emplacement of the mineralized intrusive the area may have undergone a period of leaching and supergene sulfide enrichment (Figure 2.3). Although there is no definite evidence of leaching exposed in the prospect area it is certainly possible as it is well documented that the Ray deposit a few miles to the northeast underwent substantial leaching and enrichment. At that deposit a chalcocite blanket containing ± 1.0% copper ore was produced from protore averaging 0.1 to 0.2% copper. Following this possible stage of development the area was covered with Pliocene or Miocene sediments and rotated to the east 60-90° (Sketch 2.4).

With this structural interpretation in mind a possible porphyry copper target in the area may be visualized as an east-west trending cylindrical intrusive mass that, in the prospect area, is presently completely enclosed by Precambrian Oracle Granite (Figure 4). What was originally the upper portion (mineralized and enriched) of the intrusive now lies to the east of its original position and is tilted on its side. Therefore the target is not the "usual" one of large areal extent and limited depth extent but rather may be expected to be narrow in areal extent and large in depth extent. West of the target area one would expect to find sub-marginal mineralization (0.1-0.2% Cu) at depth. East of the target area one would expect to find "leached capping" at depth. This model is strengthened by two facts. First, prior drilling west of the present target area encountered 0.1-0.2% copper mineralization at depth (Figure 3). Second, east of the present target area the outcropping Oracle Granite is moderately iron stained, silicified and cut by fissure veins. In light of the hypothesized model it is felt that this may by a fringe expression of significant mineralization to the west and at depth.

It should be noted that similar structural rotation is notunknown at some of the major porphyry copper deposits. Examples of major post mineralization tilting or rotation has been documented at San Manuel-Kalamazoo thirty-five miles southeast of the Kelvin Prospect as well as at Ajo, Arizona. It has also been suggested in the area of Yerington, Nevada.

KELVIN PROSPECT - PINAL COUNTY, ARIZONA



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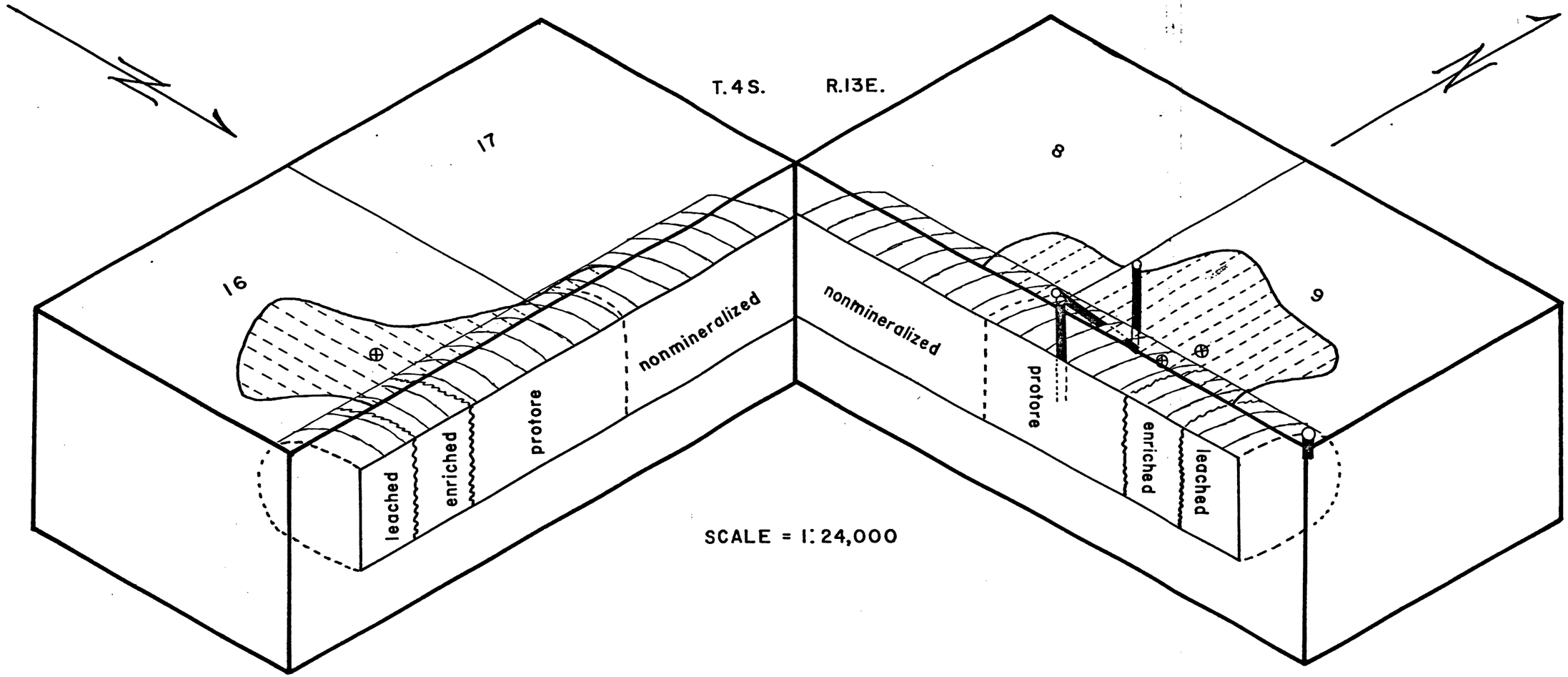
NORTH-SOUTH SECTION THROUGH HOLES
KE-1, T-1 AND T-2 (numbers to right of drill holes = % copper).

Figure 3

J.P.V. 1 FEB 74

KELVIN PROSPECT - PINAL COUNTY, ARIZONA



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ISOMETRIC DIAGRAM SHOWING HYPOTHESIZED TARGET AT THE KELVIN PROSPECT - A CYLINDRICAL BODY OF LARAMIDE AGE QUARTZ MONZONITE HAS BEEN ROTATED TO THE EAST 60°-90° SINCE EMPLACEMENT AND IS PRESENTLY SURROUNDED BY THE ORACLE GRANITE OF PRECAMBRIAN AGE. INDUCED POLARIZATION ANOMALY ON THE SURFACE (red) INDICATES UNDERLYING SULFIDE ZONE. PAST DEEP DRILLING HAS BEEN TOO FAR WEST TO TEST THE MOST FAVORABLE PORTION OF THE TARGET. PROPOSED C.S.M.C. DRILLING SITES = ⊕.

FIGURE 5

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HISTORY OF PAST WORK

The first written record of copper deposits in the Kelvin-Ray area was made by members of the Army of the west in 1846. The first claims in the area were staked in the vicinity of Ray in 1870. The first attempt at production at Ray was made in 1880 but was short lived. The Ray deposit has now been in continuous production since 1911 (Metz & Rose, 1966).

Prospecting in the Kelvin area was probably initiated in the period 1910-1920. The Zelleweger claim was patented in 1924 and it is reported that $40,000 in gold, copper and zinc ore was shipped from that claim during the period 1920-1930. In 1933 Mr. Arnold H. Johnson located several "Black Copper claims" and prospected surficial indications of copper and gold. Johnson has continued prospecting the area to the present day. During 1953-1957 Johnson located additional claims in the area on encouraging surface shows of copper and molybdenum. During this same period he sank two sixty foot shafts on the molybdenum rich "Rare Metals Vein". This was the last attempt at any small scale production from the property (Zelinski, etal. 1970).

It is reported that Inspiration Consolidated Copper Company ran two Induced Polarization lines across the property in 1967. Mr. Arnold Johnson has reported that this work was done without his prior knowledge or permission. The results of that survey has not been made available to Johnson or C.S.M.C.

Minbanco acquired the property and did some exploration drilling during 1968-1969. It has been reported that Minbanco drilled nine hammer holes during that time. The drilling was confined to a small area considerably to the west of the presently defined C.S.M.C. target. It is felt that their drilling procedures and sample recovery techniques were poor and do not aid materially in an evaluation of the prospect.

Tipperary Resources Corporation acquired the prospect in late 1969 and conducted a fairly detailed exploration program through 1970. Their program involved geologic mapping, geochemical sampling, a ground magnetic survey, a detailed induced polarization-resistivity survey, and the drilling of two rotary holes on the property. Most of these data have been made available to C.S.M.C. The ground magnetic survey data is considered to be of no help in our present program-the data indicate that the area was surveyed with a malfunctioning Vertical field ground magnetometer. The geochemical maps are of marginal interest. What appear to be anomalously high concentrations of both copper and

molybdenum occur in an east-west band across the property and may conform to the east-west area of dike swarms. Although the geochemical maps are not a prime factor in our present interpretation of the prospect it is encouraging to note that our immediate area of interest is high with respect to trace amounts of copper and molybdenum. The most useful Tipperary data made available to C.S.M.C. are the results from a detailed induced polarization survey (described in detail under "Induced Polarization" below) and their two hole rotary drilling program.

Cyprus Mines Corporation optioned the property in the first half of 1972 and drilled one core hole inclined -60° to the north on the property. This hole was collared in the vicinity of Tipperary's first hole, was drilled for a total length of 2500 feet and bottemed below Tipperary's second hole (see Figure 3). Cyprus drilled into what they believed was the strongest portion of the Induced Polarization anomaly. Logs and assays of the two Tipperary holes and the Cyprus hole (KE-1) reveal two facts that are important to an interpretation of the prospect area. First, an intrusive mass of quartz monzonite-granodiorite, inferred to be of Laramide age, was intersected at depth (Figure 3). Secondly, two of the holes clearly show an increase in copper mineralization (to 0.1-0.2% Copper) at depth. Although this is not ore grade mineralization it is comparable to the grade of the protore at Kennecotts' Ray Mine to the northeast. According to our present interpretation all of these holes have been drilled too far to the west (i.e. too low in the deposit) to have intersected a possible enriched zone (Figure 4).

Kerr McGee was the last company to do any exploration work on the prospect area. It is believed that the only appreciable work done by them was drilling of one 500 foot core hole in the SE4 SE4 of Section 9, T. 4 S., R. 13 E. This hole was drilled east of the main portion of the Induced Polarization anomaly and was not drilled deep enough to test the anomaly. The core from this hole has been made available to C.S.M.C.

INDUCED POLARIZATION

Detailed Induced Polarization-Resistivity data from a survey completed in 1970 by Heinrichs Geoexploration Company of Tucson, Arizona for Tipperary Resources has been made available to C.S.M.C. by the present property owners, Messrs. Arnold and John Johnson. Eleven north-south lines spaced approximately 1000 feet apart were run (Figure 5). All of the lines were run using a stand-

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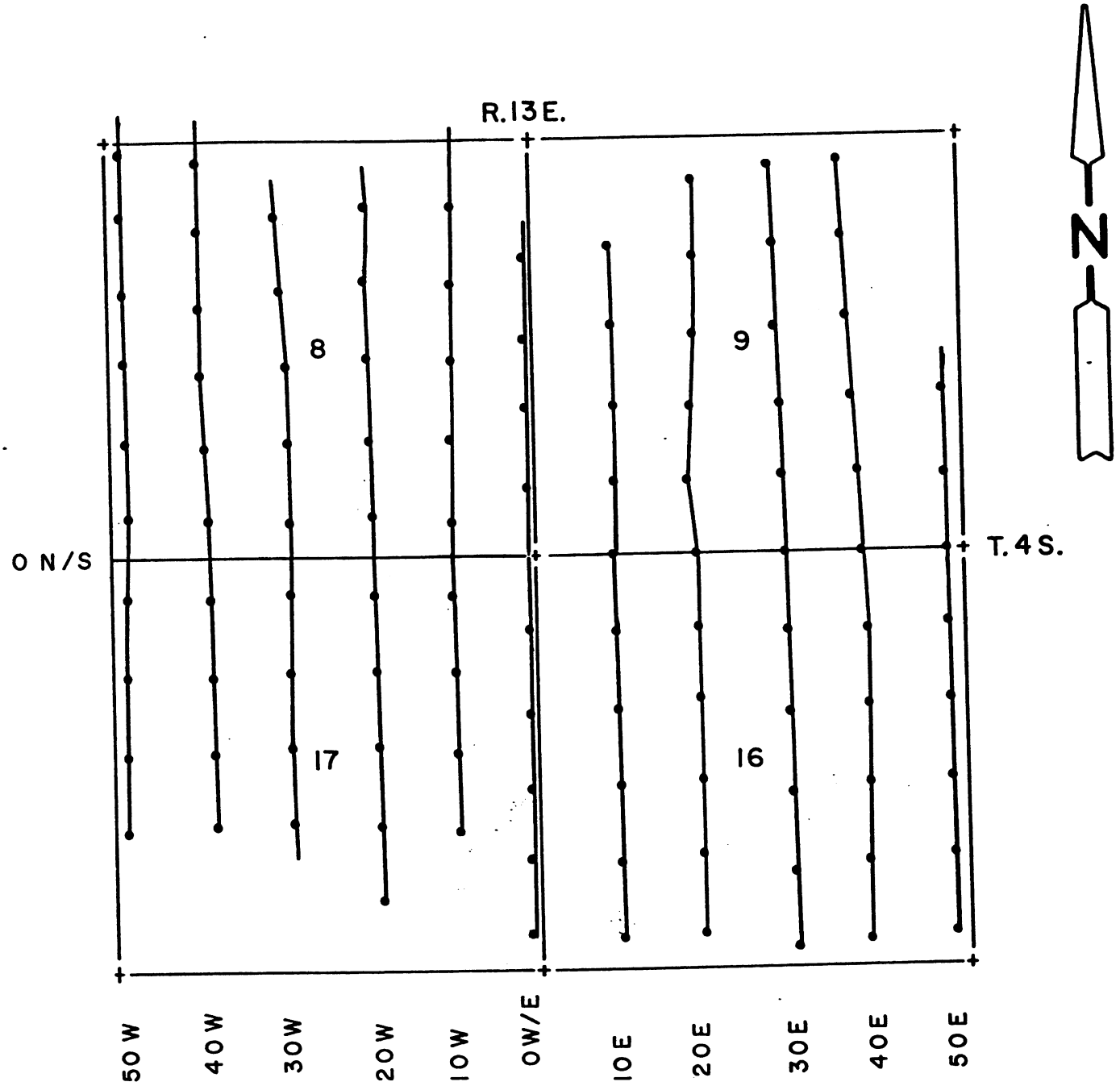

TITLE KELVIN PROSPECT - INDUCED POLARIZATION LINES SKETCH NO. 5

ard dipole-dipole electrode configuration with a dipole length ("a" spacing) of 1000 feet. In addition lines 10 W, 0 E/W and 10 E were surveyed using a 500 foot "a" spacing. The separation between the sending and receiving dipoles was varied from 1 to 6 times ("n"=1-6) the "a" spacing. The data, as prepared by Heinrichs, was presented in pseudo-sections. The data appears to be of good quality and not seriously affected by electromagnetic or induced coupling effects. The apparent Percent Frequency Effect was calculated from the change in resistivity values measured at 0.3 and 3.0 c.p.s.

These data have been reinterpreted by the C.S.M.C. staff. The reinterpretation involved plotting and contouring the values of apparent Precent Frequency Effect at the first, third and fifth separations (n=1,3 & 5). These plots (Figures 6, 7, and 8) clearly indicate that the three deep holes (Tipperary 1 & 2 and Cyprus KE-1) were drilled at the extreme western edge of the Induced Polarization anomaly; and that the Kerr McGee hole was too far east and/or too shallow to test the anomaly. The depth to the top of the chargeable body causing the anomaly has been estimated by comparing actual values determined in the field during the survey to standard theoretical curves. Figure 9 is an example of this curve matching technique as applied to the data from the prospect area.

The reinterpretation of the data by the C.S.M.C. staff indicates that the Induced Polarization anomaly present on the prospect area is real, is related to sulfide mineralization that may be of economic significance, and has not been adequately tested by drilling. Depth to the top of the anomaly producing body, near the center of the area of present interest is interpreted to be approximately 500 feet but may be as much as 1000 feet.

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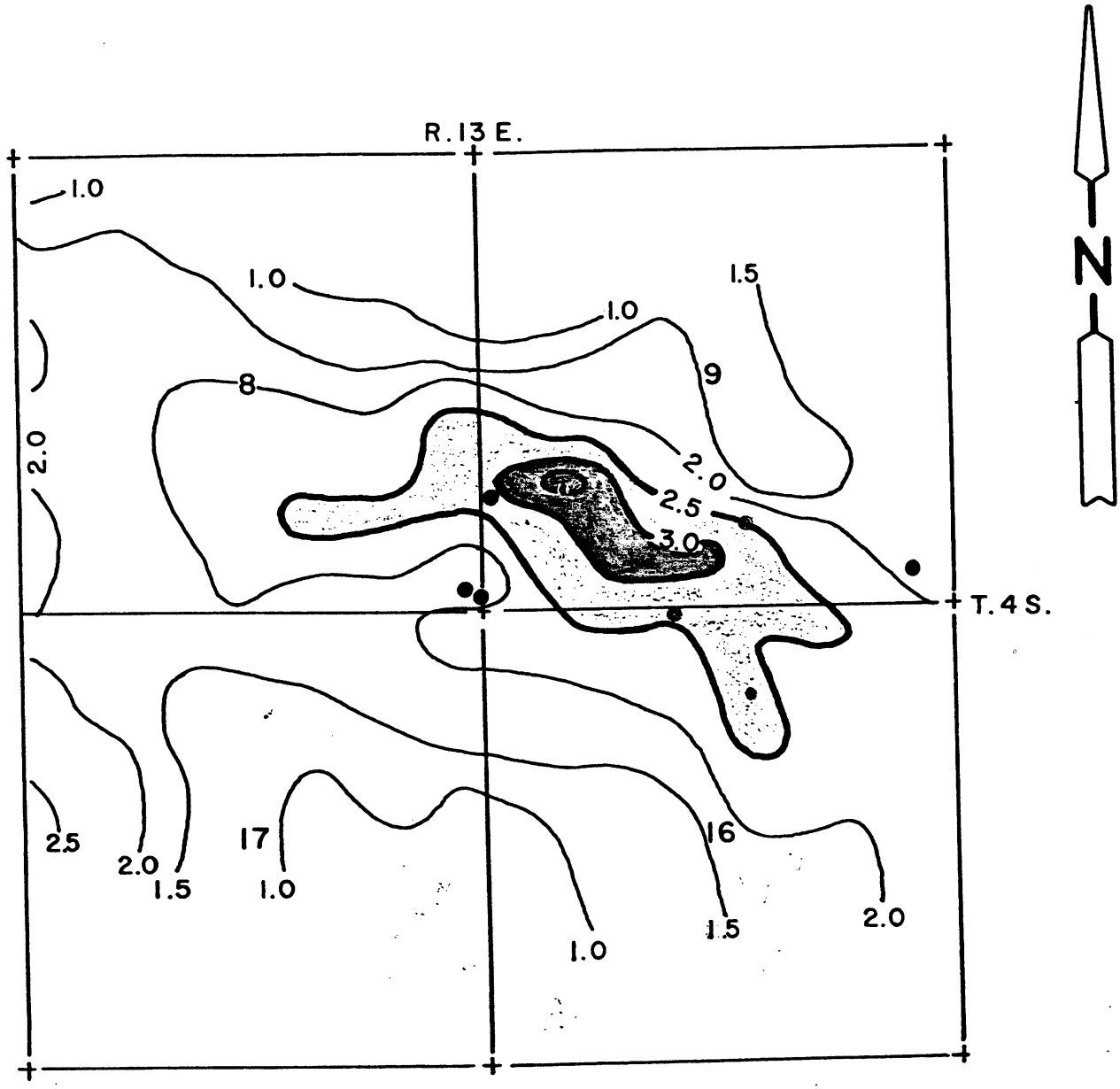

contour interval = 0.5 P.F.E.

● = existing drill hole

TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n" = 1 SKETCH NO. 6

(P.F.E. over 2.5 % in red)

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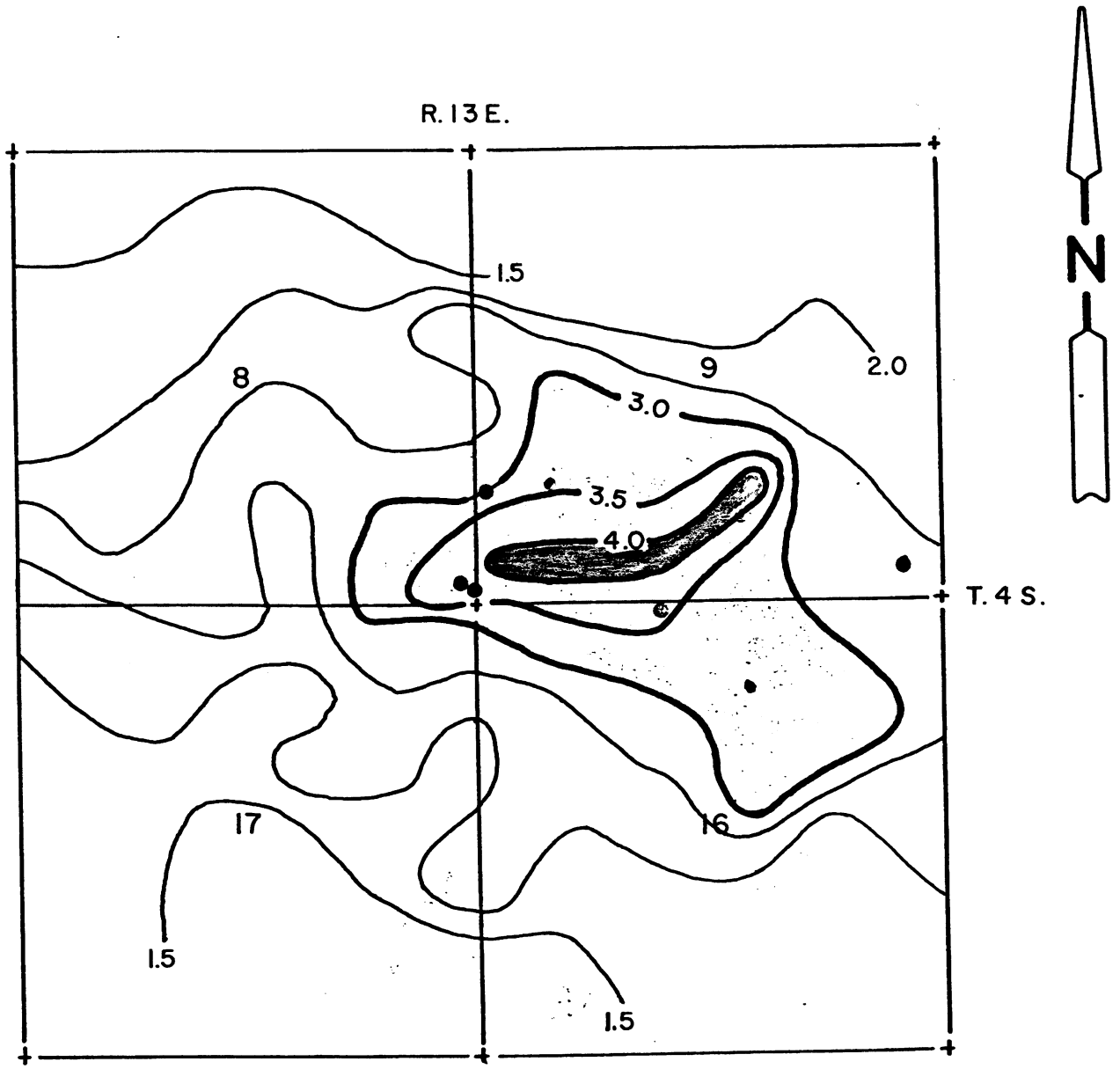

contour interval = 0.5 P.F.E.

● = existing drill hole

TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n"=3
(P.F.E. over 3% in red)

SKETCH NO. 7

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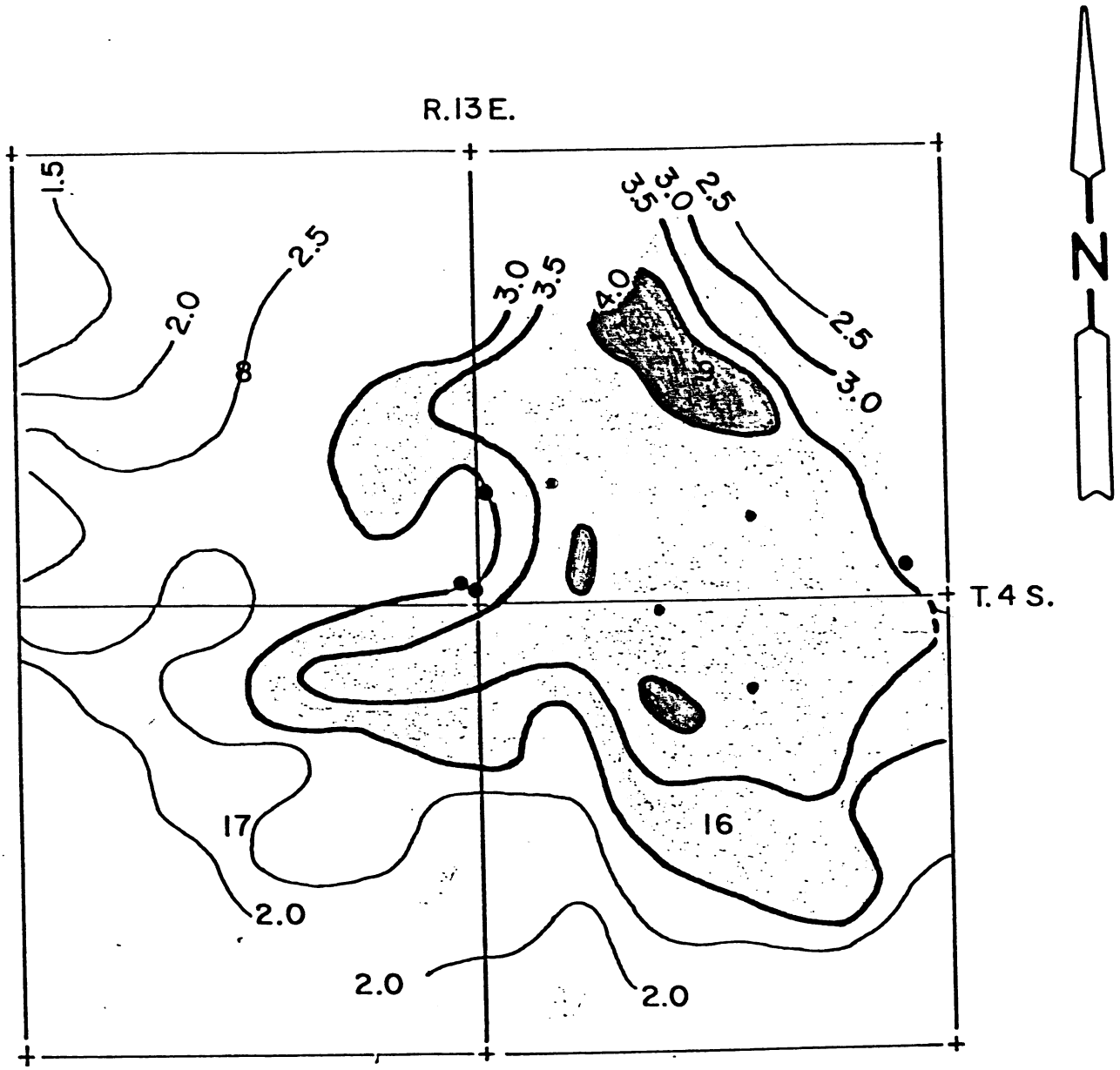

contour interval = 0.5 P.F.E.

= existing drillhole

TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n" = 5 (P.F.E. over 3.0 % in red)

SKETCH NO. 8

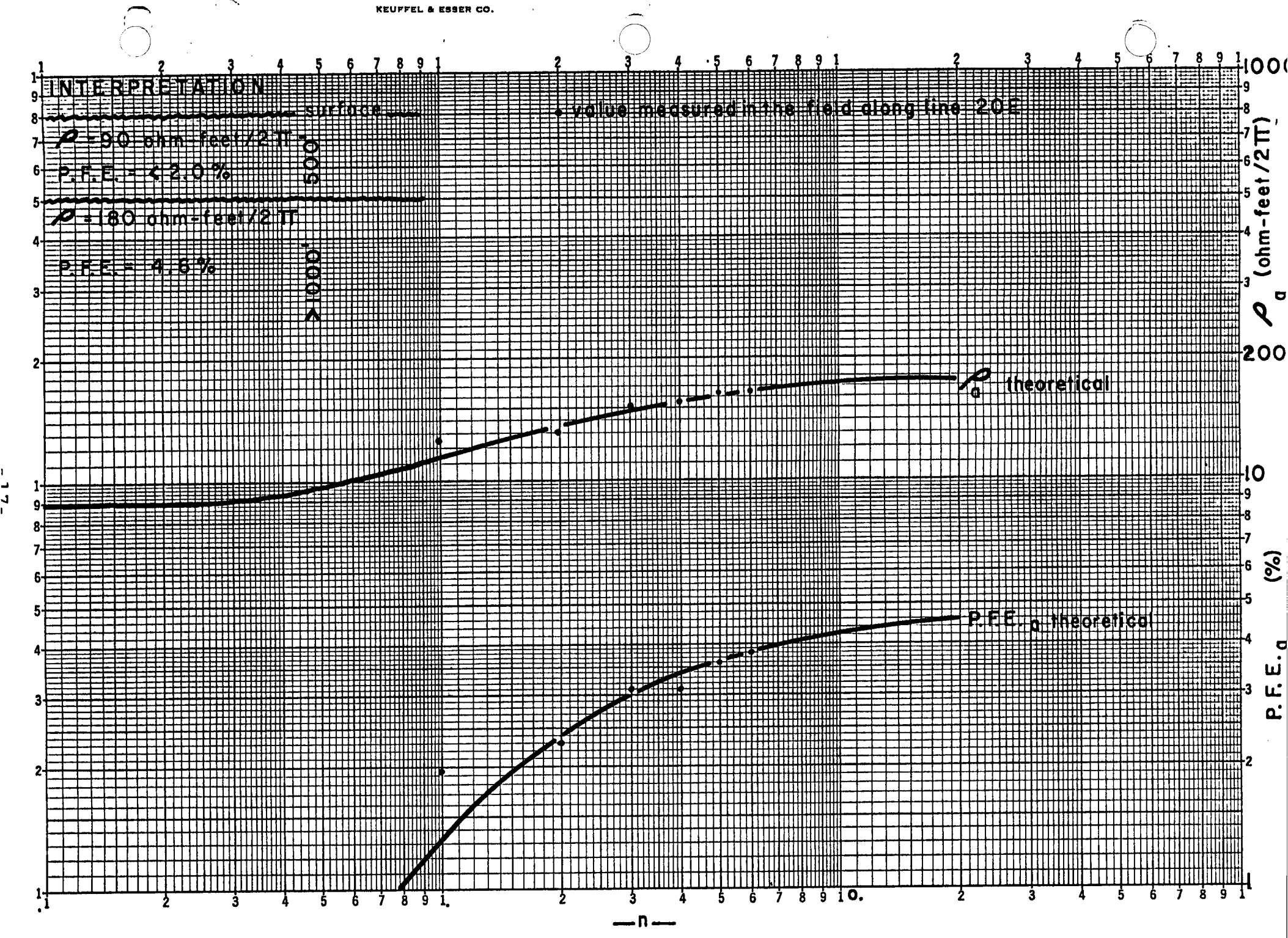

Figure 9

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LAND STATUS

Subsurface: There are three groups of holdings of interest to C.S.M.C. (See Figure 10). The Johnson group of 57 unpatented lode mining claims covers the major portion of the area of interest. This group is owned by Mr. Arnold H. Johnson, etux. and their son Mr. John Johnson. The Johnson's live in Mesa, Arizona and have been contacted by Mr. Wilson Walker, C.S.M.C. landman. The Johnsons are asking $6000.00 for a one year exclusive option on the property. These payments could probably be paid in four quarterly $1500.00 installments. The Johnsons have set an upset purchase price of $750,000 on the property and the terms regarding length of the payment period are negotiable. The Johnsons have been most cooperative and seem to be very reasonable people to deal with.

Tipperary Resources corporation (500 West Illini, Midland, Texas 79701) are the owners of record of the Zelleweger patented lode mining claim (MS 3314-20.661 acres) located in the S 1/2, SW 1/4, Section 9.

Mr. James W. Sharpe holds a valid state prospecting permit (PP 25685) on the N 1/2 of Section 16. The permit is presently valid until November 20, 1974.

Neither Tipperary nor Sharp have been contacted by C.S.M.C. It is presently believed that the best time to approach these two parties would be immediately after concluding an agreement with the Johnsons. For the purpose of this request it is assumed that agreements, similar to the Johnson agreement, will be able to be concluded between Tipperary, Sharp and C.S.M.C.

Surface: At the present time it is believed that there are three groups of surface holdings within the area of interest (see Figure11). Tipperary controls the surface on their patented claim, the N 1/2 of Section 16 is owned by the State of Arizona and the remainder of the area by the Federal government. The exact status of this land and the names of any surface leasees is presently being investigated by Mr. Walker.

PROBLEMS

As with any exploration program many problems may be encountered before its completion. It is felt that the possibility of two such problems should be mentioned at tims time.

Although it is felt that the induced polarization anomaly

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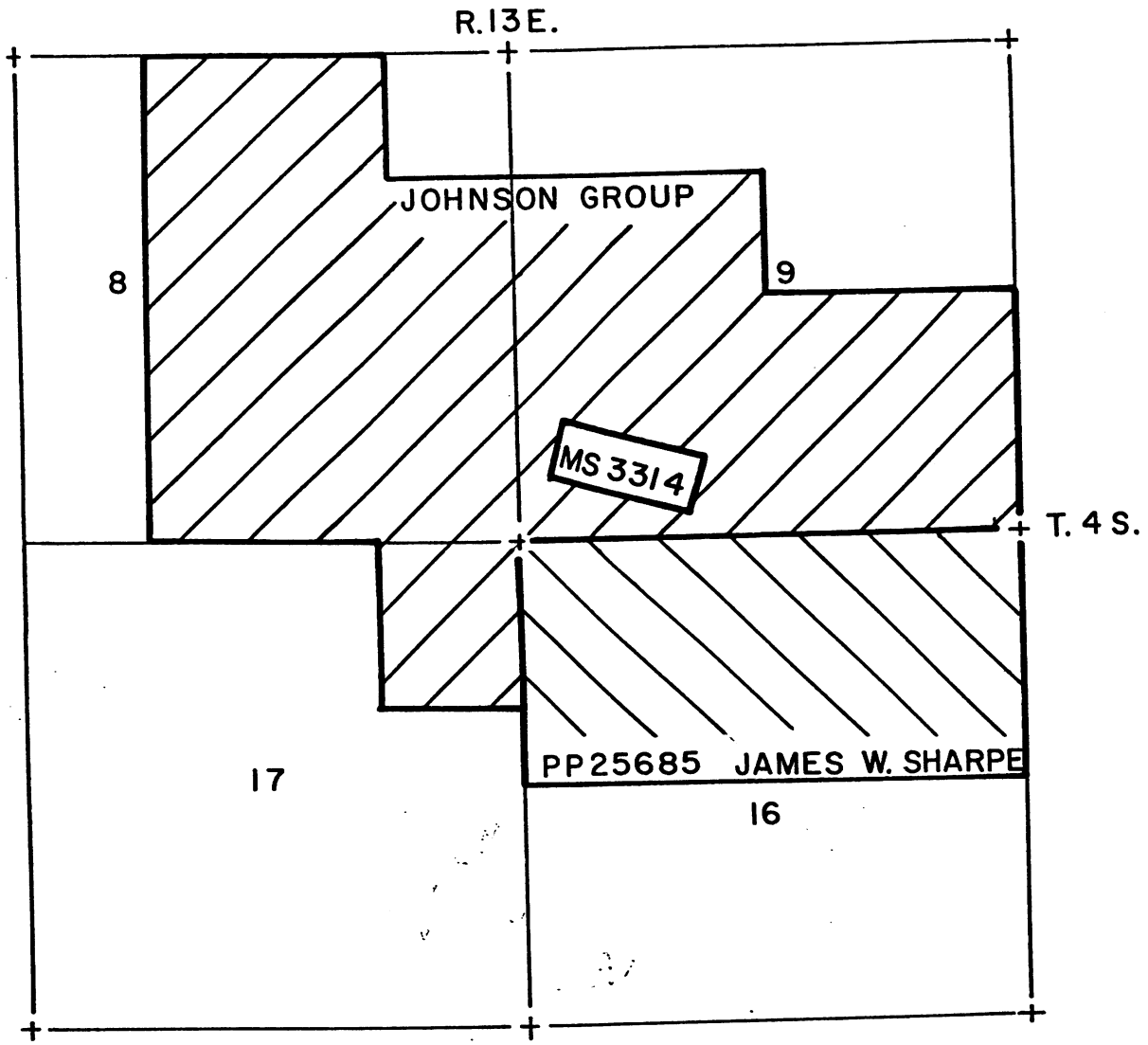

TITLE KELVIN PROSPECT - SUBSURFACE LAND STATUS

SKETCH NO. 10

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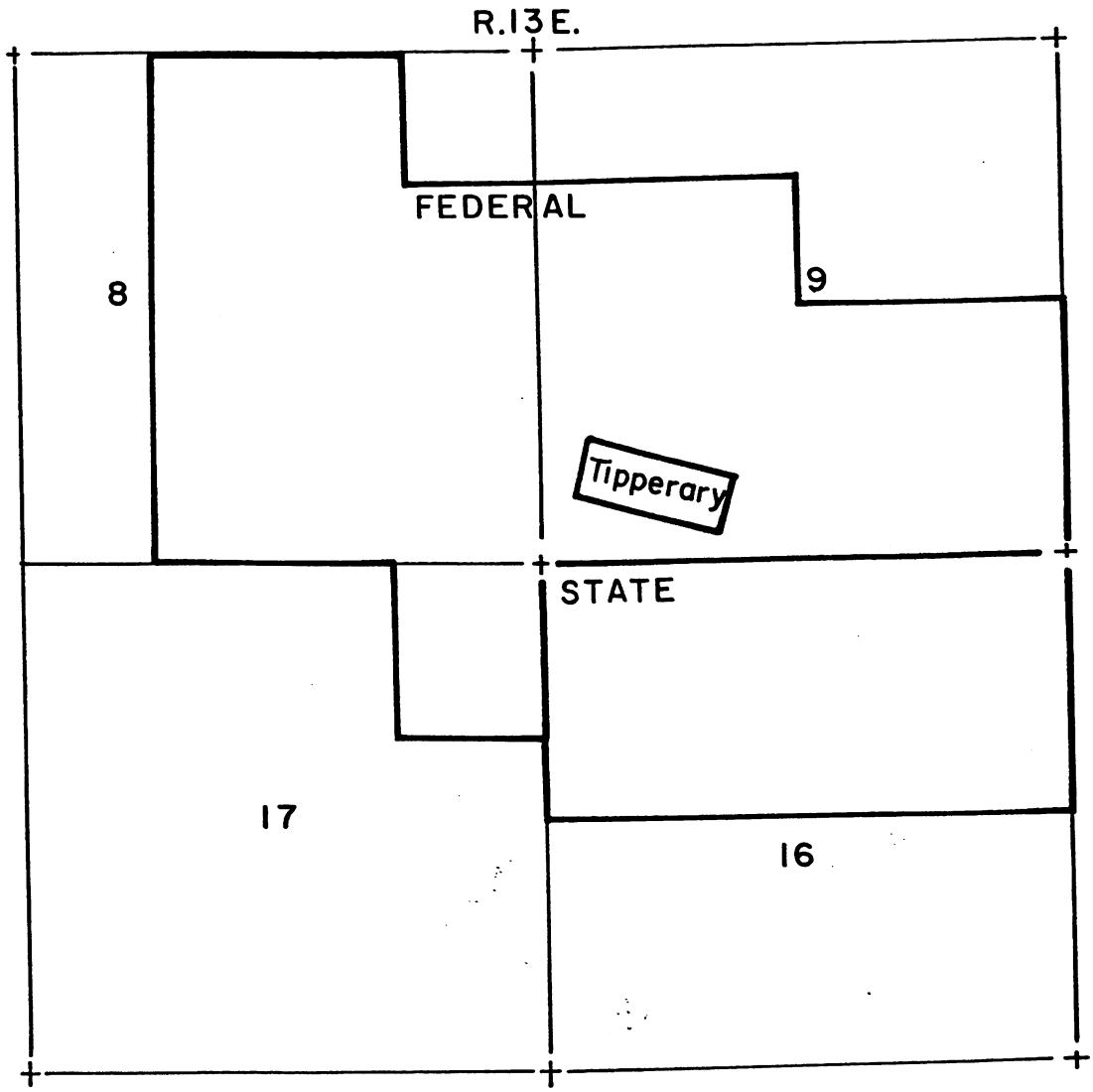

TITLE KELVIN PROSPECT - SURFACE LAND STATUS

SKETCH NO. //

is related to sulfide mineralization there is no assurance that the anomaly is caused by economic amounts of copper sulfides. Many such anomalies are caused by pyrite without associated economic amounts of copper. However, the previous sections have shown that there is a reasonable chance that the anomaly may be related to ore-grade copper mineralization and the only way to test the hypothesis and the anomaly is by drilling.

The second problem that may be encountered concerns the land situation. It is nearly certain that an agreement can be reached between the Johnsons and C.S.M.C. This will give us control of the major portion of the area of interest. As stated under the Land Status section, the other two landowners, Tipperary and Sharpe, have not been contacted and therefore we do not know their terms, if they are willing to option the property. However, we have no reason to believe that agreements cannot be reached with them.

COST ESTIMATES FOR A THREE HOLE DRILLING PROGRAM

DRILLING:*	
Mobilization-Demobilization	$ 1,000.00
Drilling between 0 & 500'; 1500' @ $ 7.90/Ft.	11,850.00
Drilling between 500 & 1000'; 1500' @ 8.50/Ft.	12,750.00
Drilling between 1000 & 1500'; 1500' @ 9.20/Ft.	13,800.00
Drilling between 1500 & 2000'; 500' @ 10.20/Ft.	5,100.00
Water truck rental; 4 months @ $325.00/Mo.	1,300.00
Water, mud, additives, casing, down time, standby, etc.	4,300.00
TOTAL DRILLING	$50,100.00
LAND:	
Johnson Claim Group - First year option	$ 6,000.00
Tipperary & Sharp Land - First year option	5,000.00
TOTAL LAND	$11,000.00
ROADBUILDING:**	
Mobilization-Demobilization	$ 300.00
5250' Roadbuilding ÷ 750'/day=7 days=56 hours D-9 Rental W/operator; 56 hours X $75.00/Hr.	4,200.00
TOTAL ROADBUILDING	$ 4,500.00
SAMPLING:	
Assaying - estimate 750 assays including sample preparation: 750 x $3.60/sample	$ 2,700.00
Physical Property tests (1 sample each 50') 5000'÷50'=100 samples x $12.00 (includes sample prep. I.P.& Mag. suscept. determ.)	1,200.00
TOTAL SAMPLING	$ 3,900.00
DOWNHOLE ELECTRICAL SURVEYS:***	
10 Days @ _550.00/Day	$ 5,500.00
GRAND TOTAL	$75,000.00

* Estimated from recent bids at Elfrida, Arizona
** Estimated from information supplied by W. Bennett-Pinto Valley
*** Estimated from recent work at Bagdad, Arizona

SUMMARY

The Kelvin Prospect is favorably located regionally with respect to known major copper mineralization. The geology of the prospect area is favorable for porphyry copper type mineralization in that acidic intrusive rocks of Laramide age are present on the property. Similar rocks are known to be genetically related to porphyry copper mineralization in other parts of Arizona. The structural history of the area permits a hypothesis that the property contains a porphyry copper sulfide system that has been rotated easterly $\pm$ 90° and is presently concealed by Precambrian granite. An induced polarization anomaly present on the property is almost certainly related to sulfide mineralization. Neither the most favorable portion of the induced polarization anomaly nor the geologic model has been tested by drilling. The most favorable land can probably be optioned at reasonable terms. It is felt that three drill holes are needed to adequately test the prospect area (see Figure 4). Two holes to a depth of 1500 feet and one to 2000 feet are planned. The drilling will proceed in stages with the location and depths of the latter hole(s) dependant on information gained from the former. It is possible that the prospect can be adequately tested with two holes but this will not be known until after the completion of the first two holes.

If results of this program are encouraging then additional work will be necessary. This request covers only the initial evaluation which it is estimated will take less than one (1) year to complete.

RECOMMENDATION

I recommend that a CE for $75,000 be issued to cover the cost of the first year options on the property and the cost of conducting a three hole drill program.

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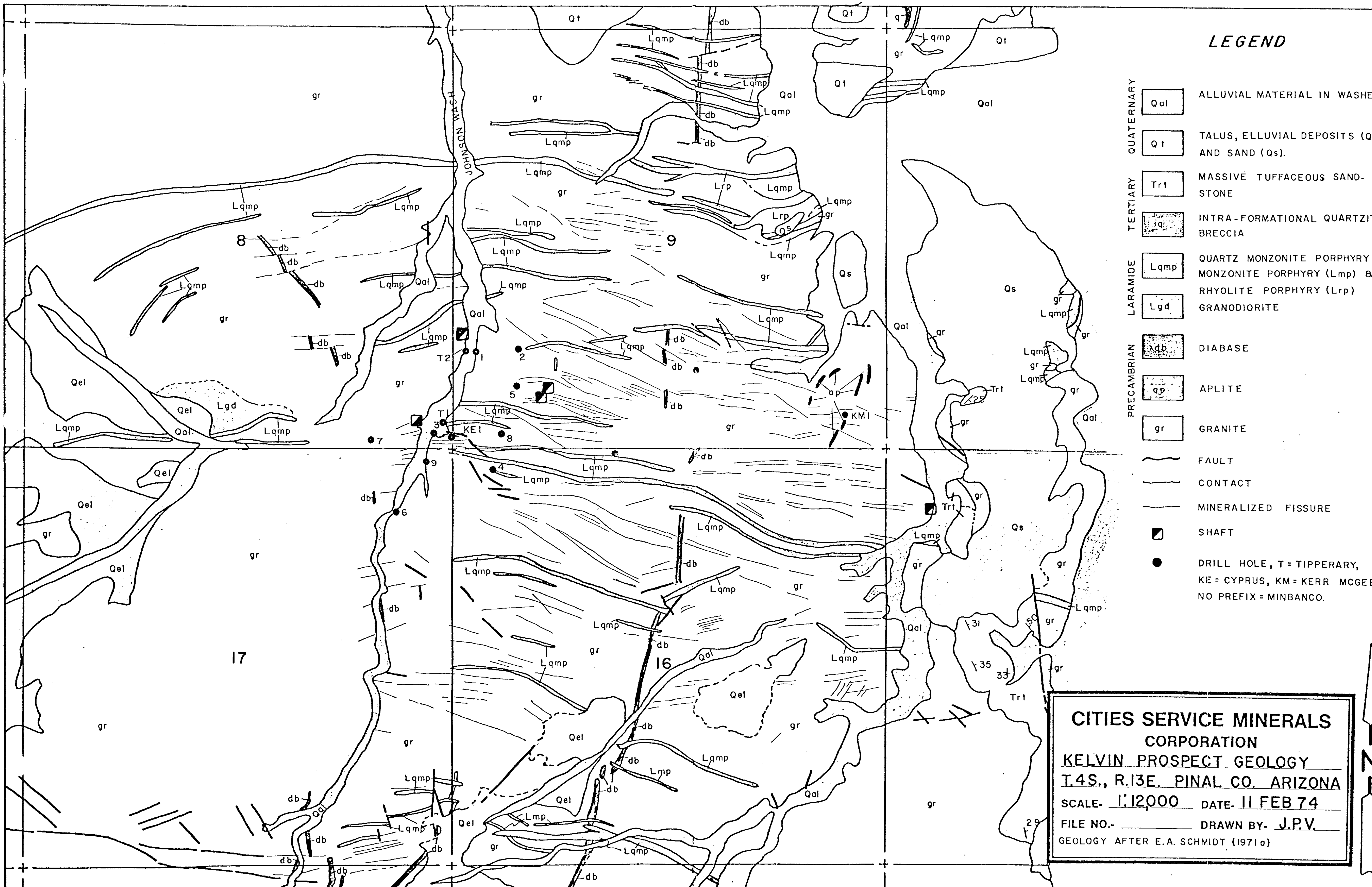

LEGEND
QUATERNARY
Qal ALLUVIAL MATERIAL IN WASHES
Qt TALUS, ELLUVIAL DEPOSITS (Qel) AND SAND (Qs).
TERTIARY
Trt MASSIVE TUFFACEOUS SAND-STONE
q INTRA-FORMATIONAL QUARTZITE BRECCIA
LARAMIDE
Lqmp QUARTZ MONZONITE PORPHYRY MONZONITE PORPHYRY (Lmp) & RHYOLITE PORPHYRY (Lrp)
Lgd GRANODIORITE
PRECAMBRIAN
db DIABASE
ap APLITE
gr GRANITE
FAULT
CONTACT
MINERALIZED FISSURE
SHAFT
DRILL HOLE, T = TIPPERARY, KE = CYPRUS, KM = KERR MCGEE, NO PREFIX = MINBANCO.
N
JOHNSON WASH
8
9
16
17
CITIES SERVICE MINERALS CORPORATION
KELVIN PROSPECT GEOLOGY
T.4S., R.13E. PINAL CO. ARIZONA
SCALE- 1:12000 DATE- 11 FEB 74
FILE NO.- DRAWN BY- J.P.V.
GEOLOGY AFTER E.A. SCHMIDT (1971a)

SECTION 8

PROJECT KELVIN DRILL HOLE N J-1 SCALE 1" = 100' PAGE NO. 1 OF 4

LENGTH	Vol. % sulf. (comp.)	Cu.	Mo	S	calc. wt. % sulfide	Py/Cp	Mineralization & Miscellaneous
0–250	0.39	.0768	.0016	.2600	.560	1.5	.0295 % Zinc

Depth scale: 100, 200, 300, 400, 500, 600, 700

Mineralization & Miscellaneous

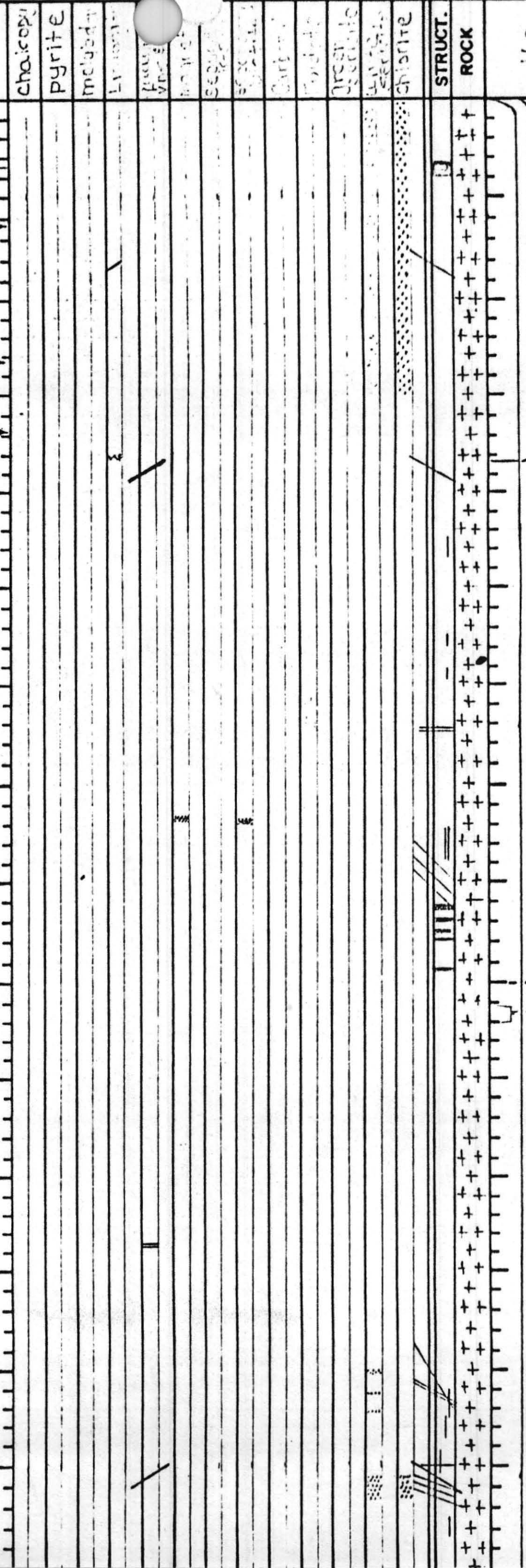
35'-40': trace copper oxides (& sulfides) in veinlets.

trace copper oxides

.0295 % Zinc

trace covellite

169': lost all circulation



Summary Lithology & Alteration

Zone of surface oxidation (0-133')

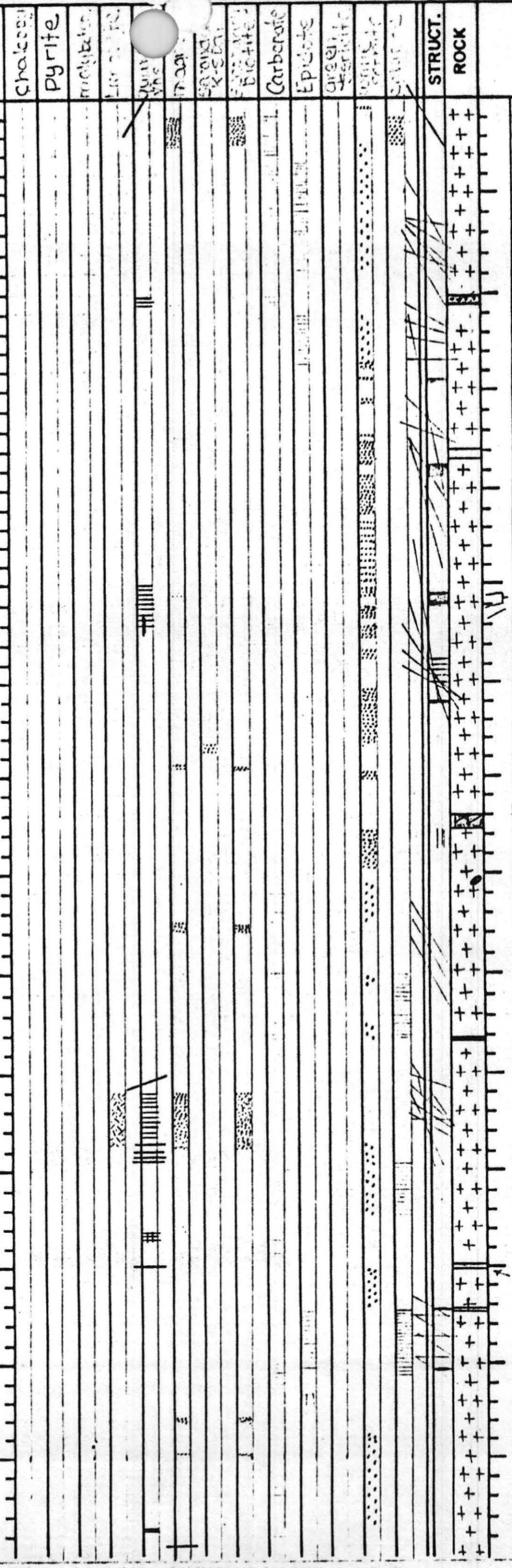
Plagioclase altered to: 20% sericite, 10% secondary K-spar, 5% clay, 1% CO_3, 1% chlorite, 1% epidote and 2% quartz. Primary [illegible] feldspar altered to 2% quartz plus a trace of hematite - the remainder is untwinned and is assumed to be recrystallized to secondary K-feldspar. Mafic minerals altered to: 55% chlorite, 4% sericite, 3% rutile & leucoxene, 4% carbonate, 4% epidote & 1% biotite. Probably a "propylitic subzone" of that assemblage described below: possibly separated from the rock below by a fault.

461-471: breccia

0-2478 (unless otherwise noted): <u>Precambrian Oracle Granite:</u> porphyritic quartz monzonite with numerous pink, euhedral K-feldspar phenocrysts up to 1.5 inch in length; [illegible] crystals, generally euhedral up to 0.25 inch in diameter in a course to medium [illegible] groundmass of quartz, K-spar, plagioclase, biotite and minor magnetite and hematite.

PROJECT KELVIN DRILL HOLE N D-7 SCALE 1" = 100' PAGE NO. 2 OF 4

LENGTH	VOL % Fe_3O_4 (comp)	Cu	Mo	S	Calc. wt % Sulfide	py/cp	Mineralization & Miscellaneous
800							
900							
	0.56	.0573	.0010	.2182	.470	1.8	.0047 % Zinc
1000							
1100							
1200							
1300							
1400							
1500							



Summary Lithology & [illegible] Log

851-856: Precambrian (?) Diabase: approximately 13% phenocrysts (10% plagioclase, 2% quartz and 1% hornblende) in a very fine-grained matrix of quartz, plagioclase and hornblende or actinolite. The plagioclase is strongly zoned and is strongly altered to sericite along the rims - the cores are sometimes fresh. Mafic phenocrysts are strongly altered to chlorite + epidote. Moderately magnetic. Probably "contaminated" by surrounding Precambrian Oracle Granite.

930-935
1231-1231½
1349½-1350½
1372-1373
} Precambrian aplite: 50% quartz, [illegible] plagioclase, 25% K-feldspar and 2% mafic minerals. Plagioclase altered 45% to sericite, K-feldspar altered 15% to chlorite, mafics altered 70% to sericite and 30% to chlorite.

1006-1011: breccia zone, also 1017-1019

PROPYLITIC ALTERATION ASSEMBLAGE: Overall plagioclase is altered 30% to sericite, 10% to [illegible] K-spar, 3% to clay, 2% to quartz, 2% to chlorite, 1% to carbonate plus a trace of biotite, [illegible] and epidote. Primary K-feldspar is altered [illegible] to sericite, 2% to quartz, 1% to chlorite plus a trace of carbonate, clay, biotite, magnetite and [illegible] - the remainder is not twinned and [illegible] be completely recrystallized to secondary K-feldspar. Mafic minerals are altered 40% to chlorite, 10% to sericite, 3% to biotite, 2% to epidote, 2% to rutile &/or leucoxene, 1% to quartz, 1% to magnetite and 1% to carbonate. Copper = .0602%, Molybdenum = .0012%, total sulfides = 0.48 wt. %, pyrite : chalcopyrite = 1.76:1.0, Zinc .0077%. Below 1000 feet (+/-) K-spar-chlorite alteration apparently becomes somewhat more intense than in the rock above: plagioclase may be altered up to 20% to secondary K-spar plus 5% chlorite and sericite [illegible] mafic minerals may be generally absent in the lower zone.

1120-1128: Tertiary-Cretaceous Granodiorite Porphyry II Phenocrysts of quartz (rounded, up to 0.25 inch), plagioclase (subhedral to euhedral up to 0.1 inch in length) and biotite (subhedral averaging 0.05 in in diameter) in a groundmass of quartz, feldspar (K-feldspar ?) chlorite and carbonate. Total phenocrysts approximately 30% - overall rock is medium gray. Possibly same as Teacup Granodiorite described below.

aplite appears to postdate some quartz [illegible]

PROJECT KELVIN — DRILL HOLE No. J-1 — SCALE 1" = 100' — PAGE NO. 3 OF 4

LENGTH	Vol % Fe_3O_4 (mag.)	Cu	Mo	S	Calc. wt % sulfide	py/cp
1600						
1700	0.19	.1426	.0018	.2300	.573	0.39
	0.10	.3967	.0066	.7000	1.710	0.49
1800	0.51	.0422	.0016	.3800	.753	5.2
1900						
2000	0.42	.5843	.0012	1.165	2.76	0.64
2100						
2200	0.32	.0131	.0006	.0533	.113	2.0

Mineralization & Miscellaneous

speck of native copper associated with mafics

1740-1795 = 55' = .3927 Copper .0059 Molybdenum

1795-1930 = 135' = .0503 Copper .0016 Molybdenum

1740-2100 = 360' = .3842 Copper .0021 Molybdenum

50' = 1.27 % Copper

1930-2100 = 170' = .6573 Copper .0012 Molybdenum

ZINC: 1900-2050 = .0283 %.

1740-2400 = 660' = .2524 Copper .0020 Molybdenum

2123-2236 = 113' = .0024 Copper .0003 Molybdenum

Columns: chalcopy, Pyrite, molybden., Limonite, quartz veinlets, magnet., Secondary K-spar, secondary biotite, carbonate, Epidote, green sericite, white sericite, chlorite, STRUCT., ROCK

Summary Lithology & Alteration Log

1510-1520: Intimate mixture of Precambrian Oracle Granite and Precambrian Aplite.

1542-1544: "mylonitic"

PHYLLIC ALTERATION ASSEMBLAGE: Overall plagioclase is altered 65 % to sericite, 10 % to chlorite, 5% to carbonate, 5% to secondary K-spar, 1% to magnetite, 1% to biotite, 1% to clay, 1% to quartz plus a trace of epidote. Primary K-feldspar is altered [illegible]% to sericite, 5 % to chlorite, 3% to carbonate, and 2% to quartz - the remainder is not [illegible] and is assumed to be completely recrystallized to secondary K-spar. Mafic minerals are altered 45% to chlorite, 20% to sericite, 5 % to [illegible], 3% to biotite, 3% to rutile-leucoxene and [illegible] carbonate plus a trace of epidote and pyrite. Copper = .2254 Molybdenum = .0021 %, total sulfides = 1.2[illegible] wt. % pyrite : chalcopyrite = 0.84:1.0; Zinc = .0091%.

1932-1983: Tertiary-Cretaceous Granodiorite Porphyry II (?) see description above. Overall rock is dark gray and well mineralized (>1.2 % copper). Plagioclase altered 60% to sericite, 20% to chlorite, 2% to carbonate & 1% to quartz. Biotite is altered 95% to chlorite and 5% to rutile & leucoxene. Matrix K-spar is partially altered to sericite and chlorite. The original rock was probably mafic rich. Exact identity of this unit is tenuous.

2123-2236: } 2245-2255: } Tertiary Dacite Porphyry: a light gray to cream colored rock with approximately 30% phenocrysts (50% plagioclase, 35% quartz, 10% biotite & hornblende and 5% K-feldspar) in a fine grained groundmass of sericite, quartz, carbonate, chlorite, and possible clay. Phenocrysts (quartz & feldspar) [illegible]. [illegible] altered 50% to sericite, 15% carbonate, 15% [illegible] K-spar and 5% to chlorite, K-feldspar partially altered to carbonate. Mafic minerals altered 40% to chlorite, 3[illegible] to sericite, 15 % to carbonate and 5% to rutile & leucoxene. Matrix strongly altered to [illegible] carbonate and chlorite. Probably [illegible] TKqp II above - may be correlative with [illegible] Latite Porphyry (Tql) of the U.S.G.S. [illegible]

PROJECT KELVIN DRILL HOLE N J-1 SCALE 1" = 100' PAGE NO. 4 OF [illegible]

LENGTH	Vol. % Fe_3O_4 (Comp.)	Cu	Mo	S	Calc. wt. % Sulfide	Py/cp	Mineralization & Miscellaneous
	0.70	.0719	.0007	.1200	.300	0.43	
2300							
	0.46	.2010	.0044	.3400	.845	0.40	
2400							
	0.40	.1030	.0031	.5328	1.100	2.7	.0047% Zinc; 2458-2471: specular hematite veinlets at 40° to core axis.

Alteration columns: Chalcocite, Pyrite, Molybdenite, Limonite, Quartz veins, Magnetite, Secondary K-spar, Secondary biotite, Carbonate, Epidote, Green sericite, White sericite, Chlorite; STRUCT.; ROCK

Summary Lithology & [illegible] Log

Th[illegible] tered [illegible] with K-spar phenocrysts. Contact @ 2093 = 90°, 2236' = 50°, 2245' = 45°, 2253' = near vertical to axis (ave. = 45°).

2478 feet is total length

* date started: 16 JULY 1974
* date completed: 3 JAN 1975
total length: 2478 feet
Hole size:
0-11' : 4½ inch (rock bit)
11-2478: NX wireline core
collar location: approximately 50 FNL & 2000 FWL, section 16, T. 4S., R. 13E, Pinal Co., Ariz.
collar elevation: 2450 feet (±)
Inclination: −90° (acid survey at 2400 feet = −80° ±).

Drilling Contractor: Joy Manufacturing Co.

Casing Left in Hole:
0-180 feet = 180' NX
(split at 10' & ± 25')

Average footage/shift = *	12.8
Direct drilling cost:	$ 9.61/ft
Mud, additives, water:	1.48/ft
cementing, reaming, casing:	1.01/ft
assaying:	.73/ft
casing left in hole:	.33/ft
Thin sections	.08/ft
TOTAL	$13.24/ft

* rig was shut down at 1378' on 8/28/74 and moved to hole J-2 − hole was re-entered at 1378' on 11/3/74

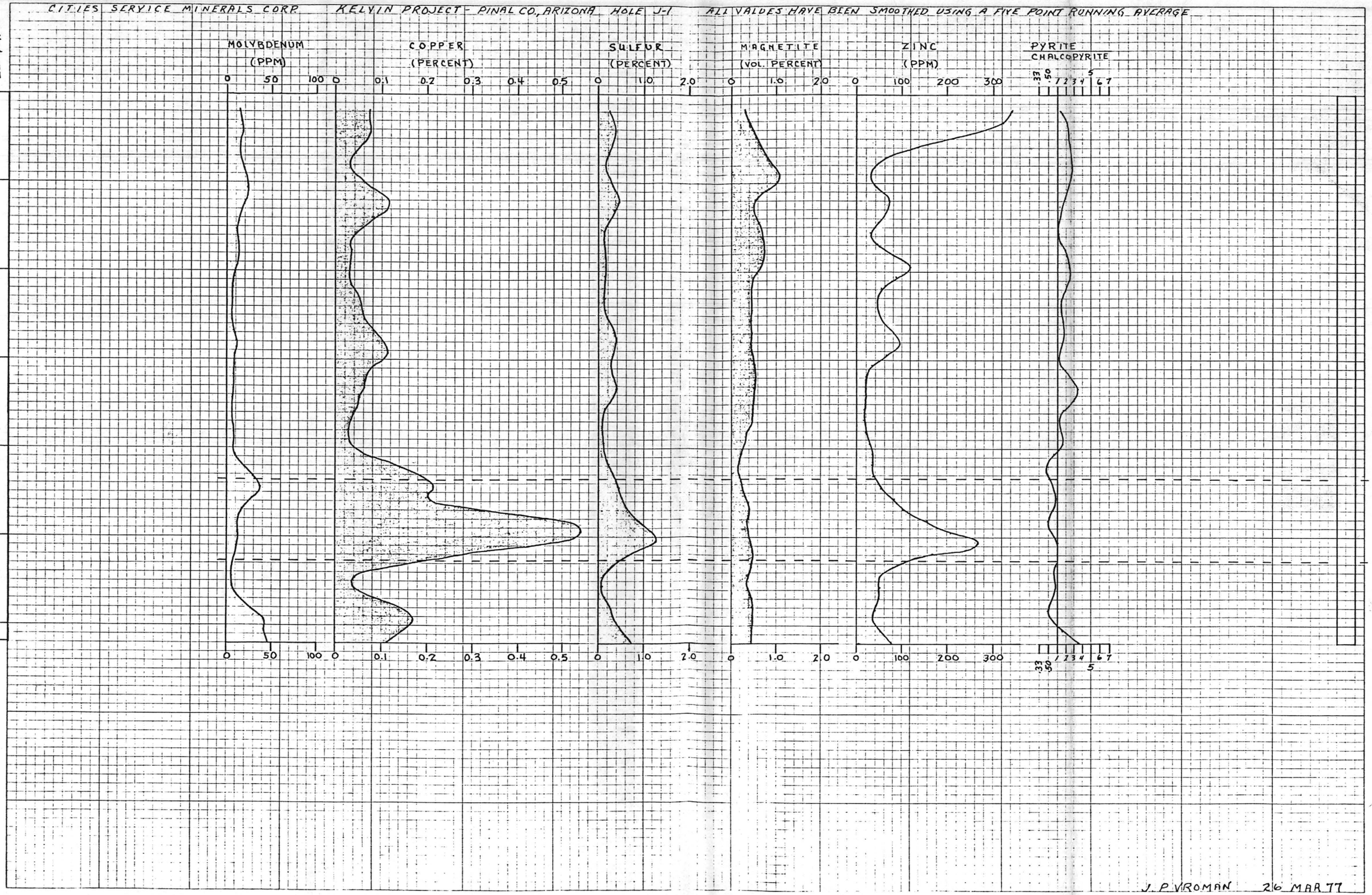
Logged By:
0-1378: R. Sawyer & R. Moore
1378-2478: R. Sawyer & J. Vroman
logging was not done graphically − this log is reconstructed from the original "verbal type" log.

Alteration descriptions above from petrographic examination of 54 thin sections by C. A. Hennessy and D.F. Denison.

Yellow in "white sericite" column = clay (0-150').

CITIES SERVICE MINERALS CORP. KELVIN PROJECT - PINAL CO, ARIZONA HOLE J-1

ALL VALUES HAVE BEEN SMOOTHED USING A FIVE POINT RUNNING AVERAGE



J. P. VROMAN 26 MAR 77

47 0700 KEUFFEL & ESSER CO MADE IN U.S.A.

AMPAD EFFICIENCY LINE NO. 6636

C.S.M.C. KELVIN PROJECT: HOLE J-
REPLICATE ASSAYS ON PULPS
(originally prepared by R.M.G.C.)

	% COPPER						PPM MOLYBDENUM						
INTERVAL	1 R.M.G.C.	2 Skyline	3 Am. Anal.	4	5	6	7 R.M.G.C.	8 Skyline	9 Am. Anal.	10	11	12	13
[illegible]	.04	.	.										
1910-1915	.04	.	.										
[illegible]	.03	.	.										
[illegible]	.10	.	.										
[illegible]	.23	.	.										
[illegible]	4.60	.	.										
[illegible]	2.30	.	.										
[illegible]	1.20	.	.										
[illegible]	.70	.	.				11						
[illegible]	.35	.	.										
[illegible]	.36	.	.										
[illegible]	.66	.	.										
[illegible]	.43	.	.										
[illegible]	.70	.	.										
[illegible]	1.40	.	.										
[illegible]	.46	.	.										
[illegible]	.50	.	.										
[illegible]	.13	.	.										
[illegible]	.07	.	.				13						
2000-2005	.18	.	.										
2005-2010	.22	.	.										
2010-2015	.15	.	.										
2015-2020	.54	.	.										
2020-2025	.41	.	.										
[illegible]	.72	.	.										
2030-2035	1.60	.	.										
[illegible]	.39	.	.										
[illegible]	.40	.	.										
[illegible]	.50	.	.				14						
[illegible]	.33	.	.										
[illegible]	.47	.	.										
2060-2065	.42	.	.										
2065-2070	.22	.	.										
2070-2075	.13	.	.										
[illegible]	.25	.	.										
2080-2085	.07	.	.										
2085-2090	.28	.	.										
2090-2095	.49	.	.										
2095-2100	.70	.	.				11						
MEAN													
2030-2035	.8429	.	.				13.0	.	.				
2030-2100	.6574	.	.				12.5	.	.				

AMPAD EFFICIENCY LINE NO. 6636

HOLE J-1 - Replicate Assays on pul[illegible] (prepared by R.M.G.C.)

INTERVAL	1 Am. Anal.	2 Skyline	3 R.M.G.C.	4	5	6 MEAN	7 Am. Anal	8 Skyline	9 R.M.G.C.	10	11	12	13 MEAN
1905-1910 1	.05	.04	.04			.04	13	6	4				
1910-1915 2	.05	.04	.04			.04	8	4					
1915-1920 3	.03	.02	.03			.03	21	12					
1920-1925 4	.11	.11	.10			.11	18	14					
1925-1930 5	.21	.20	.23			.21	18	6					
1930-1935 6	3.68	3.84	(4.60)			4.04	7	4					
1935-1940 7	2.20	2.23	2.30			2.24	14	6					
1940-1945 8	(.88)	1.09	(1.20)			1.06	11	4					
1945-1950 9	.72	.78	.70			.73	12	8	11				
1950-1955 10	.37	.36	.35			.36	15	10					
1955-1960 11	.34	.34	.36			.35	14	8					
1960-1965 12	.65	.67	.66			.66	17	8					
1965-1970 13	.39	.41	.43			.41	24	14					
1970-1975 14	.65	.73	.70			.69	16	8					
1975-1980 15	1.46	1.45	1.40			1.44	13	4					
1980-1985 16	.43	.41	.46			.43	18	14					
1985-1990 17	.47	.47	.50			.48	15	8					
1990-1995 18	.13	.13	.13			.13	6	2					
1995-2000 19	(.14)	.09	.09			.11	17	4	13				
2000-2005 20	.19	.20	.18			.19	15	18					
2005-2010 21	.21	.20	.22			.21	20	16					
2010-2015 22	.50	.47	.50			.49	14	6					
2015-2020 23	.49	.48	.54			.50	19	10					
2020-2025 24	.40	.36	.41			.39	33	16					
2025-2030 25	.60	.64	(.72)			.65	22	10					
2030-2035 26	(1.18)	1.25	(1.60)			1.34	45	50					
2035-2040 27	.34	.34	.39			.36	11	4					
2040-2045 28	.37	.35	.40			.37	10	2					
2045-2050 29	.46	.46	.50			.47	19	2	14				
2050-2055 30	.31	.31	.33			.32	9	6					
2055-2060 31	.43	.49	.47			.46	10	4					
2060-2065	(.28)	.30	(.42)			.33	12	6					
2065-2070	.19	.20	.22			.20	6	4					
2070-2075	(.09)	.12	(.13)			.11	11	2					
2075-2080 1	.23	.23	.25			.24	7	2					
2080-2085 2	.07	.06	.07			.07	6	2					
2085-2090 3	.23	.24	.28			.25	15	4					
2090-2095 4	.48	.49	.49			.49	38	26					
2095-2100 5	.64	.69	.70			.68	128	24	11				
6													
7	(-5.0%)	(-1.8%)	(+6.8%)										
1930-2100 8	.5941	.6141	.6676	11%		.6253	16	9	12				12
9													
1930-1980 10	1.134	1.190	1.270	11%		1.198							
11													
1930-2060 12	.6919	.7135	.7746	11%		.7267							
13													
14	-5	-0	-6										
(J1,J4,J5) 15													
TOTAL (-) 16	13/85	3/85	11/85										

AMPAD · EFFICIENCY · LINE NO. 6636

HOLE J-1 COMPARISON

COMPOSITED ASSAY DATA

	[1]Am. Anal	[2]Skyline	[3]R.M.G.C.	[4]	[5]MEAN	[6]	[7]	[8]Am. Anal	Skyline	[10]R.N.G.C.	[11]	[12]	[13]
1910-1920[1]	.04	.03	.04		.04								
1920-1930[2]	.16	.16	.16		.16		1920-40	1.55	1.60	(1.81)			
1930-1940[3]	2.94	3.04	3.45		3.14		1940-60	(.58)	.64	.65			
1940-1950[4]	(.80)	.94	.95		.90		1960-80	.78	.82	.80			
1950-1960[5]	.36	.35	.36		.36		1980-2000	.29	.28	.30			
1960-1970[6]	.52	.54	.54		.53		2000-20	.35	.34	.36			
1970-1980[7]	1.06	1.09	1.05		1.07		2020-40	.63	.65	(.78)			
1980-1990[8]	.45	.44	.48		.46		2040-60	.39	.40	.42			
1990-2000[9]	(.14)	.11	.11		.12		2060-80	.20	.21	(.26)			
2000-2010[10]	.20	.20	.20		.20		2080-2100	.36	.37	.38			
2010-2020[11]	.50	.48	.52		.50								
2020-2030[12]	.50	.50	.56		.52								
2030-2040[13]	.76	.80	(1.00)		.85		1900-1940	.90	.93	(1.05)			
2040-2050[14]	.42	.40	.45		.42		1940-1980	(.68)	.73	.72			
2050-2060[15]	.37	.40	.40		.39		1980-2020	.32	.31	.33			
2060-2070[16]	.24	.25	(.32)		.27		2020-2060	.51	.52	(.60)			
2070-2080[17]	.16	.18	.19		.18		2060-2100	.28	.29	(.32)			
2090-2090[18]	.15	.15	.18		.16								
2090-2100[19]	.56	.59	.60		.58								
[20]													
1930-2100[21]	.594	.614	.668		.625								
[22]													
[23]	-5.0%	-1.8%	+6.9%		—								
[24]													
[25]													
[26]													
[27]													
[28]													
[29]													
[30]													
[31]													

Sp. Gravity Py : 5.0 (5.04)

EFFICIENCY, LINE NO. 6636

Cu assay x 1.00925 = % S in cp

S assay - (% S in cp) = % S in py

(S in py) x 1.871 = wt. % Py

wt % pyrite + wt % cp = weight %

HOLE J-1

	ASSAY	Cu x 2.6885 =	Cu x 1.00925 =	ASSAY	Column 4 minus column 3 =	% S in py x 1.871 =								
	1 % Cu	2 wt. % Cp	3 % S in Cp	4 % S	5 % S in py.	6 wt. % py.	7	8 TOTAL SULFIDES	9 % Mo	10 Py/Cp	11 % Zn	12 % Fe_3O_4	13
50 - 100 1	.083	.2397	.0838	.05	———	———		0.24	.0014	———	.0332	.142	
100 - 150 2	.047	.1358	.0474	.43	.3826	0.716		0.85	.0011	5.3	.0409	.557	
3	.115	.3322	.1161	.42	.3039	0.569		0.90	.0029	1.7	.0217	.388	
-250 4	.056	.1618	.0565	.35	.2935	0.549		0.71	.0012	3.4	.0186	.715	
-300 5	.030	.0867	.0303	.14	.1097	0.205		0.29	.0005	2.4	.0021	.808	
-350 6	.026	.0751	.0262	.11	.0838	0.157		0.23	.0025	2.1	.0032	.660	
-400 7	.028	.0809	.0283	.21	.1817	0.340		0.42	.0027	4.2	.0026	1.702	
-450 8	.055	.1589	.0555	.22	.1645	0.308		0.47	.0014	1.9	.0020	.772	
-500 9	.166	.4795	.1675	.70	.5325	0.996		1.48	.0034	2.1	.0113	.218	
-550 10	.139	.4015	.1403	.39	.2497	0.467		0.87	.0012	1.2	.0075	.425	
-600 11	.064	.1849	.0646	.10	.0354	0.066		0.25	.0016	0.36	.0028	.877	
-650 12	.027	.0780	.0272	.10	.0728	0.136		0.21	.0003	1.7	.0023	.657	
-700 13	.030	.0867	.0303	.08	.0497	0.093		0.18	.0018	1.1	.0022	.628	
-750 14	.045	.1300	.0454	.20	.1546	0.289		0.42	.0014	2.2	.0024	.868	
-800 15	.040	.1155	.0404	.20	.1596	0.299		0.41	.0012	2.6	.0274	.770	
-850 16	.025	.0722	.0252	.13	.1048	0.196		0.27	.0006	2.7	.0023	.136	
-900 17	.016	.0462	.0161	.11	.0939	0.176		0.22	.0005	3.8	.0026	.658	
900 18	.073	.2109	.0737	.21	.1363	0.255		0.47	.0005	1.2	.0050	.274	
-1000 19	.060	.1733	.0606	.16	.0994	0.186		0.36	.0010	1.1	.0063	.585	
-1050 20	.042	.1213	.0423	.13	.0876	0.164		0.29	.0001	1.4	.0024	.418	
-1100 21	.062	.1791	.0626	.35	.2874	0.538		0.72	.0003	3.0	.0051	.565	
-1150 22	.135	.3899	.1362	.49	.3538	0.662		1.05	.0023	1.7	.0200	.152	
-1200 23	.144	.4159	.1453	.31	.1647	0.308		0.72	.0001	0.74	.0018	.700	
-1250 24	.053	.1531	.0535	.15	.0965	0.181		0.33	.0012	1.2	.0019	.348	
-1300 25	.052	.1502	.0525	.18	.1275	0.239		0.39	.0006	1.6	.0020	.867	
1350 26	.087	.2513	.0878	.73	.6422	1.202		1.45	.0010	4.8	.0023	.308	
-1400 27	.032	.0924	.0323	.25	.2177	0.407		0.50	.0007	4.4	.0013	.536	
1400 28	.062	.1791	.0626	.06	———	———		0.18	.0007	———	.0017	.450	
-1500 29	.028	.0809	.0283	.08	.0517	.0968		0.18	.0005	1.2	.0018	.625	
-1550 30	.028	.0809	.0283	.08	.0517	.0968		0.18	.0010	1.2	.0016	.153	
-1600 31	.020	.0578	.0202	.16	.1398	.262		0.32	.0010	4.5	.0015	.498	

0.3471

ASSAY Cu × 2.8885 = Cu × 1.00925 = ASSAY column 4 minus column 3 = % S in py × 1.871 = wt % py + wt. % cp = weight %

	1 % Cu	2 wt. % Cp.	3 % S in Cp.	4 % S	5 % S in py.	6 wt % py.	7	8 TOTAL SULFIDES	9 % Mo	10 py/cp	11 % Zn	12 % Fe_3O_4	13
-1650 1	.035	.1011	.0353	.08	.0447	0.084		0.18	.0003	0.83	.0064	.092	✓
-1700 2	.1214	.3507	.1225	.14	.0175	0.032		0.38	.0011	0.09	.0020	.142	✓
-1750 3	.1638	.4731	.1653	.32	.1546	0.289		0.76	.0025	0.61	.0023	.245	✓
-1800 4	.3967	1.1459	.4004	.70	.2996	0.561		1.71	.0066	0.49	.0045	.095	✓
-1850 5	.0405	.1167	.0408	.26	.2192	0.410		0.52	.0020	3.51	.0101	.515	✓
-1900 6	.0439	.1268	.0443	.50	.4557	0.852		0.98	.0011	6.72	.0058	.504	✓
1900 -1950 7	.9281	2.6808	.9367	1.14	.2033	0.380		3.06	.0011	0.14	.0222	.163	✓
-2000 8	.3082	1.4679	.5129	.74	.2271	0.425		1.89	.0013	0.29	.0032	.606	✓
-2050 9	.5110	1.4760	.5157	2.22	1.7043	3.189		4.66	.0014	2.16	.0595	.151	✓
-2100 10	.3900	1.1265	.3936	.56	.1664	0.311		1.44	.0011	0.26	.0043	.745	✓
-2150 11	.0221	.0638	.0223	.04	.0177	0.033		0.10	.0007	0.52	.0042	.469	✓
-2200 12	.0028	.0081	.0028	.06	.0572	0.107		0.12	.0003	13.21	.0055	.231	✓
-2250 13	.0144	.0416	.0145	.06	.0455	0.085		0.13	.0007	2.04	.0059	.267	✓
-2300 14	.0719	.2077	.0726	.12	.0474	0.089		0.30	.0007	0.43	.0041	.695	✓
-2350 15	.1900	.5488	.1918	.36	.1682	0.315		0.86	.0011	0.57	.0048	.358	✓
-2400 16	.2280	.6586	.2301	.32	.0899	0.168		0.83	.0078	0.26	.0021	.568	✓
-2450 17	.1124	.3247	.1134	.26	.1466	0.274		0.60	.0018	0.84	.0024	.395	✓
-2478 18	.0863	.2493	.0871	1.02	.9329	1.745		1.99	.0054	7.00	.0121	.401	
19													
20											vol % sulfide corrected to 2.5		
21													
22													
23							% Mo	TOTAL SULFIDE	% Zn	py/cp	vol % Cp	vol % py	vol % S
0-1650 24	.0602	.1740	.0608	.2245	.1637	0.306	.0012	0.48	.0077	1.76	.111	.165	0.27
1650-2478 25	.2254	.6510	.2275	.5188	.2913	0.545	.0021	1.20	.0071	0.84 (1.19)	.417	.294	0.71
15-250 26	.0768	.2218	.0775	.2600	.1825	0.341	.0016	0.56	.0295	1.54	.142	.184	0.32
250-1650 27	.0573	.1655	.0578	.2182	.1604	0.300	.0010	0.47	.0047	1.81	0.106	0.162	0.26
1650-1900 28	.1533	.4427	.1547	.3840	.2293	.429	.0027	0.87	.0049	0.97	0.283	0.232	0.51
1900-2100 29	.5843	1.6880	.5897	1.1650	.5753	1.076	.0012	2.76	.0223	0.63	1.080	0.581	1.661
2100-2250 30	.0131	.0378	.0132	.0533	.0401	.075	.0006	0.11	.0052	1.98	0.024	0.040	0.064
2250-2478 31	.1377	.3973	.1390	.4160	.2770	.518	.0034	0.92	.0052	1.30	0.255	0.280	0.535

AMPAD EFFICIENCY® LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-1

FIVE POINT RUNNING AVERAGES

weight %

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5	6 wt% py	7 Py/CP	8 Py+CP	9	10 Vol. % CP	11 Vol % Py	12 Vol % Hg	13 Mc
						Cu x 1.8363					3+ Py x .532		
50-100 1	.0746	.0015	.0345	.2178		.2666	1.2			.1370	.1418	.308	8.8
100-150 2	.0738	.0016	.0323	.3258		.4702	2.2			.1355	.2501	.424	12.1
150-200 3	.0767	.0018	.0248	.3562		.5216	2.4			.1408	.2775	.516	14.0
200-250 4	.0606	.0015	.0160	.2977		.4425	2.5			.1113	.2354	.645	14.9
250-300 5	.0415	.0015	.0077	.2085		.3117	2.6			.0762	.1658	.789	15.5
300-350 6	.0319	.0019	.0039	.1669		.2520	2.7			.0586	.1341	.947	17.1
350-400 7	.0445	.0022	.0032	.2215		.3304	2.6			.0817	.1758	1.064	19.8
400-450 8	.0786	.0022	.0048	.3331		.4748	2.1			.1443	.2526	.823	18.3
450-500 9	.1157	.0022	.0070	.4338		.5931	1.8			.2125	.3155	.558	16.3
500-550 10	.1128	.0017	.0065	.3592		.4590	1.4			.2071	.2442	.526	14.7
550-600 11	.0780	.0014	.0044	.2115		.2484	1.1			.1432	.1321	.652	13.9
600-650 12	.0462	.0011	.0028	.1254		.1474	1.1			.0848	.0784	.699	12.9
650-700 13	.0362	.0013	.0043	.1231		.1620	1.5			.0664	.0862	.720	13.1
700-750 14	.0375	.0013	.0081	.1592		.2271	2.1			.0689	.1208	.717	13.6
750-800 15	.0351	.0012	.0120	.1677		.2475	2.4			.0645	.1317	.627	12.3
800-850 16	.0316	.0009	.0084	.1531		.2268	2.5			.0580	.1207	.470	9.7
850-900 17	.0365	.0008	.0053	.1485		.2089	2.0			.0670	.1111	.452	9.5
900-950 18	.0508	.0007	.0043	.1631		.2092	1.4			.0933	.1113	.435	9.6
950-1000 19	.0556	.0006	.0047	.1754		.2232	1.4			.1021	.1187	.479	10.5
1000-1050 20	.0603	.0006	.0055	.2215		.3006	1.7			.1107	.1599	.459	10.9
1050-1100 21	.0804	.0008	.0078	.3062		.4211	1.8			.1476	.2240	.448	12.3
1100-1150 22	.1068	.0011	.0096	.3623		.4762	1.5			.1961	.2533	.409	12.9
1150-1200 23	.1132	.0009	.0063	.3077		.3620	1.1			.2079	.1926	.495	13.4
1200-1250 24	.0827	.0009	.0033	.2646		.3389	1.4			.1519	.1803	.531	12.9
1250-1300 25	.0658	.0008	.0020	.3154		.4659	2.5			.1208	.2479	.580	14.2
1300-1350 26	.0617	.0008	.0020	.3962		.6248	3.5			.1133	.3324	.504	14.2
1350-1400 27	.0528	.0007	.0019	.2985		.4588	3.0			.0970	.2441	.496	12.6
1400-1450 28	.0465	.0007	.0018	.1615		.2144	1.6			.0854	.1141	.476	10.1
1450-1500 29	.0355	.0007	.0017	.0946		.1100	1.1			.0652	.0585	.459	8.7
1500-1550 30	.0293	.0008	.0020	.0969		.1260	1.5			.0538	.0670	.360	7.2
1550-1600 31	.0337	.0008	.0027	.1154		.1523	1.6			.0619	.0810	.307	6.7

AMPAD EFFICIENCY, LINE NO. 6636

weight %

Cu x 1.8363

wt. Py x .532

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5	6 wt. % Py	7 Py/CP	8 Py+CP	9	10 Vol % CP	11 Vol % Py	12 Vol % Mg	13 Mc
1600-1650 1	.0608	.0009	.0036	.1308		.1299	0 .74 1.4			.1116	.0691	.214	5.9
1650-1700 2	.1246	.0017	.0032	.2123		.1619	0 .45 2.2			.2288	.0861	.178	7.4
1700-1750 3	.1883	.0029	.0037	.3431		.2864	0 .53 1.9			.3458	.1524	.196	10.4
1750-1800 4	.2125	.0037	.0052	.4523		.4450	0 .72 1.4			.3902	.2367	.262	13.3
1800-1850 5	.2012	.0028	.0081	.4892		.5354	0 .92 1.1			.3695	.2848	.368	15.3
1850-1900 6	.3103	.0017	.0103	.6262		.5857	0 .65 1.5			.5698	.3116	.404	19.3
1900-1950 7	.5273	.0012	.0160	.9154		.7170	0 .47 2.1			.9683	.3814	.370	25.8
1950-2000 8	.5611	.0012	.0208	1.1415		1.0762	0 .57 1.7			1.0303	.5725	.402	30.1
2000-2050 9	.4769	.0012	.0266	1.2446		1.4280	1. .04			.8757	.7597	.418	30.8
2050-2100 10	.3123	.0010	.0170	.7985		.9043	1 .00			.5735	.4811	.494	23.2
2100-2150 11	.1395	.0008	.0089	.3338		.3611	0 .90 1.1			.2562	.1921	.438	13.3
2150-2200 12	.0450	.0006	.0051	.0985		.0993	0 .76 1.3			.0826	.0528	.369	7.6
2200-2250 13	.0391	.0006	.0052	.0954		.1047	0 .93 1.1			.0718	.0557	.380	7.6
2250-2300 14	.0926	.0013	.0047	.1723		.1475	0 .55 1.8			.1700	.0785	.473	10.8
2300-2350 15	.1521	.0026	.0040	.2646		.2079	0 .47 2.1			.2793	.1106	.480	13.0
2350-2400 16	.1696	.0041	.0037	.3538		.3417	0 .70 1.4			.3114	.1818	.477	14.6
2400-2450 17	.1412	.0041	.0050	.4733		.6214	1 .5			.2593	.3306	.437	15.4
2450-2478 18	.1108	.0045	.0078	.6889		1.0796	3 .4			.2035	.5743	.418	17.9
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

0-1650 = 12.5
1650-2478 = 16.2 1.3

AMPAD EFFICIENCY® LINE NO. 6636

THIN SECTION SUMMARY HOLE J-1

		PLAGIOCLASE									K-SPAR					MAFICS									
DEPTH	ROCK	ser	qtz	clay	CO_3	K-spar	biot	chl.	epi	mag	ser	qtz	Sec. K-sp.	chl.	hem	gthrev	ser	chl	biot	lithic feus	epi	CO_3	qtz	mag	py	13
65	Yr 1	15	5	10		10							100					65		8						
132	Yr 2	12				2			3			5	100				2	70	10		5					
195	Yr 3	18				10			6			5	100		T			48		10	5					
253	Yr 4	20			10	25			—			10	100				25	50		10		15				
274	Yr 5	11				5							100		T			46			11					Am 9
301	Yr 6	30				8							100					42			8					
338	Yr 7			40									100					42			5					
395	Yr 8	40	12			8	2	5					100				5	70		5		10				
440	Yr 9	30				20		5					100					75				10				
464	Yr 10	90						Tr			?	?		?			—	—					—			
500	Yr 11	90	10								75	20					100									
550	Yr 12	25				8							100				12	70		8						
600	Yr 13	18						T	2	*								12								
697	Yr 14	40											100?					42			10					
742	Yr 15	90						5			18	12		5	10	Tmg 2py	90									
785	Yr 16	15				12							100?		T			8								
841	Yr 17	30				20							100				8	62		5		2				
853	Ydb 18	55			8													40			20		8			
904	Yr 19	5											100					12								
934	Ya 20	95											?	15			70	30								
987	Yr 21	5											100					5								
1036	Yr 22			30		12							100					52			T					
1084	Yr 23	18				8							100					48			6					
1116	Yr 24	50				35		10		15	5			5				65	T							
1123	25	20				T												70								
1166	Yr 26	8		5									100					18								
1176	Yr 27	65					5	10			65			10		5biot										
1233	Ya 28	25				28							100					50	T		T					
1265	Yr 29	65	20			10		10					100					15	35	15						
1314	Yr 30	10				50		15				10	100	5				90								
1370	Yr 31	15		10		10	1						100					32	12		11					
1430	Yr					50		T	T	T*		5	100	5												
1495	Yr	55	10					8		•			100	2				40	50							
1540	Yr 1	20		?	T	25							100					60								
1592	Yr 2	5				30						5	100			2chl 2CO_3		55					25	20		
1640	Yr 3	75					10	10		8		5		10					55					15		
1691	Yr 4	75						8		2		2	100	2			20	65			5			10		
1732	Yr 5	78						8		2	8	2		5			70	15	3					20		
1759	Yr 6	95									80	5		5		5CO_3	—					—	—			
1830	Yr 7	85	2		2	5		5			T	4		5				80		5				5	T	
1872	Yr 8	20			5	5							100	3				42								
1881	Yr 9	65		20	8	8		5		2	10			10				60		10				30		
1931	Yr 10	85						12			5		100	5			25	60		10				10		
1943	11	50						30										90		8						
1973	12	70	2		3			12										?								
2039	Yr 13	95	3					2			80	10		10												
2119	Yr 14	25				15		25		8	2		100	2			30	50						10		
2125	15	60			30	5											50	40								
2200	16	35				25		2									10	40		10		30				
2315	Yr 17	90			5			2						5		5CO_3	40	50		T				10		
2352	Yr 18	10				5			5								—	—			—					
2402	Yr 19	90						2			2	2		2		10CO_3	30	60		3				3	3	
2461	Yr 20	95	5					2						30		35CO_3	—	—		—				—	—	
2476	Yr 21	45			15								100				30	60				10				

SECTION 9

PROJECT KELVIN DRILL HOLE NO. J-2 SCALE 1" = 100' PAGE NO. 1 OF 5

LENGTH	% Fe_3O_4 (comp.)	ASSAYS % Cu	Mo	S	Weight % sulfide	Py/cp
	0.69	.0020	.0002	.1000	.189	31.6
100	0.57	.0070	.0003	.0200	.044	1.2
	0.76	.0018	.0003	.0400	.076	13.7
200	0.29	.0184	.0007	.8800	1.665	30.4
	0.01	.0207	.0003	.8400	1.593	25.6
300	0.42	.0034	.0002	.0600	.116	10.8
	0.41	.0018	.0002	.1200	.226	42.5
400	0.65	.0014	<.0001	.0300	.058	13.5
	0.55	.0018	<.0001	.0200	.039	6.5
500	0.27	.0030	<.0001	.0200	.041	3.7
	0.59	.0026	.0002	.0400	.078	9.3
600	0.05	.0026	.0005	.0200	.040	4.4
	—	.0021	.0005	.0200	.039	5.4
700	1.13	.0036	.0003	.0300	.059	4.7

Miscellaneous

Cu FeS_2 | pyrite | quartz in vns & mtls | Fe_3O_4 | Lime | MoS_2 | secondary biotite | secondary K-spar | $CaCO_3$ | Epidote | Green Sericite | white sericite | chlorite + sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

0-2810': Precambrian Oracle Granite: porphyritic quartz monzonite - generally yellowish-gray to grayish-orange in color. Fresh and unaltered specimens contain numerous flesh colored phenocrysts of orthoclase and microcline, partly perthitic, up to 1.5 inches in length, in a coarse grained groundmass of quartz, plagioclase, and biotite. Accessory minerals include zircon, sphene and magnetite.

0-200': plagioclase altered 10% to sericite, 10% to clay, 5% to carbonate, 2% to chlorite, 1% to epidote; K-spar generally fresh (microcline) - minor alteration to clay (2%), epidote (1%) and chlorite (trace); biotite altered to chlorite (30%) and epidote (15%) plus minor carbonate. The clay alteration noted decreases downward & is probably supergene.

PROJECT KELVIN DRILL HOLE NO. J-2 SCALE 1" = 700' PAGE NO. 2 OF 5

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp	Miscellaneous
	0.12	.0021	.0003	.0200	.039	5.4	
800							
	0.43	.0025	.0001	.0100	.021	1.9	
	0.04	.0121	<.0001	.1200	.237	5.8	
900							
	0.31	.0040	.0001	.0200	.042	2.6	
	0.86	.0020	<.0001	.0300	.058	9.0	
1000							
	0.27	.0070	<.0001	.0400	.082	3.1	
	0.57	.0015	<.0001	.0200	.039	8.1	
1100							
	0.23	.0016	<.0001	.0200	.039	7.4	
	0.01	.0057	<.0001	.0100	.024	0.48	
1200							
	0.38	.0010	<.0001	.0400	.076	25.1	
	0.43	.0058	<.0001	.0200	.043	7.5	
1300							
	0.26	.0529	<.0001	.2200	.465	2.0	
	0.09	.2042	<.0001	.7200	1.552	7.6	3700 ppm zinc (compared to 63 ppm above and 28 ppm below).
1400							
	0.25	.0151	.0008	.0400	.090	1.7	Mangance oxides (4') on fractures
	0.39	.0725	.0008	.1400	.334	0.60	trace native copper as small octahedral crystals - 1469'

CuFeS2 | pyrite | quartz in vns/veinlts | Fe_3O_4 | Limonite | MoS_2 | secondary biotite | secondary K-spar | $CaCO_3$ | Epidote | green Sericite | white Sericite | Chlorite & Sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

Plagioclase altered to sericite (55%), chlorite (5%), epidote (3%), clay (2%), carbonate (2%) plus trace amounts of secondary K-spar, quartz and hematite. K-spar altered to sericite (10%), chlorite (3%), clay (2%), carbonate (2%) and quartz (2%) plus trace amounts of epidote, hematite and secondary K-spar. Biotite altered to chlorite (50%), sericite (15%), epidote (10%) plus trace amounts of clay, carbonate and quartz. Overall alteration assemblage is weak to moderate (approximately 40% of the susceptible minerals are altered) PROPYLITIC (sericite-chlorite-epidote).

LENGTH	% Fe_3O_4 (comp.)	Cu	Mo	S	weight % sulfide	py/cp
	0.55	.1954	.0010	.5000	1.131	1.0
	0.41	.0166	.0013	.2000	.391	7.2
1600						
	0.01	.0547	.0013	.4800	.953	5.0
	0.29	.0321	.0002	.4600	.893	8.6
1700						
	0.41	.0259	.0010	1.0400	1.972	25.4
	0.38	.0644	.0017	.4600	.925	4.0
1800						
	0.52	.2540	.0022	.7600	1.676	1.3
	0.42	.0956	.0037	.6000	1.218	3.4
1900						
	0.02	.2494	.0062	.7200	1.596	1.2
	0.13	.1045	.0046	.4000	.853	1.8
2000						
	0.41	.0698				
	0.36	.0780				
2100						
	0.54	.0607	.0021	.3264	.671	2.8
2200						

Miscellaneous

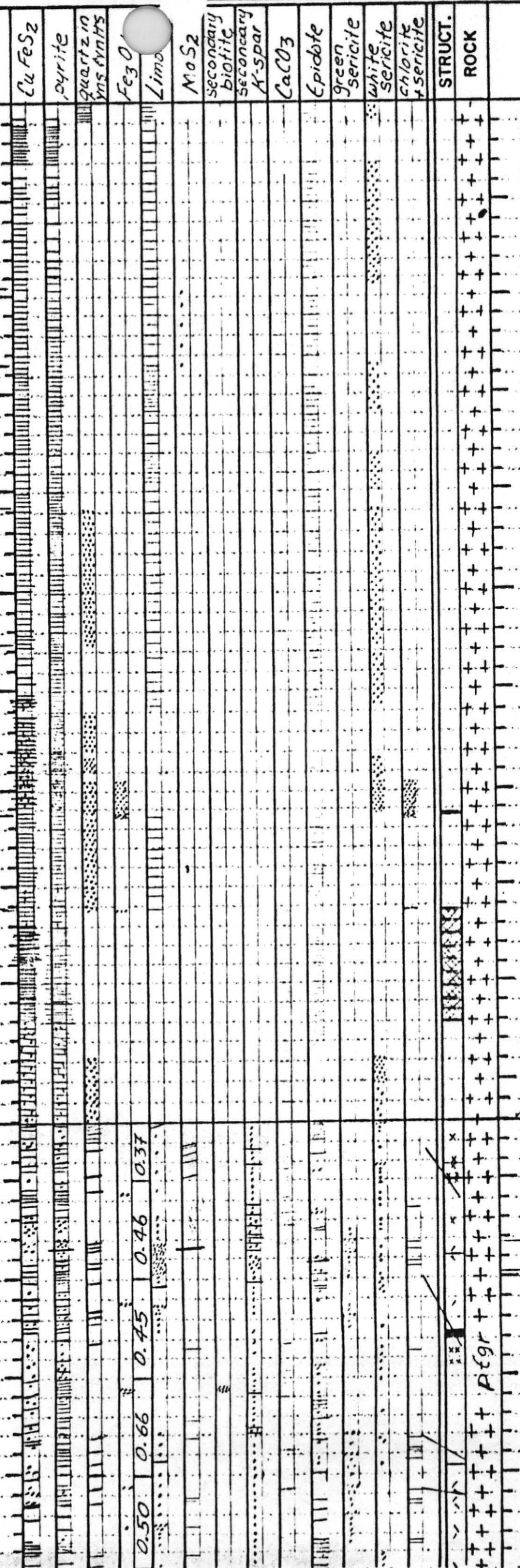
trace cuprite (?) along some fractures.

trace cuprite (?) along some nearly vertical fractures.

150' = 0.1997 % Copper + 0.0040 % Molubdenum = 0.2197 % Copper equiv. 1.497 % total sulfide py : cp = 1.6 : 1.0

trace cuprite (?) along some fractures.

pyrite and chalcopyrite occur mostly in veinlets as does weak molybdenum. Disseminations are secondary. True veins are absent.



Summary Lithology & Alteration Log

Plagioclase altered to sericite (55%), epidote (2%), K-spar (1%), chlorite (1%), quartz (1%) plus a trace of hematite. K-spar altered to sericite (5%), secondary K-spar (7%), chlorite (3%), quartz (3%), Carbo[nate] (1%) plus a trace of epidote & hematite. Biotite altered to chlorite (65%), epidote (5%), sericite (2[%]) and carbonate (2%). Alteration assemblage nearly identical to that described above wi[th] a slight decrease in the amount of sericite & a slight increase in the amount of secondary K-spar. Weak to moderate PROPYLITIC (approximately 40% of the susceptible minerals are altered. Marked increase in total sulfides, copp[er] and molybdenum in this zone as compared to the zone above.

NOTE: all alteration descriptions above taken from thin section descriptions only.

strong limonite staining of plagioclase (sericitized).

LENGTH	% Fe_3O_4 (comp.)	Cu	Mo	S	calc. wt. % sulfide	py/cp
2500	0.53	.0236	.0023	.2014	0.400	4.9
2700–2800	0.31	.0238	.0008	.4423	0.852	11.4
2900	1.00	.0075	.0011	.2872	0.545	24.2

Depth scale: 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000

Columns: chalcopy, pyrite, quartz in vns/vnlts, Fe_2O_3, Limo, MoS_2, secondary biotite, secondary K-spar, $CaCO_3$, Epidote, green sericite, white sericite, chlorite & sericite, STRUCT., ROCK

Fe_2O_3: 0.58, 0.67, 0.64, 0.39, 0.49, 0.54, 0.59, 0.51, 0.32, 0.76, 0.41, 0.46, 0.34, 0.43, 1.20 (low magnetite zone)

Miscellaneous

2', approximately 13% pyrite (by weight) in coarse blebs throughout rock.

pyrite and chalcopyrite in disseminations and veinlets (approx. equal). Molybdenum weak - generally along veinlets. Pyrite to chalcopyrite ratio increases from that above. Total sulfides decrease.

73 ppm zinc (compared to 28 ppm above and 32 ppm below).

2697' reduced to BX wireline

10', approximately 4% (wt) pyrite in breccia - crystals common.

pyrite common in fine disseminations much more common than in veinlets. Chalcopyrite in disseminated equal to veinlets. Molybdenum generally absent except occassionally discontinuously along quartz veins.

Chalcopyrite extremely rare. Pyrite in veinlets and disseminated (approx equal). Numerous quartz veins generally barren. Molybdenum generally absent.

Summary Lithology & Alteration Log

Plagioclase is generally fresh to weakly altered to white sericite, locally strongly to green sericite - a trace of secondary K-spar occurs throughout the interval along rims of some plagioclase grains. K-spar generally fresh to weak incipient recrystalliz tion to secondary K-spar. Secondary biotite generally absent. Carbonate weak to moderate along fractures and infrequent veins. Epidote common & locally strong in rock matrix & as alteration of mafics. 70% of susceptible minerals are altere moderate to strong. PROPYLITIC?

Moderate - strong development of epidote.

2400-2665: Chlorite along fractures common

Moderate alteration of plagioclase to white sericit decrease in epidote abundance.

Plagioclase usually completely altered to green sericite. K-spar generally altered, partially to completely to sericit chlorite. Carbonate relatively common - some of which replaces plagioclase (in trace amounts). Noticeable increase in limonite (brick red) along fractures. To sulfides increased by 2X from that above or bel Magnetite is low & has apparently been destroyed Increase in white sericite alteration of plagioclas immediately above and below zone. Gouge, broken brecciated rock more common than above or below Possible fault zone (or sheared zone).

* green ... probably ... sericite - chlorite mixture ... secondary K-spar ... Moderate alteration. 85% of susceptible minerals altere

2810-2820: *intimate mixture of Precambrian Oracle Grani and Tertiary-Cretaceous Melanocratic Rhyodacite Porph corroded quartz phenocrysts up to 0.3 inch and plagioclase phenocrysts up to 0.1 inch (which are weakly to strongly alt to sericite and minor clay occur in a fine-grained, poorly defined groundmass of abundant secondary biotite, quar K-feldspar & rare epidote; approximately 0.8% magnetite abundant fine grained disseminated pyrite are presen*

2931-2935 / 2961-2962] *Tertiary-Cretaceous Melanocratic Rhyodacite Porphyry; see description immediately ab*

Strong development of secondary K-spar, secondary bio and quartz (barren) veining. Sudden and marked decr in epidote and sericite (white & green), and chalcopy Marked increase in pyrite-chalcopyrite ratio. Inc only non-Precambrian granitic rocks seen in hole. overall moderate POTASSIC? (70% of susceptible minerals altered)

2996-3014: Precambrian (?) Fine Grained Diabase

PROJECT KELVIN DRILL HOLE NO. J-2 SCALE 1"=100' PAGE NO. 5 OF 5

LENGTH	% Fe_3O_4 comp	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp	Miscellaneous
							3014 feet is total length
							2018-3014 logged by: J.P.VROMAN
							collar location: approximately 1000' FSL & 3000' FWL, section 9, T.4.S., R.13 E., Pinal Co., Arizona. Collar elevation: approx. 2080'. Inclination: -90° (acid survey at 1987' = -85° ±).
							Drilling Contractor: Joy Manufacturing Co.
							Average Footage/Shift: 13.0 Direct Drilling Cost: 10.86 /ft casing lost in hole: .99 /ft Mud, additives, water: .92 /ft reaming, cleaning, standby: .78 /ft set & pull casing .67 /ft Assaying .61 /ft Splitting .22 /ft Thin sections .06 /ft TOTAL $15.10 /ft
							CASING LEFT IN HOLE: 0-40' = 40' NX 2000-2697 = 697' BX cut at 2600, 2400' & 2200'
							date started: 30 AUG 1974 date completed (2018') 31 OCT 74 date re-entered: 9 NOV 1976 date completed (3014) 21 DEC 1976
							HOLE SIZE: 0-40': 4 1/2 inch rock bit 40-2697': NX wireline core 2697-3014': BX wireline core

Cu Fe S2 | pyrite | quartz in vns & volts | Fe3O4 | Limon | Mo S2 | secondary biotite | secondary K-spar | Ca CO3 | Epidote | green sericite | white sericite | chlorite & sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

contains 4.46% disseminated magnetite.

CITIES SERVICE MINERALS CORP. KELVIN PROJECT - PINAL CO. ARIZONA HOLE J-2 ALL VALUES HAVE BEEN SMOOTHED USING A FIVE POINT WEIGHTED RUNNING AVERAGE

LENGTH

MOLYBDENUM (PPM) 0 50 100 150

COPPER (PERCENT) 0 0.1 0.2 0.3 0.4

SULFUR (PERCENT) 0 1 2 3

MAGNETITE (VOL PERCENT) 0 1 2 3

ZINC (PPM) 0 100 200 300

PYRITE ÷ CHALCOPYRITE .33 .5 1 5 10 15 20

400
800
1200
1600
2000
2400
2800
3014

J.P. YROMAN 23 MAR 77

Py = 5.0 (.54)

AMP.S EFFICIENCY LINE NO. 6838

KELVIN PROJECT

PAGE 1 of 2

0-2018 feet completed 20 Oct. 75

	ASSAY	%Cu × 2.8885	%Cu × 1.00925	ASSAY	Column 4 minus Column 3	Column 5 × 1.871	column 2 + column 6	column 6 ÷ column 2	ASSAY		ASSAY		
interval	1 % Cu	2 wt % cp	3 % S in Cp.	4 % S	5 % S in py	6 wt % py	7 TOTAL SULFIDES	8 py / cp	9 % Mo	10 % Fe_3O_4	11 % Zn	12	13
45-100 1	.0020	.0058	.0020	.10	.0980	.183	.19	31.6	.0002	.69	.0059	0-1300 feet	
100-150 2	.0070	.0202	.0071	.02	.0129	.024	.04	1.2	.0003	.57	.0065	.0047 % copper	
150-200 3	.0018	.0052	.0018	.04	.0382	.071	.08	13.7	.0003	.76	.0064	.0136 wt % chalcop	
200-250 4	.0184	.0531	.0186	.88	.8614	1.612	1.66	30.4	.0007	.29	.0130	.0087 vol % "	
250-300 5	.0207	.0598	.0209	.84	.8191	1.533	1.59	25.6	.0003	.01	.0104	.1850 wt. % pyrit	
300-350 6	.0034	.0098	.0034	.06	.0566	.106	.12	10.8	.0002	.42	.0023	.1000 vol. % "	
350-400 7	.0018	.0052	.0018	.12	.1182	.221	.23	42.5	.0002	.41	.0051	.1986 wt % sulfid	
400-450 8	.0014	.0040	.0014	.03	.0286	.054	.06	13.5	<.0001	.65	.0033	.1087 vol. % "	
450-500 9	.0018	.0052	.0018	.02	.0182	.034	.04	6.5	<.0001	.55	.0046	py : cp = 13.6 : 1.0	
500-550 10	.0030	.0087	.0030	.02	.0170	.032	.04	3.7	<.0001	.27	.0068	0.41 % magnetite	
550-600 11	.0026	.0075	.0026	.04	.0374	.070	.08	9.3	.0002	.59	.0027	.0002 % molybden	
600-650 12	.0026	.0075	.0026	.02	.0174	.033	.04	4.4	.0005	.05	.0045	.0063 % Zinc	
650-700 13	.0021	.0061	.0021	.02	.0179	.033	.04	5.4	.0005	—.—	.0053		
700-750 14	.0036	.0104	.0036	.03	.0264	.049	.06	4.7	.0003	1.13	.0072		
750-800 15	.0021	.0061	.0021	.02	.0179	.033	.04	5.4	.0003	.42	.0047		
800-850 16	.0025	.0072	.0025	.01	.0075	.014	.02	1.9	.0001	.43	.0036		
850-900 17	.0121	.0350	.0122	.12	.1078	.202	.24	5.8	<.0001	.04	.0112		
900-950 18	.0040	.0116	.0040	.02	.0160	.030	.04	2.6	.0001	.31	.0033		
950-1000 19	.0020	.0058	.0020	.03	.0280	.052	.06	9.0	<.0001	.86	.0070		
1000-1050 20	.0070	.0202	.0071	.04	.0329	.062	.08	3.1	<.0001	.27	.0033		
1050-1100 21	.0015	.0043	.0015	.02	.0185	.035	.04	8.1	<.0001	.57	.0041		
1100-1150 22	.0016	.0046	.0016	.02	.0184	.034	.04	7.4	<.0001	.23	.0107		
1150-1200 23	.0057	.0165	.0058	.01	.0042	.008	.02	.48	<.0001	.00	.0073		
1200-1250 24	.0010	.0029	.0010	.04	.0390	.073	.08	25.1	<.0001	.38	.0012		
1250-1300 25	.0058	.0168	.0059	.02	.0141	.026	.04	1.5	<.0001	.42	.0032		
1300-1350 26	.0529	.1528	.0534	.22	.1666	.312	.46	2.0	<.0001	.26	.0047	1300-2680	
1350-1400 27	.2042	.5898	.2061	.72	.5139	.962	1.55	1.6	<.0001	.09	.3700	.0727 % Copper	
1400-1450 28	.0151	.0436	.0152	.04	.0248	.046	.09	1.1	.0008	.25	.0034	.2100 wt % chalcop	
1450-1500 29	.0725	.2094	.0732	.14	.0668	.125	.33	.60	.0008	.39	.0035	.1344 vol % "	
1500-1550 30	.1954	.5644	.1972	.50	.3028	.567	1.13	1.0	.0010	.55	.0030	.5576 wt % pyrit	
1550-1600 31	.0166	.0479	.0168	.20	.1832	.343	.39	7.2	.0013	.41	.0032	.3011 vol % "	
1600-1650	.0547	.1580	.0552	.48	.4248	.795	.95	5.0	.0013	.00	.0019	.7687 wt % sulfid	
1650-1700	.0321	.0927	.0324	.46	.4276	.800	.89	8.6	.0002	.29	.0013	.4355 vol % sulfi	
												py : cp = 2.7 : 1.0	
												.0020 % molybden	
												0.41 % magnetite	

AMPAD EFFICIENCY LINE NO. 6636

KELVIN PROJECT: CSMC HOLE J-2
PAGE 2 of 2
2018 - 3014 feet completed 18 Jan 77

Interval	ASSAY 1 % Cu	2 wt % Cp.	3 % S in Cp	ASSAY 4 % S	5 % S in py	6 wt % py	7 TOTAL SULFIDES	8 py/cp	ASSAY 9 % Mo	10 % Fe_3O_4	ASSAY 11 % Zr	12	13
1700-1750 1	.0259	.0748	.0261	1.04	1.0139	1.897	1.97	25.4	.0010	.41	.0036		
1750-1800 2	.0644	.1860	.0650	.46	.3950	.739	.93	4.0	.0017	.38	.0025		
1800-1850 3	.2540	.7337	.2563	.76	.5037	.942	1.68	1.3	.0022	.52	.0028		
1850-1900 4	.0956	.2761	.0965	.60	.5035	.942	1.22	3.4	.0037	.42	.0017		
1900-1950 5	.2494	.7204	.2517	.72	.4683	.876	1.60	1.2	.0062	.02	.0046		
1950-2000 6	.1045	.3018	.1055	.40	.2945	.551	.85	1.8	.0046	.13	.0020		
2000-2040 7	.0739	.2135	.0746	.3970	.3224	.603	.82	2.8	.0018	.39	.0033		
2040-2080 8	.0758	.2189	.0765	.3750	.2985	.558	.78	2.6	.0014	.48	.0032		
2080-2120 9	.0510	.1473	.0515	.5820	.5305	.993	1.14	6.7	.0024	.48	.0026		
2120-2160 10	.0382	.1103	.0386	.3310	.2924	.547	.66	5.0	.0028	.51	.0025		
2160-2200 11	.0414	.1196	.0418	.3470	.3052	.571	.69	4.8	.0009	.60	.0026		
2200-2240 12	.0747	.2158	.0754	.3180	.2426	.454	.67	2.1	.0018	.48	.0020		
2240-2280 13	.0624	.1802	.0630	.1650	.1020	.191	.37	1.1	.0023	.57	.0025		
2280-2320 14	.0812	.2345	.0820	.1670	.0850	.159	.39	.68	.0028	.67	.0016		
2320-2360 15	.0222	.0641	.0224	.1860	.1636	.306	.37	4.8	.0012	.64	.0023		
2360-2400 16	.0282	.0815	.0285	.3710	.3425	.641	.72	7.9	.0100	.63	.0024		
2400-2440 17	.0282	.0815	.0285	.1655	.1370	.256	.34	3.1	.0021	.36	.0066		
2440-2480 18	.0233	.0673	.0235	.1435	.1200	.224	.29	3.3	.0012	.43	.0029		
2480-2520 19	.0177	.0511	.0179	.1105	.0926	.173	.22	3.4	.0011	.58	.0024		
2520-2560 20	.0210	.0607	.0212	.0925	.0713	.133	.19	2.2	.0010	.56	.0023		
2560-2600 21	.0345	.0996	.0348	.3400	.3052	.571	.67	5.7	.0024	.58	.0021		
2600-2640 22	.0232	.0670	.0234	.3310	.3076	.576	.64	8.6	.0012	.52	.0023		
2640-2680 23	.0140	.0404	.0141	.0725	.0584	.109	.15	2.7	.0007	.46	.0019		
2680-2720 24	.0429	.1239	.0433	.3522	.3089	.578	.70	4.7	.0008	.16	.0034	2680-2840	
2720-2760 25	.0175	.0505	.0177	.5870	.5693	1.065	1.12	21.1	.0007	.13	.0150	.0238 % copper .0008 % molybden	
2760-2800 26	.0128	.0370	.0129	.2460	.2331	.436	.47	11.8	.0007	.48	.0037	.31 % magnetit .852 % (wt) sulfid	
2800-2840 27	.0218	.0630	.0220	.5840	.5620	1.052	1.12	16.7	.0008	.48	.0072	py:cp = 11.4:1 .0077 % Zn	
2840-2880 28	.0080	.0231	.0081	.0990	.0909	.170	.19	7.4	.0006	.27	.0024	2840'-3014'	
2880-2920 29	.0076	.0219	.0077	.4100	.4023	.753	.77	34.4	.0011	.34	.0023	.0075 % copper	
2920-2960 30	.0067	.0194	.0068	.3400	.3332	.623	.64	32.1	.0010	.61	.0022	.0011 % molybdenu	
2960-3014 31	.0075	.0217	.0076	.3000	.2924	.547	.57	25.2	.0015	2.39	.0061	1.00 % magnetite	
												0.43% " (w/o diab	
												.0032% Zn	

AMAX EFFICIENCY® LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-Z

FIVE POINT WEIGHTED RUNNING AVERAGES

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5	6 wt. % py	7 Py/Cp	8	9	10 Vol % Cp (Cu x 1.8363)	11 Vol % py (wt Py x 0.532)	12 Vol % Fe_3O_4	13 Mc
45-100 1	.0036	.0002	.0062	.067		.1186	11.4			.0066	.0631	.658	11.8
100-150 2	.0054	.0003	.0069	.117		.2087	13.4			.0099	.1110	.624	11.2
150-200 3	.0083	.0004	.0082	.295		.5362	22.3			.0152	.2853	.545	12.7
200-250 4	.0131	.0004	.0096	.548		1.0005	26.4			.0241	.5323	.365	13.8
250-300 5	.0133	.0004	.0086	.552		1.0076	26.2			.0244	.5361	.258	12.3
300-350 6	.0080	.0003	.0061	.315		.5742	24.8			.0147	.3055	.331	9.8
350-400 7	.0035	.0002	.0046	.133		.2422	24.0			.0064	.1289	.448	7.0
400-450 8	.0019	.0001	.0043	.050		.0900	16.4			.0035	.0479	.525	7.9
450-500 9	.0020	.0001	.0040	.032		.0561	9.7			.0037	.0298	.501	8.0
500-550 10	.0025	.0002	.0049	.025		.0421	5.8			.0046	.0224	.421	6.7
550-600 11	.0026	.0003	.0044	.028		.0475	6.3			.0048	.0253	.372	6.0
600-650 12	.0026	.0004	.0047	.025		.0419	5.6			.0048	.0223	.342	5.5
650-700 13	.0026	.0004	.0053	.024		.0400	5.3			.0048	.0213	.569	8.9
700-750 14	.0027	.0003	.0057	.023		.0379	4.9			.0050	.0202	.739	11.5
750-800 15	.0033	.0003	.0056	.028		.0462	4.8			.0061	.0246	.568	9.0
800-850 16	.0044	.0002	.0063	.040		.0665	5.2			.0081	.0354	.382	6.4
850-900 17	.0065	.0001	.0081	.057		.0944	5.0			.0119	.0502	.285	4.3
900-950 18	.0055	.0001	.0085	.046		.0757	4.8			.0101	.0403	.381	6.5
950-1000 19	.0044	.0001	.0078	.036		.0590	4.6			.0081	.0314	.512	8.3
1000-1050 20	.0039	.0001	.0073	.030		.0488	4.3			.0072	.0259	.475	7.6
1050-1100 21	.0032	.0001	.0073	.025		.0407	4.4			.0059	.0217	.400	6.4
1100-1150 22	.0029	.0001	.0081	.021		.0338	4.0			.0053	.0180	.270	4.4
1150-1200 23	.0034	.0001	.0071	.021		.0329	3.3			.0062	.0175	.217	3.6
1200-1250 24	.0072	.0001	.0046	.041		.0631	3.0			.0132	.0336	.281	4.9
1250-1300 25	.0308	.0001	.0318 36	.124		.1738	2.0			.0566	.0925	.316	7.0
1300-1350 26	.0700	.0002	.0883 38	.262		.3580	1.8			.1285	.1905	.266	8.8
1350-1400 27	.1003	.0003	.1447	.349		.4636	1.6			.1841	.2466	.215	9.7
1400-1450 28	.0888	.0006	.0881 34	.120		.0568	.22 4.5			.1630	.0302	.269	6.9
1450-1500 29	.0934	.0008	.0315 32	.249		.2895	1.1			.1715	.1540	.373	10.5
1500-1550 30	.1011	.0010	.0029	.311		.3910	1.3			.1856	.2080	.415	12.1
1550-1600 31	.0721	.0011	.0024	.349		.5168	2.5			.1324	.2749	.337	11.2
1600-1650	.0493	.0010	.0022	.455		.7582	5.3			.0905	.4033	.235	10.9
1650-1700	.0372	.0008	.0023	.578		1.0111	9.4			.0683	.5379	.267	13.1

EFFICIENCY, LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-2

FIVE POINT WEIGHTED RUNNING AVERAGES

Cu x 1.8363

INTERVAL	1 %Cu	2 %Mo	3 %Zn	4 %S	5	6 wt % py	7 py/cp	8	9	10 vol % cp	11 vol % py	12 vol % Fe_3O_4	13 Mc
1700-1750 1	.0560	.0011	.0027	.703		1.2095	7.5			.1028	.6435	.352	16.5
1750-1800 2	.0992	.0017	.0027	.674		1.0737	3.7			.1822	.5712	.391	17.2
1800-1850 3	.1558	.0026	.0027	.672		.9631	2.1			.2861	.5123	.418	18.2
1850-1900 4	.1659	.0038	.0027	.562		.7382	1.5			.3046	.3927	.325	15.3
1900-1950 5	.1673	.0046	.0031	.597		.8010	1.7			.3072	.4261	.205	14.1
1950-2000 6	.1280	.0040	.0030	.487		.6694	1.8			.2350	.3561	.214	12.1
2000-2040 7	.0931	.0027	.0030	.432		.6324	2.4			.1710	.3365	.329	12.5
2040-2080 8	.0690	.0021	.0029	.426		.6667	3.3			.1267	.3547	.435	13.7
2080-2120 9	.0548	.0021	.0028	.444		.7272	4.6			.1006	.3869	.489	14.6
2120-2160 10	.0476	.0021	.0026	.395		.6491	4.7			.0874	.3453	.519	14.3
2160-2200 11	.0507	.0018	.0024	.341		.5422	3.7			.0931	.2885	.540	13.8
2200-2240 12	.0619	.0019	.0023	.279		.4051	2.3			.1137	.2155	.545	13.1
2240-2280 13	.0649	.0021	.0022	.216		.2816	1.5			.1192	.1498	.580	12.7
2280-2320 14	.0587	.0028	.0021	.198		.2596	1.5			.1078	.1381	.622	13.0
2320-2360 15	.0408	.0038	.0025	.221		.3364	2.9			.0749	.1790	.618	13.1
2360-2400 16	.0305	.0049	.0033	.248		.4064	4.6			.0560	.2162	.558	12.5
2400-2440 17	.0258	.0036	.0041	.205		.3348	4.5			.0474	.1781	.477	10.5
2440-2480 18	.0233	.0017	.0036	.154		.2441	3.6			.0428	.1299	.474	9.7
2480-2520 19	.0219	.0013	.0028	.136		.2131	3.4			.0402	.1134	.524	10.2
2520-2560 20	.0237	.0014	.0023	.176		.2845	4.2			.0435	.1514	.556	11.3
2560-2600 21	.0259	.0016	.0022	.243		.4057	5.4			.0476	.2158	.552	12.2
2600-2640 22	.0250	.0013	.0022	.257		.4336	6.0			.0459	.1873	.495	10.9
2640-2680 23	.0246	.0010	.0034	.257		.4344	6.1			.0452	.2311	.383	10.0
2680-2720 24	.0265	.0008	.0057	.332		.5711	7.5			.0487	.3038	.275	9.4
2720-2760 25	.0223	.0007	.0081	.414		.7324	11.4			.0409	.3897	.270	10.5
2760-2800 26	.0179	.0007	.0070	.400		.7146	13.8			.0329	.3801	.358	11.6
2800-2840 27	.0151	.0007	.0055	.381		.6843	15.7			.0277	.3640	.394	11.8
2840-2880 28	.0114	.0008	.0036	.313		.5641	17.1			.0209	.3001	.377	10.5
2880-2920 29	.0086	.0010	.0030	.327		.5955	24.0			.0158	.3168	.555	13.3
2920-2960 30	.0060	.0011	.0032	.327		.6005	34.6			.0110	.3194	.959	19.3
2960-3014 31	.0072	.0013	.0044	.326		.5963	28.7			.0132	.3172	1.569	23.5

	PLAGIOCLASE									K-spar									Mafics							
INTERVAL	ser	clay	K-spar	chl.	CO_3	Epi	qtz	hem		ser	clay	K-spar	chl	CO_3	Epi	qtz	hem.		ser.	clay	chl	CO_3	epi	qtz	Hbd	rut
0-200 1	10	40	—	2	5	1	—	—	60	—	2	—	T	—	1	—	—	5 45	—	—	30	1	15	—	—	—
200-1350 2	55	2	T	5	2	3	T	T	65	10	2	T	3	2	T	2	T	20 75	15	T	50	T	10	T	T	T
1350-2120 3	55	T	1	1	—	2	T	T	60	5	—	10	3	T	T	2	T	20 75	2	—	65	2	5	—	—	—
2120-3014 4	50	—	10	5	3	—	T	T	70	10	—	75	5	T	1	1	1	90 65	20	—	40	1	1	—	T	T
5																										
6																										
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10																										
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12																										
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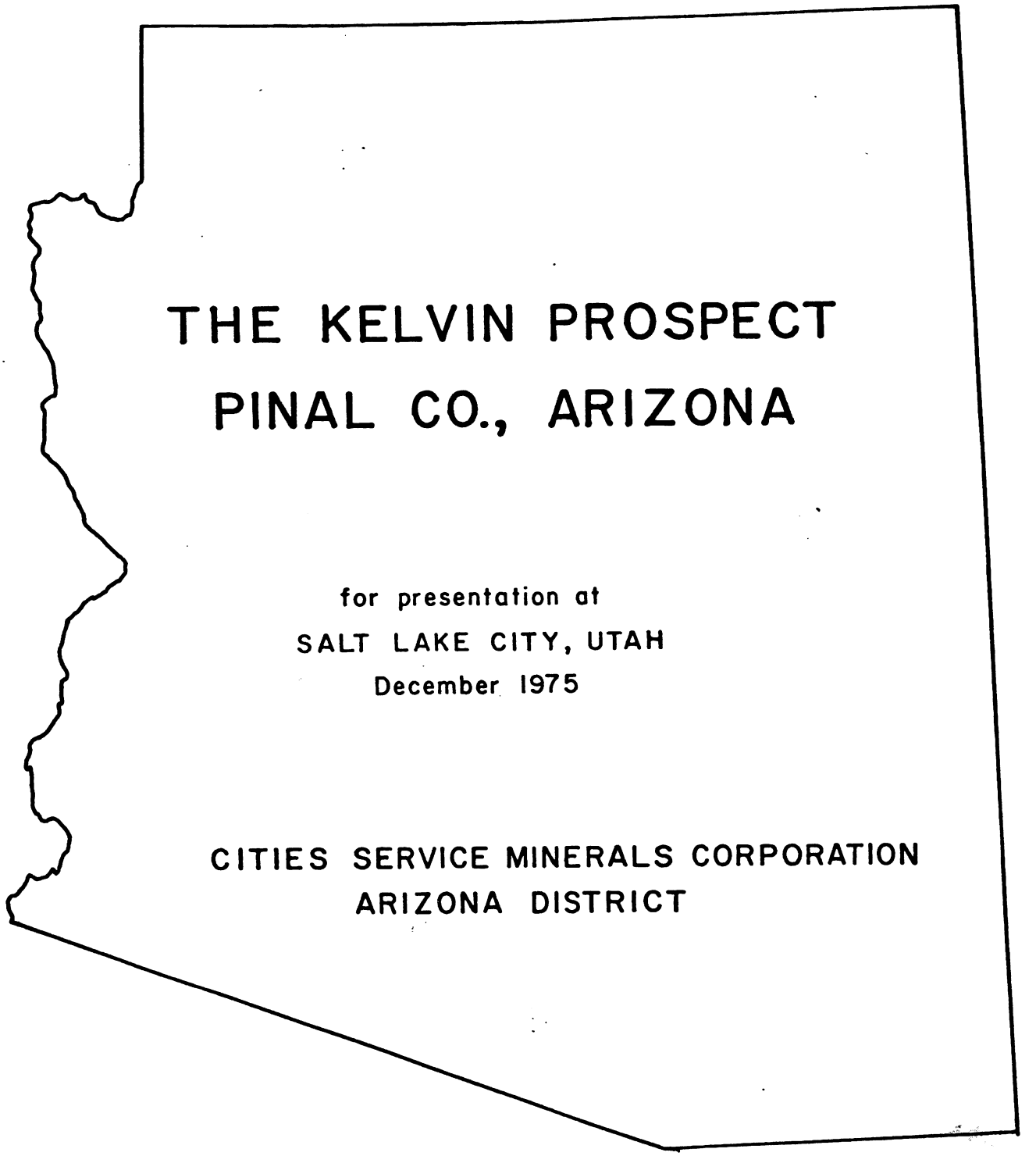
16																										
17																										
18																										
19																										
1350-2018 20	56		1	1		2	1	T		5		7	3	1	T	3	T		2		66	2	4			
21																										
22																										
23																										
24																										
25																										
0-200 26	10	40	—	2	5	1			58 3		2		T		1						30	1	15			
200-1350 27	55	2	T	5	2	3	T	T	65 20	10	2	T	3	2	T	2	T	75	15	T	50	T	10	T		
1350-2320 28	49	T	1	T		1	T	T	80 17	4		10	2	T	T	2	T	97	2		60	1	5			
2320-2680 29	60		8	8	8				84 8	2		88	T	T				98	14		52	2				
2680-2840 30	53		10	4			1	2	10 95	22		56	15		2		2	71	37		39		1			
2840-3014 31	29		12	2	2				45 10			97	1			2		45	20	5	39	1				

HOLE J-2

Depth	Rock	No.	PLAGIOCLASE ser	qtz	clay	CO_3	K-spar	biot	actin	chl.	epi	hem	K-SPAR ser	qtz	clay	Sec. K-sp.	chl.	epi	CO_3	hem	mic/perthite	other	MAFICS musc	chl	bi	CO_3	clay	other
71	Yr	1	10		25	10					2						Tr				m			55	30	5		
104	Yr	2	10		70	.				10					10						m			5	2			
137	Yr	3	20		40	10															m			35	5			
155	Yr	4	10		30						1							:5			m			30	20			
223	Yr	5	80		?					20			80		?		20				m			80	2			
264	Yr	6	80		10					2			10?	30	10?		20						100					
324	Yr	7	50			5				4					5						m	15 albite	5	50	20		5	5qtz
375	Yr	8	35		5						9			1				T						50	20			
449	Yr	9	30							1	5												✓	42	10			
528	Yr	10	95	2	8							1	2	2						10	m		70					
591	Yr	11	30		10	10					2		30		10			2	10		m			50	12			[illegible]
705	Yr	12	30			5					8							1	1					8				
815	Yr	13	35							2	8			5							m			70	30			
863	Yr	14	85							15														80		5		
919	Yr	15	85			2				4	2		2						10				5	80	5			
1016	Yr	16	80							15			2						5					90				
1071	Yr	17	10			2				8	6					8		2			m			42	12			
1105	Yr	18	30		4?	5					8						2		5					35				
1142	Yr	19	90		?	5							5						5		m		50	50				
1274	Yr	20	40			5	4			10									2					90				5 rutile
1358	Yr	21	90							5			35	25									20	60				
1418	Yr	22	1								5						2	2						90	5			
1468	Yr	23	90		?												20		5					90		5		
1546	Yr	24	35				2									✓	T							45	10	10		
1652	Yr	25	50								8					35					m			45	12			
1776	Yr	26	25							✓	✓	✓									m			48	5			
1811	Yr	27	85										T				2			✓	m			80				
1847	Yr	28	95	5									5				2				m			90				Sulf
1970	Yr	29	35		?		5				✓	✓				25					m			50	8			
2058	Yr	30	20								✓	✓				15				✓	m		—	50	20			
2279	Yr	31	18.				4									30					m			11				
2332	Yr		80			5	✓						10			50					m			80				
2426	Yr		95		?	2	3									100							50	20				10 …
2450	Yr	1	30			30				30			2			90	1		1				20	40				4 sec bio
2528	Yr	2	25			5	15									100								40		10		10 …
2622	Yr	3	70				20			12						99								80				leuc actin
2735	Yr		30									8					70	10?	.	8			30	30				leuc rutile
2747	Yr		60				10			8			2			98								80				
2791	Yr	6	35				30						10			90							50	50				10 leuc 4 ruti…
2803	Yr	7	95	5									95										80		3			8K …
2823	Yr	8	15				10			10			2			94?	4						25	35				5 leuc 4 ru… 10 ma…
2859	Yr	9	12				15			5				5		93?	2						35	30				
2900	Yr	10	40				15			5						100							25	15		2		5 ruti…
2922	Yr	11	15		.	10	10							5		94?	1							80				90 bio 10 q…
2934	porphyry		18				m	5m		2						?.									10			5 ruti…
2975	Yr		50		?		10									100							20	30			20?	70 q… 10 bio
3003	db	14	8?		?			.	5							—												

SECTION 10



THE KELVIN PROSPECT
PINAL CO., ARIZONA

for presentation at
SALT LAKE CITY, UTAH
December 1975

CITIES SERVICE MINERALS CORPORATION
ARIZONA DISTRICT

J. P. VROMAN 11/75

The Kelvin Prospect is located in the northern portion of the Tortilla Mountains and the northeastern portion of Pinal Co., Arizona. Tucson is 60 miles south of the prospect and Miami is 23 miles to the north-northeast (figure 1).

The Kelvin Prospect is situated within the Ray-Sacaton structural belt which bisects Pinal Co., Arizona (figure 2). Other features of interest within this belt include Kennecott's Ray Mine, Conoco's Poston Butte mineral deposit and ASARCO's Sacaton Mine.

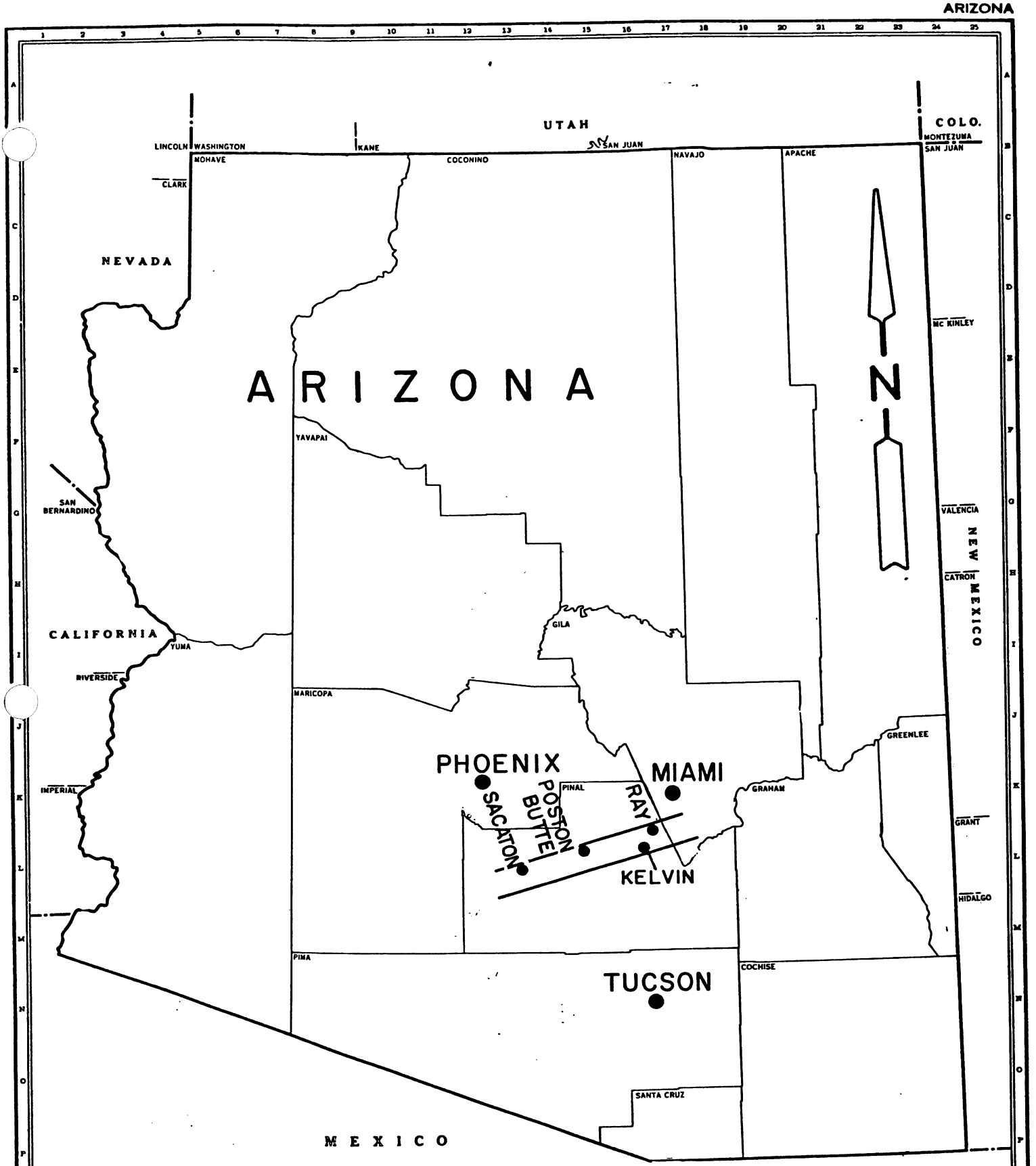
The Kelvin Prospect had been explored by several companies prior to C.S.M.C. interest in the property. During 1968-1969 Minbanco drilled nine relatively shallow holes. During 1969-1970 Tipperary Resources Corporation geologically mapped the prospect at a scale of 1 inch equals 200 feet; conducted a detailed induced polarization survey (figure 3) and drilled two rotary holes. During early 1972 Cyprus Mines drilled one angle core hole on the property. Kerr McGee was the last company to option the property prior to C.S.M.C. work. They drilled one 500 foot core hole and terminated their option.

During late 1973 and 1974 C.S.M.C. geologist reviewed all the accumulated geological and geophysical data from the Kelvin Prospect as well as more regional geologic data from the surrounding area. Several nearby outcrops (but not exposed in the immediate area of the prospect) indicated that the prospect area may have been tectonically disturbed since Laramide time and may have been rotated easterly up to 90 degrees (figure 4). The review of the induced polarization data indicated that there was a true anomaly present on the property and the strongest portion of the anomaly had never been tested by drilling. From this work C.S.M.C. geologist developed an exploration model shown in Figure 5.

With this model in mind C.S.M.C. obtained a land position on the most favorable ground (figure 6). The 1520 acres $\pm$ presently held by C.S.M.C. includes unpatented lode mining claims and one section of state land.

To date C.S.M.C. has drilled two core holes on the property. Hole J-1 was collared first (figure 7). Due to the need to complete assessment work requirements drilling at J-1 was temporarily suspended and the rig moved to J-2. After completion of hole J-2 (figure 8) the rig was moved to hole J-1 and the hole was drilled to completion at 2478 feet on January 3, 1975.

Hole J-2 (figure 8) penetrated 1350 feet of relatively barren rock before crossing a fault. Above the fault copper values averaged less than 50 ppm. Within the fault zone copper values increased to 0.16%. Below the fault 400 feet



LOCATION MAP SHOWING THE RAY - SACATON MINERAL & STRUCTURAL BELT IN SOUTH - CENTRAL ARIZONA

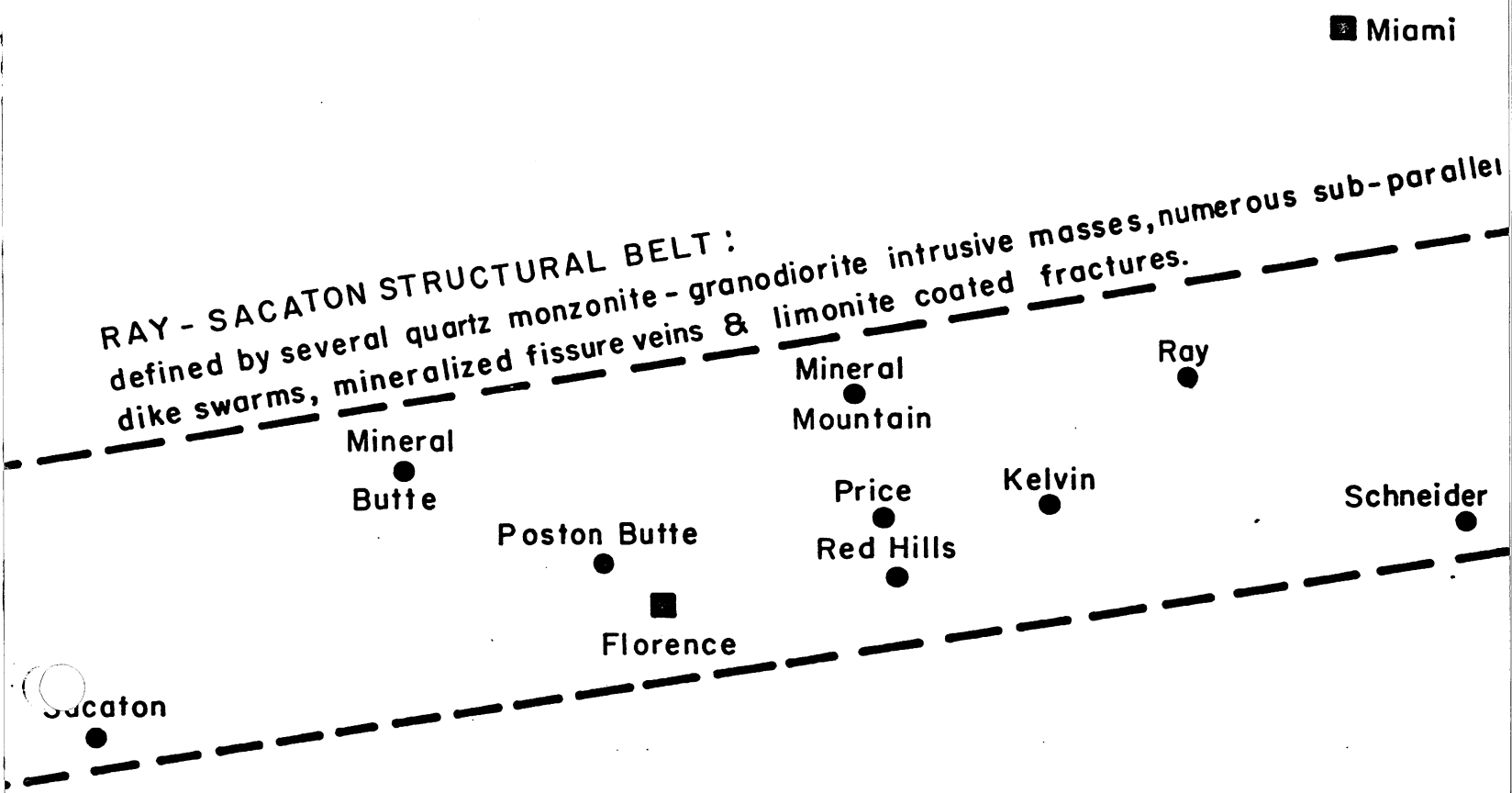
J. P. VROMAN 11/75

FIGURE 1

FILE NO.

CITIES SERVICE MINERALS CORPORATION

1" = 8 miles
or
SCALE 1:500,000
DATE 13 NOV 75
DRAWN BY J.P.V.



Major Production	Minor Production	Drilled By Cities Sub-marginal
Ray	Red Hills	Schneider
Sacaton		

Major Developing	Prospects
Poston Butte	Kelvin
	Price
	Mineral Butte
	Mineral Mountain

N

LOCATION MAP - KELVIN PROSPECT : PINAL CO., ARIZONA

TITLE — SKETCH NO.

FIGURE 2

of rock was penetrated that averaged o.06% copper. At 1780 feet ± a second fault was crossed. Rock below this fault averaged 0.17% copper. Trace amounts of molybdenum also increased as did total sulfide content.

Hole J-1 (figure 7) penetrated 1640 feet of rock averaging 0.06% copper. At 1640 feet a fault was crossed and the degree of alteration changed drastically. From 1640 feet to 1920 feet the rock averaged 0.15% copper. A second fault was crossed at 1920 feet. Immediately below this fault the rock was highly altered (strong phyllic) and 160 feet of rock was intercepted that averaged 0.66% copper. The entire interval below the lower fault (558 feet) averaged 0.23% copper. Included in this interval is 117 feet of barren post mineral (?) intrusive rock.

The results of this drilling and continued re-evaluation of all the existing data has caused us to modify our orignal ~~XXX~~ concept to some extent. The generalized geology as we interpret it today is shown in figure 9. You will immediately note the two north-south trending low angle faults that dip to the west. It is presently believed that the easternmost of the faults is the "major structure" penetrated by both holes J-1 and J-2. A section drawn NE-SW (figure 10) through these two holes reveals the importance of this fault to our future exploration effort.

C.S.M.C. Arizona District geologist now propose to explore this interesting area by drilling a third new hole (J-3) and by deepening of some some of the more strategic existing holes.

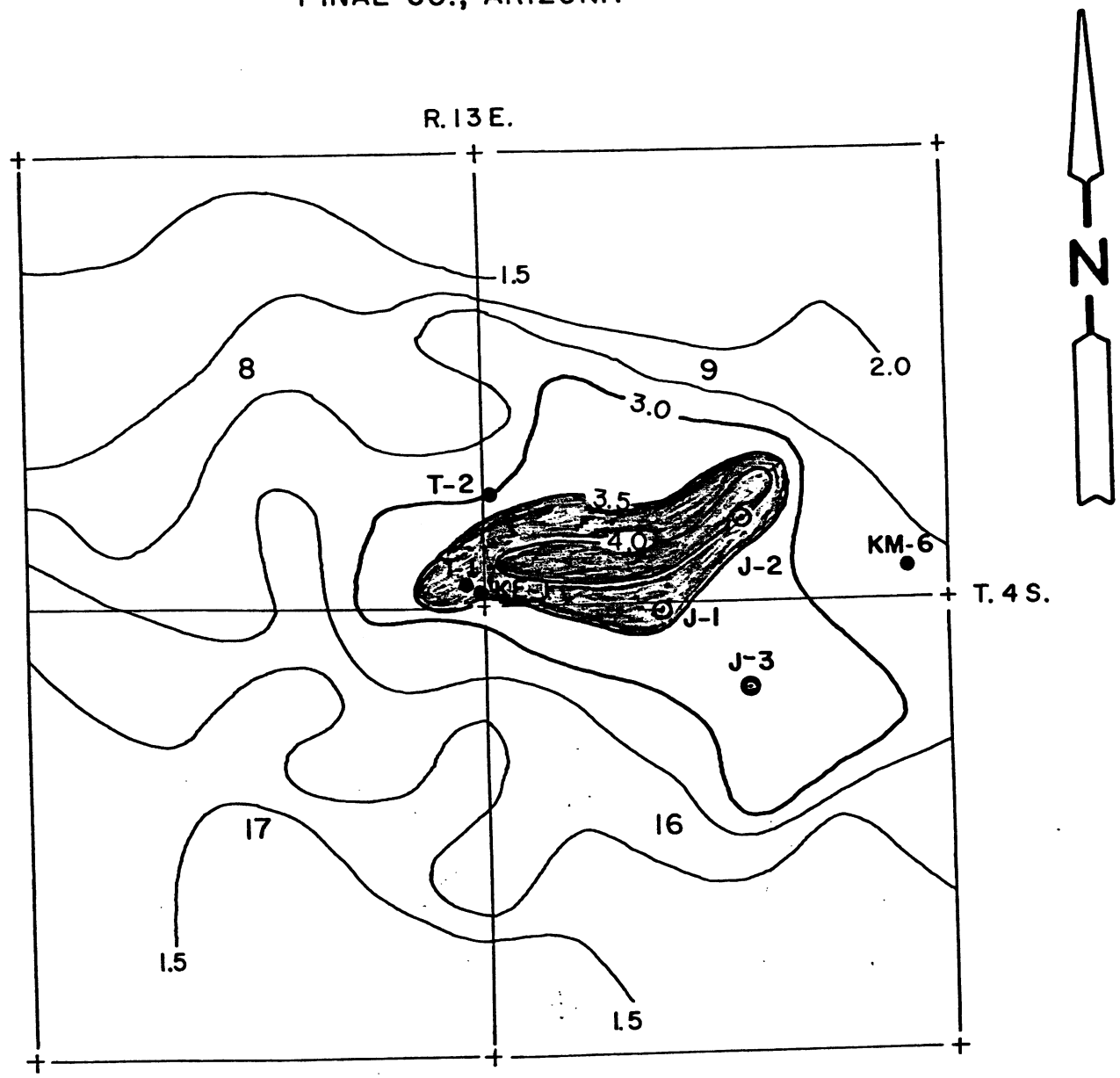
FILE NO.

CITIES SERVICE MINERALS CORPORATION

1"=2000'
or
SCALE 1:24,000
DATE 14 NOV 75
DRAWN BY Vroman

INDUCED POLARIZATION SURVEY

PINAL CO., ARIZONA



contour interval = 0.5 P.F.E.

● = drillhole existing prior to C.S.M.C. work
⊙ = C.S.M.C. drillhole
T = Tipperary Resources
KE = Cyprus
KM = Kerr McGee
J = C.S.M.C.

TITLE KELVIN PROSPECT - APPARENT PERCENT FREQUENCY EFFECT AT "n"=3 SKETCH NO.

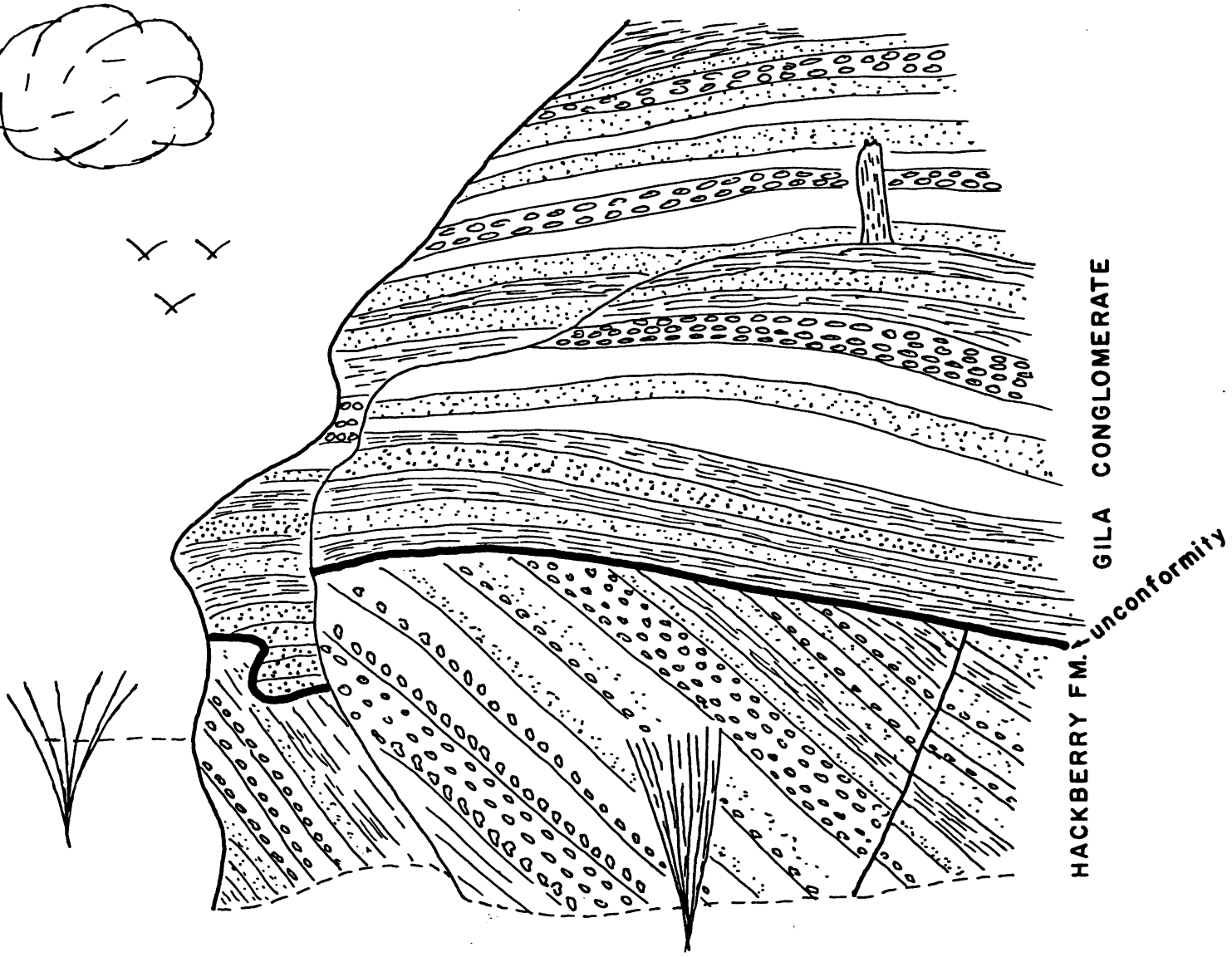
(P.F.E. over 3.0% in red)

FIGURE 3

FILE NO.

CITIES SERVICE MINERALS CORPORATION

SCALE 1" = 10'
DATE 14 NOV 75
DRAWN BY Vroman



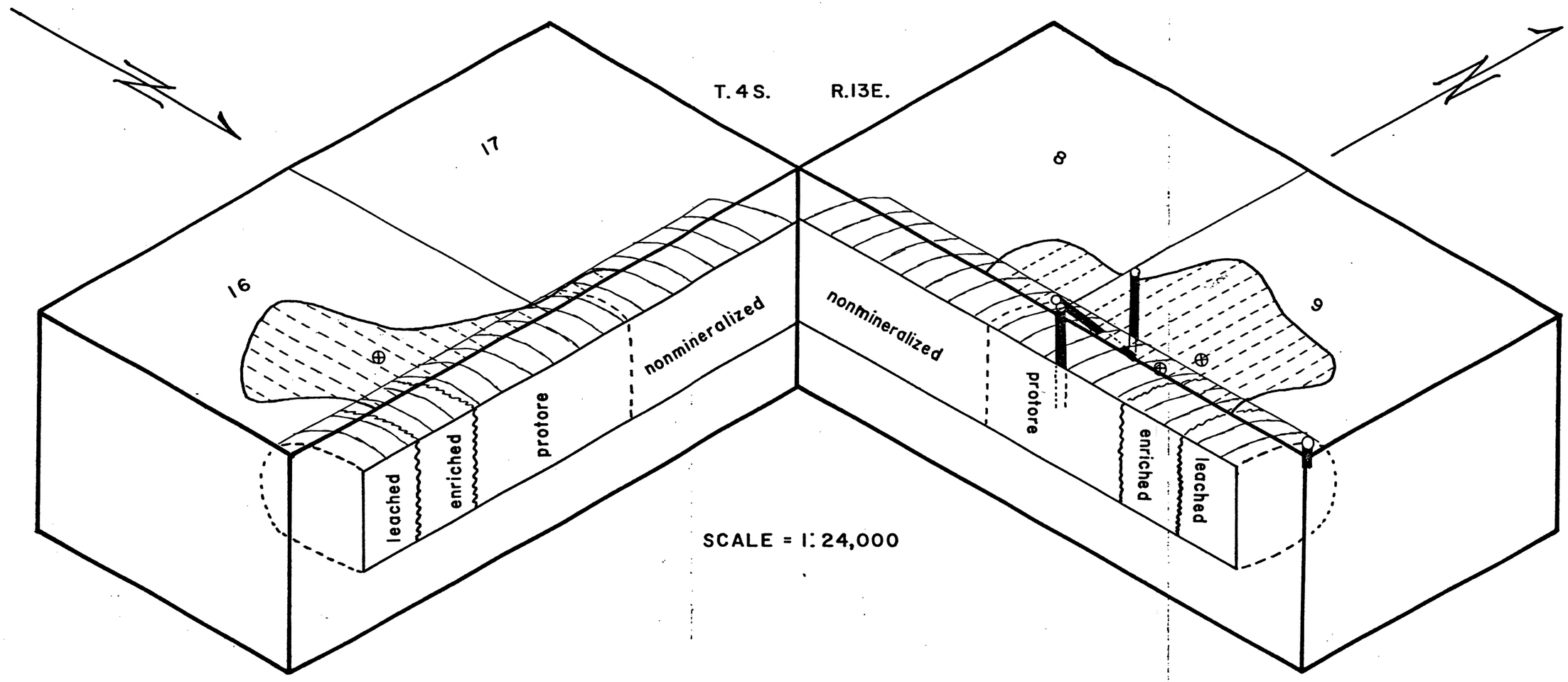
LINE DRAWING OF OUTCROP FOUR MILES
EAST-NORTHEAST OF CSMC DRILLHOLE J-1

Gently dipping Gila Conglomerate of upper Tertiary to Quaternary age unconformably overlies steep easterly dipping Hackberry Formation of middle miocene age (20-24 mybp). Fault in the Hackberry Formation is terminated at the unconformity.

TITLE KELVIN PROSPECT—PINAL CO., ARIZONA

SKETCH NO. FIGURE 4

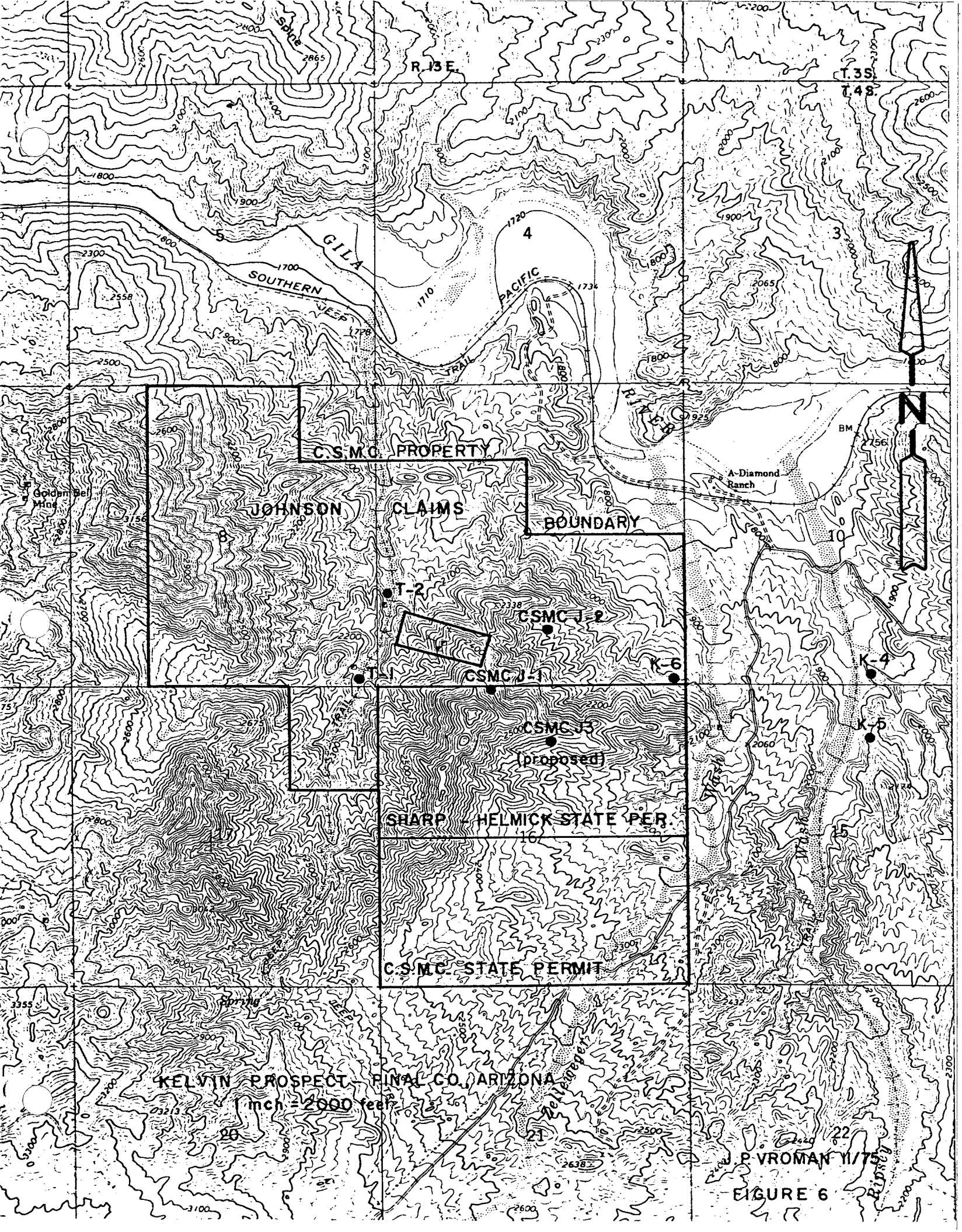
KELVIN PROSPECT - PINAL COUNTY, ARIZONA



SCALE = 1: 24,000

ISOMETRIC DIAGRAM SHOWING HYPOTHESIZED TARGET AT THE KELVIN PROSPECT - A CYLINDRICAL BODY OF LARAMIDE AGE QUARTZ MONZONITE HAS BEEN ROTATED TO THE EAST 60°-90° SINCE EMPLACEMENT AND IS PRESENTLY SURROUNDED BY THE ORACLE GRANITE OF PRECAMBRIAN AGE. INDUCED POLARIZATION ANOMALY ON THE SURFACE (red) INDICATES UNDERLYING SULFIDE ZONE. PAST DEEP DRILLING HAS BEEN TOO FAR WEST TO TEST THE MOST FAVORABLE PORTION OF THE TARGET. PROPOSED C.S.M.C. DRILLING SITES = ⊕.

FIGURE 5
J.P.V. 1 FEB 74


R. 13 E.
T. 3 S.
T. 4 S.
GILA
SOUTHERN
PACIFIC
JEEP
TRAIL
RIVER
C.S.M.C. PROPERTY
JOHNSON CLAIMS
BOUNDARY
Golden Bell Mine
A-Diamond Ranch
T-2
T-1
CSMC J-2
CSMC J-1
CSMC J-3
(proposed)
K-6
K-4
K-5
SHARP - HELMICK STATE PER.
C.S.M.C. STATE PERMIT
Spring
Wash
N
KELVIN PROSPECT - PINAL CO., ARIZONA
1 inch = 2000 feet
J. P. VROMAN 11/75
FIGURE 6

PROJECT Kelvin DRILL HOLE NO. J-1 SCALE 1" = 400' PAGE NO. 1 OF 1

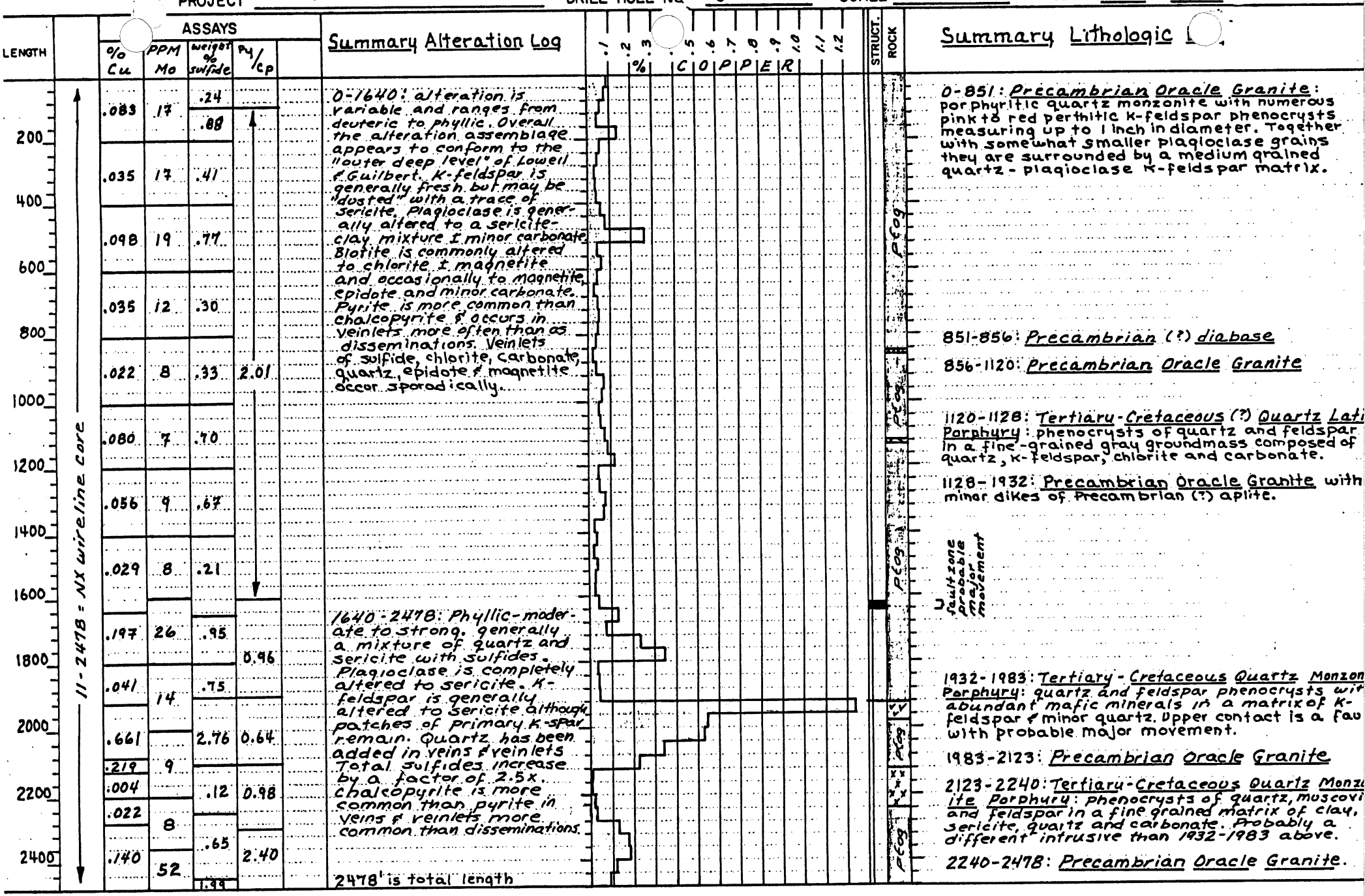


FIGURE 7

KELVIN PROSPECT - PINAL CO., ARIZONA
C.S.M.C. DRILLHOLE J-1

J.P. VROMAN 11/75

PROJECT Kelvin DRILL HOLE J-2 SCALE 1"= 400' PAGE NO. 1 OF 1

LENGTH	% Cu	PPM Mo	wt. % sulfide	py/cp
200	.0035	3	.10	
	.0110	4	1.62	
400	.0022	1		
600	.0026	4		
800			.07	13.6
	.0052	1		
1000	.0039			
1200	.0037	<1		
	.1594			
1400				1.29
	.0749		.72	
1600		10		
	.0443			8.18
1800				
	.1662	29	1.38	1.63
2000				

40 - 2018 = NX wireline core

Summary Alteration Log

0-2018: alteration is variable and generally increases in or near known sheared zones. Overall the alteration assemblage appears to conform to the "outer deep level" of Lowell & Guilbert. K-feldspar is generally fresh but may be "dusted" with a trace of sericite. Plagioclase is generally altered to a sericite-clay mixture ± minor carbonate. Biotite is commonly altered to chlorite ± magnetite and occasionally to epidote ± minor carbonate. Total sulfide content is extremely low but increases by a factor of 20x ± below the fault at 1300'. Other than the marked increase in sulfides there is no distinct change in alteration from above to below the fault.

2018' is total length

.1 .2 .3 .4 .5 .6 .7 .8 .9 1.0 1.1 1.2

% C O P P E R

STRUCT. ROCK

pCog

fault zones where major movement is indicated.

Summary Lithologic Log

0-2018: Precambrian Oracle Granite: porphyritic quartz monzonite with numerous pink to red perthitic K-feldspar phenocrysts measuring ½ to 1 inch in diameter. Together with somewhat smaller plagioclase grains they are surrounded by a medium grained quartz-plagioclase, K-feldspar matrix.

KELVIN PROSPECT - PINAL CO., ARIZONA

C.S.M.C. DRILLHOLE J-2

FIGURE 8

J.P. VROMAN 11/75

PROJECT Kelvin DRILL HOLE NO. J-1 SCALE 1" = 400' PAGE NO. 1 OF 1

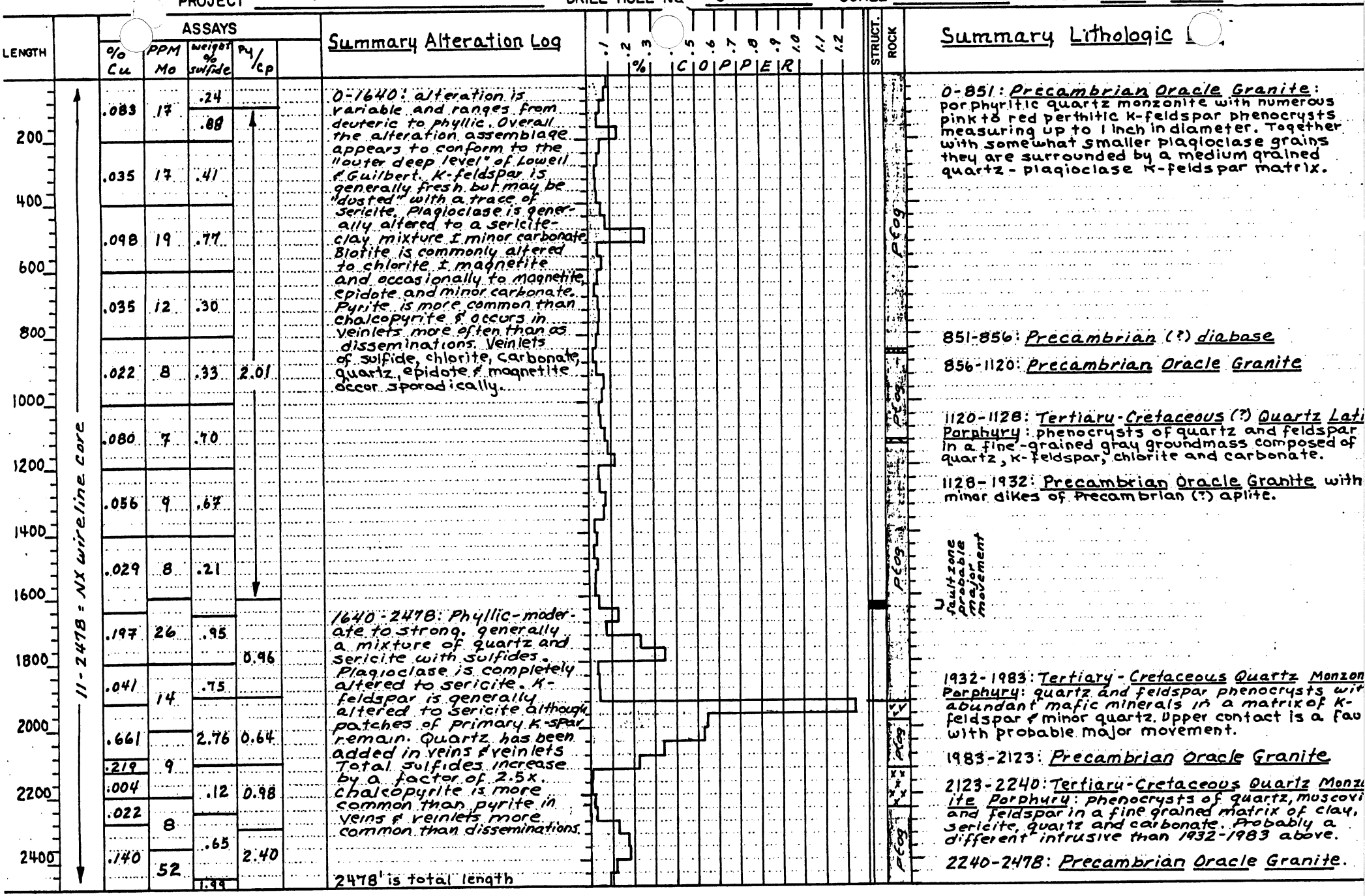


FIGURE 7

KELVIN PROSPECT - PINAL CO., ARIZONA
C.S.M.C. DRILLHOLE J-1

J.P. VROMAN 11/75

PROJECT Kelvin DRILL HOLE J-2 SCALE 1"= 400' PAGE NO. 1 OF 1

LENGTH	% Cu	PPM Mo	wt. % sulfide	py/cp
200	.0035	3	.10	
	.0110	4	1.62	
400	.0022	1		
600	.0026	4		
800			.07	13.6
	.0052	1		
1000	.0039			
1200	.0037	<1		
	.1594			
1400				1.29
	.0749		.72	
1600		10		
	.0443			8.18
1800				
	.1662	29	1.38	1.63
2000				

40 - 2018 = NX wireline core

Summary Alteration Log

0-2018: alteration is variable and generally increases in or near known sheared zones. Overall the alteration assemblage appears to conform to the "outer deep level" of Lowell & Guilbert. K-feldspar is generally fresh but may be "dusted" with a trace of sericite. Plagioclase is generally altered to a sericite-clay mixture ± minor carbonate. Biotite is commonly altered to chlorite ± magnetite and occasionally to epidote ± minor carbonate. Total sulfide content is extremely low but increases by a factor of 20x ± below the fault at 1300'. Other than the marked increase in sulfides there is no distinct change in alteration from above to below the fault.

2018' is total length

.1 .2 .3 .4 .5 .6 .7 .8 .9 1.0 1.1 1.2

% C O P P E R

STRUCT. ROCK

pCog

fault zones where major movement is indicated.

Summary Lithologic Log

0-2018: Precambrian Oracle Granite: porphyritic quartz monzonite with numerous pink to red perthitic K-feldspar phenocrysts measuring ½ to 1 inch in diameter. Together with somewhat smaller plagioclase grains they are surrounded by a medium grained quartz-plagioclase, K-feldspar matrix.

KELVIN PROSPECT - PINAL CO., ARIZONA

C.S.M.C. DRILLHOLE J-2

FIGURE 8

J.P. VROMAN 11/75

PROJECT KELVIN DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 1 OF 4

LENGTH	% Fe_3O_4 (comp.)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
0-50' By casing left in hole						
	0.27	.048	.0002	.0063	.048	0
100						
200						
300	0.57	.0096	.0006	.1670	.322	10.6
400						
500						
600						
	0.69	.0055	.0001	.0328	.067	3.2
700						

Miscellaneous

magnetite content was determined using an Elliot Geophysical Co. hand held susceptibility meter. Approximately three readings per foot were recorded and arithmetically averaged then converted to "apparent magnetite content" using graphs supplied with the instrument. The fourth column to the right illustrates the mode of occurrence, a dot for a disseminated grain(s) and a slash for veins & veinlets.

carbonate probably all calcite, was determined by applying 10% HCl along the core. Nearly all of the carbonate occurs along hairline fractures - the abundance of those fractures is illustrated by the closeness of the slashes in the ninth column to the right. Occasional veins & CO_3 replacement (alteration) of plagioclase was noted but is not recorded on this log.

all other minerals were visually estimated. In general dots represent disseminated grains and slashes represent veins & veinlets.

Potassium feldspar alteration is represented in the 13th column to the right. Open rectangles: partial alteration; solid rectangles = complete (more or less) alteration to a chlorite-sericite mixture, usually dark blue-green in color.

Plagioclase, when altered, usually alters to sericite with secondary amounts of clay and chlorite, epidote and carbonate is minor. The alteration usually results in a pale to dark green soft material. The relative intensity of this type alteration is shown in the 11th column to the right, less commonly the plagioclase alters to white sericite shown in the 12th column to the right.

$CaFeS_2$	pyrite	quartz in vns/knits	Fe_3O	% Fe_3	Limonit
				0.27	
			0.69		
			1.18		
			0.53		
			0.70		
			1.02		
			0.58		
			0.50		
			0.21		
			0.40		
			0.51		
			0.55		
			0.91		
			0.79		
			0.62		

"blue stain	2nd K-spar	$CaCO_3$	epidote	green sericite	white sericite	chlorite	STRUCT.	ROCK

Summary Lithology Alteration Log

0-16': no core - 11" surface casing

Zone of oxidation - brown limonite after pyrite & magnetite common - minor Cu oxide stain on fractures

16 - 3004 : (unless otherwise noted):
Precambrian Oracle Granite: porphyritic quartz monzonite, fresh & unaltered specimens contain numerous pink to red K-feldspar phenocrysts measuring up to 1.5 inches in length. Together with somewhat smaller plagioclase grains they are surrounded by a medium grained matrix composed of quartz-plagioclase & K-feldspar. Biotite is generally minor, primary muscovite is rare.

pyrite, chalcopyrite, quartz veining more common than immediately below. Magnetite occurs in veins & veinlets more commonly than as disseminations.

pEgr

rock strongly broken & crushed

Plagioclase strongly altered to green sericite

← possible fault zone with major movement

PROJECT Kelvin DRILL HOLE NO J-3 SCALE 1" = 100'

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
800						
	0.45	.0036	.0001	.1326	.252	23.2
900						
1000						
	0.55	.0031	.0003	.0390	.076	7.5
1100						
1200						
	0.37	.0075	.0003	.1287	.248	10.5
1300						
1400						
	0.40	.0066	.0002	.0253	.054	1.8
1500						

Miscellaneous

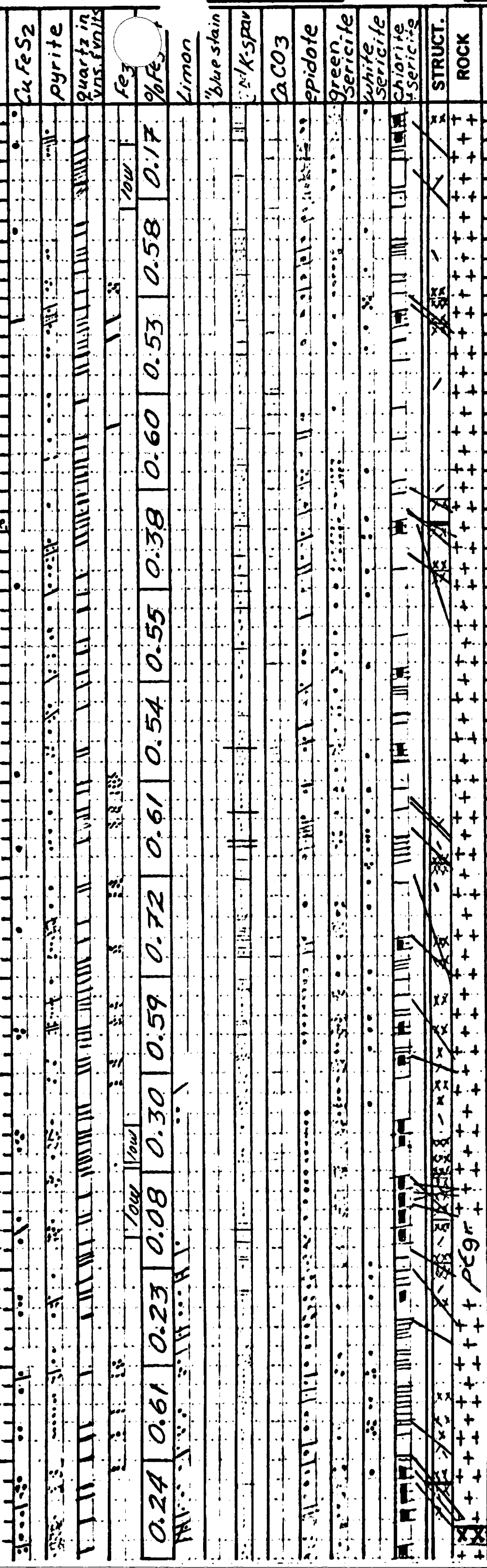
Epidote in trace amounts is common throughout the core. Occassionally it is abundant, usually in the matrix of the rock, apparently as an alteration product. The relative amounts are shown in the 10th column to the right and in notes to the right of the rock column.

Secondary K-spar occurs in rare veins and veinlets throughout the length of the hole, the occurence of which is shown in the 8th column to the right. Some also occurs as minor recrystallization of primary K-spar & as rims around plagioclase.

Limonite: bright red to brown Fe oxides from surface oxidation is common at the top of the hole and decreases to nil at approximately 140'. At 1250' to the bottom of the hole it occurs along fractures and as stain on sericitized plagioclase grains (dots); sometimes it becomes intense and the relative amounts are shown in the 6th column to the right.

"Blue stain" believed to be chloritic was noted in the interval 2250'-2850'. The stain occurs along fractures is deep blue-green in color and is shown in the 7th column to the right.

Secondary biotite: although not recorded on this log there generally is an abundance of black biotite associated with each high concentration of magnetite - some of the biotite may be secondary.



Summary Lithology & Alteration Log

strong epidote in matrix - marked decrease in $CaCO_3$; extremely low magnetite zone extends ± 4' above & below zone of strong epidote.

Plagioclase generally strongly altered to green sericite

zone of relatively strong secondary K-spar alteration of plagioclase.

1483½-1492: Laramide Quartz Latite Porphyry: upper contact @ 70° to core axis - lower @ 35°. Magnetite: 0.23% No K-spar seen. Phenocrysts of quartz and former feldspars up to 0.2" occur in a quartz-rich fine-grained groundmass. Feldspars altered to green ser. Approx. 3 vol. % fine disseminated pyrite present. Dark gr... Former biotite altered to chlorite altered to sericite

PROJECT Kelvin DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 3 OF 4

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
1700	0.23	.0082	.0001	.3186	.604	24.5
1700	0.26	.0051	.0002	.0173	.038	1.5
1800	0.31	.0030	.0002	.0338	.066	6.7
1900						
2000	0.34	.0044	.0004	.0116	.026	1.1
2100						
2200	0.16	.0072	.0003	.0736	.145	6.0

Miscellaneous

Structure: solid horizontal lines show gouge zones. closely spaced "x's" show broken and crushed core. No notation reflects relatively solid core. Gradations are apparent. Solid lines drawn completely through the column show the orientation with respect to core axis along which slickensides were noted or there is other evidence for possible movement.

Casing left in hole:
cloth & cement plug
flange - welded to BX casing
16' NX casing
50' BX casing suspended inside NX casing

Cu FeS_2	pyrite	quartz in vns & vnlts	Fe_3O_4	% Fe_2O_3	limonite	"blue stain"	2nd K-spar	$CaCO_3$	epidote	green sericite	white sericite	chlorite & sericite	STRUCT.	ROCK
			0.14	0.14	0.17	0.26	0.32	0.26	0.43	0.25	0.27	0.42	0.13	0.36	0.26	0.12

Summary Lithology & Alteration Log

- brecciated
- zone of abundant brick red limonite occurring along fractures and as stain on plagioclase phenocrysts. The red plagioclase is soft and is probably sericitized.
- speck of native copper
- iron stained calcite crystals
- strong epidote
- zone of very low magnetite, potassium feldspars generally partially altered to sericite & chlorite
- possible "healed" fault
- strong epidote

PROJECT KELVIN DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 4 OF 4

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
2300						
	0.30	.0382	.0003	.8045	1.543	13.0
2400						
2500	0.74	.0030	.0004	.0259	.052	4.9
2600						
2700						
2800	0.28	.0162	.0005	.2877	.554	8.7
2900						
	0.89	.0029	.0005	.0259	.052	5.1

Miscellaneous

Drilling & Cost Data:
date started: 5 MAR 1976
date completed: 8 MAY 1976
total length: 3004 feet
core size: NX wireline
collar location: approximately 1000' FNL & 2300' FEL, sec 16, T.4S., R.11E., Pinal Co., Ariz.
collar elevation: ~2370'
inclination: -90°

average footage per shift = 18.3
direct drilling cost = 12.49/foot
mud, H_2O, etc. = 1.29/foot
assaying = 0.71/foot
splitting = 0.32/foot
thin sections = 0.05/foot
TOTAL $ 14.86/foot

drilling contractor: JOY MANUFACTURING CO.

Logged by: J. P. VROMAN

CuFeS2	pyrite	quartz in vns & vnlts	Fe_3O_4	% Fe_3O_4	limonite	"blue stn"	sidrkspar	$CaCO_3$	epidote	green sericite	white sericite	chlorite & sericite	STRUCT.	ROCK
			0.76	0.90										
			0.28	0.27										
			0.19	0.41										
			0.49	0.85										
			1.08	0.72										
			0.78	0.73										
			0.20	0.41										
			0.41	0.25										

Summary Lithology & Alteration Log

2253.3-2254.5: Laramide Quartz Latite Porphyry - upper contact at 70° to core axis - lower contact at 45°. Chilled margin at upper contact not evident at lower. epidote and pyrite common. Lower portion brecciated.

2291-2297: brecciated and rehealed fault (?) zone.

zone of high pyrite, strongest chalcopyrite in hole. quartz veins & veinlets common, carbonate decreased, feldspars generally altered to sericite with some chlorite.

2461-2461.5: Laramide Quartz Latite Porphyry upper contact @ 42° to core axis; lower at 39°
2462.5-2463.2: Laramide Quartz Latite Porphyry upper contact at 43° to core axis; lower at 45°

visible MoS_2 in quartz vein (2470-2480 = 38 ppm Mo)

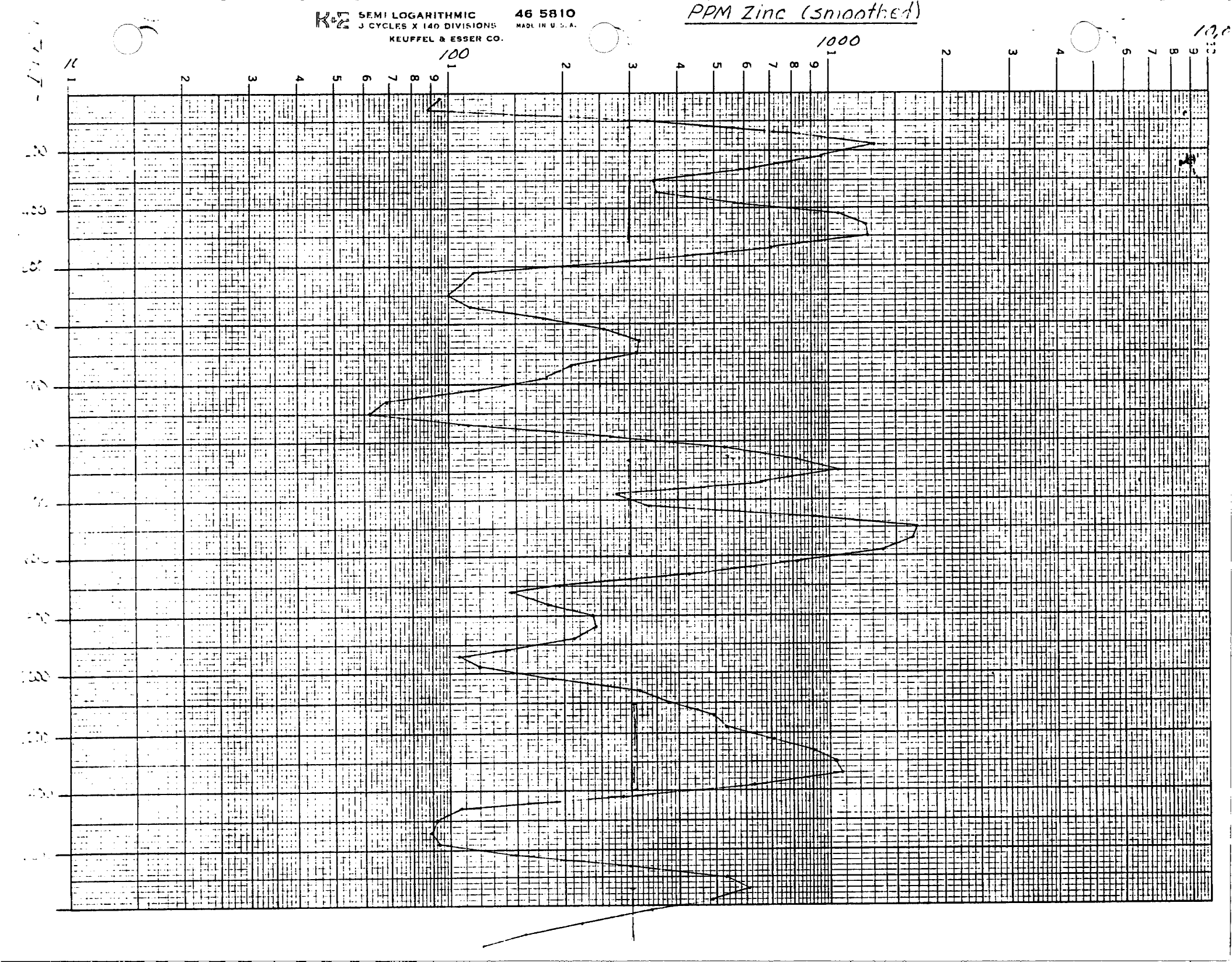
2395'-2745': relatively fresh Oracle Granite

rehealed breccia

plagioclase completely altered to green sericite microcline generally altered to sericite and chlorite, magnetite probably destroyed, pyrite (disseminated) & qtz veinlets more common than above or below. Carbonate less abundant. Rock in general is more broken.

Fresh Precambrian Oracle Granite.

3004 feet is total length


K&E SEMI LOGARITHMIC 46 5810
3 CYCLES X 140 DIVISIONS MADE IN U. S. A.
KEUFFEL & ESSER CO.
PPM Zinc (smoothed)
100
1000

EFFICIENCY, LINE NO. 6636

HOLE J-3

Footage	ASSAY 1 % Cu	Cu x 2.8885 = 2 wt % cp	Cu x 1.00925 = 3 % S in cp	ASSAY 4 % S	Column 4 minus Column 3 = 5 % S in py	% S in py x 1.871 = 6 wt % py	7	wt % py + wt % cp = wt % 8 TOTAL SULFIDES	9 PPM Co	10 Py/cp	11 % Zn	12 % Fe_3O_4	13 % Mo
0 - 40 1	.0480	.1386	.0484	.0063	.0000	.0000		.048	—	0.0		.27	.0002
40 - 80 2	.0050	.0144	.0050	.0179	.0129	.0241		.029	10	1.7	.0098	.73	.0003
80-120 3	.0100	.0289	.0101	.0700	.0680	.1272		.137	10	4.4	.0087	.66	.0004
120-160 4	.0050	.0144	.0050	.3590	.3540	.6623		.667	22	46.	.0054	1.40	.0022
160-200 5	.0238	.0687	.0240	.3050	.2810	.5257		.550	8	7.7	.3100	.34	.0004
200-240 6	.0091	.0263	.0092	.0710	.0618	.1156		.142	10	1.4	.0262	.75	.0004
240-280 7	.0059	.0170	.0060	.0930	.0870	.1628		.169	8	9.6	.0554	.56	.0003
280-320 8	.0049	.0142	.0049	.0720	.0671	.1255		.130	10	6.8	.0415	.58	.0006
320-360 9	.0042	.0121	.0042	.0380	.0338	.0632		.067	14	5.2	.0143	1.41	.0003
360-400 10	.0058	.0168	.0059	.0670	.0611	.0327		.039	10	1.7	.0100	.19	.0002
400-440 11	.0147	.0425	.0148	.5190	.5042	.9433		.958	16	22.	.1775	.15	.0003
440-480 12	.0056	.0162	.0057	.1050	.0993	.1858		.192	10	11.	.0706	.48	.0002
480-520 13	.0210	.0607	.0212	.2780	.2568	.4804	//////	.502	10	6.0	.2400	.34	.0003
520-560 14	.0057	.0165	.0058	.0370	.0312	.0584		.064	10	2.5	.0179	.52	.0001
560-600 15	.0049	.0142	.0049	.0120	.0071	.0133		.013	8	.9	.0075	.60	.0001
600-640 16	.0067	.0194	.0068	.0610	.0542	.1014		.108	12	3.2	.0128	.93	.0001
640-680 17	.0046	.0133	.0046	.0350	.0304	.0569		.060	8	4.3	.0126	.50	.0001
680-720 18	.0063	.0182	.0064	.0350	.0286	.0535		.072	10	2.7	.0083	.14	.0001
720-760 19	.0046	.0133	.0046	.0170	.0124	.0232		.036	8	1.7	.0061	.61	.0001
760-800 20	.0052	.0150	.0052	.0810	.0758	.1418		.157	8	9.5	.0201	.10	.0001
800-840 21	.0029	.0084	.0029	.0270	.0241	.0451		.054	8	5.4	.0188	.53	.0001
840-880 22	.0040	.0116	.0040	.1977	.1937	.3624		.374	10	31.	.0482	.55	.0001
880-920 23	.0030	.0087	.0030	.0260	.0230	.0430		.052	8	4.9	.0293	.66	.0001
920-960 24	.0028	.0081	.0028	.0125	.0097	.0181		.026	10	2.2	.0061	.41	.0001
960-1000 25	.0034	.0098	.0034	.0650	.0616	.1152		.125	10	12.	.0336	.44	.0001
1000-1040 26	.0028	.0081	.0028	.0245	.0217	.0406		.049	8	5.0	.0052	.59	.0002
1040-1080 27	.0036	.0104	.0036	.0555	.0519	.0971		.108	8	9.3	.0044	.43	.0001
1080-1120 28	.0029	.0084	.0029	.0335	.0306	.0572		.066	10	6.6	.0047	.79	.0001
1120-1160 29	.0030	.0087	.0030	.0145	.0115	.0215		.030	8	2.5	.0048	.52	.0001
1160-1200 30	.0037	.0107	.0037	.1420	.1383	.2587		.269	12	24.	.0241	.70	.0001
1200-1240 31	.0042	.0121	.0042	.1135	.1093	.2045		.214	10	17.	.0553	.62	.0002

footage	1 % Cu	2 wt % cp	3 % S in cp	4 % S	5 % S in py	6 wt % py	7	8 TOTAL SULFIDES	9 PPM Co	10 Py/cp	11 % Zn	12 % Fe as Ox	13 % Mo
0-1240	.0160	.0462	.0161	.0720	.0559	.1046	//////////	.151	8	2.3	.0378	.43	.0002
1240-1320	.0090	.0260	.0091	.2180	.2089	.3908		.417	10	15.	.2200	.11	.0003
1320-1360	.0047	.0136	.0047	.0978	.0931	.1742		.188	8	13.	.0292	.13	.0002
1360-1400	.0036	.0104	.0036	.0163	.0127	.0238		.034	6	2.3	.0056	.24	.0002
1400-1440	.0044	.0127	.0044	.0277	.0233	.0436		.056	8	3.4	.0045	.64	.0002
1440-1480	.0117	.0338	.0118	.0316	.0198	.0370		.071	8	1.1	.0083	.33	.0002
1480-1520	.0143	.0413	.0144	.8700	.8556	1.6007		1.642	16	39.	.3400	.14	.0002
1520-1560	.0082	.0237	.0083	.1100	.1017	.1903		.214	8	8.0	.0950	.13	.0002
1560-1600	.0066	.0191	.0067	.2100	.2033	.3804		.400	8	20.	.1950	.30	.0001
1600-1640	.0034	.0098	.0034	.0765	.0731	.1368		.147	8	14.	.0602	.34	.0002
1640-1680	.0033	.0095	.0033	.0135	.0102	.0191		.029	8	2.0	.0244	.49	.0001
1680-1720	.0074	.0214	.0075	.0317	.0242	.0453		.067	8	2.1	.0156	.17	.0002
1720-1760	.0047	.0136	.0047	.0067	.0020	.0037		.017	8	.27	.0093	.13	.0004
1760-1800	.0035	.0101	.0035	.0335	.0300	.0561		.066	10	5.6	.0114	.29	.0002
1800-1840	.0026	.0075	.0026	.0359	.0333	.0623		.070	8	8.3	.0342	.40	.0001
1840-1880	.0030	.0087	.0030	.0341	.0311	.0582		.067	10	6.7	.0211	.41	.0001
1880-1920	.0029	.0084	.0029	.0317	.0288	.0539		.062	10	6.4	.0290	.15	.0001
1920-1960	.0077	.0222	.0078	.0093	.0015	.0028		.025	10	.13	.0066	.48	.0004
1960-2000	.0038	.0110	.0038	.0170	.0132	.0247		.036	10	2.2	.0110	.25	.0004
2000-2040	.0032	.0092	.0032	.0116	.0084	.0157		.025	10	1.7	.0082	.30	.0004
2040-2080	.0029	.0084	.0029	.0085	.0056	.0105		.019	8	1.2	.0073	.37	.0004
2080-2120	.0038	.0110	.0038	.0401	.0363	.0679		.079	8	6.2	.0535	.22	.0001
2120-2160	.0035	.0101	.0035	.0604	.0569	.1065		.117	10	10.	.0077	.11	.0005
2160-2200	.0127	.0367	.0128	.1610	.1482	.2773		.314	10	7.6	.0896	.13	.0002
2200-2240	.0035	.0101	.0035	.0109	.0074	.0138		.024	8	1.4	.0124	.11	.0001
2240-2280	.0094	.0272	.0095	.1091	.0996	.1863	//////////	.214	10	6.8	.0830	.19	.0001
2280-2320	.0425	.1230	.0429	1.2075	1.1646	2.1789		2.302	30	18.	.1115	.33	.0002
2320-2360	.0425	.1230	.0429	.3625	.3196	.5979		.721	16	4.9	.0477	.34	.0004
2360-2400	.0225	.0580	.0227	.6500	.6273	1.1736	//////////	1.232	12	20.	.2200	.22	.0003
2400-2440	.0047	.0136	.0047	.0285	.0238	.0445		.058	10	3.3	.0105	.75	.0004
2440-2480	.0030	.0087	.0030	.0478	.0448	.0838		.093	10	9.6	.0173	.60	.0015

footage	1 % Cu	2 wt % cp	3 % S in cp	4 % S	5 % S in py	6 wt % py	7	8 TOTAL SULFIDES	9 PPM Co	10 FS/CP	11 % Zn	12 % Fe_3O_4	13 % Mo
2430-2560 [1]	.0025	.0072	.0025	.0174	.0149	.0279		.035	10	3.9	.0074	.96	.0002
-2560 [2]	.0030	.0087	.0030	.0032	.0002	.0004		.009	12	.05	.0087	.61	.0001
-2617 [3]	.0023	.0066	.0023	.0149	.0126	.0236		.030	12	3.6	.0096	1.21	.0001
-2641 [4]	.0026	.0075	.0026	.0218	.0192	.0359		.043	12	4.8	.0073	.83	.0001
-2670 [5]	.0053	.0153	.0053	.0714	.0561	.1050		.120	12	6.9	.0124	.50	.0002
-2720 [6]	.0035	.0101	.0035	.0108	.0073	.0137		.024	10	1.4	.0093	.82	.0006
-2760 [7]	.0152	.0439	.0153	.1237	.1084	.2028		.247	9	4.6	.0716	.40	.0006
-2800 [8]	.0178	.0514	.0180	.5615	.5435	1.0168		1.068	16	20.	.0832	.20	.0005
-2840 [9]	.0175	.0505	.0177	.1916	.1739	.3253		.376	11	6.4	.0395	.18	.0003
-2890 [10]	.0192	.0555	.0194	.2510	.2316	.4333		.489	13	7.8	.0312	.37	.0004
-2920 [11]	.0044	.0127	.0044	.1715	.1275	.2385		.251	12	19.	.0222	.42	.0006
-2960 [12]	.0029	.0084	.0029	.0295	.0266	.0498		.058	8	5.9	.0109	1.02	.0004
-3000 [13]	.0029	.0084	.0029	.0223	.0194	.0363		.045	8	4.3	.0106	.77	.0006
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
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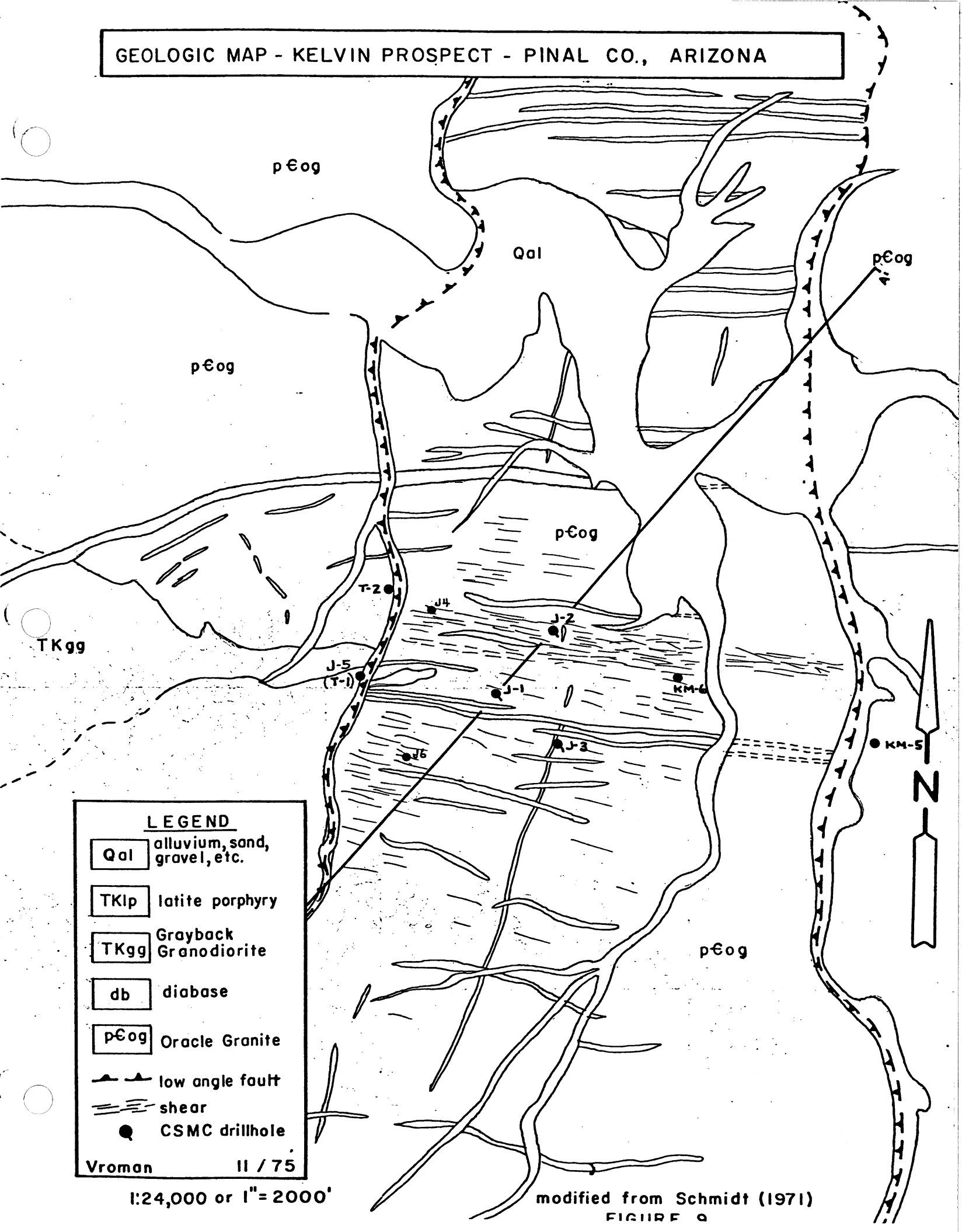
AMPAD EFFICIENCY® LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-3

FIVE-POINT WEIGHTED RUNNING AVERAGES

INTERVAL		1 % Cu	2 % Mo	3 % Zn	4 % S	5 S in ZnS (Zn x .4905)	6 wt % py (S in py & cp only)	7 py/cp	8 wt % py (if S in FeS_2, $CuFeS_2$, & ZnS)	9 py/cp	10 vol % cp (Cu x 1.8363)	11 vol % py (wt % py x .5…)	12 vol % Mg	13 Mc
0-40	1	.0294	.0003	.0095	.0182	.0047	—	—	—	—	.0540	.0119	.467	8.0
40-80	2	.0170	.0006	.0089	.0587	.0044	.0971	2.0	.0695	1.4	.0312	.1517	.653	11.0
80-120	3	.0117	.0008	.0333	.1413	.0163	.2477	7.3	.2118	6.3	.0215	.1318	.792	14.2
120-160	4	.0108	.0011	.0784	.2335	.0385	.4160	13.3	.3444	11.0	[illegible]	[illegible]	.883	16.9
160-200	5	.0136	.0008	.1315	.2298	.0645	.4041	10.3	.2836	7.2	[illegible]	.2150	.721	14.4
200-240	6	.0111	.0005	.0980	.1523	.0481	.2640	8.2	.1740	5.4	.0204	.1404	.648	12.1
240-280	7	.0077	.0004	.0619	.0952	.0304	.1635	7.4	.1067	4.8	.0141	.0370	.593	10.4
280-320	8	.0054	.0004	.0348	.0685	.0171	.1181	7.6	.0859	5.5	.0099	.0628	.750	12.3
320-360	9	.0057	.0004	.0353	.0938	.0173	.1647	10.0	.1324	8.0	.0105	.0876	.775	13.1
360-400	10	.0074	.0004	.0567	.1679	.0278	.3002	14.0	.2481	11.6	.0136	.1597	.515	10.3
400-440	11	.0102	.0003	.1064	.2636	.0522	.4739	16.1	.3762	12.8	.0187	[illegible]	.347	9.3
440-480	12	.0113	.0004	.1256	.2323	.0616	.4133	12.7	.2980	9.1	.0208	.2199	.352	8.9
480-520	13	.0122	.0004	.1270	.1805	.0623	.3147	8.9	.1981	5.6	.0224	.1674	.419	12.2
520-560	14	.0091	.0003	.0704	.0939	.0345	.1585	6.0	.0939	3.6	.0167	.0843	.527	9.4
560-600	15	.0067	.0002	.0294	.0513	.0144	.0833?	4.3	.0564	2.9	.0123	.0443	.635	10.4
600-640	16	.0056	.0001	.0116	.0398	.0057	.0639	4.0	.0532	3.3	.0103	.0340	.732	11.6
640-680	17	.0055	.0001	.0108	.0378	.0053	.0603	3.3	.0504	3.2	.0101	.0321	.722	11.5
680-720	18	.0055	.0001	.0100	.0364	.0049	.0577	3.6	.0485	3.1	.0101	.0307	.695	11.1
720-760	19	.0050	.0001	.0113	.0381	.0055	.0615	4.3	.0516	3.6	.0092	[illegible]	.554	8.9
760-800	20	.0045	.0001	.0178	.0592	.0087	.1023	7.9	.0860	6.6	.0083	.0544?	.416	7.2
800-840	21	.0038	.0001	.0257	.0780	.0126	.1388	12.6?	.1152	10.5	.0070	.0738	.452	8.0
840-880	22	.0035	.0001	.0317	.0955	.0155	.1721	17.0	.1431	14.2	.0064	.0916	.525	9.3
880-920	23	.0032	.0002	.0311	.0656	.0153	.1167	12.6	.0881	9.5	.0059	.0621	.550	9.3
920-960	24	.0030	.0001	.0210	.0437	.0103	.0761	8.8	.0569	6.6	.0055	.0405	.499	8.2
960-1000	25	.0031	.0002	.0181	.0398	.0089	.0686	7.7	.0520	5.8	.0057	.0365	.484	7.9
1000-1040	26	.0031	.0003	.0116	.0408	.0057	.0705	7.9	.0599	6.7	.0057	[illegible]	.520	8.4
1040-1080	27	.0032	.0004	.0069	.0385	.0034	.0660	7.1	.0597	6.5	.0059	.0351	.553	9.0
1080-1120	28	.0031	.0004	.0062	.0419	.0030	.0725	8.1	.0670	7.5	.0057	.0386	.622	10.0
1120-1160	29	.0033	.0004	.0112	.0591	.0055	.1044	11.0	.0941	9.9	.0061	.0555	.623	10.3
1160-1200	30	.0045	.0004	.0264	.0923	.0129	.1642	12.6	.1401	10.8	.0083	.0874	.622	10.8
1200-1240	31	.0071	.0004	.0528	.1109	.0259	.1941	9.5	.1456	7.1	.0130	.1033	.540	9.8

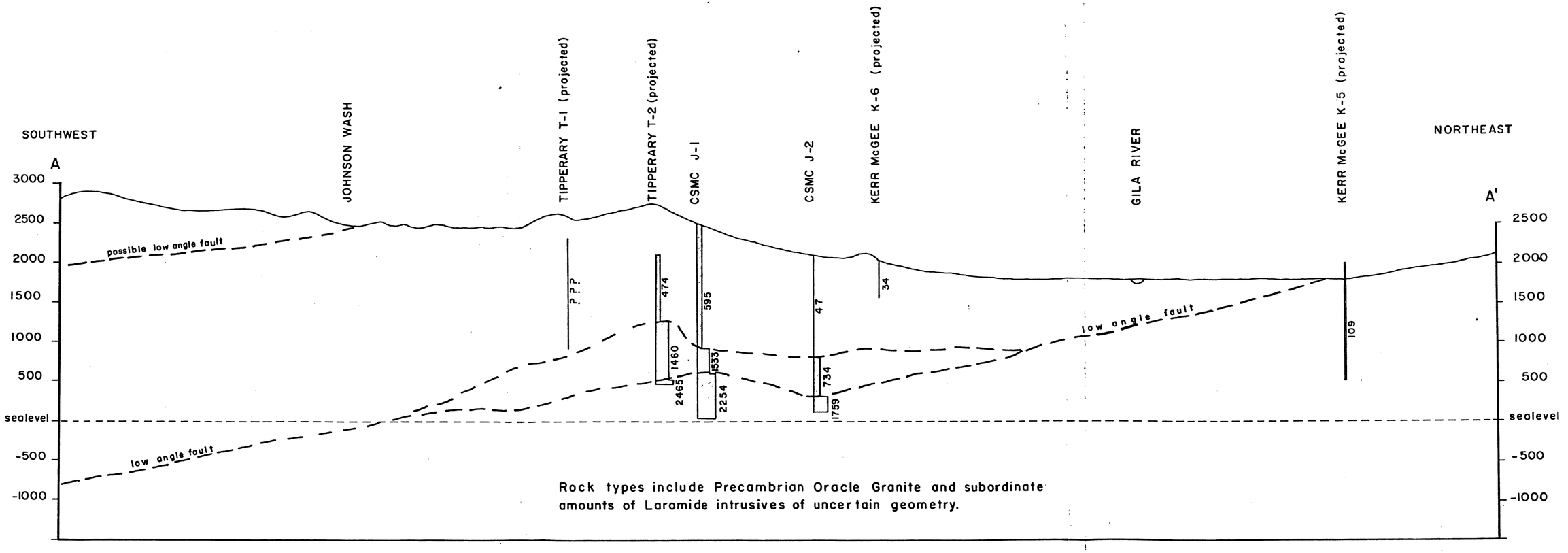
GEOLOGIC MAP - KELVIN PROSPECT - PINAL CO., ARIZONA



1:24,000 or 1"= 2000'

modified from Schmidt (1971)

FIGURE 9



CROSS SECTION ACROSS THE KELVIN PROSPECT - PINAL COUNTY, ARIZONA

(LOOKING NORTWEST)

NOTE: numbers written vertically indicate amount of copper (ppm) within interval.

CITIES SERVICE MINERALS CORPORATION

KELVIN PROSPECT

PINAL CO., ARIZONA

SCALE- 1:12,000 DATE- 13 NOV 75

FILE NO.- _____ DRAWN BY- VROMAN

FIGURE 10

PROJECT KELVIN DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 1 OF 4

LENGTH	% Fe_3O_4 (comp.)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
0-50' By casing left in hole						
	0.27	.048	.0002	.0063	.048	0
100						
200						
300	0.57	.0096	.0006	.1670	.322	10.6
400						
500						
600						
	0.69	.0055	.0001	.0328	.067	3.2
700						

Miscellaneous

magnetite content was determined using an Elliot Geophysical Co. hand held susceptibility meter. Approximately three readings per foot were recorded and arithmetically averaged then converted to "apparent magnetite content" using graphs supplied with the instrument. The fourth column to the right illustrates the mode of occurrence, a dot for a disseminated grain(s) and a slash for veins & veinlets.

carbonate probably all calcite, was determined by applying 10% HCl along the core. Nearly all of the carbonate occurs along hairline fractures - the abundance of those fractures is illustrated by the closeness of the slashes in the ninth column to the right. Occasional veins & CO_3 replacement (alteration) of plagioclase was noted but is not recorded on this log.

all other minerals were visually estimated. In general dots represent disseminated grains and slashes represent veins & veinlets.

Potassium feldspar alteration is represented in the 13th column to the right. Open rectangles: partial alteration; solid rectangles = complete (more or less) alteration to a chlorite-sericite mixture, usually dark blue-green in color.

Plagioclase, when altered, usually alters to sericite with secondary amounts of clay and chlorite, epidote and carbonate is minor. The alteration usually results in a pale to dark green soft material. The relative intensity of this type alteration is shown in the 11th column to the right, less commonly the plagioclase alters to white sericite shown in the 12th column to the right.

$CaFeS_2$	pyrite	quartz in vns/knits	Fe_3O	% Fe_3	Limonit
				0.27	
			0.69		
			1.18		
			0.53		
			0.70		
			1.02		
			0.58		
			0.50		
			0.21		
			0.40		
			0.51		
			0.55		
			0.91		
			0.79		
			0.62		

"blue stain	2nd K-spar	$CaCO_3$	epidote	green sericite	white sericite	chlorite	STRUCT.	ROCK

Summary Lithology Alteration Log

0-16': no core - 11" surface casing

Zone of oxidation - brown limonite after pyrite & magnetite common - minor Cu oxide stain on fractures

16 - 3004 : (unless otherwise noted):
Precambrian Oracle Granite: porphyritic quartz monzonite, fresh & unaltered specimens contain numerous pink to red K-feldspar phenocrysts measuring up to 1.5 inches in length. Together with somewhat smaller plagioclase grains they are surrounded by a medium grained matrix composed of quartz-plagioclase & K-feldspar. Biotite is generally minor, primary muscovite is rare.

pyrite, chalcopyrite, quartz veining more common than immediately below. Magnetite occurs in veins & veinlets more commonly than as disseminations.

pEgr

rock strongly broken & crushed

Plagioclase strongly altered to green sericite

← possible fault zone with major movement

PROJECT Kelvin DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 2 OF 4

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
800						
	0.45	.0036	.0001	.1326	.252	23.2
900						
1000						
	0.55	.0031	.0003	.0390	.076	7.5
1100						
1200						
	0.37	.0075	.0003	.1287	.248	10.5
1300						
1400						
	0.40	.0066	.0002	.0253	.054	1.8
1500						

Column heads: Cu FeS_2 | pyrite | quartz in vns. & vnlts | Fe_3O_4 | % Fe_3O_4 | Limon | % blue stain | 2nd K-spar | $CaCO_3$ | epidote | Green Sericite | white Sericite | Chlorite & Sericite | STRUCT. | ROCK

% Fe_3O_4: 0.17 (low), 0.58, 0.53, 0.60, 0.38, 0.55, 0.54, 0.61, 0.72, 0.59, 0.30 (low), 0.08 (low), 0.23, 0.61, 0.24

Rock column: pcgr

Miscellaneous

Epidote in trace amounts is common throughout the core. Occassionally it is abundant, usually in the matrix of the rock, apparently as an alteration product. The relative amounts are shown in the 10th column to the right and in notes to the right of the rock column.

Secondary K-spar occurs in rare veins and veinlets throughout the length of the hole, the occurence of which is shown in the 8th column to the right. Some also occurs as minor recrystallization of primary K-spar & as rims around plagioclase.

Limonite: bright red to brown Fe oxides from surface oxidation is common at the top of the hole and decreases to nil at approximately 140'. At 1250' to the bottom of the hole it occurs along fractures and as stain on sericitized plagioclase grains (dots); sometimes it becomes intense and the relative amounts are shown in the 6th column to the right.

"Blue stain" believed to be chloritic was noted in the interval 2250'-2850'. The stain occurs along fractures is deep blue-green in color and is shown in the 7th column to the right.

Secondary biotite: although not recorded on this log there generally is an abundance of black biotite associated with each high concentration of magnetite - some of the biotite may be secondary.

Summary Lithology & Alteration Log

Strong epidote in matrix - marked decrease in $CaCO_3$; extremely low magnetite zone extends ± 4' above & below zone of strong epidote.

Plagioclase generally strongly altered to green sericite

Zone of relatively strong secondary K-spar alteration of plagioclase.

1483½-1492: Laramide Quartz Latite Porphyry: upper contact @ 70° to core axis - lower @ 35°. Magnetite: 0.23% No K-spar seen. Phenocrysts of quartz and former feldspars up to 0.2" occur in a quartz-rich fine-grained groundmass. Feldspars altered to green ser. Approx. 3 vol. % fine disseminated pyrite present. Dark grains Former biotite altered to chlorite altered to sericite

PROJECT Kelvin DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 3 OF 4

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
1700	0.23	.0082	.0001	.3186	.604	24.5
1700	0.26	.0051	.0002	.0173	.038	1.5
1800	0.31	.0030	.0002	.0338	.066	6.7
1900						
2000	0.34	.0044	.0004	.0116	.026	1.1
2100						
2200	0.16	.0072	.0003	.0736	.145	6.0

Miscellaneous

Structure: solid horizontal lines show gouge zones. closely spaced "x's" show broken and crushed core. No notation reflects relatively solid core. Gradations are apparent. Solid lines drawn completely through the column show the orientation with respect to core axis along which slickensides were noted or there is other evidence for possible movement.

Casing left in hole:
cloth & cement plug
flange - welded to BX casing
16' NX casing
50' BX casing suspended inside NX casing

Cu FeS_2	pyrite	quartz in vns & vnlts	Fe_3O_4	% Fe_2O_3	limonite	"blue stain"	2nd K-spar	$CaCO_3$	epidote	green sericite	white sericite	chlorite & sericite	STRUCT.	ROCK
			0.14	0.14	0.17	0.26	0.32	0.26	0.43	0.25	0.27	0.42	0.13	0.36	0.26	0.12

Summary Lithology & Alteration Log

- brecciated
- zone of abundant brick red limonite occurring along fractures and as stain on plagioclase phenocrysts. The red plagioclase is soft and is probably sericitized.
- speck of native copper
- iron stained calcite crystals
- strong epidote
- zone of very low magnetite, potassium feldspars generally partially altered to sericite & chlorite
- possible "healed" fault
- strong epidote

PROJECT KELVIN DRILL HOLE NO. J-3 SCALE 1" = 100' PAGE NO. 4 OF 4

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	weight % sulfide	py/cp
2300						
	0.30	.0382	.0003	.8045	1.543	13.0
2400						
2500	0.74	.0030	.0004	.0259	.052	4.9
2600						
2700						
2800	0.28	.0162	.0005	.2877	.554	8.7
2900						
	0.89	.0029	.0005	.0259	.052	5.1

Miscellaneous

Drilling & Cost Data:
date started: 5 MAR 1976
date completed: 8 MAY 1976
total length: 3004 feet
core size: NX wireline
collar location: approximately 1000' FNL & 2300' FEL, sec 16, T.4S., R.11E., Pinal Co., Ariz.
collar elevation: ~2370'
inclination: -90°

average footage per shift = 18.3
direct drilling cost = 12.49/foot
mud, H_2O, etc. = 1.29/foot
assaying = 0.71/foot
splitting = 0.32/foot
thin sections = 0.05/foot
TOTAL $ 14.86/foot

drilling contractor: JOY MANUFACTURING CO.

Logged by: J. P. VROMAN

CuFeS2	pyrite	quartz in vns & vnlts	Fe_3O_4	% Fe_3O_4	limonite	"blue stn"	sidrkspar	$CaCO_3$	epidote	green sericite	white sericite	chlorite & sericite	STRUCT.	ROCK
			0.76	0.90										
			0.28	0.27										
			0.19	0.41										
			0.49	0.85										
			1.08	0.72										
			0.78	0.73										
			0.20	0.41										
			0.41	0.25										

Summary Lithology & Alteration Log

2253.3-2254.5: Laramide Quartz Latite Porphyry - upper contact at 70° to core axis - lower contact at 45°. Chilled margin at upper contact not evident at lower. epidote and pyrite common. Lower portion brecciated.

2291-2297: brecciated and rehealed fault (?) zone.

zone of high pyrite, strongest chalcopyrite in hole. quartz veins & veinlets common, carbonate decreased, feldspars generally altered to sericite with some chlorite.

2461-2461.5: Laramide Quartz Latite Porphyry upper contact @ 42° to core axis; lower at 39°
2462.5-2463.2: Laramide Quartz Latite Porphyry upper contact at 43° to core axis; lower at 45°

visible MoS_2 in quartz vein (2470-2480 = 38 ppm Mo)

2395'-2745': relatively fresh Oracle Granite

rehealed breccia

plagioclase completely altered to green sericite microcline generally altered to sericite and chlorite, magnetite probably destroyed, pyrite (disseminated) & qtz veinlets more common than above or below. Carbonate less abundant. Rock in general is more broken.

Fresh Precambrian Oracle Granite.

3004 feet is total length

CITIES SERVICE MINERALS CORP. KELVIN PROJECT - PINAL CO., ARIZONA HOLE U-3. ALL VALUES HAVE BEEN SMOOTHED USING A FIVE POINT RUNNING AVERAGE

LENGTH

MOLYBDENUM (PPM) 0 50 100

COPPER (PERCENT) 0 0.1 0.2

SULFUR (PERCENT) 0 1.0 2.0

MAGNETITE (VOL. PERCENT) 0 10 20

ZINC (PPM) 0 200 400 600 800 1000 1200 1400 1600

PYRITE + CHALCOPYRITE 33.5 1 5 10 15

0
400
800
1200
1600
2000
2400
2800
3000

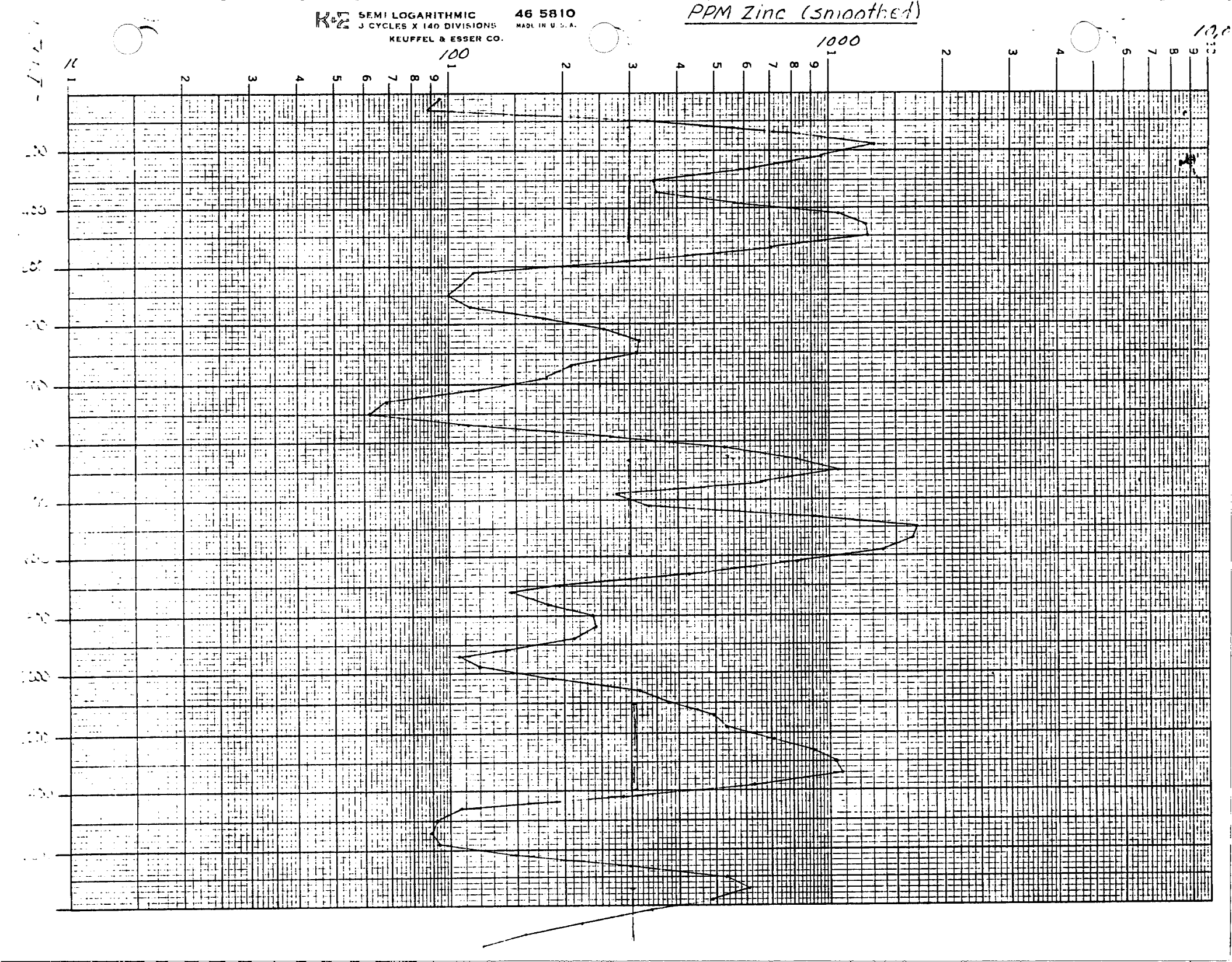
47 0700

K&E 10 X 10 TO THE INCH • 10 X 15 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

NOTE: DUE TO INCREASED ZINC CONTENT SCALE ON THIS SHEET DECREASED BY A FACTOR OF 2X

DUE TO THE HIGH ZINC CONTENT IN PORTIONS OF THE HOLE IT HAS BEEN ASSUMED THAT SULFUR OCCURS AS: FeS_2, $CuFeS_2$ & ZnS. THE PYRITE÷CHALCOPYRITE RATIO HAS BEEN COMPUTED ACCORDINGLY.

J. P. VROMAN 29 MAR 77


K&E SEMI LOGARITHMIC 46 5810
3 CYCLES X 140 DIVISIONS MADE IN U. S. A.
KEUFFEL & ESSER CO.
PPM Zinc (smoothed)
100
1000

EFFICIENCY, LINE NO. 6636

HOLE J-3

Footage	ASSAY 1 % Cu	Cu x 2.8885 = 2 wt % cp	Cu x 1.00925 = 3 % S in cp	ASSAY 4 % S	Column 4 minus Column 3 = 5 % S in py	% S in py x 1.871 = 6 wt % py	7	wt % py + wt % cp = wt % 8 TOTAL SULFIDES	9 PPM Co	10 Py/cp	11 % Zn	12 % Fe_3O_4	13 % Mo
0 - 40 1	.0480	.1386	.0484	.0063	.0000	.0000		.048	—	0.0		.27	.0002
40 - 80 2	.0050	.0144	.0050	.0179	.0129	.0241		.029	10	1.7	.0098	.73	.0003
80-120 3	.0100	.0289	.0101	.0700	.0680	.1272		.137	10	4.4	.0087	.66	.0004
120-160 4	.0050	.0144	.0050	.3590	.3540	.6623		.667	22	46.	.0054	1.40	.0022
160-200 5	.0238	.0687	.0240	.3050	.2810	.5257		.550	8	7.7	.3100	.34	.0004
200-240 6	.0091	.0263	.0092	.0710	.0618	.1156		.142	10	1.4	.0262	.75	.0004
240-280 7	.0059	.0170	.0060	.0930	.0870	.1628		.169	8	9.6	.0554	.56	.0003
280-320 8	.0049	.0142	.0049	.0720	.0671	.1255		.130	10	6.8	.0415	.58	.0006
320-360 9	.0042	.0121	.0042	.0380	.0338	.0632		.067	14	5.2	.0143	1.41	.0003
360-400 10	.0058	.0168	.0059	.0670	.0611	.0327		.039	10	1.7	.0100	.19	.0002
400-440 11	.0147	.0425	.0148	.5190	.5042	.9433		.958	16	22.	.1775	.15	.0003
440-480 12	.0056	.0162	.0057	.1050	.0993	.1858		.192	10	11.	.0706	.48	.0002
480-520 13	.0210	.0607	.0212	.2780	.2568	.4804	//////	.502	10	6.0	.2400	.34	.0003
520-560 14	.0057	.0165	.0058	.0370	.0312	.0584		.064	10	2.5	.0179	.52	.0001
560-600 15	.0049	.0142	.0049	.0120	.0071	.0133		.013	8	.9	.0075	.60	.0001
600-640 16	.0067	.0194	.0068	.0610	.0542	.1014		.108	12	3.2	.0128	.93	.0001
640-680 17	.0046	.0133	.0046	.0350	.0304	.0569		.060	8	4.3	.0126	.50	.0001
680-720 18	.0063	.0182	.0064	.0350	.0286	.0535		.072	10	2.7	.0083	.14	.0001
720-760 19	.0046	.0133	.0046	.0170	.0124	.0232		.036	8	1.7	.0061	.61	.0001
760-800 20	.0052	.0150	.0052	.0810	.0758	.1418		.157	8	9.5	.0201	.10	.0001
800-840 21	.0029	.0084	.0029	.0270	.0241	.0451		.054	8	5.4	.0188	.53	.0001
840-880 22	.0040	.0116	.0040	.1977	.1937	.3624		.374	10	31.	.0482	.55	.0001
880-920 23	.0030	.0087	.0030	.0260	.0230	.0430		.052	8	4.9	.0293	.66	.0001
920-960 24	.0028	.0081	.0028	.0125	.0097	.0181		.026	10	2.2	.0061	.41	.0001
960-1000 25	.0034	.0098	.0034	.0650	.0616	.1152		.125	10	12.	.0336	.44	.0001
1000-1040 26	.0028	.0081	.0028	.0245	.0217	.0406		.049	8	5.0	.0052	.59	.0002
1040-1080 27	.0036	.0104	.0036	.0555	.0519	.0971		.108	8	9.3	.0044	.43	.0001
1080-1120 28	.0029	.0084	.0029	.0335	.0306	.0572		.066	10	6.6	.0047	.79	.0001
1120-1160 29	.0030	.0087	.0030	.0145	.0115	.0215		.030	8	2.5	.0048	.52	.0001
1160-1200 30	.0037	.0107	.0037	.1420	.1383	.2587		.269	12	24.	.0241	.70	.0001
1200-1240 31	.0042	.0121	.0042	.1135	.1093	.2045		.214	10	17.	.0553	.62	.0002

footage	1 % Cu	2 wt % cp	3 % S in cp	4 % S	5 % S in py	6 wt % py	7	8 TOTAL SULFIDES	9 PPM Co	10 Py/cp	11 % Zn	12 % Fe as Ox	13 % Mo
0-1240	.0160	.0462	.0161	.0720	.0559	.1046	//////////	.151	8	2.3	.0378	.43	.0002
1240-1320	.0090	.0260	.0091	.2180	.2089	.3908		.417	10	15.	.2200	.11	.0003
1320-1360	.0047	.0136	.0047	.0978	.0931	.1742		.188	8	13.	.0292	.13	.0002
1360-1400	.0036	.0104	.0036	.0163	.0127	.0238		.034	6	2.3	.0056	.24	.0002
1400-1440	.0044	.0127	.0044	.0277	.0233	.0436		.056	8	3.4	.0045	.64	.0002
1440-1480	.0117	.0338	.0118	.0316	.0198	.0370		.071	8	1.1	.0083	.33	.0002
1480-1520	.0143	.0413	.0144	.8700	.8556	1.6007		1.642	16	39.	.3400	.14	.0002
1520-1560	.0082	.0237	.0083	.1100	.1017	.1903		.214	8	8.0	.0950	.13	.0002
1560-1600	.0066	.0191	.0067	.2100	.2033	.3804		.400	8	20.	.1950	.30	.0001
1600-1640	.0034	.0098	.0034	.0765	.0731	.1368		.147	8	14.	.0602	.34	.0002
1640-1680	.0033	.0095	.0033	.0135	.0102	.0191		.029	8	2.0	.0244	.49	.0001
1680-1720	.0074	.0214	.0075	.0317	.0242	.0453		.067	8	2.1	.0156	.17	.0002
1720-1760	.0047	.0136	.0047	.0067	.0020	.0037		.017	8	.27	.0093	.13	.0004
1760-1800	.0035	.0101	.0035	.0335	.0300	.0561		.066	10	5.6	.0114	.29	.0002
1800-1840	.0026	.0075	.0026	.0359	.0333	.0623		.070	8	8.3	.0342	.40	.0001
1840-1880	.0030	.0087	.0030	.0341	.0311	.0582		.067	10	6.7	.0211	.41	.0001
1880-1920	.0029	.0084	.0029	.0317	.0288	.0539		.062	10	6.4	.0290	.15	.0001
1920-1960	.0077	.0222	.0078	.0093	.0015	.0028		.025	10	.13	.0066	.48	.0004
1960-2000	.0038	.0110	.0038	.0170	.0132	.0247		.036	10	2.2	.0110	.25	.0004
2000-2040	.0032	.0092	.0032	.0116	.0084	.0157		.025	10	1.7	.0082	.30	.0004
2040-2080	.0029	.0084	.0029	.0085	.0056	.0105		.019	8	1.2	.0073	.37	.0004
2080-2120	.0038	.0110	.0038	.0401	.0363	.0679		.079	8	6.2	.0535	.22	.0001
2120-2160	.0035	.0101	.0035	.0604	.0569	.1065		.117	10	10.	.0077	.11	.0005
2160-2200	.0127	.0367	.0128	.1610	.1482	.2773		.314	10	7.6	.0896	.13	.0002
2200-2240	.0035	.0101	.0035	.0109	.0074	.0138		.024	8	1.4	.0124	.11	.0001
2240-2280	.0094	.0272	.0095	.1091	.0996	.1863	//////////	.214	10	6.8	.0830	.19	.0001
2280-2320	.0425	.1230	.0429	1.2075	1.1646	2.1789		2.302	30	18.	.1115	.33	.0002
2320-2360	.0425	.1230	.0429	.3625	.3196	.5979		.721	16	4.9	.0477	.34	.0004
2360-2400	.0225	.0580	.0227	.6500	.6273	1.1736	//////////	1.232	12	20.	.2200	.22	.0003
2400-2440	.0047	.0136	.0047	.0285	.0238	.0445		.058	10	3.3	.0105	.75	.0004
2440-2480	.0030	.0087	.0030	.0478	.0448	.0838		.093	10	9.6	.0173	.60	.0015

footage	1 % Cu	2 wt % cp	3 % S in cp	4 % S	5 % S in py	6 wt % py	7	8 TOTAL SULFIDES	9 PPM Co	10 FS/CP	11 % Zn	12 % Fe_3O_4	13 % Mo
2430-2560 [1]	.0025	.0072	.0025	.0174	.0149	.0279		.035	10	3.9	.0074	.96	.0002
-2560 [2]	.0030	.0087	.0030	.0032	.0002	.0004		.009	12	.05	.0087	.61	.0001
-2617 [3]	.0023	.0066	.0023	.0149	.0126	.0236		.030	12	3.6	.0096	1.21	.0001
-2641 [4]	.0026	.0075	.0026	.0218	.0192	.0359		.043	12	4.8	.0073	.83	.0001
-2670 [5]	.0053	.0153	.0053	.0714	.0561	.1050		.120	12	6.9	.0124	.50	.0002
-2720 [6]	.0035	.0101	.0035	.0108	.0073	.0137		.024	10	1.4	.0093	.82	.0006
-2760 [7]	.0152	.0439	.0153	.1237	.1084	.2028		.247	9	4.6	.0716	.40	.0006
-2800 [8]	.0178	.0514	.0180	.5615	.5435	1.0168		1.068	16	20.	.0832	.20	.0005
-2840 [9]	.0175	.0505	.0177	.1916	.1739	.3253		.376	11	6.4	.0395	.18	.0003
-2890 [10]	.0192	.0555	.0194	.2510	.2316	.4333		.489	13	7.8	.0312	.37	.0004
-2920 [11]	.0044	.0127	.0044	.1715	.1275	.2385		.251	12	19.	.0222	.42	.0006
-2960 [12]	.0029	.0084	.0029	.0295	.0266	.0498		.058	8	5.9	.0109	1.02	.0004
-3000 [13]	.0029	.0084	.0029	.0223	.0194	.0363		.045	8	4.3	.0106	.77	.0006
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AMPAD EFFICIENCY® LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-3

FIVE-POINT WEIGHTED RUNNING AVERAGES

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5 S in ZnS (Zn x .4905)	6 wt % py (S in py & cp only)	7 py/cp	8 wt % py (if S in FeS_2, $CuFeS_2$, & ZnS)	9 py/cp	10 vol % cp (Cu x 1.8363)	11 vol % py (wt % py x .5…)	12 vol % Mg	13 Mc
0-40 1	.0294	.0003	.0095	.0182	.0047	—	—	—	—	.0540	.0119	.467	8.0
40-80 2	.0170	.0006	.0089	.0587	.0044	.0971	2.0	.0695	1.4	.0312	.0517	.653	11.0
80-120 3	.0117	.0008	.0333	.1413	.0163	.2477	7.3	.2118	6.3	.0215	.1318	.792	14.2
120-160 4	.0108	.0011	.0784	.2335	.0385	.4160	13.3	.3444	11.0	[illegible]	[illegible]	.883	16.9
160-200 5	.0136	.0008	.1315	.2298	.0645	.4041	10.3	.2836	7.2	[illegible]	.2150	.721	14.4
200-240 6	.0111	.0005	.0980	.1523	.0481	.2640	8.2	.1740	5.4	.0204	.1404	.648	12.1
240-280 7	.0077	.0004	.0619	.0952	.0304	.1635	7.4	.1067	4.8	.0141	.0870	.593	10.4
280-320 8	.0054	.0004	.0348	.0685	.0171	.1181	7.6	.0859	5.5	.0099	.0628	.750	12.3
320-360 9	.0057	.0004	.0353	.0938	.0173	.1647	10.0	.1324	8.0	.0105	.0876	.775	13.1
360-400 10	.0074	.0004	.0567	.1679	.0278	.3002	14.0	.2481	11.6	.0136	.1597	.515	10.3
400-440 11	.0102	.0003	.1064	.2636	.0522	.4739	16.1	.3762	12.8	.0187	[illegible]	.347	7.3
440-480 12	.0113	.0004	.1256	.2323	.0616	.4133	12.7	.2980	9.1	.0208	.2199	.352	8.9
480-520 13	.0122	.0004	.1270	.1805	.0623	.3147	8.9	.1981	5.6	.0224	.1674	.419	12.2
520-560 14	.0091	.0003	.0704	.0939	.0345	.1585	6.0	.0939	3.6	.0167	.0843	.527	9.4
560-600 15	.0067	.0002	.0294	.0513	.0144	[illegible]	4.3	.0564	2.9	.0123	.0443	.635	10.4
600-640 16	.0056	.0001	.0116	.0398	.0057	.0639	4.0	.0532	3.3	.0103	.0340	.732	11.6
640-680 17	.0055	.0001	.0108	.0378	.0053	.0603	3.3	.0504	3.2	.0101	.0321	.722	11.5
680-720 18	.0055	.0001	.0100	.0364	.0049	.0577	3.6	.0485	3.1	.0101	.0307	.695	11.1
720-760 19	.0050	.0001	.0113	.0381	.0055	.0618	4.3	.0516	3.6	.0092	[illegible]	.554	8.9
760-800 20	.0045	.0001	.0178	.0592	.0087	.1023	7.9	.0860	6.6	.0083	[illegible]	.416	7.2
800-840 21	.0038	.0001	.0257	.0780	.0126	.1388	[illegible]	.1152	10.5	.0070	.0738	.452	8.0
840-880 22	.0035	.0001	.0317	.0955	.0155	.1721	17.0	.1431	14.2	.0064	.0916	.525	9.3
880-920 23	.0032	.0002	.0311	.0656	.0153	.1167	12.6	.0881	9.5	.0059	.0621	.550	9.3
920-960 24	.0030	.0001	.0210	.0437	.0103	.0761	8.8	.0569	6.6	.0055	.0405	.499	8.2
960-1000 25	.0031	.0002	.0181	.0398	.0089	.0686	7.7	.0520	5.8	.0057	.0365	.484	7.9
1000-1040 26	.0031	.0003	.0116	.0408	.0057	.0705	7.9	.0599	6.7	.0057	[illegible]	[illegible]	8.4
1040-1080 27	.0032	.0004	.0069	.0385	.0034	.0660	7.1	.0597	6.5	[illegible]	.0351	.553	9.0
1080-1120 28	.0031	.0004	.0062	.0419	.0030	.0725	8.1	.0670	7.5	.0057	.0356	.622	10.0
1120-1160 29	.0033	.0004	.0112	.0591	.0055	.1044	11.0	.0941	9.9	.0061	.0555	.623	10.3
1160-1200 30	.0045	.0004	.0264	.0923	.0129	.1642	12.6	.1401	10.8	.0083	.0874	.622	10.8
1200-1240 31	.0071	.0004	.0528	.1109	.0259	.1741	9.5	.1456	7.1	.0130	.1033	.540	9.8

AMPAD EFFICIENCY LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-3

FIVE POINT WEIGHTED RUNNING AVERAGES

Zn x .4905 ← 1/S in FeS_2, $CuFeS_2$, ZnS — Cu x 1.32… — wt. py x .5…

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5 S in ZnS	6 wt % py	7 py/cp	8 wt. % py	9 py/cp	10 vol. % cp	11 vol. % py	12 [illegible]	13 [illegible]
1240-1280 1	.0098	.0003	.0822	.1226	.0403	.2109	7.5	.1355	4.8	.0130	.1122	.393	7.8
1280-1320 2	.0088	.0003	.1048	.1330	.0514	.2322	9.1	.1360	5.4	.0162	.1235	.236	5.6
1320-1360 3	.0063	.0002	.0665	.0994	.0326	.1741	9.6	.1132	6.2	.0116	.0926	.213	4.8
1360-1400 4	.0051	.0002	.0275	.0544	.0135	.0922	6.3	.0670	4.5	.0094	.0491	.304	5.4
1400-1440 5	.0067	.0002	.0333	.0962	.0163	.1674	8.6	.1369	7.1	.0123	.0891	.395	7.5
1440-1480 6	.0097	.0002	.0904	.2290	.0443	.4101	14.6	.3272	11.7	.0178	.2181	.335	8.6
1480-1520 7	.0109	.0002	.1700	.3856	.0834	.7008	22.3	.5448	17.3	.0200	.3728	.232	9.4
1520-1560 8	.0091	.0002	.1653	.2999	.0811	.5439	20.7	.3922	14.9	.0167	.2894	.203	7.6
1560-1600 9	.0066	.0002	.1388	.1918	.0681	.3464	18.2	.2191	11.5	.0121	.1843	.272	7.0
1600-1640 10	.0048	.0002	.0323	.0919	.0404	.1629	11.7	.0874	6.3	.0088	.0354	.336	6.5
1640-1680 11	.0046	.0002	.0426	.0468	.0209	.0789	5.9	.0399	3.0	.0084	.0420	.339	5.8
1680-1720 12	.0052	.0003	.0193	.0253	.0095	.0375	2.5	.0198	1.3	.0095	.0200	.257	4.3
1720-1760 13	.0048	.0002	.0144	.0214	.0071	.0310	2.2	.0178	1.3	.0088	.0164	.225	3.4
1760-1800 14	.0038	.0002	.0181	.0319	.0089	.0525	4.8	.0359	3.3	.0070	.0279	.273	4.7
1800-1840 15	.0031	.0002	.0238	.0324	.0117	.0548	6.1	.0329	3.7	.0057	.0272	.337	5.6
1840-1880 16	.0033	.0002	.0242	.0320	.0119	.0536	5.6	.0314	3.3	.0061	.0285	.344	5.7
1880-1920 17	.0041	.0003	.0211	.0263	.0103	.0415	3.5	.0223	1.9	.0075	.0221	.313	5.1
1920-1960 18	.0050	.0004	.0140	.0183	.0069	.0248	1.7	.0120	.83	.0092	.0132	.332	5.3
1960-2000 19	.0044	.0004	.0104	.0145	.0051	.0188	1.5	.0094	.74	.0081	.0100	.315	5.0
2000-2040 20	.0037	.0004	.0120	.0141	.0059	.0194	1.8	.0084	.79	.0068	.0103	.308	4.9
2040-2080 21	.0033	.0004	.0185	.0212	.0091	.0334	3.5	.0165	1.7	.0061	.0177	.282	4.6
2080-2120 22	.0042	.0004	.0316	.0446	.0155	.0755	6.2	.0466	3.8	.0077	.0402	.224	4.1
2120-2160 23	.0056	.0004	.0375	.0711	.0184	.1224	7.6	.0831	5.4	.0103	.0651	.155	3.5
2160-2200 24	.0075	.0003	.0496	.0899	.0243	.1540	7.1	.1086	5.0	.0138	.0819	.132	3.4
2200-2240 25	.0100	.0002	.0538	.1641	.0264	.2831	10.0	.2387	8.3	.0184	.1523	.154	4.9
2240-2280 26	.0185	.0002	.0711	.3634	.0349	.6450	12.1	.5797	10.8	.0340	.3431	.222	9.0
2280-2320 27	.0303	.0002	.0909	.6541	.0446	1.1665	13.3	1.0831	12.4	.0556	.6206	.274	14.6
2320-2360 28	.0324	.0003	.1020	.5787	.0500	1.0215	10.9	.9280	9.9	.0595	.5434	.342	14.2
2360-2400 29	.0230	.0004	.1080	.4368	.0530	.7738	11.6	.6746	10.2	.0422	.4117	.412	13.0
2400-2440 30	.0112	.0006	.0630	.2012	.0309	.3553	11.0	.2975	9.2	.0206	.1590	.573	11.8
2440-2480 31	.0048	.0004	.0285	.0792	.0140	.1391	10.0	.1130	8.0	.0088	.0740	.637	11.6

AMPAD EFFICIENCY® LINE NO. 6636

C.S.M.C. KELVIN PROJECT - HOLE J-3 PAGE 3 of 3

FIVE POINT WEIGHTED RUNNING AVERAGES

Zn x .4905

if S in FeS_2, $CuFeS_2$ & ZnS

Cu x 1.35[illegible]

wt. Py x .532

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5 S in ZnS	6 wt % py	7 py/cp	8 wt % py	9 py/cp	10 vol % cp	11 vol % py	12 vol % [illegible]	13 [illegible]
2480-2520 1	.0029	.0005	.0104	.0218	.0051	.0354	4.2	.0258	3.1	.0053	.0188	.799	12.3
2520-2560 2	.0027	.0002	.0092	.0140	.0045	.0211	2.7	.0127	1.6	.0050	.0112	.845	12.9
2560-2600 3	.0028	.0001	.0089	.0183	.0044	.0290	3.6	.0208	2.6	.0051	.0154	.910	14.0
2600-2640 4	.0033	.0002	.0093	.0294	.0046	.0488	5.1	.0402	4.2	.0061	.0260	.801	12.5
2640-2680 5	.0048	.0003	.0148	.0456	.0073	.0763	5.5	.0627	4.5	.0088	.0406	.628	10.2
2680-2720 6	.0076	.0005	.0299	.0940	.0146	.1615	7.4	.1342	6.1	.0140	.0859	.487	8.8
2720-2760 7	.0125	.0005	.0529	.1999	.0259	.3504	9.7	.3019	8.4	.0230	.1864	.372	11.8
2760-2800 8	.0161	.0005	.0608	.3089	.0298	.5475	11.8	.4918	10.6	.0296	.2913	.279	9.0
2800-2840 9	.0168	.0005	.0488	.2839	.0239	.4994	10.3	.4547	9.4	.0308	.2657	.264	8.4
2840-2880 10	.0140	.0005	.0335	.2258	.0164	.3960	9.8	.3653	9.0	.0257	.2107	.375	9.2
2880-2920 11	.0084	.0005	.0221	.1471	.0108	.2593	10.7	.2391	9.9	.0154	.1380	.555	10.6
2920-2960 12	.0046	.0005	.0154	.0754	.0076	.1324	10.0	.1182	8.9	.0084	.0704	.753	12.5
2960-3004 13	.0031	.0005	.0120	.0413	.0059	.0715	8.0	.0604	6.7	.0057	.0380	.614	12.9
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EFFICIENCY. LINE NO. 6636

J3

* porphyry
** quartz diorite

M = moderate
S = strong
W = weak
tr = trace

depth		PLAGIOCLASE							K-FELDSPAR							BIOTITE							CONTENTS		
		[1]ser.	chl.	[2]epi	CO_3	[3]clay	qtz	[4]ther	ser.	[5]chl	epi	[6]CO_3	clay	[7]qtz	other	[8]mod	chl	[9]epi	CO_3	[10]clay	qtz	[11]ther		12	13
52'	1	W-M		min													min	min					opaques w/ mafics		
122'	2	M-S	tr	tr					min	min	min						S	S					opaques w/ mafics		
144'	3	S							S.							S	tr						opaques thrm.		
280'	4	M			min											min	S	S	min				opaques w/ mafics		
344'	5	W-M				tr.											min	min							1 inter
387'	6	W															S						coarsly brecciated		
428'	7	S	min														M		M						
479'	8	S	min			S				M		M				S							qtz-calc. veinlets		
545'	9	W-M															min	min							
668'	10	W															S	S							
671'	11																W	W							
725'	12	W				W											min	min					opaques w/ mafics		
785'	13															min	W-M	S		min					
953'	14															S	S	tr		min					
? 1177'	15	S					S		S					S		S	S								
x 1489'	16	S	min		min	S			S	min		min	S				S	S								
1673'	17	S				S			S	min		min	min			S	S								
1733'	18	M			M	S										S			min				opaques w/ maf		
x 1813'	19	W				W										W	W								
1837'	20																min	S							
2254'	21	S				S										S									
2295'	22	S				S				M-S		M-S				S			S						
2303	23	W	S				S		W	S				S											
2334'	24	S	M			S			W-M	M-M		M				S			S						
2450'	25	W				tr											W	W					opaques w/ maf		
2461.5'	26	S			M									S		S		M				tr pyr			
2564'	27	M															W-S	min			W-S		mg w/ mafics		
2611'	28	W															W	tr							
2649.5'	29	S			tr				M			tr				S	tr	-	min						
2726'	30	W															W	tr.							
2794'	31	S							M	M						S	tr		M						
2893'		S							M	tr						S	tr		M						
2947'		W															W	tr	tr						
		W															W	tr	tr						

SECTION 12

THE KELVIN PROSPECT

PINAL COUNTY, ARIZONA

AN EXPLORATION PROPOSAL

CITIES SERVICE MINERALS CORPORATION

JAMES P. VROMAN

JULY 1976

The Kelvin Prospect is located in the northern portion of the Tortilla Mountains and the northeastern portion of Pinal Co., Arizona. Tucson is 60 miles south of the prospect and Miami is 23 miles to the north-northeast (figure 1).

The Kelvin Prospect is situated within the Ray-Sacaton structural belt which bisects Pinal Co., Arizona (figure 2). Other features of interest within this belt include Kennecott's Ray Mine, Conoco's Poston Butte deposit and ASARCO's Sacaton Mine.

The Kelvin Prospect had been explored by several companies prior to C.S.M.C. interest in the property. During 1968-1969 Minbanco drilled nine hammer holes (total footage = 7820'). During 1969-1970 Tipperary Resources Corporation geologically mapped the prospect at a scale of 1 inch equals 200 feet; conducted a detailed induced polarization-resistivity survey and drilled two rotary holes (1400' and 1625'). During early 1972 Cyprus Mines drilled a 2500' angle core hole on the property. Kerr-McGee drilled one 500' core hole in 1973.

C.S.M.C. has controlled the property since mid-1974 until the present. To date Cities has drilled three core holes on the property (2478', 2018', and 3004'). Summary geologic logs of these three holes are presented in this report as

figures 3 through 5. Logs of holes J-1 and J-2 are at a scale of 1 inch equals 400 feet while the log of hole J-3 (completed May, 1976) is at a scale of 1 inch = 100 feet. The most significant copper mineralization encountered on the prospect by any of the drilling to date occurs in hole J-1 where 160 feet (from 1920' to 2080') of 0.661% copper was intersected.

Since the completion of hole J-3 all of the existing data from prior drilling has been reviewed and that review forms the basis for the recommendation that follows. The review indicates that there is justification for additional drilling by C.S.M.C. on the Kelvin prospect.

In figures 6-9 copper assays over 500 foot widths have been averaged and contoured. By inspection it may be seen that, in general, copper grade increases with depth and that the lateral dimensions of the copper mineralization also increases with depth. This latter aspect is clearly illustrated in figure 10 which shows the area of greater than 0.05% (500 ppm) copper mineralization systematically increasing with depth.

Assays for total sulfur were made on samples from C.S.M.C. drilling which allows for an accurate computation of total sulfides and pyrite/chalopyrite ratio in these three holes.

Figure 11 indicates that total sulfides increase to the north and that the pyrite/chalcopyrite ratio decreases (figure 12) to the west-northwest at the deepest intervals penetrated. A contour map of molybdenum values (figure 13) also indicates that the grade of that metal increases in a northerly direction.

Figure 14 summarizes all of these parameters in the interval 0'-500' elevation. The contours of copper values as well as vectors of the other parameters (drawn from C.S.M.C. hole J-1) seem to indicate that it would be reasonable to test the area northwest of C.S.M.C. hole J-1 by drilling.

It would also seem reasonable at this time to deepen hole J-2 as the log of that hole (figure 4) shows that copper, molybdenum and total weight percent sulfides are increasing and the pyrite/chalcopyrite ratio is decreasing at the bottom of the hole.

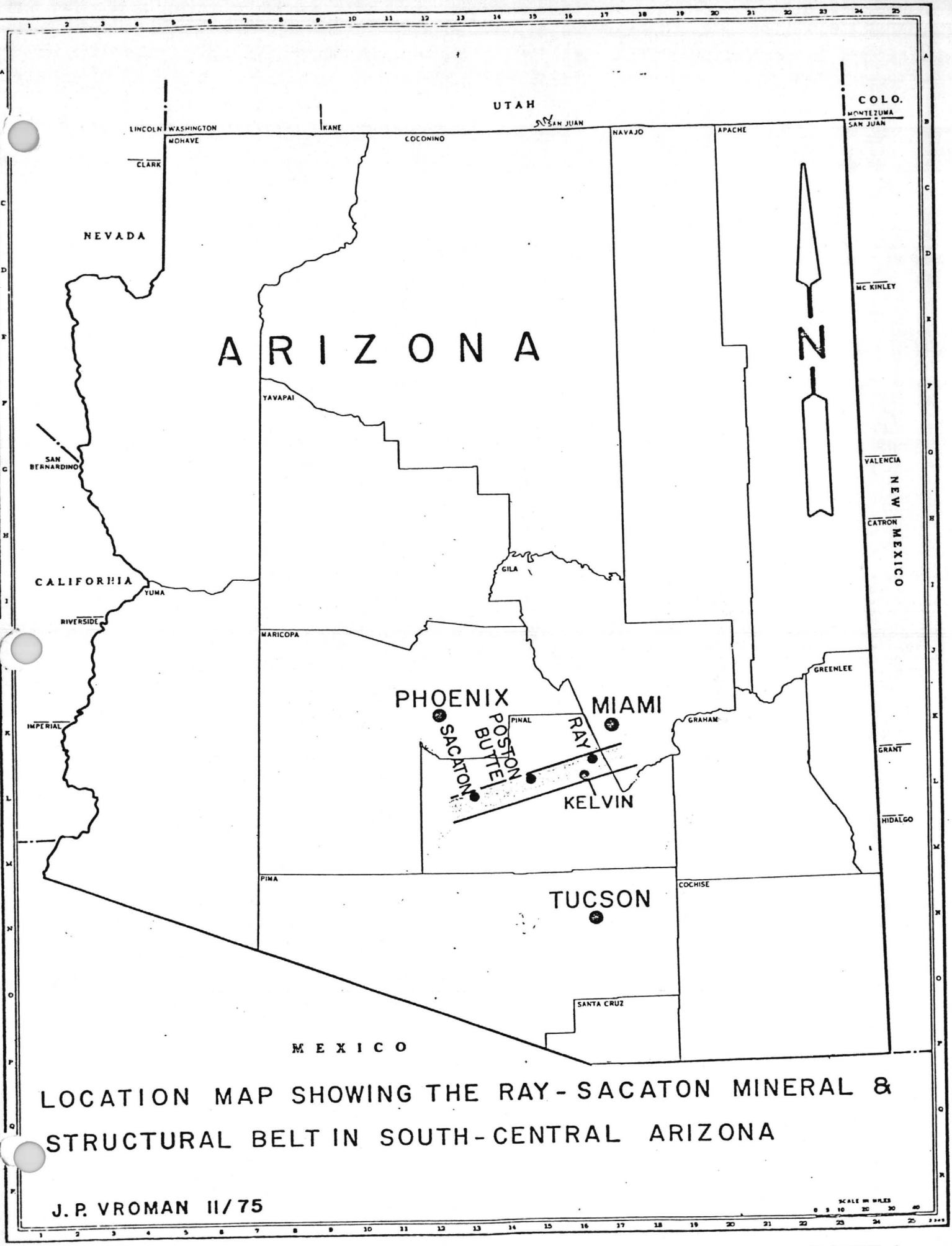
I recommend that:

1) C.S.M.C. hole J-2 be deepened to a total length of 3000 feet (present length is 2018 feet).

2) A new hole J-4 be drilled at a point approximately 850' FWL and 1400' FSL, section 9, T.4S., R.13E. to a total length of 3000 feet. It may be possible to re-enter Minbanco

hole J-2 at this location (total length is 582') but it is anticipated that this 1968 hammer hole is caved and that it will be necessary to drill a completely new hole from the surface.

Projected costs for this 4000 feet of recommended drilling will be discussed in a memorandum by R. C. Moore that is to accompany this request.



LOCATION MAP SHOWING THE RAY-SACATON MINERAL & STRUCTURAL BELT IN SOUTH-CENTRAL ARIZONA

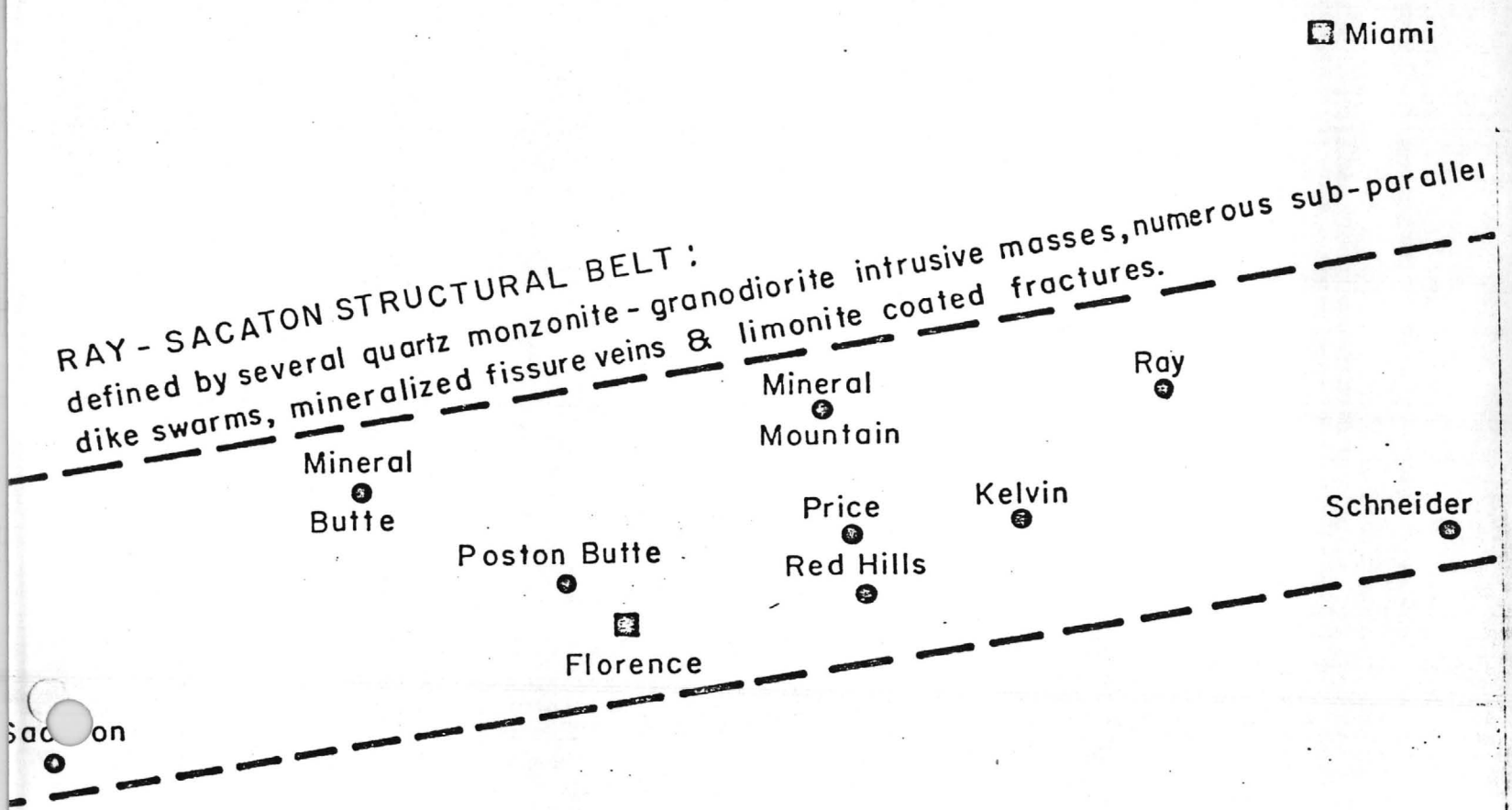
J. P. VROMAN 11/75

FIGURE 1

FILE NO.

CITIES SERVICE MINERALS CORPORATION

or
SCALE 1:500,000
DATE 13 NOV 75
DRAWN BY J.P.V.



Major Production
Ray
Sacaton

Minor Production
Red Hills

Drilled By Cities Sub-marginal
Schneider

Major Developing
Poston Butte

Prospects
Kelvin
Price
Mineral Butte
Mineral Mountain

N

TITLE LOCATION MAP - KELVIN PROSPECT : PINAL CO., ARIZONA

SKETCH NO.

FIGURE 2

PROJECT Kelvin DRILL HOLE J-1 SCALE 1" = 400' PAGE NO. 1 OF 1

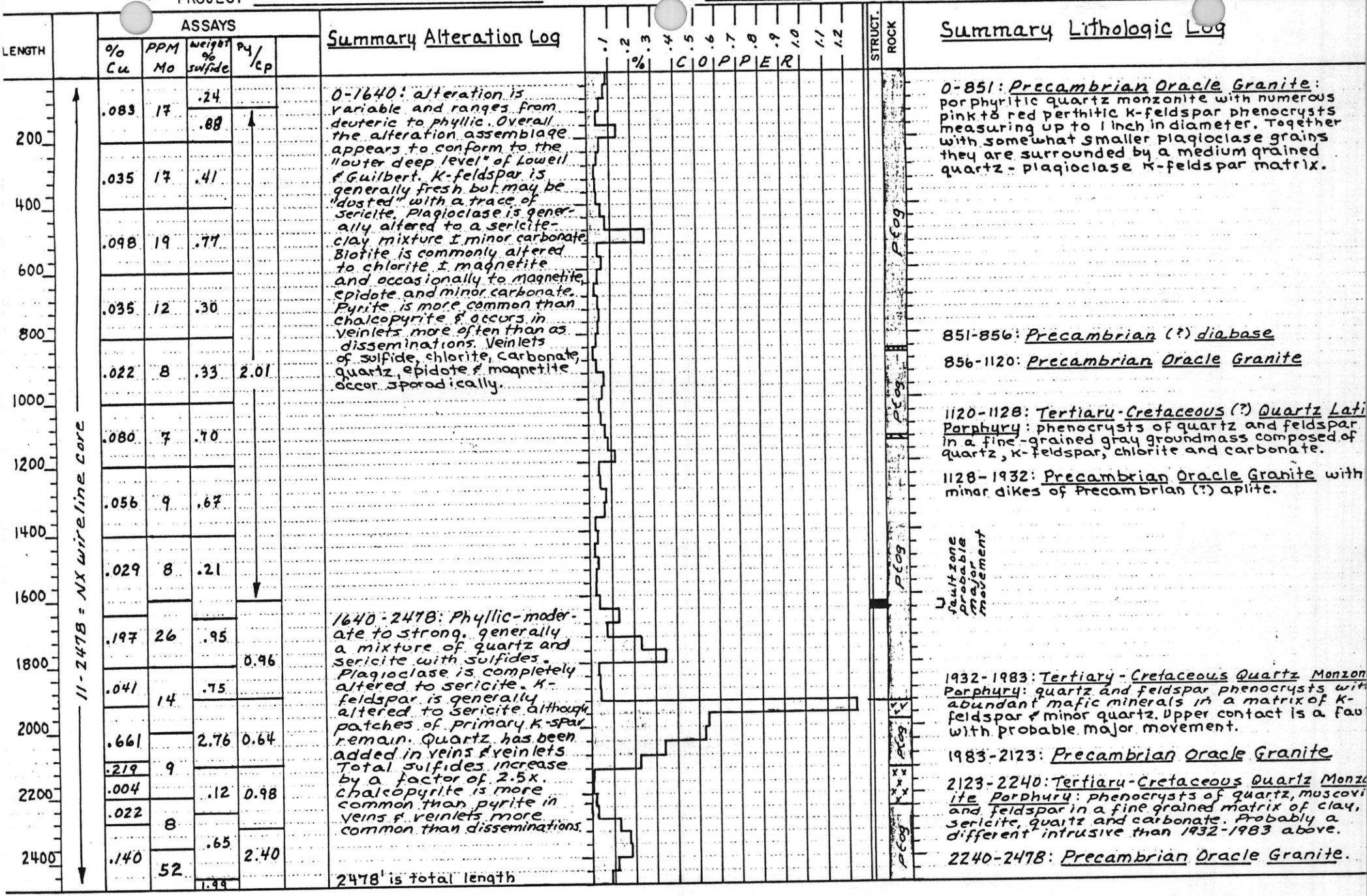
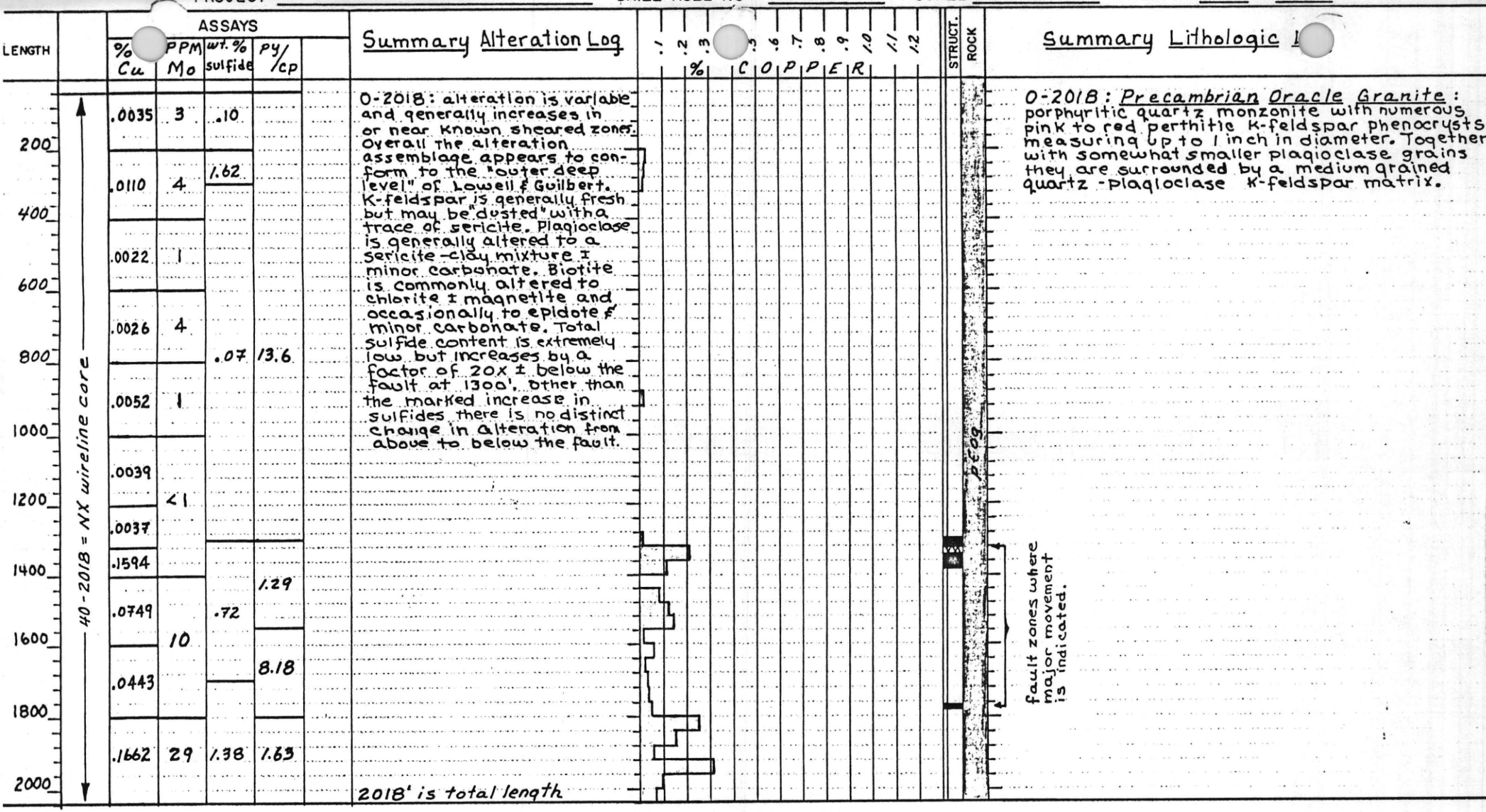


FIGURE 3

KELVIN PROSPECT - PINAL CO., ARIZONA
C.S.M.C. DRILLHOLE J-1

J.P. VROMAN 11/75



KELVIN PROSPECT - PINAL CO., ARIZONA

C.S.M.C. DRILLHOLE J-2

FIGURE 4

J.P. VROMAN 11/75

DRILL HOLE RECORD

PROJECT KELVIN DRILL HOLE J-3 SCALE 1" = 100' PAGE NO. 1 OF

LENGTH	% Fe_3O_4 (comp.)	Cu	Mo	S	weight % sulfide	Py/cp
casing left in hole	0.27	.048	.0002	.0063	.048	0
300	0.57	.0096	.0006	.1670	.322	10.6
	0.69	.0055	.0001	.0328	.067	3.2
	0.45	.0036	.0001	.1326	.252	23.2
	0.55	.0031	.0003	.0390	.076	7.5
	0.37	.0075	.0003	.1287	.248	10.5
	0.40	.0066	.0002	.0253	.054	1.8
	0.23	.0082	.0001	.3186	.604	24.5
1700	0.26	.0051	.0002	.0173	.038	1.5
	0.31	.0030	.0002	.0338	.066	6.7
	0.34	.0044	.0004	.0116	.026	1.1
2200	0.16	.0072	.0003	.0736	.145	6.0
	0.30	.0382	.0003	.8045	1.543	13.0
	0.74	.0030	.0004	.0259	.052	4.9
	0.28	.0162	.0005	.2877	.554	8.7
	0.89	.0029	.0005	.0259	.052	5.1

Miscellaneous

magnetite content was determined using an Elliot Geophysical Co. hand held susceptibility meter. Approximately three readings per foot were recorded and arithmetically averaged then converted to "apparent magnetite content" using graphs supplied with the instrument. The fourth column to the right illustrates the mode of occurrence, a dot for a disseminated grain(s) and a slash for veins & veinlets.

carbonate probably all calcite was determined by applying 10% HCl along the core. Nearly all of the carbonate occurs along hairline fractures - the abundance of those fractures is illustrated by the closeness of the slashes in the ninth column to the right. Occasional veins & spg replacement (alteration) of plagioclase was noted but is not recorded on this log.

all other minerals were visually estimated. In general dots represent disseminated grains and slashes represent veins & veinlets.

Potassium feldspar alteration is represented in the 13th column to the right. Open rectangles = partial alteration; solid rectangles = complete (more or less) alteration to a chlorite-sericite mixture, usually dark blue-green in color.

Plagioclase, when altered, usually alters to sericite with secondary amounts of clay and chlorite, epidote and carbonate is minor. The alteration usually results in a pale to dark green soft material. The relative intensity of this type alteration is shown in the 11th column to the right. Less commonly the plagioclase alters to white sericite shown in the 12th column to the right.

Epidote in trace amounts is common throughout the core. Occassionally it is abundant, usually in the matrix of the rock, apparently as an alteration product. The relative amounts are shown in the 10th column to the right and in notes to the right of the rock column.

Secondary K-spar occurs in rare veins and veinlets throughout the length of the hole, the occurence of which is shown in the 8th column to the right. Some of the occurences noted may actually be "pink calcite".

Limonite: bright red to brown Fe oxides. From surface oxidation is common at the top of the hole and decreases to nil at approximately 140'. At 1250' to the bottom of the hole it occurs along fractures and as stain on sericitized plagioclase grains (dots); sometimes it becomes intense and the relative amounts are shown in the 6th column to the right.

"Blue stain" believed to be chloritic was noted in the interval 2250'-2850'. The stain occurs along fractures, is deep blue-green in color and is shown in the 7th column to the right.

Structure: solid horizontal lines show gouge zones. closely spaced "X's" show broken and crushed core. No notation reflects relatively solid core. Gradations are apparent. Solid lines drawn completely through the column show the orientation with respect to core axis along which slickensides were noted or there is other evidence for possible movement.

casing left in hole:
cloth & cement plug
flange - welded to BX casing
16' NX casing
50' BX casing suspended inside NX casing.

Drilling & Cost Data:
date started: 5 MAR 1976
date completed: 8 MAY 1976
total length: 3004 feet
core size: NX wireline
collar location: approximately 1000' FNL & 2300' FEL, sec. 16, T. 4 S., R. 11 E., Pinal Co., Ariz.
collar elevation: ~2370'
inclination: -90°

average footage per shift: 18.3
direct drilling cost = 12.49 /foot
mud, H_2O, etc. = 1.29 /foot
assaying = 0.66 /foot
splitting = 0.32 /foot
thin sections = 0.05 /foot
TOTAL $14.81 /foot

drilling contractor: JOY MANUFACTURING CO.

Logged by: J. P. VROMAN

Column headings: $CuFeS_2$, pyrite, quartz veins, Fe_3O_4, % Fe_3O_4, limonite, "blue stain", 2nd K-spar, $CaCO_3$, epidote, green sericite, white sericite, chlorite & sericite, STRUCT., ROCK

% Fe_3O_4 (downhole): 0.27, 0.69, 1.18, 0.53, 0.70, 0.58, 1.02, 0.50, 0.21, 0.40, 0.51, 0.55, 0.91, 0.79, 0.62, 0.17, 0.58, 0.53, 0.60, 0.38, 0.55, 0.54, 0.61, 0.72, 0.59, 0.30, 0.08, 0.23, 0.61, 0.24, 0.12, 0.26, 0.36, 0.36, 0.13, 0.27, 0.42, 0.25, 0.43, 0.26, 0.32, 0.26, 0.17, 0.14, 0.14, 0.25, 0.41, 0.20, 0.73, 0.78, 0.72, 1.08, 0.85, 0.49, 0.41, 0.19, 0.27, 0.28, 0.90, 0.76

Rock column: pegr

Summary Lithology & Alteration Log

0-16': no core - NX surface casing

zone of oxidation - brown limonite after pyrite & magnetite common - minor Cu oxide stain on fractures.

16-3004: (unless otherwise noted): Precambrian Oracle Granite: porphyritic quartz monzonite, fresh & unaltered. Specimens contain numerous pink to red K-feldspar phenocrysts measuring up to 1.5 inches in length. Together with somewhat smaller plagioclase grains they are surrounded by a medium grained matrix composed of quartz - plagioclase & K-feldspar. Biotite is generally minor, primary muscovite is rare.

pyrite, chalcopyrite, quartz veining more common than immediately below. Magnetite occurs in veins & veinlets more commonly than as disseminations.

rock strongly broken & crushed

Plagioclase strongly altered to green sericite.

possible fault zone with major movement

strong epidote in matrix - marked decrease in $CaCO_3$. extremely low magnetite zone extends ±4' above & below zone of strong epidote.

Plagioclase generally strongly altered to green sericite

1483½-1492: Laramide Quartz Latite Porphyry: upper contact @ 70° to core axis - lower @ 35°. Magnetite: 0.23%. No K-spar seen. Phenocrysts of quartz and former feldspars up to 0.2" occur in a quartz-rich fine-grained groundmass. Feldspars altered to green ser. Approx. 3 vol. % fine disseminated pyrite present. Dark gray. Former biotite altered to chlorite altered to sericite.

brecciated

zone of abundant brick red limonite occurring along fractures and as stain on plagioclase phenocrysts. The red plagioclase is soft and is probably sericitized.

speck of native copper

iron stained calcite crystals

strong epidote

zone of very low magnetite, potassium feldspars generally partially altered to sericite & chlorite

possible "healed" fault

strong epidote

2253.3-2254.5: Laramide Quartz Latite Porphyry - upper contact at 70° to core axis - lower contact at 45°. Chilled margin at upper contact not evident at lower. epidote and pyrite common. Lower portion brecciated.

2291-2297: brecciated and rehealed fault (?) zone.

zone of high pyrite, strongest chalcopyrite in hole. quartz veins & veinlets common, carbonate decreased, Feldspars generally altered to sericite with some chlorite.

2461-2461.5: Laramide Quartz Latite Porphyry upper contact @ 42° to core axis; lower at 39°
2462.5-2463.2: Laramide Quartz Latite Porphyry upper contact at 43° to core axis; lower at 45°

visible MoS_2 in quartz vein (2470-2480 = 38 ppm Mo)

2395'-2745': relatively fresh Oracle Granite

rehealed breccia

Plagioclase completely altered to green sericite, microcline generally altered to sericite and chlorite, magnetite probably destroyed, pyrite (disseminated) & qtz veinlets more common than above or below. Carbonate less abundant. Rock in general is more broken.

fresh Precambrian Oracle Granite

3004 feet is total length

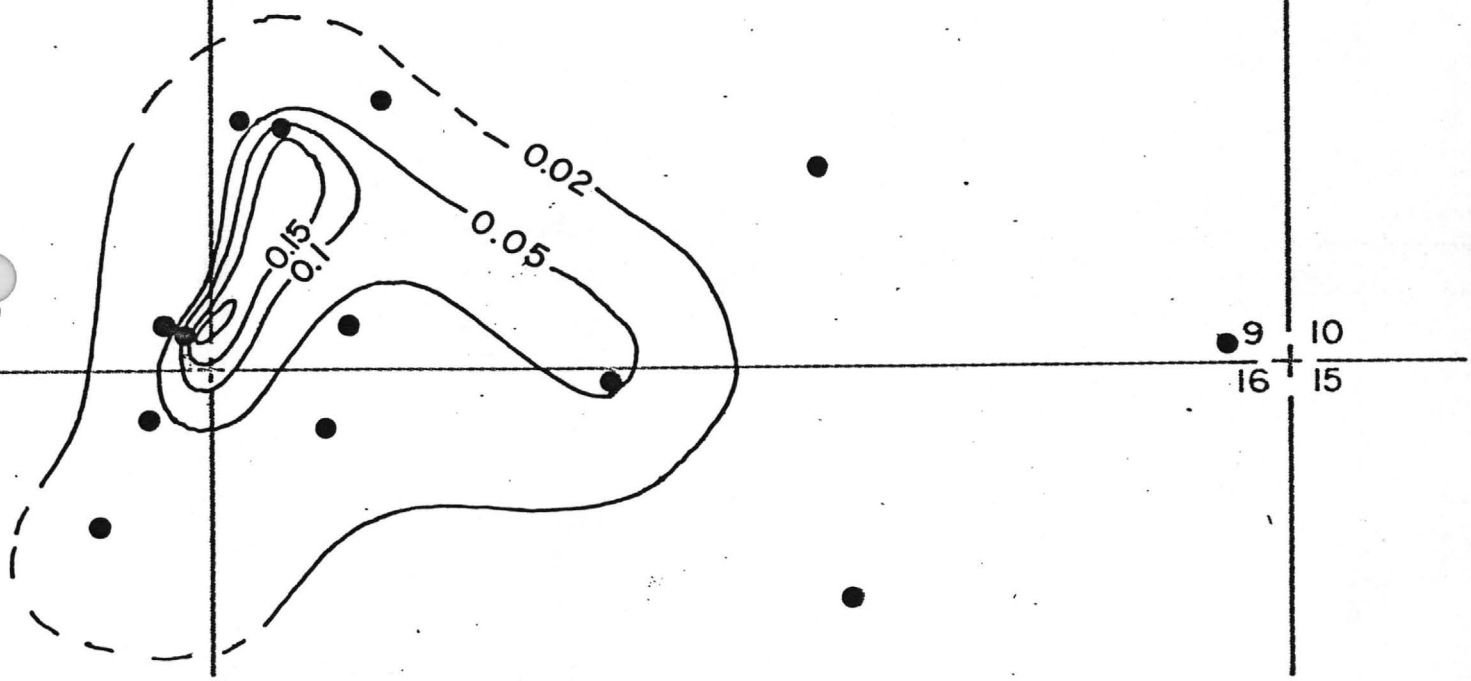
FIGURE 5

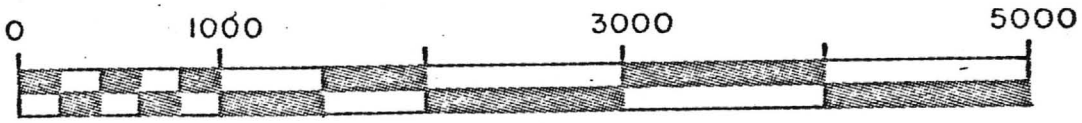
KELVIN PROJECT

T. 4 S., R. 13E.

PINAL CO., ARIZONA

PERCENT COPPER—
1500-2000' ELEVATION





SCALE IN FEET

FIGURE 6

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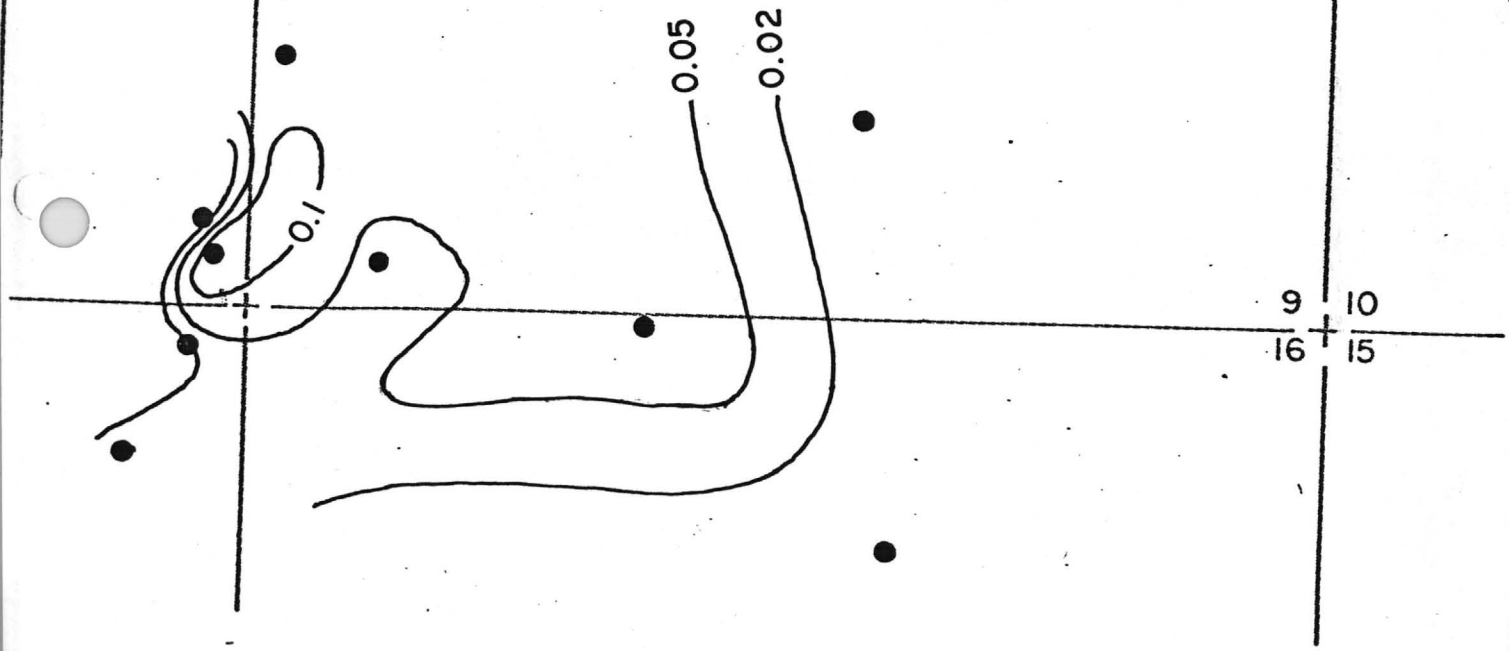
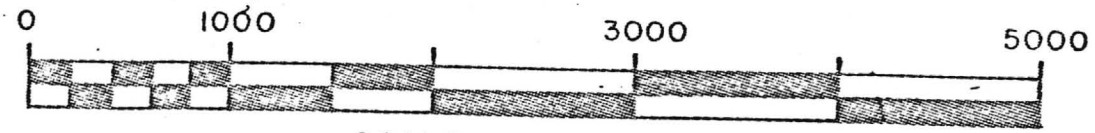
KELVIN PROJECT

T. 4 S., R. 13 E.

PINAL CO., ARIZONA

PERCENT COPPER—
1000-1500' ELEVATION





SCALE IN FEET

JULY 1976

FIGURE 7

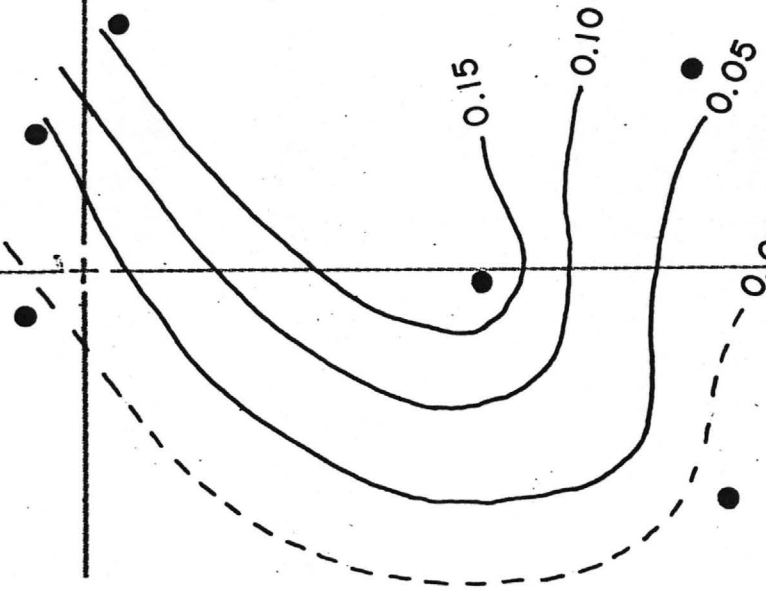
J. P. VROMAN

KELVIN PROJECT

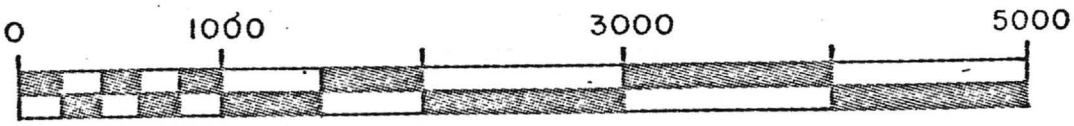
T. 4 S., R. 13 E.

PINAL CO., ARIZONA

PERCENT COPPER—
500-1000' ELEVATION



9 | 10
16 | 15



SCALE IN FEET

JULY 1976

FIGURE 8

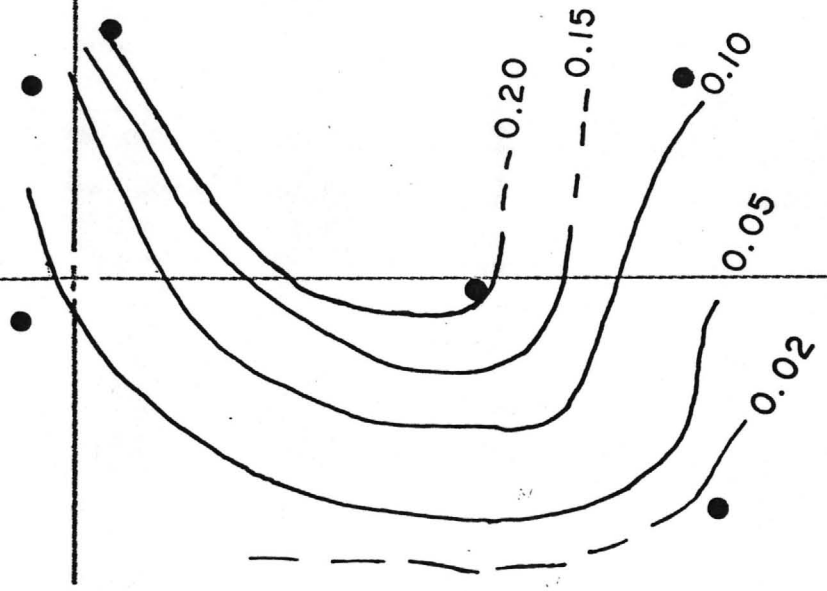
J. P. VROMAN

KELVIN PROJECT

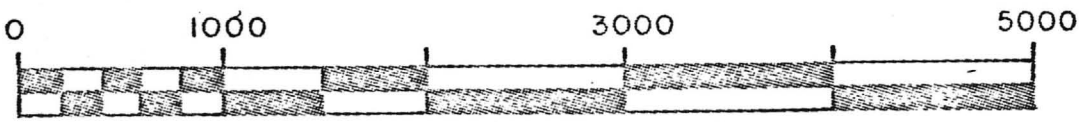
T. 4 S., R. 13 E.

PINAL CO., ARIZONA

PERCENT COPPER—
0-500' ELEVATION



9 | 10
16 | 15



SCALE IN FEET

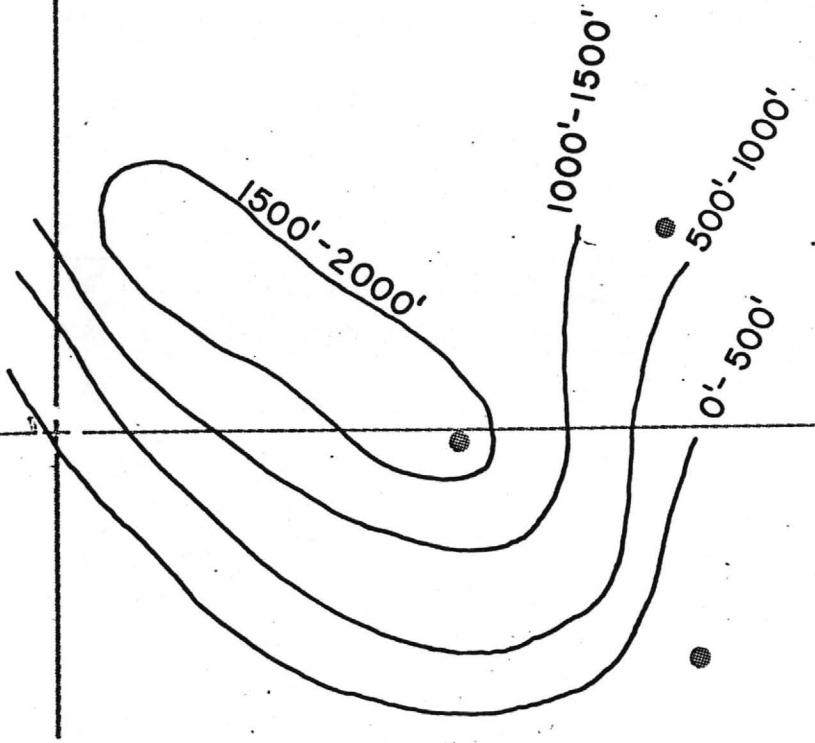
JULY 1976 FIGURE 9 J. P. VROMAN

KELVIN PROJECT

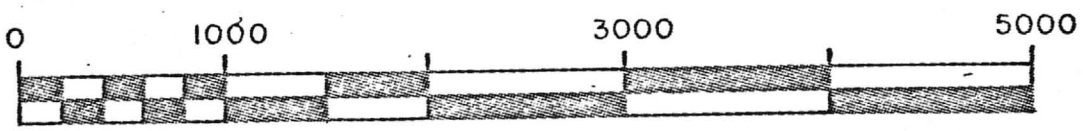
T. 4 S., R. 13 E.

PINAL CO., ARIZONA

.0 5 PERCENT COPPER CONTOUR
AT VARIOUS ELEVATIONS (generalized)



9 | 10
16 | 15



SCALE IN FEET

JULY 1976

FIGURE 10

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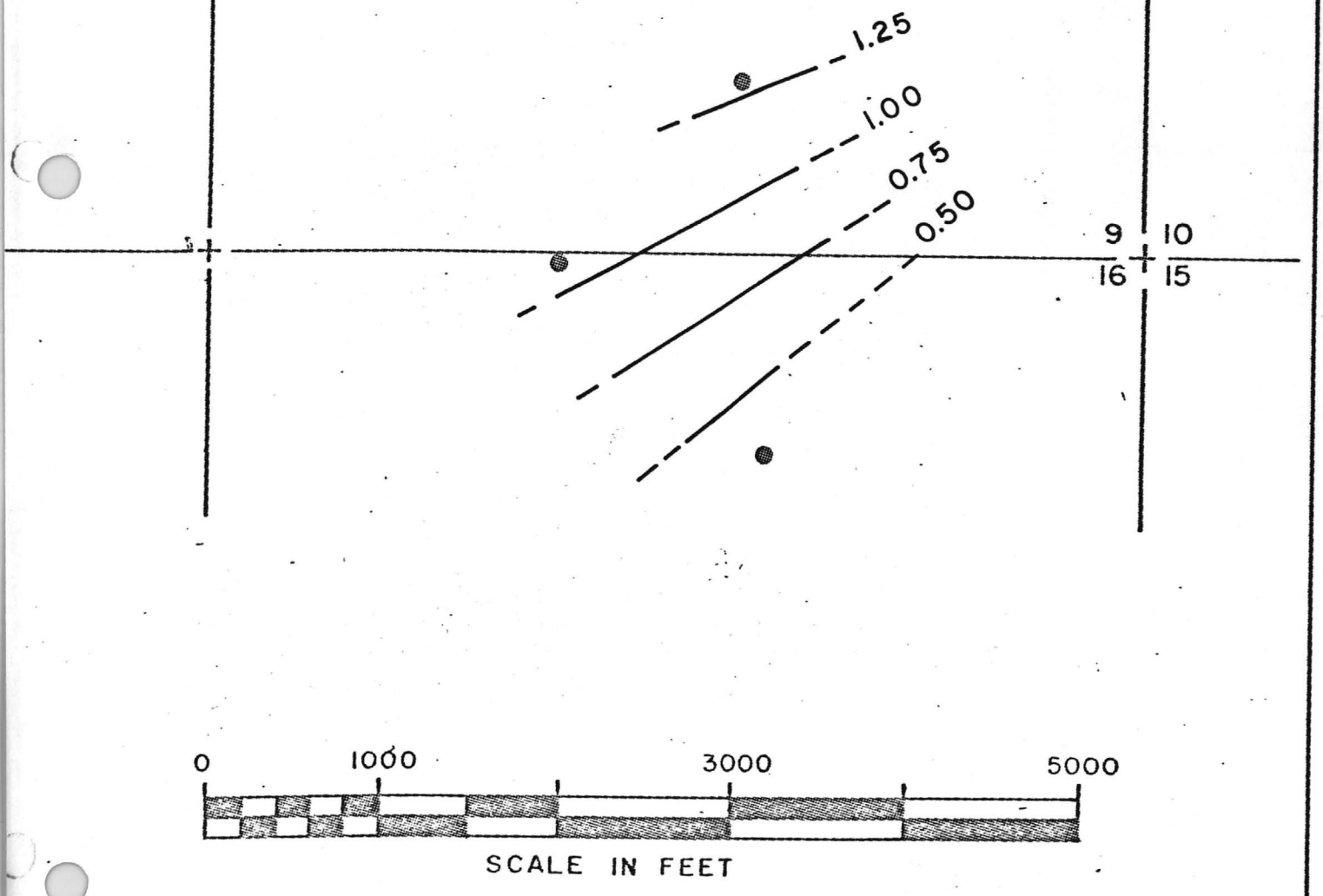
KELVIN PROJECT

T. 4 S., R. 13 E.

PINAL CO., ARIZONA

TOTAL WEIGHT PERCENT SULFIDES
0'-500' ELEVATION



SCALE IN FEET

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FIGURE II

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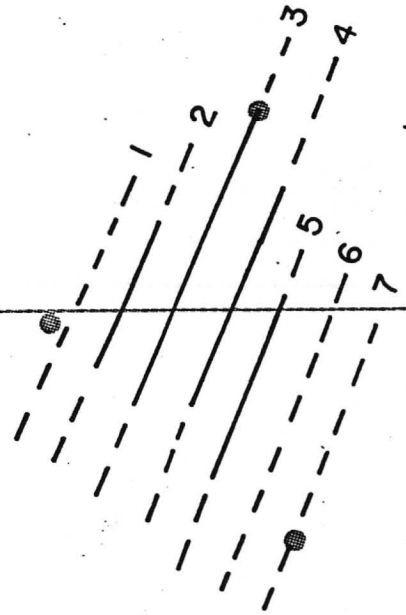
KELVIN PROJECT

T. 4 S., R. 13 E.

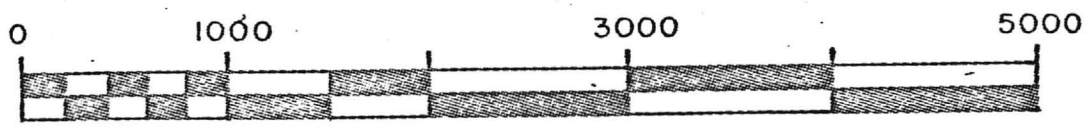
PINAL CO., ARIZONA

WEIGHT PERCENT PYRITE
WEIGHT PERCENT CHALCOPYRITE

0'-500' ELEVATION



9 | 10
16 | 15



SCALE IN FEET

JULY 1976

FIGURE 12

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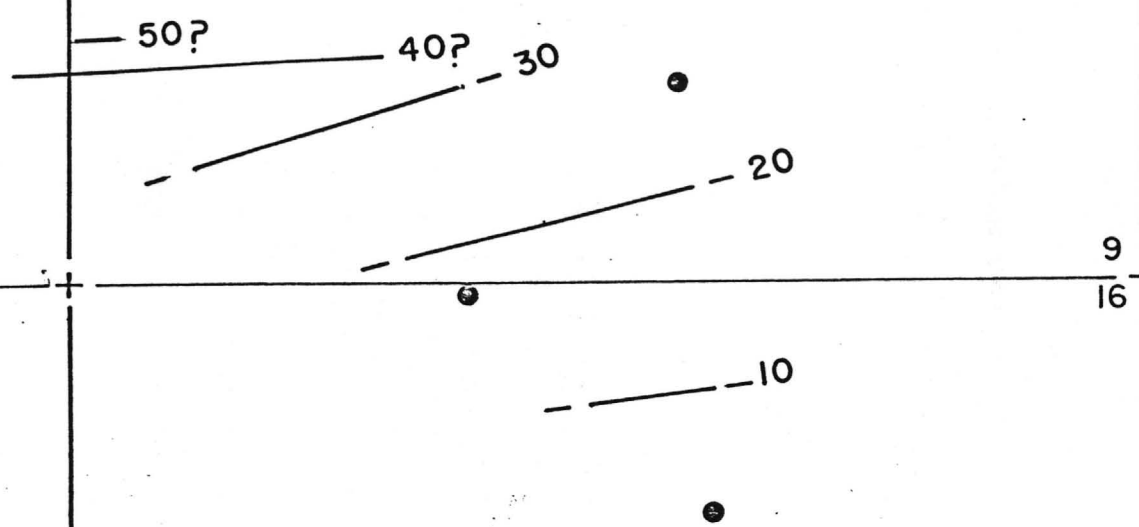
KELVIN PROJECT

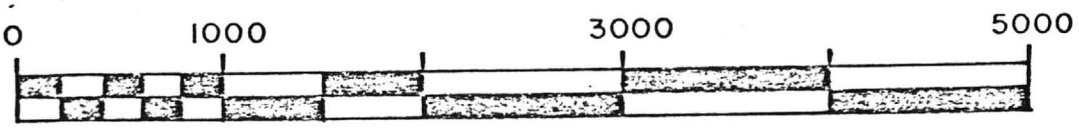
T. 4 S., R. 13 E.

PINAL CO., ARIZONA

MOLYBDENUM (parts per million)
0'-500' ELEVATION



9 | 10
16 | 15



SCALE IN FEET

JULY 1976

FIGURE 13

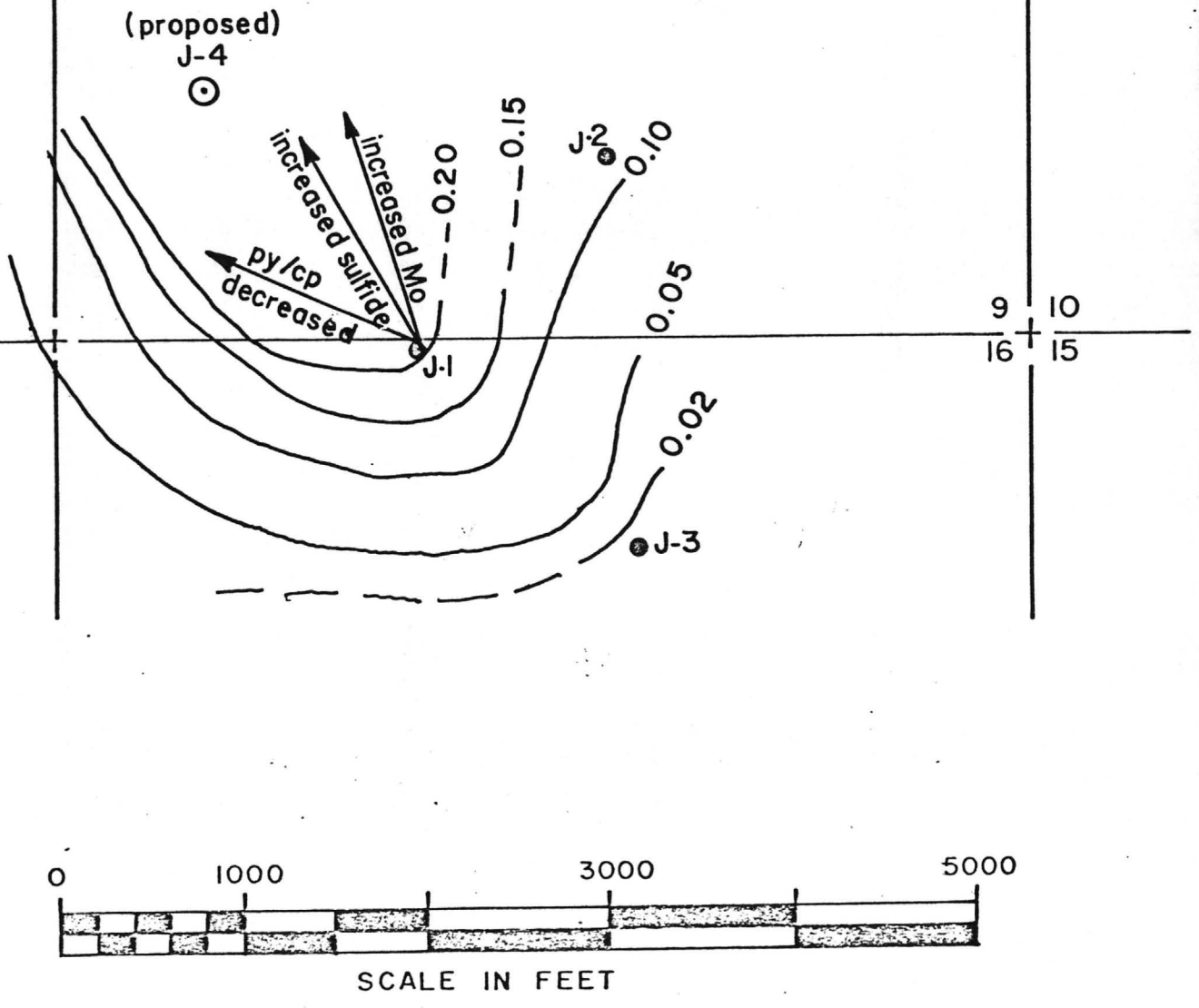
J. P. VROMAN

KELVIN PROJECT

T. 4 S., R. 13 E.

PINAL CO., ARIZONA

SUMMARY OF ANALYSIS OF PRIOR DRILLING 0 - 500' ELEVATION



JULY 1976

FIGURE 14

J. P. VROMAN

SECTION 13

PROJECT KELVIN DRILL HOLE NO. J-4 SCALE 1" = 100' PAGE NO. 1 OF 5

LENGTH	Fe (comp.)	ASSAYS (%) Cu	Mo	S	calc. wt % sulfide	Py/cp
300		.0240				
600	0.56	.0314	.0004	.4870	0.940	9.4
700	0.42	.0136	.0004	.1760	0.343	7.7

Miscellaneous

0-582: drilled by Minbanco Corporation:
started: 11/15/68
completed: 11/20/68
6½ inch hammer bit
Minbanco designation is hole J-2.

C.S.M.C. re-entered the hole 10/30/76 & designated the hole J-4.

Information from 0-582 from Minbanco Logs

chalcopy | pyrite | quartz in fns & vnlts | magn | Limonite | Mo Sc | secondary biotite | secondary K-spar | carbonate | epidote | green sericite | white sericite | chlorite/sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

23' = base of strong weathering

53' = base of surface weathering

590-670, 672-675, 677-689, 691-775 } Precambrian Oracle Granite

670-672, 675-677, 689-691 } Brecciated & rehealed Precambrian Oracle Granite. Average orientation of contacts = 55° to core axis.

690-[illegible] - numerous shears @ 45° to core axis

PROJECT KELVIN DRILL HOLE NO. J-4 SCALE 1" = 100'

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	calc. wt.% sulfide	py/cp
900	0.57	.0322	.0011	.7324	1.402	14.1
	0.68	.0145	.0005	.1842	0.359	7.6
1400	0.62	.0116	.0004	.0741	0.150	3.5

Miscellaneous

Columns: Chalcopy, pyrite, qtz. in fns & vnlts, magn, Limon, MoS_2, Secondary biotite, Secondary K-spar, Carbonate, Epidote, Green Sericite, White Sericite, Chlorite + Sericite, STRUCT., ROCK

Magnetite column values: 0.45, 0.40, 0.38, 0.33, 0.81, 0.70, 0.53, 0.83, 0.59, 0.65, 0.77, 0.96, 0.68, low, 0.38, 0.57

Summary Lithology & Alteration Log

PROPYLITIC (?) ALTERATION ASSEMBLAGE: Epidote common in veinlets, veins, in interstices & as alteration product after biotite. Mafic minerals are all generally chloritized. Secondary K-spar is common as vein envelopes (usually quartz-sulfide and in distinct "bands" - occassionally partially replacing plagioclase. Minor sericite occurs occassionally in groundmass, as aggregates, rare veinlets and occassionally as weak to moderate alteration along rims of plagioclase. Trace 2nd bi

775-776, 785-787, 790-793, 800-803, 806-809, 835-839, 908-974.5, 1110-1158 — Tertiary-Cretaceous Granodiorite Porphyry: a medium-gray rock with plagioclase phenocrysts up to 0.25 inch in a medium-grained (0.1") groundmass of plagioclase, quartz, biotite, magnetite and probable interstitial K-spar. well defined chilled margins up to 20 feet in width are generally present when in contact with Precambrian Oracle Granite or Precambrian Diabase. Often when dikes of this unit are less than 30 feet in width the entire dike is chilled and the typical equigranular to slightly porphyritic texture is not present. Average magnetite content is 0.94% (some may be added).

1025-1028, 1034-1042 — Precambrian Diabase

776-785, 787-790, 793-800, 803-806, 809-835, 839-908, 974.5-1025, 1028-1034, 1042-1110, 1158-1603 — Precambrian Oracle Granite: porphyritic quartz monzonite with numerous pink K-spar phenocrysts up to 1.5" (generally euhedral); plagioclase is generally 0.25" to 0.50" in diameter in a coarse to medium grained groundmass of quartz, K-spar, plagioclase, biotite, minor magnetite and hornblende.

brecciated & healed Precambrian Oracle Granite

abundant limonite after pyrite along [illegible] and as minor staining on plagioclase.

PROJECT KELVIN DRILL HOLE NO. J-4 SCALE 1" = 100' PAGE NO. 3 OF 5

LENGTH	% Fe_3O_4 (comp)	ASSAYS (%) Cu	Mo	S	calc. wt. % sulfide	py/cp	Miscellaneous
1600							
1700							
	0.48	.0400	.0005	.7000	1.350	10.7	
1800							
1900							
	0.17	.0257	.0060	1.0803	2.047	26.6	
2000							
	2.43	.2568	.0109	3.7350	7.240	8.8	1920'-3040' = 1120' = zone of high molybdenum = 67 PPM Mo (compared to 6 PPM above & 5 PPM below zone.
2100							
	0.25	.0716	.0065	1.0919	2.114	9.2	2040'-2400' = 360' = zone of high cobalt = 57 PPM Co (compared to 16 PPM above & 21 PPM below zone.
2200							

Chalcopy. | Pyrite | Quartz in vns & vnlts | Magnet. | Limonite | MoS_2 | Secondary biotite | Secondary K-spar | Carbonate | Epidote | green sericite | white sericite | chlorite + sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

1532-1589: zone of abundant brick red limonite after pyrite in veinlets and along fractures (transported?) rare granular pyrite remains in centers of some veinlets

603-1616, 1632-1683, 1688-1703, 1726-1743, 1781-1786, 1813-1883, 1912-2003: Paleocene Teacup Granodiorite: (see description below).

1683-1688, 1709-1726, 1743-1781, 1786-1813, 2060-2071: Precambrian Diabase

1883-1890, 1905-1912, 2038-2043, 2045-2056: probable former porphyry that has undergone nearly texture destructive alteration. Very fine-grained, light colored (c.i. = 15). Former phenocrysts now altered completely to sericite & minor clay. Former matrix altered to sericite & chlorite. Groundmass composed of matrix sericite & clay(?). Patches of chlorite common in upper two intercepts = secondary biotite in lower

"SERICITIC" ALTERATION ASSEMBLAGE:
Epidote generally weak to absent, mafics strongly partially chloritized at top of interval becoming weaker downhole & finally becomes absent. Secondary K-spar weaker than above or below. Secondary biotite only locally present. Sericite varies, generally moderate to strong in former plagioclase phenocrysts often strong in matrix and rarely in K-spar phenocrysts = minor to weak clay often associated with sericite which probably gives alteration product different shades of green color (light green tagged under green sericite, dark green tagged under "chlorite + sericite".

1616-1632, 1703-1709, 1890-1905, 2003-2038, 2043-2045, 2056-2060, 2071-2272: Precambrian Oracle Granite

PROJECT KELVIN DRILL HOLE NO. J-4 SCALE 1" = 100' PAGE NO. 4 OF 5

LENGTH	% Fe_3O_4 (comp.)	ASSAYS (%) Cu.	Mo	S	calc. wt.% sulfide	py/cp
2300						
	3.10	.2304	.0076	1.5850	3.196	3.8
	3.87	.3852	.0022	1.5000	3.190	1.9
2400						
	0.14	.3925	.0192	0.8700	2.020	0.78
2500						
2600	0.30	.1396	.0071	0.3595	0.812	1.0
2700						
	0.17	.1450	.0058	1.3540	2.680	5.4
2800						
	0.22	.1127	.0035	0.5020	1.052	2.2
2900						
3000	0.14	.0382	.0020	0.9950	1.900	16.2

Miscellaneous

1460'-2600'=610"= zone of high Tungsten = 9 ppm (compared to 4 ppm above & 5 ppm below).

110' = 0.4118% copper + 0.0127% Molybdenum = 0.4753% Copper equiv. (from 5 replicate assays)

280' = 0.2836% copper + 0.0104% Molybdenum = 0.3356% copper equiv.

540' = 0.2118% copper + 0.0083% Molybdenum = 0.2533% copper equiv.

chalcopy. | pyrite | quartz in vns. & vnlts | magn | Limonite | MoS_2 | secondary biotite | secondary K-spar | Carbonate | Epidote | green sericite | white sericite | chlorite + sericite | STRUCT. | ROCK

Summary Lithology & Alteration Log

2272-2401, 2486-2493, 2500-2502: **Precambrian (?) Diabase:** generally dark gray rock - hers fine-grained and often exhibiting ophitic texture with interlocking grains of plagioclase and pyroxene (probably augite) up to 0.1 inch in length. Rock here is strongly altered with secondary biotite. Average magnetite content = 3.36%; magnetite increase toward bottom of unit as probably does secondary biotite

Secondary K-spar and/or secondary biotite common. Secondary biotite probably associated with magnetite in diabase (becomes very strong near 2400'). Secondary K-spar common rimming plagioclase grains & in veinlets (veins become more common at bottom of interval. Epidote generally weak (except locally strong in granodiorite porphyry II & as veinlets in diabase. Mafics only weakly chloritized (spotty). Sericite alteration of plagioclase weak to "dusted". Overall alteration assemblage = POTASSIC

2465-2482, 2520-2584, 2626-2645: **Tertiary-Cretaceous Granodiorite Porphyry II:** medium to dark gray rock with approximately 50 percent phenocrysts of anhedral quartz up to 0.3" in diam, subhedral plagioclase up to 0.4 inch in length and euhedral to subhedral biotite up to 0.1 inch in a medium grained groundmass of K-spar, quartz, biotite (possibly secondary). Magnetite = 0.27%. Much darker in appearance than Teacup Granodiorite although they may be closely related. Probably correlative with Rhyodacite Porphyry (T) of the U.S.G.S.

2482-2486: gouge with pC Oracle & Granodiorite porphy

2401-2465, 2493-2500, 2502-2520, 2584-2626, 2645-2790, 2793-2800, 2812-2815, 2817-2830: **Precambrian Oracle Granite**

2790-2793, 2800-2812, 2815-2817, 2830-3039: **Tertiary (Paleocene) Teacup Granodiorite** medium to light gray rock with 30-60 percent phenocrysts of (in order of decreasing abundance) plagioclase (up to 0.2-0.3 inch), quartz (subhedral up to 0.3 inch), and biotite (up to 0.2 inch) in a fine to medium-grained groundmass of quartz, K-spar (minor) plus plagioclase, biotite and possible hornblende. Average magnetite = 0.18%. Probably correlative with porphy between 1630 and 2005 above.

weak to moderate alteration of plagioclase to sericite.

PROJECT KELVIN DRILL HOLE NO. J-4 SCALE 1"=100' PAGE NO. 5 OF 5

LENGTH	% Fe_3O_4 (comp.)	ASSAYS (%) Cu	Mo	S	calc. wt. % sulfide	py/cp	Miscellaneous
3100	0.21	.0108	.0005	0.9250	1.741	54.8	3104 is total length

Alteration columns: chalcopy, pyrite, quartz in ms. & vnlts, magnetite, Limonite, MoSz, secondary biotite, secondary K-spar, Carbonate, Epidote, green Sericite, white Sericite, chlorite + sericite, STRUCT., ROCK

Summary Lithology & Alteration Log

"green sericite" in this interval may actually be chlorite in sheared and gouge zones

3039-3104: Precambrian Oracle Granite:

secondary K-spar extremely weak, secondary biotite, epidote & quartz veining generally absent, carbonate in occasional veinlets, mafics generally altered to chlorite, plagioclase weakly altered to sericite. (porphyritic)

date started: 30 Oct. 1976
date completed: 5 Jan. 1977
total length: 3104 feet
core size: NX wireline: 582-3104
collar location: approximately 840' FWL & 1400' FSL, section 9, T. 4 S., R. 13 E., Pinal Co., Arizona
collar elevation: ~ 2133 feet
inclination: -90°
drilling contractor: JOY MANUFACTURING CO.

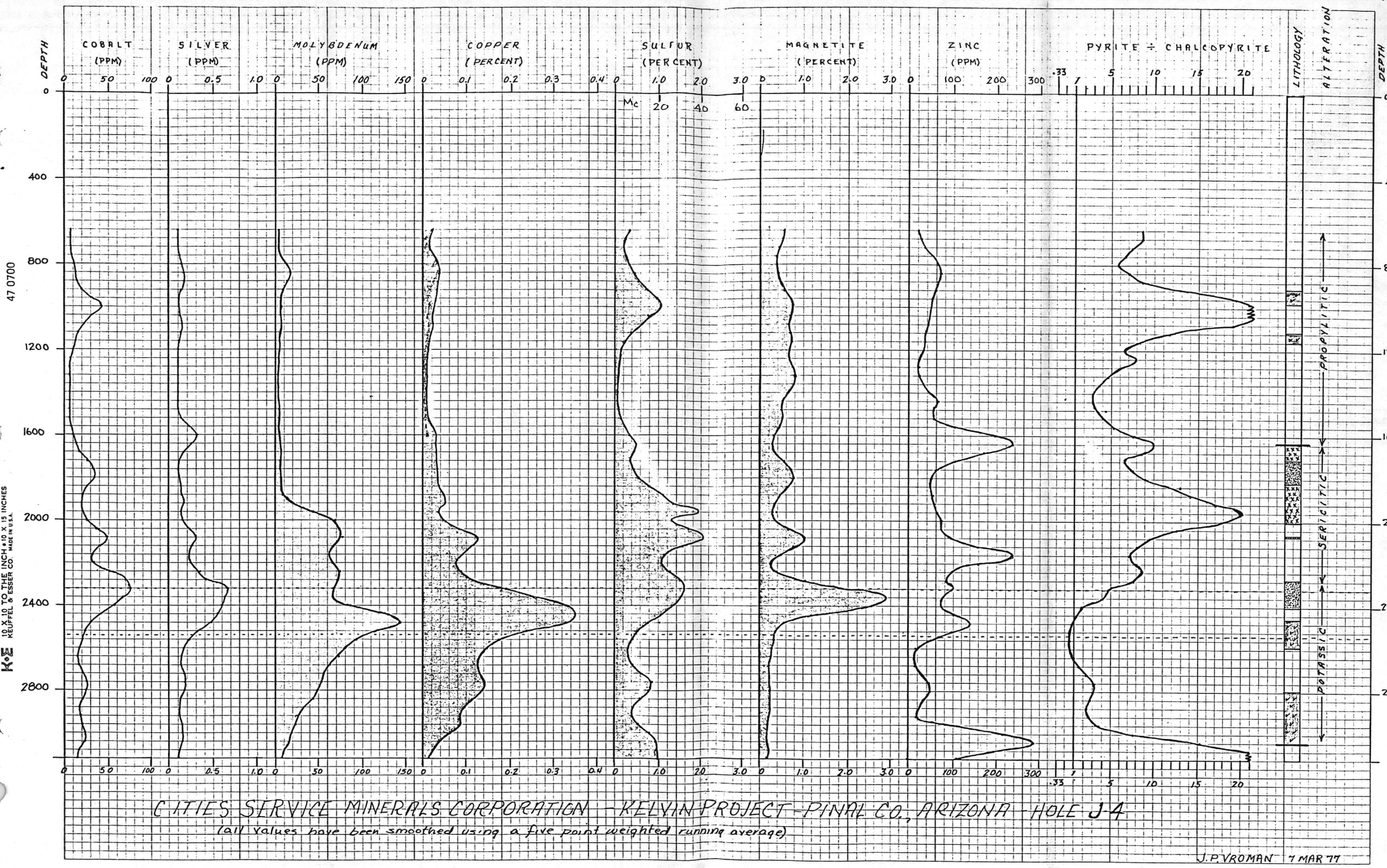
Average footage/shift = 17.7

Direct Drilling Cost:	13.73/ft
Mud, additives, water:	.83/ft
Reaming	.76/ft
Casing, time & left in hole	.84/ft
Assaying	.87/ft
Splitting	.59/ft
Thin sections	.05/ft
(2513') TOTAL	$17.67/ft

CASING LEFT IN HOLE:

17 feet (0-17): 8 5/8"
584 feet (0-584): 4"
(capped with tin can in end of casing).

Logged By: J. P. VROMAN



47 0700

10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.

CITIES SERVICE MINERALS CORPORATION - KELVIN PROJECT - PINAL CO., ARIZONA - HOLE J-4

(all values have been smoothed using a five point weighted running average)

J.P. VROMAN 7 MAR 77

MEMORANDUM

TIES SERVICE MINERALS CORP. DATE May 3, 1977

TO C.S.M.C. Staff _____ DEPT.

FROM J. P. Vroman _____ DEPT.

RE: Replicate assays on crusher rejects from drill core

The Tucson office recently had 18 samples analyzed for copper and molybdenum at five different local laboratories. Each sample was a crusher reject of a 10-foot interval of NXWL core. A tabulation of the results of this test is enclosed for your examination.

It should be noted that copper assays were repeated within 10 percent of the mean value 78.9% of the time. One lab (B) reported within 10 percent of the mean value 100% of the time while another lab (D) reported within 10 percent of the mean value only 66.7% of the time.

Also, molybdenum assays were reported within 30 percent of the mean value 72.2% of the time. One lab (D) reported within 30 percent of the mean value 83.3% of the time while another lab (E) reported within 30 percent of the mean value only 61.1% of the time. Most labs reported greater than a 30 percent deviation of the mean over the full range of values. However, all of the greater than 30% deviations for lab B occurred at the low end of the range. Variations in reported Mo values up to 767% occurred (sample J4-177).

These results may have a bearing on your interpretation of geochemical results - especially Mo surveys.

It is hoped that the enclosed sheet will be self-explanatory - if you do have any questions, please call me in Tucson.

JPV:sbc
atch.

AMPAD · EFFICIENCY® LINE NO. 6636

Cu × 1.8363 wt. Py × 1.532

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5 PPM Ag	6 wt% Py	7 Py/CP	8 PPM Co	9 PPM W	10 vol% CP (Cu × 1.8)	11 Vol % Py	12 vol% Fe_3O_4	13 MC
1880-1920[1]	.0498	.0021	.0058	1.33	.16	2.39	17.1	20	6.0	.09	1.24	.37	
1920-1960[2]	.0385	.0043	.0062	1.92	.13	2.24	20.4	21	6.6	.07	1.19		23.2
1960-2000[3]	.0458	.0069	.0073	1.29	.15	2.32	17.8	26	7.3	.08	1.23		
2000-2040[4]	.0819	.0073	.0071	1.69	.22	3.00	12.5	37	8.8	.15	1.63	.65	
2040-2080[5]	.1289	.0078	.0095	2.04	.30	3.57	9.6	49	8.1	.24	1.90		
2080-2120[6]	.1128	.0068	.0160	1.54	.25	2.67	8.1	40	7.9	.21	1.42		
2120-2160[7]	.0919	.0062	.0235	1.12	.22	1.92	8.1	32	7.9	.17	1.02		
2160-2200[8]	.0782	.0067	.0160	1.07	.24	1.86	8.1	34	8.6	.14	.99		
2200-2240[9]	.0879	.0074	.0095	1.24	.35	2.16	8.6	51	9.6	.16	1.15		
2240-2280[10]	.1148	.0071	.0082	1.48	.21	2.56	7.8	70	9.6		1.36		39.3
2280-2320[11]	.1894	.0068	.0098	1.58	.68	2.60	4.7	75	8.7				
2320-2360[12]	.2567	.0067	.0077	1.49	.63	2.30	3.1	68	7.9	.47	1.22	2.89	28.7
2360-2400[13]	.3288	.0056	.0076	1.30	.60	1.81	1.9		8.5	.60	.76		
2400-2440[14]	.3513	.0130	.0101	1.02	.55	1.25	1.2	41	10.4	.65	.66		
2440-2480[15]	.3289	.0145	.0141	.79	.48	.86	(-1.1) .905	30	10.8		.46		
[illegible]-2520[16]	.2393	.0116	.0095	.56	.32	.59	(-1.2) .855	24	9.8	.44	.31		
2520-2560[17]	.1750	.0093	.0048	.41	.22	.43	(-1.2) .843	21	8.8	.32	.23	.35	3.5
2560-2600[18]	.1464	.0080	.0019	.33	.17	.35	(-1.2) .83	18	7.8	.27	.19		
2600-2640[19]	.1300	.0072	.0014	.33	.14	.38	1.0	16	6.0	.24	.20		
2640-2680[20]	.1280	.0062	.0016	.42	.14	.55	1.5	17	4.6	.24	.29		
2680-2720[21]	.1311	.0055	.0028	.61	.17	.87	2.3	21	4.5	.24	.47		
2720-2760[22]	.1408	.0053	.0045	.84	.18	1.31	3.2	26	5.5	.26	.70	.21	
2760-2800[23]	.1395	.0049	.0046	.79	.17	1.21	3.0	25	5.9	.26	.66	.22	
2800-2840[24]	.1171	.0043	.0032	.60	.13	.95	2.8	21	5.0	.2	.50		
2840-2880[25]	.0950	.0032	.0024	.42	.12	.65	2.4	18	4.2	.17	.36		11.1
2880-2920[26]	.0836	.0026	.0019	.41	.12	.65	2.7	19	4.2	.15	.36		
2920-2960[27]	.0560	.0023	.0102	.56	.15	.92	3.7	21	5.3	.16	.49		
2960-3000[28]	.0617	.0019	.0214	.80	.15	1.38	7.7	24	6.2	.11	.76		
3000-3040[29]	.0389	.0016	.0286	.93	.15	1.67	15.2	24	5.3	.08	.89		
3040-3080[30]	.0205	.0010	.0194	.94	.12	1.73	23.8	18	4.3	.04			
3080-3104[31]	.0144	.0003	.0109	.97	.11	1.78	44.5	15	3.2	.06	.95		

AMPAD EFFICIENCY® LINE NO. 6636

CSMC Kelvin Proj. 1, Hole J-1
Five Point Weighted Running Average

∠0.2 = 0.1
(for comp.)

Cu × 1.8363 wt py × .532

Page 1 of 2

INTERVAL	1 % Cu	2 % Mo	3 % Zn	4 % S	5 PPM Ag	6 wt % Py	7 Py / CP	8 PPM Co	9 PPM W	10 Vol % CP	11 Vol % Py	12 Vol % Fe_2O_3	13 Mo
600 - 640 1	.0238	.0004	.0022	.35	.10	.60	8.6	8	4.4	.04	.32	.56	
640 - 680 2	.0176	.0004	.0028	.25	.10	.43	8.6	8	4.0	.08	.23	.61	11.6
680 - 720 3	.0170	.0004	.0037	.21	.10	.37	7.4	8	3.7	.06	.20	.22	
720 - 760 4	.0224	.0007	.0057	.24	.11	.41	6.8	9	4.6	.04	.22	.35	
760 - 800 5	.0335	.0013	.0063	.34	.13	.58	5.8	11	5.2	.06	.31		
800 - 840 6	.0395	.0018	.0073	.46	.16	.78	7.1	13	6.5	.07	.41		
840 - 880 7	.0365	.0014	.0062	.55	.16	.96	8.7	14	6.5	.07	.51	.46	15.6
880 - 920 8	.0341	.0009	.0060	.77	.13	1.37	13.7	20	6.2	.07	.73	.57	
920 - 960 9	.0301	.0007	.0051	.97	.11	1.75	19.4	32	5.8	.06	.93	.71	3550
960 - 1000 10	.0240	.0008	.0050	1.05	.11	1.91	27.3	42	5.7	.04	1.02	.73	2668
1000 - 1040 11	.0220	.0007	.0046	.78	.12	1.42	23.2	31	5.5	.04		.67	
1040 - 1080 12	.0221	.0008	.0043	.68	.14	1.14	9.0	23	5.6	.04		.64	
1080 - 1120 13	.0199	.0007	.0037	.39	.12	.70	12.7	16	4.8	.04			
1120 - 1160 14	.0174	.0006	.0037	.24	.11	.42	3.4	13	4.1	.06	.22	.72	
1160 - 1200 15	.0135	.0005	.0033	.15	.10	.26	6.5	10	3.9	.02	.14	.66	1335
1200 - 1240 16	.0110	.0004	.0025	.14	.10	.24	3.0	7	3.5	.02	.13	.67	1365
1240 - 1280 17	.0102	.0004	.0023	.11	.10	.18	6.0	6	3.2	.02	.10	.75	1355
1280 - 1320 18	.0111	.0003	.0025	.09	.10	.14	2.7	6	3.2	.02	.07		13.5
1320 - 1360 19	.0108	.0008	.0032	.07	.10	.11	3.7	6	3.4	.02	.06		
1360 - 1400 20	.0098	.0003	.0047	.06	.10	.09	2.8	6	3.2	.02	.05	.64	
1400 - 1440 21	.0101	.0004	.0064	.06	.10	.09	3.0	6	2.8	.02	.05	.51	
1440 - 1480 22	.0113	.0004	.0055	.08	.10	.13	4.5	6	2.7	.02	.07		
1480 - 1520 23	.0165	.0004	.0055	.13	.14	.21	4.2	6	3.2	.03	.11	.51	
1520 - 1560 24	.0234	.0004	.0105	.22	.22	.37	5.3	5	4.1	.04	.20	.45	
1560 - 1600 25	.0313	.0005	.0197	.38	.31	.68	7.6	15	4.7	.06	.36	.30	
1600 - 1640 26	.0316	.0006	.0234	.49	.25	.90	10.0	14	4.3	.06	.44	.27	
1640 - 1680 27	.0305	.0007	.0169	.43	.16	.77	8.6	18	3.5	.06	.41		
1680 - 1720 28	.0327	.0006	.0103	.38	.11	.66	6.6	26	2.7	.06	.35	.56	
1720 - 1760 29	.0348	.0006	.0060	.44	.10	.76	7.6	33	2.6	.06	.40		
1760 - 1800 30	.0364	.0009	.0051	.57	.11	.99	9.0	34	3.2	.04	.50	.75	
1800 - 1840 31	.0374	.0009	.0047	.30	.13	1.43	13.0	27	4.2	.04	.96		
1840 - 1880	.0485	.0009	.0054	1.11	.14	1.98	14.1	21	5.0		1.06		

AMPAD · EFFICIENCY® LINE NO. 6636

% Copper**

INTERVAL	SAMPLE	American Analytical LAB A	Skyline LAB B	Rocky Mtn Geochem LAB C •	Southwest Assay LAB D	Cities Service Miami LAB E	MEAN
2300-2310 1	J4-172	.43	.44	.38	.40	.43	.41
2310-2320 2	-173	(.33)	.29	.27	(.24)	.26	.28
2320-2330 3	-174	.13	.15	(.10) (.15)	.14	.15	.14
2330-2340 4	-175	.27	.28	(.17) (.30)	(.31)	.26	.26
2340-2350 5	-176	(.34)	.46	.44 (.46)	(.40)	(.51)	.44
2350-2360 6	-177	(.11)	.12	.13	(.15)	.13	.13
2360-2370 7	-178	.12	.13	(.16)	.13	(.11)	.13
2370-2380 8	-179	(.49)	.39	.38	(.32)	.43	.40
2380-2390 9	-180	.56	.48	.50	(.64)	(.42)	.52
2390-2400 10	-181	.37	.40	.44	.45	.40	.41
2400-2410 11	-182	.46	.48	.40	(.52)	(.39)	.45
2410-2420 12	-183	.25	.26	.24	.25	(.12)	.22
2420-2430 13	-184	.28	.32	.28	.34	.31	.31
2430-2440 14	-185	.36	.35	.38	.34	.38	.36
2440-2450 15	-186	.53	.57	.58	.56	.55	.56
2450-2460 16	-187	.30	.32	.34 (.35)	.34	.29	.32
2460-2470 17	-188	.56	.55	.61	.57	.55	.57
2470-2480 18	J4-189	.40	.40	(.33) (.46)	.43	.43	.41
19							
2300-2480 20	MEAN	.3498	.3550	.3406 (.3594)	.3628	.3400	.3511
" " 21	Cu. Equiv. Mo = 5x Cu	.4085	.4044	.3918 (.4124)	.4086	.3795	.4021
" " 22	% deviat. from mean	1.6	0.6	2.6 (2.6)	1.6	5.6	0.0
2370-2480 23	MEAN	.4186	.4109	.4073 (.4200)	.4327	.3882	.4118
" " 24	Cu Equiv. Mo: 5x Cu	.4921	.4719	.4733 (.4830)	.5002	.4362	.4753
" " 25	% deviat. from mean	3.5	0.7	0.4 (1.6)	5.2	8.2	0.0
26							
27	ALL SAMPLES = CRUSHER REJECTS						
28							
29	** greater than 10% deviation from mean circled						
30							
# deviations from mean 31		-4	-0	-4	-6	-5	
COST		$72.00	$101.25	$73.00	$90.00		

PPM Molybdenum*

INTERVAL	SAMPLE	American Analytical LAB A	Skyline LAB B	Rocky Mtn Geochem. LAB C •	Southwest Assay LAB D	Cities Service Miami LAB E *	MEAN
2300-2310 1	J4-172	(154)	120	100	(154)	(62)	118
2310-2320 2	-173	73	60	53	81	54	64
2320-2330 3	-174	59	46	(27) (36)	53	55	46
2330-2340 4	-175	151	150	(59) (166)	(168)	73	128
2340-2350 5	-176	41	44	33 (59)	56	(24)	43
2350-2360 6	-177	13	(6)	(11)	16	(46)	18
2360-2370 7	-178	(6)	(6)	(11)	(24)	(43)	18
2370-2380 8	-179	26	(12)	(12)	20	(35)	21
2380-2390 9	-180	32	(18)	27	38	30	29
2390-2400 10	-181	24	20	26	27	29	25
2400-2410 11	-182	(119)	85	97	96	(42)	88
2410-2420 12	-183	(328)	220	225	231	191	239
2420-2430 13	-184	99	95	97	119	89	100
2430-2440 14	-185	143	120	140	111	110	125
2440-2450 15	-186	248	280	225	321	193	253
2450-2460 16	-187	238	180	(330) (225)	209	179	227
2460-2470 17	-188	70	55	74	72	91	72
2470-2480 18	J4-189	(289)	260	198 (242)	244	(71)	217
19							
2300-2480 20	MEAN	117	99	102 (106)	113	79	102
" " 21							
" " 22	% deviat. from mean	14.7	2.5	0.0 - (3.9)	11.8	22.5	0.0
2370-2480 23	MEAN	147	122	132 (126)	135	96	127
" " 24							
" " 25	% deviat. from mean	15.7	3.9	3.9 (0.8)	6.3	24.4	0.0
26							
27							
28							
29	■ greater than 30% deviation from mean circled						
30							
# deviations from mean 31		-5	-4	-6	-3	-7	

• number in parenthesis reflect rerun values.

* converted from reported MoS_2 values

AMPAD · EFFICIENCY, LINE NO. 6636

CSMC KELVIN PROJECT: HOLE J-4

completed 24 JAN 77

INTERVAL	ASSAY 1 % Cu.	Cu x 2.8885 2 wt. % Cp	Cu x 1.00925 3 % S in Cp	ASSAY 4 % S	column 4 minus column 3 5 % S in py	column 5 x 1.871 6 wt. % py	column 2 + column 6 7 TOTAL SULFIDES	ASSAY 8 Py/Cp	ASSAY 9 % Mo	ASSAY 10 % Fe_3O_4	ASSAY 11 % Zn	ASSAY 12 PPM Ag	ASSAY 13 PPM Co	PP
600-640 1	.0314	.0907	.0317	.4870	.4553	.852	.94	9.4	.0004	.56	.0023	<0.2	8	
640-680 2	.0145	.0419	.0146	.1630	.1484	.278	.32	6.6	.0004	.62	.0022	<0.2	8	
680-720 3	.0139	.0402	.0140	.1850	.1710	.320	.36	8.0	.0003	.35	.0020	<0.2	8	
720-760 4	.0125	.0361	.0126	.1800	.1674	.313	.35	8.7	.0004	.30	.0091	<0.2	8	
760-800 5	.0391	.1129	.0395	.3240	.2845	.532	.64	4.7	.0006	.44	.0024	<0.2	10	
800-840 6	.0550	.1589	.0556	.5870	.5314	.994	1.15	6.3	.0038	.39	.0126	0.2	16	
840-880 7	.0236	.0682	.0238	.3680	.3442	.644	.71	9.4	.0006	.42	.0024	0.2	12	
880-920 8	.0378	.1092	.0382	.7600	.7218	1.351	1.46	12.4	.0006	.46	.0084	<0.2	14	
920-960 9	.0385	.1112	.0389	.9230	.8841	1.654	1.76	14.9	.0008	.92	.0037	<0.2	20	
960-1000 10	.0134	.0387	.0135	1.7250	1.7115	3.202	3.24	82.7	.0009	.73	.0054	<0.2	80	
1000-1040 11	.0210	.0607	.0212	.1335	.1123	.210	.27	3.5	.0004	.70	.0042	<0.2	16	
1040-1080 12	.0291	.0841	.0294	1.0390	1.0096	1.889	1.97	22.5	.0012	.49	.0056	0.2	24	
1080-1120 13	.0148	.0427	.0149	.2470	.2321	.434	.48	10.2	.0005	.68	.0021	<0.2	12	
1120-1160 14	.0213	.0615	.0215	.1700	.1485	.278	.34	4.5	.0006	.94	.0042	<0.2	16	
1160-1200 15	.0121	.0350	.0122	.1100	.0978	.183	.22	5.2	.0004	.49	.0044	<0.2	8	
1200-1240 16	.0097	.0280	.0098	.2100	.2002	.375	.40	13.4	.0004	.62	.0015	<0.2	6	
1240-1280 17	.0074	.0214	.0076	.0530	.0454	.085	.11	4.0	.0004	.80	.0016	<0.2	6	
1280-1320 18	.0144	.0416	.0145	.1040	.0895	.168	.21	4.0	.0003	.83	.0034	<0.2	6	
1320-1360 19	.0110	.0318	.0111	.0670	.0559	.104	.14	3.3	.0003	.91	.0025	<0.2	8	
1360-1400 20	.0078	.0225	.0079	.0460	.0381	.071	.09	3.2	.0004	.64	.0018	<0.2	6	
1400-1440 21	.0113	.0326	.0114	.0480	.0366	.068	.10	2.1	.0003	.35	.0123	<0.2	6	
1440-1480 22	.0072	.0208	.0073	.0440	.0367	.069	.09	3.3	.0003	.51	.0038	<0.2	6	
1480-1520 23	.0182	.0526	.0184	.1910	.1726	.323	.38	6.1	.0007	.62	.0019	<0.2	6	
1520-1560 24	.0150	.0433	.0151	.0400	.0249	.047	.09	1.1	.0002	.30	.0082	<0.2	6	
1560-1600 25	.0455	.1314	.0459	.4000	.3541	.662	.79	5.0	.0005	.14	.0140	0.6	10	
1600-1640 26	.0311	.0898	.0314	.7800	.8114	1.518	1.61	16.9	.0004	.28	.0437	0.2	14	
1640-1680 27	.0227	.0656	.0229	.3170	.2941	.550	.62	8.4	.0010	.25	.0086	<0.2	14	
1680-1720 28	.0361	.1043	.0364	.2530	.2166	.405	.51	3.9	.0005	.63	.0091	<0.2	28	
1720-1760 29	.0365	.1054	.0368	.4870	.4502	.842	.95	8.0	.0005	.61	.0048	<0.2	34	
1760-1800 30	.0382	.1103	.0386	.5000	.4614	.863	.97	7.8	.0007	1.17	.0049	<0.2	46	
1800-1840 31	.0248	.0716	.0250	.7250	.7000	1.310	1.38	18.3	.0008	.53	.0038	<0.2	22	
1840-1880	.0562	.1623	.0567	.9930	.9363	1.752	1.91	10.8	.0008	.24	.0063	0.2	14	

AMPAD EFFICIENCY® LINE NO. 6636

CSMC KELVIN PROJECT: HOLE J-4

INTERVAL	ASSAY 1 % Cu	2 wt. % Cp.	3 % S in cp.	ASSAY 4 % S	5 % S in py	6 wt. % py	7 TOTAL SULFIDES	8 Py/Cp	ASSAY 9 % Mo	10 % Fe_3O_4	ASSAY 11 % Zn	Skyline ASSAY 12 PPM Ag	ASSAY 13 PPM Co	PP
1880-1920 1	.0686	.1981	.0692	1.8450	1.7758	3.322	3.52	16.8	.0006	.46	.0062	0.2	22	
1920-1960 2	.0308	.0890	.0311	1.2150	1.1839	2.215	2.30	24.9	.0030	.29	.0041	<0.2	22	
1960-2000 3	.0192	.0554	.0198	.7160	.6962	1.303	1.36	23.5	.0119	.21	.0089	<0.2	20	
2000-2040 4	.0271	.0783	.0274	1.3100	1.2826	2.400	2.48	30.6	.0032	.01	.0090	<0.2	20	
2040-2080 5	.2568	.7418	.2592	3.7350	3.4758	6.503	7.24	8.8	.0109	2.43	.0047	<0.2	90	
2080-2120 6	.0702	.2028	.0708	.8230	.7522	1.407	1.61	6.9	.0072	.22	.0023	<0.2	28	
2120-2160 7	.0806	.2328	.0813	.6990	.6177	1.156	1.39	5.0	.0032	.54	.0568	0.2	22	
2160-2200 8	.0760	.2195	.0767	1.3110	1.2343	2.309	2.53	10.5	.0075	.10	.0031	0.2	30	
2200-2240 9	.0968	.2796	.0977	.9365	.8388	1.569	1.85	5.6	.0094	.09	.0042	0.4	36	
2240-2280 10	.0343	.0991	.0346	1.6900	1.6554	3.097	3.20	31.2	.0050	.32	.0078	0.2	95	
2280-2320 11	.2471	.7137	.2494	1.7800	1.5306	2.864	3.58	4.0	.0085	2.76	.0156	1.2	80	
2320-2360 12	.2138	.6176	.2158	1.3900	1.1742	2.197	2.82	3.6	.0066	3.44	.0050	0.4	60	
2360-2400 13	.3852	1.1127	.3888	1.5000	1.1112	2.079	3.19	1.9	.0022	3.87	.0063	0.6	75	
2400-2440 14	.3375	.9749	.3406	.8500	.5094	.953	1.93	.98	.0172	.18	.0018	0.6	30	
2440-2480 15	.4475	1.2926	.4516	.8900	.4384	.820	2.11	.63	.0211	.09	.0317	0.6	24	
2480-2520 16	.1669	.4821	.1684	.4700	.3016	.564	1.05	1.2	.0068	.64	.0035	0.2	28	
2520-2560 17	.1396	.4032	.1409	.3655	.2246	.420	.82	1.0	.0094	.35	.0027	0.2	20	
2560-2600 18	.1779	.5139	.1795	.2825	.1031	.193	.71	.37	.0082	.19	.0016	0.2	14	
2600-2640 19	.0956	.2761	.0965	.3240	.2275	.426	.70	1.5	.0072	.24	.0014	<0.2	18	
2640-2680 20	.1406	.4061	.1419	.3820	.2401	.449	.86	1.1	.0064	.21	.0010	<0.2	14	
2680-2720 21	.1171	.3382	.1182	.3330	.2148	.402	.74	1.2	.0045	.20	.0011	0.2	16	
2720-2760 22	.1450	.4188	.1463	1.3540	1.2077	2.260	2.68	5.4	.0058	.17	.0067	0.2	38	
2760-2800 23	.1665	.4809	.1680	.6900	.5220	.977	1.46	2.0	.0049	.30	.0064	0.2	22	
2800-2840 24	.1134	.3276	.1144	.7000	.5856	1.096	1.42	3.3	.0050	.19	.0016	<0.2	22	
2840-2880 25	.0893	.2579	.0901	.3100	.2199	.411	.67	1.6	.0024	.24	.0015	<0.2	14	
2880-2920 26	.0439	.1268	.0443	.3100	.2657	.497	.62	3.9	.0026	.19	.0035	<0.2	20	
2920-2960 27	.1505	.4347	.1519	.5000	.3481	.651	1.09	1.5	.0024	.18	.0021	0.2	18	
2960-3000 28	.0340	.0982	.0343	.9100	.8757	1.638	1.74	16.7	.0016	.18	.0164	<0.2	26	
3000-3040 29	.0423	.1222	.0427	1.0800	1.0373	1.941	2.06	15.9	.0023	.11	.0611	0.2	34	
3040-3080 30	.0102	.0295	.0103	.8100	.7997	1.496	1.53	50.7	.0004	.32	.0033	<0.2	10	
3080-3104 31	.0113	.0326	.0114	1.0400	1.0286	1.924	1.96	59.0	.0007	.10	.0055	<0.2	14	

HOLE J-4

		1	2	3	4	5	6	7		1	2	3	4	5	6	7	
	/	Epidote			Chlorite			Carbonate	Secondary K-spar	Secondary biotite		Sericite		grndmass	CLAY		matrix
1	908.5	rare in groundmass			rare in groundmass			late wormy vnlts ± in qtz-sulf vnlts	envelopes and qtz-sulf. bands	aggregates in plag pheno. trace ? in groundmass & mafics →		aggregates in p pheno. & vnlt. mod on outside of plag pheno phen → strg		minor grndmass dirty	aggregates		fine ?
2	920	biot → epid common			biot → chl generally												
3	968.5								narrow envelope								mixture specks interst
4	✓ 1113	accessory interstitial							specks ???	Tr in interstic.							
5	✓ 1123	biot → epid common			biot → chl generally				distinct bands	trace ?		mod on outside of plag phen		minor grndmass			
6	✓ 1196.5				biot → chl, some			in matrix				strong		strong	strong		strong
7	✓ 1657				mafics → chl.			in matrix				strong		strong	some		
8	✓ 1770				pyroxene → min chl.							minor			weak		
9	✓ 1887				patches in grndms mafics → chl			late veinlets				strong		strong	minor		?
10	✓ 2016							qtz-py-CO_3 vnlt.				rare in K-spar & wk-mod plag / mafics			minor		
11	✓ 2040				patches in grndms ? mafics → chl ?			late veinlets + qtz-CO_3-py vnlts.	well def envelopes @ qtz-CO_3-sulf vlt	clots		rare in K-spar & wk-mod plag / mafics			minor		?
12	✓ 2062							qtz-CO_3-py vnlts	envelopes	mafics → obat.		wk-mod			mixture		
13	✓ 2140				Trace			CO_3 vnlts increase plag → min. CO_3				rare in K-spar & wk-mod plag / mafics			minor		
14	✓ 2227				very rare							plag strong					
15	✓ 2243							patches w/ seric.				strong		coarse			
16	✓ 2286									clots some pyrox →		wk plag					
17	✓ 2383							minor		strong		rare					rare
18	✓ 2530	rare			some in groundmass				some rims plag. grains	clusters in groundmass		dusted					
19	✓ 2854	biot-epid weak			biot wk → chlor			rare in grdm	some in veins	some in grndmass		weak					
20	✓ 2968	biot-epid weak			biot wk → chlor			rare in grdm	some in veins	very weak		rare					
21	✓ 3072				mafics → chlor			rare patches				wk-mod					
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	

SECTION 14

LENGTH	% Cu_{SOl} (comp)	Cu	Mo	S	Calc. wt % sulfide	py/cp
100						
~144–153		.2126	.0246			
200						
300						
400						
500						
600						
700						
~720			.1684			

Mineralization & Miscellaneous

0-1400 drilled by Tipperary Resources in March 1970 and designated the hole T-1.

C.S.M.C. re-entered the hole on 3/24/77 and designated the hole J-5.

Information for interval 0-1400 from Tipperary Logs.

HOLE SIZE:
0-1400: 6 5/8" (?) rotary
1400-1554: NX wireline core
1554-2825: BX wireline core

COLLAR:
elevation: ~ 2170 feet
inclination: -90°
location: 125' FSL & 300' FEL of section 8, T.4S., R.13E., Pinal County, Arizona.

DRILLING CONTRACTOR:
JOY MANUFACTURING CO. (1400-2825).

CASING LEFT IN HOLE:
6 5/8" : 0-52'
NX (100 feet): 1300-1400 feet (cut at 1350 feet).
A steel plate is welded to the top of the 6 5/8" casing.

DRILLING & COST DATA:

Average footage/shift	= 18.5
Direct Drilling Cost	= 14.07/ft.
Mud, additives, water	= 1.89/ft.
Reaming, excess bits	= 1.60/ft.
Casing, time & left in hole	= 2.73/ft.
Assaying	= 1.08/ft.
Splitting	= 0.36/ft.
Mobilization	= 1.11/ft.
Thin sections	= .14/ft.
(1425') TOTAL	= 22.98/ft.

Trace copper oxides 460-470

Trace native copper 235-240, 880-890

Columns: Chalcopy. | Pyrite | Molyb. | Limonite | Hematite | ... | Carbonate | Epidote | ... | White ser. clay | Chlorite | STRUCT. | ROCK

Summary Lithology & Alteration

0-34: Quaternary alluvium: unconsolidated medium to coarse grained with fragments of Oracle granite, diabase, diorite and quartz.

34-144: Precambrian Oracle Granite

144-153: Precambrian Diabase: black diabase dike with stringers of quartz with pyrite & chalcopyrite

153-232: Precambrian Oracle Granite:

232-918: Paleocene Teacup Granodiorite: from verbal descriptions by Tipperary this unit is composed of 62% quartz, 17% plagioclase, 5% K-feldspar, 7% biotite and 7% chlorite. From this description and later drilling by Cyprus (core hole KE-1 drilled in 1972) it seems probable that this unit is the Teacup Granodiorite of the U.S.G.S. (Grayback Granodiorite of Schmidt). Note K-Feldspar = 23% of total feldspar).

PROJECT KELVIN DRILL HOLE NO. J-5 SCALE 1" = 100'

LENGTH	% Fe_3O_4 (comp.)	ASSAYS (%) Cu	Mo	S	calc. wt % sulfide	py/cp	Mineralization & Miscellaneous	Summary Lithology & Alteration
800		.3905	.0368				Intercept may be related to the Johnson molybdenum vein structure.	
900								918-1400: Precambrian Oracle Granite
								trace Kaolinite
1000								
1100							trace sphalerite	
1200							trace bornite	
1300								
1400								1400-1490: Precambrian Oracle Granite: porphyritic quartz monzonite with numerous pink K-spar phenocrysts up to 1.5 inch in length (generally euhedral) generally euhedral plagioclase phenocrysts over 0.25 inch in diameter in a coarse to medium grained groundmass of quartz, K-spar, plagioclase, biotite and minor magnetite and hornblende.
	0.18	.0226	.0015	.0722	.158	1.4	.0274 Zinc	
1500								

Graphic log columns: chalcopy, Pyrite, molybden, [illegible], [illegible], [illegible], [illegible], Secondary Biotite, Carbonate, Epidote, Green Sericite, White ser clay, [illegible], STRUCT., ROCK