Bergvesenet

Postboks 3021, N-7441 Trondheim

Rapportarkivet

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AS Sydvaranger		Elkem AS		

Tittel

FEN PROJECT Geochemistry Data processing

Forfatter	Dato År	Bedrift (oppdragsgiver og/eller oppdragstaker)
V. H. Wiik	mai 1981	As Sydvaranger

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Nome	Telemark		17134	Skien

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Råstoffgruppe	Råstofftype
Malm/metall	Skjeldne jorartsmetaller

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Rapporten er en beskrivelse av overforing av gamle data fra Fensfeltet som tidligere har vært manuelt bearbeidet over på EDB (NORD 100 mskin).

ASV GRUPPEN

R Jensen -

FEN PROJECT

Geochemistry

Data processing

Progress report

by

V.H. Wiik

Oslo, May 1981

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VHW/AE
5.5.81

Introduction.

During the initial stage of the current Fen project in 1979, data from the earlier FSJ study were subjected to statistical analyses on an experimental basis. Since then, data analysis by computer has been an all but neglected project activity.

The Fen exploration project is now well underway, and the amount of relevant geochemical data is steadily increasing. Already, computerized data processing can offer distinctive advantages over time-consuming manual methods, and with the onset of diamond drilling and routine assaying of drillcore, there will clearly be a need for efficient computer procedures to store and process large amounts of data.

It is against this background that work on geochemical data analysis has now been resumed. So far this year, the ÅSV-geologist has spent 4-5 weeks on the project, mostly programme development and data processing work carried out at the ÅSV head office in Oslo, where a NORD 100 computer with alpha-numeric display terminals and graph plotting facilities is readily available.

Chemical analyses.

The analytical laboratories at SI and IFE were contracted in mid-1980 and started to work initially on selected sample material from the earlier FSJ study on the Fen area. By the end of 1980, more than 270 new rock specimens had been submitted for routine analysis at SI, and 25 of the samples from the Gruveåsen grid-sampling programme had also been selected for more complete REE-analysis at IFE.

The SI procedure comprises a Stage I with XRF-determination of Nb, Y, Th, La, Ce, Nd, P and S on pulverized rock material, and an optional Stage II where the sample is dissolved in hot acid and analysed by plasmaspectrometry (ICP) for the 12 elements Si, Al, Fe, Mg, Ca, Ti, Mn, Sr, Ba, Na, K and V. For 1981, SI will charge NOK 170.-/sample and NOK 225.-/sample for Stage I and Stage II analyses respectively.

The IFE procedure involves fusion of the samples and a combination of XRF and neutron activation methods to determine Y, La, Ce, Nd, Sm, Eu and Gd. For this high-precision procedure, IFE charged NOK 375.-/sample in 1980.

While these analytical procedures do provide much information of value to the project, a need for additional data has already been felt. In søvites with pyrochlor mineralization, U and Ta might supplement Nb as valuable constituents, and in REE-ores, Pr could similarly enhance the value of the ore. SI has recently completed a campaign in which Fen samples submitted to them with Nb-concentrations in excess of o.1 % have been analysed by XRF for U and Ta. The possibility of including Pr-determinations as part of the IFE-procedure is being discussed.

Data and file organization.

Great flexibility is required in order to make full use of both old and new data for the purpose of the current Fen project. At present this achieved by having the different data-sets stored on individual disk-files, and writing small editing programmes to combine and otherwise re-arrange data as required for any particular application.

The pre-198o Fen-data have been summarized in John Landreth's Fen-report from February 1979. The new data are presented in Tables I - V accompanying this report.

Table I shows old and new REE-data for 125 FSJ-samples re-analysed by IFE in 198o.

Table II presents the SI stage I-results for the 7o samples from the Gruveåsen grid-sampling programme. The samples are defined by location coordinates, and the values recently supplied by SI for U and Ta percentages have been appended to each sample record. Table III is a listing of IFE's REE determinations on 25 of the Gruveåsen grid-samples.

Table IV shows, in the same format as Table II, the SI-analyses for altogether 8o surface rock samples from the Vipeto-Rullekoll area. The first page of the table lists specimens collected in conjunction with general geological mapping, whereas the 3o samples listed on the second page were taken in a systematic sampling of søvite outcrops for prospecting purposes.

In table IV the geologist's field identification of rock type has also been coded as a single character in column 2o of each sample record.

Table V presents 123 Fen rock samples submitted for analysis by S. Olmore and K. Mørk. Completing both stages of their analytical procedure SI have determined major as well as minor elements.

This data-set carries much information, and sample location coordinates as well as rock type should be added to make the file even more comprehensive.

While the present, unstructured data filing system appears to work well at present, some form of standardization will be required when surface- and drillhole-data are to be merged in order to contribute to 3-D orebody models. The experience gained through the current experimental work will be of value when the final data filing system is to be designed.

Programmes, implementation and applications.

In 1980 ÅSV got its own in-house computer, and when work on the Fen-data was resumed in early 1981, it was decided to use this installation for the initial programme- and system-development work. As expected, adaption to the new system was not without problems, which account for the rather moderate achievements as per today. However, these problems have by now been resolved, and the ÅSV Nord-system is judged to be a convenient and fully adequate tool for the work that is to be done.

Programmes are now available to perform single variable- and multivariable statistical analyses including principal component analysis and factor analysis. A programme for cluster analysis is in the process of being implemented.

Programmes to plot maps and graphs have been developed, and with the familiarity now acquired with the Nord graph-plotting package, new programmes can readily be written to cater for particular requirements.

The text-editing facility of the Nord system (TED) permits data-files to be handled easily and efficiently, under full user control.

It is not within the scope of the present report to describe particular programme applications and discuss the results. A few examples are presented in the following, only to indicate how data processing might help the geologists in their challenging task of exploring the Fen complex.

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Figures 1 and 2 show scatter diagrammes of IFE-results versus SI-results for determinations of % Y and % Ce on the same set of Fen samples. It appears that whereas the Ce-values (Fig. 1) show a certain spread roughly along the Y = X line, the %Y-values (Fig. 2) are more strongly correlated but exhibit a clear deviation from the expected Y = X relationship. The laboratories have been alerted and are now searching for a systematic error in one of the procedures for Y.

Fig. 3 shows a geochemical map of the Gruveåsen area in the scale of 1:5ooo. The Ce ppm-values are posted and sample locations with Ce-contens exceeding a pre-specified level of 2ooo ppm are marked with a special symbol to facilitate map analysis.

In Fig. 4, IFE's REE analyses have been used to construct chondrite-normalized spectral diagrams that might help the geologist to differentiate between different types of REE-mineralization.

Recommendation for further work.

With computer terminal facilities now available also at the Stabekk-office of A/S Sydvaranger, the project policy should be to transfer all data and operational programmes to this installation so that they are readily available to the geologists who work full time on the Fen project. In order to implement this policy, a Stabekk-based person should be appointed to work part-time with the ÅSV-geologist so as to effectuate a gradual transfer of this activity to the Stabekk office.

Oslo, 5.mai 1981.

Viggo H. Wiik

Viggo H. Wiik

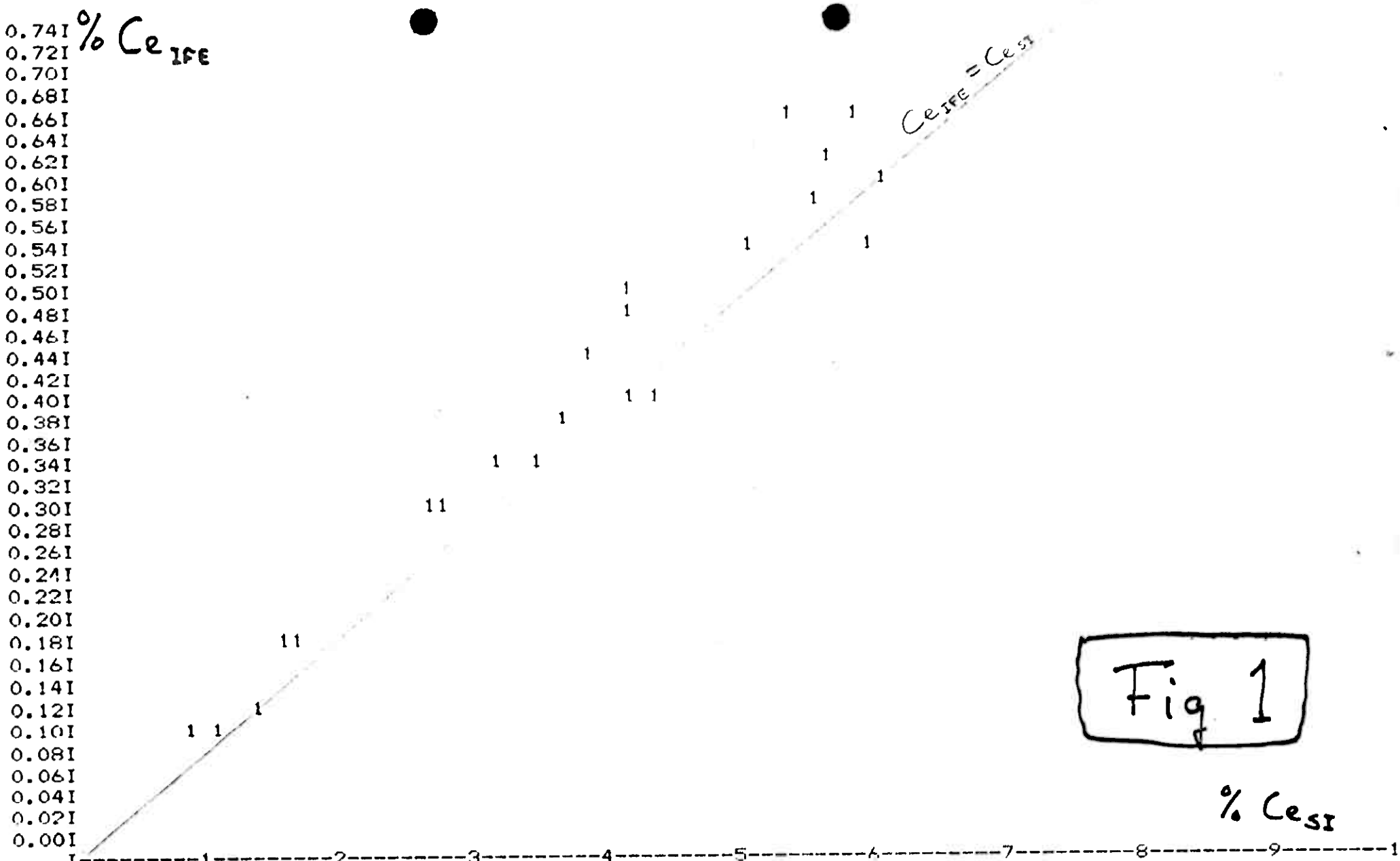

Fig 1

VARIABLE 2 ALONG HORIZONTAL AXIS PRINT-UNIT(-)= 0.010 UPPER LIMIT REPRESENTS THE VALUE 1.000

FURTHER INFORMATION REGARDING THE RELATIONSHIP BETWEEN THE TWO VARIABLES UNDER INVESTIGATION:

CORRELATION COEFFICIENT = 0.9194 REGRESSION EQUATION: Y = 1.26289 X + -0.0412

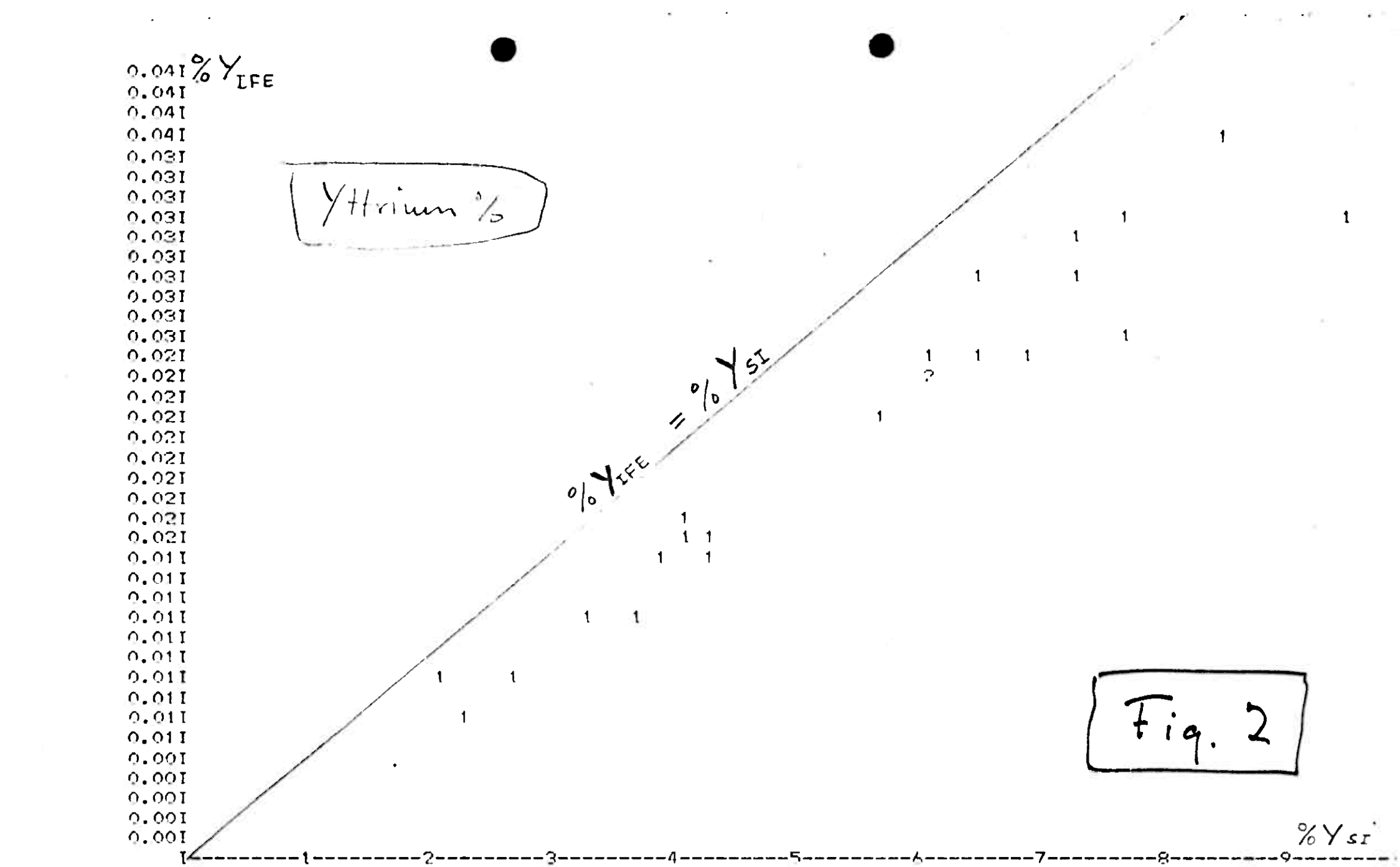

Fig. 2

VARIABLE 2 ALONG HORIZONTAL AXIS PRINT-UNIT(-)= 0.000 UPPER LIMIT REPRESENTS THE VALUE 0.050

FURTHIER INFORMATION REGARDING THE RELATIONSHIP BETWEEN THE TWO VARIABLES UNDER INVESTIGATION:

CORRELATION COEFFICIENT = 0.9755 REGRESSION EQUATION: Y = 0.81249 X + -0.0010

GRUVERASEN GRID-AREA MAP SCALE = 1:5000

CERIUM (PPM) LEVEL: 2000

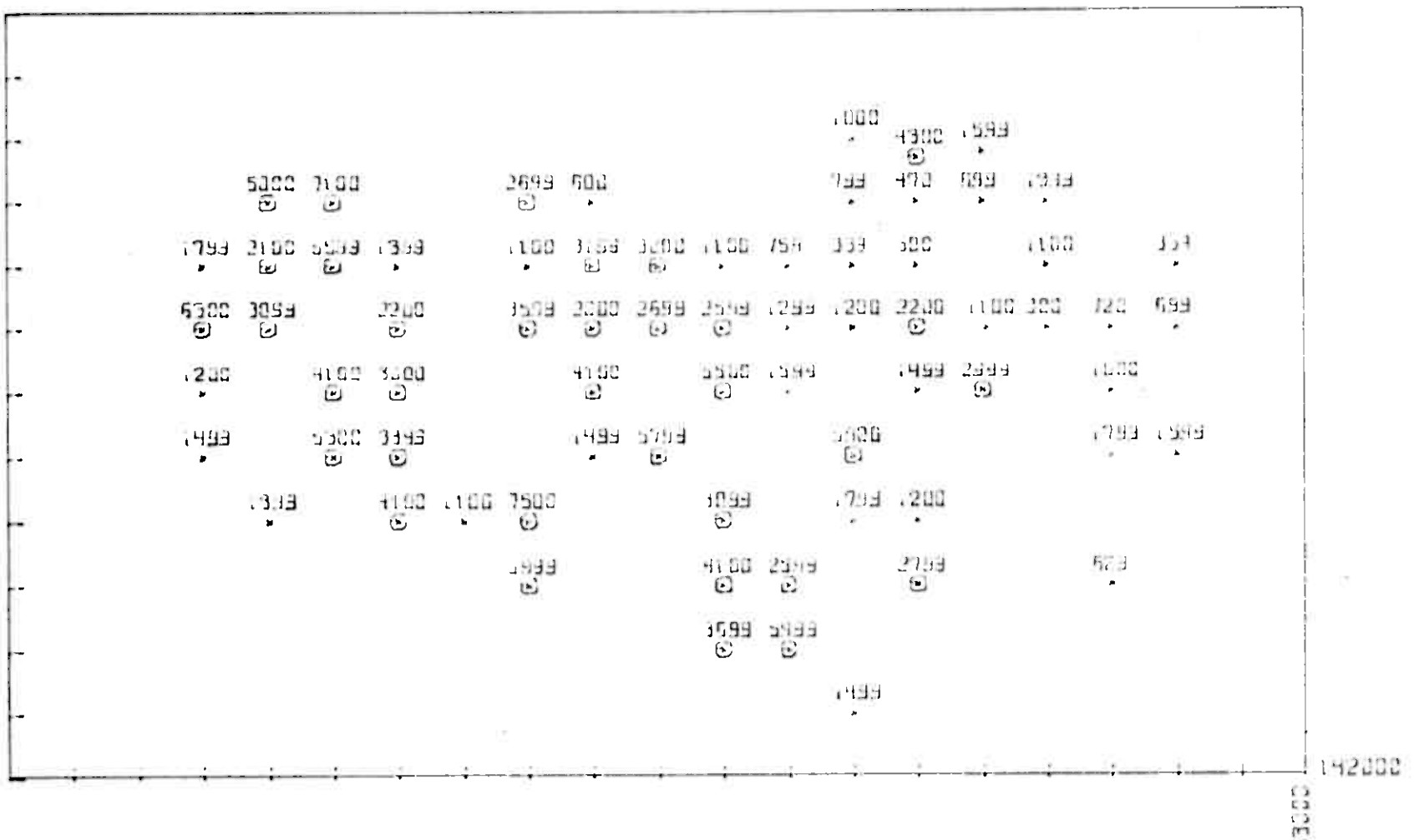

Fig. 3

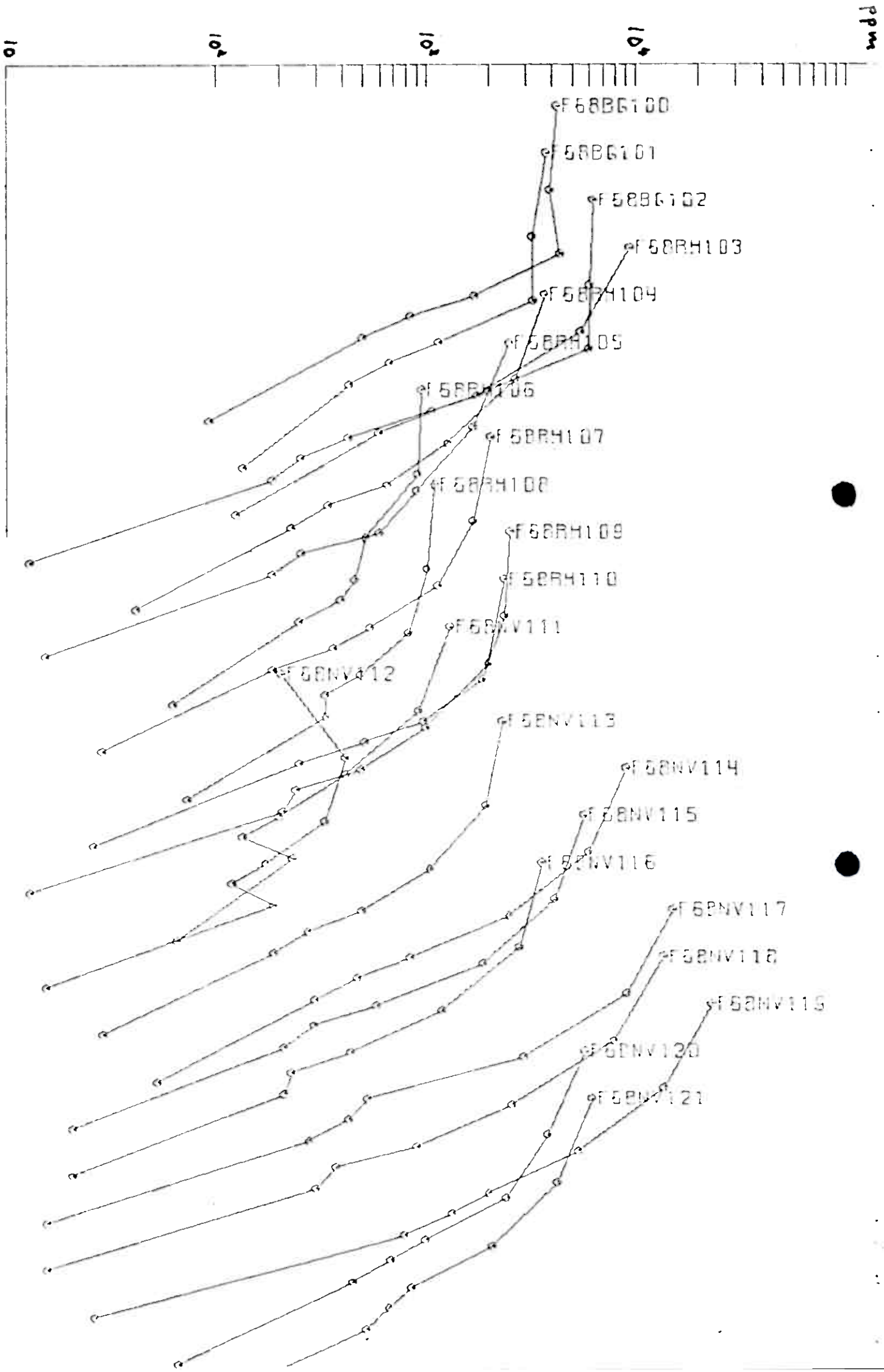

Fig. 4 Chondrite-normalized REE spectral diagrams for Ten rocks

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TABLES
I - V

FEN PROJECT * * * * * LISTING OF FSI-SAMPLES SELECTED FOR RE-ANALYSIS 1980 * * * * *

FILNAVN "FENDIV" FENSFELTET 1968 ANALYSERT 1970 REANALYSERT 1980
PRØVER FRA BOLLADALEN, GRUVEÅSEN, RAUHAUGOMRÅDET, ANVISNINGSPUNKTER, NY VEI, DH-TUFTE, T-STOLLEN MV.

	ANALYSERT VED IFA 1970 (PPM)					RE-ANALYSERT VED IFE 1980 (PPM)						
	Y	LA	SM	EU	YB	Y	LA	CE	ND	SM	EU	GD
F68RG100	120	1340	220	45	130	180	1360	3360	2570	300	57	120
F68RG101	150	2060	350	50	50	260	1210	2760	1920	205	45	105
F68RG102	170	2480	380	100	50	240	2050	5220	3510	350	72	145
F68RH103	30	3480	110	20	50	25	3050	4700	1020	75	17	45
F68RH104	55	1840	140	35	50	80	1190	2310	745	115	23	55
F68RH105	40	1090	130	30	50	30	805	1440	525	105	17	45
F68RH106	120	340	110	35	50	120	305	780	300	80	26	60
F68RH107	60	1340	150	30	50	55	660	1440	665	95	24	45
F68RH108	120	680	150	30	50	140	355	865	480	85	22	80
F68RH109	55	1360	240	50	50	50	810	2020	1080	170	34	60
F68RH110	30	1340	90	30	50	25	755	1700	580	85	16	50
F68RH182	90	2240	170	40	50	80	1570	2830	1030	140	35	60
F68RH183	90	320	60	20	50	85	295	345	165	40	10	50
F68RH184	50	1540	100	15	50	50	1480	2275	640	55	11	50
F68RH185	65	770	65	15	50	60	710	1135	310	35	10	50
F68RH186	120	390	55	30	50	135	490	760	285	55	21	60
F68AP187	80	390	60	15	50	70	365	655	245	35	11	50
F68AP188	25	4780	90	25	50	20	4580	6950	1310	70	17	50
F68AP189	25	2340	120	35	50	15	3220	5230	1460	120	25	50
F68AP190	35	1620	130	35	50	30	2020	3520	1090	135	25	50
F68AP191	45	1150	65	25	50	35	1440	2415	690	80	15	50
F68AP192	80	740	80	25	50	85	935	1740	575	75	20	50
F68AP193	70	1460	110	25	50	75	1625	2800	830	85	18	50
F68AP194	220	1350	200	60	50	215	1935	4020	1785	225	50	110
F68NV111	90	320	70	10	50	125	420	785	240	35	9	55
F68NV112	45	190	65	10	50	30	65	350	190	30	8	45
F68NV113	60	1080	110	25	50	55	740	1455	605	85	18	45
F68NV114	70	3850	160	35	50	100	2890	5105	1445	145	31	70
F68NV115	40	2500	130	25	50	40	1805	3500	1085	100	19	50
F68NV116	45	1640	60	20	50	40	1140	2370	685	75	15	50
F68NV117	40	5500	160	30	50	30	4820	7770	1670	90	28	65
F68NV118	35	3440	130	30	50	30	4330	6690	1480	155	24	70

TABLE 1

LISTING CONTINUED

	Y	LA	SM	EU	YB	Y	LA	CE	ND	SM	EU	GD
F68NV119	60	8600	340	110	50	50	7360	11580	3040	345	87	185
F68NV120	120	2680	240	50	50	125	1820	3210	1380	170	44	105
F68NV121	110	2720	220	60	50	135	1960	3550	1180	145	43	120
F68NV122	90	3940	350	75	50	105	2520	4550	1650	235	58	160
F68NV123	120	8600	540	160	50	145	5330	8740	2850	450	120	280
F68NV124	120	5000	480	110	50	130	3470	5720	2000	350	89	210
F68NV125	90	3160	360	75	50	80	1820	3635	1535	310	63	105
F68NV126	120	4840	320	90	50	115	3310	6450	1880	195	61	120
F68NV127	130	3600	240	60	50	125	2280	4245	1360	165	45	95
F68NV128	400	3260	340	80	50	375	2360	4730	1680	275	64	155
F68NV129	150	3460	300	70	50	145	2105	4410	1800	255	55	115
F68NV130	180	2920	280	60	50	205	1695	3340	1470	170	47	125
F68NV131	170	2850	270	55	50	195	1745	3400	1450	195	45	110
F68NV132	160	3480	280	60	50	160	2070	3920	1395	185	47	95
F68NV133	160	3530	270	75	50	170	2365	5030	1810	220	53	115
F68NV134	230	2450	280	70	50	220	1400	3015	1165	210	51	135
F68NV135	200	3280	280	65	50	180	2305	4595	1685	235	56	120
F68NV136	130	3560	250	65	50	130	2990	5480	1815	210	51	105
F68NV137	240	3860	350	80	50	215	2415	4775	1955	285	68	135
F68NV138	160	1950	200	55	50	155	1010	2175	905	160	39	75
F68NV139	130	1720	180	40	50	125	885	1745	680	100	26	75
F68NV140	110	900	90	10	50	110	440	865	335	60	17	50
F68NV141	110	1620	150	30	50	120	1135	2115	795	110	24	55
F68NV142	100	1400	100	30	50	100	1215	2105	670	90	26	50
F68NV143	140	2940	200	95	50	140	3890	5450	1470	230	62	140
F68NV144	220	800	150	45	50	230	740	1740	900	160	37	95
F68NV145	140	3580	290	80	50	190	3080	6050	2060	240	64	155
F68NV146	140	1100	200	60	50	150	720	1220	545	120	27	70
F68NV147	260	1300	200	50	50	275	880	1710	760	160	48	110
F68NV148	200	2820	300	65	50	215	1870	3630	1520	240	54	155
F68NV149	180	2230	240	50	50	255	1900	3765	1460	155	43	145
F68NV150	360	2900	440	110	50	370	2270	5210	2810	355	85	230
F68NV151	210	1540	200	50	50	205	1345	2520	1010	165	36	80
F68NV152	140	1000	120	35	50	150	650	1500	655	115	24	60

LISTING CONTINUED

	Y	LA	SM	EU	YB	Y	LA	CE	ND	SM	EU	GD
F68NV153	180	1720	260	45	50	170	795	2180	1010	115	31	65
F68NV154	180	1240	190	45	50	195	725	1650	750	125	30	80
F68NV155	220	2640	340	75	50	270	1620	5350	1460	190	49	145
F68NV156	300	2070	310	90	50	345	2160	4400	2030	290	71	200
F68NV157	260	1150	230	65	50	270	950	1830	740	140	44	135
F68NV158	280	2870	360	100	50	320	3120	5990	2340	310	76	200
F68NV159	230	1060	140	60	50	205	995	2240	945	170	41	95
F68NV160	140	390	65	20	50	160	195	460	260	45	16	50
F68NV161	120	510	140	25	50	125	295	765	375	95	19	50
F68NV162	95	450	45	15	50	100	250	455	130	25	9	50
F68NV163	50	1160	140	10	50	60	145	280	95	20	6	50
F68NV164	80	780	60	10	50	80	430	600	185	25	10	50
F68NV165	100	260	50	20	50	115	250	400	130	20	9	55
F68NV166	180	590	100	30	50	210	690	1260	465	95	23	75
F68NV167	220	1390	280	60	50	240	1160	2065	930	150	46	110
F68NV168	250	720	140	40	50	255	650	1425	710	105	31	75
F68NV169	240	1900	330	60	50	275	1345	2345	830	190	47	145
F68NV170	130	800	65	25	50	135	585	790	280	55	16	50
F68NV171	150	500	120	25	50	170	430	705	335	60	20	85
F68NV172	110	250	40	20	50	115	275	450	170	45	9	50
DH10T16	15	7720	150	73	50	35	6840	11320	3180	260	68	125
DH58T16	30	1660	160	69	50	25	1710	4130	1770	205	47	100
DH 3T21	16	7400	100	55	50	15	3940	6210	1340	195	22	50
DH 6T21	34	6080	140	57	50	25	7080	11240	2400	160	33	70
DH 9T21	10	7360	80	40	50	15	5530	8210	1450	115	25	50
DH15T21	10	4880	90	32	50	15	3610	5530	1260	155	20	50
DH42T21	44	4440	110	62	50	55	4110	6980	1800	155	33	65
DH12T23	58	3520	30	49	50	80	3640	5020	1000	85	35	80
DH15T23	40	3630	90	38	50	50	3340	5210	1160	115	23	50
FPGRA 6	360	880	300	98	130	420	1520	3020	1590	350	56	225
FPGRA16	200	2600	600	168	80	370	2600	7000	5500	630	120	220
FPGRA17	60	2800	330	88	70	140	2070	4110	1810	265	60	125
FPGRA26	95	3860	140	57	50	110	4400	7280	1930	160	37	75
FPGRA27	85	2400	290	63	70	190	2290	5740	2910	295	50	110

LISTING CONTINUED

	Y	LA	SM	EU	YB	Y	LA	CE	ND	SM	EU	GD
FPGRA30	95	2810	580	128	50	200	2760	5980	4910	640	78	180
FPGRA31	390	500	290	91	50	410	630	1290	1450	325	61	150
FPGRA32	10	1140	310	44	100	70	1000	2440	1940	315	27	50
FPGRA34	50	2430	210	49	300	130	1720	3520	1500	190	31	50
FPGRA36	88	2610	310	76	140	170	2150	4940	2260	225	53	90
FPRHG 1	220	220	90	50	50	215	335	825	365	100	30	95
FPRHG 2	210	580	70	47	50	410	650	1330	525	85	29	85
FPRHG 3	170	420	80	42	50	360	975	1150	380	90	24	65
FPRHG 4	120	220	40	35	50	270	300	620	280	55	21	50
FPRHG 5A	120	220	30	37	50	270	345	610	280	65	23	50
FPRHG 5B	150	500	80	46	50	315	600	1130	465	120	31	80
FPPHG 6A	110	460	90	25	50	135	510	1080	580	135	36	60
FPRHG 6B	180	400	90	51	50	190	440	970	510	135	40	80
FPPHG 8	54	1270	250	66	50	60	850	2120	1395	230	50	80
FPRHG 9	100	900	120	42	50	130	805	1910	800	105	29	90
FPPHG10	44	4200	440	145	50	75	4360	8490	3160	475	107	185
FPPHG10R	66	5500	460	152	50	110	5040	7600	2760	495	110	220
FPRHG10	62	5660	430	163	50	75	4360	8490	3160	475	107	185
FPRHG11	120	410	100	44	50	255	445	1040	500	115	29	75
FPRHG12	75	850	85	44	50	80	710	1740	870	125	28	50
FPRHG12R	78	1240	140	45	50	90	945	2220	1135	140	33	60
FPRHG13	4410	1880	230	103	50	380	2260	4120	1680	215	62	190
FPRHG14	2320	1670	150	50	50	250	1170	2940	1090	175	47	120
FPPHG15	78	2950	400	78	70	130	3570	5750	2070	295	68	100
DH18T12	100	2240	75	25	50	60	1780	2710	610	55	18	55

TABLE II

GRUVEISEN GRID-SAMPLING PROGRAMME 1980

DRILL CORE SAMPLES ANALYSED BY "SI"

10-30 ppm

SAMPLENR	NORTH	EAST	NB%	Y %	TH%	P %	S %	LA%	CE%	ND%	.U %	.TA%
14225052150			.110.	018.	0730.	200.	42.	074.	150.	068.	001.	002
14230052150			.092.	039.	05910.	00.	66.	046.	120.	060		
14235052150			.068.	038.	1200.	721.	20.	280.	630.	200		
14240052150			.081.	031.	0681.	200.	82.	070.	180.	100		
14220052200			.120.	010.	0270.	190.	37.	075.	140.	058		
14235052200			.120.	032.	0990.	210.	58.	140.	310.	150		
14240052200			.094.	020.	0880.	240.	30.	091.	210.	092		
14245052200			.120.	021.	0790.	231.	00.	220.	500.	180.	001.	002
14225052250			.070.	011.	0680.	200.	59.	280.	530.	180		
14230052250			.130.	036.	1400.	290.	27.	170.	410.	230.	001.	002
14240052250			.140.	030.	1000.	250.	75.	300.	560.	170.	001.	004
14245052250			.058.	030.	0630.	801.	50.	480.	710.	170		
14220052300			.140.	034.	0700.	660.	55.	200.	410.	150.	003.	002
14225052300			.130.	042.	1300.	311.	20.	150.	340.	190.	002.	003
14230052300			.037.	303.	2300.	291.	20.	160.	380.	210		
14235052300			.170.	014.	0340.	250.	06.	120.	220.	090.	001.	002
14240052300			.085.	012.	0330.	220.	31.	066.	140.	258		
14220052350			.110.	026.	0670.	270.	23.	050.	110.	061		
14215052400			.160.	047.	0730.	291.	20.	300.	600.	210.	002.	002
14220052400			.087.	038.	1800.	190.	27.	330.	750.	370		
14235052400			.073.	036.	1201.	300.	40.	120.	360.	210		
14240052400			.084.	013.	0280.	250.	12.	061.	110.	050		
14245052400			.094.	032.	0970.	320.	54.	120.	270.	130		
14225052450			.077.	008.	0190.	250.	05.	059.	150.	080		
14230052450			.070.	020.	0360.	750.	86.	150.	410.	180		
14235052450			.070.	010.	0290.	250.	25.	086.	200.	080		
14240052450			.081.	010.	0120.	300.	60.	180.	320.	068		
14245052450			.092.	019.	0211.	000.	16.	026.	060.	033		
14225052500			.060.	016.	0850.	202.	30.	350.	580.	190		
14235052500			.096.	017.	0430.	650.	46.	130.	270.	110		
14240052500			.095.	011.	0520.	200.	03.	140.	380.	150		
14210052550			.110.	017.	0850.	190.	95.	150.	370.	170		
14215052550			.047.	032.	1700.	720.	20.	290.	410.	220		
14220052550			.090.	028.	0830.	280.	85.	140.	310.	150		
14230052550			.080.	013.	1300.	200.	67.	280.	550.	190		
14235052550			.070.	013.	0210.	230.	70.	120.	260.	110		
14240052550			.064.	032.	0580.	650.	40.	036.	110.	094		
14210052600			.110.	023.	0620.	430.	53.	067.	60	.084		
14215052600			.100.	020.	0890.	210.	60.	090.	260.	130.	003.	002
14230052600			.096.	026.	1200.	200.	15.	073.	160.	120		
14235052600			.023.	038.	0890.	220.	30.	056.	130.	084		
14240052600			.090.	009.	0240.	280.	03.	044.	076.	030		
14205052650			.100.	026.	0760.	250.	18.	058.	150.	094		
14220052650			.100.	027.	1300.	300.	65.	092.	180.	100		
14225052650			.041.	020.	1200.	201.	20.	300.	590.	230		
14235052650			.120.	023.	0430.	400.	03.	061.	120.	056		
14240052650			.057.	010.	0260.	300.	14.	018.	034.	019		
14245052650			.086.	010.	0160.	500.	15.	050.	080.	025		
14250052650			.090.	012.	0290.	710.	67.	054.	100.	038		
14215052700			.060.	069.	1600.	650.	07.	100.	280.	170		
14220052700			.050.	049.	0730.	220.	33.	060.	120.	068		
14230052700			.100.	025.	1000.	210.	03.	071.	150.	080		
14235052700			.086.	023.	1200.	650.	05.	086.	220.	140		

LISTING CONTINUED

Page 2 of Table II

SAMPLENR	NORTH	EAST	NB%	Y %	TH%	P %	S %	LA%	CE%	ND%	.U %	.TA%
14240052700			.072	.020	.043	0.22	0.08	.021	.050	.035		
14245052700			.068	.024	.033	0.54	0.75	.034	.047	.027		
14248552700			.120	.021	.097	0.19	1.10	.160	.430	.200	.004	.002
14230052750			.039	.027	.150	0.21	0.06	.150	.300	.130		
14235052754			.058	.034	.029	2.00	0.05	.058	.110	.044		
14245052750			.100	.027	.097	0.32	0.06	.031	.070	.060		
14249052750			.051	.023	.083	0.61	0.24	.075	.160	.084		
14235052800			.039	.015	.011	0.20	0.60	.016	.030	.019		
14240052800			.078	.012	.023	0.25	0.25	.056	.110	.038		
14245052800			.150	.059	.086	0.47	0.27	.059	.140	.090		
14215052850			.081	.027	.037	0.26	0.14	.035	.063	.029		
14225052850			.120	.042	.180	0.52	0.45	.081	.180	.110		
14230052850			.140	.052	.028	0.25	0.20	.041	.100	.058	.003	.002
14235052850			.090	.023	.070	0.50	0.25	.038	.072	.048		
14225052900			.110	.019	.088	0.25	0.22	.074	.160	.074	.001	.006
14235052900			.080	.017	.035	0.23	0.04	.034	.070	.040		
14240052900			.051	.014	.012	0.24	0.07	.017	.034	.015		

TABLE

FEN PROJECT
REE-ANALYSES OF 25 SAMPLES FROM THE GRUVEÅSEN
GRID-SAMPLING PROGRAMME 1980

ANALYSIS BY "IFE"

PRØVER FRA GRUVEÅSEN 1980 - KONTROLLANALYSERT VED IFE

PRØVENR 14----5----	Y %	LA%	CE%	ND%	SM%	EU%	GD%
14225052150	.012	0.093	5.181	0.076	0.012	5.003	8.008
14235052150	.029	5.408	0.824	0.283	0.027	0.007	4.018
14245052200	.014	5.273	0.557	0.203	0.020	5.006	0.010
14225052250	.007	0.407	6.678	0.256	0.024	5.005	4.010
14230052250	.031	0.161	0.409	0.228	0.032	5.007	3.018
14240052250	.023	5.358	0.633	0.194	0.021	0.007	3.013
14245052250	.024	5.862	01.27	4.329	0.021	5.006	6.019
14220052300	.024	5.272	0.496	0.184	0.017	5.004	1.010
14225052300	.035	5.172	0.355	0.229	0.036	0.008	4.017
14230052300	.024	0.202	0.443	0.270	0.051	0.009	6.018
14215052400	.032	0.348	0.607	0.220	0.022	5.005	4.010
14220052400	.031	5.401	0.859	0.451	0.059	5.011	1.022
14235052400	.028	5.148	0.390	0.235	0.036	5.008	3.018
14245052400	.024	5.167	0.311	0.144	0.019	5.004	2.012
14225052500	.011	0.484	0.662	0.238	0.020	5.005	7.008
14215052550	.029	0.184	0.503	0.268	0.037	0.008	2.016
14220052550	.022	0.178	0.354	0.162	0.019	5.005	1.009
14230052550	.008	5.282	0.581	0.202	0.022	5.004	4.007
14215052600	.016	0.122	0.311	0.163	0.013	0.003	2.009
14235052600	.025	5.047	0.134	0.081	0.015	0.003	6.006	5
14225052650	.016	5.303	0.548	0.220	0.027	0.007	4.018
14245052650	.008	5.051	0.101	0.026	0.003	4.000	8.004	5
14248552700	.015	5.167	0.412	0.197	0.017	5.003	9.007	5
14230052850	.042	5.035	0.110	0.058	0.015	0.004	6.015	0
14225052900	.014	5.085	0.188	0.084	0.019	0.004	2.008	0

TABLE IV

FEN PROJECT
SURFACE ROCK SAMPLES FROM THE VIRETO-RULLEKOLL AREA 1980

SAMPLE--14----5----	.NB%.	Y %	.TH%.	P.%	S.%	.LA%.	CE%.	ND%.	U %	.TA%
1W80A 14131952035S.	018.	012.	014	1.500.	10.	028.	053.	027		
2W80A 14129452069R.	029.	015.	025	2.800.	10.	035.	072.	042		
4W80X 14115852741D.	018.	007.	005	1.300.	17.	030.	055.	025		
5W80B 14116352697K.	140.	024.	100	1.400.	10.	130.	290.	100.	002.	003
5W80C 14116352697F.	035.	005.	005	0.400.	11.	021.	036.	015		
6W80A 14117552625H.	038.	014.	140	0.403.	40.	4701.	00.	300		
6W80C 14117552625J.	035.	005.	015	0.250.	38.	380.	740.	160		
8W80 14116852545K.	049.	005.	005	0.400.	14.	010.	012.	010		
9W80 14127552153B.	110.	022.	025	1.300.	36.	045.	085.	039.	001.	004
10W80 14123852139R.	160.	043.	045	0.500.	12.	070.	170.	060.	003.	003
11W80 14119252215B.	099.	014.	028	0.650.	44.	023.	037.	021		
13W80 14120552147R.	044.	029.	033	1.100.	31.	065.	140.	058		
14W80 14147052255H.	100.	018.	070	0.701.	30.	140.	250.	085.	001.	004
15W80 14146852273B.	110.	018.	075	0.400.	27.	070.	140.	060.	004.	005
16W80 14145852285D.	041.	005.	046	0.300.	11.	017.	037.	029		
17W80 14146352313B.	053.	016.	093	0.390.	25.	120.	250.	100		
19W80 14148152348R.	120.	023.	032	2.801.	10.	060.	130.	060.	001.	008
20W80A 14146752347R.	150.	018.	052	1.200.	06.	040.	075.	041.	002.	007
20W80B 14146752347H.	120.	035.	053	3.200.	09.	052.	110.	051.	005.	007
21W80 14145552350R.	110.	011.	041	0.800.	18.	075.	170.	052.	001.	009
32W80 14100051760C.	006.	012.	008	1.300.	06.	022.	043.	023		
33W80 14092551185F.	060.	010.	008	1.900.	16.	040.	095.	042		
34W80A 14093051115C.	039.	005.	005	0.830.	05.	028.	045.	020		
34W80B 14093051115S.	035.	005.	005	0.400.	07.	010.	010.	010		
39W80 14131551540R.	065.	018.	076	1.800.	07.	040.	066.	040		
39W80X 14131551540S.	060.	005.	007	0.440.	35.	014.	023.	018		
41W80A 14140051260C.	027.	005.	005	0.350.	24.	010.	010.	010		
47W80 14093050460K.	028.	008.	005	0.720.	52.	018.	029.	017		
50W80 14127051558D.	054.	005.	007	1.100.	16.	150.	250.	067		
51W80A 14128451543R.	086.	006.	009	0.950.	19.	029.	064.	039		
51W80B 14128451543B.	290.	010.	016	1.700.	58.	047.	110.	065.	002.	002
51W80X 14128451543S.	005.	023.	005	7.400.	08.	065.	160.	080		
52W80 14130451540H.	066.	009.	006	0.840.	23.	110.	180.	052		
52W80X 14130451540S.	065.	010.	017	1.001.	11.	081.	140.	050		
53W80 14136051510H.	100.	005.	011	0.600.	39.	042.	084.	037.	001.	002
54W80 14138251541H.	170.	005.	034	0.440.	21.	250.	430.	120.	001.	004
55W80A 14121751683S.	010.	007.	005	1.200.	24.	023.	050.	021		
55W80B 14121751683R.	015.	012.	012	1.900.	21.	030.	070.	035		
56W80A 14098051880S.	270.	008.	009	1.500.	25.	030.	070.	035.	001.	002
56W80B 14098051880C.	041.	009.	005	1.400.	09.	016.	040.	025		
56W80C 14098051880S.	013.	012.	005	1.500.	06.	028.	065.	031		
60W80X 14114051652H.	022.	017.	010	2.800.	31.	037.	090.	044		
62W80 14094051967R.	170.	005.	007	0.930.	03.	010.	017.	014.	001.	005
63W80 14136251923S.	093.	008.	024	1.400.	10.	025.	055.	031		
67W80 14100252027R.	065.	005.	011	0.750.	40.	110.	250.	065		
68W80 14101852080S.	170.	011.	037	1.800.	06.	025.	060.	028.	005.	020
70W80 14095552030R.	048.	013.	017	0.820.	14.	085.	140.	062		
73W80 14108352103H.	079.	017.	011	0.720.	38.	018.	028.	026		
74W80 14113552083C.	081.	026.	039	2.400.	46.	030.	076.	043		
75W80 14084551925C.	042.	008.	007	1.100.	06.	017.	035.	024		

PRØVER AV SØVITT-BERGARTER I VIPETO-ØMRÅDET TATT 1980

PRØVENR.	NORD	ØST	NB%	Y%	TH%	P%	S%	LA%	CE%	ND%		
SP0114094551765	8.	180.	013.	034	2.	10.	150.	028.	061.	029.	002.	021
SP0214096551765	8.	460.	012.	061	2.	10.	590.	020.	053.	027.	001.	016
SP0314098551760	8.	030.	009.	004	0.	47.	110.	019.	048.	023		
SP0414097051810	8.	310.	010.	034	1.	80.	230.	019.	050.	028.	001.	009
SP0514098051885	8.	220.	009.	012	1.	20.	350.	022.	056.	028.	001.	007
SP0614101551810	8.	110.	010.	030	0.	97.	160.	110.	180.	043.	001.	002
SP0714094051720	8.	009.	010.	004	1.	20.	290.	021.	051.	024		
SP0814096051695	8.	009.	015.	008	1.	00.	180.	020.	049.	027		
SP0914103051755	8.	014.	009.	011	0.	64.	340.	025.	055.	023		
SP1014106551730	8.	009.	015.	014	3.	10.	190.	030.	081.	046		
SP1114110051715	8.	009.	014.	010	3.	50.	060.	028.	076.	040		
SP1214116551655	8.	140.	011.	009	1.	20.	350.	020.	050.	024.	001.	003
SP1314111551625	8.	009.	013.	009	1.	60.	190.	020.	047.	024		
SP1414111051600	8.	082.	015.	013	2.	10.	140.	020.	050.	029		
SP1514110051570	8.	030.	020.	017	1.	70.	180.	024.	054.	029		
SP1614133051535	8.	060.	004.	010	0.	48.	180.	039.	072.	026		
SP1714137551520	8.	090.	005.	007	1.	50.	260.	032.	072.	033		
SP1814132551810	8.	094.	004.	015	0.	64.	170.	050.	089.	029		
SP1914101052085	8.	071.	010.	015	0.	92.	050.	018.	042.	023		
SP2014106052115	8.	020.	007.	005	0.	46.	140.	021.	047.	021		
SP2114103052060	8.	054.	008.	010	1.	90.	270.	018.	045.	022		
SP2214105052025	8.	031.	009.	005	1.	20.	140.	017.	041.	020		
SP2314109051990	8.	400.	016.	060	2.	60.	260.	018.	051.	026.	001.	037
SP2414114552090	8.	009.	013.	006	2.	90.	230.	019.	050.	025		
SP2514114552105	8.	009.	012.	004	0.	93.	120.	020.	052.	027		
SP2614130552040	8.	016.	012.	021	2.	30.	090.	022.	059.	031		
SP2714131552010	8.	037.	012.	011	1.	30.	260.	017.	046.	024		
SP2814134551950	8.	065.	008.	014	1.	80.	200.	016.	046.	027		
SP2914137051915	8.	042.	009.	009	1.	50.	250.	018.	045.	021		
SP3014140551920	8.	068.	009.	012	2.	20.	420.	035.	078.	034		

TABLE V

FEN PROJECT
123 ROCK SPECIMENS FROM THE SOVE AREA AND THE CENTRAL FEN COMPLEX
ANALYSED FOR MINOR AND MAJOR ELEMENTS BY "SI" 1980

SAMPLE--14----5----	.NB%.	Y %.	TH%P.	% S.%	.LA%.	CE%.	ND%	FE. %	SI.%	MG.%	AL.%	P. %NA.	%TI.	%K .	%CA.	%MN.	%BA.	%SR.	%V %
HB 1	.005.	010.	003.		.120.	024.	060.	030	8.0004.	4005.	0000.	0993.	8000.	2300.	2800.	40021.	400.	2900.	0330.	2700.	023
HB 2	.020.	008.	005.		.029.	023.	050.	023	1.9001.	0000.	6000.	1901.	4000.	2200.	0080.	10037.	800.	1500.	0570.	4400.	010
HB 3	.120.	008.	021.		.250.	026.	057.	026	2.2001.	0001.	4000.	1801.	100.	02200.	0300.	40033.	900.	1900.	1100.	5500.	009
HB 4	.500.	007.	047.		.240.	029.	062.	027	4.1001.	3002.	9000.	1501.	8000.	2500.	0600.	50031.	500.	2400.	0850.	5300.	021
HB 5	.029.	005.	005.		.100.	012.	029.	017	2.0001.	1009.	4000.	3701.	1000.	1500.	0200.	30024.	300.	5900.	0280.	4900.	005
HB 6	.041.	006.	005.		.150.	010.	015.	010	6.3001	9.	301.	4008.	8000.	5000.	4900.	5606.	60008.	000.	3000.	5900.	2500.	023
140930S1755	.580.	012.	075.		.130.	027.	069.	035	1.4000.	5001.	1000.	1501.	3000.	1500.	0300.	50035.	600.	2100.	0820.	4300.	005
142550S2614	.005.	005.	009.		.040.	010.	010.	010	22.1017.	804.	1007.	2000.	0500.	0200.	2400.	50000.	480.	0550.	1100.	0030.	010
F 2	.006.	006.	005.		.080.	017.	020.	011	4.10026.	800.	9407.	0000.	1504.	5000.	2102.	3002.	8000.	1000.	2900.	0480.	006
F 3	.042.	005.	005.		.040.	010.	010.	010	0.29029.	100.	2709.	6000.	0392.	6000.	0079.	3000.	2600.	0170.	2900.	0130.	005
F 4	.005.	005.	005.		.030.	010.	010.	010	2.10032.	000.	3505.	9000.	0513.	7000.	1403.	5000.	3900.	0410.	0300.	0100.	005
F 5	.005.	005.	005.		.040.	010.	010.	010	2.70029.	600.	7706.	4000.	0373.	3000.	2204.	3001.	6000.	1100.	0990.	0210.	006
F 6	.009.	005.	005.		.060.	010.	010.	010	2.60028.	301.	3006.	3000.	1403.	5000.	1503.	7002.	4000.	1000.	1100.	0390.	011
F 7	.005.	006.	005.		.030.	010.	010.	010	1.50032.	300.	2606.	5000.	0402.	8000.	1303.	1001.	0000.	0260.	0960.	0150.	005
F 8	.019.	005.	010.		.030.	020.	020.	010	2.40023.	500.	83010.	500.	0260.	2500.	1709.	6002.	4000.	1300.	2400.	0260.	005
F 9	.095.	005.	005.		.030.	010.	019.	015	1.2000.	20010.	500.	0310.	8000.	0500.	0040.	20021.	000.	3900.	0080.	3300.	005
F 10	.110.	005.	005.		.030.	010.	020.	012	4.00013.	409.	6003.	2001.	5000.	0900.	0804.	40011.	500.	1900.	0190.	1300.	005
F 12	.900.	006.	046.		.070.	020.	045.	028	1.5002.	10010.	100.	1501.	2000.	4200.	0300.	10021.	800.	4300.	0790.	3200.	005
F 13	.005.	005.	005.		.050.	010.	010.	010	4.20026.	900.	8407.	2000.	2104.	8000.	1704.	0003.	5000.	0870.	0730.	0510.	011
F 16	.190.	009.	024.		.300.	029.	070.	033	1.0000.	5002.	0000.	1601.	2000.	0600.	0100.	05034.	000.	2600.	0720.	5800.	005
F 17	.380.	010.	045.		.240.	033.	075.	038	1.7002.	6002.	6000.	2902.	9000.	3000.	0470.	32032.	000.	2300.	0680.	5600.	005
F 18	.049.	005.	005.		1.50.	022.	045.	025	3.10017.	001.	2005.	1001.	0003.	9000.	0850.	72015.	800.	1400.	0490.	3200.	005
F 19	.024.	005.	005.		.040.	010.	010.	010	3.70021.	902.	7005.	2000.	1503.	1000.	1702.	8009.	9000.	1100.	0060.	0390.	010
F 20	1.50.	041.	900.		.040.	130.	530.	190	0.1403.	0000.	3008.	2000.	0331.	3002.	3000.	2001.	2000.	0701.	2000.	0220.	020
F 23	.040.	005.	005.		2.70.	010.	020.	010	7.70013.	604.	4002.	4000.	4800.	0900.	0570.	17016.	500.	3400.	0170.	0530.	005
F 24	.100.	010.	015.		.120.	032.	075.	040	0.4900.	4001.	7000.	1002.	4000.	0600.	0090.	05035.	800.	2300.	0500.	5000.	005
F 25	.045.	011.	012.		.270.	034.	075.	033	1.4001.	6001.	5000.	1100.	7500.	1100.	0100.	05035.	700.	2900.	0510.	3800.	005
F 26	.140.	005.	014.		.160.	029.	050.	025	2.90014.	308.	5003.	8001.	2001.	1000.	1604.	60014.	200.	2400.	0900.	2300.	005
F 27	.330.	006.	006.		.110.	020.	055.	025	6.7001.	5001.	2000.	2302.	1000.	1000.	1401.	80032.	100.	2900.	0550.	5200.	045
F 28	.022.	005.	005.		.120.	014.	020.	012	8.20016.	807.	8004.	3000.	4700.	4401.	9003.	7009.	6000.	1800.	5200.	1300.	025
F 29	.077.	009.	015.		.110.	040.	070.	025	3.9008.	8004.	7000.	4201.	3000.	3100.	1100.	40022.	600.	5000.	1100.	2600.	006
F 30	.015.	005.	005.		.210.	010.	010.	010	7.30024.	503.	6006.	0000.	3204.	0000.	3201.	9004.	8000.	1400.	0220.	0700.	036
F 31	.012.	005.	005.		.080.	010.	010.	010	5.90030.	500.	7507.	3000.	1406.	1000.	2303.	4002.	7000.	1200.	1700.	0310.	026
F 32	.200.	017.	031.		.340.	030.	070.	033	3.6002.	3002.	4000.	5801.	5000.	0800.	0910.	56031.	200.	2400.	3200.	4300.	016
F 33	.009.	005.	005.		.070.	010.	010.	010	2.10031.	700.	4109.	0000.	0406.	3000.	0974.	4001.	5000.	0510.	2400.	0300.	008
F 34A	.510.	009.	030.		.430.	019.	045.	021	2.5001.	2001.	2000.	2702.	2000.	0700.	0770.	33035.	100.	1600.	1100.	5300.	007
F 34B	.450.	008.	041.		.350.	017.	045.	023	3.2003.	2001.	5000.	2201.	6000.	2700.	3100.	12030.	800.	2200.	2700.	5100.	057
F 35	.250.	006.	005.		1.00.	019.	045.	023	4.8001.	3000.	7500.	1101.	5000.	1300.	0880.	05033.	000.	2500.	0450.	5500.	031
F 36	.390.	006.	011.		.280.	018.	050.	020	3.4001.	4001.	1000.	1500.	9700.	1200.	0780.	01033.	600.	1800.	0470.	5300.	020
F 37	.022.	005.	005.		.950.	014.	023.	012	5.80016.	302.	2003.	4000.	6402.	5000.	1103.	40015.	000.	1400.	1800.	3200.	052
F 44A	.010.	005.	005.		.050.	013.	025.	020	2.9002.	1000.	7000.	1100.	7100.	1600.	0070.	05021.	100.	7000.	0380.	4000.	005
F 49	.083.	015.	032.		.620.	110.	170.	050	5.1006.	8006.	8000.	8900.	2900.	1400.	0810.	75019.	800.	6800.	9000.	2100.	009
F 50	.220.	006.	019.		.320.	028.	057.	029	7.90022.	103.	2008.	6000.	3903.	3001.	3001.	4005.	1000.	1400.	1200.	1200.	022
F 51	.006.	005.	005.		.180.	010.	010.	010	4.6005.	5003.	7000.	4201.	6001.	5000.	0530.	20030.	100.	3800.	2900.	5700.	014
F 52	.009.	003.	005.		.170.	030.	065.	030	3.4001.	1001.	4000.	1501.	7000.	2200.	0990.	50033.	800.	1300.	0540.	3800.	008
F 53	.016.	013.	010.		.250.	027.	060.	032	3.7004.	2003.	1000.	9901.	3000.	3100.	3000.	50028.	900.	1900.	0990.	3800.	010
F 56	.030.	010.	014.		.120.	055.	110.	039	7.0009.	90010.	102.	3000.	9700.	2000.	7700.	70014.	700.	4300.	4400.	2500.	014
F 59	.006.	008.	005.		.070.	012.	021.	010	4.60027.	301.	2006.	4000.	4106.	0000.	3002.	4006.	9000.	2000.	1400.	1400.	014
F 60	.026.	006.	005.		.380.	010.	015.	010	3.80025.	801.	1006.	4000.	3404.	7000.	4901.	8005.	1000.	1800.	1200.	0890.	010
F 61	.026.	005.	005.		.180.	010.	010.	010	1.70030.	100.	4206.	6000.	1103.	3000.	0923.	0003.	9000.	1000.	1900.	0680.	005
F 62	.021.	005.	005.		.050.	010.	010.	010	1.90030.	500.	3207.	5000.	1303.	0000.	0914.	2003.	1000.	0950.	2400.	0670.	005
F 64	.009.	005.	005.		.080.	010.	010.	010	3.10031.	300.	7506.	9000.	1204.	2000.	3302.	7002.	3000.	1000.	1800.	0610.	009

LISTING CONTINUED

SAMPLE--14----5----	.NB%.	Y %.	TH%.	P.%	S.%	.LA%.	CE%.	ND%	FE. %	SI.%	MG.%	AL.%	P. %	NA. %	TI. %	K . %	CA. %	MN. %	BA. %	SR. %	V %
F 55	.005.	005.	005.		.190.	010.	010.	010	8.800	21.60	3.500	8.500	0.290	2.900	1.800	0.500	5.400	0.130	0.093	0.120	0.029
F 56	.010.	005.	005.		.060.	010.	010.	010	3.100	32.30	1.500	6.700	0.170	5.900	0.210	2.500	1.200	0.100	0.160	0.025	0.008
F 67	.200.	008.	019.		.180.	028.	065.	033	1.300	1.900	3.100	0.650	0.850	0.060	0.054	0.660	31.90	0.270	0.098	0.560	0.005
F 58	.030.	005.	005.		.100.	010.	010.	010	4.500	28.00	1.300	6.600	0.310	6.200	0.210	2.100	0.200	2.600	0.120	0.068	0.063	0.014
F 59	.011.	005.	005.		.120.	010.	010.	010	2.900	28.60	1.100	7.400	0.350	5.800	0.120	3.500	1.900	0.082	0.099	0.048	0.010
F 70	.028.	009.	005.		.330.	032.	068.	031	1.100	0.300	1.700	0.054	0.430	0.050	0.005	0.500	34.80	0.320	0.073	0.610	0.005
F 71	.050.	006.	008.		.540.	016.	030.	018	6.000	14.80	5.200	4.200	1.400	1.200	0.780	2.100	13.10	0.200	0.430	0.200	0.020
F 71A	.100.	011.	015.		.460.	025.	050.	028	3.900	6.700	3.100	1.800	1.900	0.230	0.190	0.500	26.50	0.190	0.051	0.370	0.005
F 72	.190.	010.	028.		.820.	032.	070.	034	2.100	3.700	2.100	0.280	1.900	0.100	0.024	0.500	36.60	0.310	0.220	0.490	0.005
F 73	.011.	005.	009.		.120.	010.	010.	010	2.700	32.70	0.640	6.200	0.210	3.500	0.170	3.100	3.200	0.160	0.130	0.059	0.007
F 74	.044.	005.	005.		.180.	011.	023.	010	3.100	26.60	1.800	6.100	0.290	4.300	0.200	2.900	4.500	0.140	0.190	0.096	0.009
F 75	.018.	005.	005.		.140.	010.	015.	010	3.400	26.20	1.100	6.300	0.290	5.100	0.370	2.300	6.100	0.150	0.083	0.150	0.013
F 76	.023.	008.	005.		.400.	023.	039.	019	6.900	22.70	2.400	5.600	0.530	4.000	1.300	1.700	10.60	0.240	0.400	0.300	0.026
F 77	.037.	005.	005.		.560.	017.	031.	016	4.300	21.50	2.700	6.100	0.650	3.600	0.450	2.100	7.800	0.150	0.230	0.230	0.012
F 78	.240.	008.	005.		.300.	033.	070.	031	0.730	0.500	1.200	0.040	0.340	0.090	0.018	0.500	35.70	0.280	0.087	0.700	0.005
F 79	.140.	009.	015.		.410.	023.	062.	033	1.500	3.300	2.400	0.770	1.300	0.530	0.015	0.500	32.60	0.220	0.084	0.560	0.005
F 80	.140.	008.	017.		.400.	028.	060.	031	1.900	1.700	1.900	0.200	1.300	0.310	0.015	0.500	35.90	0.260	0.110	0.590	0.005
F 82	.032.	009.	007.		.250.	028.	059.	028	1.000	3.500	0.800	0.280	1.100	0.100	0.020	0.500	40.70	0.230	0.280	0.430	0.005
F 83	.050.	005.	013.		.530.	011.	030.	015	5.400	19.10	3.200	6.300	0.820	1.700	0.230	2.800	9.900	0.170	0.460	0.120	0.007
F 84	.120.	009.	015.		.180.	032.	072.	036	1.000	0.800	2.300	0.140	1.100	0.110	0.019	0.100	35.80	0.270	0.070	0.620	0.005
F 85	.074.	016.	014.		.790.	029.	067.	032	2.200	2.200	2.200	0.370	1.400	0.270	0.020	0.500	34.10	0.270	0.190	0.480	0.005
F 86	.031.	005.	005.		.410.	010.	010.	010	3.300	24.70	2.400	6.700	0.260	3.900	0.240	3.600	6.500	0.140	0.360	0.100	0.007
F 87	.024.	007.	011.		.590.	010.	010.	010	5.500	20.90	3.000	3.100	0.240	0.230	0.250	0.500	11.60	0.340	0.260	0.050	0.012
F 88	.009.	005.	160.		1.60.	390.	800.	300	11.10	6.100	4.800	0.300	0.150	0.200	0.017	0.050	14.70	0.100	0.240	0.200	0.016
F 89	.069.	007.	008.		.210.	010.	010.	010	1.700	25.20	0.470	7.500	0.370	3.000	0.180	4.000	6.700	0.110	0.370	0.130	0.010
F 90	.075.	006.	005.		.480.	013.	023.	011	3.900	15.30	2.600	5.000	0.550	2.100	0.440	2.200	14.10	0.230	0.097	0.260	0.010
F 91	.200.	013.	015.		.410.	024.	043.	030	3.100	5.800	2.600	1.300	2.200	0.620	0.190	0.600	27.30	0.270	0.210	0.570	0.005
F 92	.007.	005.	008.		.090.	010.	014.	010	2.600	25.20	1.400	6.000	0.210	4.100	0.270	2.300	4.900	0.190	0.090	0.082	0.008
F 93	.200.	012.	012.		.580.	032.	080.	040	2.000	7.200	3.000	1.000	0.300	1.500	0.140	0.600	30.30	0.220	0.240	0.510	0.005
F 94	.055.	009.	010.		.300.	024.	055.	029	1.100	0.500	0.600	0.028	0.500	0.300	0.024	0.500	36.80	0.290	0.170	0.630	0.005
F 95	.005.	005.	005.		.070.	010.	014.	010	4.000	28.10	1.600	6.100	0.160	4.200	0.260	2.800	3.100	0.140	0.089	0.064	0.008
F 96	.015.	005.	008.		2.60.	010.	017.	014	7.400	20.70	2.600	4.600	0.040	0.210	0.110	0.500	8.500	0.270	0.021	0.072	0.011
F 97	.080.	009.	009.		.460.	023.	060.	027	3.000	0.900	1.000	0.058	1.500	0.480	0.130	0.500	36.80	0.240	0.110	0.670	0.011
F 98	.012.	005.	005.		.080.	010.	010.	010	2.900	27.80	0.720	8.300	0.120	6.100	0.150	2.800	3.900	0.120	0.160	0.082	0.005
F 99	.014.	005.	013.		.160.	021.	036.	019	6.200	25.10	2.200	6.600	0.270	3.000	0.300	2.800	4.600	0.160	0.190	0.080	0.017
F100	.011.	005.	005.		.130.	010.	010.	010	2.500	27.30	1.200	8.500	0.140	4.200	0.100	3.700	3.100	0.110	0.400	0.065	0.007
F101	.020.	015.	011.		.380.	030.	070.	038	2.900	1.900	1.600	0.450	1.500	0.120	0.053	0.400	32.50	0.240	0.120	0.480	0.005
F102	.005.	005.	007.		.180.	010.	017.	012	5.400	19.60	2.600	6.600	0.670	0.670	0.290	5.000	8.500	0.180	0.190	0.096	0.009
F103	.040.	020.	032.		.400.	020.	050.	036	5.600	2.200	6.400	0.490	2.300	0.200	0.250	0.500	24.60	0.490	0.170	0.500	0.005
F104	.105.	009.	011.		.460.	029.	067.	030	7.600	5.000	2.600	0.800	3.500	0.190	0.210	0.500	25.50	0.400	0.180	0.300	0.014
F105	.040.	016.	030.		.830.	280.	550.	140	7.600	2.200	5.500	0.150	3.200	0.190	0.090	0.160	23.70	0.810	0.800	0.190	0.005
F106	.038.	024.	050.		.490.	060.	180.	110	4.000	9.400	2.000	0.430	7.400	0.210	0.027	0.500	24.70	0.390	0.200	0.360	0.005
F107	.012.	009.	005.		.300.	024.	052.	026	3.500	1.500	1.800	0.240	3.700	0.210	0.062	0.500	34.10	0.200	0.083	0.250	0.005
F108	.085.	007.	006.		.460.	050.	090.	033	4.800	3.300	7.900	0.330	2.700	0.850	0.012	0.500	23.30	0.780	0.350	0.420	0.005
F109	.170.	009.	013.		.170.	110.	190.	060	5.300	1.300	6.300	0.260	1.300	0.170	0.016	0.500	24.20	0.800	0.260	0.110	0.005
F110	.008.	005.	031.		.083.	270.	500.	140	6.000	0.800	7.900	0.070	0.310	0.190	0.071	0.500	20.80	1.040	0.750	0.480	0.005
F111	.061.	006.	040.		.590.	290.	530.	200	2.900	1.200	2.700	0.200	0.370	0.210	0.014	0.500	31.60	0.690	0.930	0.120	0.005
F112	.008.	005.	019.		.480.	190.	350.	100	5.800	1.500	7.100	0.200	0.200	0.280	0.005	0.500	23.30	1.000	0.670	0.360	0.005
F113	.010.	005.	020.		14.0	1.10	1.60	0.300	22.00	0.800	0.250	0.160	0.150	0.060	0.011	0.500	1.200	0.020	0.020	0.014	0.007
F114	.040.	006.	016.		.240.	400.	700.	130	4.200	1.100	5.700	0.160	1.500	0.200	0.014	0.500	27.40	0.910	0.200	0.280	0.005
F115	.060.	006.	023.		.120.	230.	400.	095	2.300	1.400	0.930	0.750	0.970	0.160	0.075	0.500	32.70	0.210	0.040	0.074	0.005
F116	.005.	009.	005.		.650.	025.	052.	028	3.200	2.400	2.100	0.470	1.900	0.210	0.150	0.500	30.00	0.150	0.100	0.280	0.005
F117	.013.	009.	007.		.550.	022.	052.	030	10.10	11.40	6.500	4.200	2.100	0.530	1.400	0.900	12.80	0.130	0.160	0.095	0.020

LISTING CONTINUED

SAMPLE--14----5----	.NB%.	Y %.	TH%P.%	S.%	.LA%.	CE%.	ND%	FE. %	SI.%	MG.%	AL.%	P. %NA.	%TI.	%K .	%CA.	%MN.	%BA.	%SR.
F118	.061.	008.	012.	.200.	025.	057.	035	2.8000.	9004.	0000.	2102.	8000.	2300.	0140.	50028.	300.	3400.	1600.
F119	.030.	005.	006.	.310.	014.	024.	018	4.10021.	002.	7006.	6000.	2003.	9000.	0330.	80006.	500.	2800.	2000.
F120	.020.	015.	016.	.150.	035.	080.	045	5.3005.	5002.	7001.	5004.	7000.	1800.	3200.	50025.	000.	2000.	1400.
F121	.400.	010.	022.	.480.	033.	070.	037	6.2000.	5006.	8000.	0501.	8000.	1400.	0410.	50020.	900.	6400.	2600.
F122	.230.	007.	007.	.220.	043.	076.	033	3.0000.	7008.	7000.	0501.	8000.	1700.	0110.	50021.	700.	6200.	0420.
F123	.011.	011.	005.	.170.	024.	056.	016	1.5001.	3001.	2000.	3802.	1000.	2300.	0390.	50034.	000.	1300.	0620.
F124	.005.	005.	005.	.090.	010.	010.	010	8.20020.	107.	9002.	5000.	1301.	1001.	4000.	50009.	600.	1400.	1000.
F125	.060.	005.	005.	.300.	017.	050.	030	2.8001.	0008.	2000.	0300.	9300.	1400.	0080.	50022.	000.	6200.	0320.
F127	.440.	010.	017.	.530.	028.	063.	026	4.1000.	6002.	4000.	0502.	3000.	1600.	0600.	50027.	700.	3600.	0250.
F128	.094.	005.	005.	.080.	017.	036.	020	2.6000.	7008.	6000.	0701.	3000.	1300.	0240.	50020.	300.	5900.	0100.
F129	.015.	005.	005.	.360.	015.	035.	020	6.60011.	605.	2003.	7001.	2000.	4900.	9100.	50012.	800.	2100.	1900.
F131	.053.	009.	012.	.350.	029.	065.	030	1.6000.	7002.	1000.	1402.	4000.	1800.	0120.	50031.	900.	2600.	0540.
F133	.160.	005.	007.	.280.	010.	016.	010	2.8001.	0009.	3000.	1201.	1000.	1800.	0420.	50020.	800.	4900.	0170.
F134	.038.	007.	006.	.290.	026.	065.	035	9.00011.	906.	0003.	6001.	9001.	2001.	9002.	10015.	300.	2600.	4200.
F136	.560.	005.	018.	1.30.	030.	055.	030	8.2001.	2007.	8000.	0463.	1000.	1600.	1500.	50023.	100.	4300.	0110.
F137	.410.	005.	011.	.550.	020.	037.	020	11.701.	6007.	4000.	1102.	0000.	3000.	2500.	50023.	400.	4300.	0460.
F138	.014.	008.	005.	.140.	021.	048.	025	1.3000.	7001.	2000.	2001.	0000.	2000.	0340.	50037.	100.	1900.	0760.
F139	.150.	007.	005.	.120.	010.	020.	015	1.4000.	3002.	0000.	0900.	7400.	2600.	0520.	50037.	600.	3900.	0690.