

Appendix I

C. WHOLE ROCK ANALYSIS - DETERMINATION OF SiO_2 , Al_2O_3 , CaO , MgO , Fe_2O_3 , K_2O , P_2O_5 , TiO_2 and MnO

(i) Summary

Samples are fused with a pre-mixed lithium tetraborate flux and the melt rapidly cooled to give a glass bead which is ground and pelletized. All elements except Mn are determined with Cr radiation. Counting times of 10 secs. are generally adequate and 3 unknowns and 1 standard are run in succession. Instrumental variability is minimised by a ratio method whereby

$$C_{\text{sample}} : C_{\text{standard}}$$

is compared to a line, fitted by least squares, for

$$C_{\text{STD}} : C_{\text{standard}} / \text{Concentration}_{\text{STD}}$$

where C_{STD} and $\text{Concentration}_{\text{STD}}$ are, respectively, counts and recommended concentrations for up to 25 well-analyzed silicate standards covering a wide concentration range. The standard rock AGV-1 is used to obtain C_{standard} .

Precision at the 95% confidence level is generally better than $\pm 5\%$ of the amount present and most of this variability can be assigned to inadequate homogenization of sample powders and/or poor fusion and pelletization.

(ii) Fusion

(a) Materials

Flux: Chemplex Grade III (#925) - a commercially available flux consisting of 16% lanthanum oxide, 47% lithium tetraborate and 37% lithium carbonate. Dry the flux overnight at 120°C .

Crucibles: Spex cat. #7152 graphite crucibles, regular grade.

(b) Procedure

1. Dry minus 100-mesh sample at 120°C : cool and store in a desiccator.
2. Transfer 0.28g sample and 1.52g flux to a graphite crucible and mix with a toothpick. Tap the crucible to remove powder adhering to upper wall.
3. Using asbestos gloves and a face shield place crucible in muffle furnace at 1000°C for 5 minutes.
4. Remove and swirl; replace in muffle for a further 5 minutes.

* See "Norrish, K. and Hutton, J.E. 1969. Geochim. Cosmochim. Acta. v.33." for methods of dealing with structural water.

5. Remove and rapidly pour the melt onto a polished aluminium tray. Allow the glass bead to cool. Store.
6. Grind for 15 minutes in a Spex WC grinding vial.

(iii) Pelletizing

(a) Materials

2% P.V.A. binder: Add 2g polyvinal alcohol (Baker) to 100 ml water. Heat to dissolve and store in a dropping bottle.

Backing: Grind amber bakelite (Buehler 20-3500 AB) for about 5 min. in a Spex WC grinding vial. Add an equal amount of powdered boric acid (Fisher A-74) and mix thoroughly.

(b) Procedure

1. Clean all parts of the die with distilled water and tissue. If any tarnish remains on the polished surface clean with Brasso metal polish and then rinse with acetone.
2. Assemble the die as shown in Fig. 1 with the polished surface of the disc uppermost.
3. Transfer sample to a clean dixie cup, add 4 drops of P.V.A., mix well and pour the slightly moist powder into the sleeve and onto the polished surface.
4. While holding the sleeve down, slowly insert the plastic plunger and press down hard for a few seconds. Simultaneously rotate the sleeve.
5. Withdraw the sleeve until it is flush with the plunger and then remove both.
6. Add a heaped teaspoonful of backing ensuring that the gap between the pellet and cylinder wall is filled. Level and insert the steel plunger.
7. Insert the die in the press and pelletize at 17 tons for 2 minutes.
8. Remove the base from the cylinder and invert while holding the plunger in position. Place the die in the orange Arbor press with the plastic cup centred over the sample pellet.
9. Press the pellet upwards into the plastic cup.
10. Clean-up apparatus as in (1).

Table 1 Instrumental conditions for whole rock analysis*

(i) Cr tube at 50/30 KV-MA

Element	HV Counter	Lower Level	Window	Crystal Angle	Collimator	Count Time(secs)
Mg	4.850	250	400	RAP 14.49	Coarse	40
Al	4.640	180	300	EDDT 112.4	Coarse	10
Si	4.640	200	450	EDDT 77.98	Coarse	10
P	4.550	250	300	EDDT 58.66	Coarse	40
K	4.450	200	450	EDDT 20.28	Fine	10

(ii) Cr tube at 40/20 KV-MA

Ca	4.350	150	500	LiF 113.01	Fine	10
Ti	4.250	180	300	LiF 86.07	Fine	10
Fe	4.250	300	350	LiF 57.45	Fine	10

(iii) W tube at 40/20 KV-MA

Mn	4.250	280	300	LiF 62.91	Fine	10
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* Flow proportional counter, and attenuation 2 for all determinations.

D. DETERMINATION OF SULPHUR (PROVISIONAL)

(i) Summary

S content over the range 0-0.35% is estimated by comparing pelletized powders to a series of standards prepared by successive dilution of EMR standard HV-1 with an unmineralized granodiorite (UBC standard rock). Precision is $\pm 15\%$ at the 95% confidence level.

(ii) Pelletizing

(a) Materials

As for whole rock analysis (page C2).

(b) Procedure

Transfer one level teaspoon of powdered sample to a clean dixie cup; add 5-6 drops of P.V.A. and proceed as from step 3, page C2.

(iii) Instrumental conditions

- a. Cr tube at 50 kv and 30 ma
- b. Flow proportional counter with attenuation at 2.
- c. H.V. counter supply 4.50
- d. Lower level 250
- e. Window 300
- f. EDDT crystal; angle 44.90
- g. Collimator coarse
- h. Counting time 20 secs.

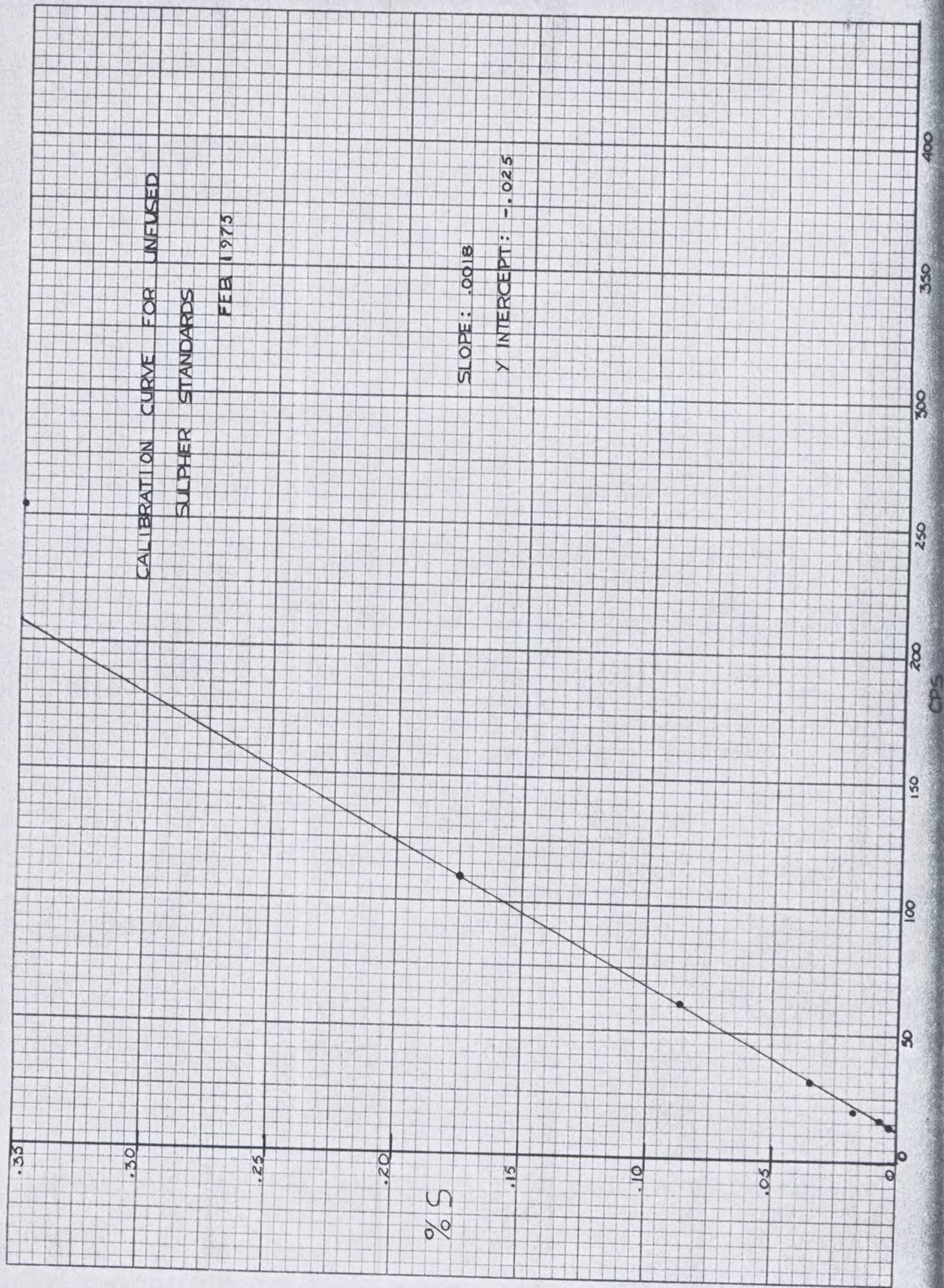
(iv) Procedure

Standards have been prepared by dilution of HV-1 (S content 0.35%, E.M.R. Tech. Bull. 167, March 1973) with an unmineralized granodiorite. Nominal S concentrations in the standards are 35, 35, 70, 175, 350, 875, 1750 and 3500 ppm. Standards and unknowns are run together and S concentrations obtained directly from the calibration curve (eg Fig. 1).

(v) Precision and accuracy

On the basis of 18 duplicate analyses of granitic samples precision is estimated as $\pm 15\%$ at the 95% confidence level. Accuracy is not known. However, providing matrices of samples and standards are comparable (i.e. granodiorite) errors are probably small. The reason for the deviation of the highest standard (HV-1) from the calibration line is not known. It may reflect sampling error as the sulphur is principally present as discrete grains of pyrite and chalcopyrite.

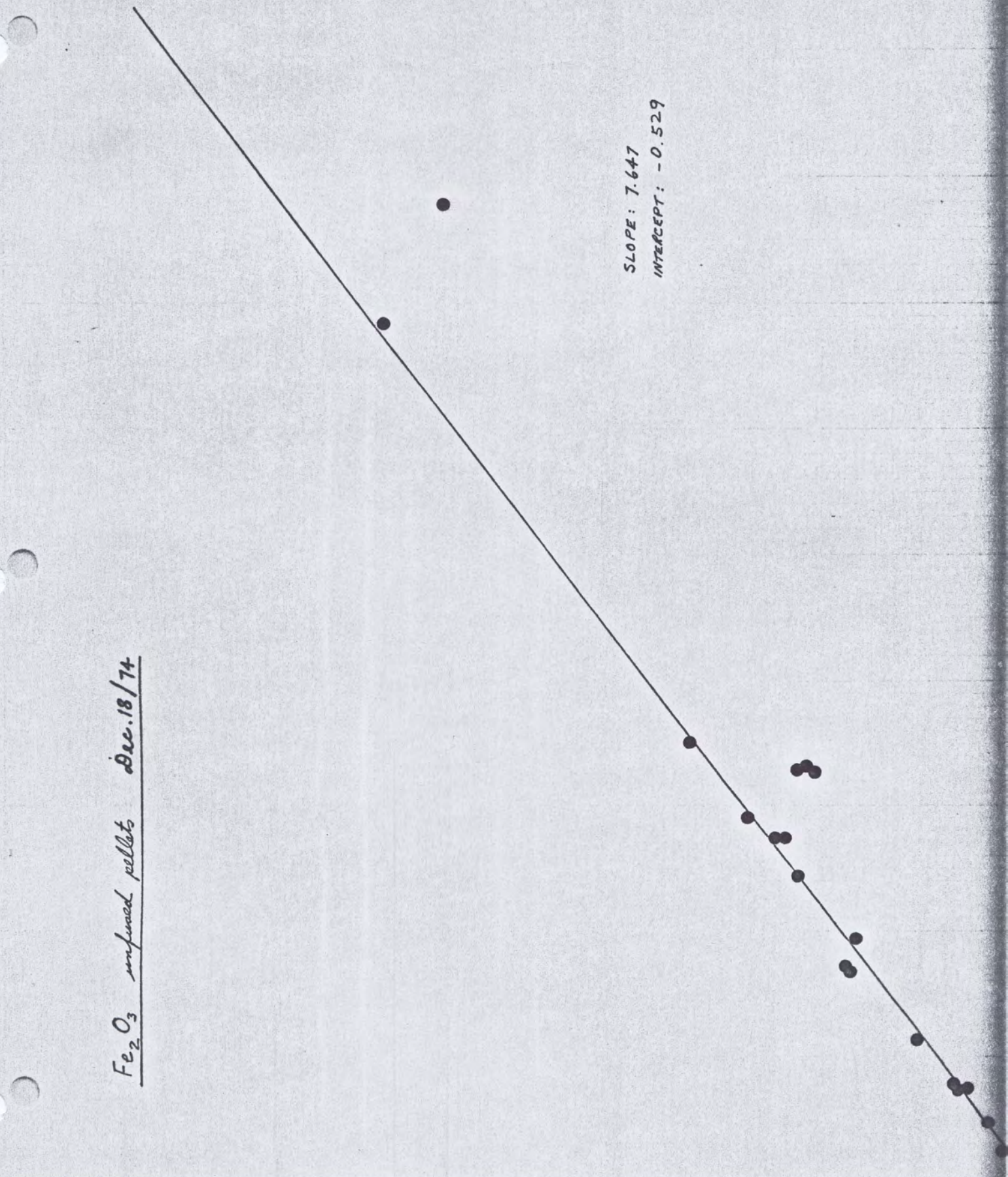
Appendix II



Fe₂O₃ unfused pellets Dec. 18/74

% Fe₂O₃

SLOPE: 7.647
INTERCEPT: -0.529

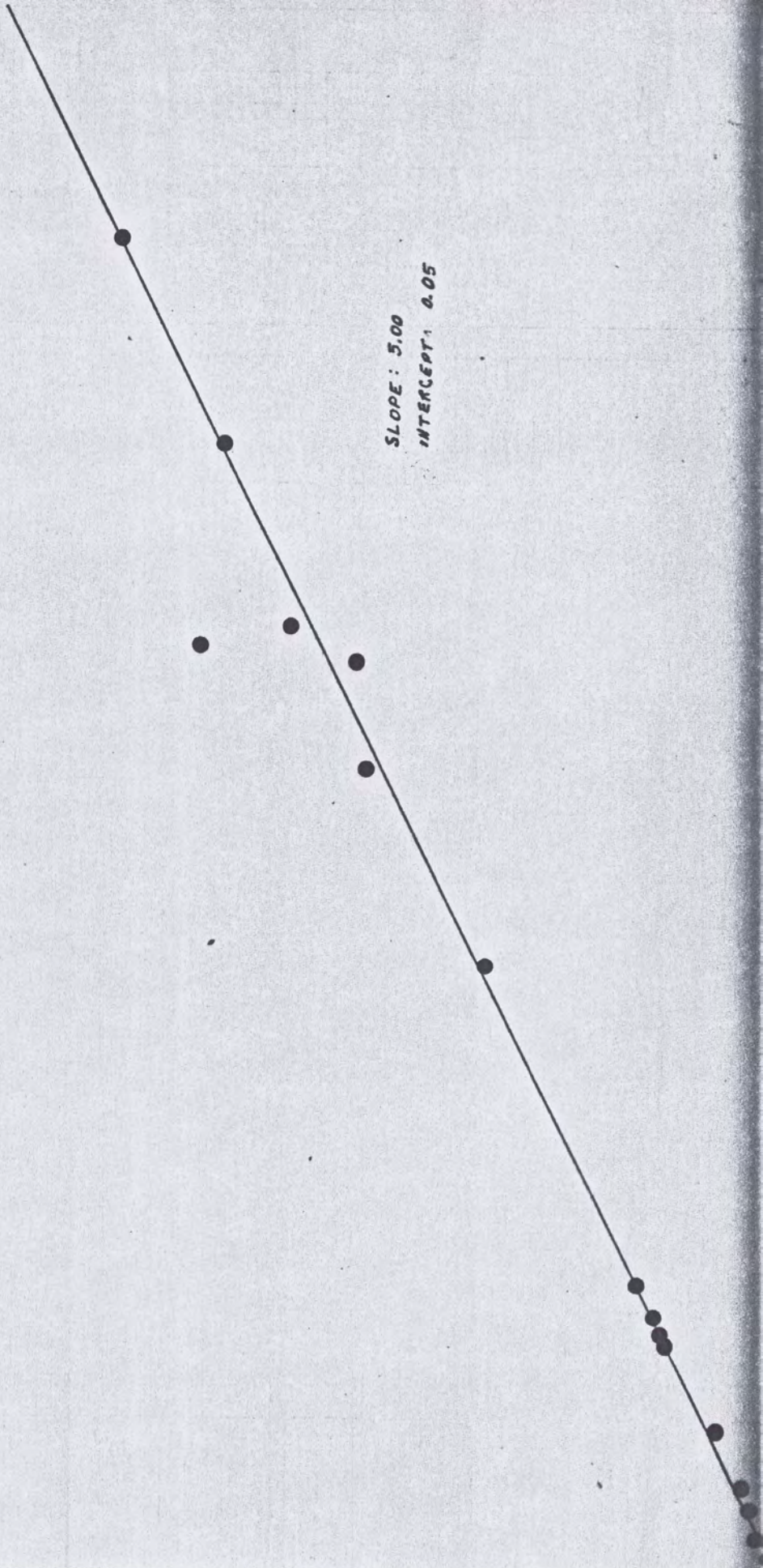


CaO infused pellets Dec. 18/74

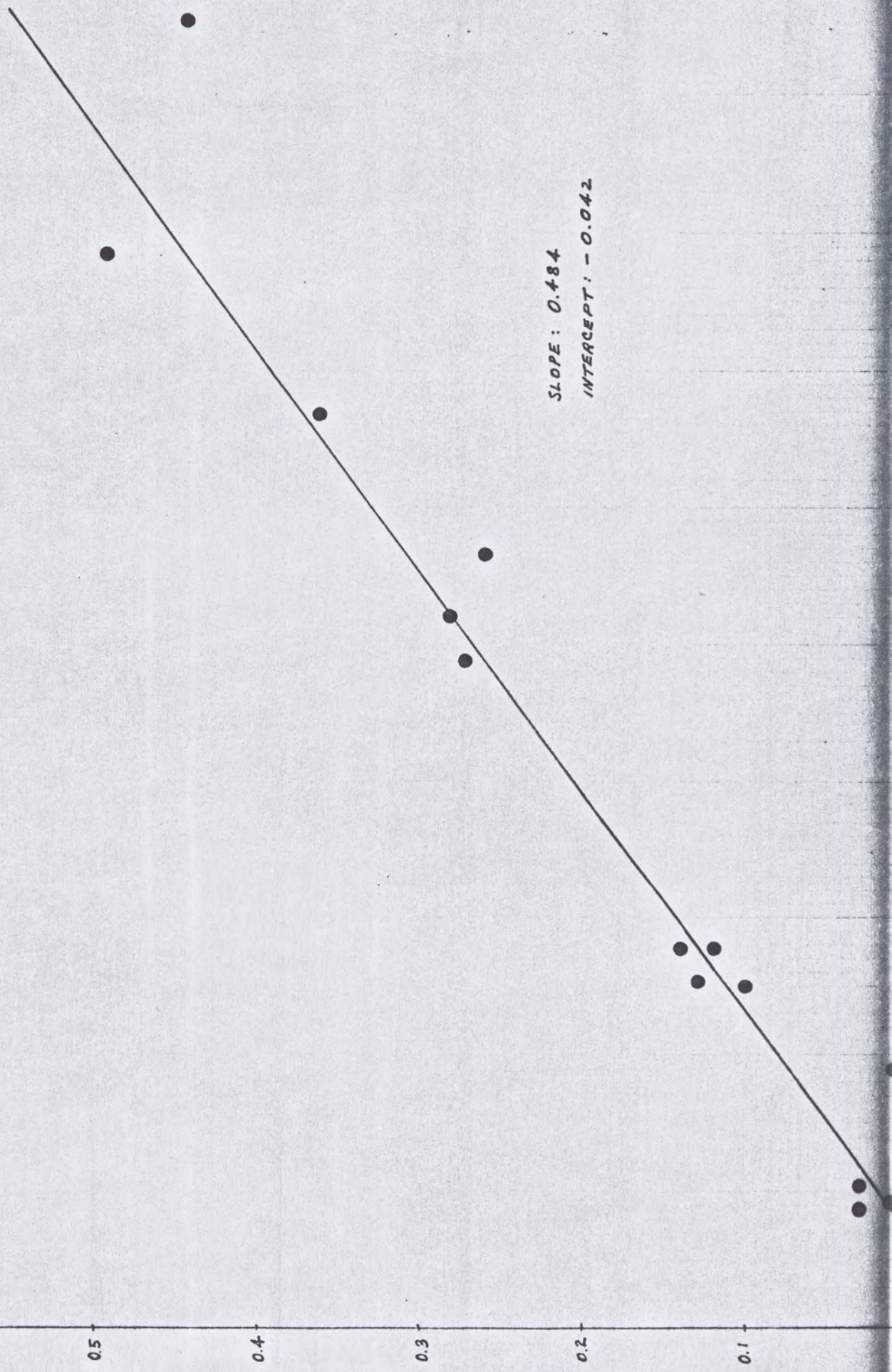
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0

% CaO

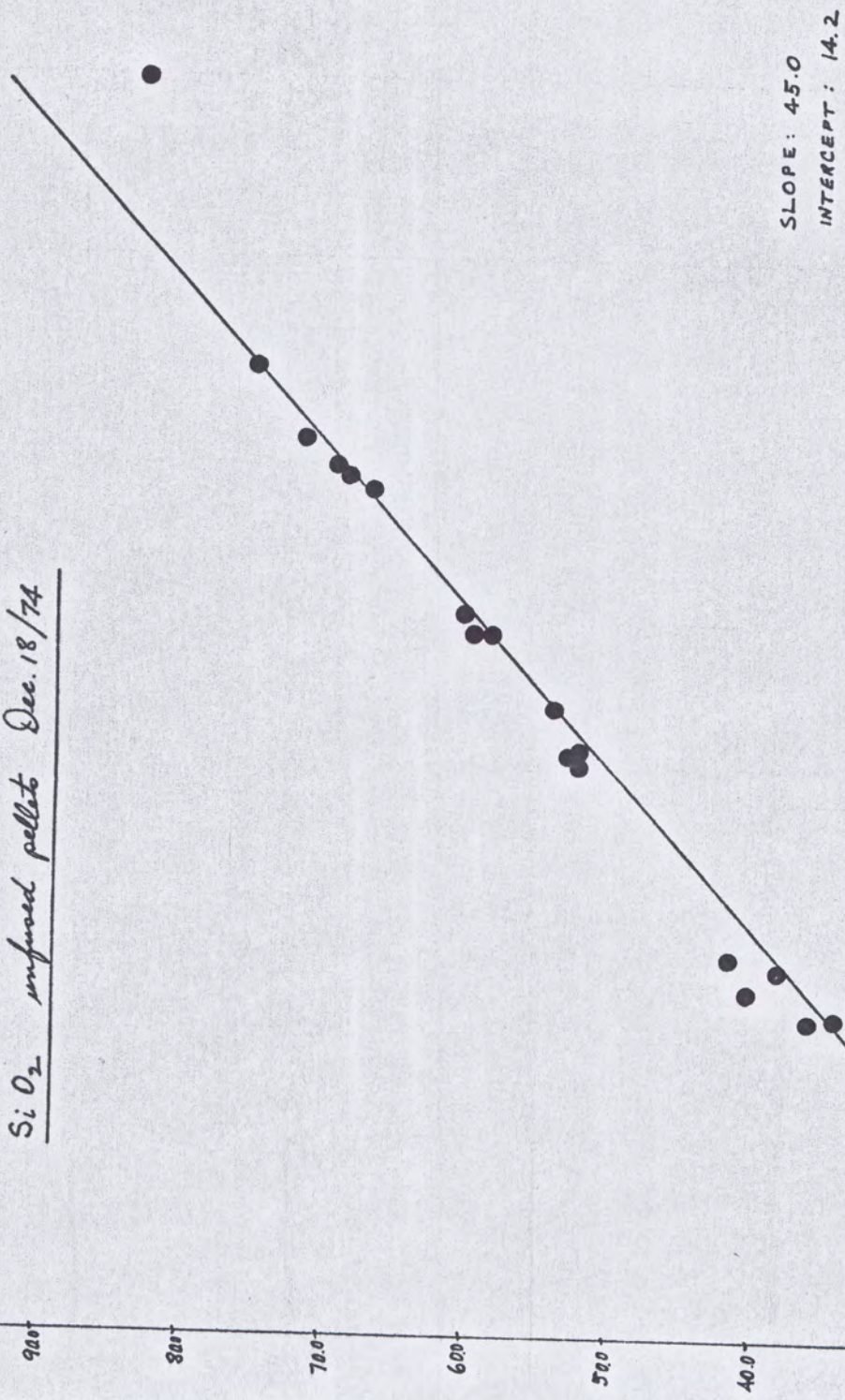
SLOPE: 5.00
INTERCEPT: 0.05



P₂O₅ unfused pellets Dec. 18/74

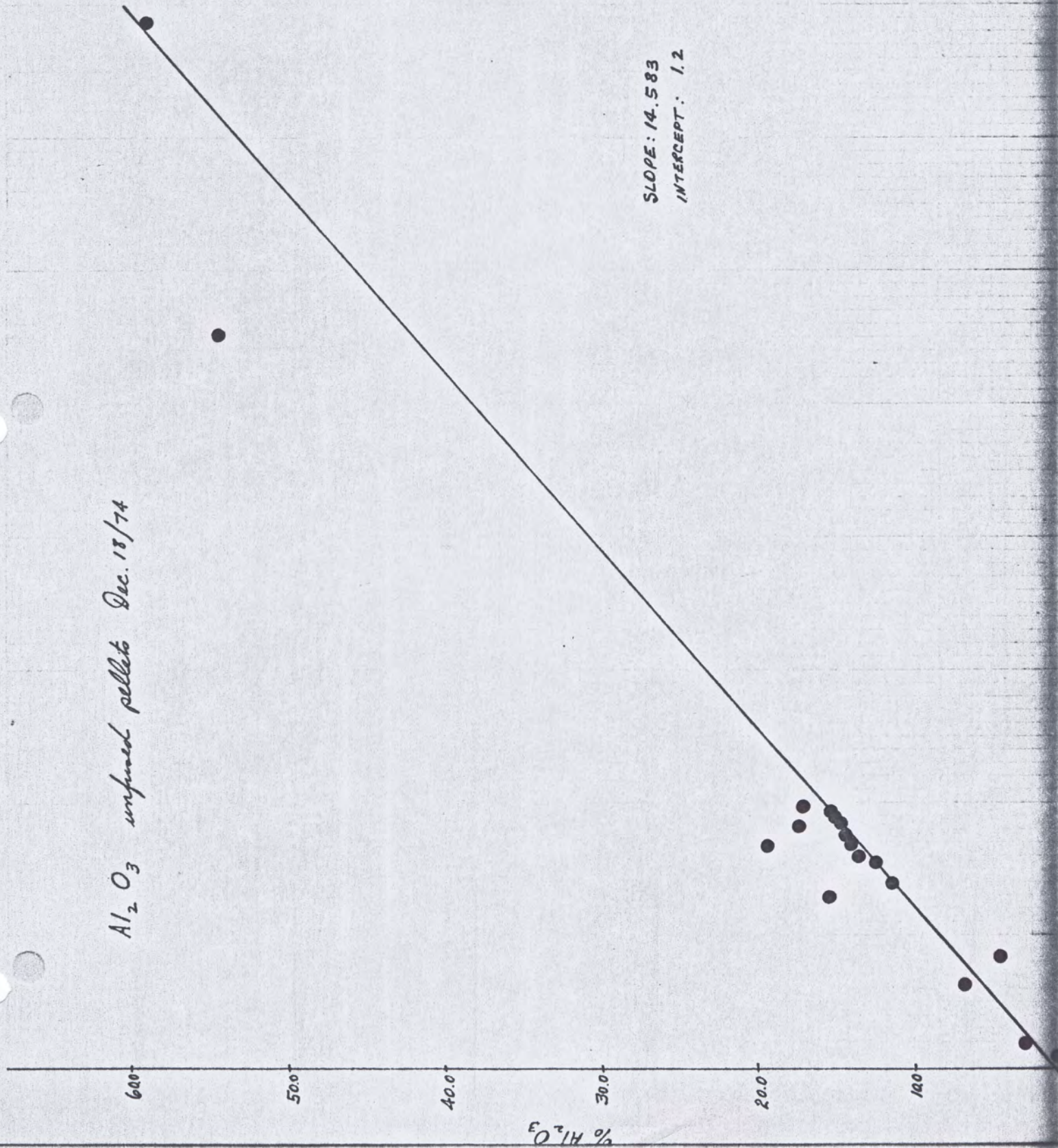


SiO₂ unfused pellets Dec. 18/74

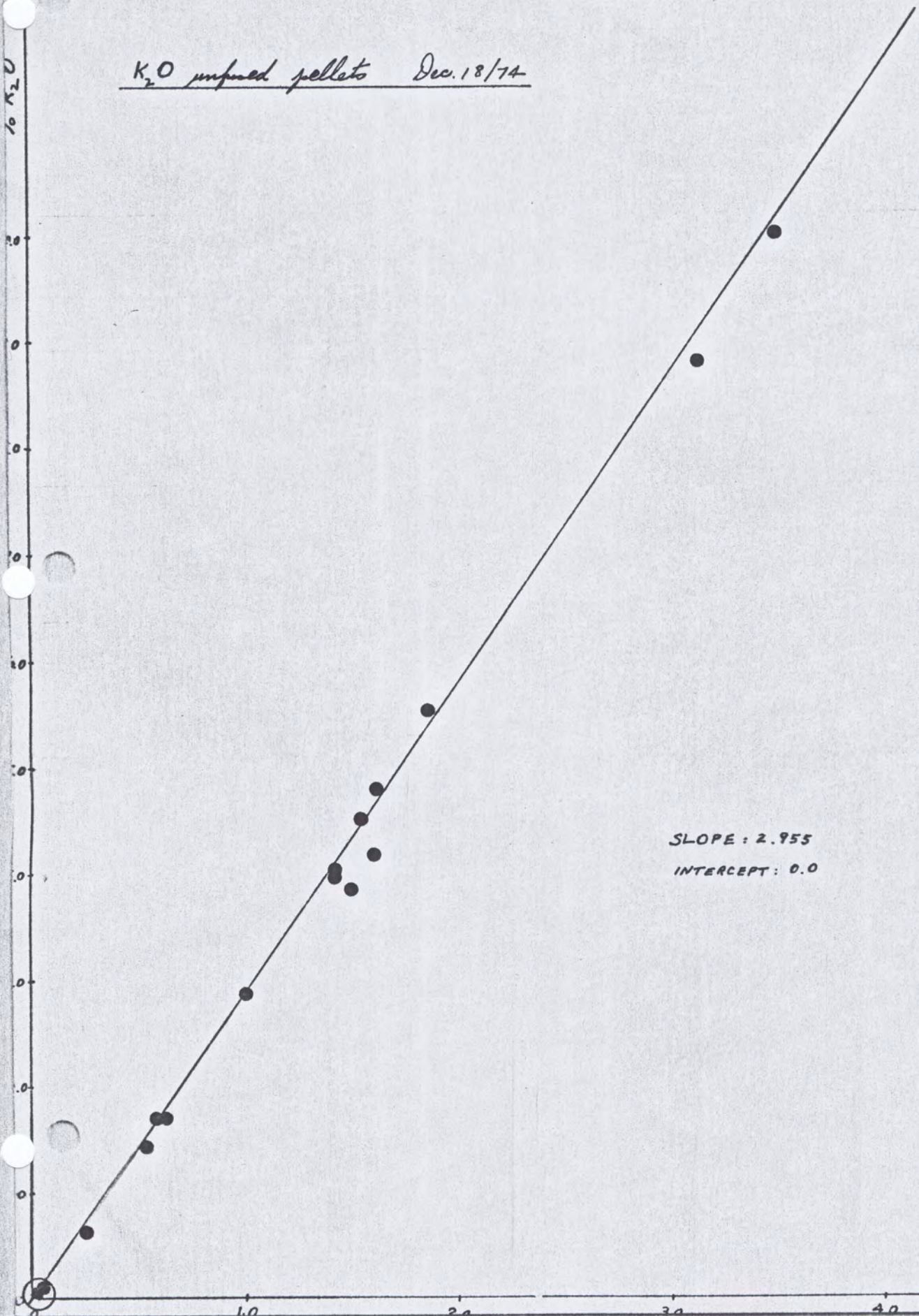


Al_2O_3 unfired pellets Dec. 18/74

SLOPE: 14.583
INTERCEPT: 1.2



K₂O un-fired pellets Dec. 18/74



SLOPE: 2.955

INTERCEPT: 0.0

RATIO - SAMPLE / ASH

TiO₂ unfused pellets Dec. 18/74

SLOPE : 1.0
INTERCEPT : 0.0

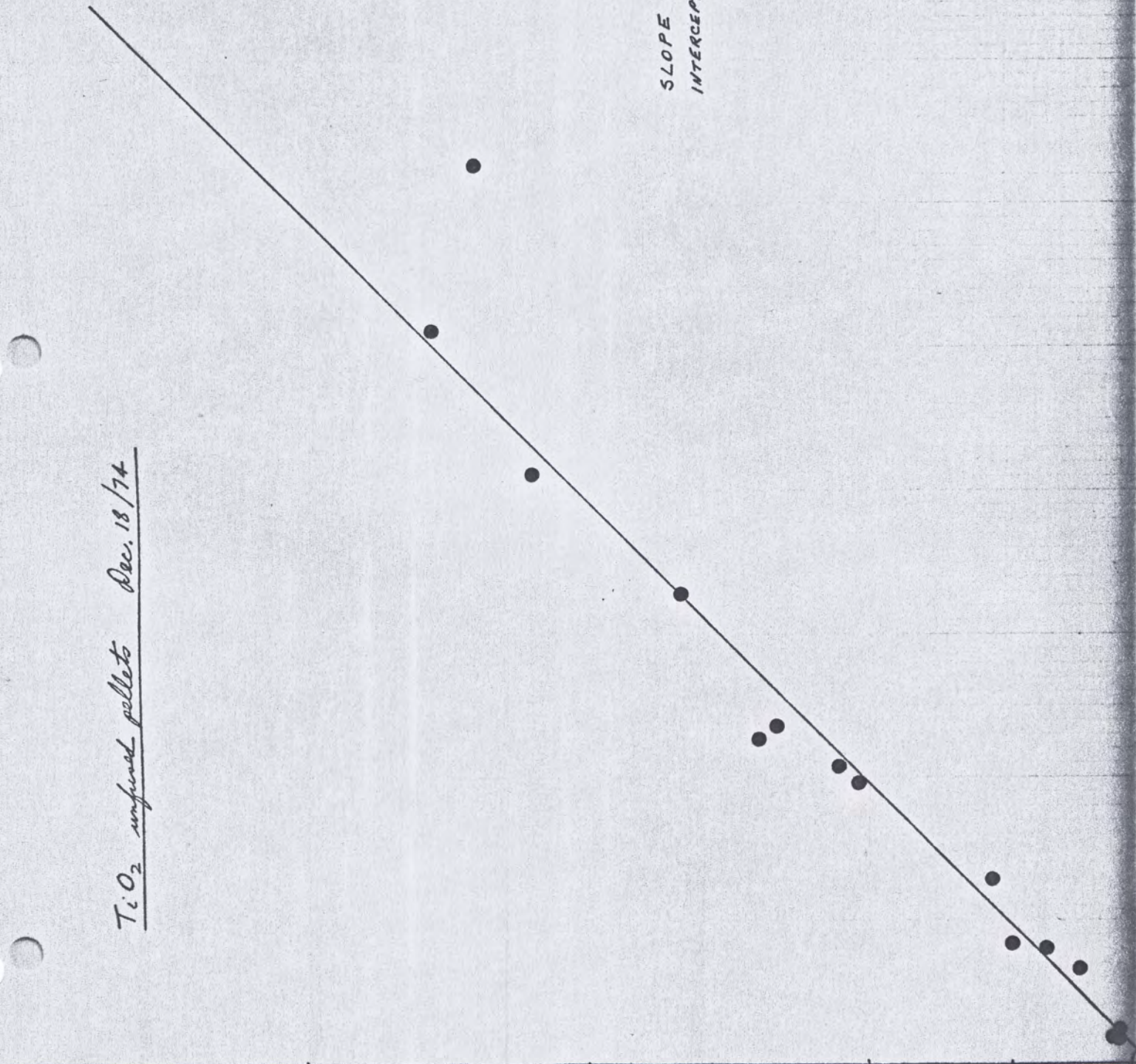
3.0

2.0

1.0

0.5

% TiO₂



Appendix III

ROCK SAMPLES

Ag

Cd

Pb

Zn

	FAS PROPERTY DELUXE THESIS FRED DALEY						
1							
2	13200000	0	0	1.050	1.411	24.755	36.514
3	13300000	0	0	0.668	0.420	18.292	16.016
4	13600000	0	0	0.411	0.491	9.093	5.772
5	13700000	0	0	0.359	0.350	9.888	3.515
6	13900000	0	0	0.0	0.0	11.482	16.818
7	14000000	0	0	0.0	0.0	13.079	16.778
8	14300000	0	0	0.616	0.0	18.694	21.100
9	14400000	0	0	0.771	0.0	11.881	3.631
10	14700000	0	0	1.704	0.0	34.140	4.681
11	14900000	0	0	2.467	0.0	26.785	5.811
12	15100000	0	0	0.926	0.0	19.902	9.300
13	15300000	0	0	1.185	0.0	27.600	40.253
14	15400000	0	0	3.649	0.0	32.090	17.381
15	15600000	0	0	1.652	0.0	25.973	107.952
16	15703000	0	0	1.548	0.0	15.881	254.689
17	15900000	0	0	1.340	0.631	37.431	516.919
18	16000000	0	0	1.185	0.0	16.282	73.637
19	16100000	0	0	1.860	0.0	23.944	505.500
20	16300000	0	0	2.488	0.0	16.684	212.098
21	16400000	0	0	1.856	0.0	21.837	17.100
22	16700000	0	0	1.544	0.341	21.917	269.215
23	16800000	0	0	1.856	0.685	39.441	309.597
24	16900000	0	0	0.0	0.410	35.405	142.896
25	17100000	0	0	0.923	0.383	48.151	174.552
26	17200000	0	0	0.666	1.168	56.215	58.036
27	17500000	0	0	0.872	1.237	4716.918	455.422
28	17600000	0	0	0.256	0.478	111.960	261.017
29	17900000	0	0	1.803	7.861	23421.094	149.589
30	18000000	0	0	0.666	22.566	13819.715	3456.419
31	18100000	0	0	1.027	5.754	1261.435	4459.086
32	18403000	0	0	1.130	6.051	1488.542	2087.841
33	18500000	0	0	0.666	4.943	5209.016	954.343
34	18800000	0	0	0.923	0.822	152.596	213.847
35	18900000	0	0	0.666	0.891	123.160	110.818
36	19900000	0	0	0.563	1.099	73.365	100.794
37	19200000	0	0	0.512	5.532	246.109	112.412
38	19300000	0	0	0.0	7.207	59.947	132.826
39	19500000	0	0	0.563	5.090	59.199	113.702
40	19600000	0	0	0.461	5.458	45.128	283.815
41	19700000	0	0	1.007	6.967	55.990	337.710
42	19900000	0	0	0.0	2.730	38.637	69.156
43	20000000	0	0	0.0	4.607	43.027	173.629
44	20100000	0	0	0.653	3.180	94.035	164.937
45	20300000	0	0	0.251	1.191	511.461	65.185
46	20403000	0	0	0.251	1.365	40.828	78.618
47	20600000	0	0	0.502	1.853	252.776	88.372
48	20700000	0	0	1.361	2.064	128.048	256.574
49	20900000	0	0	0.0	1.408	72.640	113.228
50	21000000	0	0	0.0	1.278	78.024	59.173
51	21100000	0	0	0.0	0.976	32.467	29.163
52	21300000	0	0	0.452	1.625	57.112	213.527
53	21400000	0	0	0.0	1.365	37.908	61.478
54	21600000	0	0	0.0	1.278	37.908	39.966
55	21700000	0	0	0.251	0.848	38.273	57.630
56	21800000	0	0	0.0	0.848	28.144	50.612
57	22000000	0	0	0.653	0.0	44.863	221.386
58	22100000	0	0	0.502	0.0	35.364	265.698
59	22300000	0	0	0.0	0.0	18.516	45.039
60	22400000	0	0	0.502	0.0	15.337	48.802
61	22603000	0	0	0.0	0.208	17.395	60.102

SOIL SAMPLES

Ag

Cd

Pb

Zn

	PAS PROPERTY DELUXE THESIS FRED DALEY						
1	13053000	0	0	0.404	1.521	41.823	511.322
2	13150000	0	0	1.318	5.396	26.602	221.150
3	13450000	0	0	1.267	1.067	34.781	177.641
4	13550000	0	0	1.727	0.796	17.080	106.929
5	13850000	0	0	0.0	0.0	20.709	40.808
6	14150000	0	0	0.454	0.0	16.766	81.093
7	14250000	0	0	0.657	0.543	26.921	51.410
8	14550000	0	0	3.849	0.838	89.895	101.523
9	14650000	0	0	2.446	0.0	44.452	34.781
10	14850000	0	0	1.932	0.208	21.188	14.508
11	15050000	0	0	1.114	0.0	48.748	36.870
12	15250000	0	0	0.961	0.0	35.299	58.701
13	15550000	0	0	0.758	0.0	37.900	99.176
14	15850000	0	0	0.758	0.166	30.774	144.187
15	16250000	0	0	2.291	1.093	31.096	632.842
16	16553000	0	0	0.657	0.375	33.356	232.005
17	16650000	0	0	1.778	1.008	30.774	661.011
18	17050000	0	0	0.707	1.263	27.882	653.562
19	17350000	0	0	0.863	0.416	35.422	294.260
20	17450000	0	0	1.784	4.912	88.229	2891.054
21	17850000	0	0	0.863	0.835	76.126	365.562
22	18250000	0	0	0.253	1.731	454.249	794.303
23	18350000	0	0	1.733	6.867	6359.055	2483.843
24	18650000	0	0	1.118	1.345	1962.914	499.515
25	18750000	0	0	0.965	2.735	4509.965	1100.268
26	19150000	0	0	1.015	16.192	341.431	287.242
27	19850000	0	0	1.118	14.749	3766.626	731.736
28	20250000	0	0	0.669	2.383	354.217	333.180
29	20550000	0	0	1.271	5.052	2715.790	690.590
30	20850000	0	0	1.220	7.457	1807.261	733.115
31	21253000	0	0	0.0	0.962	44.449	304.277
32	21550000	0	0	0.0	0.709	139.983	292.780
33	21950000	0	0	0.506	0.0	73.394	151.758
34	22250000	0	0	0.0	0.290	87.531	163.067
35	22550000	0	0	0.659	2.603	331.856	260.020

PART NO. 116

PART NO. 116

Appendix IV

X-RAY FLUORESCENCE ANALYSIS

1

DATE:- Jan. 15/75		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-		MA:-		COUNTER:-	
COUNTER KV:-		CONSTANT COUNTS:-		CONSTANT TIME:-		ATTENUATION:-	
LOWER LEVEL:-		WINDOW:-		CRYSTAL:-		COLLIMATOR:-	
VARIABLE M:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 AGV-1 (std)	Fe/57.51	~~38248~~	3846X	~~38626~~	37868	40026	40016
2 141 L	26/6	~~16893~~	16907	~~16893~~	16804	16748	16909
3 142 L		~~31072~~	30861	~~30736~~	31083	31038	30734
4 143 R		~~16222~~	16227	~~16227~~	16000	16353	16318

1 ST.	Ti/86.17	42574	51942	52656	52167		51086
2 141 L	30/12	31219	31530	31592			31614
3 142 L		23472	33417	33206			33365
4 143 R		29686	29808	29955			29816

1 ST.	Ca/113.11	112110	137370	138661	138606		131692
2 141 L	34/8	3134	3149	3162			3150
3 142 L		3238	3204	3156			3199
4 143 R		1824	1879	1896			1866

1 ST.	K/20.00	27984	41581	43140	43746	44893	43926
2 141 L	38/18	80664	81211	81969			81281
3 142 L		89541	89187	89473			89400
4 143 R		81384	81030	81636			81350

1 ST.	P/58.70	~~211~~	528	642	677	703	674
2 141 L	50/30	275	286	293			285
3 142 L		346	377	380			363
4 143 R		215	219	213			216

1 ST.	Si/77.73	9304	14850	15889	15890	16097	15959
2 141 L	32/12	20003	20134	20183			20107
3 142 L		18944	18708	18592			18715
4 143 R		21795	21758	21642			21732

1 ST.	Al/112.45	1391	3344	2857	3891	3941	3896
2 141 L	32/10	3873	2785	3851			3836
3 142 L		3966	3846	3708			3871

X-RAY FLUORESCENCE ANALYSIS

2

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
LOWER LEVEL:-			WINDOW:-		CRYSTAL:-		COLLIMATOR:-
VAL. JM:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 ST	Fe	~~45211~~	~~45216~~	~~45210~~	39614	40122	40054
2 144R		~~21124~~	~~21115~~	~~21110~~	9771	9578	9649
3 162L		~~44752~~	~~44115~~	~~44541~~	44855	45343	44869
4 163R		~~21110~~	~~21111~~	~~21111~~	21434	21695	21738

1 ST	Ti	47439	52007	52044	52174		52075
2 144R		38924	38711	38944			38860
3 162L		26521	27006	26670			26732
4 163R		25043	25083	25410			25179

1 ST	Ca	103305	138261	139434	140276		139224
2 144R		1380	1482	1375			1412
3 162L		8528	8400	8489			8472
4 163R		1686	1761	1746			1731

1 ST	K	27364	40827	42424	42947		42686
2 144R		93828	94920	94975			94574
3 162L		62998	63620	63946			63521
4 163R		63943	64057	63443			63714

1 ST	P	355	637	617	669	726	662
2 144R		187	179	167			178
3 162L		891	941	896			909
4 163R		296	322	298			305

1 ST	Si	3708	12860	15614	16092	16042	16067
2 144R		19456	19209	19378			19348
3 162L		19644	19816	19384			19615
4 163R		23364	23658	23616			23546

1 ST	Al	630	3167	3805	3898	4006	3952
2 144R		4539	4665	4623			4626
3 162L		3115	3149	3102			3122

X-RAY FLUORESCENCE ANALYSIS

3

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
LOWER LEVEL:-			WINDOW:-		CRYSTAL:-		COLLIMATOR:-
VAC. J.M:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 ~~164R~~ ST	Fe	~~40000~~	~~41111~~	~~41111~~	39932	39737	40134
2 ~~164R~~ 164R		~~12244~~	~~12111~~	~~12111~~	12081	11998	12249
3 ~~170L~~ 170L		~~41444~~	~~41111~~	~~41111~~	41457	41785	41642
4 ~~171R~~ 171R		~~14115~~	~~14111~~	~~14111~~	14230	14145	14159

1 ST.	Ti	46730	51458	51986	51656		51700
2 164R		21274	21504	21695			21491
3 170L		25730	25573	26009			25771
4 171R		26853	26937	26728			26839

1 ST.	Ca	125628	139397	139665	140087		139716
2 164R		1144	1121	1106			1124
3 170L		10045	9928	9882			9952
4 171R		1061	1107	1099			1089

1 ST.	K.	72117	38859	40811	41322		41067
2 164R		5640	57077	57447			57055
3 170L		44305	44495	44352			44384
4 171R		57117	57501	57426			57348

1 ST.	P	2158	6775	667	739	715	727
2 164R		172	167	164			168
3 170L		1048	1078	1041			1056
4 171R		219	253	225			232

1 ST.	Si	7448	17277	15613	15681	16181	15825
2 164R		25784	26126	25922			25944
3 170L		19410	19575	19403			19463
4 171R		26104	26249	26018			26124

1 ST.	Al	3806	3807	3841	3832	3892	3855
2 164R		2497	2453	2440			2463
3 170L		3552	3502	3478			3511

X-RAY FLUORESCENCE ANALYSIS

4

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
LOWER LEVEL:-		WINDOW:-		CRYSTAL:-		COLLIMATOR:-	
VACUUM:-		OTHER:-					

	SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1	ST.	Fe	39544	39913	40308			39922
2	172R		15619	15446	15604			15556
3	182L		55668	55122	55389			55393
4	183L		130306	129253	130091			130050

1	ST	Ti	41944	51185	52015	52097		51766
2	172R		24472	24487	24702			24554
3	182L		17902	17837	18196			17978
4	183L		9510	9463	9255			9409

1	ST	Ca	141716	141711	140947	141186		141066
2	172R		1010	968	1030			1003
3	182L		21924	22157	21868			21933
4	183L		10632	10605	10811			10683

1	ST	K	38840	38840	38840	39626	40176	39547
2	172R		56392	56692	56816			56633
3	182L		30952	31142	31178			31091
4	183L		14660	14406	14472			14513

1	ST	P	560	560	677			680
2	172R		247	236	217			233
3	182L		2049	1953	2060			2021
4	183L		3235	3354	3308			3299

1	ST	Si	15793	171111	15793	16168	16501	16154
2	172R		25803	25761	25521			25699
3	182L		20394	20703	20698			20598
4	183L		15500	15554	15725			15593

1	ST	Al	3917	36111	21111	3917	4002	3960
2	172R		2805	2638	2727			2723
3	182L		2166	2076	2092			2111

X-RAY FLUORESCENCE ANALYSIS

5

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
LOW LEVEL:-			WINDOW:-		CRYSTAL:-		COLLIMATOR:-
VACUUM:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 ST	Fe	39782	39512	39893			39730
2 184R		65544	65679	65661			65628
3 185R		39652	40114	40084			39967
4 202L		35987	36181	35979			36049

1 ST	Ti	51820	51917	52345			52027
2 184R		7276	7388	7347			7337
3 185R		7381	7360	7434			7392
4 202L		29675	29723	29703			29700

1 ST	Cr	104115	177773	140651	141479		141065
2 184R		9752	9672	9696			9707
3 185R		2017	1946	2041			2001
4 202L		32469	32620	32636			32575

1 ST	K	277718	347714	37876	38776	38956	38536
2 184R		11502	11591	11670			11588
3 185R		10190	10238	10224			10217
4 202L		47640	48437	48914			48330

1 ST	P	7277	5777	6777	724	756	740
2 184R		1457	1386	1412			1418
3 185R		664	638	673			658
4 202L		1673	1795	1696			1721

1 ST	Si	25777	25777	177775	15831	16209	16020
2 184R		25123	25359	25250			25244
3 185R		29778	30214	30275			30162
4 202L		20263	20008	20447			20273

1 ST	Al	2777	2777	3932	3837	3949	3923
2 184R		968	906	960			945
3 185R		294	840	831			823

X-RAY FLUORESCENCE ANALYSIS

6

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
R LEVEL:-			WINDOW:-		CRYSTAL:-		COLLIMATOR:-
VACUUM:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 ST	Fe	37655	39200	37897			38917
2 203L		10763	10759	10827			10783
3 204R		19455	19373	19420			19416
4 219L		36110	35695	36147			35984

1 ST	Ti	51669	52073	51852			51865
2 203L		16963	17063	17198			17075
3 204R		28773	28862	28507			28714
4 219L		42302	41853	42225			42127

1 ST	Ca	141110	140756	142103	141744		141534
2 203L		131427	132874	132718			132340
3 204R		151311	151163	151781			151418
4 219L		3529	3423	3469			3474

1 ST	K	37111	37116	37189	37436	37899	37508
2 203L		32111	32749	32465			32442
3 204R		52472	52762	52630			52621
4 219L		69684	70202	69960			69949

1 ST	P	7811	7818	689	732	692	704
2 203L		3826	3935	4042			3934
3 204R		5603	5739	5739			5693
4 219L		460	444	443			449

1 ST	Si	15550	15780	15550	15780	15960	15763
2 203L		21375	21312	21697			21468
3 204R		190138	19087	18914			19046
4 219L		18692	18585	18494			18590

1 ST	Al	3875	3917	3920			3904
2 203L		1963	1950	1973			1962
3 204R							

X-RAY FLUORESCENCE ANALYSIS

7

DATE:-		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-	MA:-	COUNTER:-		COUNTER KV:-	
CONSTANT COUNTS:-			CONSTANT TIME:-			ATTENUATION:-	
LOWER LEVEL:-			WINDOW:-		CRYSTAL:-		COLLIMATOR:-
VARIABLE:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 ST	Fe	~~37113~~	39624	39712	39253		39697
2 220 R		53761	53707	53811			53760
3 221 R		61515	61689	61501			61568
4							

1 220 R	Ti	~~37585~~	37242	37443	37158		37314
2 ST		52421	52166	52120			52236
3 221 R		27687	27619	27550			27619
4							

1 ST	Ca	~~12777~~	140793	141562	142249		141545
2 220 R		739	763	762			755
3 221 R		875	874	833			861
4							

1 ST	K	~~27777~~	~~37777~~	37470	37361	37391	37376
2 220 R		69016	69182	69690			69269
3 221 R		67790	60635	60501			60642
4							

1 ST	P	~~7777~~	~~1677~~	653	716	691	687
2 220		615	630	628			624
3 221 R		251	283	264			266
4							

1 ST	Si	~~1777~~	~~1877~~	15561	15910	16095	15855
2 220 R		16854	17007	17002			16954
3 221 R		18651	18610	18542			18595
4							

1 ST	Al	~~2777~~	~~3777~~	39779	3985	4088	4017
2 220 R		3387	3305	3376			3356
3 221 R		3053	2758	2982			2998
4							

NUCLEAR ANALYSIS

DATE:- JAN 22		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:- CR.		KV:- 50		MA:- 30		COUNTER:- 20 SEC	
CONSTANT COUNTS:-		CONSTANT TIME:-		ATTENUATION:-		COUNTER KV:- 4540	
L ¹ R LEVEL:- 250		WINDOW:- 300		CRYSTAL:-		COLLIMATOR:- 2	
VACUUM:-		OTHER:-					

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 50/50	5/44.99	2303	2265	2381	2257	(115.1)	2302
2 141 L		2644	2672	2594	2655	(132.05)	2641
3 142 L	50/30	3555	3506	3435	3675	(177.15)	3543
4 143 R		1985	1942	1891	1830	(95.60)	1912

1 50/50		2206	2078	2134	2124	(106.8)	2136
2 144 R		1502	1503	1540	1594	(76.75)	1535
3 162 L		6530	6299	6415	6348	(319.9)	6398
4 163 R		5520	5532	5500	5517	(275.85)	5517

1 HV-1	(135%)	5190	5151	5006	5036	(254.8)	5096
2 144 R		1545	1570	1575	1539	(77.85)	1557
3 162 L		6671	6523	6628	6559	(329.35)	6595
4 163 R		5735	5665	5670	5677	(284.35)	5687

1 25/75		1203	1202	1240	1193	(60.55)	1211
2 144 R		1560	1577	1592	1600	(79.1)	1582
3 162 L		6548	6483	6570	6624	(329.05)	6581
4 163 R		5776	5630	5563	5663	(282.9)	5658

1 10/90		627	553	603	652	(30.5)	610
2 164 R		4468	4393	4448	4373	(221.05)	4421
3 170 L		2173	2286	2223	2204	(111.1)	2222
4 171 R		1908	1887	1857	1913	(102.8)	2056

1 5/75		360	406	415	417	(20)	400
2 172 R		2204	2209	2146	2148	(108.85)	2177
3 182 L		3489	3606	3576	3479	(176.9)	3538
4 33 L		3379	3494	3312	3355	(169.35)	3387

1 2/98		326	310	300	329	(15.8)	316
2 184 R		977	1010	936	1040	(49.55)	991
3 185 R		1146	1166	1119	1111	(55.8)	1143

X-RAY FLUORESCENCE ANALYSIS

DATE:- JAN 22		OPERATOR:-		PROJECT NO.:-		REQUESTED BY:-	
TUBE:-		KV:-		MA:-		COUNTER:-	
						COUNTER KV:-	
CONSTANT COUNTS:-				CONSTANT TIME:-		ATTENUATION:-	
LOWER LEVEL:-				WINDOW:-		CRYSTAL:-	
						COLLIMATOR:-	
VACUUM:-				OTHER:-			

SAMPLE DESCRIPTION	ELEMENT ANGLE	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	COUNTS TIME	AVERAGE
1 199	S	310	287	280	270	(14.6)	292
2 203 L		1551	1478	1554	1506	(76.1)	1522
3 204 R		2027	2013	2051	2047	(101.75)	2035
4 219 L		2714	2738	2675	2735	(136.4)	2728

1 URC ST.	S	268	294	256	262	(13.5)	270
2 220 R		1339	1335	1320	1302	(66.2)	1324
3 221 R		1105	1071	1090	1097	(54.55)	1091
4							

1							
2							
3							
4							

1							
2							
3							
4							

1							
2							
3							
4							

1							
2							
3							
4							

1							
2							
3							

Appendix V

LOGARITHMIC VALUES
 ZERO OMITTED FOR AG
 ZERO OMITTED FOR CD
 ZERO OMITTED FOR PP
 ZERO OMITTED FOR ZN

PAS PROPERTY DEFILKE THESIS
 FRED TALEY
 JANUARY 1976

NO. OF JOBS 1
 (18,10X,4F10.3)

AXIS 2

ELEMENTS	AC	CD	PP	ZN
ZEPC =	+0.0	+0.0	+0.0	+0.0
NCS	31	25	34	34
MEAN	1.019	1.469	113.812	254.531
STCX	.252	.525	.777	.518
ANCM +	3.247	16.492	4076.441	2768.292
ANCM -	.320	.121	3.178	23.403
SDPI	1.819	4.921	681.138	839.414
SDPI	.571	.435	19.017	77.180

HISTOGRAM PLOTS FOR Ag, Cd, Pb, Zn IN
 SOIL SAMPLES

LOGARITHMIC VALUES
ZEROS OMITTED

THE HISTOGRAM INTERVAL IS 10X / 3.0

AG

INTERVAL FPM

%

C.2

.179

.218

+0.0

+0.0

.264

3.2

3.2

.320

+0.0

3.2

.388

+0.0

3.2

.471

**

6.5

9.7

.571

3.2

12.9

.693

12.9

25.8

.840

9.7

35.5

1.019

16.1

51.6

1.237

12.9

64.5

1.500

9.7

74.2

1.819

12.9

87.1

2.207

3.2

90.3

2.677

6.5

96.8

3.247

+0.0

96.8

3.938

3.2

100.0

4.777

+0.0

100.0

3.938

+0.0

100.0

NUMBER OF SAMPLES

31

MEAN

1.019

STANDARD DEVIATION

.252

PROBABLY ANOM. +

3.247

PROBABLY ANOM. -

.320

LOGARITHMIC VALUES
ZEROS OMITTED

THE HISTOGRAM INTERVAL IS SIX / 3.0

CD

INTERVAL PPM
.039

% C. %

+0.0 +0.0

+0.0 +0.0

+0.0 +0.0

3.6 3.6

7.1 10.7

7.1 17.9

3.6 21.4

17.9 39.3

17.9 57.1

7.1 64.3

10.7 75.0

3.6 78.6

10.7 89.3

3.6 92.9

7.1 100.0

+0.0 100.0

+0.0 100.0

+0.0 100.0

NUMBER OF SAMPLES 28
MEAN 1.469
STANDARD DEVIATION .525
PROBABLY ANOM. + 16.492
PROBABLY ANOM. - .131

LOGARITHMIC VALUES ZEROS OMITTED

THE HISTOGRAM INTERVAL IS SIX / 3.0

PR

INTERVAL PPM
.531

C. %

+0.0 +0.0

+0.0 +0.0

+0.0 +0.0

+0.0 +0.0

+0.0 +0.0

5.9 5.9

23.5 20.4

23.5 52.9

14.7 57.6

2.9 70.6

8.8 79.4

2.9 82.4

+0.0 82.4

5.9 88.2

5.9 94.1

5.9 100.0

+0.0 100.0

+0.0 100.0

WARNING OUTPUT FIELD WIDTH TOO SMALL. CONDITION OCCURRED DURING A FORMATTED WRITE ON FORTRAN UNIT 6 WHICH IS ATTACHED TO
SINK. THE WRITE IS SEQUENTIAL AT RECORD NUMBER 156. FOR THIS AND ALL FUTURE OCCURRENCES OF THIS CONDITION A FIELD OF #IS WILL
BE WRITTEN.

NUMBER OF SAMPLES 34
MEAN 113.812
STANDARD DEVIATION .777
PROBABLY ANOM. + 4076.441
PROBABLY ANOM. - 3.178

LOGARITHMIC VALUES
Z-RECS OMITTED

THE HISTOGRAM INTERVAL IS STOX / 3.C

ZN

INTERVAL FPM

%

C.2

7.000

+0.0

+0.0

10.000

2.0

2.0

15.000

+0.0

2.0

20.000

2.0

5.0

30.000

5.0

11.0

40.000

2.0

14.0

50.000

11.0

20.0

60.000

8.0

35.0

70.000

8.0

44.0

80.000

20.0

60.0

90.000

5.0

70.0

100.000

20.0

91.0

110.000

2.0

94.0

120.000

+0.0

94.0

130.000

2.0

97.0

140.000

2.0

100.0

150.000

+0.0

100.0

160.000

+0.0

100.0

170.000

NUMBER OF SAMPLES 34

MEAN 254.531

STANDARD DEVIATION .513

PROBABLY ANOM. + 2768.293

PROBABLY ANOM. - 23.403

EXECUTION TERMINATED

5100000

LOCATED VALUES
 ZERC OMITTED FOR AG
 ZERC OMITTED FOR CC
 ZERC OMITTED FOR PE
 ZERC OMITTED FOR ZN

PAS PROPERTY DELUXE THESIS
 FRED DALEY
 JANUARY 1975

NC.CF JCBS 1 NX IS 4
 (18,10X,4F10.3)

ELEMENTS	AC	CD	PB	ZN
ZERO =	+0.0	+0.0	+0.0	+0.0
NOS	46	41	41	61
MEAN	.842	1.546	60.646	88.244
STD	.279	.467	.740	.684
ANOM +	3.037	13.310	1830.334	1879.479
ANOM -	.223	.180	2.009	4.143
SDPI	1.599	4.536	333.171	407.250
SDMI	.442	.527	11.039	19.121

HISTOGRAM PLOTS FOR Ag, Cd, Pb, Zn IN
 BEDROCK SAMPLES

LOGARITHMIC VALUES
ZEROS OMITTED

THE HISTOGRAM INTERVAL IS STDX / 3.0

AG

INTERVAL FPM	%	C.2
.123	+0.0	+0.0
.152	+0.0	+0.0
.188	+0.0	+0.0
.233	6.5	6.5
.285	2.2	8.7
.358	4.3	13.0
.443	13.0	26.1
.545	21.7	47.8
.680	2.2	50.0
.842	13.0	65.0
1.042	8.7	71.7
1.291	8.7	80.4
1.555	13.0	93.5
1.980	+0.0	93.5
2.452	4.3	97.8
3.037	2.2	100.0
3.761	+0.0	100.0
4.658	+0.0	100.0

NUMBER OF SAMPLES 46
MEAN .842
STANDARD DEVIATION .279
PROBABLY ANOM. + 3.037
PROBABLY ANOM. - .233

LOGARITHMIC VALUES
ZEROS OMITTED

THE FISTCGRAM INTERVAL IS STD / 3.0

CD

INTERVAL PPN	%	C.D.
.061	+0.0	+0.0
.088	+0.0	+0.0
.122	+0.0	+0.0
.180	+0.0	+0.0
.257	2.4	2.4
.368	4.9	7.3
.527	12.2	15.5
.754	4.9	24.4
1.080	12.2	36.6
1.546	24.4	61.0
2.213	7.3	68.2
3.169	2.4	70.7
4.526	2.4	73.2
6.454	17.1	90.2
9.257	7.3	97.6
13.310	40.0	97.6
19.055	+0.0	97.6
27.280	2.4	100.0
	+0.0	100.0

NUMBER OF SAMPLES 41
 MEAN 1.546
 STANDARD DEVIATION .467
 PROBABLY ANOM. + 13.310
 PROBABLY ANOM. - .180

LOGARITHMIC VALUES
ZERCS OMITTED

THE HISTOGRAM INTERVAL IS STD_X / 3.0

PB

INTERVAL FPM
.366

% C. %

.645

+0.0 +0.0

1.125

+0.0 +0.0

2.009

+0.0 +0.0

3.546

+0.0 +0.0

6.256

+0.0 +0.0

11.039

3.3 3.3

19.479

18.0 21.3

24.370

21.3 42.6

60.646

29.5 72.1

107.010

6.6 78.7

188.815

6.6 85.2

333.170

3.3 88.5

*

587.878

1.6 90.2

1037.309

+0.0 90.2

1830.321

3.3 93.4

3225.615

+0.0 95.4

5658.645

3.3 96.7

NUMBER OF SAMPLES 61
MEAN

60.646

STANDARD DEVIATION

.740

PROBABLY ANOM. +

1830.334

PROBABLY ANOM. -

2.009

+0.0 96.7

LOGARITHMIC VALUES
ZERCS OMITTED

THE HISTOGRAM INTERVAL IS STDX / 3.0

ZN

INTERVAL FPM
-858

1.495			0.8
2.489	**	+0.0	+0.0
4.143	***	+0.0	+0.0
6.898	*	3.3	3.3
11.485	*****	4.5	8.2
19.121	**	1.6	9.0
31.835	*****	8.2	18.0
53.002	*****	3.3	21.3
88.244	*****	11.5	32.8
146.918	*****	14.8	47.5
244.606	*****	14.8	62.2
407.248	*****	13.1	75.4
678.032	***	15.1	88.5
1128.865	*	4.0	93.4
1875.462	*	1.6	95.1
3129.143	***	+0.0	95.1
5209.754	***	1.6	96.7
		2.3	100.0
		+0.0	100.0

NUMBER OF SAMPLES 61
MEAN 88.244
STANDARD DEVIATION .664
PROBABLY ANOM. + 1875.479
PROBABLY ANOM. - 4.143

EXECUTION TERMINATED

*SIGNOFF

LOGARITHMIC VALUES
 ZERC OMITTED FOR AG
 ZERC OMITTED FOR CD
 ZERC OMITTED FOR PP
 ZERC OMITTED FOR ZN

PAS PROPERTY DELUXE THESIS
 FRED CALEY
 JANUARY 1975

NC.CF JC8S 1 NX IS 4
 (18,1)X,4F10.3)

ELEMENTS	AG	CD	PB	ZN
ZERC =	+0.0	+0.0	+0.0	+0.0
NOS	77	69	55	75
MEAN	.505	1.514	15.571	128.925
STDV	.270	.489	.761	.652
ANCM +	2.145	14.330	2524.055	2594.355
ANCM -	.263	.160	2.237	6.405
SCPI	1.691	4.653	437.898	578.408
SCM1	.485	.492	13.180	28.737

HISTOGRAM PLOTS FOR Ag, Cd, Pb, Zn IN
 SOIL + BEDROCK SAMPLES

LOGARITHMIC VALUES ZEROS OMITTED

THE HISTOGRAM INTERVAL IS STDX / 3.0

AG

INTERVAL FPM

.141

2

C.2

.174

+0.0

+0.0

.214

+0.0

+0.0

.263

5.2

5.2

.323

+0.0

5.2

.397

2.6

7.8

.489

6.5

14.3

.601

9.1

23.4

.739

16.9

40.3

.909

7.8

48.1

1.118

15.6

63.6

1.375

11.7

75.3

1.691

3.9

79.2

2.080

13.0

92.2

2.558

5.2

97.4

3.145

+0.0

97.4

3.868

2.6

100.0

4.757

+0.0

100.0

+0.0

100.0

NUMBER OF SAMPLES 77
MEAN .909
STANDARD DEVIATION .270
PROBABLY ANCM. + 3.145
PROBABLY ANCM. - .263

LOGARITHMIC VALUES
ZEROS OMITTED

THE HISTOGRAM INTERVAL IS STEPS / 3.0

CD

INTERVAL FPM
.052

2 C.2

+0.0 +0.0

+0.0 +0.0

+0.0 +0.0

4.3 4.3

1.4 5.8

13.0 18.8

5.8 24.6

14.5 39.1

20.3 59.4

7.2 68.7

7.2 73.9

1.4 75.4

13.0 88.4

7.2 95.7

+0.0 95.7

2.5 98.6

1.4 100.0

+0.0 100.0

NUMBER OF SAMPLES 69
MEAN 1.514
STANDARD DEVIATION .488
PROBABLY ANOM. + 14.330
PROBABLY ANOM. - .160

LOGARITHMIC VALUES
ZERCS OMITTED

THE HISTOGRAM INTERVAL IS STD / 3.0

PR

INTERVAL FPM .307	%	C.2
.711	+0.0	+0.0
1.275	+0.0	+0.0
2.287	+0.0	+0.0
4.100	+0.0	+0.0
7.351	+0.0	+0.0
13.180	5.3	5.3
23.432	15.6	21.1
42.371	31.6	52.6
75.571	15.3	68.4
136.214	9.5	77.9
244.229	2.1	80.0
437.883	5.3	85.3
785.142	2.1	87.4
1407.744	1.1	88.4
2524.055	3.2	91.6
4525.578	3.2	94.7
8114.256	3.2	97.9
	1.1	98.9

NUMBER OF SAMPLES 95
MEAN 75.571
STANDARD DEVIATION .761
PROBABLY ANCM. + 2524.055
PROBABLY ANCM. - 2.287

LOGARITHMIC VALUES
ZEROS OMITTED

THE HISTOGRAM INTERVAL IS STD_X / 3.0

7N

INTERVAL FFM			
1.428			
2.355	**	+C.0	+C.9
3.884	***	2.1	2.1
6.405	*	3.2	5.3
10.564	*****	1.1	6.3
17.424	*	6.2	12.6
28.737	*****	1.1	13.7
47.395	*****	8.4	22.1
78.163	*****	12.6	34.7
128.524	*****	12.6	47.4
212.633	*****	11.6	58.9
350.695	*****	20.0	78.9
578.400	*****	6.3	95.3
953.952	*****	7.6	92.6
1573.345	**	2.1	94.7
2594.917	**	2.1	96.8
4279.785	*	2.1	98.9
7058.629	*	1.1	100.0
		+C.0	100.0

NUMBER OF SAMPLES 55
 MEAN 128.525
 STANDARD DEVIATION .652
 PROBABLY ANOM. + 2594.969
 PROBABLY ANOM. - 6.405
 EXECUTION TERMINATED