DDH NO. SH-7

STATE _____ MINING DISTRICT _____ COORDINATES _____ N _____ E DATE STARTED _____ DRILLING CO. _____

COUNTY _____ PROJECT _____ COLLAR ELEVATION _____ DATE COMPLETED _____

INCLINATION _____ BEARING _____ FINAL DEPTH _____

FOOTAGE		L1	L2	CORE % REC. BY FT.	CORE LBS. REC.	CORE % REC. BY WT.	CORE TOT. CU.	CORE OX CU	CORE ASSAY MO	CORE ASSAY Pb	CORE ASSAY Zn	CORE ASSAY	CORE SIZE	SAMP. NO.	SLUDGE SAMP. NO.	SLUDGE LBS. REC.	SLUDGE % REC. BY WT.	SLUDGE SPLIT	SLUDGE ASSAY TOT. CU.	SLUDGE ASSAY OX CU	SLUDGE ASSAY MO S2	COMBINED ASSAY PERCENT 0.1 0.5 1.0	COMBINED ASSAY TOT. CU
10.022	8.125	12.8	12.5	97			0.04						NX	20-1									
22.8	28.9	6.1	6.1	100			0.06							21-1									
28.9	38.9	10.0	10.0	100			0.07							22-1									
38.9	50.6	11.7	11.8	101			0.09							23-1									
50.6	57.9	7.3	7.4	101			0.07							24-1									
57.9	67.9	10.0	9.9	99			0.04							25-1									
67.9	77.0	9.1	9.1	100			0.07							26-1									
77.0	89.6	12.6	9.8	77			0.07							27-1									
89.6	98.7	9.1	9.4	103			0.14							9681									
98.7	114.1	15.4	15.2	98			0.13							9682									
114.1	129.1	15.0	15.0	100			0.09							9683									
129.1	134.1	5.0	5.0	100			0.16							9684									
134.1	143.9	9.8	10.1	103			0.16							9685									
143.9	154.2	10.3	10.2	99			0.13		0.003					9686									
154.2	163.2	9.0	9.0	100			0.10							9687									
163.2	173.2	10.0	10.0	100			0.16							9688									
173.2	180.8	7.6	7.2	94			0.15		0.002					9689									
180.8	190.8	10.0	10.0	100			0.14							9690									
190.8	201.6	10.8	11.0	101			0.14							9691									
201.6	215.2	13.6	13.6	100			0.12							9712									
215.2	227.6	12.4	12.2	98			0.11							9713									
227.6	237.6	10.0	10.1	101			0.13							9714									
237.6	243.0	5.4	5.4	100			0.15							9715									
243.0	252.7	9.7	9.5	97			0.14							9716									
252.7	264.4	11.7	11.8	101			0.16							9717									
264.4	278.8	14.4	14.3	99			0.13							9718									
278.8	286.7	7.9	7.7	97			0.11							9727									
286.7	297.1	10.4	10.5	101			0.06							9728									
297.1	306.9	9.8	9.8	100			0.19							9729									
306.9	316.3	9.4	9.4	100			0.11							9730									
316.3	324.5	8.2	8.2	100			0.14							9731									
324.5	333.8	9.3	9.3	100			0.11							9732									
333.8	340.5	6.7	7.0	104			0.17							9733									
340.5	349.7	9.2	8.7	94			0.12							9750									
349.7	357.9	8.2	9.0	109			0.11						BX	9751									
357.9	369.2	11.3	11.3	100			0.09							9752									
369.2	378.0	8.8	8.8	100			0.10							9753									
378.0	388.8	10.8	9.2	85			0.18							9775									
388.8	397.2	8.4	9.3	110			0.12							9776									
397.2	408.6	11.4	10.8	94			0.11							9777									
408.6	418.0	9.4	9.5	101			0.12							9778									
418.0	429.0	11.0	10.8	98			0.08							9779									
429.0	437.8	8.8	8.8	100			0.10							9780									
437.8	447.6	9.8	9.9	101			0.10							9781									
447.6	454.3	6.7	6.7	100			0.10							9782									
454.3	463.8	9.5	9.5	100			0.08							9783									
463.8	474.3	10.5	10.7	102			0.06			Tr	Tr			9795									
474.3	484.3	10.0	9.4	94			0.08			Tr	Tr			9796									
484.3	495.3	11.0	11.8	107			0.12			0.05	Tr			9798									
495.3	502.0	6.7	6.7	100			0.11			0.05	Tr			9805									

DDH NO. SH-7

STATE Ariz
COUNTY Pima
Sec 12 T15S R12E

MINING DISTRICT Arnole
PROJECT Saginaw Hill

COORDINATES K 50 N 55 E
COLLAR ELEVATION
INCLINATION BEARING

DATE STARTED 11/30/60 DRILLING CO. Jay
DATE COMPLETED 12/23/60
FINAL DEPTH 846.3

FOOTAGE	UNALT	CHLOR.	EPIDOTE	MONTMOR.	BIOTITE	KAOL.	HY. MICA.	ORTHO.	SER.	SIL.		STAGE NO.	ROCK TYPE	SECTION	CU5FES4	CUFES2	FE S2	CU2S	CUS	MOS2		OXIDE ZONE: LEACHED CAVITIES-COLOR ETC. / SULPHIDE ZONE-CHAR OF MIN. DISS. VEIN, ETC.	< INCL.	FRACTURING	GEOLOGY	LOG BY
507 0 512 0													Q.M.									<1 py, cp, Pb, Zn		60°	-do-	
512 0 521 9													"									<1 " " " "		50°, 130°	-do-	
521 9 531 9													"									<1 " " " "		40°	-do-	
531 9 545 9													"									<1 " " " "		50°	-do-	
545 9 558 9													"									<1 " " " "		50°	-do-	
558 9 568 2													"									<1 " " " "		70°	-do-	
568 2 580 6													"									<1 " " " "		40°	-do- Moderate clay alteration	
580 6 590 3													"									<1 " " " "		40°	-do-	
590 3 597 8													"									<1 " "		40°	-do-	
597 8 607 3													"									<1 " "		vert.	-do-	
607 3 620 6													"									<1 " " " "		vert. 40°	-do-	
620 6 630 6													"									<1 " " " "		vert. 30	-do- Very weak sulphides	
630 6 640 6													"									<1 " " " "		vert. 40°	-do-	
640 6 650 1													"									<1 "		vert. 50°	-do-	
650 1 656 3													"									<1 " Pb		vert. 30°	-do-	
656 3 666 3													"									<1 "		vert. 40°	-do-	
666 3 678 9													"									<1 " Cp Pb Zn		80°, 40°	-do- Quartz stringers with Cp, Zn mins.	
678 9 688 9													"									<1 " Cp		40°	-do-	
688 9 703 9													"									<1 " "		vert., 70°, 50°	-do-	
703 9 711 5													"									<1 " " Pb		50°	-do-	
711 5 721 5													"									<1 " Cp		45-60°	-do- Pink orthoclase phenocrysts still present; py in	CSHB
721 5 731 5					Sample								"									<1 Py Cp Pb Zn Mag(?)		vert. 40-60	-do- creasing: sphal, gal., mag. in thin stringers. Mod.	
731 5 741 5													"									<1 Py, Cp, Mag		50°	-do- clay alteration. Qtz stringers w/ pyrite	
741 5 751 5					Thin Section								"									<1 " " "		40°	-do- finer grained phase present (dike rock?) fluorescent	
751 5 761 5													"									<1 " " "		60°	-do- Coarse grained by 760: py + chalcopy often in lenses	
761 5 769 7													"									" " "		60, vert.	-do- Coarse grained: Ortho. phenocrysts still large	rock
769 7 778 4													"									" " "		45-60	-do- no longer "pink"; reduced by 807	
778 4 788 3													"									" " "		vert	-do- Sulphides: mag. (chalcopyrite?) in thin stringers	
788 3 798 2													"									" " "		50°	-do- w/ qtz. qtz still glomular, perhaps fine size	
798 2 808 3													"									" " "		40-60	-do- Pyrite very pale yellow along fractures	
808 3 818 3													"									" " "		45, vert.	-do- Sulphides occur as disseminations and along fractures as thin stringers	
818 3 828 3													"									<1 Py, Chalcopy		35, 50, vert	-do- chalcopy very minor; pyrite + chalcopyrite just disseminations and along fractures: often w/ qtz. stringers. Mod. kaolinitic alteration. Pyrite very pale yellow	
828 3 836 2													"									<1 " "		85, 30	-do- chalcopyrite very rare. Sulphides mostly along fractures. Some disseminated sulphides. Mod. clay alteration	
836 2 846 3					Thin Section								"									<1 " "		70, 40, 15, vert	-do- Chalcopyrite very rare: py. along fractures and as disseminations: often associated w/ qtz veins. Slickensided on a 15°-fracture	

Note I taught over Saginaw Hill Proj. from E. Applet Nov 1, 60 I began logging core for Saginaw Hill about Dec 29, 1960. I took over from Clare Schafer.

C Arnold Barclay

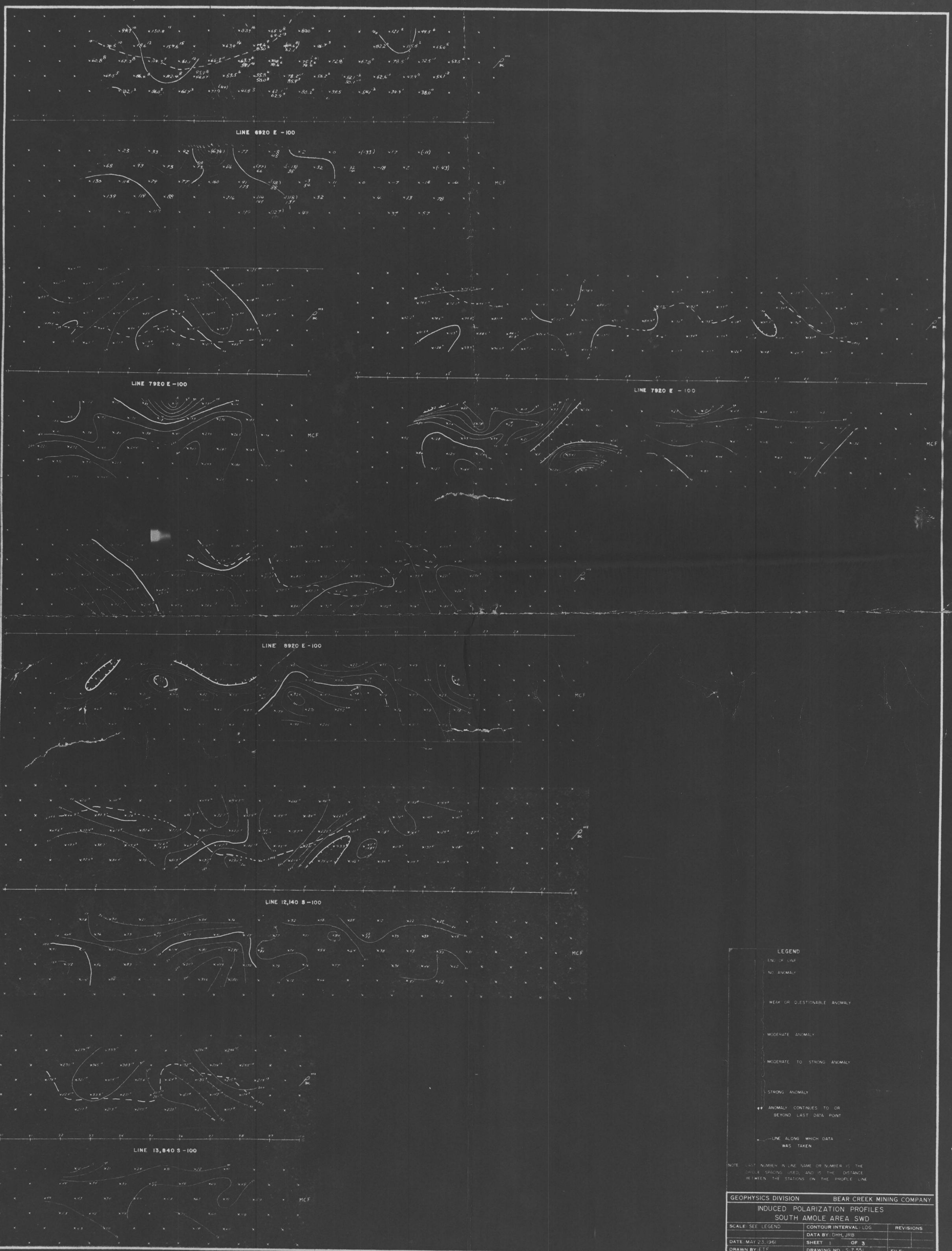
DDH NO. SH-7

STATE ____ MINING DISTRICT ____ COORDINATES ____ N ____ E ____ DATE STARTED ____ DRILLING CO. ____

COUNTY ____ PROJECT ____ COLLAR ELEVATION ____ DATE COMPLETED ____

INCLINATION ____ BEARING ____ FINAL DEPTH ____

FOOTAGE		L1	L2	CORE: % REC. BY FT.	LBS. REC.	% REC. BY WT.	TOT. CU.	OX CU	MO S2	ASSAY Pb	Zn	CORE SIZE	SAMP. NO.	SLUDGE: SAMP. NO.	LBS. REC.	% REC. BY WT.	SPLIT	ASSAY TOT. CU.	OX CU	MO S2	COMBINED ASSAY: PERCENT 0.1 0.5 1.0	TOT. CU
502 0	512 0	10 0	9 5				0 10			Tr	Tr		9805									
512 0	521 8	9 8	10 2				0 03			Tr	Tr		06									
521 8	531 8	10 0	10 0				0 06			Tr	Tr		07									
531 8	545 9	14 1	10 9				0 07			Tr	Tr		08									
545 9	558 9	13 0	13 0				0 13						9919									
558 9	568 2	9 3	8 9				0 10						20									
568 2	580 6	12 4	11 7				0 09						21									
580 6	590 3	9 7	9 8				0 08						22									
590 3	597 8	7 5	7 3				0 10						23									
597 8	607 8	10 0	10 2				0 15						24									
607 8	620 6	12 8	12 8				0 08						25									
620 6	630 6	10 0	10 1				0 14						9835									
630 6	640 7	10 0	10 1				0 14						9836									
640 7	651 2	9 5	9 5				0 16						9837									
651 2	656 3	6 2	5 9				0 16			Tr			9838									
656 3	666 3	10 0	10 3				0 16						9839									
666 3	678 9	12 6	12 6				0 19			0 05			9840									
678 9	688 9	10 0	10 1				0 12						9922									
688 9	703 9	15 0	14 8				0 12						9923									
703 9	711 5	7 6	7 6				0 09						9924									
711 5	721 5	10 0	9 9				0 08						9925									
721 5	731 5	10 0	9 5				0 10						9926									
731 5	741 5	10 0	9 8				0 17						9927									
741 5	751 5	10 0	9 9				0 15						9928									
751 5	761 5	10 0	9 9				0 10						9929									
761 5	769 7	8 2	7 2				0 07						9942									
769 7	778 4	8 7	9 9				0 08						9943									
778 4	788 3	9 9	10 1				0 06						9944									
788 3	798 2	9 9	10 2				0 04						9945									
798 2	808 3	10 1	10 0				0 04						9946									
808 3	818 3	10 0	10 1				0 05						9947									
818 3							0															
818 3	828 3	10 0	7 5				0 08						9997									
828 3																						
828 3	836 2	7 9	10 1				0 06						9998									
836 2	846 3	10 1	10 1				0 06						9999									


LINE 6920 E -100
LINE 7920 E -100
LINE 7920 E -100
LINE 8920 E -100
LINE 12,140 S -100
LINE 13,840 S -100
MCF
LEGEND
END OF LINE
NO ANOMALY
WEAK OR QUESTIONABLE ANOMALY
MODERATE ANOMALY
MODERATE TO STRONG ANOMALY
STRONG ANOMALY
ANOMALY CONTINUES TO OR BEYOND LAST DATA POINT
LINE ALONG WHICH DATA WAS TAKEN
NOTE: LAST NUMBER IN LINE NAME OR NUMBER IS THE DRILL SPACING USED, AND IS THE DISTANCE BETWEEN THE STATIONS ON THE PROFILE LINE
GEOPHYSICS DIVISION
BEAR CREEK MINING COMPANY
INDUCED POLARIZATION PROFILES
SOUTH AMOLE AREA SWD
SCALE: SEE LEGEND
CONTOUR INTERVAL: LOG
REVISIONS
DATA BY: DHH, JRB
DATE: MAY 23, 1961
SHEET 1 OF 3
DRAWN BY: ETF
DRAWING NO.: S-7 551
FILE:

10

BEAR CREEK MINING COMPANY
Saginaw Hill Drillings
May 1960 to Jan. 1961

Drill Holes- Assay Logs- and Geological crossection

Items 12-21

19. — Heat -

20. — Pact - Part - past - ~~[illegible]~~ 15-51

21. — Germ -

22 — Eagle

23 — Share

24 — Fast - past

2. 17 sheets

SHEET NO. 1

DATE STARTED 5/21/60
DATE COMPLETED

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-1

COORDINATES N W COLLAR ELEVATION BEDROCK ELEVATION

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE Zn WT	SLUDGE Zn ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0	8.0	8.0	RR											
8.0	18.3	10.3	NX		90									
18.3	28.5	10.2	"		99									
28.5	40.0	11.5	"		98									
40.0	52.5	12.5	"		97									
52.5	60.1	7.6	"		100									
60.1	63.1	3.0	"		113									
63.1	73.1	10.0	"		100									
73.1	83.1	10.0	"		98	8601		Tr			Tr			
83.1	93.1	10.0	"		100									
93.1	103.1	10.0	"		99	8602		Tr			0.05			
103.1	113.2	10.1	"		106									
113.2	123.3	10.1	"		100	8603		0.02			0.05			
123.3	128.0	4.7	"		98									
128.0	138.0	10.0	"		97	8604		0.02			Tr			
138.0	144.4	6.4	"		100									
144.4	153.1	8.7	"		99	8605		Tr			Tr			
153.1	160.1	7.0	"		99									
160.1	170.1	10.0	"		95	8606		Tr			Tr			
170.1	178.3	8.2	"		100									
178.3	188.3	10.0	"		102	8607		Tr			Tr			
188.3	197.4	9.1	"		95									
197.4	209.7	12.3	"		97	8608		0.02			Tr			
209.7	220.1	10.4	"		108									
220.1	231.6	11.5	"		98	8609		Tr			0.05			
231.6	238.0	6.4	"		96									
238.0	248.4	10.4	"		96	8610		Tr			0.05			
248.4	257.4	9.0	"		99									
257.4	270.5	13.1	"		98	8611		Tr			Tr			
270.5	278.7	8.2	"		100									
278.7	288.7	10.0	"		100	8612		Tr			Tr			
288.7	298.3	9.6	"		99									
298.3	306.5	8.2	"		99	8613		0.02			Tr			
306.5	315.5	9.0	"		100									
315.5	325.5	10.0	"		97	8614		0.02			0.05			
325.5	334.8	9.3	"		97									
334.8	344.8	10.0	"		98	8615		Tr			0.10			
344.8	354.8	10.0	"		99									
354.8	363.9	9.1	"		104	8616		Tr			0.15			
363.9	370.1	6.2	"		98									
370.1	380.1	10.0	"		100	8617		0.03			0.60			
380.1	388.0	7.9	"		91									
388.0	398.0	10.0	"		99	8618		Tr			0.10			
398.0	408.0	10.0	"		100									
408.0	418.0	10.0	"		100	8619		Tr			0.05			
418.0	428.0	10.0	"		100									
428.0	437.3	9.3	"		98	8620		0.02			Tr			
437.3	445.6	8.3	"		98									
445.6	455.5	9.9	"		100	8621		0.02			Tr			
455.5	465.5	10.0	"		100									
465.5	473.8	8.3	"		100	8622		Tr			Tr			
473.8	485.2	11.4	"		100									
485.2	496.0	10.8	"		97	8623		Tr			Tr			
496.0	506.0	10.0	"		100									
506.0	518.0	12.0	"		92	8624		0.03			0.70			
518.0	530.0	12.0	"		98									

SHEET NO. 2

DATE STARTED 5/21/60
DATE COMPLETED

DIAMOND DRILL ASSAY LOG

HOLE NO. S4-1

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY ~~SLUDGE~~	CORE Cu ~~WT.~~	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE Zn ~~WT.~~	SLUDGE Zn ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
530.0	542.0	12.0	NX		90	8625		0.03			0.10			
542.0	553.9	11.9	"		78									
553.9	565.4	11.5	"		95	8626		Tr			0.75			
565.4	573.9	8.5	"		96									
573.9	583.1	9.2	"		96	8627		Tr			0.05			
583.1	594.6	11.5	"		93									
594.6	604.7	10.1	"		101	8628		Tr			Tr			
604.7	613.7	9.0	"		98									
613.7	619.4	5.7	"		100	8629		Tr			Tr			
619.4	628.5	9.1	"		99									
628.5	639.4	10.9	"		97	8630		Tr			Tr			
639.4	651.1	11.7	"		99									
651.1	660.6	9.5	"		100	8631		0.02			Tr			
660.6	669.5	8.9	"		100									
669.5	679.5	10.0	"		100	8632		Tr			Tr			
679.5	688.2	8.7	"		94									
688.2	697.3	9.1	"		99	8633		0.03			0.05			
697.3	707.3	10.0	"		100									
707.3	714.7	7.4	"		99	8634		0.02			0.05			
714.7	724.7	10.0	"		99									
724.7	734.7	10.0	"		100	8635		Tr			0.05			
734.7	746.3	11.6	"		95									
746.3	755.3	9.0	"		98	8636		0.02			Tr			
755.3	760.3	5.0	"		102									
760.3	770.3	10.0	"		100	8637		Tr			0.05			
770.3	778.9	8.6	"		95									
778.9	788.9	10.0	"		85	8638		Tr			Tr			
788.9	799.7	10.8	"		93									
799.7	808.3	8.6	"		100	8639		0.03			0.05			
808.3	815.8	7.5	"		100									
815.8	827.7	11.9	"		96	8640		0.02			0.10			
827.7	840.5	12.8	"		101									
840.5	848.1	7.6	"		98	8641		0.02			Tr			
848.1	857.9	9.8	"		101									
857.9	862.3	4.4	"		100	8642		0.03			0.55			
862.3	872.3	10.0	"		93									
872.3	881.6	9.3	"		110	8643		Tr			0.10			
881.6	891.6	10.0	"		90									
891.6	900.7	9.1	"		103	8644		Tr			0.05			
900.7	908.4	7.7	"		99									
908.4	918.1	9.7	"		91	8645		0.02			0.05			
918.1	927.6	9.5	"		111									
927.6	937.6	10.0	"		100	8646		Tr			Tr			
937.6	947.6	10.0	"		99									
947.6	957.6	10.0	"		94	8647		Tr			Tr			
957.6	964.6	7.0	"		106									
964.6	974.6	10.0	"		100	8648		0.02			Tr			
974.6	984.6	10.0	"		90									
984.6	993.5	8.9	"		109	8649		0.02			0.05			
993.5	1003.5	10.0	"		101									
1003.5	1010.0	6.5	"		106	8650		Tr			Tr			
	BOTTOM OF HOLE													

SHEET NO. 1

DATE STARTED 10/27/60
DATE COMPLETED 11/29/60

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-4

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu	CORE ASSAY	WEIGHTED AVERAGE Mo	SLUDGE WT Au	SLUDGE ASSAY Ag	REMARKS Pb	REMARKS Zn	DATA OK	MEASURED CORE RECOVERY
10.0	21.0	11.0	NX		100	9305		0.10	0.002						
21.0	31.0	10.0	"		100	06		0.18							
31.0	41.0	10.0	"		92	07		0.18							
41.0	51.0	10.0	"		100	08		0.16		Tr	0.3	0.05	0.35		
51.0	61.0	10.0	"		100	09		0.18		0.005	0.4	Tr	0.70		
61.0	71.0	10.0	"		98	10		0.10							
71.0	81.0	10.6	"		99	11		0.07							
81.6	95.3	13.7	"		100	12		0.19							
95.3	104.7	9.4	"		100	13		0.24		Tr	0.2	0.05	0.05		
104.7	114.7	10.0	"		97	14		0.15		Tr	0.2	Tr	Tr		
114.7	124.7	10.0	"		101	15		0.17							
124.7	134.7	10.0	"		100	16		0.20							
134.7	141.5	6.8	"		100	17		0.12							
141.5	151.5	10.0	"		100	18		0.20							
151.5	161.5	10.0	"		100	19		0.20		Tr	0.2	Tr	Tr		
161.5	171.5	10.0	"		100	20		0.18		Tr	0.3	Tr	0.05		
171.5	181.5	10.0	"		100	21		0.10		Tr	0.3	0.05	0.10		
181.5	191.5	10.0	"		102	22		0.14		0.005	0.2	0.05	Tr		
191.5	201.5	10.0	"		84	23		0.08							
201.5	210.3	8.8	"		112	24		0.14							
210.3	220.3	10.0	"		100	9325		0.11		Tr	0.2	0.15	0.10		
220.3	230.3	10.0	"		100	26		0.15		0.005	0.2	0.05	Tr		
230.3	240.3	10.0	"		100	27		0.08		Tr	0.1	Tr	Tr		
240.3	250.3	10.0	"		100	28		0.18							
250.3	257.3	7.0	"		100	9341		0.06		0.005	0.3	Tr	0.05		
257.3	267.3	10.0	"		100	42		0.09							
267.3	283.3	16.0	"		104	43		0.11							
283.3	293.3	10.0	"		100	44		0.10							
293.3	303.9	10.6	"		98	45		0.08		Tr	0.2	0.05	Tr		
303.9	313.9	10.0	"		100	46		0.11		Tr	0.1	0.05	Tr		
313.9	324.0	10.1	"		98	47		0.08							
324.0	334.0	10.0	"		98	48		0.11							
334.0	344.0	10.0	"		100	49		0.15		Tr	0.2	Tr	0.05		
344.0	354.0	10.0	"		102	50		0.12		Tr	0.1	0.05	Tr		
354.0	364.0	10.0	"		97	51		0.10		Tr	0.2	Tr	Tr		
364.0	374.1	10.1	"		99	52		0.12		Tr	0.4	0.05	1.00		
374.1	384.1	10.0	"		100	53		0.02							
384.1	391.3	7.2	"		99	54		0.08							
391.3	400.0	8.7	"		96	55		0.11							
400.0	408.1	8.1	"		104	56		0.08							
408.1	418.3	10.2	"		99	57		0.09		0.005	0.2	Tr	0.05		
418.3	428.3	10.0	"		102	9386		0.08							
428.3	438.6	10.3	"		92	87		0.08							
438.6	448.2	9.6	"		107	88		0.06							
448.2	468.5	20.3	"		98	89		0.06							
468.5	478.5	10.0	"		99	90		0.04							
478.5	486.5	8.0	"		98	92		0.04							
486.5	495.5	9.0	"		101	93		0.05							
495.5	503.7	8.2	"		100	9405		0.03							
503.7	518.5	14.8	"		101	06		0.03							
458.5	468.5	10.0	"		100	9390		0.04							
518.5	528.5	10.0	"		97	9407		0.03							
528.5	538.5	10.0	"		100	08		0.04							

SHEET NO. 2

DATE STARTED 10/27/60
DATE COMPLETED 11/29/60

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-4

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT.	SLUDGE ASSAY (Mo, Au, Ag)	REMARKS (Pb, Zn)		DATA OK	MEASURED CORE RECOVERY
538.5	548.5	10.0	NX		88	9409		0.04							
548.5	557.5	9.0	"		111	10		0.06							
557.5	567.5	10.0	"		99	9424		0.05							
567.5	577.1	9.6	"		104	25		0.02							
577.1	587.3	10.2	"		100	26		0.04							
587.3	597.5	10.2	"		99	27		0.03							
597.5	607.6	10.1	"		101	28		0.04							
607.6	617.8	10.2	"		100	9444		0.02							
617.8	628.0	10.2	"		100	45		0.07							
628.0	638.0	10.0	"		102	46		0.06							
638.0	649.2	11.2	"		98	47		0.04							
649.2	659.2	10.0	"		100	48		0.04							
659.2	669.2	10.0	"		90	9508		0.07							
669.2	679.0	9.8	"		99	09		0.13							
679.0	689.0	10.0	"		99	10		0.05							
689.0	699.4	10.4	"		97	11		0.05							
699.4	714.0	14.6	"		71	12		0.06							
714.0	722.2	6.2	"		61	13		0.06							
722.2	732.0	9.8	"		100	14		0.09							
732.0	747.2	15.2	"		97	15		0.04							
747.2	756.0	8.8	"		99	16		0.06							
756.0	767.0	10.0	"		107	17		0.05							
767.0	777.5	10.5	"		98	18		0.05							
777.5	787.5	10.0	"		99	19		0.09							
787.5	797.7	10.2	"		100	20		0.08							
797.7	806.0	8.3	"		98	21		0.06							
806.0	813.8	7.8	"		101	22		0.08							
813.8	822.5	8.7	"		95	23		0.12							
822.5	832.8	10.3	"		100	24		0.10							
832.8	840.7	7.9	"		104	9636		Tr		0.07	0.8	0.1	1.15		
840.7	850.8	10.1	"		100	37		Tr							
850.8	860.8	10.0	"		100	38		0.02							
860.8	870.9	10.1	"		98	39		Tr							
870.9	880.8	9.9	"		100	9640		Tr			0.9		0.05		
880.8	890.9	10.1	"		98	41		0.05			0.3		0.05		
890.9	900.9	10.0	"		100										
900.9	910.9	10.0	"		100										
910.9	920.9	10.0	"		100										
920.9	931.1	10.2	"		100										
931.1	941.2	10.1	"		100										
941.2	956.6	15.4	"		92										
956.6	966.6	10.0	"		97										
966.6	980.5	13.9	"		100										
980.5	990.5	10.0	"		97										
990.5	1003.7	13.2	"		104										
1003.7	1014.3	10.6	"		109										
	BOTTOM OF HOLE														

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

SHEET NO. 4

HOLE NO. SH-5

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE (Mo)	SLUDGE WT	SLUDGE ASSAY (Au)	REMARKS (Ag)	REMARKS (Pb)	REMARKS (Zn)	DATA OK	MEASURED CORE RECOVERY
10.0	19.6	9.6	NX		96											
19.6	28.3	8.7	"		101											
28.3	43.7	15.4	"		99											
43.7	53.7	10.0	"		97											
53.7	63.7	10.0	"		101	9370		0.04								
63.7	73.7	10.0	"		100											
73.7	81.1	7.4	"		63											
81.1	90.6	9.5	"		103											
90.6	100.6	10.0	"		100											
100.6	110.6	10.0	"		101	9371		0.06								
110.6	120.6	10.0	"		101											
120.6	130.6	10.0	"		100	72		0.05								
130.6	140.6	10.0	"		101	73		0.12								
140.6	150.6	10.0	"		100	74		0.03								
150.6	160.6	10.0	"		100	75		0.03								
160.6	170.6	10.0	"		100	76		0.05								
170.6	180.6	10.0	"		100	77		0.06								
180.6	190.6	10.0	"		100	78		0.05								
190.6	200.6	10.0	"		100	79		0.08								
200.6	210.6	10.0	"		100	80		0.07								
210.6	220.6	10.0	"		100	81		0.04								
220.6	230.6	10.0	"		100	82		0.06								
230.6	240.6	10.0	"		101	83		0.06								
240.6	250.6	10.0	"		100	84		0.05			0.1	0.05	T			
250.6	260.6	10.0	"		100	85		0.11			0.1	T	T			
260.6	270.6	10.0	"		101	9394		0.06								
270.6	278.4	7.8	"		100	95		0.11								
278.4	288.4	10.0	"		100	96		T								
288.4	298.4	10.0	"		99	97		T								
298.4	308.4	10.0	"		100	98		0.04								
308.4	318.4	10.0	"		100	99		0.05								
318.4	328.4	10.0	"		100	9400		0.02								
328.4	338.4	10.0	"		100	01		0.06								
338.4	348.4	10.0	"		102	02		0.06								
348.4	358.4	10.0	"		100	03		0.06								
358.4	368.4	10.0	"		100	04		0.06								
368.4	378.4	10.0	"		101	9429		0.05								
378.4	388.4	10.0	"		101	30		0.04								
388.4	398.4	10.0	"		100	31		0.06								
398.4	408.4	10.0	"		102	32		0.06								
408.4	418.4	10.0	"		98	33		0.08								
418.4	428.4	10.0	"		102	34		0.09								
428.4	438.4	10.0	"		100	35		0.10								
438.4	448.4	10.0	"		100	36		0.08								
448.4	461.0	12.6	"		99	37		0.08								
461.0	471.0	10.0	"		100	38		0.06								
471.0	481.0	10.0	"		100	39		0.08								
481.0	491.0	10.0	"		101	40		0.06	0.002							
491.0	501.0	10.0	"		100	41		0.08	0.002							
501.0	516.5	15.5	"		100	42		0.06	0.004							
516.5	526.1	9.5	"		101	43		0.08	0.005							
526.1	534.0	8.9	"		91	9487		0.08								
534.0	541.4	7.4	"		94	88		0.10								
541.4	550.7	9.3	"		103	89		0.07								
550.7	560.5	9.8	"		100	90		0.04								

SHEET NO 2

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

HOLE NO 54-5

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Au)	REMARKS (Ag)	REMARKS (Pb)	DATA OK	MEASURED CORE RECOVERY (Zn)
560.5	573.2	12.7	NX		110	9491		0.08							
573.2	580.3	7.1			100	92		0.07							
580.3	590.3	10.0			99	93		0.06							
590.3	604.7	14.4			101	94		0.03							
604.7	614.7	10.0			98	95		0.07							
614.7	623.0	9.3			91	96		0.02							
623.0	633.0	10.0			100	97		0.04							
633.0	638.0	5.0			100	98		0.07							
638.0	648.0	10.0			101	99		0.03							
648.0	658.0	10.0			98	9500		0.04							
658.0	666.1	8.1			100	01		0.04							
666.1	675.9	9.8			103	02		0.04							
675.9	685.9	10.0			100	03		0.06							
685.9	695.9	10.0			102	04		0.05							
695.9	705.9	10.0			100	05		0.05							
705.9	715.9	10.0			100	06		0.04							
715.9	720.5	4.6			95	07		0.02							
720.5	734.9	14.4	BX		109	9598		0.03							
734.9	743.8	8.9	"		100	99		0.02							
743.8	753.8	10.0	"		100	9600		0.02							
753.8	763.8	10.0	"		99	01		0.03							
763.8	779.6	15.8			100	02		tr							
779.6	789.6	10.0			100	03		tr							
789.6	799.6	10.0			100	04		tr							
799.6	809.6	10.0			101	05		tr							
809.6	819.7	10.1			99	06		0.02							
819.7	827.8	8.1			100	07		tr							
827.8	836.6	8.8			98	08		tr							
836.6	846.6	10.0			101	09		tr							
846.6	856.6	10.0			100	10		tr							
856.6	866.6	10.0			101	11		0.02		tr	0.3	0.1	1.10		
866.6	880.8	14.2			97	12		tr							
880.8	889.8	9.0			91	13		0.03							
889.8	899.8	10.0			101	14		tr							
899.8	909.8	10.0			101	15		tr							
909.8	919.8	10.0			97	16		0.02							
919.8	929.8	10.0			99	17		0.03		0.005	0.2	0.1	0.65		
929.8	939.8	10.0			98	18		tr							
939.8	949.8	10.0			102	19		0.10							
949.8	959.8	10.0			100	20		0.07		0.005	0.3	tr	0.50		
959.8	969.3	9.5			101	21		0.02							
969.3	979.3	10.0			100	22		tr		tr	0.1	tr	0.60		
979.3	989.3	10.0			99	23		0.02		tr	0.1	tr	0.35		
989.3	999.3	10.0			101	24		0.04		tr	0.1	0.1	0.20		
999.3	1009.3	10.0	"		100	25		0.02		0.005	0.2	0.1	0.05		
1009.3	1015.2	5.9	"		100	26		0.04		tr	0.2	0.1	0.20		
1015.2	1024.0	8.8	"		101	27		0.18		0.005	2.1	0.8	5.70		
1024.0	1029.3	5.3	"		102	28		0.11							
1029.3	1039.3	10.0	"		99	29		0.02							
1039.3	1049.3	10.0	"		100	30		0.05							
1049.3	1059.3	10.0	"		100	31		tr							
1059.3	1069.3	10.0	"		100	32		0.02		tr	0.2	tr	0.55		
1069.3	1079.3	10.0	"		100	33		tr		tr	0.1	tr	0.25		
1079.3	1089.3	10.0	"		100	34		0.02		tr	0.2	tr	0.70		
1089.3	1101.6	12.3	"		81	35		tr		tr	0.1	tr	0.30		

SHEET NO 3

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

HOLE NO S4-5

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Au, Ag)	REMARKS		DATA OR	MEASURED CORE RECOVERY
1101.6	1112.3	10.7	BX		68										
1112.3	1121.6	10.3	"		61										
1121.6	1130.0	8.4	"		52										
	BOTTOM	OF	HOLE												

SHEET NO. 1

DATE STARTED 11/29/60
DATE COMPLETED 12/28/60

DIAMOND DRILL ASSAY LOG

HOLE NO SH-6

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE No.)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT.	SLUDGE ASSAY (Pb, Zn)	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	8.0	8.0	NX											
8.0	18.1	10.1	"		88									
18.1	30.0	11.9	"		98									
30.0	40.2	10.2	"		99									
40.2	50.5	11.3	"		90									
50.5	58.0	7.5	"		99									
58.0	67.0	9.0	"		99									
67.0	81.8	14.8	"		94									
81.8	95.0	13.2	"		102									
95.0	103.0	8.0	"		105									
103.0	114.0	11.0	"		98									
114.0	123.2	9.2	"		100									
123.2	140.1	16.9	"		99									
140.1	147.1	7.0	"		100									
147.1	158.6	11.5	"		98									
158.6	171.2	12.6	"		100									
171.2	185.1	13.9	"		101									
185.1	190.4	5.3	"		98									
190.4	199.0	8.6	"		100									
199.0	210.6	11.6	"		102									
210.6	224.8	14.2	"		96									
224.8	237.0	12.2	"		99									
237.0	246.2	9.2	"		98									
246.2	251.3	5.1	"		102									
251.3	261.4	10.1	"		101									
261.4	271.4	10.0	"		100									
271.4	281.4	10.0	"		100									
281.4	292.0	10.6	"		105									
292.0	308.6	16.6	"		96									
308.6	321.2	12.6	"		105									
321.2	331.3	10.1	"		97									
331.3	341.9	10.6	"		101									
341.9	349.2	7.3	"		100									
349.2	361.3	12.1	"		100									
361.3	373.5	12.2	"		100									
373.5	385.3	11.8	"		98									
385.3	391.6	6.3	"		97									
391.6	400.2	8.6	"		108									
400.2	412.0	11.8	"		97									
412.0	422.3	10.3	"		98									
422.3	432.2	9.9	"		100									
432.2	448.0	15.8	"		96									
448.0	457.2	9.2	"		91									
457.2	468.7	11.5	"		95									
468.7	475.0	6.3	"		95									
475.0	484.9	9.9	"		101									
484.9	491.8	6.9	"		101									
491.8	501.7	9.9	"		98									
501.7	510.7	9.0	"		100									
510.7	522.3	11.6	"		101									
522.3	534.5	12.2	"		102									
534.5	545.7	11.2	"		95									
545.7	556.8	11.1	"		100									
556.8	569.1	12.3	"		101									
569.1	578.9	9.8	"		99									

SHEET NO. 2

DATE STARTED 11/29/60
DATE COMPLETED 12/28/60

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-6

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE No.)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Pb / Zn)	REMARKS	DATA OK	MEASURED CORE RECOVERY
578.9	589.0	10.1	NX		100									
589.0	599.6	10.6	"		100	9930		Tr		0.05	Tr			
599.6	604.1	4.5	"		100	31		0.02		0.05	Tr			
604.1	619.2	15.1	"		99	32		0.02		Tr	0.05			
619.2	629.3	10.1	"		100	33		Tr		Tr	Tr			
629.3	639.4	10.1	"		101	34		Tr		0.05	0.55			
639.4	649.5	10.1	"		99	35		Tr		Tr	0.10			
649.5	659.5	10.1	"		100	36		0.02		Tr	0.40			
659.5	673.4	13.9	"		96	37		Tr		Tr	Tr			
673.4	682.0	8.6	"		100	38		Tr		Tr	0.10			
682.0	692.0	10.0	"		100	39		Tr		—	—			
692.0	702.6	10.6	"		102	40		0.02		Tr	0.50			
702.6	711.9	9.3	"		100	41		Tr		Tr	0.35			
711.9	720.1	8.2	"		91	9955		Tr		0.05	0.20			
720.1	732.0	11.9	"		64	56		0.02		0.05	0.10			
732.0	746.9	14.9	"		135	57		0.03		Tr	0.10			
746.9	755.8	8.9	"		99	58		0.02		Tr	Tr			
755.8	765.2	9.4	"		97	59		0.02		Tr	Tr			
765.2	774.3	9.1	"			60		0.03		0.05	Tr			
774.3	782.7	8.4	"		100	61		0.04		0.05	Tr			
782.7	794.4	11.7	"		98	1000.0		0.03		0.05	0.10			
794.4	806.5	12.1	"		101	.1-1		0.02		Tr	Tr			
806.5	815.3	8.8	"			.1-2		Tr		0.05	Tr			

Bottom of Hole

SHEET NO 1

DATE STARTED 11-30-60
DATE COMPLETED 12-23-60

DIAMOND DRILL ASSAY LOG

HOLE NO SH-7

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY ~~SLUDGE~~	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	10.0	10.0	Rockbit			Sample #								
10.0	22.8	12.8	NX		97	20-1		0.04						
22.8	28.9	6.1	"		100	21-1		0.06						
28.9	38.9	10.0	"		100	22-1		0.07						
38.9	50.6	11.7	"		100	23-1		0.09						
50.6	57.9	7.3	"		100	24-1		0.07						
57.9	67.9	10.0	"		99	25-1		0.04						
67.9	77.0	9.1	"		100	26-1		0.07						
77.0	89.6	12.6	"		77	27-1		0.07						
89.6	98.7	9.1	"		100	9681		0.14						
98.7	114.1	15.4	"		98	9682		0.13						
114.1	129.1	15.0	"		100	-83		0.09						
129.1	134.1	5.0	"		100	-84		0.10						
134.1	143.9	9.8	"		100	-85		0.10						
143.9	154.2	10.3	"		99	-86		0.13						
154.2	163.2	9.0	"		100	-87		0.10						
163.2	173.2	10.0	"		100	-88		0.10						
173.2	180.8	7.6	"		94	-89		0.15						
180.8	190.8	10.0	"		100	-90		0.14						
190.8	201.6	10.8	"		100	-91		0.14						
201.6	215.2	13.6	"		100	9712		0.12						
215.2	227.6	12.4	"		98	-13		0.11						
227.6	237.6	10.0	"		100	-14		0.18						
237.6	243.0	5.4	"		100	-15		0.15						
243.0	252.7	9.7	"		97	-16		0.14						
252.7	264.4	11.7	"		100	-17		0.16						
264.4	278.8	14.4	"		99	-18		0.13						
278.8	286.7	7.9	"		97	-27		0.11						
286.7	297.1	10.4	"		100	-28		0.06						
297.1	306.9	9.8	"		100	-29		0.19						
306.9	316.3	9.4	"		100	-30		0.11						
316.3	324.5	8.2	"		100	-31		0.14						
324.5	333.8	9.3	"		100	-32		0.11						
333.8	340.5	6.7	"		100	-33		0.17						
340.5	349.7	9.2	"		94	9750		0.12						
349.7	357.9	8.2	BX		100	-51		0.11						
357.9	369.2	11.3	"		100	-52		0.09						
369.2	378.0	8.8	"		100	-53		0.10						
378.0	388.8	10.8	"		85	9775		0.18						
388.8	397.2	8.4	"		100	-76		0.12						
397.2	408.6	11.4	"		94	-77		0.11						
408.6	418.0	9.4	"		100	-78		0.12						
418.0	429.0	11.0	"		98	-79		0.08						
429.0	437.8	8.8	"		100	-80		0.10						
437.8	447.6	9.8	"		100	-81		0.10						
447.6	454.3	6.7	"		100	-82		0.10						
454.3	463.8	9.5	"		100	-83		0.08						
463.8	474.3	10.5	"		100	9795		0.06						
474.3	484.3	10.0	"		94	-96		0.08						
484.3	495.3	11.0	"		100	-97		0.12						
495.3	502.0	6.7	"		100	-98		0.11						
502.0	512.0	10.0	"		95	9805		0.10						
512.0	521.8	9.8	"		100	-6		0.03						

SHEET NO. 2

DATE STARTED 11-30-60
DATE COMPLETED 12-23-60

DIAMOND DRILL ASSAY LOG

HOLE NO SH-7

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY ~~SLUDGE~~	CORE WT	CORE ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
521.8	531.8	10.0	3X		100	9807		0.06						
531.8	545.9	14.1	"		78	-8		0.07						
545.9	558.9	13.0	"		100	9819		0.13						
558.9	568.2	9.3	"		96	-20		0.10						
568.2	580.6	12.4	"		94	-21		0.09						
580.6	590.3	9.7	"		100	-22		0.08						
590.3	597.8	7.5	"		97	-23		0.10						
597.8	607.8	10.0	"		100	-24		0.15						
607.8	620.6	12.8	"		100	-25		0.08						
620.6	630.6	10.0	"		100	9835		0.14						
630.6	640.6	10.0	"		100	-36		0.14						
640.6	650.1	9.5	"		100	-37		0.16						
650.1	656.3	6.2	"		95	-38		0.16						
656.3	666.3	10.0	"		100	-39		0.16						
666.3	678.9	12.6	"		100	-40		0.19						
678.9	688.9	10.0	"		100	9922		0.12						
688.9	703.9	15.0	"		99	-23		0.12						
703.9	711.5	7.6	"		100	-24		0.09						
711.5	721.5	10.0	"		99	-25		0.08						
721.5	731.5	10.0	"		95	-26		0.10						
731.5	741.5	10.0	"		98	-27		0.17						
741.5	751.5	10.0	"		99	-28		0.15						
751.5	761.5	10.0	"		99	-29		0.10						
761.5	769.7	8.2	"		87	9942		0.07						
769.7	778.4	8.7	"		100	-43		0.08						
778.4	788.3	9.9	"		100	-44		0.06						
788.3	798.2	9.9	"		100	-45		0.04						
798.2	808.3	10.1	"		99	-46		0.04						
808.3	818.3	10.0	"		100	-47		0.05						
818.3	828.3	10.0	"		75	9997		0.08						
828.3	836.2	7.9	"		100	-98		0.06						
836.2	846.3	10.1	"		100	-99		0.06						
846.3														
		Bottom of Hole												

SHEET NO 1

DATE STARTED 12-24-60
DATE COMPLETED 1-17-61

DIAMOND DRILL ASSAY LOG

HOLE NO SH-8

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	11.1	NX	Casing Bit			Sample #								
11.1	19.6	8.5	NX		100	28-1		0.02						
19.6	29.6	10.0	"		85	29-1		0.08						
29.6	41.1	11.5	"		100	30-1		0.04						
41.1	51.2	10.1	"		100	31-1		0.04						
51.2	59.4	8.3	"		99	32-1		0.08						
59.4	68.5	9.1	"		100	33-1		0.08						
68.5	78.7	10.2	"		100	34-1		0.03						
78.7	90.5	11.8	"		100	35-1		0.09						
90.5	100.5	10.0	"		98	36-1		0.08						
100.5	106.6	6.1	"		99	37-1		0.31						
106.6	114.4	7.8	"		100	38-1		0.04						
114.4	123.2	8.8	"		98	39-1		0.06						
123.2	130.7	7.5	"		100	40-1		0.06						
130.7	139.3	8.6	"		100	41-1		0.04						
139.3	148.5	9.2	"		100	42-1		0.03						
148.5	158.8	10.3	"		99	43-1		0.07						
158.8	168.9	10.1	"		97	44-1		0.06						
168.9	178.7	9.8	"		100	45-1		0.07						
178.7	188.7	10.0	"		100	46-1		0.08						
188.7	193.4	4.7	"		100	47-1		0.07						
193.4	203.4	10.0	"		100	48-1		0.09						
203.4	213.4	10.0	"		100	49-1		0.08						
213.4	223.4	10.0	"		100	50-1		0.11						
223.4	233.2	9.8	"		100	51-1		0.11						
233.2	243.2	10.0	"		100	52-1		0.09						
243.2	253.2	10.0	"		100	53-1		0.09						
253.2	263.2	10.0	"		100	54-1		0.09						
263.2	270.9	7.7	"		100	55-1		0.11						
270.9	280.9	10.0	"		100	56-1		0.06						
280.9	291.1	10.2	"		97	57-1		0.04						
291.1	297.9	6.8	"		100	58-1		0.12						
297.9	307.9	10.0	"		100	81-1		0.06						
307.9	317.9	10.0	"		99	82-1		0.09						
317.9	326.9	9.0	"		100	83-1		0.11						
326.9	336.9	10.0	"		99	84-1		0.08						
336.9	346.9	10.0	"		98	85-1		0.09						
346.9	356.9	10.0	"		91	86-1		0.08						
356.9	366.9	10.0	"		100	87-1		0.09						
366.9	376.9	10.0	"		100	88-1		0.08						
376.9	386.9	10.0	"		100	89-1		0.11						
386.9	393.0	6.1	"		100	90-1		0.13						
393.0	404.6	11.6	"		96	98-1		0.11						
404.6	418.6	14.0	"		100	99-1		0.12						
418.6	426.6	8.0	"		100	100-1		0.11						
426.6	435.8	9.2	"		100	101-1		0.10						
435.8	444.0	8.2	"		100	102-1		0.06						
444.0	454.0	10.0	"		99	118-1		0.07						
454.0	463.9	9.9	"		100	119-1		0.07						
463.9	473.8	9.9	"		100	120-1		0.06						
473.8	483.8	10.0	"		100	121-1		0.06						
483.8	493.8	10.0	"		98	122-1		0.04						
493.8	504.1	10.3	"		91	123-1		0.03						
504.1	514.1	10.0	"		100	124-1		0.12						
514.1	520.2	6.1	"		100	125-1		0.10						

SHEET NO. 2

DATE STARTED 12-24-60
DATE COMPLETED 1-17-60

DIAMOND DRILL ASSAY LOG

HOLE NO. 54-8

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
520.2	528.3	8.1	NX		99	126-1		0.07						
528.3	538.5	10.2	"		100	127-1		0.13						
538.5	545.9	7.4	"		100	128-1		0.15						
545.9	551.4	5.5	"		100	153-1		0.04						
551.4	560.7	9.3	"		100	154-1		0.04						
560.7	568.8	8.1	"		100	155-1		0.03						
568.8	579.4	10.6	"		99	156-1		0.07						
579.4	590.6	11.2	"		100	157-1		0.05						
590.6	594.1	3.5	BX		97	158-1		0.03						
594.1	603.9	9.8	"		100	159-1		0.06						
603.9	612.4	8.5	"		99	160-1		0.03						
612.4	624.7	12.3	"		100	161-1		0.04						
624.7	634.3	9.6	"		98	162-1		0.02						
634.3	644.3	10.0	"		98	163-1		Tr						
644.3	654.3	10.0	"		100	164-1		Tr						
654.3	664.2	9.9	"		100	165-1		0.02						
664.2	674.2	10.0	"		100	167-1		Tr						
674.2	684.2	10.0	"		100	168-1		0.03						
684.2	694.2	10.0	"		100	169-1		0.02						
694.2	704.2	10.0	"		100	170-1		Tr						
704.2	714.2	10.0	"		100	171-1		0.02						
714.2	724.4	10.2	"		100	172-1		Tr						
724.4	734.3	9.9	"		100	173-1		Tr						
734.3	744.3	10.0	"		100	174-1		Tr						
744.3	754.3	10.0	"		100	197-1		0.03						
754.3	764.3	10.0	"		100	198-1		0.05		Pb	Zn			
764.3	774.3	10.0	"		100	199-1		0.15		1.40	1.20			
774.3	784.3	10.0	"		100	200-1		0.04						
784.3	794.3	10.0	"		97	201-1		0.02						
794.3	804.3	10.0	"		100	202-1		0.02						
804.3	808.8	4.5	"		100	234-1		0.03						
808.8	818.8	10.0	"		100	235-1		0.02						
818.8	829.9	11.1	"		100	236-1		Tr						
829.9	840.0	10.1	"		100	237-1		Tr						
840.0	850.0	10.0	"		96	238-1		Tr						
850.0	858.0	8.0	"		100	239-1		0.02						
858.0	868.0	10.0	"		99	258-1		Tr						
868.0	877.0	9.0	"		93	259-1		0.02						
877.0	886.2	9.2	"		100	260-1		Tr		0.10	0.05			
886.2	894.0	7.8	"		100	261-1		0.04						
894.0	901.0	7.0	"		100	262-1		0.04		0.10	0.65			
901.0	911.0	10.0	"		99	263-1		0.02		0.10	0.05			
911.0	920.9	9.9	"		98	264-1		Tr						
920.9	930.9	10.0	"		100	265-1		Tr						
930.9	940.9	10.0	"		100	266-1		Tr						
940.9	951.0	10.1	"		100	267-1		0.02		0.10	0.05			
951.0	961.0	10.0	"		100	268-1		Tr		0.15	0.05			
961.0	966.8	5.8	"		98	269-1		Tr						

SHEET NO. 1

DATE STARTED 12/28/60
DATE COMPLETED 1/16/61

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-9

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	21.0	21.0	RB											
21.0	30.0	9.0	NX		97	59-1		0.02						
30.0	41.2	11.2	"		81	60-1		0.03						
41.2	50.0	8.8	"		99	61-1		0.03						
50.0	60.7	10.7	"		98	62-1		0.04						
60.7	69.8	9.1	"		100	63-1		0.04						
69.8	80.8	11.0	"		100	64-1		0.02						
80.8	91.3	10.5	"		100	65-1		Tr						
91.3	100.7	9.4	"		100	66-1		Tr						
100.7	109.1	8.4	"		99	67-1		Tr						
109.1	121.2	12.1	"		100	68-1		0.02						
121.2	132.3	11.1	"		99	69-1		0.02						
132.3	140.4	8.1	"		100	70-1		Tr						
140.4	147.6	7.2	"		97	71-1		Tr						
147.6	155.5	7.9	"		100	72-1		Tr						
155.5	166.5	11.0	"		95	73-1		Tr						
166.5	173.0	6.5	"		86	74-1		0.02						
173.0	178.1	5.1	"		65	75-1		0.02						
178.1	186.5	8.4	"		100	76-1		Tr						
186.5	194.2	7.7	"		100	77-1		Tr						
194.2	201.0	6.8	"		96	78-1		0.02						
201.0	214.7	13.7	"		100	79-1		Tr						
214.7	223.9	9.2	"		100	80-1		0.02						
223.9	235.6	11.7	"		100	133-1		0.04						
235.6	246.5	10.9	"		100	134-1		0.04						
246.6	257.8	11.3	"		98	135-1		0.04						
257.8	266.0	8.2	"		100	136-1		0.06						
266.0	279.7	13.7	"		97	137-1		0.04						
279.7	285.1	5.4	"		96	138-1		0.04						
285.1	294.8	9.7	"		100	139-1		0.04						
294.8	303.4	8.6	"		100	140-1		0.06						
303.4	317.0	13.6	"		100	141-1		0.03						
317.0	325.3	8.3	"		100	142-1		0.05						
325.3	336.9	11.6	"		100	143-1		0.04						
336.9	345.4	8.5	"		97	144-1		0.04						
345.4	351.5	6.1	"		95	145-1		0.02						
351.5	357.0	5.5	"		99	203-1		Tr						
357.0	365.3	8.3	"		100	204-1		Tr						
365.3	375.4	10.1	"		92	205-1		0.02						
375.4	385.9	10.5	"		100	206-1		Tr						
385.9	395.0	9.1	"		100	207-1		Tr						
395.0	408.5	13.5	"		99	208-1		Tr						
408.5	418.0	9.5	"		95	209-1		Tr						
418.0	427.7	9.7	"		89	210-1		Tr						
427.7	436.0	8.3	"		82	211-1		0.03						
436.0	446.6	10.6	"		99	212-1		0.02						
446.6	456.2	9.6	"		75	213-1		0.02						
456.2	466.3	10.1	"		100	214-1		Tr						
466.3	473.4	7.1	"		100	215-1		Tr						
473.4	483.4	10.0	"		100	216-1		0.02						
483.4	495.0	11.6	"		100	217-1		0.02						
495.0	505.8	10.8	"		88	218-1		Tr						
505.8	513.5	7.7	"		100	219-1		Tr						
513.5	524.5	11.0	"		100	220-1		Tr						
524.5	531.4	6.9	"			Not Submitted for Assay below 524.5'								

SHEET NO. 2

DATE STARTED 12-28-60
DATE COMPLETED 1-16-61

DIAMOND DRILL ASSAY LOG

HOLE NO SH-9

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
531.4	537.3	5.9	NX		100									
537.3	545.0	7.7	"		97									
545.0	557.3	12.3	"		99									
557.3	567.4	10.1	"		100									
567.4	573.0	5.6	"		100									
573.0	583.0	10.0	"		97									
583.0	594.5	11.5	"		100									
594.5	604.6	10.1	"		70									
604.6	609.0	4.4	"		100									
609.0	613.5	4.5	"		100		— Not Assayed —							
613.5	623.5	10.0	"		100									
623.5	633.2	9.7	"		100									
633.2	643.2	10.0	"		89									
643.2	659.1	15.9	"		100									
659.1	674.4	15.3	"		82									
674.4	680.3	5.9	"		100									
680.3	695.8	15.5	"		100									
695.8	714.0	18.2	"		100									
714.0	724.4	10.4	"		87									
724.4	730.7	6.3	"		73									
730.7	733.0	2.3	"		100									

DATE STARTED 1/16/61
DATE COMPLETED 2/9/61

DIAMOND DRILL ASSAY LOG

SHEET NO. 1
HOLE NO. SH-10

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE NO)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Pb / Zn)	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	8.0	8.0	7H6.7		—									
8.0	11.1	3.1	NX		106									
11.1	20.5	9.4	"		98									
20.5	30.0	9.5	"		96									
30.0	40.8	10.8	"		95									
40.8	47.3	6.5	"		85									
47.3	56.5	9.2	"		100									
56.5	66.5	10.0	"		100									
66.5	73.2	7.7	"		94	329-1		0.03		0.05	0.05			
73.2	80.0	6.8	"		91	330-1		Tr		Tr	Tr			
80.0	91.7	11.7	"		99	377-1		0.02		Tr	Tr			
91.7	103.0	11.3	"		100	378-1		0.02		Tr	0.80			
103.0	109.3	6.3	"		100	379-1		0.02		0.05	0.05			
109.3	119.3	10.0	"		100	380-1		Tr		Tr	Tr			
119.3	130.2	10.9	"		100	381-1		Tr		Tr	Tr			
130.2	142.3	12.1	"		100	410-1		Tr		Tr	Tr			
142.3	154.6	12.3	"		100	411-1		0.02		0.05	0.05			
154.6	164.3	9.7	"		100	412-1		Tr		Tr	Tr			
164.3	171.2	6.9	"		100	413-1		Tr		Tr	Tr			
171.2	179.0	7.8	"		100	432-1		Tr		0.05	Tr			
179.0	186.0	7.0	"		94	433-1		Tr		Tr	0.05			
186.0	195.8	9.8	"		100	434-1		Tr		Tr	Tr			
195.8	206.1	10.3	"		100	435-1		0.02		0.05	0.05			
206.1	217.3	11.2	"		81	436-1		0.02		0.05	Tr			
217.3	227.0	9.7	"		100	437-1		Tr		Tr	Tr			
227.0	232.9	5.9	"		71	438-1		Tr		Tr	Tr			
232.9	241.5	8.6	"		92	439-1		Tr		Tr	0.05			
241.5	247.3	5.8	"		100									
247.3	254.9	7.6	"		100									
254.9	265.3	10.4	"		99									
265.3	273.0	7.7	"		96									
273.0	278.6	5.6	"		100									
278.6	287.5	8.9	"		99									
287.5	295.5	8.0	"		101									
295.5	304.3	8.8	"		100									
304.3	312.6	8.3	"		100									
312.6	321.0	8.4	"		100									
321.0	327.5	6.5	"		97									
327.5	337.6	10.1	"		100									
337.6	347.9	10.3	"		99									
347.9	355.2	7.3	"		100									
355.2	363.6	8.4	"		100	492-1		0.04		0.05	Tr			
363.6	368.9	5.3	"		98	493-1		0.04		Tr	Tr			
368.9	375.0	6.1	"		100	494-1		0.08		0.05	0.05			
375.0	382.8	7.8	"		100	495-1		0.04		Tr	0.05			
382.8	391.5	8.7	"		100	496-1		0.03		Tr	Tr			
391.5	402.6	11.1	"		96	497-1		Tr		Tr	0.05			
402.6	410.8	8.2	"		100	498-1		0.03		Tr	Tr			
410.8	420.5	9.7	"		100	499-1		0.02		Tr	Tr			
420.5	430.7	10.2	"		100									
430.7	443.2	12.5	"		98									
443.2	452.4	9.2	"		97									
452.4	460.0	7.6	"		95									
460.0	468.4	8.4	"		100									
468.4	474.7	6.3	"		95									

SHEET NO. 2

DATE STARTED 1/16/61
DATE COMPLETED 2/9/61

DIAMOND DRILL ASSAY LOG

HOLE NO. SH-10

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

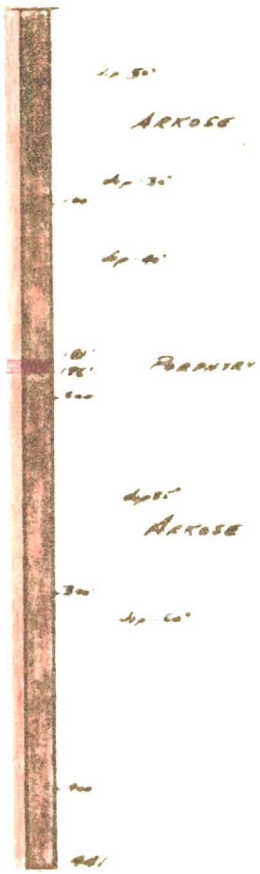
FOOTAGE		INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY		CORE		WEIGHTED AVERAGE	SLUDGE		REMARKS	DATA OK	MEASURED CORE RECOVERY
FROM	TO				CORE	SLUDGE	WT	ASSAY		WT	ASSAY			
474.7	483.4	8.7	NX		100									
483.4	493.5	10.1	"		100									
493.5	504.0	10.5	"		98									
504.0	513.5	9.5	"		86									
513.5	518.5	5.0	"		86									
518.5	524.6	6.1	"		75									

COLLAR ELEV. _____

DDH SH-1

DDH SH-2

ARKOSE
dip 55°
dip 70°
SILTSTONE
60°
ARKOSE
400
PORONTRY
500
ARKOSE
700
ARKOSE


ARKOSE
ARKOSE

COLLAR ELEV _____ DDH SH-5

Quartz Monzonite
Clay alt. (w/ development of some sericitic alt.) generally moderate, becoming strong to intense in fracture zones. Minor development of large subhedral feld. phenocrysts which are generally relatively unalt. in comparison to matrix (orthoclisation?)
Average sulphide content <1%, mostly py.

Flt ~ 387'

Flts. between 448' & 461', dip ~ 40°

COLLAR ELEV _____

DDH SH-5

F/A 923-925'

QUARTZ MONZONITE

F/A 1095-1097

COLLAR ELEV _____ DEPTH SH 6

Alternating siltstone & arkose dip 30 to 18'
dip ~0 to 30'

Arkose dip 30-40

Alternating siltstone & arkose with small fingers of porphyry dip 30 to 158
dip ~0, 158 to
dip 50-55 to

Siltstone dip 40 45

Arkose dip 40 45

Siltstone dip 40-60

Arkose dip 60-50

Siltstone dip 50'

Arkose dip 50
dip 40'

Siltstone w/ infrequent, thin arkose beds: one two-foot epidote zone between 605' & 619'. dip 40-60'

Siltstone becomes increasingly limy and is laminated generally chaotically deformed (slump-structures); thin, infrequent arkose layers; slumped siltstone carries some sulphides - mostly py. & sphal - along laminae. From about 695' to 720' siltstone bands and laminae alternate w/ calcite bands. dip 60

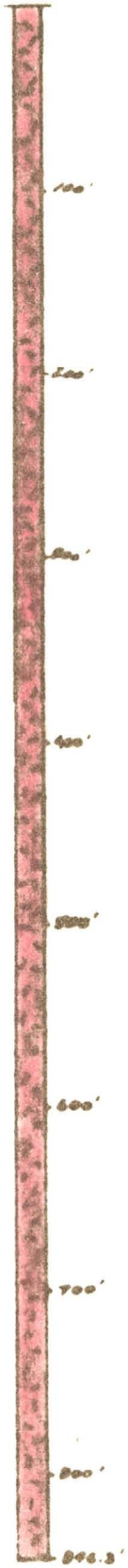
Arkose dip 50

Alternating bands & laminae of siltstone & calcite dip 45
dip 50

Mostly arkose w/ occasional siltstone and laminated siltstone, the latter frequently showing slump structures and carrying sulphides - generally py. & sphal. Arkose is frequently brecciated, carrying siltstone fragments dip 40-30

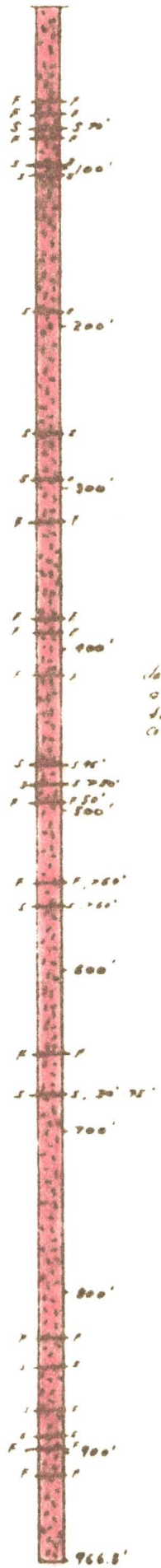
COLLAR ELEV _____

DDH SH-7



Quartz Monzonite Porphyry
Clay alt. (w/ minor development of sericite) generally moderate except in sheared portions of rock where it is strong. Development of large ortho. feld. phenocrysts which are both subhedral to euhedral and zoned (?) common: these phenocrysts are relatively unalt.: orthoclisation. Average sulphide content < 2%, mostly py

COLLAR ELEV _____ DDH SH-8



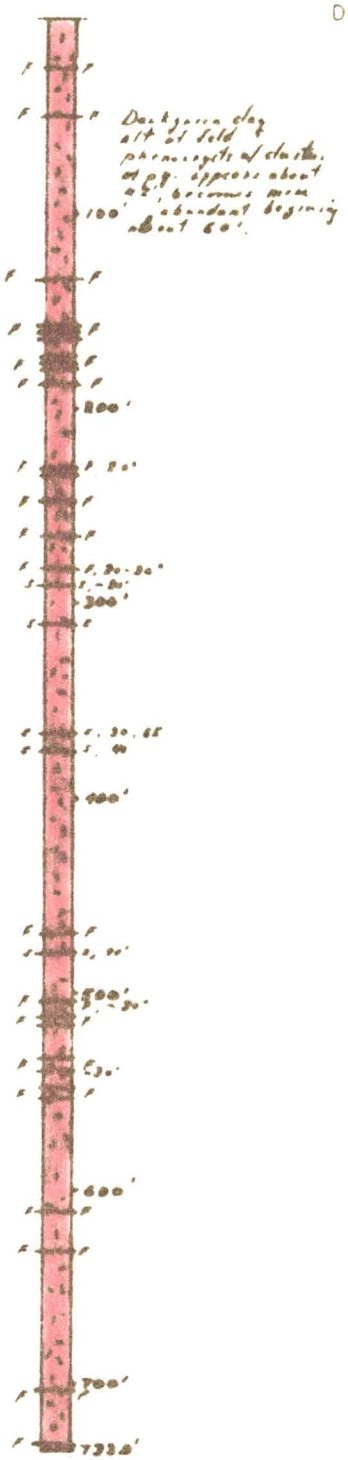
Quartz Monzonite Porphyry

Clay alt. generally moderate, sometimes strong in shear zones some development of sericite. Dipyramidal qtz xyls frequent: qtz clear. Subhedral to euhedral, large, relatively unalt. ortho. feld phenocrysts frequent (orthoclization?)

. Av sulphide content < 2%, mostly py.

dark green clay alt of feld phenocrysts w/ clusters of py frequent beginning about 400', becoming more abundant about 500'

COLLAR ELEV _____ DDH SH-9



Quartz Monzonite Porphyry

Clay alt moderate to strong to sometimes intense in fracture zones some sericite development w/ clay, esp. along shears. Dipyram. dol, clear qtz. xyls. common. large, sometimes zoned, relatively small. ortho. feld phenocrysts scattered throughout rock. Sed. rock fragments present but infrequent, generally in brecciated zones.

Rock generally strongly fractured, frequently sheared and brecciated. Av. sulphide content <1% (< .5%?), mostly py.

SH-10

Arkose w/ siltstone layers

Alternating arkose + siltstone, fault contacts frequent

Siltstone

Alternating arkose + siltstone, fault contacts occasional

Arkose w/ siltstone layers

Siltstone, shaly
Generally thaly laminated w/ chlor + occasional epidote along laminae. Calcite laminae frequent

Alternating arkose + siltstone
Siltstone often shaly, laminated w/ chlor along laminae

Siltstone w/ arkose layers
Siltstone often shaly, laminated w/ chlor along laminae

Arkose w/ infrequent siltstone layers
Arkose frequently coarse, "porphyritic aspect"

DATE STARTED 1/16/61
DATE COMPLETED 2/9/61

DIAMOND DRILL ASSAY LOG

SHEET NO 1
HOLE NO SH-10

COORDINATES _____ N _____ W _____ COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE NO)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Pb / Zn)	REMARKS	DATA OK	MEASURE CORE RECOVER
0.0	8.0	8.0	NX6.7		—									
8.0	11.1	3.1	NX		106									
11.1	20.5	9.4	"		98									
20.5	30.0	9.5	"		96									
30.0	40.8	10.8	"		95									
40.8	47.3	6.5	"		85									
47.3	56.5	9.2	"		100									
56.5	66.5	10.0	"		100									
66.5	73.2	7.7	"		94	329-1		0.03		0.05	0.05			
73.2	80.0	6.8	"		91	330-1		Tr		Tr	Tr			
80.0	91.7	11.7	"		99	377-1		0.02		Tr	Tr			
91.7	103.0	11.3	"		100	378-1		0.02		Tr	0.80			
103.0	109.3	6.3	"		100	379-1		0.02		0.05	0.05			
109.3	119.3	10.0	"		100	380-1		Tr		Tr	Tr			
119.3	130.2	10.9	"		100	381-1		Tr		Tr	Tr			
130.2	142.3	12.1	"		100	410-1		Tr		Tr	Tr			
142.3	154.6	12.3	"		100	411-1		0.02		0.05	0.05			
154.6	164.3	9.7	"		100	412-1		Tr		Tr	Tr			
164.3	171.2	6.9	"		100	413-1		Tr		Tr	Tr			
171.2	179.0	7.8	"		100	432-1		Tr		0.05	Tr			
179.0	186.0	7.0	"		94	433-1		Tr		Tr	0.05			
186.0	195.8	9.8	"		100	434-1		Tr		Tr	Tr			
195.8	206.1	10.3	"		100	435-1		0.02		0.05	0.05			
206.1	217.3	11.2	"		81	436-1		0.02		0.05	Tr			
217.3	227.0	9.7	"		100	437-1		Tr		Tr	Tr			
227.0	232.9	5.9	"		71	438-1		Tr		Tr	Tr			
232.9	241.5	8.6	"		92	439-1		Tr		Tr	0.05			
241.5	247.3	5.8	"		100	—								
247.3	254.9	7.6	"		100									
254.9	265.3	10.4	"		99									
265.3	273.0	7.7	"		96									
273.0	278.6	5.6	"		100									
278.6	287.5	8.9	"		99									
287.5	295.5	8.0	"		101									
295.5	304.3	8.8	"		100									
304.3	312.6	8.3	"		100									
312.6	321.0	8.4	"		100									
321.0	327.5	6.5	"		97									
327.5	337.6	10.1	"		100									
337.6	347.9	10.3	"		99									
347.9	355.2	7.3	"		100									
355.2	363.6	8.4	"		100	492-1		0.04		0.05	Tr			
363.6	368.9	5.3	"		98	493-1		0.04		Tr	Tr			
368.9	375.0	6.1	"		100	494-1		0.08		0.05	0.05			
375.0	382.8	7.8	"		100	495-1		0.04		Tr	0.05			
382.8	391.5	8.7	"		100	496-1		0.03		Tr	Tr			
391.5	402.6	11.1	"		96	497-1		Tr		Tr	0.05			
402.6	410.8	8.2	"		100	498-1		0.03		Tr	Tr			
410.8	420.5	9.7	"		100	499-1		0.02		Tr	Tr			
420.5	430.7	10.2	"		100									
430.7	443.2	12.5	"		98									
443.2	452.4	9.2	"		97									
452.4	460.0	7.6	"		95									
460.0	468.4	8.4	"		100									
468.4	474.7	6.3	"		95									

SHEET NO. 2

DATE STARTED 1/16/81
DATE COMPLETED 2/9/81

DIAMOND DRILL ASSAY LOG

HOLE NO 54-10

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
474.7	483.4	8.7	NX		100									
483.4	493.5	10.1	"		100									
493.5	504.0	10.5	"		98									
504.0	513.5	9.5	"		86									
513.5	518.5	5.0	"		86									
518.5	524.6	6.1	"		75									

SHEET NO 1

DATE STARTED 11/29/60
DATE COMPLETED 12/28/60

DIAMOND DRILL ASSAY LOG

HOLE NO S4-6

COORDINATES _____ N _____ W _____ COULAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Pb / Zn)	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	8.0	8.0	NX											
8.0	18.1	10.1	"		58									
18.1	30.0	11.9	"		98									
30.0	40.2	10.2	"		99									
40.2	50.5	11.3	"		90									
50.5	58.0	7.5			99									
58.0	67.0	9.0	"		99									
67.0	81.8	14.8	"		94									
81.8	95.0	13.2	"		102									
95.0	103.0	8.0	"		105									
103.0	114.0	11.0	"		98									
114.0	123.2	9.2	"		100									
123.2	140.1	16.9	"		99									
140.1	147.1	7.0	"		100									
147.1	158.6	11.5	"		98									
158.6	171.2	12.6	"		100									
171.2	185.1	13.9	"		101									
185.1	190.4	5.3	"		95									
190.4	199.0	8.6	"		100									
199.0	210.6	11.6	"		102									
210.6	224.8	14.2	"		96									
224.8	237.0	12.2	"		99									
237.0	246.2	9.2	"		98									
246.2	251.3	5.1	"		102									
251.3	261.4	10.1	"		101									
261.4	271.4	10.0	"		100									
271.4	281.4	10.0	"		100									
281.4	292.0	10.6	"		105									
292.0	308.6	16.6	"		96									
308.6	321.2	12.6	"		105									
321.2	331.3	10.1	"		97									
331.3	341.9	10.6	"		101									
341.9	349.2	7.3	"		100									
349.2	361.3	12.1	"		100									
361.3	373.5	12.2	"		100									
373.5	385.3	11.8	"		98									
385.3	391.6	6.3	"		97									
391.6	400.2	8.6	"		108									
400.2	412.0	11.8	"		97									
412.0	422.3	10.3	"		98									
422.3	432.2	9.9	"		100									
432.2	448.0	15.8	"		96									
448.0	457.2	9.2	"		91									
457.2	468.7	11.5	"		95									
468.7	475.0	6.3	"		95									
475.0	484.9	9.9	"		101									
484.9	491.8	6.9	"		101									
491.8	501.7	9.9	"		98									
501.7	510.7	9.0	"		100									
510.7	522.3	11.6	"		101									
522.3	534.5	12.2	"		102									
534.5	545.7	11.2	"		95									
545.7	556.8	11.1	"		100									
556.8	569.1	12.3	"		101									
569.1	578.9	9.8	"		99									

SHEET NO 2

DATE STARTED 12/19/60
DATE COMPLETED 12/24/60

DIAMOND DRILL ASSAY LOG

HOLE NO 54-6

COORDINATES N COLLAR ELEVATION BEDROCK ELEVATION

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE No.)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY (Pb / Zn)	REMARKS	DATA OK	MEASURED CORE RECOVERY
578.9	589.0	10.1	NX		100									
589.0	599.6	10.6			100	9930		R		0.05	R			
599.6	604.1	4.5			100	31		0.02		0.05	R			
604.1	619.2	15.1			99	32		0.02		R	0.05			
619.2	629.3	10.1			100	33		R		R	R			
629.3	639.4	10.1			101	34		R		0.05	0.35			
639.4	649.5	10.1			99	35		R		R	0.10			
649.5	659.5	10.1			100	36		0.02		R	0.40			
659.5	673.4	13.9			96	37		R		R	R			
673.4	682.0	8.6			100	38		R		R	0.10			
682.0	692.0	10.0			100	39		R		—	—			
692.0	702.6	10.6			102	40		0.02		R	0.50			
702.6	711.9	9.3			100	41		R		R	0.35			
711.9	720.1	8.2			91	9935		R		0.05	0.20			
720.1	732.0	11.9			64	36		0.02		0.05	0.10			
732.0	746.9	14.9			135	37		0.03		R	0.10			
746.9	755.8	8.9			99	38		0.02		R	R			
755.8	765.2	9.4			97	39		0.02		R	R			
765.2	774.3	9.1				60		0.03		0.05	R			
774.3	782.7	8.4			100	61		0.04		0.05	R			
782.7	794.4	11.7			98	1000.0		0.03		0.05	0.10			
794.4	806.5	12.1			101	.1-1		0.02		R	R			
806.5	815.3	8.8				.1-2		R		0.05	R			
	Bottom	of	Hole											

SHEET NO. 1

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

HOLE NO. S4-5

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE (Mo)	SLUDGE WT.	SLUDGE ASSAY (Au, Ag)	REMARKS (Pb)	REMARKS (Zn)	DATA OK	MEASURED CORE RECOVERY
10.0	19.6	9.6	NX		96										
19.6	28.3	8.7	"		101										
28.3	43.7	15.4	"		99										
43.7	53.7	10.0	"		97										
53.7	63.7	10.0	"		101	9370		0.04							
63.7	73.7	10.0	"		100										
73.7	81.1	7.4	"		63										
81.1	90.6	9.5	"		103										
90.6	100.6	10.0	"		100										
100.6	110.6	10.0	"		101	9371		0.06							
110.6	120.6	10.0	"		101										
120.6	130.6	10.0	"		100	72		0.05							
130.6	140.6	10.0	"		101	73		0.12							
140.6	150.6	10.0	"		100	74		0.03							
150.6	160.6	10.0	"		100	75		0.03							
160.6	170.6	10.0	"		100	76		0.05							
170.6	180.6	10.0	"		100	77		0.06							
180.6	190.6	10.0	"		100	78		0.05							
190.6	200.6	10.0	"		100	79		0.08							
200.6	210.6	10.0	"		100	80		0.07							
210.6	220.6	10.0	"		100	81		0.04							
220.6	230.6	10.0	"		100	82		0.06							
230.6	240.6	10.0	"		101	83		0.06							
240.6	250.6	10.0	"		100	84		0.05			0.1	0.05	R		
250.6	260.6	10.0	"		100	85		0.11			0.1	R	R		
260.6	270.6	10.0	"		101	9394		0.06							
270.6	278.4	7.8	"		100	95		0.11							
278.4	288.4	10.0	"		100	96		R							
288.4	298.4	10.0	"		99	97		R							
298.4	308.4	10.0	"		100	98		0.04							
308.4	318.4	10.0	"		100	99		0.05							
318.4	328.4	10.0	"		100	9400		0.02							
328.4	338.4	10.0	"		100	01		0.06							
338.4	348.4	10.0	"		102	02		0.06							
348.4	358.4	10.0	"		100	03		0.06							
358.4	368.4	10.0	"		100	04		0.06							
368.4	378.4	10.0	"		101	9429		0.05							
378.4	388.4	10.0	"		101	30		0.04							
388.4	398.4	10.0	"		100	31		0.06							
398.4	408.4	10.0	"		102	32		0.06							
408.4	418.4	10.0	"		98	33		0.08							
418.4	428.4	10.0	"		102	34		0.09							
428.4	438.4	10.0	"		100	35		0.10							
438.4	448.4	10.0	"		100	36		0.08							
448.4	461.0	12.6	"		99	37		0.08							
461.0	471.0	10.0	"		100	38		0.06							
471.0	481.0	10.0	"		100	39		0.08							
481.0	491.0	10.0	"		101	40		0.06	0.002						
491.0	501.0	10.0	"		100	41		0.08	0.008						
501.0	516.5	15.5	"		100	42		0.06	0.004						
516.5	526.1	9.5	"		101	43		0.08	0.005						
526.1	534.0	8.9	"		91	9487		0.08							
534.0	541.4	7.4	"		94	88		0.10							
541.4	550.7	9.3	"		103	89		0.07							
550.7	560.5	9.8	"		100	90		0.04							

SHEET NO. 2

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

HOLE NO. 54-5

COORDINATES _____ N _____ COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (SAMPLE No.)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT.	SLUDGE ASSAY (Au)	REMARKS (Ag)	REMARKS (Pb)	REMARKS (Zn)	DATA OK	MEASURED CORE RECOVERY
560.5	573.2	12.7	NX		110	9491		0.08								
573.2	580.3	7.1	"		100	92		0.07								
580.3	590.3	10.0	"		99	93		0.06								
590.3	604.7	14.4	"		101	94		0.03								
604.7	614.7	10.0	"		98	95		0.02								
614.7	623.0	9.3	"		91	96		0.02								
623.0	633.0	10.0	"		100	97		0.04								
633.0	638.0	5.0	"		100	98		0.07								
638.0	648.0	10.0	"		101	99		0.03								
648.0	658.0	10.0	"		98	9500		0.04								
658.0	666.1	8.1	"		100	01		0.04								
666.1	675.9	9.8	"		103	02		0.04								
675.9	685.9	10.0	"		100	03		0.06								
685.9	695.9	10.0	"		102	04		0.05								
695.9	705.9	10.0	"		100	05		0.05								
705.9	715.9	10.0	"		100	06		0.04								
715.9	720.5	4.6	"		95	07		0.02								
720.5	734.9	14.4	BX		109	9598		0.03								
734.9	743.8	8.9	"		100	99		0.02								
743.8	753.8	10.0	"		100	9600		0.02								
753.8	763.8	10.0	"		99	01		0.03								
763.8	779.6	15.8	"		100	02		R								
779.6	789.6	10.0	"		100	03		R								
789.6	799.6	10.0	"		100	04		R								
799.6	809.6	10.0	"		101	05		R								
809.6	819.7	10.1	"		99	06		0.02								
819.7	827.8	8.1	"		100	07		R								
827.8	836.6	8.8	"		98	08		R								
836.6	846.6	10.0	"		101	09		R								
846.6	856.6	10.0	"		100	10		R								
856.6	866.6	10.0	"		101	11		0.02		R	0.3	0.1	1.10			
866.6	880.8	14.2	"		97	12		R								
880.8	889.8	9.0	"		91	13		0.03								
889.8	899.8	10.0	"		101	14		R								
899.8	909.8	10.0	"		101	15		R								
909.8	919.8	10.0	"		97	16		0.02								
919.8	929.8	10.0	"		99	17		0.03		0.005	0.2	0.1	0.65			
929.8	939.8	10.0	"		98	18		R								
939.8	949.8	10.0	"		102	19		0.10								
949.8	959.8	10.0	"		100	20		0.07		0.005	0.3	R	0.50			
959.8	969.3	9.5	"		101	21		0.02								
969.3	979.3	10.0	"		100	22		R		R	0.1	R	0.60			
979.3	989.3	10.0	"		99	23		0.02		R	0.1	R	0.35			
989.3	999.3	10.0	"		101	24		0.04		R	0.1	0.1	0.20			
999.3	1009.3	10.0	"		100	25		0.02		0.005	0.2	0.1	0.05			
1009.3	1015.2	5.9	"		100	26		0.04		R	0.2	0.1	0.20			
1015.2	1024.0	8.8	"		101	27		0.18		0.005	2.1	0.8	5.70			
1024.0	1029.3	5.3	"		102	28		0.11								
1029.3	1039.3	10.0	"		99	29		0.02								
1039.3	1049.3	10.0	"		100	30		0.05								
1049.3	1059.3	10.0	"		100	31		R								
1059.3	1069.3	10.0	"		100	32		0.02		R	0.2	R	0.55			
1069.3	1079.3	10.0	"		100	33		R		R	0.1	R	0.25			
1079.3	1089.3	10.0	"		100	34		0.02		R	0.2	R	0.70			
1089.3	1101.6	12.3	"		81	35		R		R	0.1	R	0.30			

SHEET NO. 3

DATE STARTED 11/3/60
DATE COMPLETED 11/30/60

DIAMOND DRILL ASSAY LOG

HOLE NO. S4-5

COORDINATES _____ N _____ W

COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE (Sample No.)	CORE WT	CORE ASSAY (Cu)	WEIGHTED AVERAGE	SLUDGE WT.	SLUDGE ASSAY (Au, Ag)	REMARKS		DATA OK	MEASURED CORE RECOVERY
1101.6	1112.3	10.7	BX		68										
1112.3	1121.6	10.3	"		61										
1121.6	1130.0	8.4	"		52										
	BOTTOM OF HOLE														

SHEET NO 1

DATE STARTED 12/28/60
DATE COMPLETED 1/16/61

DIAMOND DRILL ASSAY LOG

HOLE NO SH-9

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	21.0	21.0	RB											
21.0	30.0	9.0	NX		97	59-1		0.02						
30.0	41.2	11.2	"		81	60-1		0.03						
41.2	50.0	8.8	"		99	61-1		0.03						
50.0	60.7	10.7	"		98	62-1		0.04						
60.7	69.8	9.1	"		100	63-1		0.04						
69.8	80.8	11.0	"		100	64-1		0.02						
80.8	91.3	10.5	"		100	65-1		Tr						
91.3	100.7	9.4	"		100	66-1		Tr						
100.7	109.1	8.4	"		99	67-1		Tr						
109.1	121.2	12.1	"		100	68-1		0.02						
121.2	132.3	11.1	"		99	69-1		0.02						
132.3	140.4	8.1	"		100	70-1		Tr						
140.4	147.6	7.2	"		97	71-1		Tr						
147.6	155.5	7.9	"		100	72-1		Tr						
155.5	166.5	11.0	"		95	73-1		Tr						
166.5	173.0	6.5	"		86	74-1		0.02						
173.0	178.1	5.1	"		65	75-1		0.02						
178.1	186.5	8.4	"		100	76-1		Tr						
186.5	194.2	7.7	"		100	77-1		Tr						
194.2	201.0	6.8	"		96	78-1		0.02						
201.0	214.7	13.7	"		100	79-1		Tr						
214.7	223.9	9.2	"		100	80-1		0.02						
223.9	235.6	11.7	"		100	133-1		0.04						
235.6	246.5	10.9	"		100	134-1		0.04						
246.6	257.8	11.3	"		98	135-1		0.04						
257.8	266.0	8.2	"		100	136-1		0.06						
266.0	279.7	13.7	"		97	137-1		0.04						
279.7	285.1	5.4	"		96	138-1		0.04						
285.1	294.8	9.7	"		100	139-1		0.04						
294.8	303.4	8.6	"		100	140-1		0.06						
303.4	317.0	13.6	"		100	141-1		0.03						
317.0	325.3	8.3	"		100	142-1		0.05						
325.3	336.9	11.6	"		100	143-1		0.04						
336.9	345.4	8.5	"		97	144-1		0.04						
345.4	351.5	6.1	"		95	145-1		0.02						
351.5	357.0	5.5	"		99	203-1		Tr						
357.0	365.3	8.3	"		100	204-1		Tr						
365.3	375.4	10.1	"		92	205-1		0.02						
375.4	385.9	10.5	"		100	206-1		Tr						
385.9	395.0	9.1	"		100	207-1		Tr						
395.0	408.5	13.5	"		99	208-1		Tr						
408.5	418.0	9.5	"		95	209-1		Tr						
418.0	427.7	9.7	"		89	210-1		Tr						
427.7	436.0	8.3	"		82	211-1		0.03						
436.0	446.6	10.6	"		99	212-1		0.02						
446.6	456.2	9.6	"		75	213-1		0.02						
456.2	466.3	10.1	"		100	214-1		Tr						
466.3	473.4	7.1	"		100	215-1		Tr						
473.4	483.4	10.0	"		100	216-1		0.02						
483.4	495.0	11.6	"		100	217-1		0.02						
495.0	505.8	10.8	"		88	218-1		Tr						
505.8	513.5	7.7	"		100	219-1		Tr						
513.5	524.5	11.0	"		100	220-1		Tr						
524.5	531.4	6.9	"			Not Submitted for Assay below 524.5'								

SHEET NO 2

DATE STARTED 12-28-60
DATE COMPLETED 1-16-61

DIAMOND DRILL ASSAY LOG

HOLE NO SH-9

COORDINATES N W COLLAR ELEVATION BEDROCK ELEVATION

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OR	MEASURED CORE RECOVERY
531.4	537.3	5.9	NX		100									
537.3	545.0	7.7	"		97									
545.0	557.3	12.3	"		99									
557.3	567.4	10.1	"		100									
567.4	573.0	5.6	"		100									
573.0	583.0	10.0	"		97									
583.0	594.5	11.5	"		100									
594.5	604.6	10.1	"		70									
604.6	609.0	4.4	"		100									
609.0	613.5	4.5	"		100		— Not Assayed —							
613.5	623.5	10.0	"		100									
623.5	633.2	9.7	"		100									
633.2	643.2	10.0	"		89									
643.2	659.1	15.9	"		100									
659.1	674.4	15.3	"		82									
674.4	680.3	5.9	"		100									
680.3	695.8	15.5	"		100									
695.8	714.0	18.2	"		100									
714.0	724.4	10.4	"		87									
724.4	730.7	6.3	"		73									
730.7	733.0	2.3	"		100									

DATE STARTED 11-30-60
DATE COMPLETED 12-23-60

DIAMOND DRILL ASSAY LOG

HOLE NO SH-7

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY ~~SLUDGE~~	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	10.0	10.0	Rock bit			Sample								
10.0	22.8	12.8	NX		91	20-1		0.04						
22.8	28.9	6.1	"		100	21-1		0.06						
28.9	38.9	10.0	"		100	22-1		0.07						
38.9	50.6	11.7	"		100	23-1		0.09						
50.6	57.9	7.3	"		100	24-1		0.07						
57.9	67.9	10.0	"		99	25-1		0.04						
67.9	77.0	9.1	"		100	26-1		0.07						
77.0	89.6	12.6	"		77	27-1		0.07						
89.6	98.7	9.1	"		100	9681		0.14						
98.7	114.1	15.4	"		98	9682		0.13						
114.1	129.1	15.0	"		100	-83		0.09						
129.1	134.1	5.0	"		100	-84		0.10						
134.1	143.9	9.8	"		100	-85		0.10						
143.9	154.2	10.3	"		99	-86		0.13						
154.2	163.2	9.0	"		100	-87		0.10						
163.2	173.2	10.0	"		100	-88		0.10						
173.2	180.8	7.6	"		94	-89		0.15						
180.8	190.8	10.0	"		100	-90		0.14						
190.8	201.6	10.8	"		100	-91		0.14						
201.6	215.2	13.6	"		100	9712		0.12						
215.2	227.6	12.4	"		90	-13		0.11						
227.6	237.6	10.0	"		100	-14		0.18						
237.6	243.0	5.4	"		100	-15		0.15						
243.0	252.7	9.7	"		97	-16		0.14						
252.7	264.4	11.7	"		100	-17		0.16						
264.4	278.8	14.4	"		99	-18		0.13						
278.8	286.7	7.9	"		97	-27		0.11						
286.7	297.1	10.4	"		100	-28		0.06						
297.1	306.9	9.8	"		100	-29		0.19						
306.9	316.3	9.4	"		100	-30		0.11						
316.3	324.5	8.2	"		100	-31		0.14						
324.5	333.8	9.3	"		100	-32		0.11						
333.8	340.5	6.7	"		100	-33		0.17						
340.5	349.7	9.2	"		94	9750		0.12						
349.7	357.9	8.2	BX		100	-51		0.11						
357.9	369.2	11.3	"		100	-52		0.09						
369.2	378.0	8.8	"		100	-53		0.10						
378.0	388.8	10.8	"		85	9775		0.18						
388.8	397.2	8.4	"		100	-76		0.12						
397.2	408.6	11.4	"		94	-77		0.11						
408.6	418.0	9.4	"		100	-78		0.12						
418.0	429.0	11.0	"		98	-79		0.08						
429.0	437.8	8.8	"		100	-80		0.10						
437.8	447.6	9.8	"		100	-81		0.10						
447.6	454.3	6.7	"		100	-82		0.10						
454.3	463.8	9.5	"		00	-83		0.08						
463.8	474.3	10.5	"		100	9795		0.06						
474.3	484.3	10.0	"		94	-96		0.08						
484.3	495.3	11.0	"		100	-97		0.12						
495.3	502.0	6.7	"		100	-98		0.11						
502.0	512.0	10.0	"		95	9805		0.10						
512.0	521.8	9.8	"		100	-6		0.03						

SHEET NO 2

DATE STARTED 11-30-60
DATE COMPLETED 12-22-60

DIAMOND DRILL ASSAY LOG

HOLE NO SH-7

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE WT	CORE ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED FOR RECOVERY
521.8	531.8	10.0	2K		100	9807		0.06						
531.8	545.9	14.1	"		78	-8		0.07						
545.9	552.9	13.0	"		100	9819		0.13						
552.9	568.2	9.3	"		96	-20		0.10						
568.2	580.6	12.4	"		94	-21		0.09						
580.6	590.3	9.7	"		100	-22		0.08						
590.3	597.8	7.5	"		97	-23		0.10						
597.8	607.8	10.0	"		100	-24		0.15						
607.8	620.6	12.8	"		100	-25		0.08						
620.6	630.6	10.0	"		100	9835		0.14						
630.6	640.6	10.0	"		100	-36		0.14						
640.6	650.1	9.5	"		100	-37		0.16						
650.1	656.3	6.2	"		95	-38		0.16						
656.3	666.3	10.0	"		100	-39		0.16						
666.3	678.9	12.6	"		100	-40		0.19						
678.9	688.9	10.0	"		100	9922		0.12						
688.9	703.9	15.0	"		99	-23		0.12						
703.9	711.5	7.6	"		100	-24		0.09						
711.5	721.5	10.0	"		99	-25		0.08						
721.5	731.5	10.0	"		95	-26		0.10						
731.5	741.5	10.0	"		98	-27		0.17						
741.5	751.5	10.0	"		99	-28		0.15						
751.5	761.5	10.0	"		99	-29		0.10						
761.5	769.7	8.2	"		87	9942		0.07						
769.7	778.4	8.7	"		100	-43		0.08						
778.4	788.3	9.9	"		100	-44		0.06						
788.3	798.2	9.9	"		100	-45		0.04						
798.2	808.3	10.1	"		99	-46		0.04						
808.3	818.3	10.0	"		100	-47		0.05						
818.3	828.3	10.0	"		75	9997		0.08						
828.3	836.2	7.9	"		100	-98		0.06						
836.2	846.3	10.1	"		100	-99		0.06						
846.3														
		Bottom of Hole												

SHEET NO 1

DATE STARTED 12-24-60
DATE COMPLETED 1-17-61

DIAMOND DRILL ASSAY LOG

HOLE NO SH-8

COORDINATES _____ N _____ W COLLAR ELEVATION _____ BEDROCK ELEVATION _____

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OK	MEASURED CORE RECOVERY
0.0	11.1	NX	Casing	2.1		Sample								
11.1	19.6	8.5	NX		100	28-1		0.02						
19.6	29.6	10.0	"		85	29-1		0.08						
29.6	41.1	11.5	"		100	30-1		0.04						
41.1	51.2	10.1	"		100	31-1		0.04						
51.2	59.4	8.3	"		99	32-1		0.08						
59.4	68.5	9.1	"		100	33-1		0.08						
68.5	78.7	10.2	"		100	34-1		0.03						
78.7	90.5	11.8	"		100	35-1		0.09						
90.5	100.5	10.0	"		98	36-1		0.08						
100.5	106.6	6.1	"		99	37-1		0.31						
106.6	114.4	7.8	"		100	38-1		0.04						
114.4	123.2	8.8	"		98	39-1		0.06						
123.2	130.7	7.5	"		100	40-1		0.06						
130.7	139.3	8.6	"		100	41-1		0.04						
139.3	148.5	9.2	"		100	42-1		0.03						
148.5	158.8	10.3	"		99	43-1		0.07						
158.8	168.9	10.1	"		97	44-1		0.06						
168.9	178.7	9.8	"		100	45-1		0.07						
178.7	188.7	10.0	"		100	46-1		0.08						
188.7	193.4	4.7	"		100	47-1		0.07						
193.4	203.4	10.0	"		100	48-1		0.09						
203.4	213.4	10.0	"		100	49-1		0.08						
213.4	223.4	10.0	"		100	50-1		0.11						
223.4	233.2	9.8	"		100	51-1		0.11						
233.2	243.2	10.0	"		100	52-1		0.09						
243.2	253.2	10.0	"		100	53-1		0.09						
253.2	263.2	10.0	"		100	54-1		0.09						
263.2	270.9	7.7	"		100	55-1		0.11						
270.9	280.9	10.0	"		100	56-1		0.06						
280.9	291.1	10.2	"		97	57-1		0.04						
291.1	297.9	6.8	"		100	58-1		0.12						
297.9	307.9	10.0	"		100	81-1		0.06						
307.9	317.9	10.0	"		99	82-1		0.09						
317.9	326.9	9.0	"		100	83-1		0.11						
326.9	336.9	10.0	"		99	84-1		0.08						
336.9	346.9	10.0	"		98	85-1		0.09						
346.9	356.9	10.0	"		91	86-1		0.08						
356.9	366.9	10.0	"		100	87-1		0.09						
366.9	376.9	10.0	"		100	88-1		0.08						
376.9	386.9	10.0	"		100	89-1		0.11						
386.9	393.0	6.1	"		100	90-1		0.13						
393.0	404.6	11.6	"		96	98-1		0.11						
404.6	418.6	14.0	"		100	99-1		0.12						
418.6	426.6	8.0	"		100	100-1		0.11						
426.6	435.8	9.2	"		100	101-1		0.10						
435.8	444.0	8.2	"		100	102-1		0.06						
444.0	454.0	10.0	"		99	118-1		0.07						
454.0	463.9	9.9	"		100	119-1		0.07						
463.9	473.8	9.9	"		100	120-1		0.06						
473.8	483.8	10.0	"		100	121-1		0.06						
483.8	493.8	10.0	"		98	122-1		0.04						
493.8	504.1	10.3	"		91	123-1		0.03						
504.1	514.1	10.0	"		100	124-1		0.12						
514.1	520.2	6.1	"		100	125-1		0.10						

SHEET NO 2

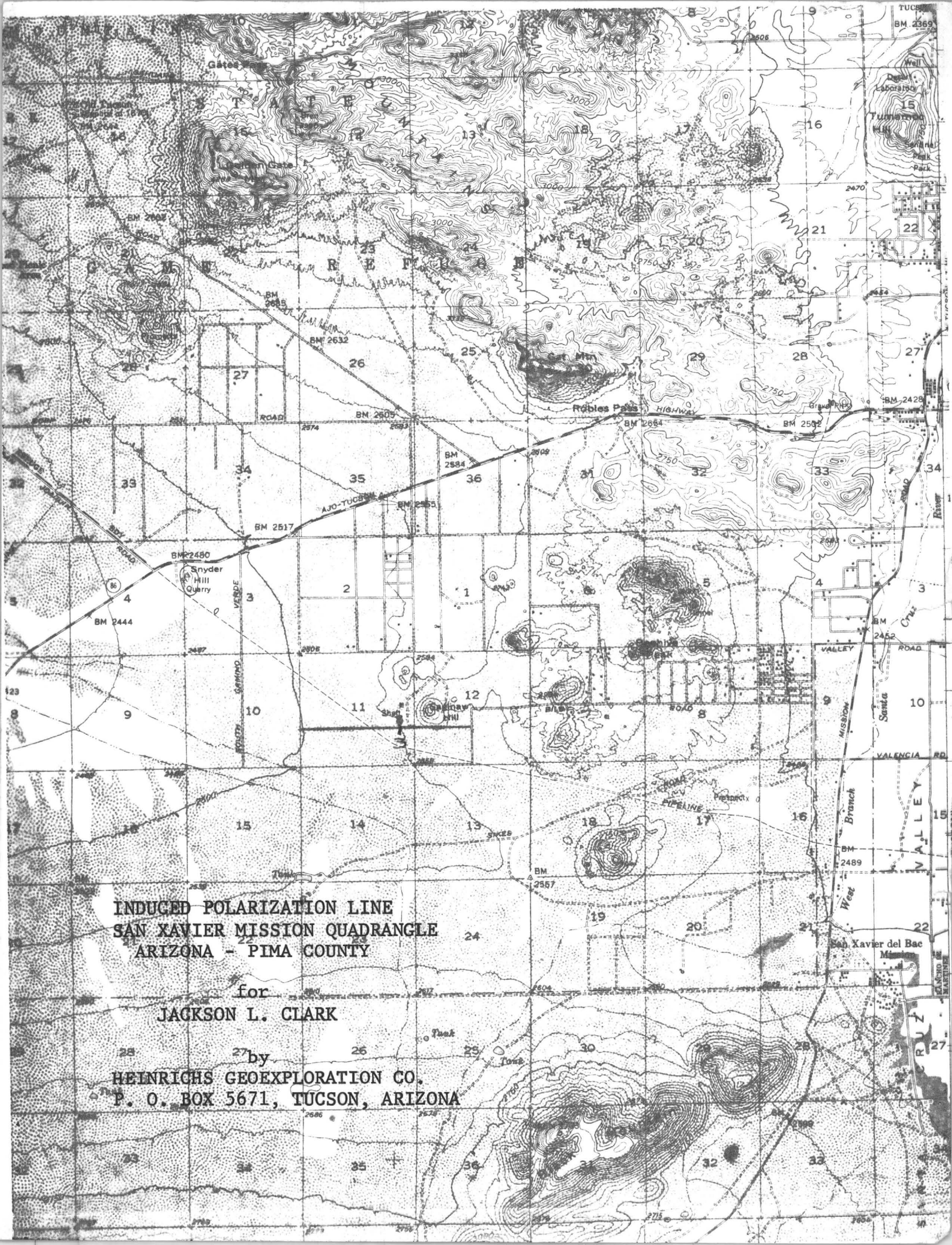
DIAMOND DRILL ASSAY LOG

HOLE NO 54-8

DATE STARTED 12-24-60
DATE COMPLETED 1-7-60

COORDINATES N W COLLAR ELEVATION BEDROCK ELEVATION

FOOTAGE FROM	FOOTAGE TO	INTERVAL	HOLE SIZE	SPECIFIC GRAVITY	% RECOVERY CORE	% RECOVERY SLUDGE	CORE Cu WT	CORE Cu ASSAY	WEIGHTED AVERAGE	SLUDGE WT	SLUDGE ASSAY	REMARKS	DATA OR	MEASURED CORE RECOVERY
520.2	528.3	8.1	NX		99	126-1		0.07						
528.3	538.5	10.2	"		100	127-1		0.13						
538.5	545.9	7.4	"		100	128-1		0.15						
545.9	551.4	5.5	"		100	153-1		0.04						
551.4	560.7	9.3	"		100	154-1		0.04						
560.7	568.8	8.1	"		100	155-1		0.03						
568.8	579.4	10.6	"		99	156-1		0.07						
579.4	590.6	11.2	"		100	157-1		0.05						
590.6	594.1	3.5	BX		97	158-1		0.03						
594.1	603.9	9.8	"		100	159-1		0.06						
603.9	612.4	8.5	"		99	160-1		0.03						
612.4	624.7	12.3	"		100	161-1		0.04						
624.7	634.3	9.6	"		98	162-1		0.02						
634.3	644.3	10.0	"		98	163-1		Tr						
644.3	654.3	10.0	"		100	164-1		Tr						
654.3	664.2	9.9	"		100	165-1		0.02						
664.2	674.2	10.0	"		100	167-1		Tr						
674.2	684.2	10.0	"		100	168-1		0.02						
684.2	694.2	10.0	"		100	169-1		0.02						
694.2	704.2	10.0	"		100	170-1		Tr						
704.2	714.2	10.0	"		100	171-1		0.02						
714.2	724.4	10.2	"		100	172-1		Tr						
724.4	734.3	9.9	"		100	173-1		Tr						
734.3	744.3	10.0	"		100	174-1		Tr						
744.3	754.3	10.0	"		100	197-1		0.03						
754.3	764.3	10.0	"		100	198-1		0.05		Pb	Zn			
764.3	774.3	10.0	"		100	199-1		0.15		1.40	1.20			
774.3	784.3	10.0	"		100	200-1		0.04						
784.3	794.3	10.0	"		97	201-1		0.02						
794.3	804.3	10.0	"		100	202-1		0.02						
804.3	808.8	4.5	"		100	234-1		0.03						
808.8	818.8	10.0	"		100	235-1		0.02						
818.8	829.9	11.1	"		100	236-1		Tr						
829.9	840.0	10.1	"		100	237-1		Tr						
840.0	850.0	10.0	"		96	238-1		Tr						
850.0	858.0	8.0	"		100	239-1		0.02						
858.0	868.0	10.0	"		99	258-1		Tr						
868.0	877.0	9.0	"		93	259-1		0.02						
877.0	886.2	9.2	"		100	260-1		Tr		0.10	0.05			
886.2	894.0	7.8	"		100	261-1		0.04						
894.0	901.0	7.0	"		100	262-1		0.04		0.10	0.65			
901.0	911.0	10.0	"		99	263-1		0.02		0.10	0.05			
911.0	920.9	9.9	"		98	264-1		Tr						
920.9	930.9	10.0	"		100	265-1		Tr						
930.9	940.9	10.0	"		100	266-1		Tr						
940.9	951.0	10.1	"		100	267-1		0.02		0.10	0.05			
951.0	961.0	10.0	"		100	268-1		Tr		0.15	0.05			
961.0	966.8	5.8	"		98	269-1		Tr						

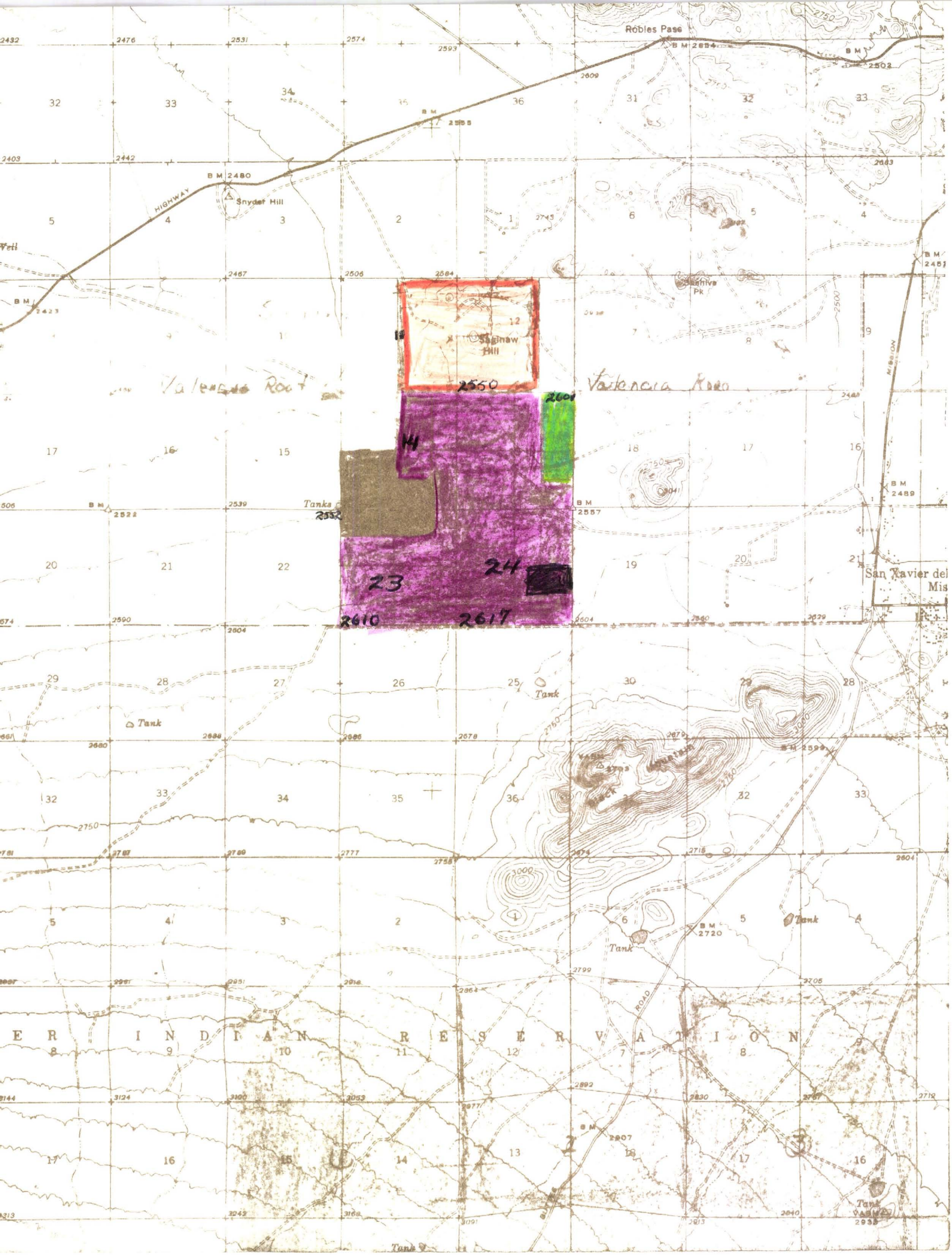


INDUCED POLARIZATION LINE
SAN XAVIER MISSION QUADRANGLE
ARIZONA - PIMA COUNTY

for
JACKSON L. CLARK

by
HEINRICHS GEOEXPLORATION CO.
P. O. BOX 5671, TUCSON, ARIZONA

M. Clark's
letter of Sept. 24, 1964

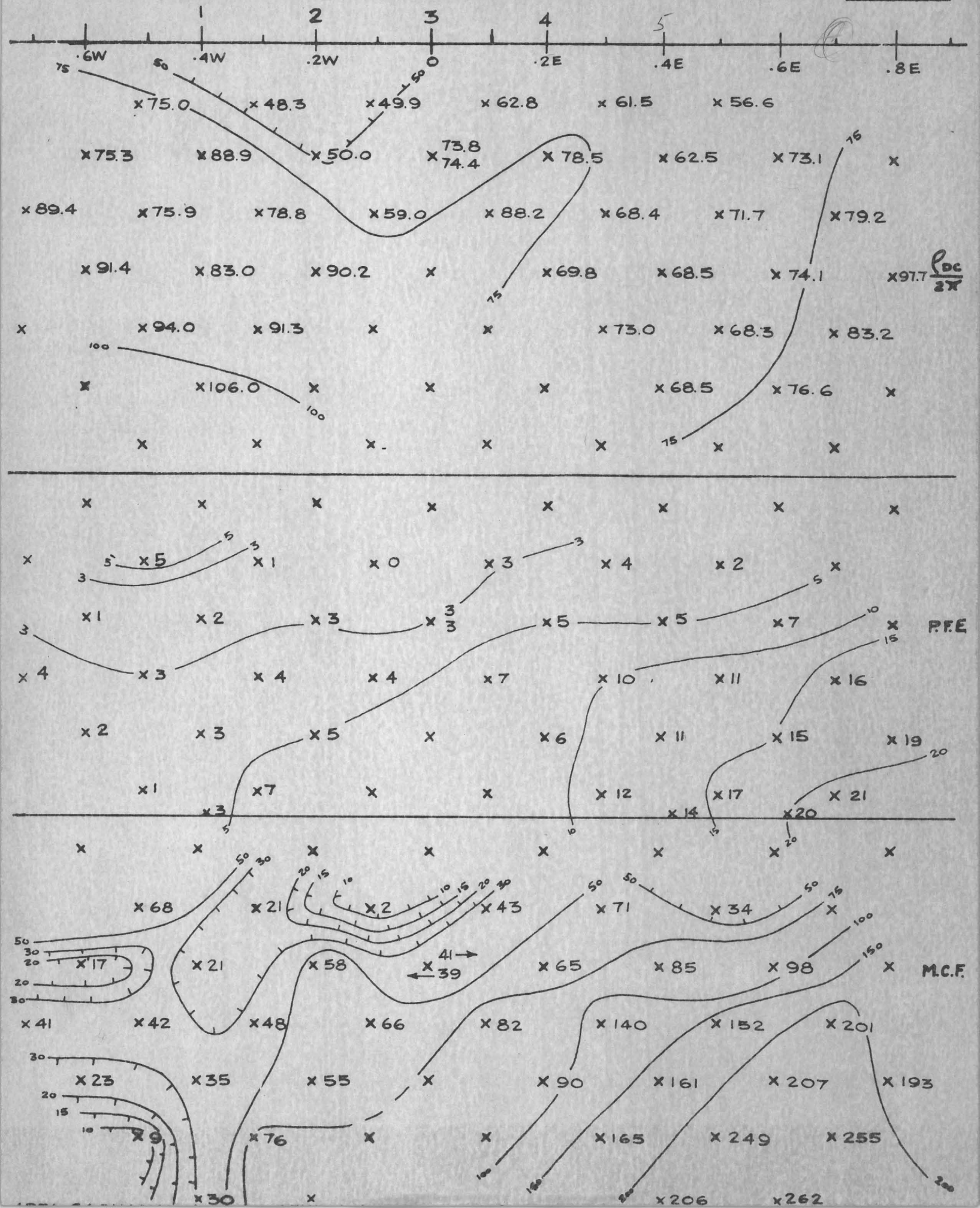


Robles Pass
HIGHWAY
Snyder Hill
Saginaw Hill
Valencia Road
Valencia Road
Tanks
Tank
Tank
Tank
Tank
Tank
Tank
San Xavier del
Mis
MISSION
ROAD
E R I N D I A N R E S E R V A T I O N
2550
2601
14
23
24
2610
2617

Robles Pass
B M 2654
B M 2502
B M 2480
Snyder Hill
HIGHWAY
Well
Saginaw Hill
Valencia Road
Valencia Road
Beehive Pk
2550
14
13
23
24
2610
2617
Tanks
B M 2522
B M 2557
B M 2489
San Xavier del Mis
Tank
Tank
Tank
Tank
Tank
Tank
B M 2720
B M 2907
ROAD
E R I N D I A N R E S E R V A T I O N

11-11-53
DHQ-A-1M-39

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING North



INDUCED POLARIZATION - RECEIVER NOTES PAGE _____ Geoex No. 7

Project: TCS4 Line: #1 W 1/2 ~~48~~ Int.Cal 48.2 Date: 6/Feb 68

Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Rec.	.2-4W	→	.4W-.8W	→	→	.6W-.8W	→	→	→	.8W-1.0W	→	→
Time	100	100 30	100	30	30	300	100	30	10	30	30	10
DC-1	74.1	27.7 27.8	70.1	18.0	8.5	108	30.2	11.4	6.58	27.5	10.9	6.0
DC-2	74.1	27.9 27.6	69.9	18.5	8.5	107	31.2	11.1	6.65	27.5	11.0	6.1
Σ	148.2	55.6 55.4	140.0	36.5	17.0	215	61.4	22.5	13.23	55.0	21.9	12.10
DC-3	74.1	27.7 27.8	70.1	18.0	8.5	107	30.2	11.4	6.58	27.5	10.9	6.02 6.02
Dc-4	74.1	27.9 27.6	69.9	18.5	8.5	108	31.2	11.1	6.65	27.5	11.0	6.10 6.12
Σ	148.2	55.6 55.4	140.0	36.5	17.0	215	61.4	22.5	13.23	55.0	21.9	12.12 12.14
DC-AV	148.2	55.6 55.4	140.0	36.5	17.0	215	61.4	22.5	13.23	55.0	21.9	12.12
AC-1	69.0	26.5 24.7	65.3	17.3	8.2	106	29.9	10.9	6.10	24.7	10.8	5.75
AC-2	69.0	26.8 24.6	65.2	17.3	8.2	106	29.9	11.0	6.05	24.7	10.8	5.75
Σ	138.0	53.3 49.3	130.5	34.6	16.4	212	59.8	21.9	12.15	49.4	21.6	11.50
S. P.	-5.1		-14.8.			+29.9						
AC-N												

INDUCED POLARIZATION - RECEIVER NOTES PAGE Geoex No. 1

Project: Test Line: W1/21 Int.Cal 48.2 oz Date:

Send	4-5	1-2	2-3	3-4	4-5		1-2					
Rec.	.8w-1.0w	1.0-1.2w		→			CAL					
Time	10	30	10	10	10?		30	100	100	30	30	100
DC-1	3.80	13.1	6.75	4.1	2.82		18.8	18.5	23.5	23.7	28.2	28.0
DC-2	3.80	13.1	6.80	4.05	2.68		18.8	18.5	23.5	23.7	28.2	28.0
Σ	7.60	26.2	13.55	8.15	5.50		37.6	37.0	47.0	47.4	56.4	56.0
DC-3	3.80	13.1	6.75	4.1	2.80		18.8	18.5	23.5	23.7	28.2	28.0
Dc-4	3.80	13.1	6.80	4.05	2.70		18.8	18.5	23.5	23.7	28.2	28.0
Σ	7.60	26.2	13.55	8.15	5.50		37.6	37.0	47.0	47.4	56.4	56.0
DC-AV	7.60	26.2	13.55	8.15	5.50		37.6	37.0	47.0	47.4	56.4	56.0
AC-1	3.60	12.8	6.35	3.98	2.63		18.1	19.0	23.5	22.0	25.5	28.0
AC-2	3.61	12.8	6.35	3.98	2.63		18.1	19.0	23.5	22.0	25.5	28.0
Σ	7.21	25.6	12.70	7.96	5.25		36.2	38.0	47.0	44.0	51.0	56.0
S. P.		-15.8										
AC-N		-15.8										

Geoex No 8

INDUCED POLARIZATION SENDER NOTES

Project: TEST Line: I W½ Date: 2-6-63

Send	3-4	4 5	2-3	3-4	4 5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
Receive	→		→			→				→		
Time	2×9	2×9	2×9	2×9	2×9	2×9	2×9	2×9	2×9	2×9	2×9	2×9
Range	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Current	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Send	4-5	1-2	2-3	3-4	4-5							
Receive	→				→		CAL	1-2				
Time	2×9						1×4	1×5	1×6			
Range	2.0						.30	.30	.30			
Current	1800						400	500	600			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____ Geoex No. 2

Our Rec

Project: Saginaw Test Line: 1 - E ½ Int.Cal 48.5 Date: 2/5/63

2/5/63 ⟷ 2/6/63

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	.2-.4E	→	.2-.2E	→	→	6-.8E	→	→	→	1.0-1.2	→	→
~~Time~~ RANGE	100 300	100 30	100 300	100 30	30	100	30	30	10	30	10	10
DC-1	91.5 91	27.7 27.8	90.5 90.0	28.8 29.0	13.0	84.2	23.8	10.0	5.1 5.1	12.0 12.0	5.50 5.38	3.20 3.30
DC-2	92.0 91	27.7 27.3	89.8 90.0	29.2 29.0	12.8	84.2	23.3	10.1	5.45 5.45	11.3 11.3	5.61 5.75	2.52 2.44
Σ	183.5 182	55.4 55.1	180.3 180.0	58.0 58.0	25.8	168.4	47.1	20.1	10.55 10.55	23.3 23.3	11.11 11.13	5.72 5.74
DC-3	91.5 91	27.8 27.8	90.3 90.0	29.2 29.0	13.0	84.1	23.8	10.0	5.1	11.9 11.3	5.32 5.25	3.20
Dc-4	92.0 91	27.6 27.3	90.0 90.0	28.8 29.0	12.8	84.3	23.3	10.1	5.55	12.1 11.1	5.77 5.80	2.56
Σ	183.5 182	55.4 55.1	180.3 180.0	58.0 58.0	25.8	168.4	47.1	20.1	10.65	24.0 22.4	11.02 11.05	5.76
DC-AV	183.5 182	55.4 55.1	180.3 180.0	58.0 58.0	25.8	168.4	47.1	20.1	10.58	23.3	11.10	5.74
AC-1	83.6 90.0	26.4 24.5	80.6 87.5	27.2 25.1	12.0	76.3	21.0	9.3	4.82	10.15	4.77	2.50
AC-2	82.8 89.5	26.3 24.0	80.4 87.0	27.6 25.2	12.0	76.2	21.0	9.3	4.82	10.15	4.77	2.49
Σ	166.4 179.5	52.7 49.1	161.0 174.5	54.8 50.3	24.0	152.5	42.0	18.6	9.64	20.3	9.54	4.99
S. P.	+24.7	→	-4.6	→	→	-8.7	→	→	→	-2.4	→	→
AC-N	.08	→	.02	→	→	.01	→	→	→	0.01	→	→
Glenn RBE	5.3 800	4.6 1200	5.8	8.3	8.1	6.6 1000	8.0	9.3	8.7			

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____ Geoex No 1

Our Rec Project: Sagimaw test Line: 1 E ½ Int.Cal _____ Date: 4/15/63

Send	CAL											
Rec.	4-5											
Time	100	30	100	30								
DC-1	19.4	19.3	23.9	24.1								
DC-2	19.4	19.4	23.9	24.1								
Σ	38.8	38.7	47.8	48.2								
DC-3	19.4	19.3	23.9	24.1								
Dc-4	19.4	19.4	23.9	24.1								
Σ	38.8	38.7	47.8	48.2								
DC-AV	38.8	38.7	47.8	48.2								
AC-1	19.0	18.6	23.8	22.5								
AC-2	19.0	18.6	23.7	22.4								
Σ	38.0	37.2	47.5	44.9								
S. P.												
AC-N												

Xerox No. 2

INDUCED POLARIZATION SENDER NOTES

Project: TEST Line: 1 EX Date: 2-5-63

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→		→	→		→	→	→	→	→	→
Time	2x9	2x9	2x9	2x9	2x9	2x9	2x9	2x9	2x9	2x9	2x9	2x9
Range	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Current	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Send	1-2	4-5	3-4	23	12							
Receive	→	→	→	→	→		CAL	4-5		1-2	1-2	
Time	2x9	2x9	2x9	2x9	2x9		x1	x1	x1	2x5	1x5	
Range	2.0	2.0	2.0	2.0	2.0		.20	.20	.30	.75	.30	
Current	1800	1800	1800	1800	1800		400	500	600	1000	500	

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____ Geoex Nor

Our Rec Project: Saginaw Test Line: 1 E. 1/2 Int.Cal 48.5 Date: 2/5/63

2/6/63 2/5/63

Send	1-2	4-5	3-4	2-3	1-2	1-2	CAL					
Rec.	→	1.2-1.4 E				→	4-5					→
~~Time~~ Range	3	10	10	3	3	3 1000 mm	100	30	100	30	100	30
DC-1	1.96 1.95	7.35 7.35	3.80 3.70	1.90 1.84	1.38 1.40	.78 .81	18.9	19.2	23.7	24.2	28.3	28.6
DC-2	1.77 1.70	7.25 7.25	3.70 3.78	2.25 2.28	1.38 1.38	.78 .76	18.9	19.2	23.8	24.2	28.4	28.7
Σ	3.73 3.65	14.60 14.60	7.50 7.48	4.15 4.12	2.76 2.78	1.56 1.57	37.8	38.4	47.5	48.4	56.7	57.3
DC-3	1.95 1.91	7.35	3.72 3.72	1.90 1.94	1.33 1.37	.80 .82	18.9	19.2	23.7	24.2	28.3	28.6
Dc-4	1.82 1.73	7.25	3.77 3.77	2.20 2.15	1.48 1.39	.71 .71	18.9	19.2	23.8	24.2	28.4	28.7
Σ	3.77 3.64	14.60	7.49 7.49	4.10 4.09	2.81 2.76	1.51 1.53	37.8	38.4	47.5	48.4	56.7	57.3
DC-AV	3.70	14.60	7.49	4.12	2.78	1.54	37.8	38.4	47.5	48.4	56.7	57.3
AC-1	1.59	6.02	3.17	1.69	1.19	.66	19.6	18.25	23.8	22.1	28.8	25.9
AC-2	1.58	6.01	3.16	1.69	1.19	.66	19.5	18.25	24.0	22.3	28.8	25.9
Σ	3.17	12.03	6.33	3.38	2.38	1.32	39.1	36.5	47.8	44.4	57.6	51.8
S. P.	→	-27.4				→						
AC-N	→	0.00				→						

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____ Geoex. Work

Our Rec Project: Saginaw test Line: 1 E ½ 2nd day Int.Cal 47.7 Date: 2/6/63

Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2
Rec.	.6-.8E	→	→	→	.8-1.0E	→	→	→	1.0-1.2E	→	→	→
Time Range	100	30	30	10	30	30	10	10				
DC-1	84.0	23.3	10.0	5.25	27.4	10.5	5.05 5.05	3.21 3.22				
DC-2	83.7	23.0	10.1	5.10	27.1	10.9	5.20 5.25	3.00 3.00				
Σ	167.7	46.3	20.1	10.35	54.5	21.4	10.25 10.70	6.21 6.22				
DC-3	84.0	23.3	10.0	5.25	27.4	10.5	5.05 5.05	3.28 3.18				
Dc-4	83.7	23.0	10.1	5.10	27.1	10.9	5.20 5.20	3.23 3.23				
Σ	167.7	46.3	20.1	10.35	54.5	21.4	10.25 10.25	6.20 6.21				
DC-AV	167.7	46.3	20.1	10.35	54.5	21.4	10.27	6.21				
AC-1	75.9	20.8	9.3	4.78	23.6	9.85	4.63	2.82				
AC-2	75.7	20.9	9.3	4.79	23.6	9.85	4.63	2.82				
Σ	151.6	41.7	18.6	9.57	47.2	19.7	9.26	5.64				
S. P.	+3.0	→	→	→	+9.2	→	→	→				
AC-N	0.00	→	→	→	0.00	→	→	→				

Sheet 2/5/63

INDUCED POLARIZATION RECEIVER NOTES PAGE _____ Geoex No. 2

Project: Saginaw Test Line: 1 Test E½ Int.Cal _____ Date: 2/6/83

Send							CAL					
Rec.							4-5					
~~Time~~							100	30	100	30	100	30
DC-1							18.2	19.0	22.7	23.4	27.8	28.1
DC-2							18.2	19.0	22.7	23.4	27.9	28.1
Σ							36.4	38.0	45.4	46.8	55.7	56.2
DC-3							18.2	19.0	22.7	23.4	27.8	28.1
Dc-4							18.2	19.0	22.7	23.4	27.9	28.1
Σ							36.4	38.0	45.4	46.8	55.7	56.2
DC-AV							36.4	38.0	45.4	46.8	55.7	56.2
AC-1							19.0	17.95	23.6	21.5	28.3	25.3
AC-2							19.0	17.95	23.5	21.7	28.3	25.3
Σ							38.0	35.9	47.1	43.2	56.6	50.6
S. P.												
AC-N												

OUR RECEIVER (OLD)

#1

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Saginaw Test Line 1 E ½ Field date 2/5/63 Data page_____ Comp. date 2/7/63. Comp by C.S.L.

	84 30	26 80	81 29	27 84	40	76 76	70 70	31 31	48 48	79	33	46
(A) Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
(B) Receive	.2-.4E	→	.4-.6E	→	→	.6-.8E	→	→	→	.8-1.0E	→	→
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1800	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	183.5 182	55.4 55.1	180.3 180.0	58.0 58.0	25.8	168.4 167.7	47.1 46.3	20.1 20.1	10.58 10.35	54.5	21.4	10.27
(F) DCcal	1.040	1.040	1.040	1.040	1.040	1.040 1.08	1.04 1.08	1.04 1.08	1.04 1.08	1.08	1.08	1.08
(G) Kn x 10^{-3}	.6	2.4	.6	2.4	6	.6	2.4	6	12	2.4	6	12
(H) ρ dc=ExFxGx10^3/D	63.3	76.8	62.5	80.6	89.4	58.4 60.4	65.3 66.8	69.7 72.3	73.1 74.6	78.6	76.7	74.1
(I) Vac Σ	166.4 179.5	52.7 49.1	161.0 174.5	54.8 50.3	24.0	152.5 151.6	42.0 41.7	18.6 18.6	9.64 9.57	47.2	19.7	9.26
(J) AC noise x 2	O.K. →											
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.925 .995	1.000 .930	.929 .996	.998 .925	.982	.935 .935	.943 .943	.993 .993	.971 .971	.931	.991	.974
(M) ρ dc/ρac=ExL/K	1.020 1.010	1.051 1.044	1.040 1.029	1.057 1.066	1.056	1.032 1.033	1.059 1.048	1.071 1.071	1.064 1.050	1.074	1.076	1.080
(N) PFE=(M-1)(10^2)	2 15 1	5 47 4	4 35 3	6 62 7	6	3 3	6 54 5	7 7	6 57 5	7	8	8
(O) MCF=(M-1)(10^5)/H	24	61	56	77	63	55 55	90 72	102 98	88 67	94	99	108

Project_____ Line 28 34 Field date 48 25 Data page 53 60 Comp. date 32 56 Comp. date 40 22 Comp by 10

(A) Send	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	1-2	1-2
(B) Receive	→	1.0-1.2E	→	→	→	1.2-1.4E	→	→	→	→	→
(C) n separation	5	3	4	5	6	4	5	6	7	7	7
(D) I	→	→	→	→	→	→	→	→	→	1000	500
(E) Vdc (avg)	6.21	23.3	11.10	5.74	3.70	14.60	7.49	4.12	2.78	1.54	.73
(F) DCcal	1.08 →	→									
(G) Kn x 10^{-3}	21	6	12	21	33.6	12	21	33.6	50.4	50.4	50.4
(H) ρ dc=ExFxGx10^3/D	78.2	84.0	80.0	72.4	74.6	105.1	94.5	82.8	84.0	83.8	79.6
(I) Vac Σ	5.64	20.3	9.54	4.99	3.17	12.03	6.33	3.38	2.38	1.32	.63
(J) AC noise x 2											
(K) Vac (corr) = $\sqrt{I^2 - J^2}$											
(L) AC-DC cal.	.997	.990	.971	1.001	.965	.956	.992	.961	.982	1.005	1.020
(M) ρdc/ρac =ExL/K	1.099	1.137	1.130	1.150	1.127	1.160	1.173	1.172	1.148	1.172	1.181
(N) PFE=(M-1)(10^2)	10	14	13	15	13	16	17	17	15	17	18
(O) MCF=(M-1)(10^5)/H	127	163	163	208	170	152	183	208	177	206	227

CALIBRATIONS OUR RECEIVER
Geoex Receiver No. 2

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Saginaw Test Line_____ Field date_____ Data page_____ Comp. date_____. Comp by_____

	9.5.0.20	61	24	74	29	86	19	62	24	75	19	60
(A) Send	CAL									2/5/67	2/6/67	
(B) Receive	4-5									←		
(C) n separation												
(D) I	400	400	500	500	600	600	400	400	500	500	400	400
(E) Vdc (avg)	37.8	38.4	47.5	48.4	56.7	57.7	38.8	38.7	47.8	48.2	36.4	38.0
(F) DCcal	1.059	1.041	1.052	1.033	1.060	1.048	1.030	1.033	1.046	1.037	1.100	1.052
(G) Kn x 10^{-3}					~1.040							
(H) ρ dc=ExFxGx10^3/D										←	→	
(I) Vac Σ	39.1	36.5	47.8	44.4	57.6	51.8	38.0	37.2	47.5	44.9	38.0	35.9
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.035	.950	1.006	.919	1.017	.904	.980	.962	.994	.931	1.043	.945
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Project_____ Line 24 72 Field date 28 84 Data page_____ Comp. date_____ Comp by_____

(A) Send												
(B) Receive												
(C) n separation												
(D) I	500	500	600	600								
(E) Vdc (avg)	45.4	46.8	55.7	56.2								
(F) DCcal	1.101	1.069	1.078	1.068								
(G) Kn x 10^{-3}		~1.080										
(H) ρ dc=ExFxGx10^3/D												
(I) Vac Σ	47.1	43.2	56.6	50.6								
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.039	.924	1.017	.900								
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H												

Our Rec. (OLD) Geoex Receiver No. 1

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Saginaw Test Line 1 W½ Field date 2/6/63 Data page_____ Comp. date 2/7/63. Comp by C.S.L.

	9.5.0. 69	27 82	65	58	27	35	30	37	61	82	36	58
(A) Send	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3	3-4
(B) Receive	.2-.4 W	→	.4-.6W	→	→	.6-.8 W	→	→	→	.8-1.0 W	→	→
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1800	→	→	→	→	→	→	→	→	→	→	→
(E) Vdc (avg)	148.2	55.6 | 55.4	140.0	36.5	17.0	215	61.4	22.5	13.23	55.0	21.9	12.12
(F) DCcal USED	1.065	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	.6	2.4	.6	2.4	6	.6	2.4	6	12	2.4	6	12
(H) ρ dc=ExFxGx10^3/D	52.7	78.9	49.7	51.9	60.3	76.6	87.2	79.8	94.0	78.0	77.8	86.1
(I) Vac Σ	138.0	53.3 | 49.3	130.5	34.6	16.4	212	59.8	21.9	12.15	49.4	21.6	11.50
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.944	.999 .928	.949	.958	.999	.988	.995	.986	.955	.928	.987	.958
(M) ρ dc/ρac=ExL/K	1.014	1.041 1.041	1.018	1.010	1.036	1.001	1.021	1.013	1.040	1.034	1.000	1.010
(N) PFE=(M-1)(10^2)	1	4 4	2	1	4	0	2	1	4	3	0	1
(O) MCF=(M-1)(10^5)/H	27	52	36	20	60	1	24	16	43	44	0	12

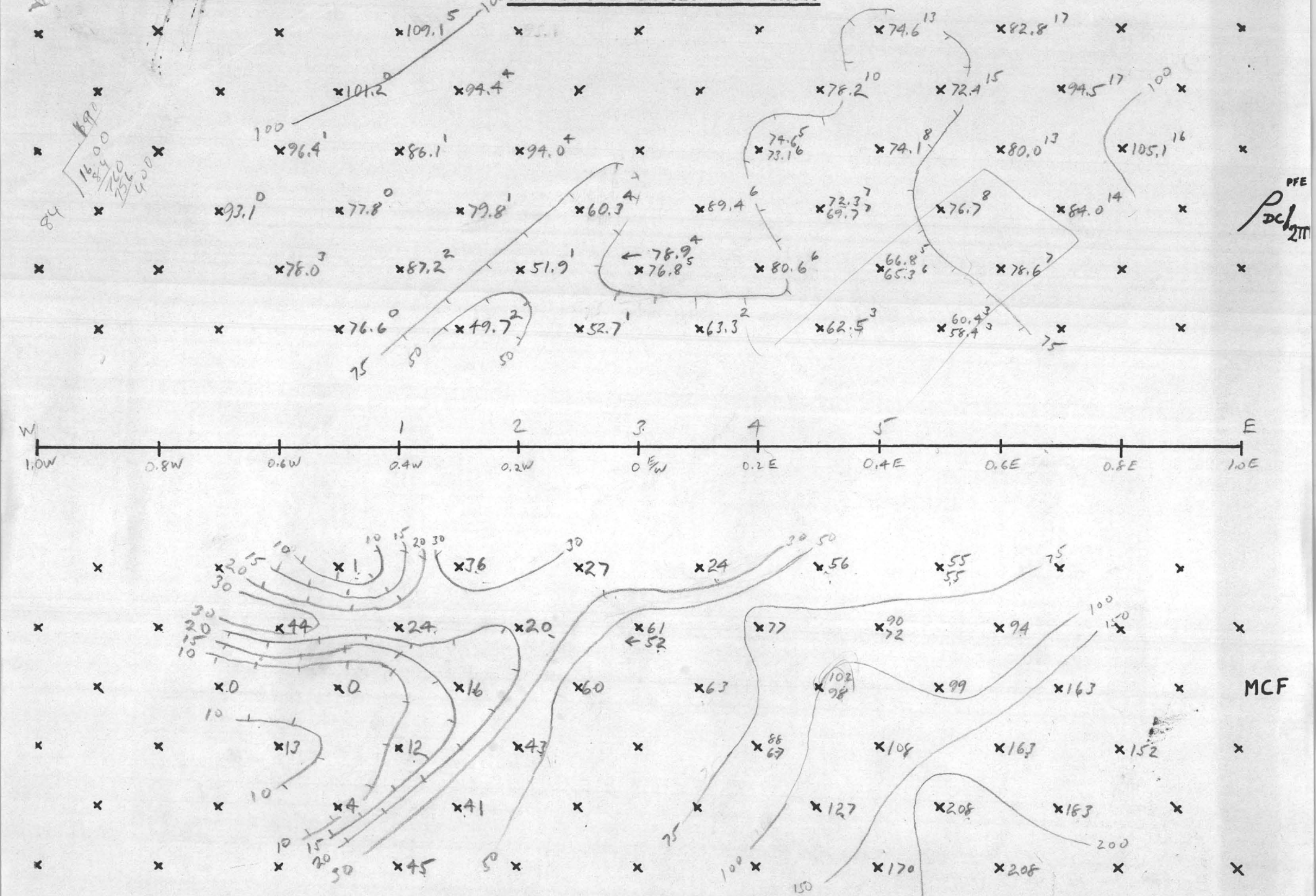
Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

	36	43	64	40	26		60	19	24	73	85	28
(A) Send	4-5	1-2	2-3	3-4	4-5		CAL					
(B) Receive	→	1.0-1.2W	→	→	→		1-2					
(C) n separation	5	3	4	5	6							
(D) I	→	→	→	→	→		400	400	500	500	600	600
(E) Vdc (avg)	7.60	26.2	13.55	8.15	5.50		37.6	37.0	47.0	47.4	56.4	56.0
(F) DCcal	→	→	→	→	→		1.063	1.080	1.063	1.055	1.065	1.071
(G) Kn x 10^{-3}	21	6	12	21	33.6			~	1.065			
(H) ρ dc=ExFxGx10^3/D	94.4	93.1	96.4	101.2	109.1							
(I) Vac Σ	7.21	25.6	12.70	7.96	5.25		36.2	38.0	47.0	44.0	51.0	56.0
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.987	.978	.951	.982	1.000		.963	1.028	1.000	.930	.905	1.000
(M) ρdc/ρac =ExL/K	1.039	1.000	1.013	1.004	1.049							
(N) PFE=(M-1)(10^2)	4	0	1	0	5							
(O) MCF=(M-1)(10^5)/H	41	0	13	4	45							

GEOEX Receiver No. 1

GEOEX Rec 1

INDUCED POLARIZATION WORK SHEET



Area SAGINAW, PIMA CO., ARIZ. LINE 1B

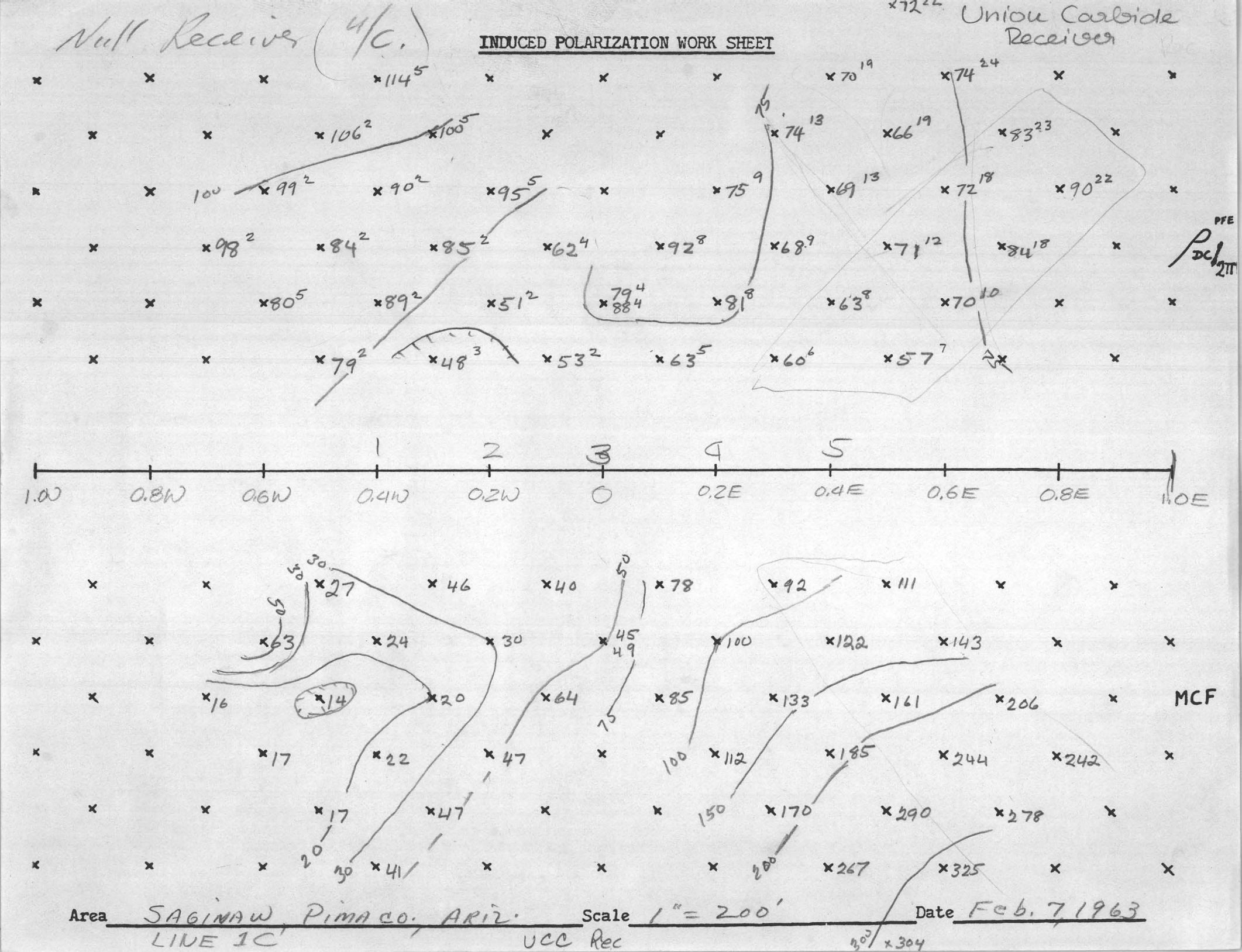
Scale 1" = 200'

Date Feb. 7, 1963

Null Receiver (4/C.)

Union Carbide Receiver

INDUCED POLARIZATION WORK SHEET

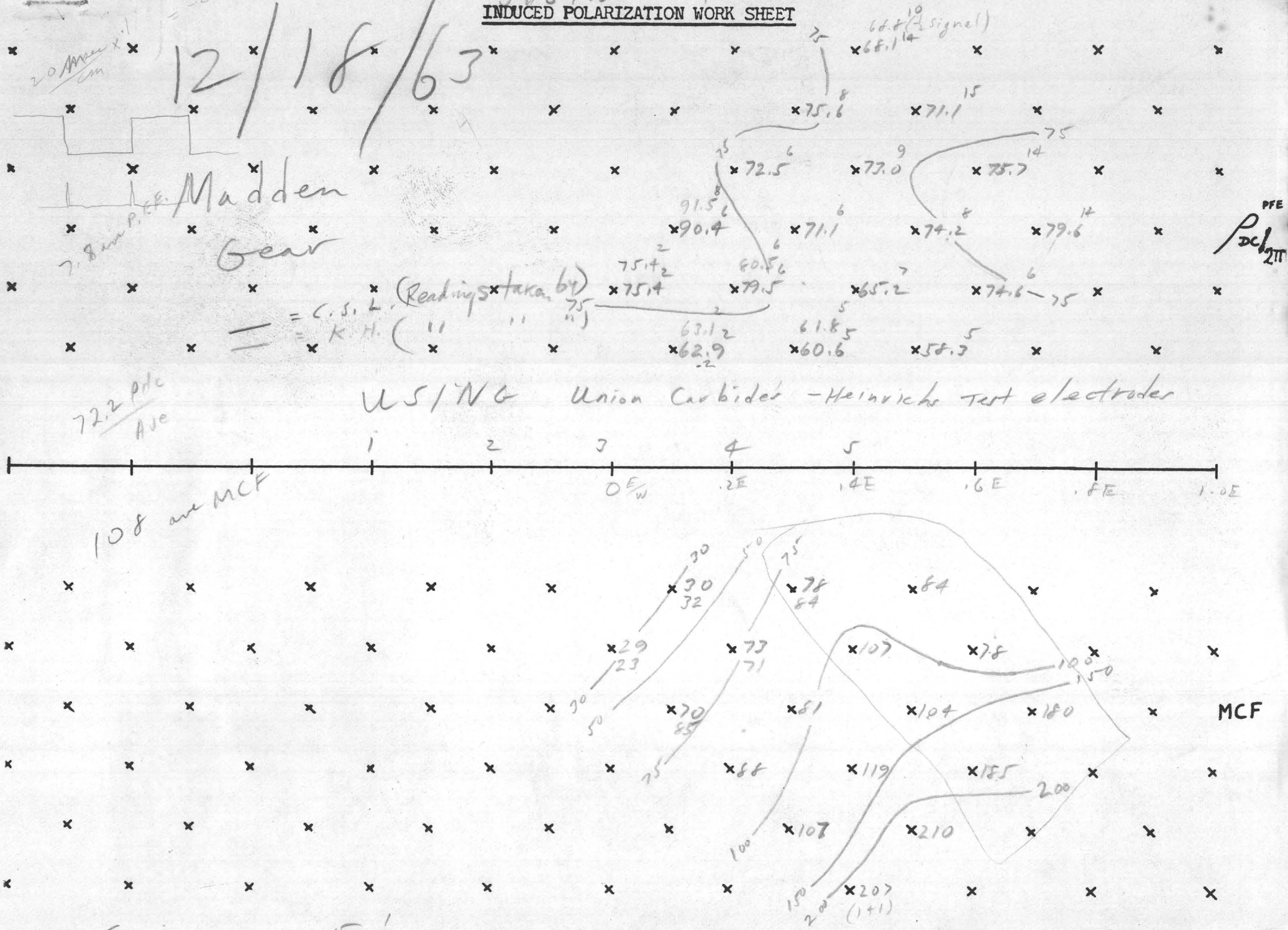


Area SAGINAW, PIMA CO., ARIZ. Scale 1" = 200' Date Feb. 7, 1963

LINE 1C UCC Rec

SAGINAW TEST

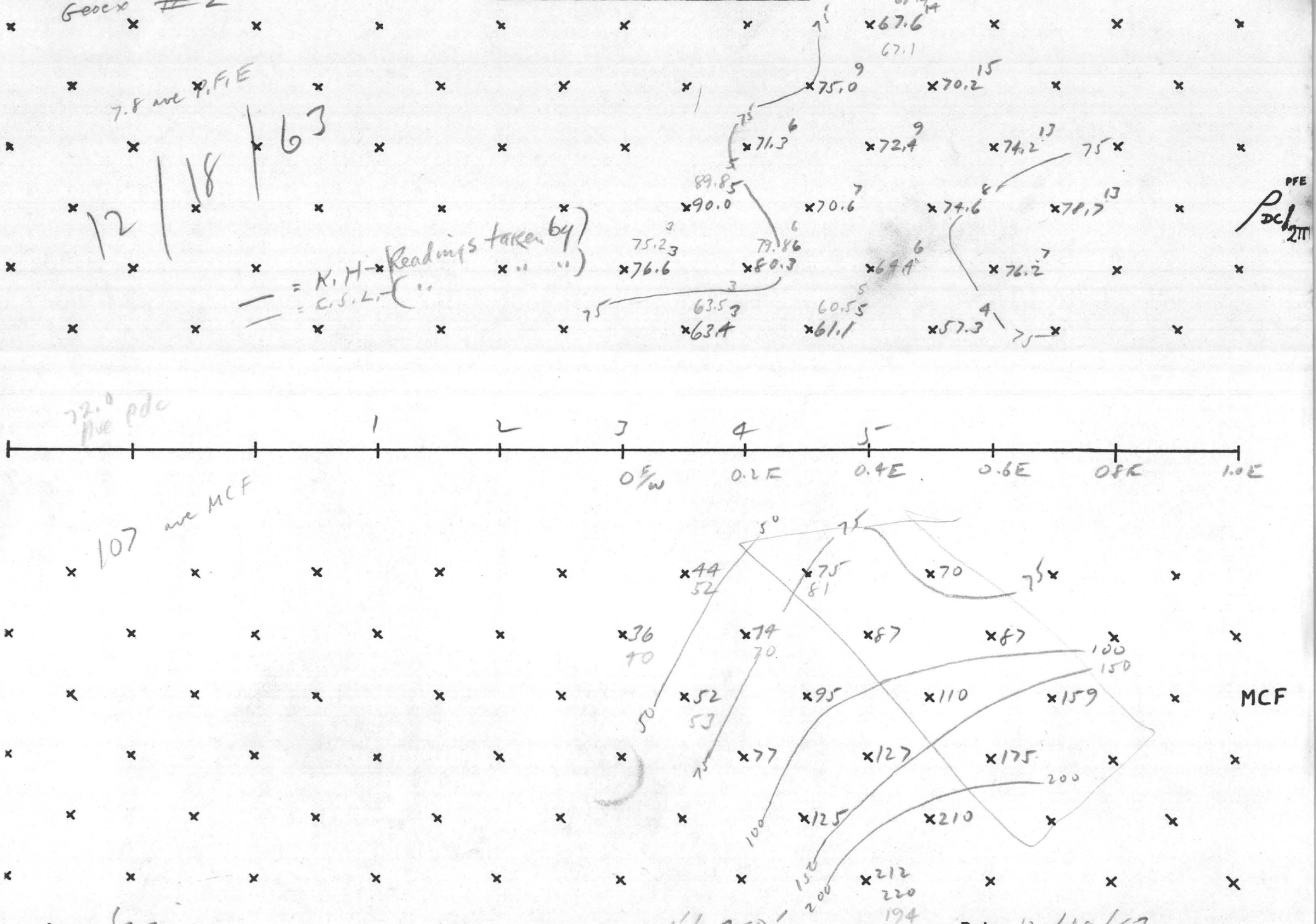
INDUCED POLARIZATION WORK SHEET



Area Saginaw E 1/2 Scale _____ Date _____

Graff Gear # 1
Geoex # 2

SAGINAW TEST
INDUCED POLARIZATION WORK SHEET



Area Saginaw Scale 1" = 200' Date 12/18/63

7.8 ave P.F.E.

Madden Gear

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Saginaw Test Line_____ Field date 12/17/63 Data page_____ Comp. date 12/18/63 Comp by C.S.L.

(A) Send	Same electrodes											
(B) Receive	.2-.4E	→	.4-.6E	→	→	.6-.8E	→	→	→	.8-1.0E	→	
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1600	→	→	→	→	→	1400	1600	1600	1600	1400	1600
(E) Vdc (avg)	163.0	48.8	157	51.4	23.4	151	36.9	18.4	9.39	48.3	16.8	9.45
(F) DCcal USED	1.030	→	→	→	→	→	→	→	→	→	→	→
(G) Kn x 10^{-3}	0.6	2.4	0.6	2.4	6.0	0.6	2.4	6.0	12.0	2.4	6.0	12.0
(H) ρ dc=ExFxGx10^3/D	62.9	75.4	60.6	79.5	90.4	58.3	65.2	71.1	72.5	74.6	74.2	73.0
(I) Vac Σ	160.0	47.7	150	48.6	22.0	144	34.5	17.4	8.82	45.7	15.6	8.70
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→	→	→	→	→	→	→	→	→	→	→
(M) ρ dc/ρac=ExL/K	1.019	1.022	1.047	1.058	1.063	1.049	1.070	1.058	1.064	1.058	1.077	1.087
(N) PFE=(M-1)(10^2)	2	2	5	6	6	5	7	6	6	6	8	9
(O) MCF=(M-1)(10^5)/H	30	29	78	73	70	84	107	81	88	78	104	119

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	→	→	→	→	→	→		→	→	→	→	→
(B) Receive	→	1.0-1.2E	→	→	→	→		CAL	→	→	→	
(C) n separation	5	3	4	5	6	6						
(D) I	1600	1600	1400	1600	→	800		1000	1000	1200	1200	
(E) Vdc (avg)	5.59	20.6	8.57	5.26	3.15	1.59		97.0	97.0	117.1	116	
(F) DCcal	→	→	→	→	→	→		1.031	1.031	1.025	1.034	
(G) Kn x 10^{-3}	21.0	6.0	12.0	21.0	33.6	33.6			1.030			
(H) ρ dc=ExFxGx10^3/D	75.6	79.6	75.7	71.1	68.1	68.8						
(I) Vac Σ	5.20	18.0	7.52	4.60	2.80	1.54		96.6	97.0	116.0	116	
(J) AC noise x 2	.60			.44	.48	.52						
(K) Vac (corr) = $\sqrt{I^2 - J^2}$	5.17			4.58	2.76	1.45						
(L) AC-DC cal.	→	→	→	→	→	→						
(M) ρdc/ρac =ExL/K	1.081	1.143	1.140	1.149	1.141	1.097						
(N) PFE=(M-1)(10^2)	8	14	14	15	14	10						
(O) MCF=(M-1)(10^5)/H	107	180	185	210	207	141						

X X X Noisy

7.4 ave P.F.E

Graff Gear #1

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Saginaw Line_____ Field date 12/17/63 Data page_____ Comp. date 12/18/63 Comp by K.H & C.S.L.

(A) Send	Old Electrodes											
(B) Receive	.2-.4E	→	.4-.6E		→	.6-.8E			→	.8-1.0E		
(C) n separation	1	2	1	2	3	1	2	3	4	2	3	4
(D) I	1600					→	1400	1600			1400	1600
(E) Vdc (avg)	183.3	54.3 56.55	175.5 178.2	57.9	26.0	164.0 167.8	40.7	20.4	10.30	54.0 56.1	18.85	10.44
(F) DCcal USED	923											
(G) Kn x 10^{-3}	0.6	2.4	0.6	2.4	6.0	0.6	2.4	6.0	12.0	2.4	6.0	12.0
(H) ρ dc=ExFxGx10^3/D	63.4	76.6	61.1	80.3	90.0	57.3	64.4	70.6	71.3	76.2	74.6	72.4
(I) Vac Σ	168.0	50.8 51.75	158.0 165.6	52.5	23.4	148.0 155.6	36.3	18.0	9.20	48.6 49.6	16.40	9.00
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$			90%									
(L) AC-DC cal.	.942	.960 .942	.942 .960	.960	.942	.942 .960	.942	.942	.942	.960 .942	.942	.942
(M) ρ dc/ρac=ExL/K	1.028	1027 1029	1.046 ~~1.034~~	1.059	1.047	1042 1035	1.056	1.067	1055	1067 1065	1082	1.092
(N) PFE=(M-1)(10^2)	3	3 2.8	5 4	6	5	4 +.0	6	7	6	7 6.6	8	9
(O) MCF=(M-1)(10^5)/H	44	36	75	74	52	70	87	95	77	87	110	127

Project_____ Line_____ Field date_____ Data page 100 Comp. date 300 30 100 Comp by_____

(A) Send							50	17	70	21	(40) →	50%
(B) Receive	→	1.0-1.2E			→		CAL					
(C) n separation	5	3	4	5	6	6						
(D) I	→	→	1400	1600	→	800	1000	1000	400	400		
(E) Vdc (avg)	6.20	22.7	9.38	5.79	3.49	1.76 1.77	106.5	104.5	44.2	42.7		
(F) DCcal						→	.939	.957	.904	.936	.934 →	.930
(G) Kn x 10^{-3}	21.0	6.0	12.0	21.0	33.6	33.6						
(H) ρ dc=ExFxGx10^3/D	75.0	78.7	74.2	70.2	67.6	68.4						
(I) Vac Σ	5.34	19.0	7.80	4.76	2.87	1.44 1.54	102.4	98.0	41.9	40.9		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.942					?	.962	.938	.947	.959		
(M) ρdc/ρac =ExL/K	1.094	1.125	1.130	1.147	1.143	1.150		.94				
(N) PFE=(M-1)(10^2)	9	13	13	15	14	15						
(O) MCF=(M-1)(10^5)/H	125	159	175	210	212	220						

SAME

1082

.960/100

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	2-3	1-2	3-4	2-3	1-2		1-2	→				
(B) Receive	.2-.4 E	→	.4-.6 E	→			1.0-1.2 E	→				
(C) n separation	1	2	1	2	3		6	6				
(D) I	1600	→					100	→				
(E) Vdc (avg)	183.5	54.4	175	57.9	25.9		1.73	1.77				
(F) DCcal USED	.923	→					→		C.S.L			
(G) Kn x 10^{-3}	.6	2.4	.6	2.4	6		33.6	→				
(H) ρ dc=ExFxGx10^3/D	63.5	75.2	60.5	79.8	89.8		67.1	68.5	& Graff			
(I) Vac Σ	167.0	50.7	157	52.6	23.3		1.44	1.54				
(J) AC noise x 2												
(K) Vac(corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.942	.960	.942	.960	.942		.942	1.000?				
(M) ρ dc/ρac=ExL/K	1.033	1.030	1.049	1.056	1.048		1.130	1.149				
(N) PFE=(M-1)(10^2)	3	3	5	6	5		13	15				
(O) MCF=(M-1)(10^5)/H	52	40	81	70	53		194	218				

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	2-3	1-2	3-4	2-3	1-2							
(B) Receive	.2-.4 E	→	.4-.6 E	→								
(C) n separation	1	2	1	2	3							
(D) I	1600	→										
(E) Vdc (avg)	163.2	48.8	160	52.0	23.7				K.H.			
(F) DCcal USED	1.030	→							Madden			
(G) Kn x 10^{-3}	.6	2.4	.6	2.4	6.0							
(H) ρ dc=ExFxGx10^3/D	63.1	75.4	61.8	80.5	91.5							
(I) Vac Σ	160.0	48.0	152	49.2	22.0							
(J) AC noise x 2												
(K) Vac (corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal. USED	1.000	→										
(M) ρdc/ρac =ExL/K	1.020	1.017	1.052	1.057	1.078							
(N) PFE=(M-1)(10^2)	2	2	5	6	8							
(O) MCF=(M-1)(10^5)/H	32	23	84	71	85							

INDUCED POLARIZATION - RECEIVER NOTES PAGE 1

Project: Saginaw test Line: #Eto W Test - E ½ Int.Cal _____ Date: 12/17/63

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Rec.	2-.4E	→	4-.6E	→		6-.8E			→	.8-1.0E		
~~Time~~	300	100	300	100	30	300	30	30	10	100	30	10
DC-1	60.0	24.7	79	24.9 26.5	11.6	74	19.2 19.4	9.2	4.79	24.1	8.3	4.85 4.81
DC-2	60.0	24.1	78	26.4 24.9	11.8	77	17.7 17.6	9.2	4.60	24.2	8.5	4.62 4.53
Σ	163.0	48.8	157	51.3 51.4	23.4	151	36.9 37.0	18.4	9.39	48.3	16.8	9.47 9.44
DC-3	60.0	24.7	79	24.9	11.8	73	17.6 19.2	9.2	4.77	24.2	8.3	4.84 4.83
Dc-4	60.0	24.1	78	26.6	11.6	78	19.2 17.6	9.2	4.62	24.1	8.5	4.61 4.61
Σ	163.0	48.8	157	51.5	23.4	151	36.8 36.8	18.4	9.39	48.3	16.8	9.45 9.44
DC-AV	163.0	48.8	157	51.4	23.4	151	36.9	18.4	9.39	48.3	16.8	9.45
AC-1	80.0	23.9	75	24.3	11.0	72	17.2	8.7	4.41	22.8	7.8	4.35
AC-2	80.0	23.8	75	24.3	11.0	72	17.3	8.7	4.41	22.9	7.8	4.35
Σ	160.0	47.7	150	48.6	22.0	144	34.5	17.4	8.82	45.7	15.6	8.70
S. P.	-48.9	→	-2.5	→						-3.4		
AC-N	.15	→		→						.30		
Inst. #45 Reader #4												

INDUCED POLARIZATION - RECEIVER NOTES

PAGE 2

Project: Saginaw Line: Test Int.Cal _____ Date: 12/17/63

Send	1-2	4-5	3-4	2-3	1-2	1-2	CAL					
Rec.	→	1.0-1.2E	→	→	→	→	4-5	→	→	→		
~~Time~~ Range	10	30	10	10	3	3	300	300	100	300		
DC-1	2.80	10.6 10.6	4.39 4.18	2.67 2.67	1.61 1.54	.81 .78	48.5	48.5	58.7	58		
DC-2	2.79	10.0 10.0	4.18 4.39	2.58 2.60	1.52 1.62	.78 .81	48.5	48.5	58.8	58		
Σ	5.59	20.6 20.6	8.57 8.57	5.25 5.27	3.14 3.16	1.59 1.59	97.0	97.0	117.1	116		
DC-3	2.81	10.0	4.39	2.60 2.66	1.62 1.53	.81 .78	48.5	48.5	58.3	58		
Dc-4	2.78	10.6	4.19	2.66 2.60	1.53 1.61	.78 .81	48.5	48.5	58.8	58		
Σ	5.59	20.6	8.58	5.26 5.26	3.14 3.15	1.59 1.59	97.0	97.0	117.1	116		
DC-AV	5.59	20.6	8.57	5.26	3.15	1.59	97.0	97.0	117.1	116		
AC-1	2.60	9.0	3.77	2.30	1.40	.78	48.3	48.5	58.0	58.0		
AC-2	2.60	9.0	3.75	2.30	1.40	.76	48.3	48.5	58.0	58.0		
Σ	5.20	18.0	7.52	4.60	2.80	1.54	96.6	97.0	116.0	116		
S. P.	noisy →			noisy →	→	→						
AC-N	↓ →	.22	→	↓ →	.20 →	.26						
Just render C.S.L												

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Graff Gear #1 Project: Cayenne Line: Test Graff Gear Int.Cal _____ Date: _____

Send	2-3	1-2	3-4	2-3	1-2		1-2					
Rec.	2-.4E	→	.4-.0E	→			1.0-1.2E					
Time	300	100	300	100	30		3	1				
DC-1	92.0	26.7	88	28.3	12.9		.99 .77 .92 .98	.97 .80				
DC-2	91.5	27.7	87	29.6	13.0		.92 .96 .81 .73	.80 .98				
Σ	183.5	54.4	175	57.9	25.9		1.71 1.73 1.73 1.71	1.78				
DC-3	92.0	26.7	87	28.3	13.0		.82 .96	.96 .98				
Dc-4	91.5	27.7	88	29.6	12.9		.96 .74	.98 .99				
Σ	183.5	54.4	175	57.9	25.9		1.78 1.70	1.74				
DC-AV	183.5	54.4	175	57.9	25.9		1.73	1.77				
AC-1	83.5	25.9	79	26.3	11.65		.72	.767				
AC-2	83.5	25.3	78	26.3	11.65		.72	.773				
Σ	167.0	50.7	157	52.6	23.3		1.44	1.54				
S. P.	-53.9	→										
AC-N	.02	→					.04	→				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Saginaw Line: Test Graff Int.Cal 53.4 Date: _____

Send	2-3	12	12	1000	1000	400	400	34	34	2-3	1-2	45
Rec.	2-4	→	→	Cal	→	30		4-6	→	→	→	6-8
Time	300	100	30	100	300	30	100	300	100	100	80	
DC-1	92.0 96.5	21.8 26.8	28.0 27.7	53.2	52.0	22.2	21.4	97.5 88.0	89.6 89.5	28.8 29.2	13.0 13.0	
DC-2	91.5 91.5	27.6 27.4	28.7 28.7	53.3	52.0	22.0	21.3	88.0 97.5	88.8 88.6	29.2 28.8	13.6 13.0	
Σ	183.5 183.5	54.4 54.2	56.7 56.4	106.6	104.0	44.2	42.7	175.5 175.5	178.4 178.1	58.0 58.0	26.0 26.1	
DC-3	92.0	26.6	27.9 28.6	53.2	52.0	22.1	21.3	87.6	88.8 88.6	29.1 28.7	13.0 13.1	
Dc-4	91.5	27.6	28.6 28.0	53.4	53.0	22.1	21.4	88.0	89.5 89.5	29.7 29.1	13.0 13.0	
Σ	183.5	54.2	56.5 56.6	106.6	105.0	44.2	42.7	175.5	178.3 178.1	57.8 57.8	26.1 26.1	
DC-AV	183.3	54.3	56.55	106.5	104.5	44.2	42.7	175.5	178.2	57.9	260	
AC-1	84.0	25.4	25.9	51.3	49.0	21.0	20.5	79.0	82.3	26.2	11.7	
AC-2	84.0	25.4	25.85	51.1	49.0	20.9	20.4	79.0	82.8	26.3	11.7	
Σ	168.0	50.8	51.75	102.4	98.0	41.9	40.9	158.0	165.6	52.5	23.4	
S. P.	-53	→		X	→		X	-21.8				
AC-N	.02	.85										
I Cal		7	9.5									

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: TM Line: _____ Int.Cal _____ Date: _____

Send	2-3	12	34	2-3	1-2	4-5	4-5	3-4	23	1-2		
Rec.	2-4 →		4-6			.8-1.0 →				→		
Time			300	100	30	100	30	30	10	10		
DC-1	82.0 82.0	24.0 24.0	79	27.0	11.8 11.9	27.0 27.0	27.8 28.4	9.0 9.9	4.60 6.85	3.41 2.79		
DC-2	81.5 81.0	24.8 24.8	80	25.0	11.9 11.9	27.0 27.0	28.4 27.6	9.9 9.0	6.85 4.54	2.79 3.41		
Σ	163.5 163.0	48.8 48.8	159	52.0	23.7 23.8	54.0 54.0	56.2 66.0	18.9 18.9	11.45 10.39	6.20 6.20		
DC-3	82.0	24.0	80	27.0	11.9 11.7	26.8	27.6 28.5	9.0 8.7	4.56 5.92	3.41 2.77		
Dc-4	81.0	24.9	80	25.0	11.7 12.0	27.2	28.5 27.6	9.8 10.1	6.10 4.35	2.77 3.43		
Σ	163.0	48.9	160	52.0	23.6 23.7	54.0	56.1 56.1	18.8 18.8	10.45 10.45	6.18 6.20		
DC-AV	163.2	48.8	160	52.0	23.7	54.0	56.1	18.85	10.44	6.20		
AC-1	80.0	24.0	76	25.0	11.0	24.3	24.8	8.2	4.50	2.67		
AC-2	80.0	24.0	76	24.2	11.0	24.3	24.8	8.2	4.50	2.67		
Σ	160.0	48.0	152	49.2	22.0	48.6	49.6	16.4	9.00	5.34		
S. P.						2.8 →				→		
AC-N						.03 →				→		

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

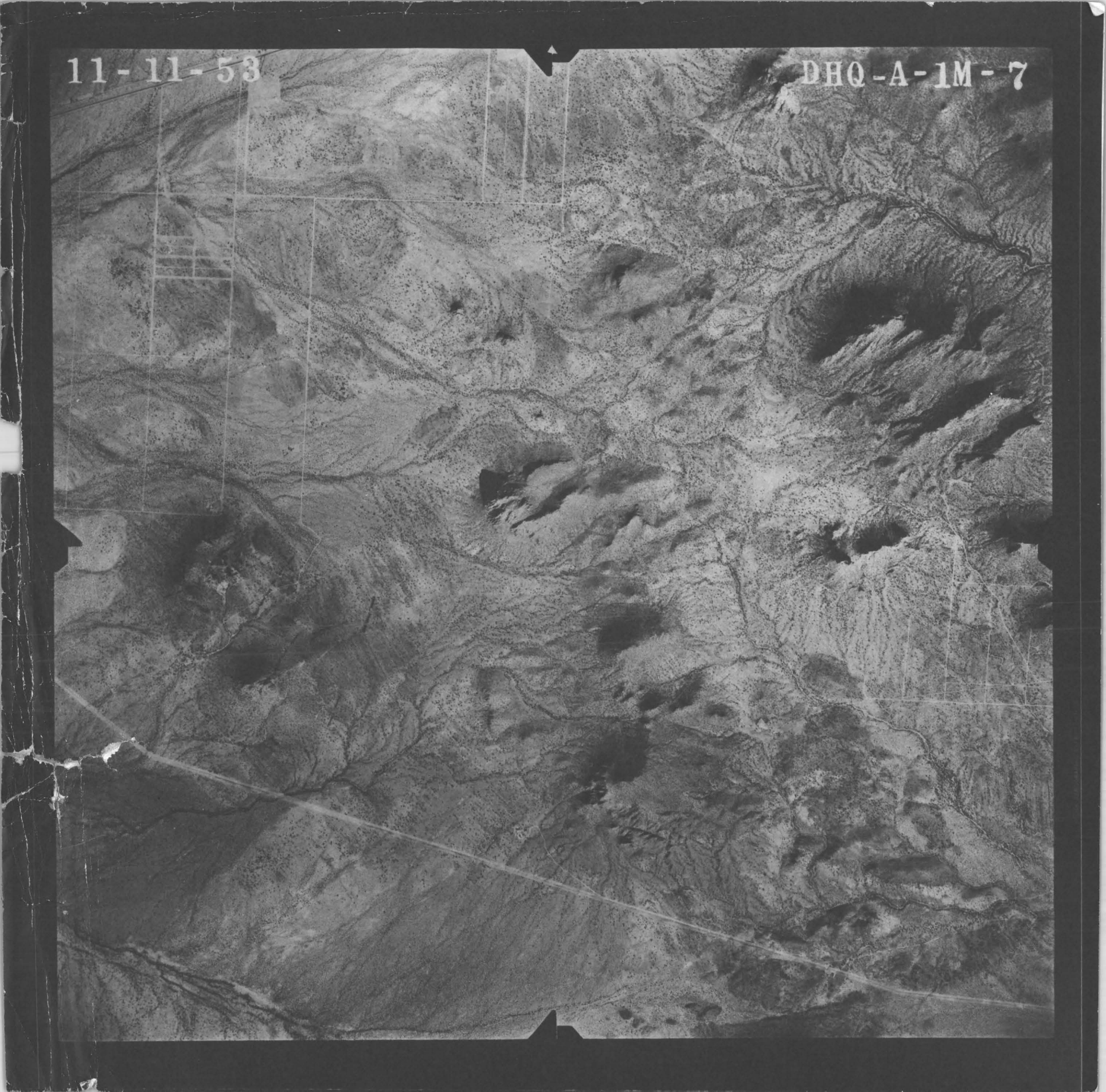
Project: Saginaw Line: Graff Int.Cal _____ Date: _____

Send	45	45	3-4	2-3	1-2	4-5	3-4	2-3	12	12		3
Rec.	1-8					1.0, 1.2						
Time	300	180	30	30	10	30	10	10	3	3	3	1
DC-1	82.0 82.0	84.0 83.4	20.0 20.8	10.8 9.4	5.10 5.20	11.0 11.7	4.66 4.80	2.62 3.14	179 182 165 176	180 165	.22 .93	.91 .86 .86 .93
DC-2	82.0 82.0	83.8 83.7	20.8 19.9	9.4 10.9	5.20 5.10	11.7 11.0	4.67 5.14	3.14 2.64	1.83 180 173 170	165 183	.93 .94	.86 .86 .92 .93
Σ	164.0	167.8 167.7	40.8 40.7	20.2 20.3	10.30 10.30	22.7 22.7	9.35 9.44	5.76 5.78	344 352 356 350	345 348	1.85 1.87	1.77 1.79 1.78 1.77
DC-3		83.9 83.5	19.9 20.9	10.9 9.5	5.32 5.38	11.0 12.0	4.22 4.26	2.64 3.56		167 182	.84 .92	.92 .88 .83 .88
Dc-4		83.8 84.1	20.7 19.8	9.5 11.0	4.58 4.92	11.7 10.7	5.12 5.16	3.16 2.24		347	.83 .93	.83 176 .92
Σ	164.0	167.7 167.5	40.7 40.7	20.4 20.6	10.30 10.30	22.7 22.7	9.34 9.42	5.80 5.82			1.76 1.76	1.75 1.75
DC-AV	164.0	167.8	40.7	20.4	10.30	22.7	9.38	5.79	345		1.76	1.77
AC-1	74.0	77.8	18.1	9.0	4.60	9.5	3.90	2.38	1.44		.72	.77
AC-2	74.0	77.8	18.2	9.0	4.60	9.5	3.90	2.38	1.43		.72	.77
Σ	148.0	155.6	36.3	18.0	9.20	19.0	7.80	4.76	2.87		1.44	1.54
S. P.						41.0						
AC-N						.04						

INDUCED POLARIZATION SENDER NOTES

Project: Saginaw Test Line: This is it Date: 12-17-63

Send	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range	1600	1600	1600	1600	1600	1600	1400	1600	1600	1600	1400	1600
Current	Calibration 400-1000 & 1200 Mils on 4-5											
Send	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	4-5	3-4	2-3
Receive	→	→	→	→	→	→	→	→	→	→	→	→
Time												
Range	1600	1600	1400	1600	1600							
Current					& 800							


11-11-53
DHQ-A-1M-7

OFFICIAL COUNTY ZONING MAP

ADOPTED BY BOARD OF SUPERVISORS _____, CORRECTED TO _____

File Aguila
Copper
Company

MK 4C #91

(3.0 - 105)

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT SAGINAW TEST

LINE ____ HALF SE SP. ____ DATE ____

PAGE 1

SEND				2-3			1-2	2-3		
RECEIVE				10-15			15-20	—		
RANGE				10.0			1.0	1.0		
DC 1 .05				6.4			6.6	5.8		
DC 2				8.3			7.2	6.6		
DC 3								5.9		
DC 4								6.4		
DC 5								5.9		
DC 6								6.4		
DC 7										
DC 8										
DC AVG.										
AC 1 3.0				119.0			108.7	30.9		
AC 2				0.0			0.0	0.0		
AC AVG.										
S.P.										
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT _____

LINE _____ HALF _____ SP. S DATE _____

SEND	1-2	2-3								Cal
RECEIVE	20-25	—								
RANGE	1.0	1.0								10.0
DC 1 .05	6.8	4.2								
DC 2	4.6	6.2								
DC 3	6.8	4.4								
DC 4	4.6	6.2								
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1 3.0	26.7	15.4								
AC 2	0.0	0.0								
AC AVG.										
S.P.										
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Saginaw Test
LINE ____ HALF ____ SP. ____ DATE 12/31/69

SEND	1 - 2	2-3 (91)	Cal	(91)	Cal					
RECEIVE	20-25	—	2-3		2-3	(82)				
RANGE	1.0	DC .05	10.0	DC 0.5	10.0	DC .05				
DC 1 1.0	1.6 1.2	2.2 1.8	0.4 0.4	2.0	0.0	0.6				
DC 2 .3	2.9 2.3	3.3 2.7	0.6 0.6	-0.8	-0.2	-0.6				
DC 3 .1	3.9 3.4	4.0 3.5	0.6 0.5	2.0 0.7	-0.3	0.6				
DC 4 .05	6.8	4.2	0.3	-0.8		-0.6				
DC 5	4.6	6.2	0.3							
DC 6	6.8	4.4								
DC 7	4.6	6.2								
DC 8										
DC AVG.										
AC 1 3.0	26.7	15.4	170.		195.					
AC 2	0.0	0.0	0.3		0.0					
AC AVG.										
S.P.	+30.6									
AC NOISE										
POT RES.										

PAGE 3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Sagiman Test
LINE ____ HALF ____ SP. ____ DATE 12/4/

SEND	1 - 2	2-3 (91)	Cal	(91)	Cal					
RECEIVE	20-25	–	2-3		2-3	(82)				
RANGE	1.0	DC .05	10.0	DC 0.5	10.0	DC .05				
DC 1 1.0	1.6	2.2	0.4	2.0	0.0	0.6				
DC 2 .3	2.9	3.3	0.6	-0.8	-0.2	-0.6				
DC 3 .1	3.9	4.0	0.6	2.0	-0.3	0.6				
DC 4 .05	6.8	4.2		-0.8		-0.6				
DC 5	4.6	6.2								
DC 6	6.8	4.4								
DC 7	4.6	6.2								
DC 8										
DC AVG.										
AC 1 3.0	26.7	15.4	170.		195.					
AC 2	0.0	0.0	0.3		0.0					
AC AVG.										
S.P.	+30.6									
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Saginaw Test
LINE ____ HALF ____ SP. ____ DATE 12/31/

SEND	1-2	(91)	2-3				1-2	(82)	2-3	
RECEIVE	15-20					→	20-25			→
RANGE	1.0	DC .05	1.0	DC .05		DC .05	1.0	DC .05	1.0	DC .05
DC 1 1.0	1.75 1.35	6.6	1.9 1.6	5.8		3.4	1.5 1.1	6.8	1.8 1.8	6.0
DC 2 .3	3.3 2.7	7.2	3.3 2.7	6.6		2.0	2.6 2.0	3.4	2.8 3.4	3.4
DC 3 .1	4.6 4.1	6.6	4.4 3.9	5.9	1.0	3.6	3.8 3.3	6.8	3.8 3.4	5.8
DC 4		7.2		6.4		1.9		3.6		3.6
DC 5				5.9		3.8		6.6		5.8
DC 6				6.4		1.8		3.9		3.6
DC 7						3.9		6.3		5.8
DC 8						1.7		4.0		4.6
DC AVG.										
AC 1 3.0	108.7		30.9		0.3 Norm		26.9		13.5	
AC 2	0.0		0.0		31.9 0.0		0.0		0.0	
AC AVG.										
S.P.	+13.0						+26.1			
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Saginaw Test
LINE ____ HALF ____ SP. ____ DATE 12/3/6

SEND	1-2	(91)	2-3				1-2	(82)	2-3	
RECEIVE	15-20					→	20-25			→
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DC 3 .1	4.6	6.6	4.4	5.9	1.0	3.6	3.8	6.8	3.8	5.8
DC 4		7.2		6.4		1.9		3.6		3.6
DC 5				5.9		3.8		6.6		5.8
DC 6				6.4		1.8		3.9		3.6
DC 7						3.9		6.3		5.8
DC 8						1.7		4.0		4.6
DC AVG.										
AC 1 3.0	108.7		30.9		0.3 Norm		26.9		13.5	
AC 2	0.0		0.0		31.9 0.0		0.0		0.0	
AC AVG.										
S.P.	+13.0						+ 26.1			
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 1

PROJECT Saginaw Test

LINE ____ HALF ____ SP. ____ DATE 12/31/

SEND	2-3	MK 4C	(91) new	2-3		1-2	(82)	2-3		
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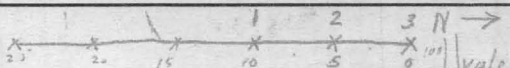
DC 2 0.3	3.5 2.9	6.9	8.3	3.1 3.3	5.2	2.9 3.1	6.8	3.2 3.4	6.8	
DC 3 0.1	4.9 4.4	4.9	6.3	5.0 5.3	9.0	4.6 4.9	6.0	4.7 5.0	5.4	
DC 4	5.6	6.9	8.3		5.2		6.8		6.6	
DC 5	7.0	4.9			8.8					
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 3.0	119.			124.		112.		31.2		
AC 2	0.0			0.0		0.0		0.0		
AC AVG.										
S.P.				11.8		12.8				
AC NOISE	.755 → 819									
POT RES.	.786									



HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 1

PROJECT Saginaw Test

LINE _____ HALF _____ SP. _____ DATE 12/31/

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DC 4		6.9	8.3		5.2		6.8		6.6	
DC 5		4.9			8.8					
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1	119.			124.		112.		31.2		
AC 2	0.0			0.0		0.0		0.0		
AC AVG.										
S.P.				11.8		12.8				
AC NOISE										
POT RES.	.786									

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT Saginaw Test

LINE 1 HALF S SP. ____ DATE 12-31-67

PAGE

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RANGE	L									
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CURRENT	3.0 A	3.0 A	3.0 A	3.0 A	3.0 A	3.0 A	3.0 A	3.0 A	3.0 A	
SEND									Cal	2-3
RECEIVE										
RANGE										
VOLTAGE										680
CURRENT										2.0 A

FREQUENCIES 3.0 1.0 0.3 0.1 .05

SENDER NO. MK4 6644-5

OPERATOR DJT

RECEIVER NO.

OPERATOR

COMMENTS:

N ⟷ S

00 @ Elec. 3

05 0 Elec 2

10 0 Elec 1

JOB MK 4C #91 LINE Test SPREAD —

LOOKING W DATE 12/31/69 A= 500 feet

CENTER 0.0 LABEL S/N FREQ. 3.0 – 0.1

COUPLING yes

1-12-69
MD

cal results
.086 Ω

Dummy half

Second

3.0 - 0.1 AC

MK 4C #91

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT SABINAW TET

LINE ____ HALF S SP. ____ DATE 12/31/69

PAGE 1

	1	2	3	4	5	6	7	8	9	10
SEND				2-3			1-2	2-3		
RECEIVE				10-15			15-20	—		
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DC 2										
DC 3										
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										
AC 1 3.0				119.0			108.7	30.9		
AC 2	$	$	$	0.0	$	$	0.0	0.0	$	$
AC AVG.										
S.P.										
AC NOISE										
POT RES.										

MK 4C #91

PAGE 2

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT _____

LINE _____ HALF _____ SP. _____ DATE 12/31/[illegible]

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RECEIVE	20 - 25	—								2 - 3
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DC 2										
DC 3										
DC 4										
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.										202.5
AC 1 3.0	26.7	15.4								~~170.~~
AC 2	0.0	0.0								0.3
AC AVG.										
S.P.										
AC NOISE										
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT _____

LINE _____ HALF _____ SP. _____ DATE _____

SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT	3.0				AC					
SEND										Cal
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										3.0

FREQUENCIES _____ _____

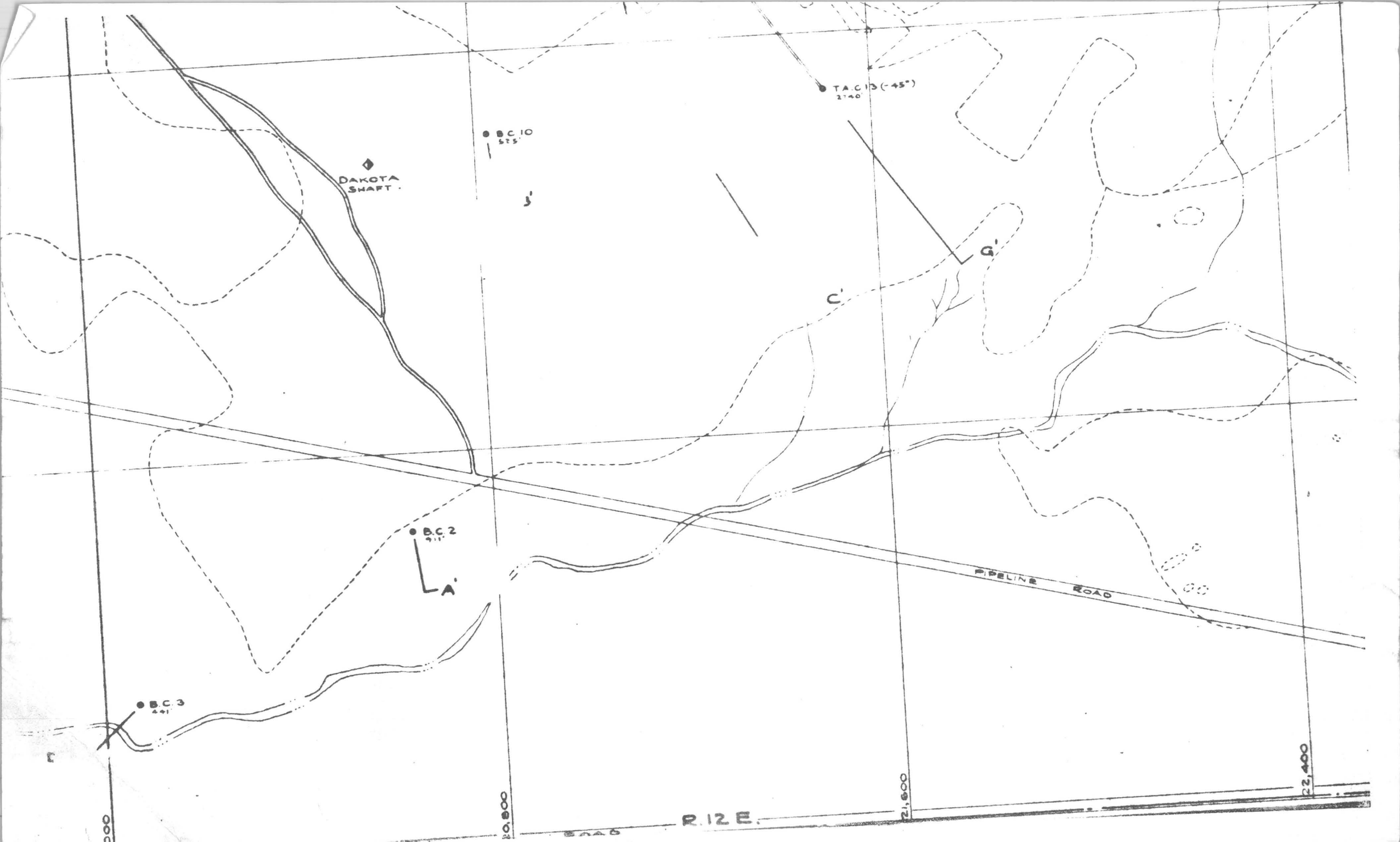
SENDER NO.

OPERATOR

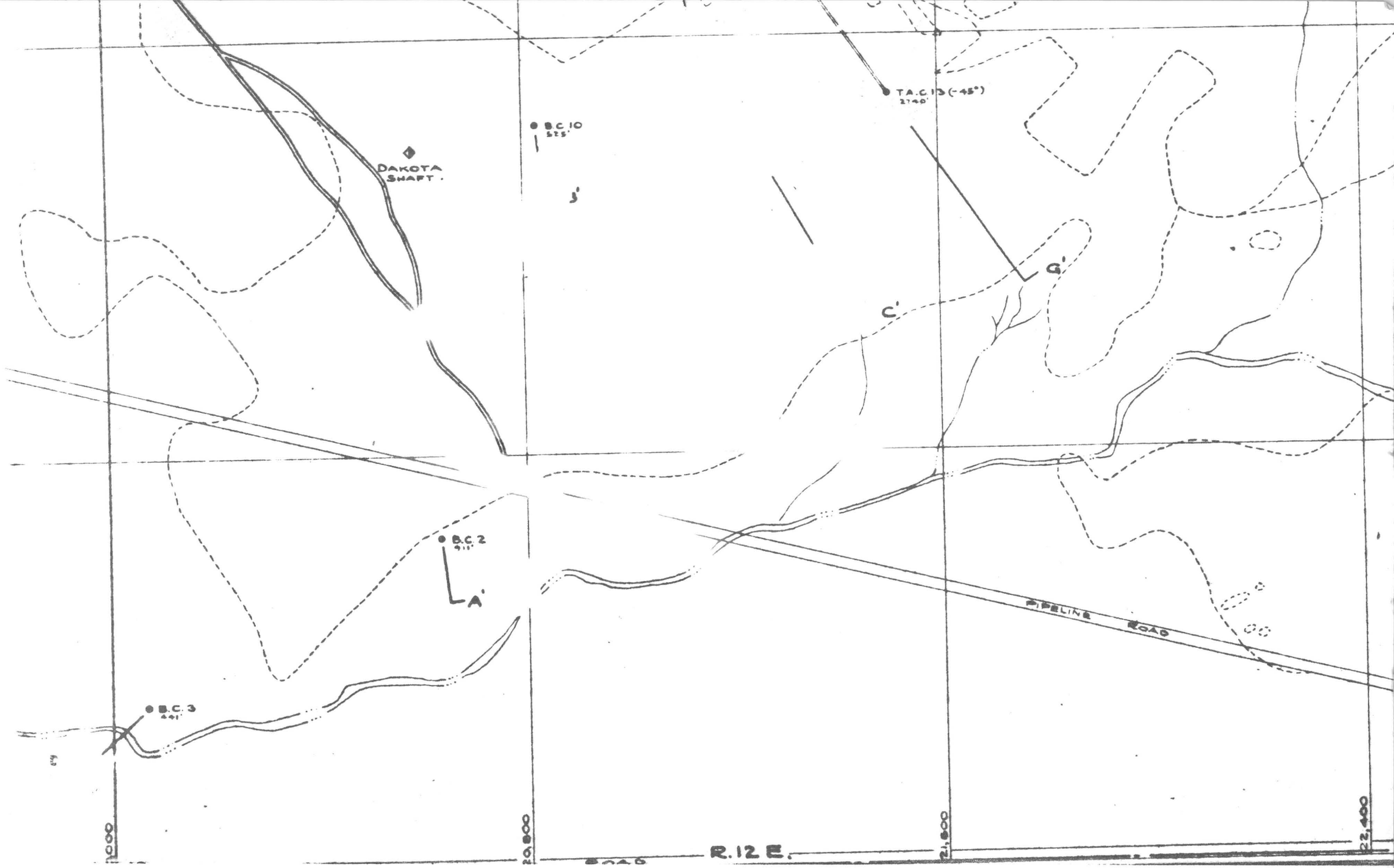
RECEIVER NO.

OPERATOR

COMMENTS:



T.A.C.13 (-45°)
2740'
B.C.10
525'
DAKOTA SHAFT
G'
C'
B.C.2
411'
A'
PIPELINE ROAD
B.C.3
441'
R.12 E.
20,800
21,600
22,400


DAKOTA SHAFT.
B.C. 10
325'
T.A.C. 13 (-45°)
2740'
B'
C'
G'
B.C. 2
911'
A'
B.C. 3
441'
PIPELINE ROAD
R. 12 E.
1,000
20,800
21,800
22,400

~~December 20, 1965~~

On loan to
Grattan Lynch 5/10/67

AGUILA COPPER COMPANY INVENTORY

~~#1. Cat Mountain from Brown Report 1938 G.S.A.~~

~~#2. Section along line E E'~~

#3. Bear Creek Mining Company Southwest district Saginaw Hill Area Amole Mining District Geologic map.

#4. Saginaw Hill Area January 12, 1948 S.S.W.

~~#5. Surface Geology map Saginaw Hill Property Pima County~~

~~#6. Silver Bell Peak Quadrangle Pima County 15 minute series~~

~~#7. 3 sheets map of Valencia Road~~

~~#8. DHQ-A-1M-6 11-11-53 DHQ-A-1M-7 11-11-53 DHQ-A-1M-38 11-11-53 DHQ-A-1M-39 11-11-53.~~

#8. a. Saginaw Hill Area Geochemical survey map ppm copper in rock ppm copper in soil

#9. Saginaw Hill Geological log summary - Assay Logs - Drill Hole A-5, A-11, A-12, A-13

~~#10. Saginaw Hill Drilling Bear Creek Mining Company drill Holes - Assay Logs and Geological crossection~~

#11. Drill hole locations - Ventures Limited

#12. DDH No. SH-1 - 16 pages
#13. DDH No. SH 2 - 5
#14. DDH No. SH 3 - 3
#15. DDH No. SH 4 - 6
#16. DDH No. SH 5 - 7
#17. DDH No. SH 6 - 5
#18. DDH No. SH 7 - 4
#19. DDH No. SH 8 - 12
#20. DDH No. SH 9 - 7
#21. DDH No. SH 10 16

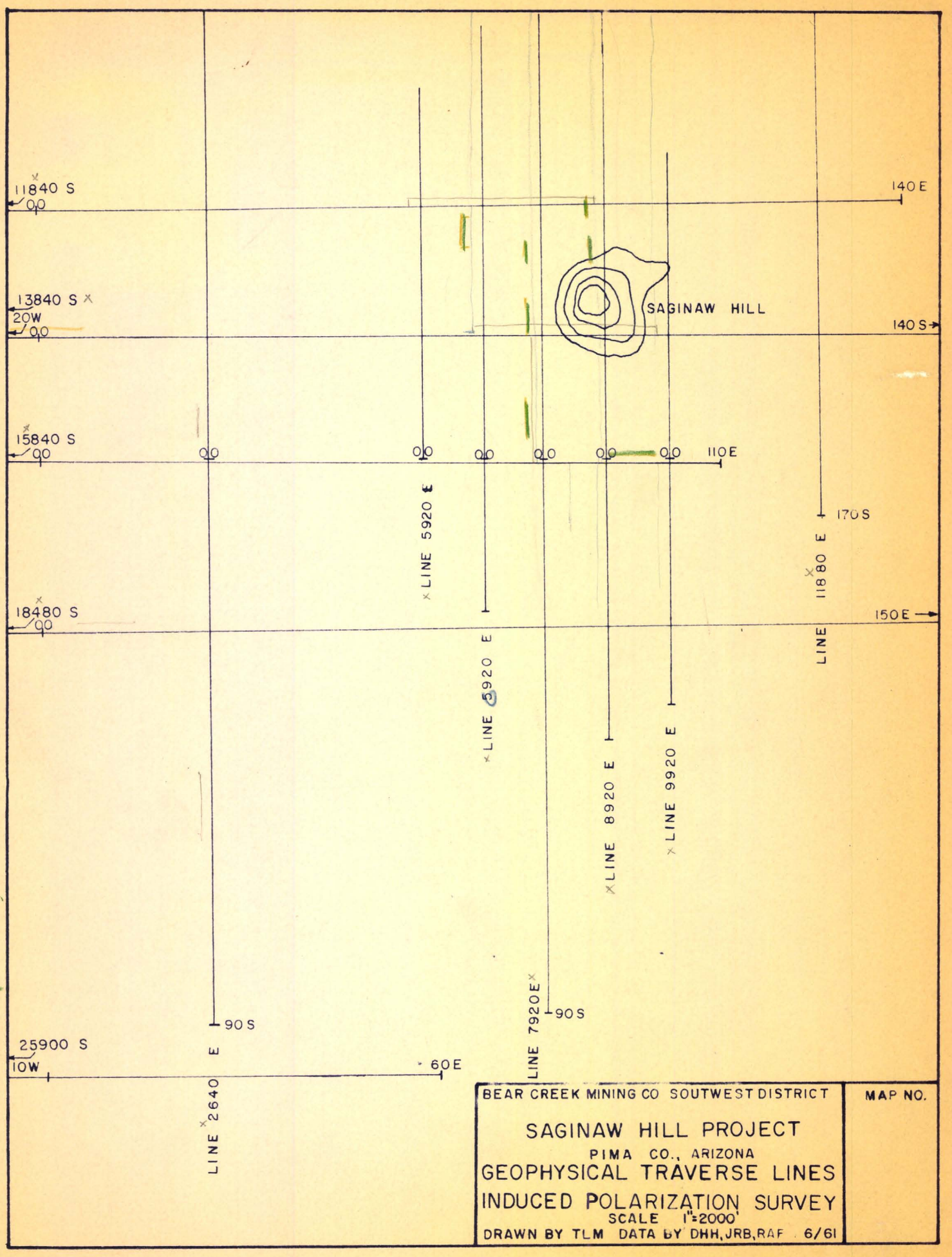
Items crossed out not loaned

22. Kinnisons Thesis

23. Saginaw Property Bulletin No. 106 pgs. 1-19

24. ~~7~~ 6 I.P. Sheets Bear Creek

Aquila File



BEAR CREEK MINING CO SOUTWEST DISTRICT

MAP NO.

SAGINAW HILL PROJECT

PIMA CO., ARIZONA

GEOPHYSICAL TRAVERSE LINES

INDUCED POLARIZATION SURVEY

SCALE 1"=2000'

DRAWN BY TLM DATA BY DHH, JRB, RAF 6/61

DIPOLE spacing 1000 500 100 } I.P. Anomalism interpretation by Geoex

item 12

Photostat copies taken from Kinnison's Thesis (U of Ar-1959)

SAGINAW HILL AREA

22

ABSTRACT

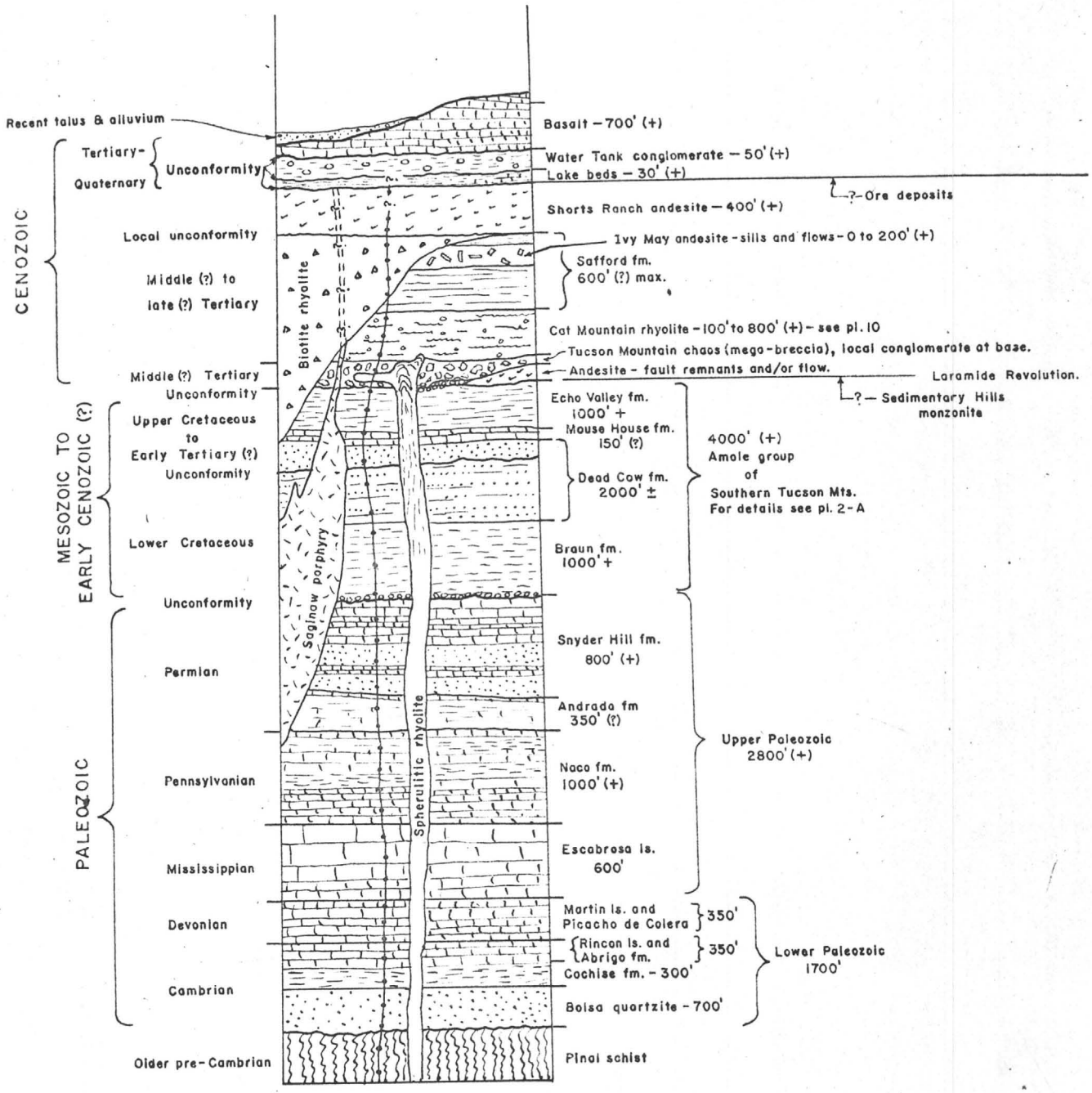
The southern section of the Amole Mining District was once covered by the Paleozoic strata common to southern Arizona. The Mesozoic strata consist of the dominantly clastic Amole group which, beginning with a basal conglomerate, is subdivided into four formations. The lower two are of Lower Cretaceous age, and the upper two are Upper Cretaceous or early Tertiary. These formations were intensely folded into a synclinorium with local thrust faulting during the Laramide revolution, and subsequently planed to a gentle erosion surface. The Tertiary formations are assigned by inference to the middle or late Tertiary, and begin with the Tucson Mountain chaos. This is a tabular unit about 200 feet thick composed of fragments of pre-Laramide rocks ranging in size up to 350 feet, and is postulated to be a sedimentary deposit resulting from combined fault action and landslide. Conformably above this formation is a layered sequence of volcanic and sedimentary rocks, which is divisible into a number of formations. These rocks were tilted northeasterly and broken by numerous high-angle faults, and mineralized by ore solutions with a high silica content. The youngest rocks are conglomerates, local (?) lake beds, basalt flows, and recent alluvium.

Geologic Summary

The principal rock types in the Tucson Mountains are upper Paleozoic limestone, Cretaceous shale, arkose, conglomerate, and limestone, Tertiary and Quaternary volcanics, and post-Cretaceous intrusives. The pre-Cambrian basement of granite and schist is exposed only in the northern part of the range. The lower Paleozoic rocks are exposed in a normal sequence only in the northern part of the range. A generalized geologic column is shown in Plate 2.

The Cretaceous and older rocks were folded during the Laramide revolution, and form a synclinorium in which local overturning and thrust faulting may have played an important part. Overlying these folded rocks and separated from them in most places by a breccia composed of giant fragments of the pre-Laramide rocks, is a volcanic sequence consisting of several distinct units. The breccia and volcanics, of Tertiary age, dip gently to the east and have been complexly faulted by high angle faults. Flat-lying basalt flows crop out locally on the east and south margin of the range. The entire range, presumably bounded by basin-range type block faults, has been eroded with the development of a wide-spread pediment.

The ore deposits of the southern section of the Amole mining district include veins, replacements, and porphyry deposits, characterized by high silica content, and are interpreted to be of late(?) Tertiary age.

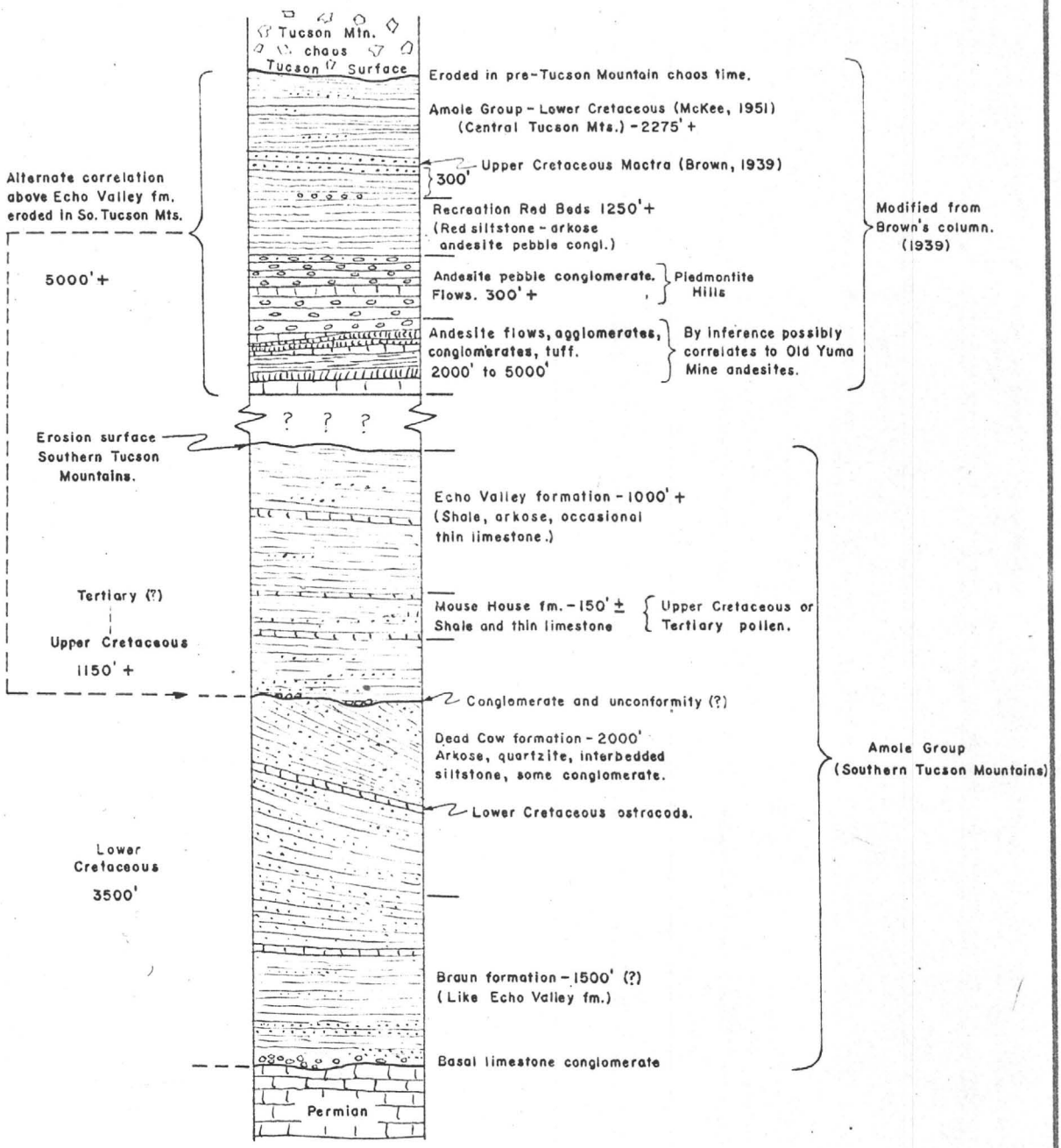


GENERALIZED STRATIGRAPHIC COLUMN

Southern Section of the Amole Mining District.

Not to Scale.

Plate 2



STRATIGRAPHIC COLUMN OF CRETACEOUS - TERTIARY (?) ROCKS

Tucson Mountains

Plate 2-A

Summary of Rock Types

The rocks of the Tucson Mountains record a long, varied, and repeatedly interrupted sequence of geologic events. While only those rocks of the southern Amole mining district will be discussed in detail, I will attempt to correlate these rocks to their place in the regional environment.

In the following rock descriptions, subdivision will be made into two broad classifications: (1) all those rocks of layered aspect which may be grouped in a geologic column, and which consist of Paleozoic and Cretaceous sediments and Tertiary volcanic flows, tuffs, and sediments; and (2) intrusive igneous rocks.

The distribution of rock formations is shown by the geologic maps (Pls. 3 and 4.)

In so far as is practical, previously established formational names are used, but where warranted I propose certain changes and additions.

SEDIMENTARY AND EFFUSIVE ROCKS

Introductory Comments

The Paleozoic rocks are subdivided in the manner defined by Stoyanow (1936). The terminology proposed by Brown (1939) for the Cretaceous and Tertiary rocks has been slightly modified to the form here presented.

At this point I wish to define certain terms used in the text which relate to classification of clastic rocks. The Cretaceous series presents a thick and variable sequence of

tilting and faulting were contemporaneous, for if either had entirely preceded the other, a preposterously high mountain would have been formed.

drifting had been done. A small amount of siliceous silver ore containing copper and lead was removed during development on the Helpmate (location?) claim. Silver-lead ore was produced from the Snyder Hill prospect.

1923. Four producers from the Amole district reported shipments aggregating 64 tons, containing gold, silver, and copper, with a total value of $1,084. The Old Bat and Pellegrin properties were the principal producers of gold-silver ore. This ore was taken out in an attempt to develop milling ore. The Old Bat was said to have 16,000 tons of ore in sight with an average value of four dollars in gold and eight ounces in silver. The ore from the Pellegrin property reportedly assays about ten per cent lead and a little gold and silver.

1924. Development work at the Palo Verde Mine was suspended in May pending construction of a power line. The management intended to complete a proposed 1,000-foot shaft, of which only 200 feet were sunk in 1924. The shaft had exposed sulfide ore assaying 10 dollars in gold and silver, 5 per cent lead, and 15 per cent zinc. This project was apparently never resumed.

1925. The aggregate production from the district was 150 tons from seven producers. It is uncertain how much of this total was produced from the southern section. The Beehive and Pellegrin (Arizona) were reported to have shipped ore.

1926 - 1934. Intermittent activity was reported from the southern section, but with very little production. The Southwestern Metal Mines Inc. operated some of the claims near Beehive Peak (probably the Ivy May) and shipped several cars of oxidized copper ore in 1929. This is the last year for which I have found recorded data which may pertain to the Ivy May Mine. The present owner, a Mr. Ortiz of Tucson, states that the main shaft is 700 feet deep, but that a fire destroyed the timbering and caused it to cave.

1935 - 1944. Nearly all production appears to have been from the northern section.

1945. The Palo Verde Mine was dewatered and retimbered to the 215-foot level. 172 tons were shipped which contained 5 oz. Au, 339 oz. Ag, 200 pounds Cu, 1,000 pounds Pb, and 17,000 pounds Zn, for a total of $3,172.

1946. The Palo Verde Mine operated during the first four months, and shipped 1,574 tons of lead-zinc ore. The Old Yuma Mine (northern section) shipped 1,640 tons of gold-silver ore. The aggregate production of these two was 3,214 tons which contained 167 oz. Au, 4,313 oz. Ag, 3,500 pounds Cu, 128,000 pounds Pb, 200,000 pounds Zn, for a total of $48,249. Very probably most of the lead, zinc, and copper came from the Palo Verde Mine, and most of the gold and silver from the Old Yuma Mine.

1947 - 1953. No activity reported.

1954. In February, Messrs. Coombs and Martin stoped

Univ. of Arizona Library

about 10 tons from the Palo Verde incline, which reportedly assayed 15 per cent zinc.

1955. The high price of copper incited some prospecting. The old Papago Queen was located by Art Jacobs of Tucson, who leased the property to Harris and Strong. During 1955 or 1956 the Papago Queen adit was reactivated, and a small amount of exploration and stoping was done.

1956. During 1956 and/or 1957 Ventures Ltd. drilled Saginaw Hill to test the disseminated copper mineralization.

1957. During the latter part of 1956, and in 1957, Ventures Ltd. drilled the Sedimentary Hills, testing both the disseminated copper mineralization of the quartz monzonite stock, and mineralized thrust fault zones.

GEOLOGIC FEATURES

Types of Deposits

The mineral deposits of the southern section of the Amole Mining District fall into six classifications based on type of occurrence.

Quartz veins containing copper silicates have been exploited at the Papago Queen, Ivy May, and Old Pueblo mines. These veins are characterized by banded quartz layers, commonly with cocks-comb structures and drusy cavities. They rarely exceed five feet in width and show a marked tendency to pinch and swell. At some places they consist of a solid quartz vein but also may consist of a fractured zone interlaced with thin stringers of quartz.

The majority of the deposits are replacements in limestone or limey siltstone. At the Braun Mine and the Snyder Hill prospect silver and/or lead have been mined from limestone of the Snyder Hill formation. Vein-like replacements of thin limestone beds of the Amole group are best exemplified by the Palo Verde deposit, but are common to other mines in the Saginaw area and in the Sedimentary Hills. At the Palo Verde Mine the ore contains lead and zinc, but most of the other deposits of this type contain principally pyrite, with a minor amount of copper. Alteration consists principally of silicification.

Saginaw Hill, composed of the Saginaw porphyry, has been explored to determine its potential as a porphyry copper deposit. The alteration is much weaker, but otherwise is similar to other southwestern porphyry copper deposits.

In the Sedimentary Hills, a small stock of quartz monzonite contains some disseminated copper, which Bennett (1957) believes to be a late magmatic product.

In the Sedimentary Hills, certain thrust faults have been mineralized by iron and copper sulfides.

The deposit at the Old Bat Mine is unlike any other in the district. It consists of a narrow, gently dipping vein of massive manganiferous siderite containing gold and silver.

Mineralogy of the Deposits

The ore minerals of the quartz veins are chrysocolla, and unidentified green copper stain which permeates gouge zones and some of the vein quartz. Sulfide ore is exposed neither in the accessible workings nor on the dumps. The vein quartz contains but few relict sulfide cavities, although sulfides may have once filled the vugs which are common to these veins. The copper silicates are entirely exotic, and may represent a considerable ratio of enrichment from nearly barren quartz veins.

The workings in the Snyder Hill formation show no ore minerals at all, save for a tiny fleck of galena at Snyder Hill. Barite is present in small quantities at Snyder Hill. These mines reportedly contain some silver, very likely in the form of argentiferous galena and silver halides.

The ore in the Palo Verde Mine, and that on the dump at the Saginaw Mine, consists of sphalerite and pyrite with a subordinate amount of galena. A minor amount of chalcopyrite occurs in the Palo Verde Mine. The host rock is a silicified limestone.

The sulfide minerals in the Sedimentary Hills consist largely of pyrrhotite, with subordinate pyrite and locally chalcopyrite (Bennett, 1957).

The sulfides beneath the leached capping at Saginaw Hill presumably contains pyrite, chalcopyrite, chalcocite, and minor molybdenite.

rather must be considered as generalized speculation based on geological possibilities and past production records.

The weakly disseminated sulfides in the Biotite rhyolite, such as those on the dump of the old Arizona Tonopah shaft, appear to be a late magmatic product and will probably not occur in any great quantity unless found in association with some specific structure, such as a fault or a fissure.

The quartz-copper veins are either barren or too thin to mine over much of their length, and the explored ore shoots appear to have been mined out. There is no reliable geologic guide by which to predict the location of other commercial shoots. These veins will probably diminish in grade with depth toward the base of the oxidized zone. The disseminated sulfides on the dump of the Ivy May Mine leaves open to speculation the possibility that the quartz veins on that property may be feeders of disseminated low grade sulfide in favorable rocks at depth.

There is some ore left in the Palo Verde Mine, and very probably other similar mineralized limy beds exist under the alluvial cover adjacent to the Palo Verde fault. The future of this mine depends on the economic factors involved in mining small bodies of 15 per cent zinc ore. The ore which is or was in the Saginaw Mine is not well enough known to lead to any conclusions. The weak alteration and the fact that the Saginaw porphyry copper prospect

has been twice drilled and rejected (or apparently so) gives a discouraging outlook.

In the Sedimentary Hills area, the quartz monzonite plug contains some disseminated copper in the outcrop, which is believed by Bennett (1957) to be a late magmatic product, and therefore will probably be of limited quantity. It is problematical whether the sulfide replacement deposits of that area contain enough valuable metal to be presently classed as ore.

At the Old Bat Mine, the developed vein material reportedly contains about 14 dollars (present value of metals) combined gold and silver. Any future work on this property will be hindered by marketing or treatment of this high iron content carbonate ore.

The only major geological structure which is known to affect ore deposition is the northeasterly mineralized zone in the vicinity of Saginaw Hill. This zone is further accentuated by the northeasterly extension of the Palo Verde fault, the Saginaw porphyry dike, and the andesite dikes west of Hill 8. The southeast extension of Paleozoic limestone on the west side of the synclinorium passes within 4000 feet of the Palo Verde Mine, and the intersection of thick limestone with the southwesterly extension of the Saginaw Hill ore zone is a geologically prospective area for ore deposits.

Description of Mines

Saginaw Area

Saginaw Mine.-- The main workings of the Saginaw Mine are due north of Saginaw Hill, and consist of two vertical inaccessible shafts about 150 feet apart. From the southwest shaft a four foot stulled vertical stope extends northeast for an unknown distance. Numerous other shafts and shallow pits have been dug along the principal fissure zone. Both of the main shafts were sunk on the Saginaw fissure. The smelter slag dump and shaft dumps cover most of the mineralized zone.

Where it can be seen, the Saginaw fissure consists of a fractured and sheared zone a few feet wide, with slight traces of alteration and some green copper stain. The fissure zone cuts the Amole group, and presumably the mineralization is largely confined to thin beds of limestone.

It is clear that at least some ore has been removed from the Saginaw workings, but because ore was reportedly transported to the mine for promotional purposes, it is uncertain which sulfide material now on the dump actually came from the Saginaw Mine.

Palo Verde Mine.-- The Palo Verde Mine is developed by an inclined shaft which bears N. 63 degrees E. and inclines at 38 degrees. The deepest accessible level is 110 feet below the collar, but company maps show that the shaft extends to a vertical depth below the surface of about 300 feet.

The shaft was sunk along the contact between the Amole group and the Saginaw prophyry. This contact is nearly vertical and is a fault with gouge and breccia up to 3 feet thick. Sphalerite, galena, pyrite, chalcopyrite, and quartz completely replace a 3-foot thick bed in the sediments. Small remnants of the original rock show that it was limestone.

The inclined shaft carries this bed of ore in the back, and is open to a stope 20 to 30 feet wide, 8 feet high, which extends to the 110-foot level. On the 110-foot level a cross cut penetrates 140 feet into Saginaw porphyry. The porphyry is altered to a soft crumbly rock consisting of quartz, sericite, clay, and carbonate. In thin-section the rock contains rounded to angular and resorbed quartz phenocrysts, set in a fine-grained, altered matrix. The feldspars are altered beyond recognition. The rock is a quartz porphyry. On the 80-foot level, a cross cut to the southwest penetrates another mineralized limy bed, about 2 feet thick, which contains more pyrite and less sphalerite than the main deposit.

At the edge of the stoped area the sulfide material gives way to unaltered limestone. The highly altered prophyry contains disseminated pyrite through its explored length. There is no sign of brecciation of the sulfide ore along the Palo Verde fault. This fault, then, appears to be pre-ore in age and to have acted as a feeder for the mineralizing solutions.

Oxidation of the ore body is shallow and extends to a depth of 15 or 20 feet. Oxidation in the porphyry extends to somewhere between the 80 and 110-foot levels. The sulfide ore averages between 15 and 18 per cent zinc.

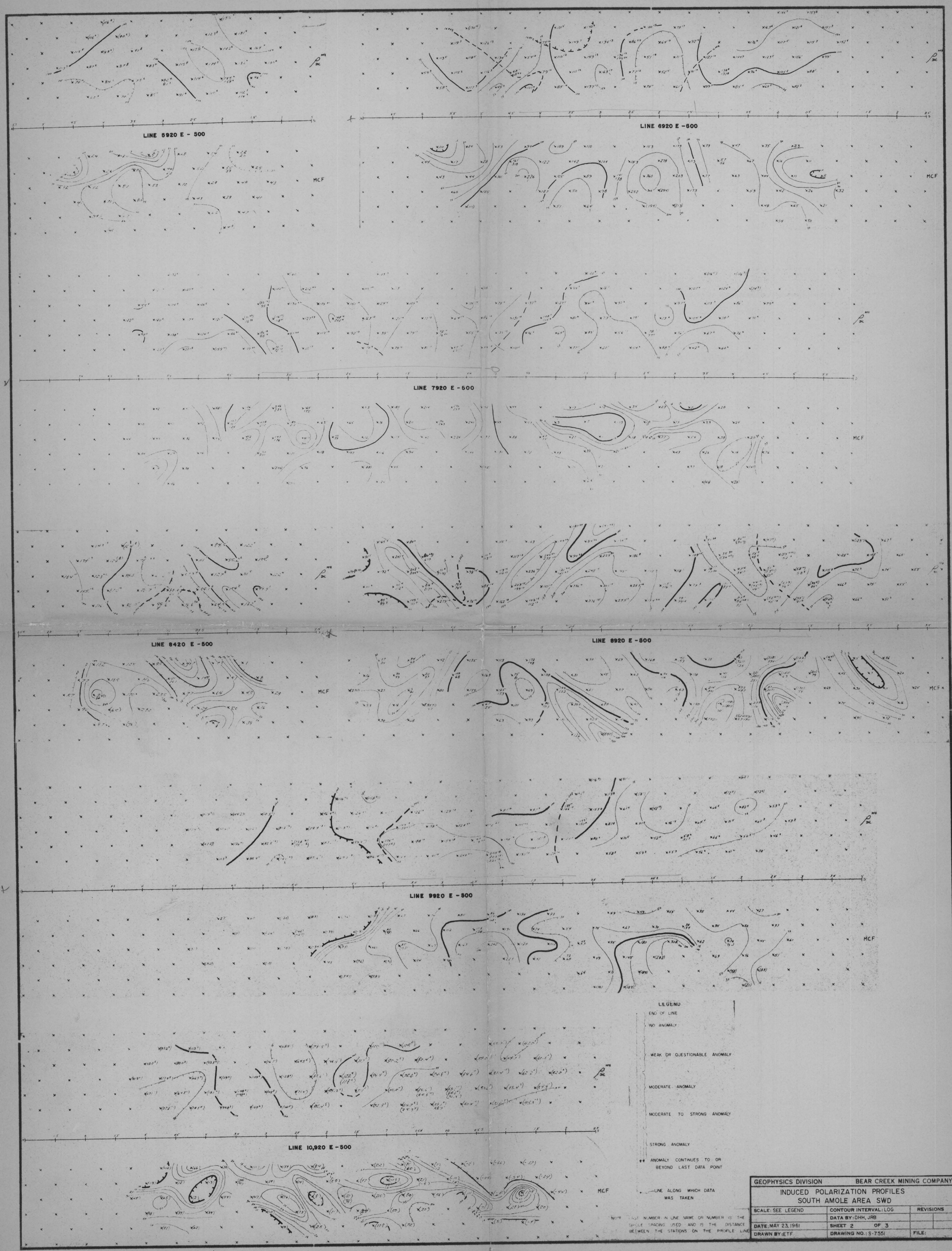
On the south side of the Palo Verde fault, a mineralized limestone bed has been developed by 2 steeply inclined shafts and several shallow pits. The ore on the dump of the deeper shafts is principally pyrite in a quartz gange. The mineralized areas of this limestone bed appear to be restricted about groups of northeast fractures.

Papago Queen.-- The quartz veins striking northeast through Saginaw Hill are developed by an adit driven into the northeast side of the hill along the main vein. The adit is approximately 150 feet long, with a 40-foot winze and a short cross cut to the south.

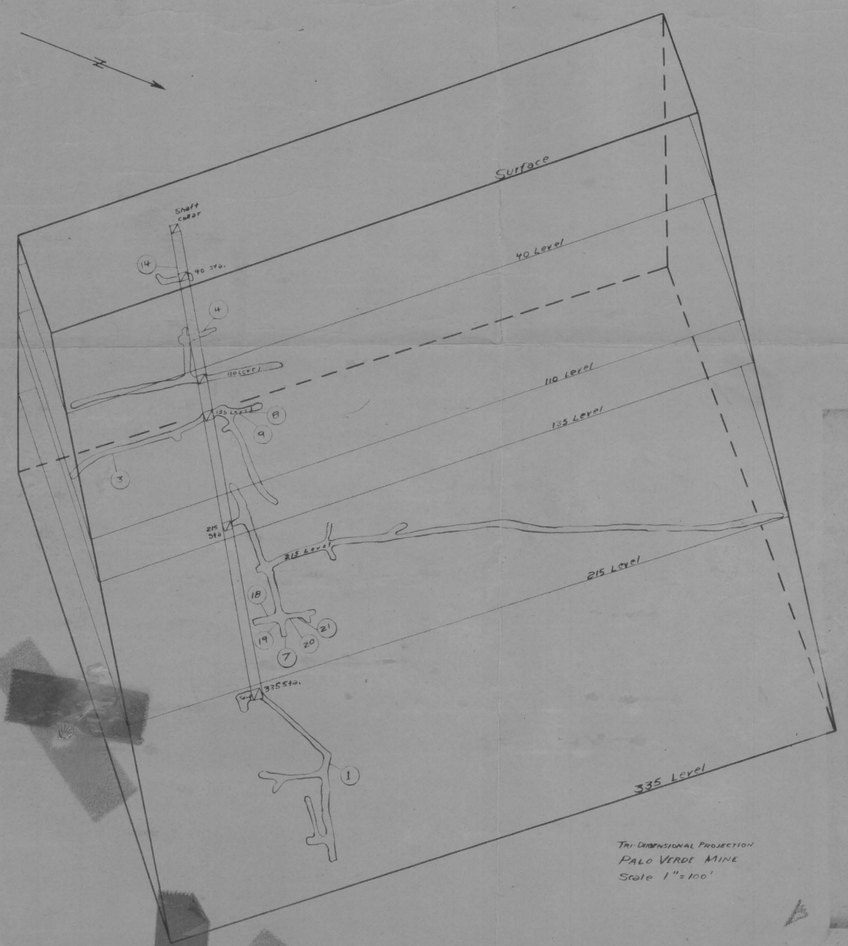
The vein consists of discontinuous stringers of quartz separated by segments of altered porphyry. The area near the winze is veined to a width of about 10 feet, and contains a moderate amount of chrysocolla. Much of the vein is nearly barren. The depth of oxidation is unknown.

Saginaw Porphyry Copper Prospect.-- The porphyry intrusive at Saginaw Hill contains disseminated copper mineralization, and was drilled by Calument and Arizona in 1914, and recently by Ventures Ltd.

The outcrop shows sulfide limonite and veinlets typical of porphyry copper alteration. The rock between



GEOPHYSICS DIVISION	BEAR CREEK MINING COMPANY	
INDUCED POLARIZATION PROFILES SOUTH AMOLE AREA SWD		
SCALE: SEE LEGEND	CONTOUR INTERVAL: LOG	REVISIONS
	DATA BY: DHH, JRB	
DATE: MAY 23, 1961	SHEET 2 OF 3	
DRAWN BY: ETF	DRAWING NO.: S-7551	FILE:



TRI-DIMENSIONAL PROJECTION
PALO VERDE MINE
Scale 1" = 100'

ASSAYS

No.	Width feet	Au oz.	Ag oz.	Cu %	Pb %	Zn %
1	15	0.02	2.0	0.07	0.2	0.35
2		0.04	4.4	---	1.4	10.5
3		0.01	0.7	0.03	---	---
4		0.01	3.8	---	4.5	7.1
5		0.05	1.9	---	2.1	---
6		0.14	4.1	---	0.7	4.6
7	3	0.04	2.8	---	0.3	10.8
8		0.02	3.5	---	15.8	10.7
9	5.5	0.02	4.6	---	8.2	6.5
10	3	0.01	0.4	---	0.7	---
11	3	0.03	0.8	---	1.0	---
12	Dump	----	1.4	---	1.0	---
14	4	0.03	1.6	---	1.2	---
15		0.01	0.4	1.03	---	---
16	Dump	0.04	---	---	---	---
17	1	0.26	1.6	---	High	Ox--
18		0.04	5.0	---	2.7	10.2
19	10	0.04	4.4	---	1.4	10.5
21	7.5	0.035	4.1	---	2.0	10.1
22	3	0.03	0.8	---	1.0	---
23	Dump	0.06	3.6	0.31	3.1	0.7
24	(Shipment)	0.20	6.0	0.5	1.1	0.3

SAGINAW HILL AREA
Scale 1" = 400'
12 Jan 1948 S.S.W.

Seaton Williams ?

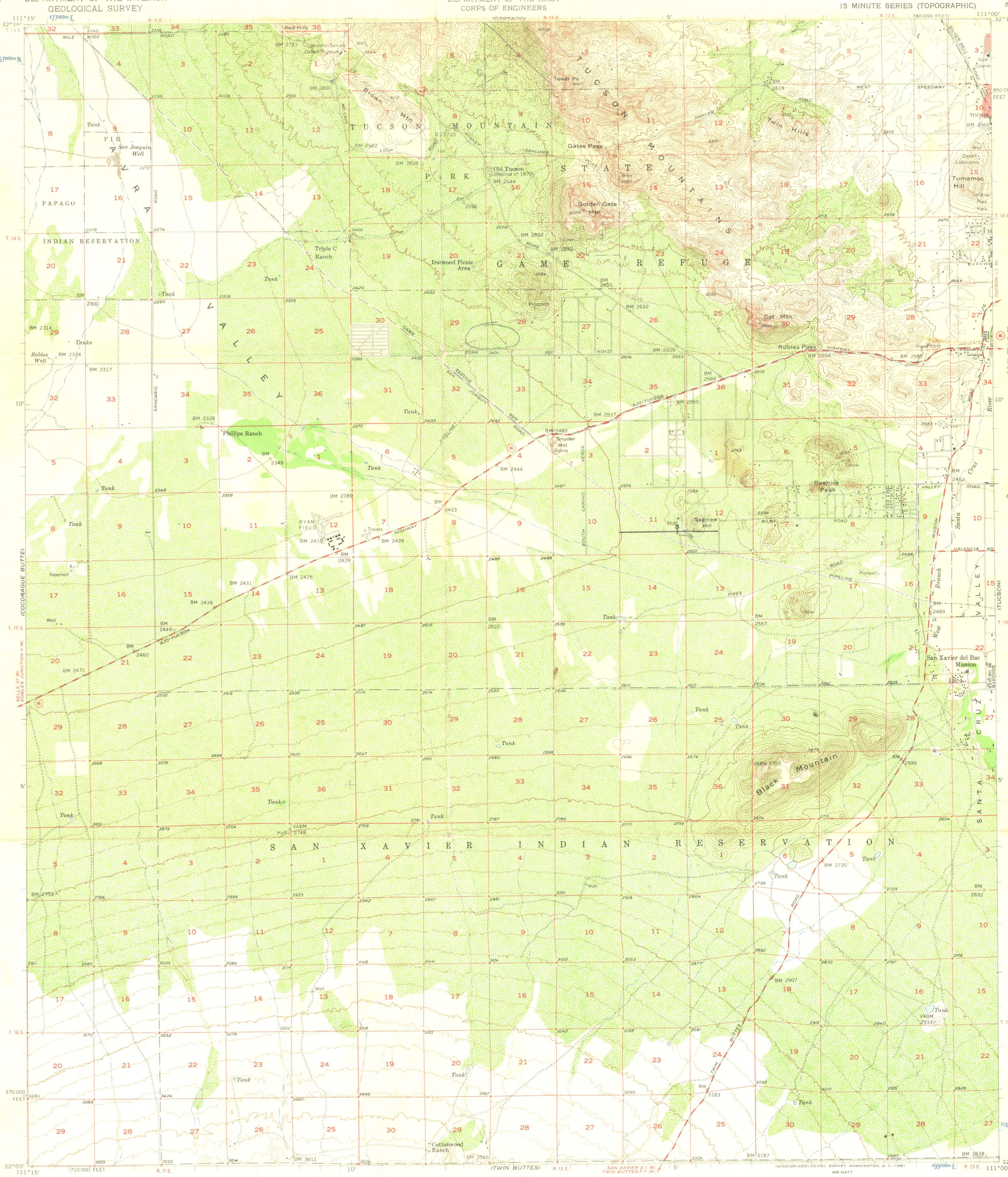
#4

4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

SAN XAVIER MISSION QUADRANGLE
ARIZONA—PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and State of Arizona

Topography by planetable surveys 1940–41
Culture revision and field check 1957

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

Red tint indicates areas in which only landmark buildings are shown

TRUE NORTH
MAGNETIC NORTH
13°
APPROXIMATE MEAN DECLINATION, 1957

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Medium-duty — Light-duty
Unimproved dirt
State Route

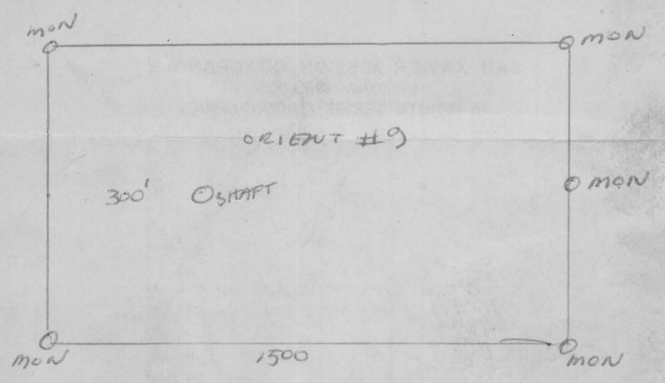
SAN XAVIER MISSION, ARIZ.
N3200—W11100/15

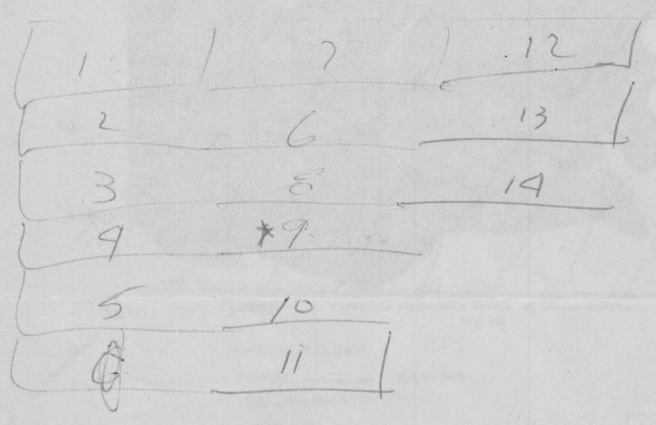
1957

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Kern County Land

Tucson Mtn Topo


MON
MON
ORIENT #9
300'
SHAFT
MON
MON
1500
MON


1
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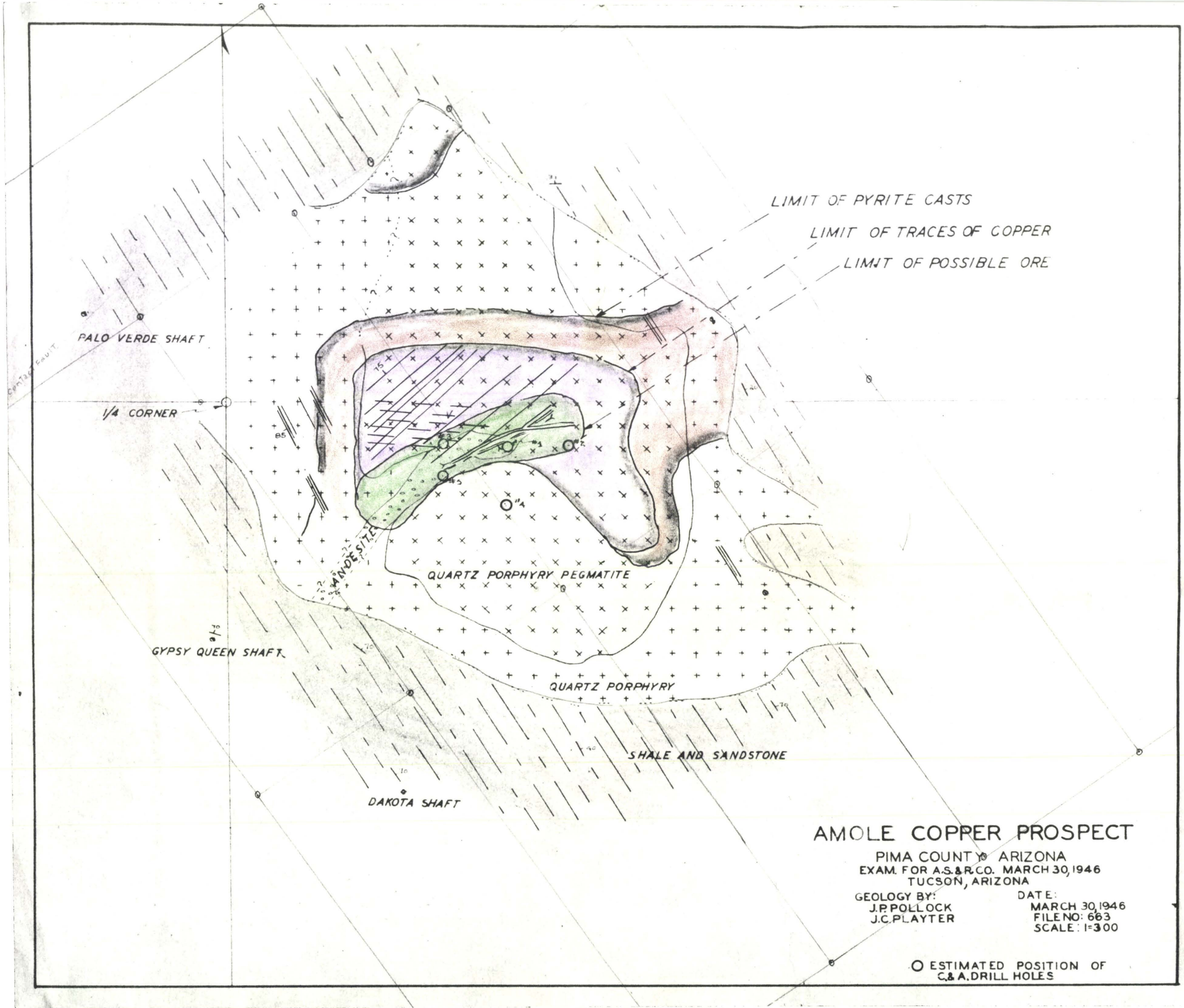
LIMIT OF PYRITE CASTS
LIMIT OF TRACES OF COPPER
LIMIT OF POSSIBLE ORE
PALO VERDE SHAFT
CONTACT FAULT
1/4 CORNER
ANDESITE
QUARTZ PORPHYRY PEGMATITE
GYPSY QUEEN SHAFT
QUARTZ PORPHYRY
SHALE AND SANDSTONE
DAKOTA SHAFT
AMOLE COPPER PROSPECT
PIMA COUNTY ARIZONA
EXAM. FOR A.S.&R.CO. MARCH 30, 1946
TUCSON, ARIZONA
GEOLOGY BY:
J.P. POLLOCK
J.C. PLAYTER
DATE:
MARCH 30, 1946
FILE NO: 663
SCALE: 1=300
O ESTIMATED POSITION OF C.&A. DRILL HOLES