A Study of Alteration Associated with Uranium Occurrences in Sandstone and Its Detection by Remote Sensing Methods

James E. Conel
Michael J. Abrams
A. F. H. Goetz

August 1, 1978

Prepared for
Department of Energy
by
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California
(JPL PUBLICATION 78-66, VOLUME II)

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The research described in this report was carried out by the Jet Propulsion Laboratory, California Institute of Technology, and was sponsored by the Department of Energy through an agreement with NASA.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDIX A

RELATION BETWEEN LABORATORY AND FIELD REFLECTANCE

It is important to realize the difference inherent in field and laboratory spectral reflectance measurements. It has already been stressed that the 2^{o} x 11^{o} FOV of the field instrument (PFRS) allows areal average spectra of undisturbed ground to be obtained that are not possible even with large numbers of laboratory samples. The field and laboratory spectra differ also with respect to photometric character, and this difference will be described below.

The laboratory spectra are taken between 0.4 - 2.5μm, with a Beckman DK-2A ratio-recording spectrophotometer equipped with $BaSO_4$ -coated integrating sphere, and special attachments to allow hemispherical measurements on horizontal uncovered samples (see Conel and Nash, (1970) for a discussion). All measurements are made with respect to MgO as a reference, and these measurements can be converted to "absolute" reflectance using absolute reflectance curves for MgO given by Edwards, et al. (1960).

The theory of the integrating sphere is given in convenient summary fashion by Wendlandt and Hecht (1966) and by Edwards et. al. (1960). Define the bidirectional half-space reflectance as $f(\theta, \phi; \theta', \phi')$, for reflectance direction in polar coordinates (θ', ϕ') and incidence direction (θ, ϕ).

The reflectance $\rho(\theta, \phi)$ for monochromatic light is then defined in terms of illumination as

$$\rho(\theta, \phi) = \int_0^{2\pi} \int_0^{\pi/2} f(\theta, \phi; \theta', \phi') \sin\theta' \cos\theta' d\theta' d\phi' \qquad \text{(A-1)}$$

Thus for real diffusely scattering surfaces $\rho(\theta, \phi) \geq f(\theta, \phi; \theta', \phi')$ and the two are related by (A-1). The theory of the integrating sphere (Wendlandt and Hecht, 1966) shows that in error-free measurement the measured hemispherical reflectance is

$$\rho_m = \rho_s (\theta, \phi) / \rho_{st} (\theta, \phi)$$

where ρ_s is sample reflectance for incidence directions (θ, ϕ) and ρ_{st} is standard reflectance for these same angles.

Field measurements conducted with the PFRS are in the spectral region 0.45-2.5μm and are always essentially bidirectional in character with the optical train of the spectrometer head lying in the plane-of-incidence of sunlight with the surface. The spectra are normalized in the field against Fibrefrax, a highly reflecting ceramic wool, with the normal procedure being to take spectra of sample and reference alternately. The normalized spectrum thus has removed from it relatively long term atmospheric effects (about 30 sec.).

Thus, with the exception of atmospheric scattered sunlight reaching the surface, the reflectance so obtained is (strongly) bi-directional and

we effectively obtain a measure of $f(\theta, \phi ; \theta', \phi')$ by such procedures. In order to go from one set of measurements to another via e.g. (A-1), some measure of the functional form of $f(\theta, \phi ; \theta', \phi')$ would be required in practice. Such measurements are ordinarily not required, as we generally use the laboratory spectra only as interpretation guides for features in the field data. An exception to the foregoing remarks of course occurs if the surface is strongly preferentially scattering in the direction of observation.

While the values of reflectance obtained by these two methods are only suggestively comparable in magnitude, the wavelength positions of important absorption features remain unaffected for observation on similar materials.

APPENDIX B

RADIOMETRIC AND CHEMICAL ANALYSIS OF SAMPLES FROM RED SEEP AND EAGLE CLAIM

This appendix tabulates chemical and radiometric data from 12 sites at Red Seep and 2 at Eagle Prospects associated with buckskin alteration. Site description, X-Ray, fluorometric and colorometric analyses together with other chemical data for these samples are given in Tables B-1, B-2, and B-3. These analyses have been prepared by Dr. R. Chessmore of Bendix Field Engineering Laboratory, Grand Junction, Colorado. Additional radiometric and chemical data for these sites are supplied by Mickel et al. (1977).

TABLE B-1. CROSS REFERENCE LISTING

JPL NO.	ERDA NO.	SITE	DESCRIPTION OF SAMPLE
RS 1	MAS 232	Red Seep	Light brown mudstone high cps (7000) just below Limestone Cap (~1m) in south prospect pit (Zone C)
RS 2	MAS 233	Red Seep	Gray mudstone mixed with limonite. Strains along fractures. (02000 cps) 1m stratigraphically beneath RS-1 & 2m North.
RS 3	MAS 234	Red Seep	Surface altered "popcorn" material just outside south exploration pit; mixed with limestone fragments.
RS 4	MAS 235	Red Seep	Granular "white" (gypsum?) material beneath RS-3 "popcorn" layer.
RS 5	MAS 236	Red Seep	Parent (?) material to RS-3 and RS-4. (Some down-slope creep).
RS 6	MAS 237	Red Seep	Heavily altered (and stained) boulder at south pit.
RS 7	MAS 238	Red Seep	Carbonaceous material in prospect pit west of river near north end of cap. 1m below limestone. Note: Not present at north end of prospect.
RS 8	MAS 239	Red Seep	Surface layer derived from RS-7 parent.
RS 9	MAS 240	Red Seep	Below ore zone about 15-25m stratigraphically. 100-150 cps. Unaltered gray knob out from main cliff.
RS 10	MAS 241	Red Seep	Parent to RS-9 about 2m down.

TABLE B-1. CROSS REFERENCE LISTING (Continuation 1)

JPL NO.	ERDA NO.	SITE	DESCRIPTION OF SAMPLE
RS 11	MAS 242	Red Seep	Purple shale above ore zone on road at north side of prospect.
RS 12	MAS 243	Red Seep	Green shale interbedded with purple RS-11.
E 1	MAS 245	Eagle	Eagle Nose, altered surface layer.
E 2	MAs 246	Eagle	Parent rock of E1.

Table B-2. Gamma Ray Spectroscopic Analyses

JOB 400073
IDENTIFICATION R Chessmore
DATE RUN 10/28/77
TIME (SECONDS) 2400

** SUMMATION ON CHANNELS X THRU Y IS NET COUNT EXCEPT ON BKG(GROSS COUNTS)

CHANNELS FOR SPECTRAL REGIONS

BACKGROUND KUT CHANNELS	POTASSIUM 241 260	URANIUM 291 310	THORIUM 433 460

A-MATRIX(1)

K	U	T
00111632	.00005996	.00001012
.00000033	.00008983	.00000609
-0 00000026	.00000116	00002892

C-MATRIX(2)

K	U	T
56.58000000	-0.00000000	-0.00000000
-0 00000000	510 00000001	-0.00000000
-0.00000000	23.69491662	509.99999999

BACKGROUND 1196 000 580.000 407.000

BFEC NO.	ERDA NO.	PCT S K(3)	PPM S U	PPM S TH	WEIGHT (GRAMS)	COUNT K	COUNT U	COUNT TH	DATE SAMPLE RUN	NET COUNT 2 THRU 512
0026977	MAS232	3.47	6 9	23.3	605.450	6577	1105	988	771025	983155
0026978	MAS233	11 63	2881.7	73.2	612.200	274041	380992	8035	771025	-5315506
0026979	MAS234	.53	166 8	8 5	582.900	14940	21033	617	771025	1505408
0026980	MAS235	.38	40 2	9 5	634.300	4468	5588	489	771025	1076311
0026981	MAS236	.27	43.8	13.5	555 400	4090	5352	590	771025	1061619
0026982	MAS237	.45	48 3	12 0	600.620	5074	6358	583	771025	1092230
0026983	MAS238	-0.01	178.0	7 4	556 630	14630	21829	614	771028	1507121
0026984	MAS239	-0 19	373.0	7.9	560 390	30502	45990	994	771028	2145450
0026985	MAS240	87	3 2	15 6	560 920	1784	513	620	771028	949150
0026986	MAS241	.87	5.0	17.1	510.950	1790	688	624	771028	946350
0026987	MAS242	1 53	6.5	9.7	617.900	3277	970	438	771028	954791
0026988	MAS243	1.47	2 8	11 8	565 640	2628	448	475	771028	938252
0026990	MAS245	1.11	17 3	16 1	561.200	3325	2265	668	771028	992415
0026991	MAS246	1.25	9.8	16.2	528.600	2739	1254	619	771028	961170

(1) Correction factors applied to eliminate interference in count rates between elements Corrections are of the form $\underline{Y} = \underline{\underline{A}}\,\underline{x}$, where $x^T = (K,U,Th)$, $\underline{Y}^T = (K_{corr}, U_{corr}, Th_{corr})$ and $\underline{\underline{A}}$ is the given matrix.

(2) Concentration matrix for counting standard.

(3) Refers to gamma-ray Spectroscopic determination.

Table B-3. Geochemical Analyses

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

≠SAMPLE 26989 MISSING
≠SAMPLE 26989 MISSING

SAMPLE		TICKET	ANALYSIS PROCEDURE +	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026977	=	MAS-232	GAMMA SPEC	ALL ELEMS				NB	77/10/28	R: 5
			ATOMIC ABSORPT	K	.24	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT	TI	.27	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT	V	541.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT	MN	163.	PPM		MR	77/10/20	R: 4
			ATOMIC ABSORPT	FE	2.37	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY	FE O	.72	PCT		NB	78/10/04	R:54
			SPECPHOTOM	TH	16.	PPM		TY	77/10/07	R: 2
			SPECPHOTOM	U3O8	.15	PCT				
026978	=	MAS-233	GAMMA SPEC	ALL ELEMS				NB	77/10/28	R: 5
			ATOMIC ABSORPT	K	.51	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT	TI	.24	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT	V	114.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT	MN	199.	PPM		MR	77/10/20	R: 4
			ATOMIC ABSORPT	FE	1.9	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY	FE O	.06	PCT		NB	78/10/04	R:54
			SPECPHOTOM	TH	15.	PPM		TY	77/10/07	R: 2
								TY	77/10/07	R: 2
								TY	77/10/07	R: 2
			FLUOMETRIC	U3O8	225.	PPM		FK	77/10/13	R: 3
026979	=	MAS-234	GAMMA SPEC	ALL ELEMS				NB	77/10/28	R: 5
			FLUORMETRY	U3O8	52.	PPM		OG	77/10/21	R: 4
			ATOMIC ABSORPT	K	.52	PCT		GM	77/10/19	R: 4

Table B-3. Geochemical Analyses (Continuation 1)

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO. 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

SAMPLE		TICKET	ANALYSIS PROCEDURE	+	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026979	=	MAS-234	ATOMIC ABSORPT		TI	.24	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT		V	52.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT		MN	674.	PPM		MR	77/10/20	R: 4
			ATOMIC AGSORPT		FE	1.82	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY		FE O	.19	PCT		NB	78/10/04	R:54
			SPECPHOTOM		TH	18.	PPM		TY	77/10/07	R: 2
026980	=	MAS-235	GAMMA SPEC		ALL ELEMS				NB	77/10/28	R: 5
			FLUORIMETRY		U3O8	44.	PPM		OB	77/10/13	R: 3
			ATOMIC ABSORPT		K	.39	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT		TI	.22	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT		V	45.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT		MN	1286.	PPM		MR	77/10/20	R: 4
			ATOMIC ABSORPT		FE	1.5	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY		FE O	.08	PCT		NB	78/10/04	R:54
						.07	PCT	*RERUN*	NB	78/10/04	R:54
			WET CHEMISTRY		FE O	.08	PCT	*RERUN*	NB	78/10/04	R:54
			SPECPHOTOM		TH	18.	PPM		TY	77/10/07	R: 2
026981	=	MAS-236	GAMMA SPEC		ALL ELEMS				NB	77/10/28	R: 5
			FLUORIMETRY		U3O8	59.	PPM		OG	77/10/21	R: 4
			ATOMIC ABSORPT		K	.56	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT		TI	.23	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT		V	90.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT		MN	214.	PPM		MR	77/10/20	R: 4

Table B-3. Geochemical Analyses (Continuation 2)

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO. 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

SAMPLE		TICKET*	ANALYSIS PROCEDURE	+	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026981	=	MAS-236	ATOMIC ABSORPT		FE	1.46	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY		FE O	.03	PCT		NB	78/10/04	R:54
			SPECPHOTOM		TH	19.	PPM		GF	77/10/28	R: 5
026982	=	MAS-237	GAMMA SPEC		ALL ELEMS				NB	77/10/28	R: 5
			FLUORIMETRY		U308	80.	PPM		OB	77/10/13	R: 3
			ATOMIC ABSORPT		K	.54	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT		TI	.22	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT		V	66.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT		MN	214.	PPM		MR	77/10/20	R: 4
			ATOMIC ABSORPT		FE	2.05	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY		FE O	.26	PCT		NB	78/10/04	R:54
			SPECPHOTOM		TH	15.	PPM		GF	77/10/28	R: 5
026983	=	MAS-238	GAMMA SPEC		ALL ELEMS				HB	77/11/01	R: 5
			ATOMIC ABSORPT		K	.23	PCT		GM	77/10/19	R: 4
			ATOMIC ABSORPT		TI	.27	PCT		MR	77/10/19	R: 4
			ATOMIC ABSORPT		V	48.	PPM		GM	77/10/21	R: 4
			ATOMIC ABSORPT		MN	107.	PPM		MR	77/10/20	R: 4
			ATOMIC ABSORPT		FE	1.98	PCT		GM	77/10/19	R: 4
			WET CHEMISTRY		FE O	.80	PCT		NB	78/10/04	R:54
			SPECPHOTOM		TH	15.	PPM		GF	77/10/28	R: 5
			SPECPHOTOM		U308	.03	PCT		FK	77/10/13	R: 3
			FLUORIMETRY		U308	255.	PPM				

Table B-3. Geochemical Analyses (Continuation 3)

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO. 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

SAMPLE	TICKET	ANALYSIS PROCEDURE +	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026984 =	MAS-239	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		ATOMIC ABSORPT	K	.31	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.23	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	93.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	368.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	1.26	PCT		GM	77/10/19	R: 4
		WET CHEMISTRY	FE O	.51	PCT		NB	78/10/04	R:54
		SPECPHOTOM	TH	14.	PPM		GF	77/10/28	R: 5
		SPECPHOTOM	U308	.04	PCT		FK	77/10/13	R: 3
		FLUORIMETRY	U308	461.	PPM				
026985 =	MAS-240	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	2.	PPM		OB	77/10/13	R: 3
		ATOMIC ABSORPT	K	.77	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.24	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	59.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	214.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	2.45	PCT				Q: 6
		WET CHEMISTRY	FE O	.41	PCT		NB	78/10/04	R:54
				.40	PCT	*RERUN*	NB	78/10/04	R:54
				.43	PCT	*RERUN*	NB	78/10/04	R:54
		SPECPHOTOM	TH	17.	PPM		GF	77/10/28	R: 5
026986 =	MAS-241	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	4.	PPM		OB	77/10/13	R: 3

Table B-3. Geochemical Analyses (Continuation 4)

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO. 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

SAMPLE	TICKET	ANALYSIS PROCEDURE +	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026986 =	MAS-241	ATOMIC ABSORPT	K	.75	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.24	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	97.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	61.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	2.29	PCT		GM	77/10/19	R: 4
		WET CHEMISTRY	FE O	.01	PCT		NB	78/10/04	R:54
		SPECPHOTOM	TH	20.	PPM		GF	77/10/28	R: 5
026987 =	MAS-242	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	8.	PPM		OB	77/10/13	R: 3
		ATOMIC ABSORPT	K	1.37	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.18	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	62.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	245.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	4.19	PCT		GM	77/10/19	R: 4
		WET CHEMISTRY	FE	NOT RUN					Q: 6
		SPECPHOTOM	TH	14.	PPM		GF	77/10/28	R: 5
026988 =	MAS-243	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	5.	PPM		OB	77/10/13	R: 3
		ATOMIC ABSORPT	K	1.34	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.22	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	48.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	153.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	2.05	PCT		GM	77/10/19	R: 4

Table B-3. Geochemical Analyses (Continuation 5)

77/11/02

GROUND TRUTH FOR REMOTE SENSING
PROJECT NO. 50-77-5213

400073. REQUEST DATE 77/09/21

00 GROUP REQD 77/10/28

SAMPLE	TICKET	ANALYSIS PROCEDURE +	ELEMENT/S	RESULT	UNIT	(BOUNDS) SD	OPER		STAT
026988 =	MAS-243	WET CHEMISTRY	FE O	.12	PCT		NB	78/10/04	R:54
		SPECPHOTOM	TH	18.	PPM		GF	77/10/28	R: 5
026990 =	MAS-245	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	.6	PPM		OB	77/10/13	R: 3
		ATOMIC ABSORPT	K	1.08	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.33	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	93.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	92.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	2.21	PCT		GM	77/10/19	R: 4
		WET CHEMISTRY	FE O	.08	PCT		NB	78/10/04	R:54
		SPECPHOTOM	TH	20.	PPM		GF	77/10/28	R: 5
026991 =	MAS-246	GAMMA SPEC	ALL ELEMS				HB	77/11/01	R: 5
		FLUORIMETRY	U308	4.	PPM		OG	77/10/21	R: 4
		ATOMIC ABSORPT	K	1.11	PCT		GM	77/10/19	R: 4
		ATOMIC ABSORPT	TI	.34	PCT		MR	77/10/19	R: 4
		ATOMIC ABSORPT	V	90.	PPM		GM	77/10/21	R: 4
		ATOMIC ABSORPT	MN	42.	PPM		MR	77/10/20	R: 4
		ATOMIC ABSORPT	FE	1.82	PCT		GM	77/10/19	R: 4
		WET CHEMISTRY	FE O	.20	PCT		NB	78/10/04	R:54
		SPECPHOTOM	TH	22.	PPM		GF	77/10/28	R: 5

APPENDIX C

ROCK CHEMISTRY AND SPECTRAL PROPERTIES

(PREPARED BY KATHLEEN W. BAIRD)

This is a statistical study of the dependence of reflectance (0.4 - 2.5 μm) on Fe^{0}, Fe^{+2}, Fe^{+3}, Fe^{+3}/Fe^{+2}, Mn and Ti for selected rock samples. Sixty four spectra were obtained from samples chemically analyzed for these elements, plus V. However, in all cases V was below sensitivity levels of analysis (< 0.02%) and the results for this element are therefore not significant.

The data set included thirty sedimentary rocks, twelve iron oxides and twenty two artificial laboratory mixtures. The sediments consist of twenty two from San Rafael Swell localities, eight from Powder River Basin (Jeanette Mine) sites. The San Rafael Suite consisted of mudstones, sandstones, shale and claystone, both altered and unaltered, with major amounts of quartz and montmorillonite and minor or trace amounts of feldspars, micas, calcite, dolomite, gypsum, kaolinite, jarosite, and probably other sulfates. The Jeanette Mine Suite contained sandstones and shale with major amounts of quartz, montmorillonite and feldspars, and minor or trace amounts of calcite, dolomite, mica, chlorite and kaolinite. The twelve iron oxides were either well known iron ores or highly altered rock of mainly goethite, hematite, and dolomite with trace quantities of mica, chlorite, kaolinite, and serpentine.

Elemental weight percents were obtained by wet chemical or atomic absorption spectroscopic analyses. Mineral assemblages were determined from thin section, grain studies, and X-ray diffraction analyses. These chemical and mineralogical data for all samples used are given in text Tables IV-B-2 and IV-C-1.

Two suites of artificial mixtures were made by varying weight percent Fe_2O_3 with (1) MgO, and (2) SiO_2. The laboratory samples were approximately micron-size reagent grade powders, and optically clear quartz ground to | < 100 - > 200 | mesh.

Several precision tests for reproducibility of reflectance data were made. Significant variance of reflectance values are a result of (1) inhomogeneity of the sample, (2) depth of the sample cup (i.e. possible finite thickness of the sample), and (3) particle size variations between samples. To help control these effects samples were carefully blended and where necessary seived to < 32 mesh, then loosely packed in optically thick sample planchets. We have not imposed a strict limitation on particle size; restricting particle size to a narrower range may be expected to alter the results quantitatively, but not change the major conclusions. To indicate the levels of precision involved, resulting deviations about the mean from thirty samples of the same specimen read three times each were accurate to two places of decimals.

A Hewlett-Packard digitizer was programmed to calculate values of reflectance of laboratory data at wavelength increments of 0.05 μm.

The water absorption bands at 1.3 - 1.5 μm and 1.8 - 2.0 μm were omitted from the data to be consistent with field analyses.

The resulting 34 values of reflectance per spectrum plus elemental weight percents for iron as total iron, ferrous and ferric oxidation states, titanium and manganese plus the ratio Fe^{+3}/Fe^{+2}, were used as variables in the UCLA Biomedical Subroutine Bi-Med 03R, multiple regression with case combinations (Dixon, 1974). This program performs both multiple regression and correlation analyses. The output includes: sums and sums of squares, correlation matrix, means and standard deviations, coefficients of regression, degrees of freedom and F-values, and both multiple and partial correlation coefficients. The regression analysis assumes a true planar regression surface. These are so-called Type I studies, where data points are judiciously selected from one population. Type II studies, which deal with randomly selected test data, are specifically excluded.

Table C-1 gives the various combinations of data employed in these analyses. To isolate interactions within data suites eight separate combinations were run. Correlation coefficients were used as a measure of dependence of reflectance on chemistry. Since the number of variables cannot exceed the number of cases, all tests following Run I employed a reduced number of wavelengths. Variables with $|r| < 0.250$ were discarded. For all elements except Ti (Runs VIII and XI) correlation coefficients are negative, indicating high chemical abundances to be associated with low reflectance values.

Attempts were made to find meaningful correlations between reflectance and chemistry of rocks with known mineralogical assemblages. Figures C-1 through C-14 are plots of elemental correlations with wavelength. Table C-2 shows elemental correlation values per run and Table C-3 illustrates maximum r-values (correlation coefficients) per run at the corresponding wavelengths.

Manganese - The results from Run I were not significant at any measurable level ($r \approx 0.1$). It was concluded that Mn behaved independently of all other variables and was therefore excluded from further runs.

Titanium - In Run I (Fig. C-5) the reflectance near 2.0 m is reasonably well correlated with Ti abundance. In Run VI (no Figure shown) the abundance of Ti was uncorrelated with the abundance of Fe^{+3}, and there was also no correlation of Ti abundance with reflectance at any wavelength. With the addition of the suite of iron oxides to the suite of sediments in Run VIII (Fig. C-13 and Table C-2) Ti correlations increased, but were still insignificant. New wavelength intervals were then selected. The results for Run XI (Fig. C-13) gave the highest correlations in the visible and near infrared range ($\lambda < 1.20$μm). This is just the opposite of results from Run I (Fig. C-5) where correlations are low in the visible and increased into the infrared.

Table C-1. Summary of Data Sets, Wavelengths and Elemental Data by Run Number

Run No.	Data Sets*	N	Wavelength Ranges Included (in m)	Elemental Data
I	All three	64	0.55-1.30, 1.50-1.80, 2.00-2.50	Fe^{0},Fe^{+3}/Fe^{+2},Fe^{+3} Fe^{+2},Mn,Ti
V	Sediments	30	0.55-1.25, 1.55-1.80, 2.10-2.15	Fe^{0},Fe^{+3}/Fe^{+2}, Fe^{+3}
VI	Sediments	30	1.05-1.30, 1.50-1.80, 2.00-2.50	Fe^{+2}, Ti
VII	Sediments & Iron Oxides	42	Same as Run V	Same as Run V
VIII	Sediments & Iron Oxides	42	Same as Run VI	Same as Run VI
IX	Laboratory Mixtures	22	0.55-1.15, 1.65-2.10	Fe^{+3}
X	Sediments	30	0.60-1.30, 1.50-1.80, 2.00-2.05, 2.15 - 2.25	Fe^{+2}
XI	Sediments & Iron Oxides	42	0.05-1.30, 1.50-1.80, 2.00-2.05	Ti

*Includes (1) Sediments, (2) Iron Oxides, (3) Artificical mixes

On a purely statistical basis improvement of r-values (correlation coefficients) with addition of iron oxides for Runs VIII and XI (Fig. C-13 and Table C-2) indicates a high correlation between Fe^{+3} and Ti, and examination of Run I, Table C-2 shows this to be true (r = -0.349). Table C-3 indicates a maximum value of r for Ti at 0.90μm, where the correlation coefficient reaches a numerical value (+) 0.504. This is of course the wavelength position of a major absorption feature of Fe^{+3} in goethite, and this correlation is then expected because of the correlation of Fe and Ti abundances.

Ferrous Iron - Correlations were low for Runs I (Fig. C-4, Table C-2) and VIII (no Figure given), barely reaching above significance levels. In Run VI (Fig. C-9) correlations were far more significant with maximum values of r near 0.785 μm, and extending out to 1.3 μm. Elemental correlations with Fe^{+2} were insignificant (Table C-2). Although these correlations are higher than those for Mn, it seems apparent the correlations of Fe^{+2} indicate independent behavior within and between the rock and

mineral suites selected for these tests. From a physical viewpoint this may merely represent the highly oxidized nature of the iron.

Ferric Iron - Results for laboratory mixtures of Run IX (Fig. C-14) show the highest correlations of all tested, with maximum values near 0.90 μm. The correlations were lowest for Run V (Fig. C-8) involving sediments alone. Considering sediments and iron oxides collectively in Run VII (Fig. C-12) produces two maxima on the correlation coefficient as a function of wavelength at ~ 0.9 μm and 1.75 μm. The first of these maxima results from the usual Fe^{+3} absorption at 0.85 - 0.9 μm, while the second results from the surmisal Ti - related absorption ~ 1.6 + μm, discussed in the text.

Elemental correlations for ferric iron were highest and were greatest with total iron and with the Fe^{+3}/Fe^{+2} ratio (Table C-2). There was no correlation with ferrous iron in results from Run I (Fig. E-3, Table C-2). Since most samples contained a high amount of ferric iron, these results are not surprising.

Ferric/Ferrous Ratio. Figure C-15 is a graphic example of the lack of dependence of ferrous iron to ferric in these samples. As with ferric iron, correlations were highest in Runs I, Fig. C-2, and VII, Fig. C-II, Table C-2. Elemental correlations with the iron ratio were highest for total and ferric iron and none with ferrous. Since it behaves independently of other variables in these tests this is not surprising. The ratioing of the data fails to change this behavior.

F-tests were made on variances due to the regression versus deviations about the multiple regression plane of Y on X. Table C-4 lists the results. Runs VI and X are not significant estimates of the true regression surface for ferrous iron and titanium. Either these data are too noisy or the true surface is not a plane. The latter seems a more realistic conclusion. The M_{SS} from the deviations about the regression were greater than the M_{SS} from the regression. Therefore an estimate of the regression surface was not meaningful. Although some significant correlations of reflectance with titanium and ferrous iron were found in the correlation matrices, attempts to fit the data to a plane failed.

Figures C-16 through C-21 give the spectra of laboratory mixes of reagent-grade α-Fe_2O_3 with quartz and with MgO used in the analyses of reflectance and chemistry, just described. No further analyses of the photometery of mixing effects will be offered at this time. Such effects are of great importance in remote sensing problems and deserve further study.

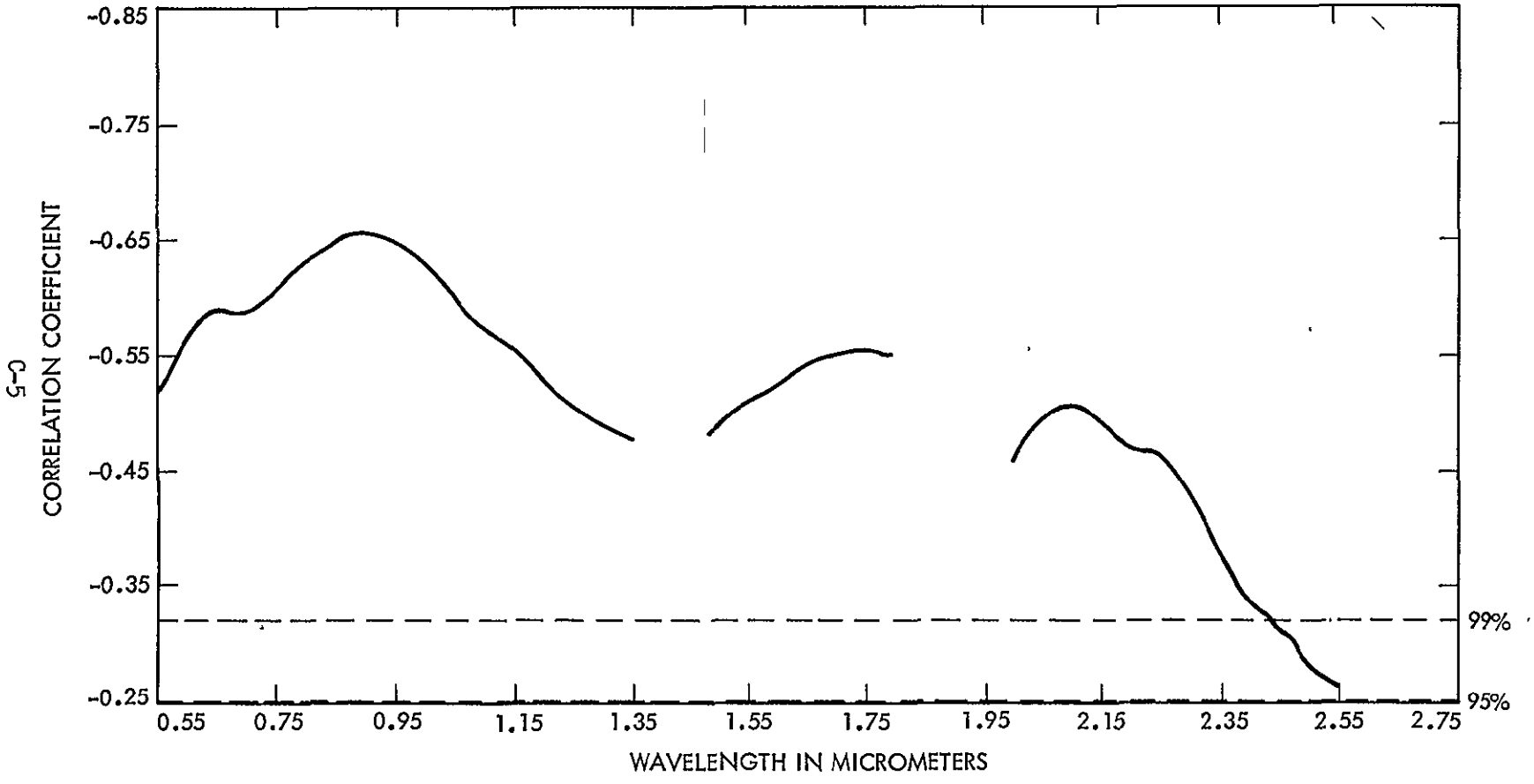


Figure C-1. Correlation of Total Iron With Reflectance, All Sample Suites

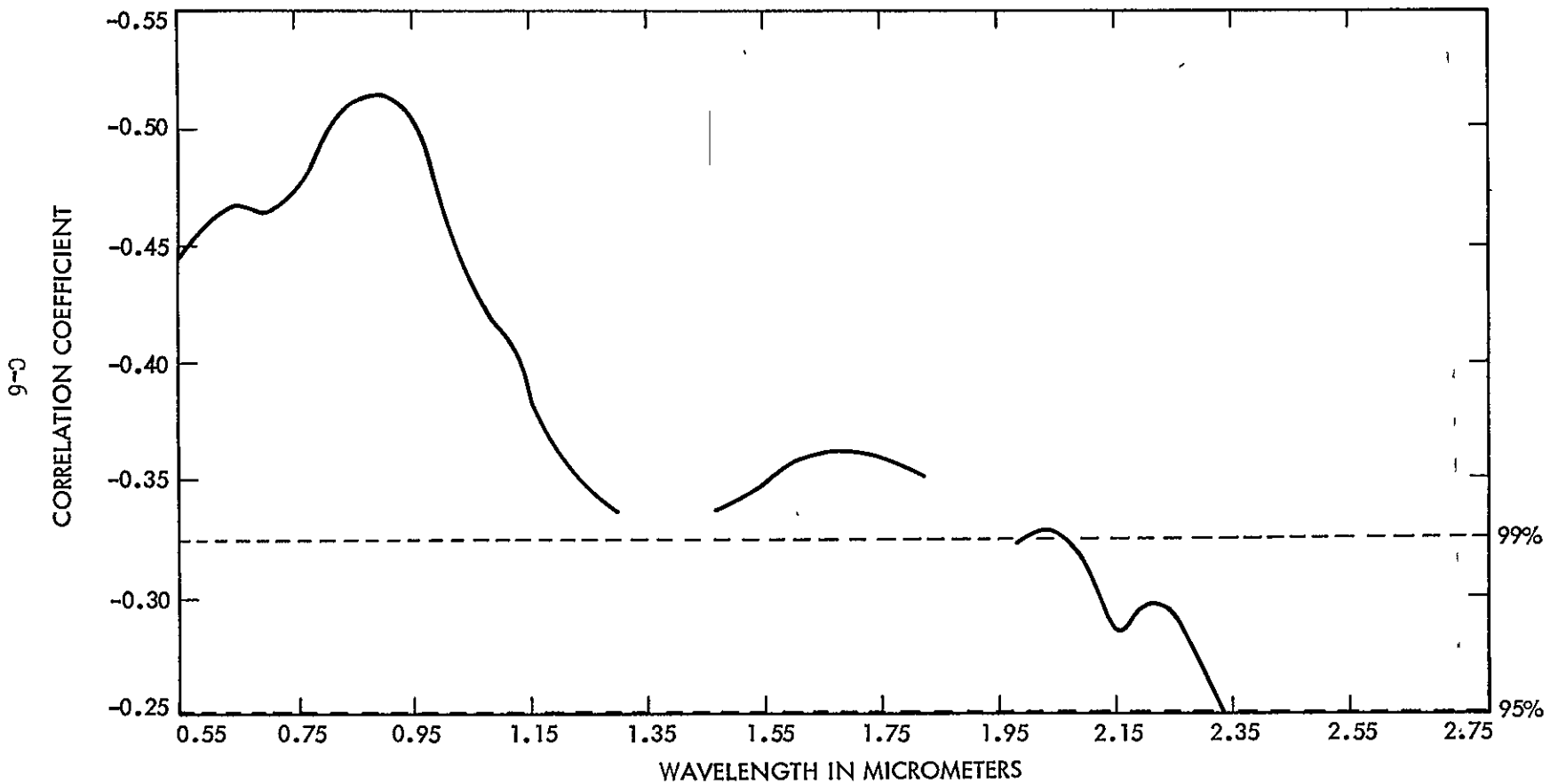


Figure C-2. Correlation of Fe^{+3}/Fe^{+2} With Reflectance, All Sample Suites

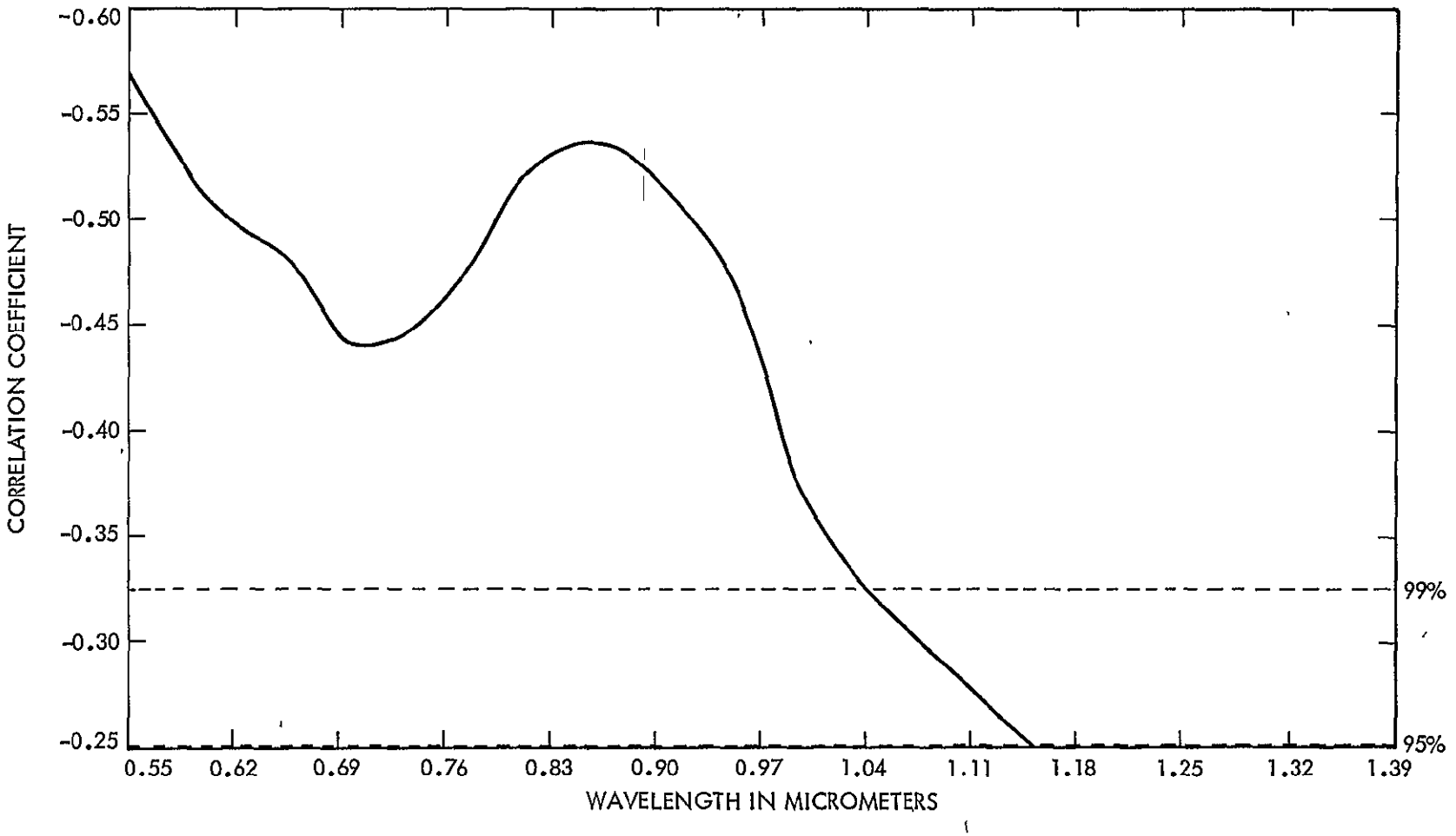


Figure C-3. Correlation of Ferric Iron With Reflectance, All Sample Suites

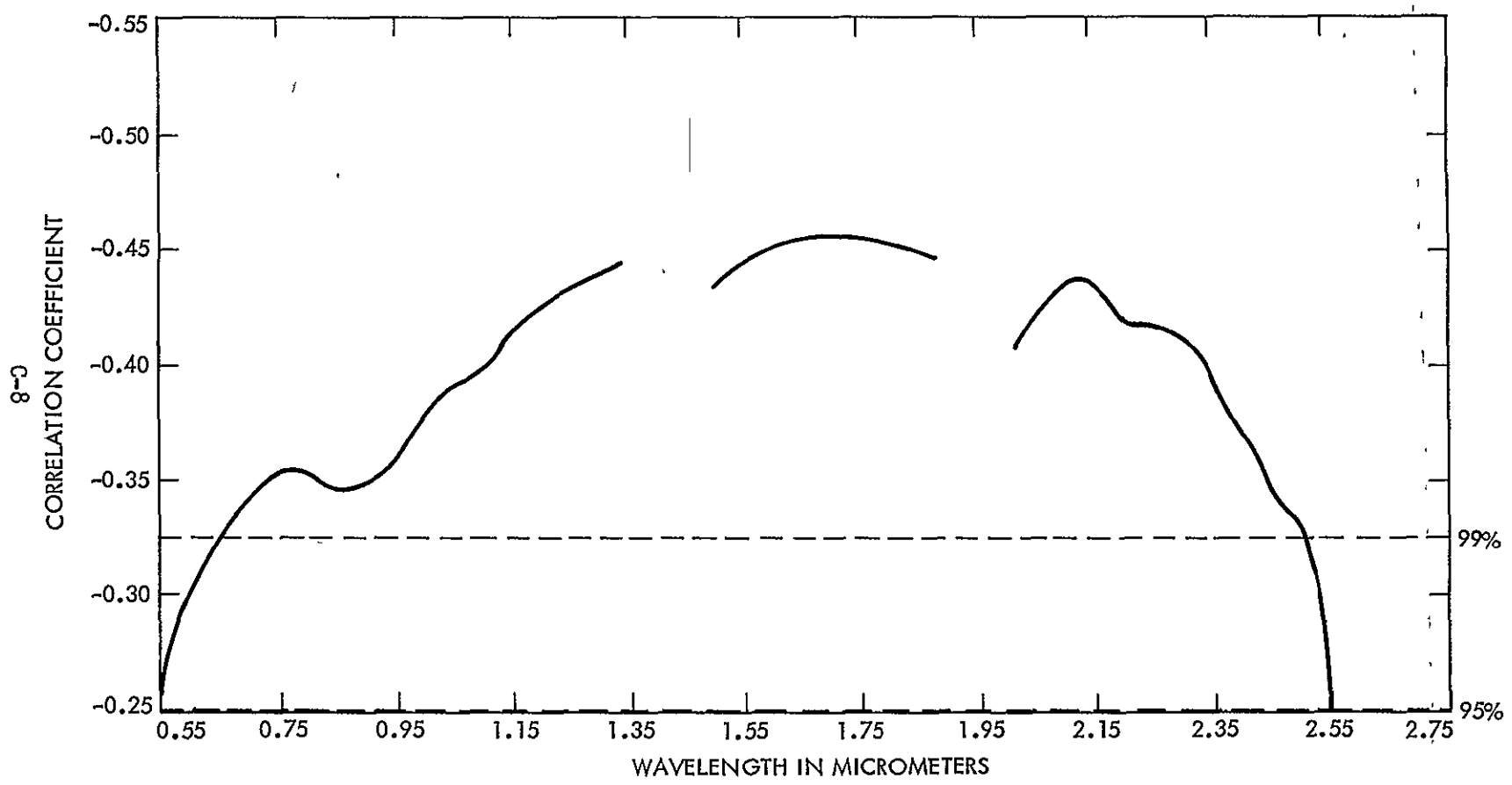


Figure C-4. Correlation of Ferrous Iron With Reflectance, All Sample Suites

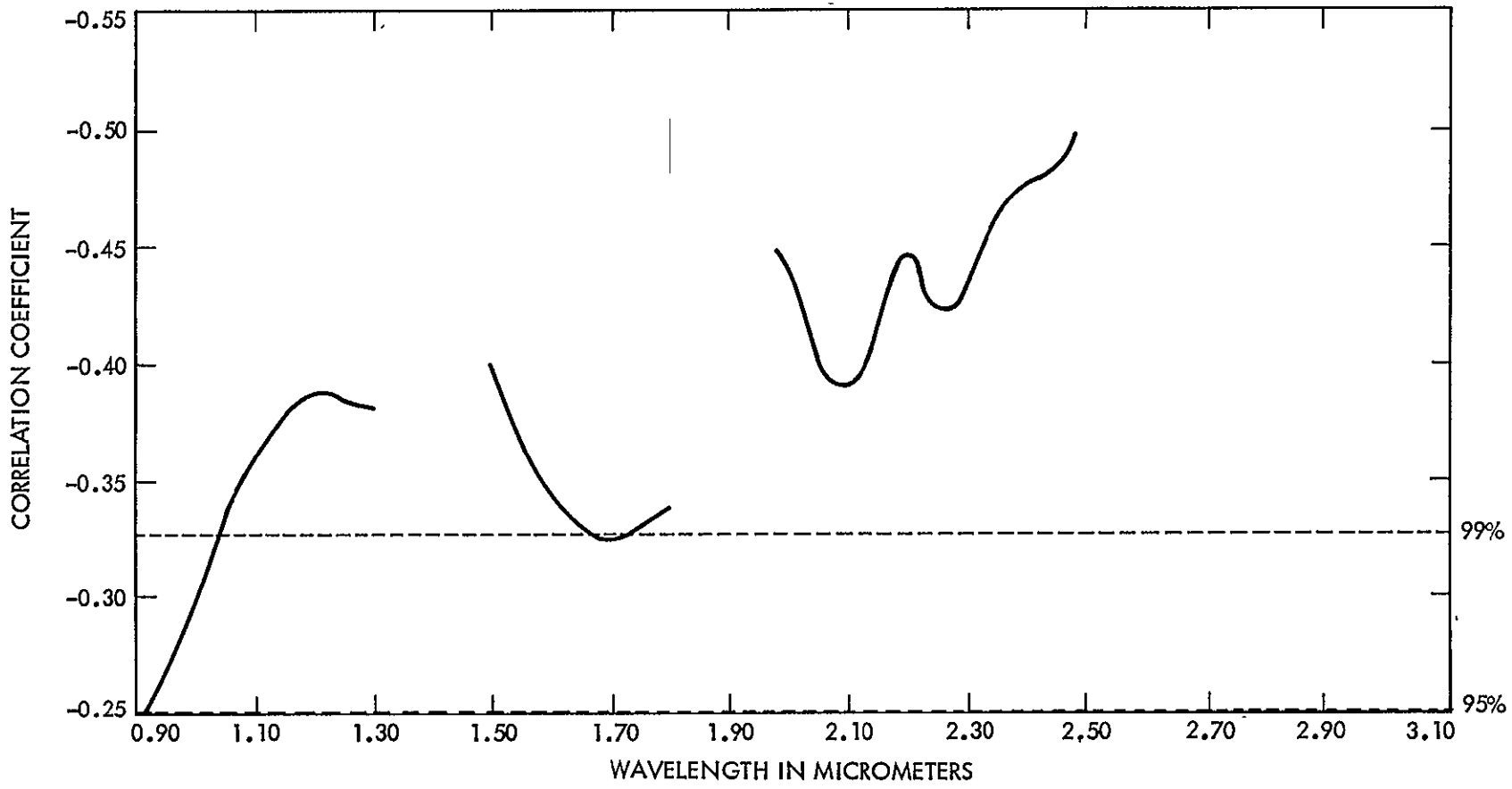


Figure C-5. Correlation of Titanium With Reflectance, All Sample Suites

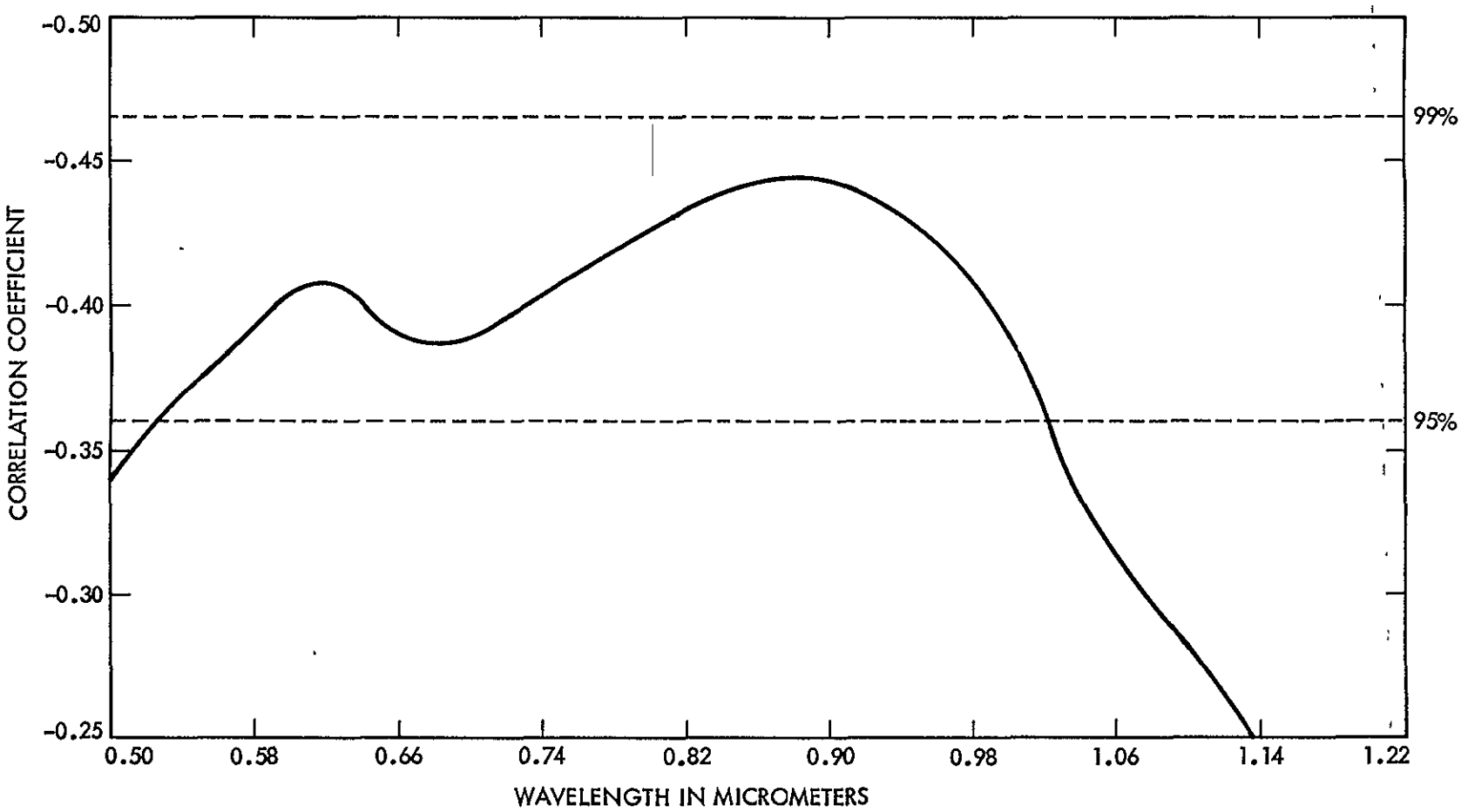


Figure C-6. Correlation of Total Iron With Reflectance, Sedimentary Suite

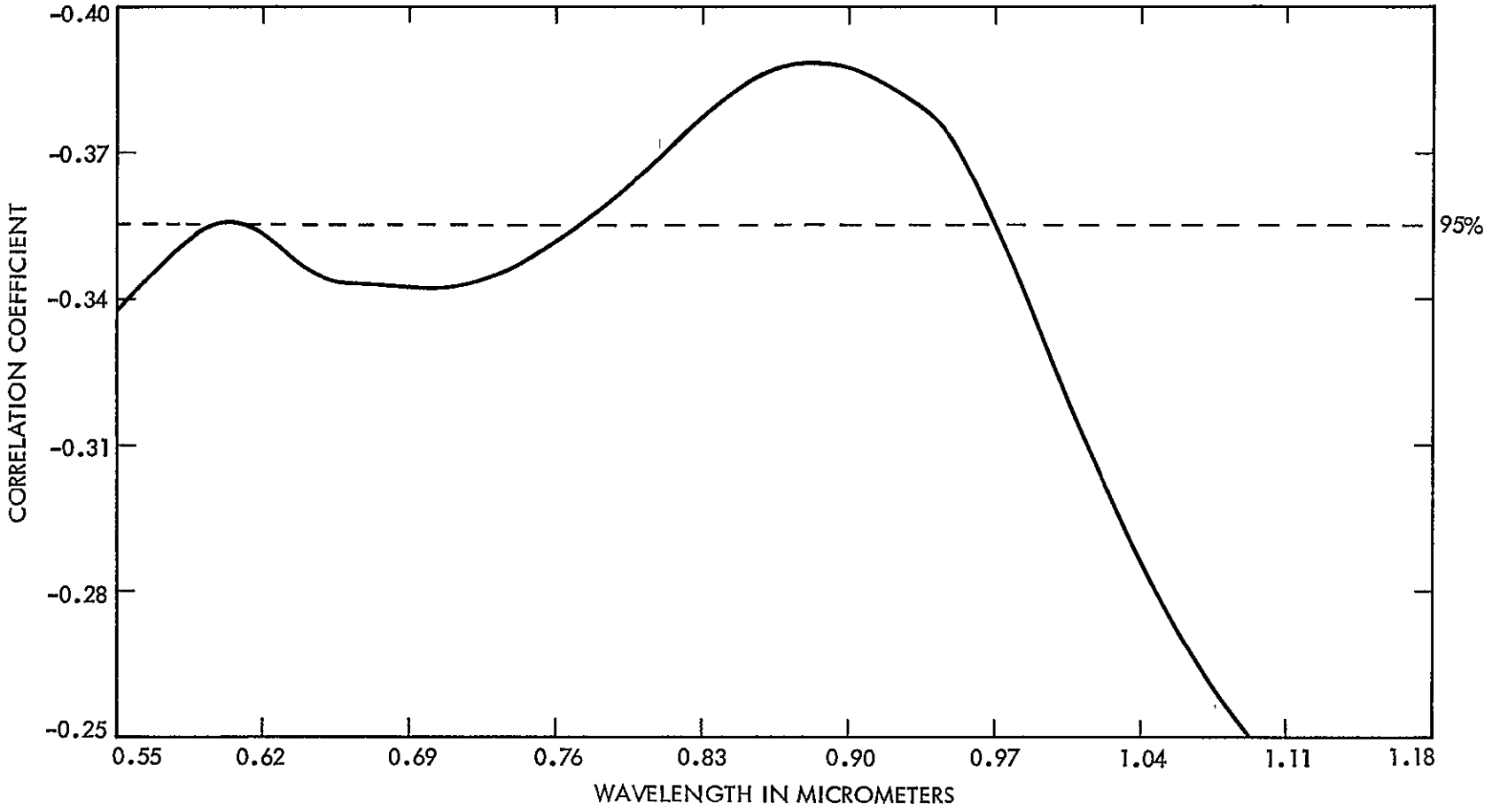


Figure C-7. Correlation of Fe^{+3}/Fe^{+2} With Reflectance Sedimentary Suite

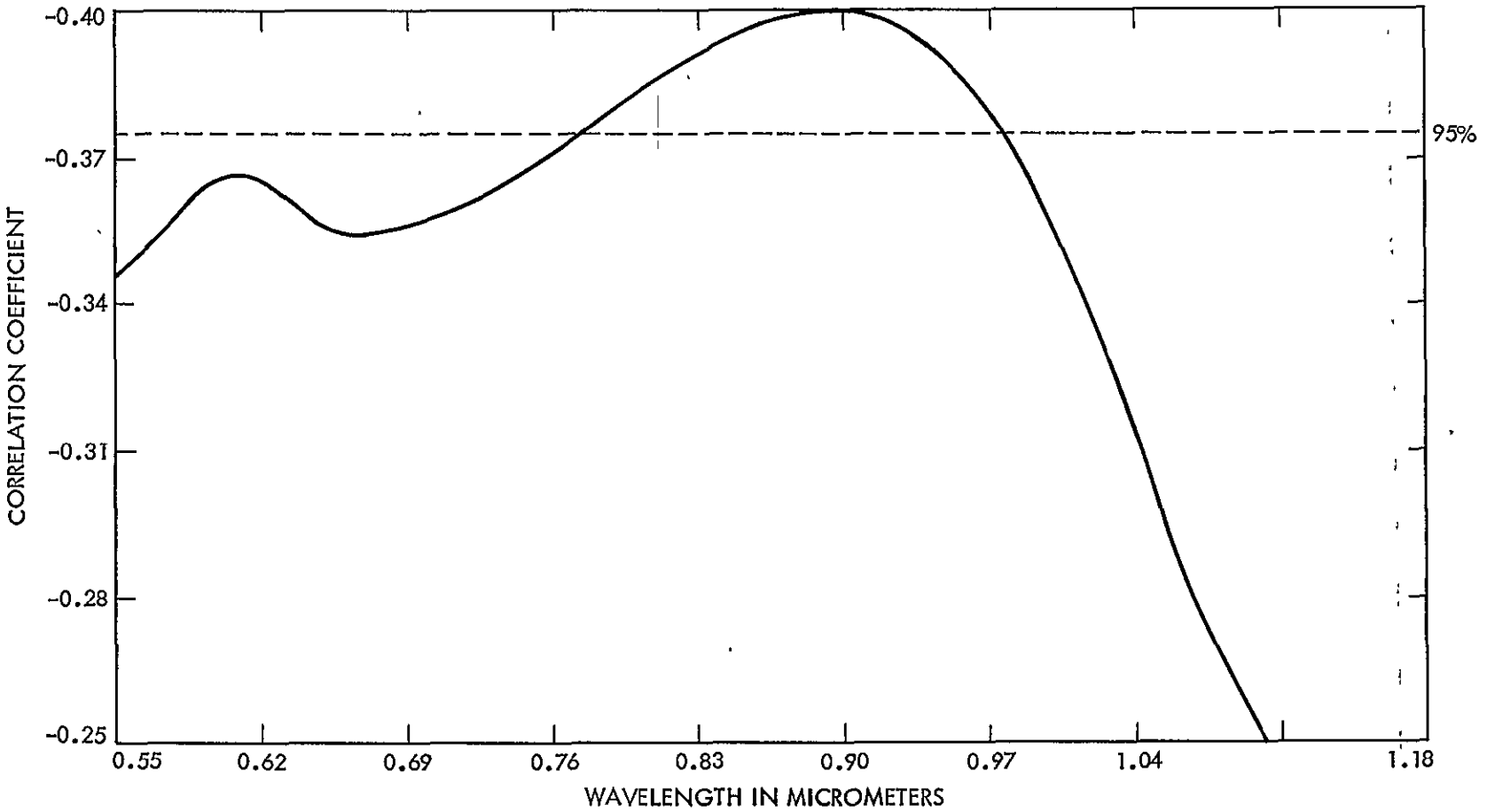


Figure C-8. Correlation of Total Iron With Reflectance, Sedimentary Suite

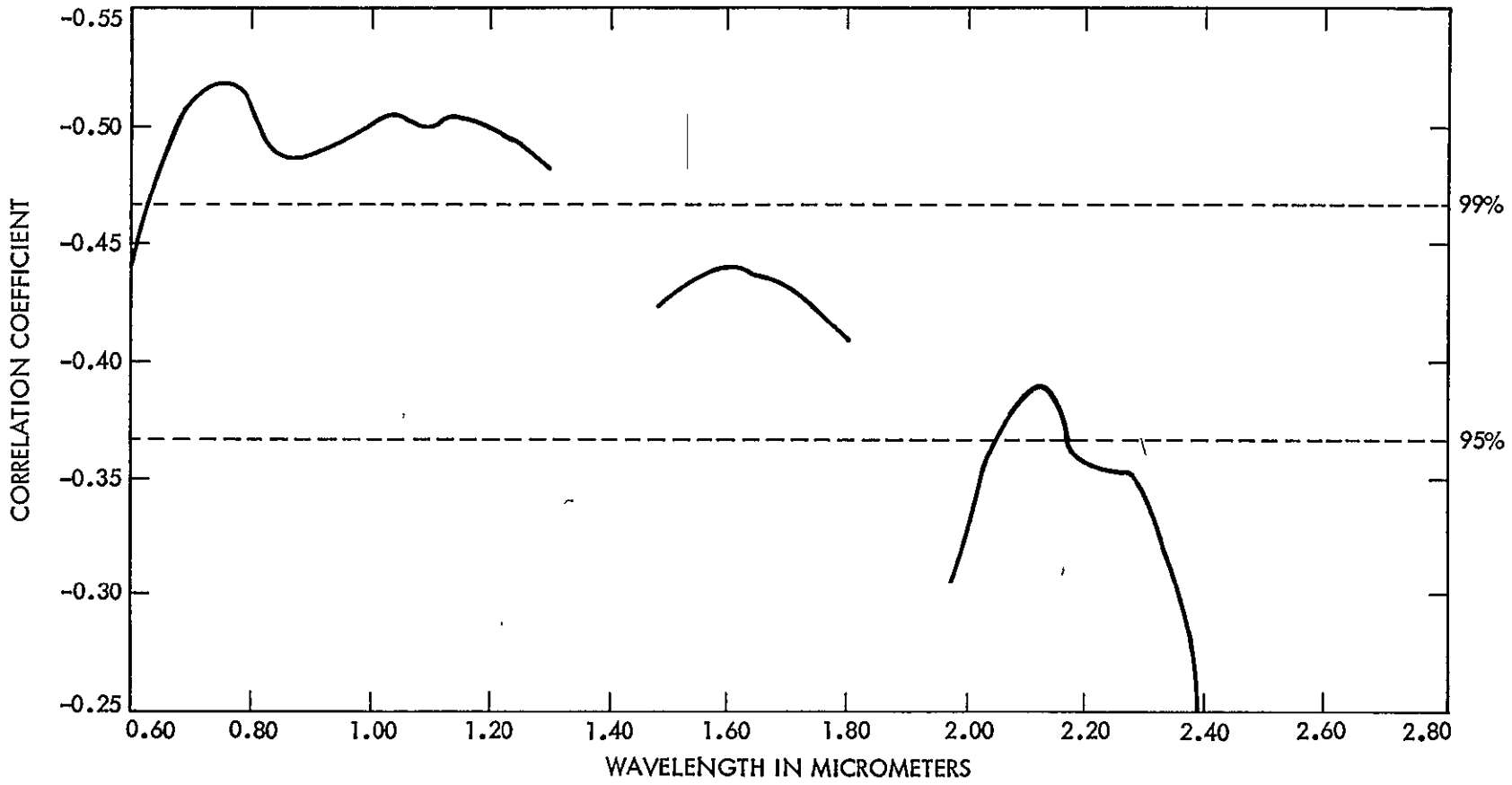


Figure C-9. Correlation of Ferrous Iron With Reflectance, Sedimentary Suites

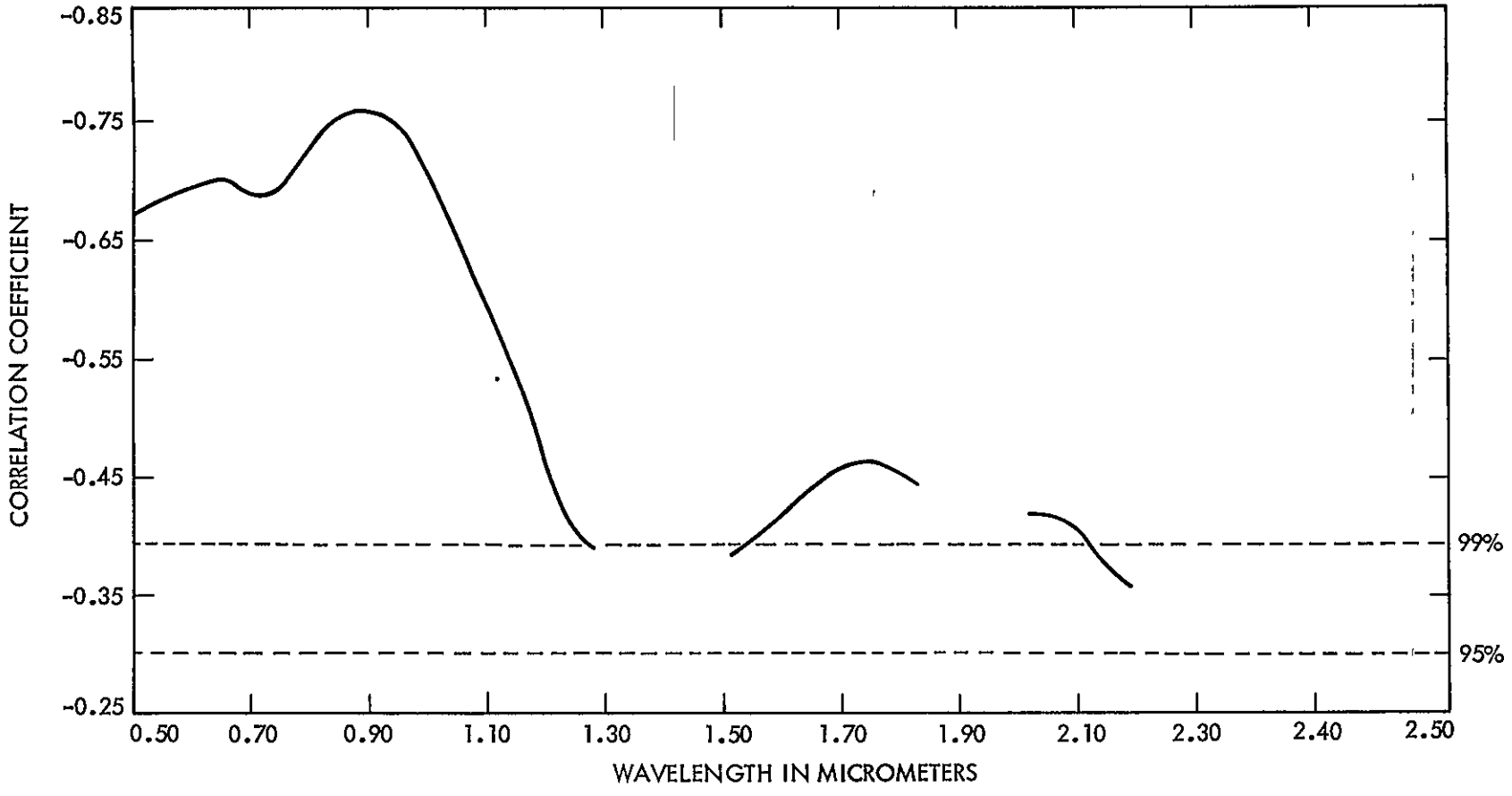


Figure C-10. Correlation of Total Iron With Reflectance, Sediments and Iron Oxides

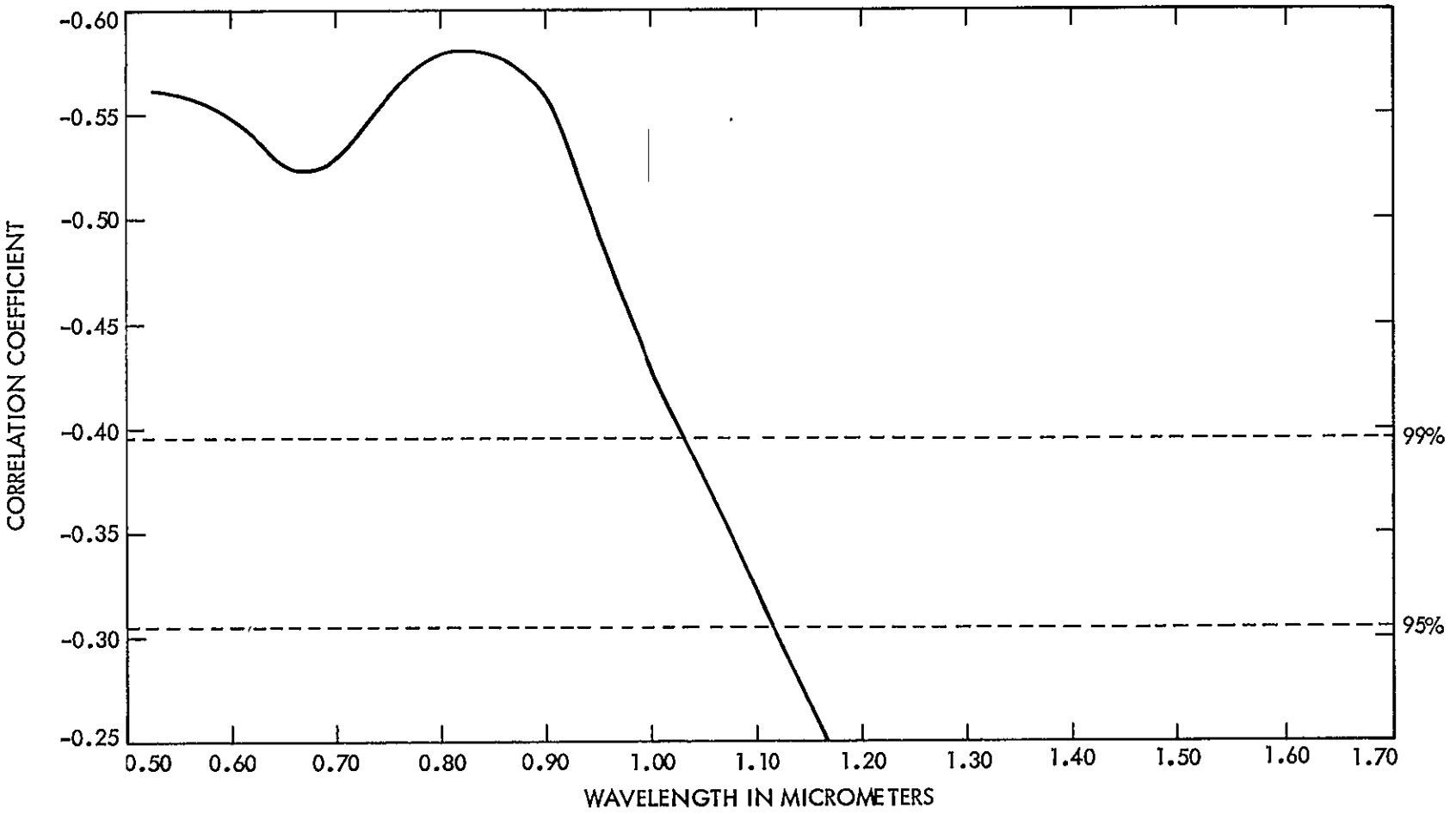


Figure C-11. Correlation of Total Iron With Reflectance, Sedimentary Suite

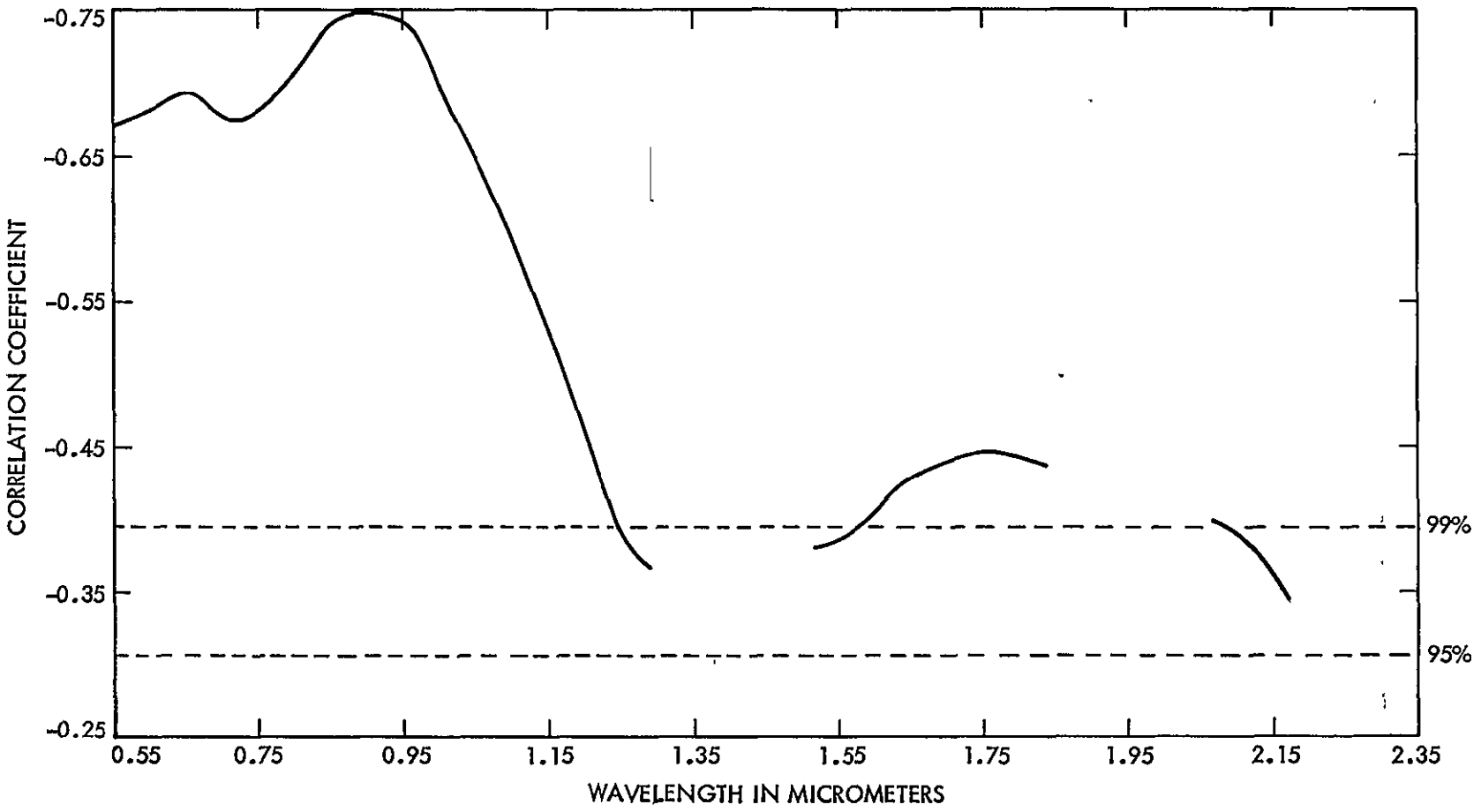


Figure C-12. Correlation of Ferric Iron With Reflectance, Sediments and Iron Oxides.

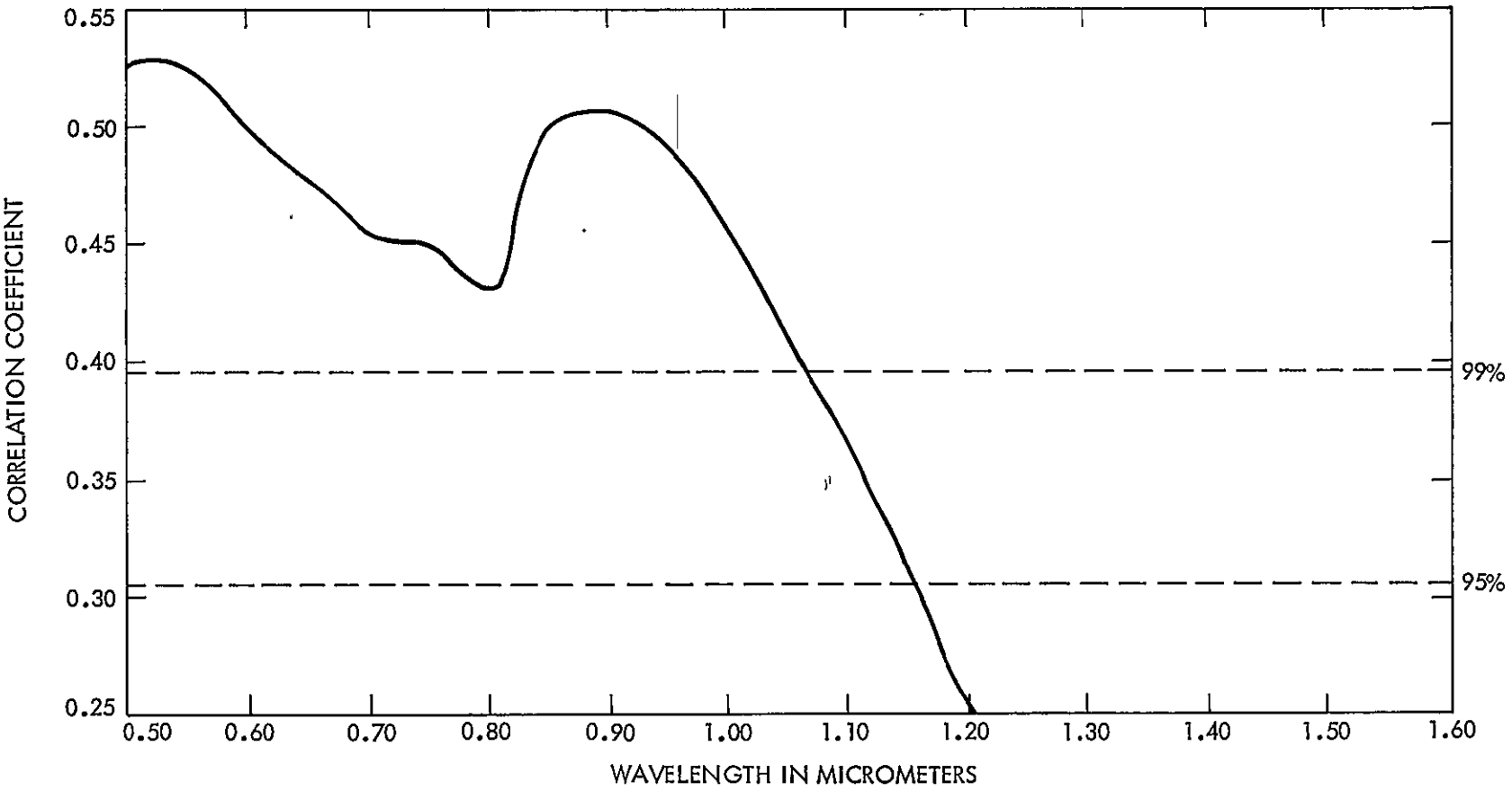


Figure C-13. Correlation of Titanium With Reflectance, Sediments and Iron Oxides.

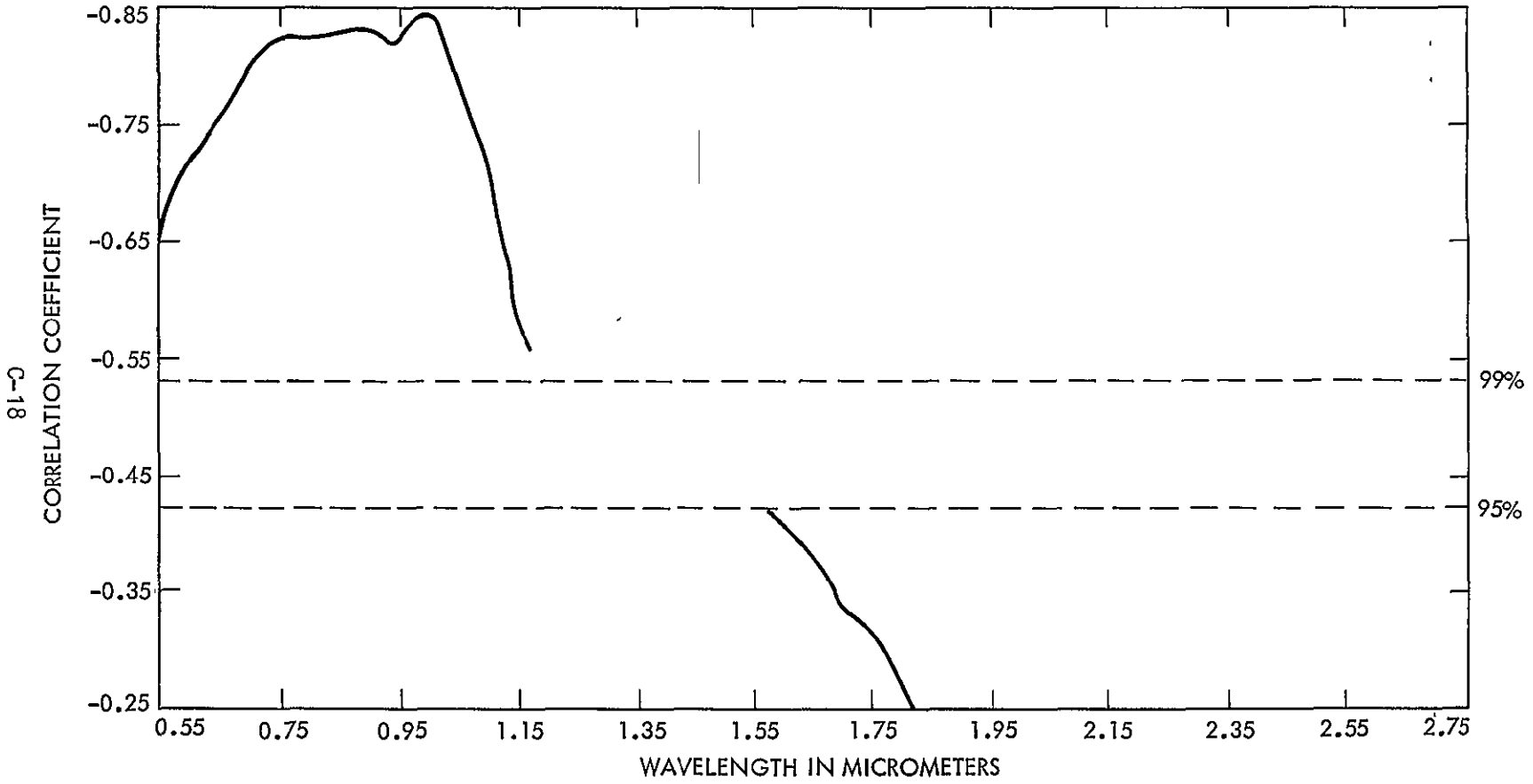


Figure C-14. Correlation of Ferric Iron With Reflectance, Synthetic Lab Mixtures

Table C-2. Elemental Correlations

	Fe^{o}	Fe^{+3}/Fe^{+2}	Fe^{+3}	Fe^{+2}	Ti	Run	Sample Suite
Fe^{o}	1.00						
Fe^{+3}/Fe^{+2}	0.7913	1.00					
Fe^{+3}	0.7920	0.6465	1.00			I	All 64 Samples
Fe^{+2}	0.2711	-0.0566	0.0941	1.00			
Ti	-0.1418	-0.1759	-0.3439	0.1051	1.00		
Fe^{o}	1.00						
Fe^{+3}/Fe^{+2}	0.9936	1.00				V	30 Sediments
Fe^{+3}	0.9966	0.9967					
			Fe^{+2}	1.00		VI	30 Sediments
			Ti	0.1590	1.00		
						VII	30 Sediments
							12 Iron Oxides
Fe^{o}	1.00						
Fe^{+3}/Fe^{+2}	0.7718	1.00					
Fe^{+3}	0.9977	0.7885	1.00				
			Fe^{+2}	1.00			30 Sediments
			Ti	-0.0749	1.00	XI	& 12 Iron Oxides

Table C-3. Maximum |r| Values for Elements per Wavelength Increment

ELEMENT	RUN NUMBER	.60	.65	.70	.75	.85	.90	1.00	1.05	1.15	1.20	1.25	1.50	1.60	1.70	1.75	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.50
Fe^{+3}	IX						.834	.845																
Fe^{0}	I						.662									.556			.511			.474		
	V	.405					.443									.412								
	VII		.708				.760																	
$\frac{Fe^{+3}}{Fe^{+2}}$	I		.468				.513							.362					.327			.296		
	V	.358					.386																	
	VII	.559				.578										.247								
Fe^{+3}	I					538																		
	V	.367					.401																	
	VII		.693				.749									445.								
Fe^{+2}	I				.356									.454					.438					
	VI, X				.516				.502	.502			.437			.384				.387				
	VIII											.337						.381		.381			379	
Ti	I			(+) 254							(+).385		(+).398			(+).442				(+).443			(+).496	
	XI						(+) 504																	

WAVELENGTH IN MICROMETERS

NOTE: ALL CORRELATIONS ARE NEGATIVE EXCEPT TITANIUM

Table C-4. Significance Tests $ms_1/ms_2 = F$

Run No.	N	K	$DF_2 \backslash DF_1$	F(obs)	Sig level %
I	64	40	24\39	2.356	97.5
V	30	26	4\25	37.030	99.5
VI	30	26	4\25	0.256	NS
VII	42	26	16\25	* ∞	All Levels
VIII	42	26	16\25	* ∞	All Levels
IX	22	21	1\20	* ∞	All Levels
X	30	26	4\25	0.621	NS
XI	42	26	16\25	3.351	99.5

*mean square values for deviation about the regression plane were zero and all variance was estimated as due to the regression

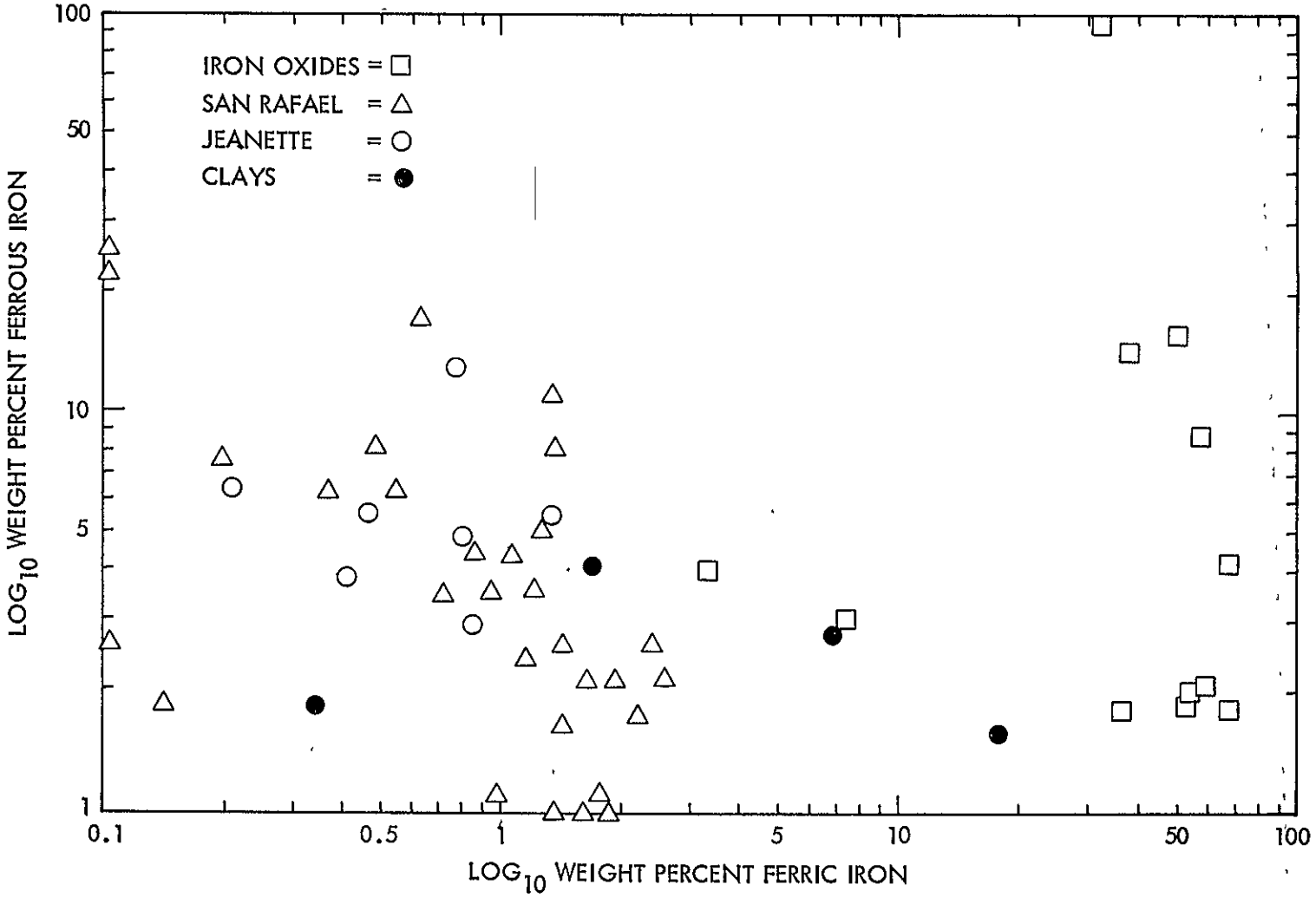


Figure C-15. Largely Independent Behavior of Ferrous Iron With Respect to Ferric Iron

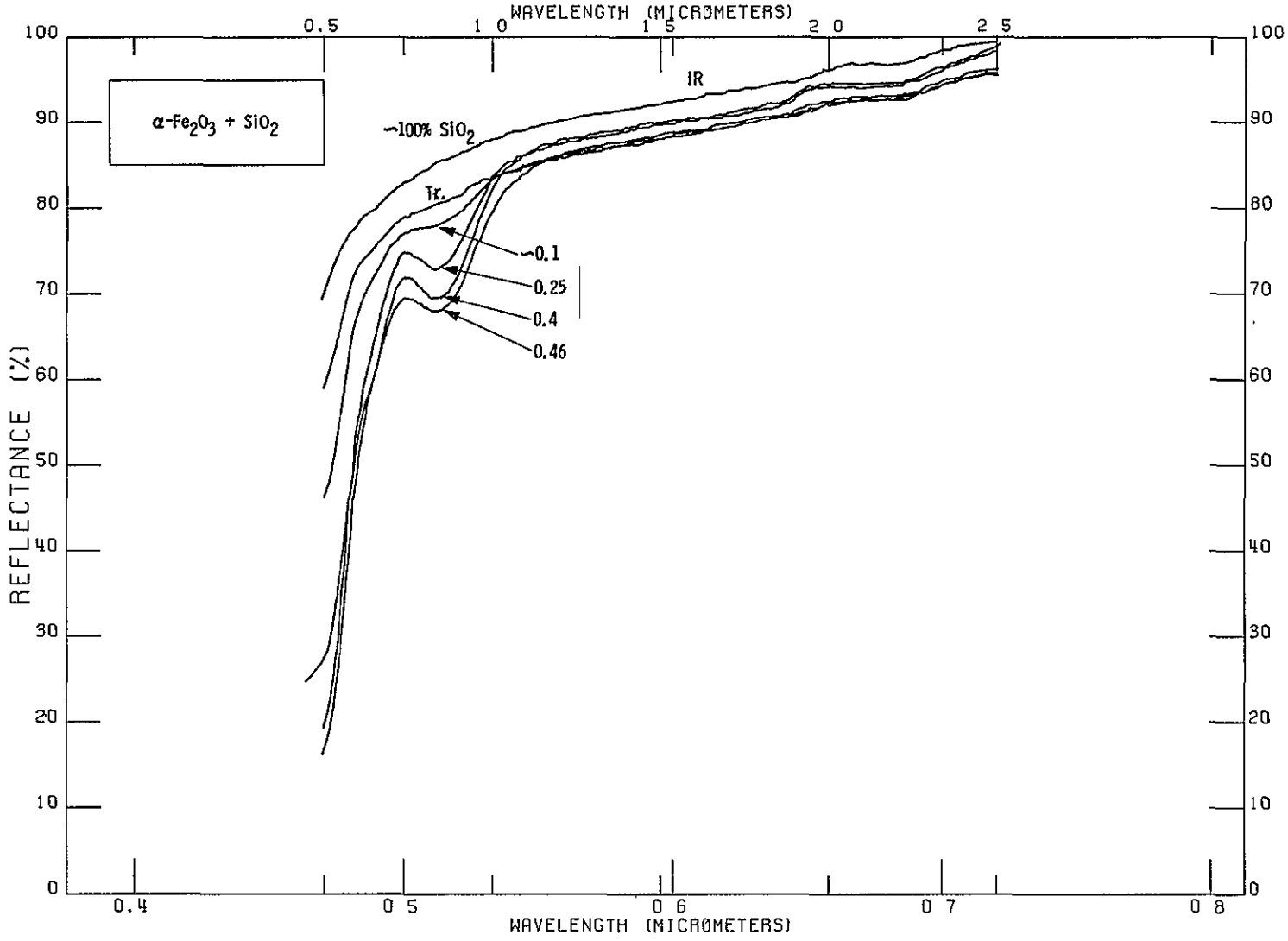


Figure C-16. Reflectance Spectra of Varying Weight Percent Iron Oxide (α-Fe_2O_3) With Quartz (SiO_2) Matrix. Numbers on curves are percent by weight α-Fe_2O_3 in Figs. C-16 through C-22.

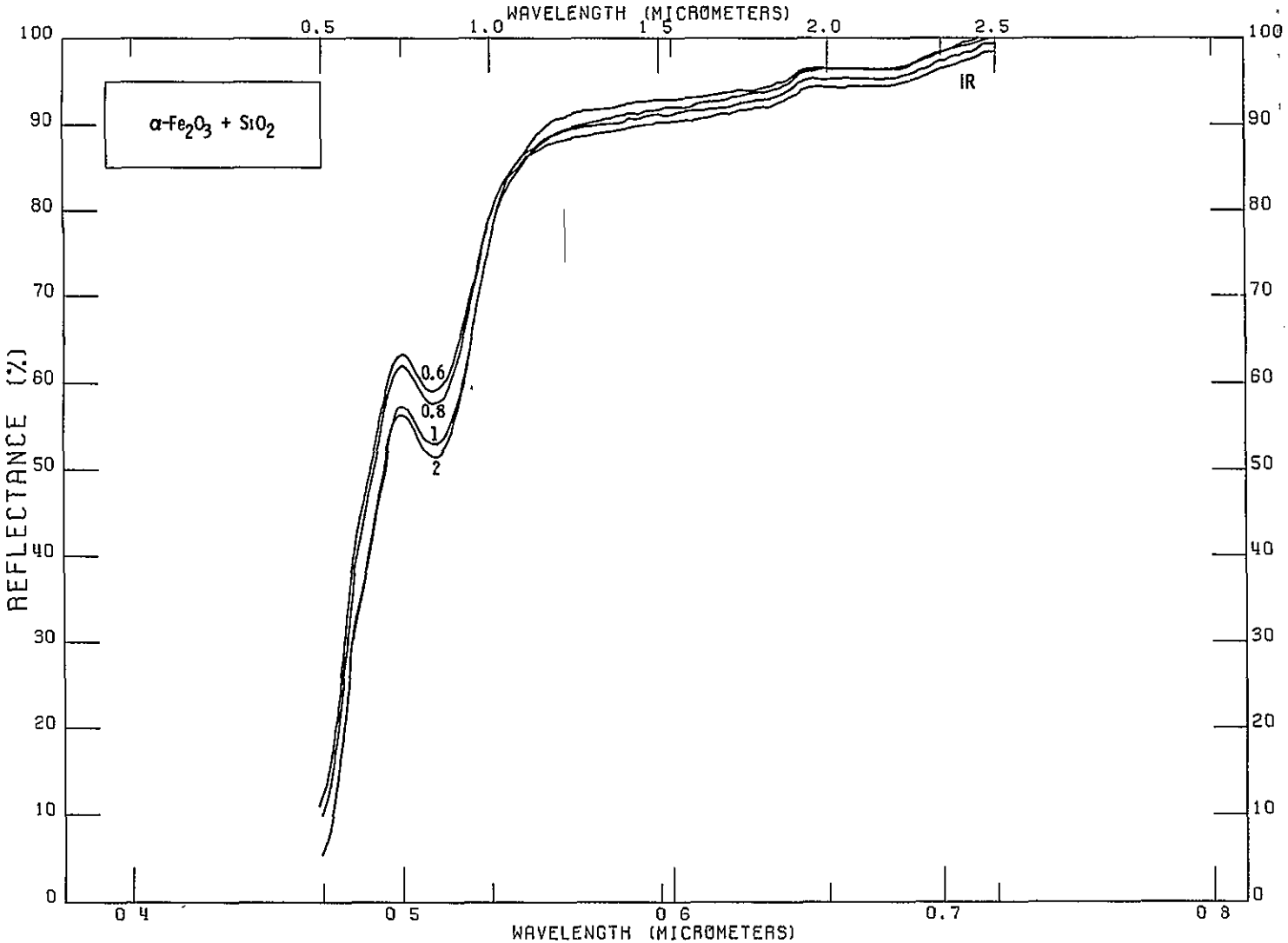


Figure C-17. Reflectance Spectra of Varying Weight Percent Iron Oxide (α-Fe_2O_3) With Quartz (SiO_2) Matrix

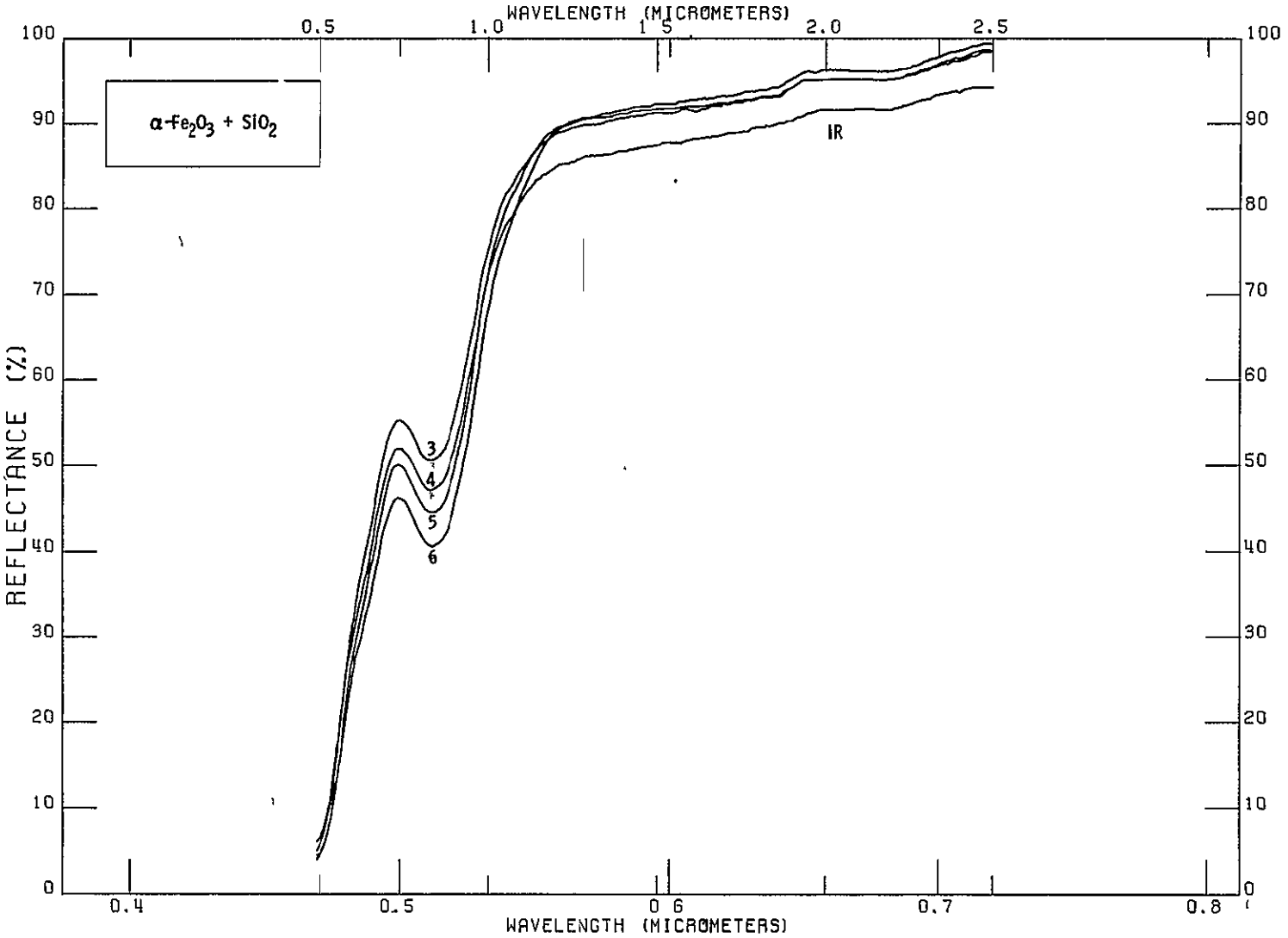


Figure C-18. Reflectance Spectra of Varying Weight Percent Iron Oxide (α-Fe_2O_3) With Quartz (SiO_2) Matrix

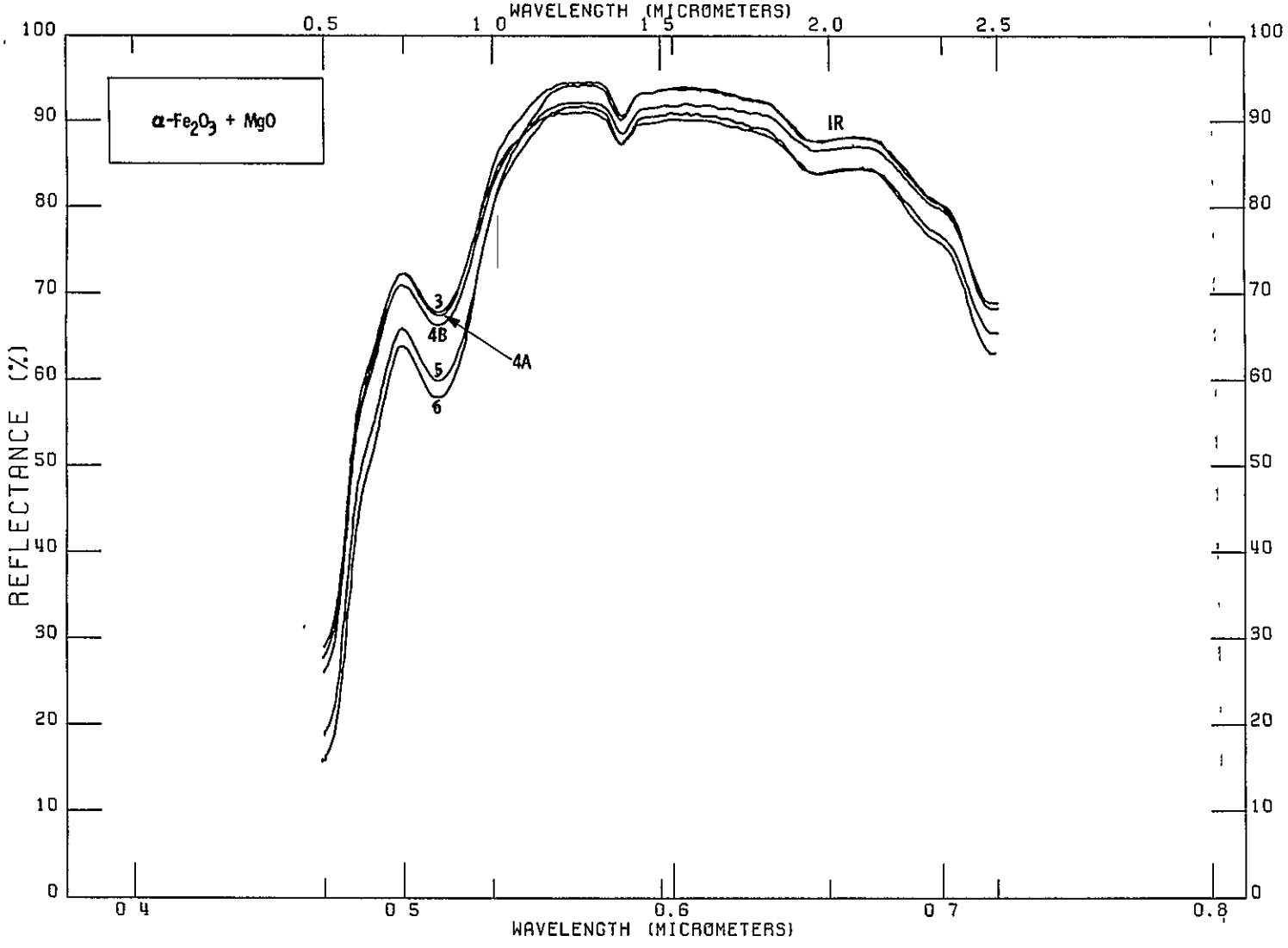


Figure C-19. Reflectance Spectra of Varying Weight Percent Iron Oxide (α-Fe_2O_3) With Magnesium Oxide (MgO) Matrix Curves A and B (4 wt. %) indicate variations in reflectance resulting from shaking (A) and subsequent regrinding (B) of the sample.

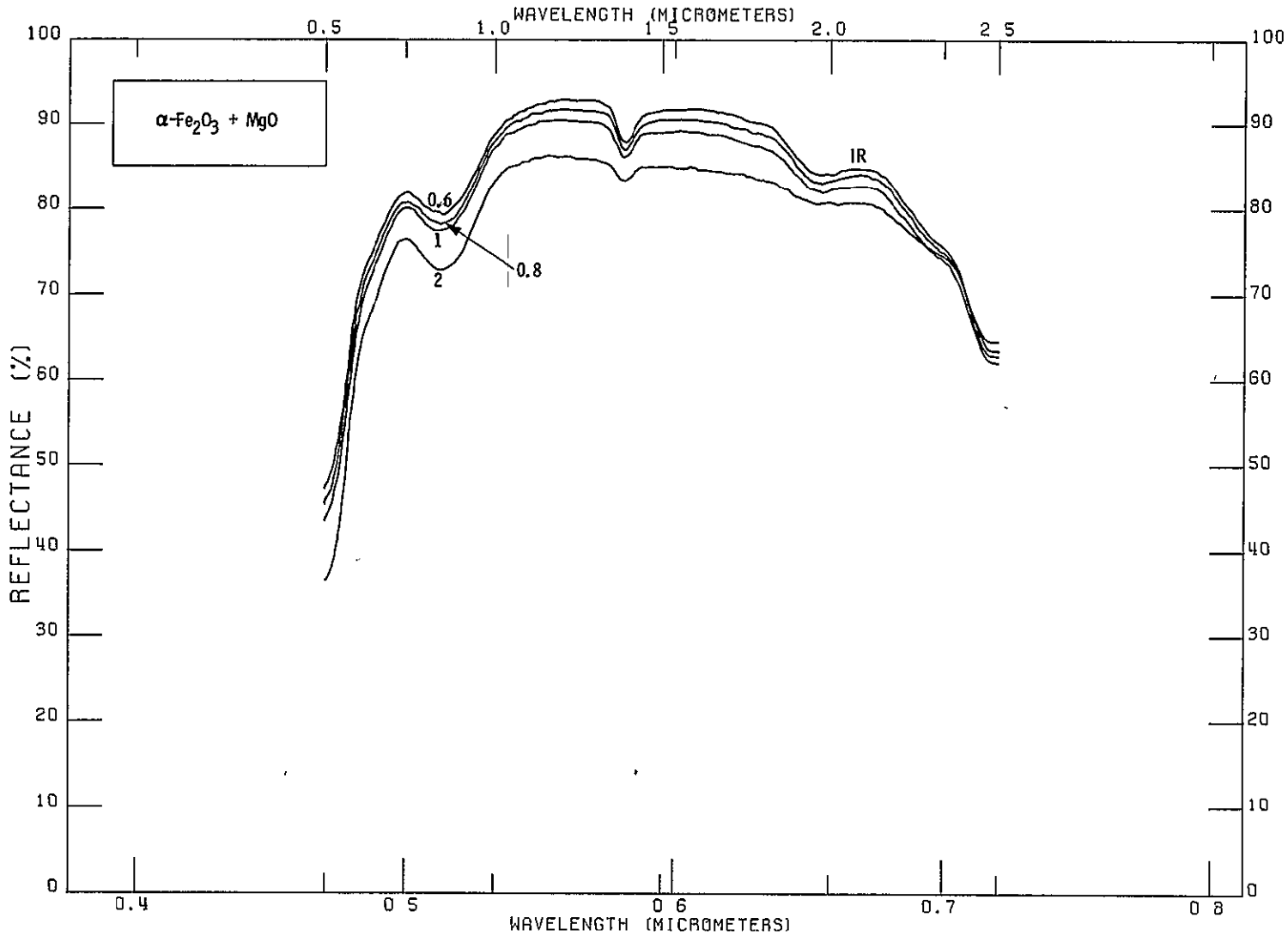


Figure C-20. Reflectance Spectra of Varying Weight Percent Iron Oxide (αFe_2O_3) With Magnesium Oxide (MgO) Matrix

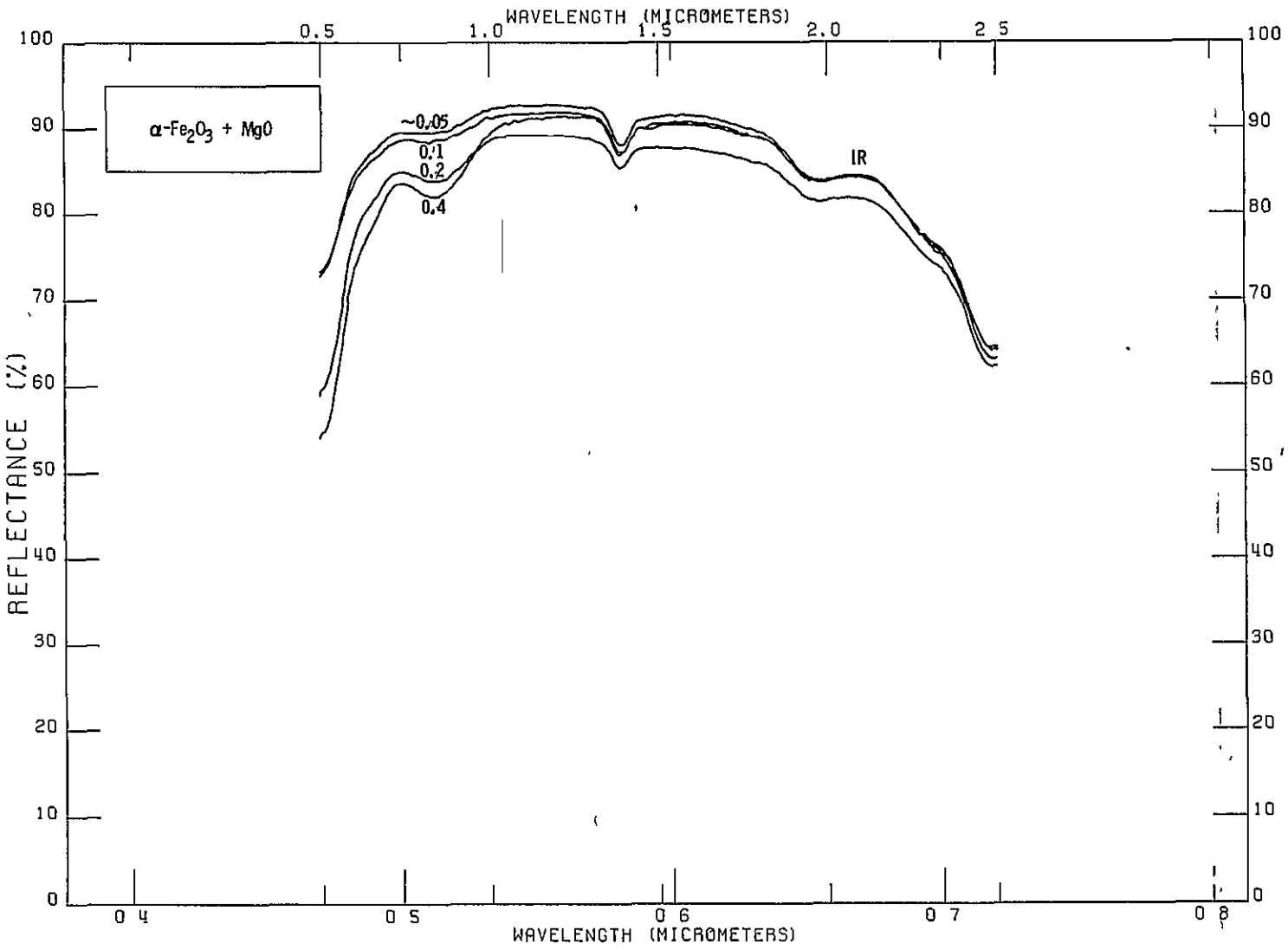


Figure C-21. Reflectance Spectra of Varying Weight Percent Iron Oxide (α-Fe_2O_3) With Magnesium Oxide (MgO) Matrix.

APPENDIX D

CATALOG OF UTAH AND POWDER RIVER FIELD SPECTRA

Red Seep - Unaltered

Date	Tape File (Sample/Fiberfax)	
05-30-77	12/13	Limestone outcrop
	14/15	Limestone chips
	16/17	Mormon tea (*Ephedra*, spp.)
	20/22	Carbonaceous shale
	24/25	Carbonaceous shale
	27/31	Gray mudstone
	33/34	Carbonaceous mudstone
	36/37	White mudstone
	40/41	Buff sandstone
	43/44	Purple mudstone
	46/50	Red mudstone
	52/53	White mudstone
	55/57	Buckwheat (*Eriogonum*, sp.)
	61/62	Limestone chips
	64/62	Limestone chips
	65/66	Grass and limestone chips
	67/70	Limestone chips
	71/74	Limestone chips
	114/115	Buff mudstone
	117/120	White mudstone
	121/122	Limestone outcrop
	123/124	Gray mudstone
	125/126	Limestone chips
	127/130	Gray mudstone
	131/132	Buff sandstone
	133/134	Green sandstone
	136/137	White mudstone
	143/144	Buff sandstone
	145/146	Gray mudstone
	147/150	Sandstone chips
	151/152	Mixed alluvium
	153/154	Mixed alluvium

Red Seep - Altered

5-30		
	2/3	Bentonite soil
	4/6	Bentonite soil
	7/10	Yellow boulder
	75/76	Yellow mudstone
	100/101	Yellow mudstone
	103/104	Yellow mudstone
	105/106	Yellow mudstone

	107/110	Yellow mudstone
	111/113	Yellow mudstone
	140/142	Gray mudstone
5-31		
	7/10	Yellow bentonitic mudstone
	13/14	Yellow bentonitic mudstone
	16/20	Yellow bentonitic mudstone
	55/60	Yellow bentonitic mudstone
	62/63	Yellow bentonitic mudstone
6-03		
	11/14	Yellow bentonitic boulder
	21/24	Gray-yellow bentonitic mudstone
	30/32	Yellow-orange mudstone
7-28		
	14/16	Yellow boulder
	20/22	Yellow mudstone
	24/22	Yellow mudstone
	26/22	Yellow mudstone
	30/22	Yellow mudstone
	32/22	Yellow mudstone
	34/22	Yellow mudstone
	36/40	Yellow-gray mudstone
	42/44	Yellow mudstone
	116/120	Multi-colored boulder
	123/125	Yellow mudstone
	150/152	Gray-yellow mudstone

Eagle - Unaltered

6-04		
	2/4	Limestone and chert chips
	6/10	Small bush
	12/14	Purple to gray mudstone
	16/20	Gray bentonite mudstone
	22/24	Brown sandstone fragments
	26/31	Brown limestone chips
	33/35	Gray bentonitic mudstone
7-26		
	5/7	Brown limestone chips and tan soil
	11/13	Gray bentonitic mudstone
	15/17	Gray soil and mixed pebbles
	21/23	Purple bentonitic mudstone
	25/27	Dark brown sandstone fragments
	31/33	Tan bentonitic mudstone

41/37	Gray shale
47/51	Purple mudstone
53/55	Brown limestone chips
57/61	Tan bentonitic mudstone
63/65	Red shaly soil
67/71	Red sandstone pebbles
73/71	Dark red sandstone
107/112	Gray bentonitic mudstone
123/122	Buff sandstone
124/125	Dark gray sandstone
132/134	Purple mudstone
137/141	Limestone chips
145/144	Mixed pebbles

Eagle - Altered

7-26

35/37	Yellow bentonitic mudstone
43/45	Tan bentonitic mudstone
75/77	Yellow-orange bentonitic mudstone
101/77	Yellow mudstone
103/105	Yellow mudstone

Arco - Unaltered

6-05

11/14	Gray mudstone
32/34	Buchhorn conglomerate

7-29

2/5	Gray mudstone
6/7	Buckhorn conglomerate
30/32	Gray mudstone
34/36	Brown limey siltstone

Arco - Altered

6-05

3/6	Yellow clay
15/21	Orange mudstone
23/25	Orange dark gray mudstone
24/26	Orange dark gray mudstone

7-29

16/7	Tan mudstone

Unaltered

5-30

157/161	Mancos, yellow siltstone
164/165	Mancos, yellow siltstone
167/165	Mancos, black shale

5-31

5/6	Mancos, buff siltstone

7-28

160/161	Mancos, buff sandstone
163/161	Mancos, Ferron sandstone
170/172	Mancos, brown sandstone
174/176	Mancos, blue gate shale
200/202	Mancos, buff sandstone

7-31

103/104	Mancos, Ferron sandstone outcrop
107/110	Mancos, Ferron sandstone outcrop
113/114	Mancos, tan shale
117/120	Mancos, Tununk shale
127/132	Dakota sandstone outcrop
134/135	Dakota sandstone w/desert varnish
141/142	Dakota sandstone, while facies
145/147	Cedar Mtn, gray bentonitic mudstone
152/153	Cedar Mtn, green-gray sandstone chips
155/157	Summerville, pink-black lephenous gypsum
171/172	Summerville, gypsum
174/177	Summerville, red, gypsiferous soil
202/203	Summerville, white gypsiferous soil
205/207	Summerville, dark limestone chips
211/214	Summerville, yellowish soil
217/221	Summerville, Red soil
223/225	Summerville, dark red siltstone
227/231	Curtis Fm, light green sandstone
233/235	Entrada Fm, red sandstone
237/241	Carmel Fm limey mudstone

Helicopter

3-30

16/0	standard field, 300'
12/0	Red Seep, Mine Dump, altered
20/0	Red Seep, Mine Dump, altered
21/0	Red Seep, limestone
22/0	Red Seep, gray bentonitic mudstone
23/0	Red Seep, purple mudstone
24/0	Red Seep, dark red sandstone

25/0	Red Seep, Buckhorn conglomerate
26/0	Red Seep, red sandstone
30/0	Red Seep, mine dump altered
32/0	standard field, 300'
33/0	Mancos Fm., buff sandstone
34/0	Mancos Fm., buff sandstone
35/0	Mancos, FM., yellow siltstone
36/0	Dakota sandstone
40/0	Cedar Mtn, gray mudstone
41/0	Buckhorn conglomerate
42/0	standard field
43/0	Mancos, Fm, yellow shale
60/0	standard field
61/0	Eagle, disturbed altered mudstone
62/0	Eagle, buckskin altered
63/0	Eagle, gray mudstone
64/0	Eagle, salmon bentonitic shale
65/0	Saltwash member
66/0	standard field
70/0	Eagle, dark brown limestone
71/0	Eagle, pink alluvium
72/0	Eagle, red "
73/0	Eagle, white bentonitic mudstone
74/0	Summerville Fm, dark pink sandstone
75/0	Curtis Fm, white sandstone
76/0	Entrada Fm - red
77/0	Carmel Fm - gray sandstone
100/0	standard field, 300'

Powder River

Blowout Anomaly 9-16-75

BA-1	Buff sandstone
BA-2	Buff sandstone
BA-3	Buff sandstone
BA-4	Buff sandy soil
BA-5	Yellow soil
BA-6	Yellow soil
BA-7	Buff sandstone
BA-8	Yellow red sandstone
BA-9	Yellow sandstone
BA-10	Red sandstone
BA-11	Weathered red sandstone

Alcova - Area 9-17-75

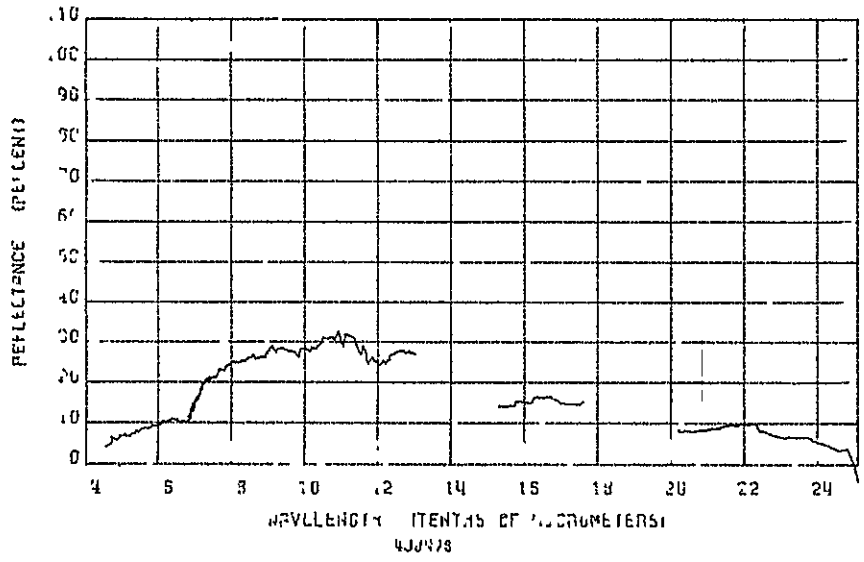
AL-1	Chugwater Fm - gray limestone, Alcova member
AL-2	Chugwater Fm - gray limestone, Alcova member
AL-3	Chugwater Fm - gray limestone, Alcova member
AL-4	Chugwater Fm - gray limestone, Alcova member
AL-5	Jelm Fm., red sandstone
AL-6	Nugget Fm., white sandy soil
AL-7	Sundance Fm., white sandstone
AL-8	Sundance Fm., red soil
AL-9	Sundance Fm., red sandstone
AL-10	Sundance Fm., red soil
AL-11	Sundance Fm., red white sandstone
AL-12	Sundance Fm., white sandstone
AL-13	Sundance Fm., red siltstone
AL-14	Sundance Fm., gray sandstone
AL-15	Sundance Fm., buff shale
AL-16*	Sundance Fm., tan sandstone
AL-17*	Sundance Fm., gypsum
AL-18*	Sundance Fm., gypsum
AL-19*	Morrison Fm., red sandstone
AL-20	Morrison Fm., purple shale
AL-21	Morrison Fm., yellow sandstone
AL-22	Morrison Fm., gray shale
AL-23	Morrison Fm., red-gray shale
AL-24	Morrison Fm., gray sandstone
AL-25	Morrison Fm., gray shale
AL-28	Cloverly, Fm., buff sandstone
AL-29	Chugwater Fm., red shale
AL-30	Chugwater Fm., gray limestone
AL-31	Chugwater Fm., red soil
AL-32	Chugwater Fm., purple shale
AL-33	Chugwater Fm., buff sandstone
AL-34	Chugwater Fm., red sandstone

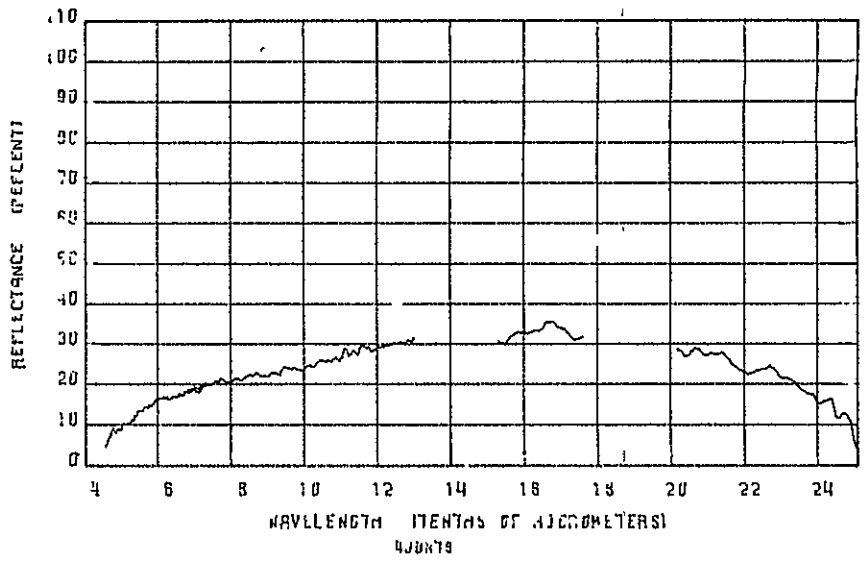
Jeanette Mine Area

JN-1	Wastch Fm., pink sandy soil
JN-2	Wastch Fm., pink sandstone
JN-3	Wastch Fm., pink sandstone
JN-4	Wastch Fm., gray sandstone
JN-5	Wastch Fm., yellow, limonitic sandstone
JN-6	Wastch Fm., yellow red sandstone
JN-7	Wastch Fm., red soil
JN-8	Wastch Fm., red sandstone
JN-9	Wastch Fm., gray shale
JN-11	Wastch Fm., red and gray soil
JN-12	Wastch Fm., buff soil
JN-13	Wastch Fm., buff soil
JN-14	Wastch Fm., buff, gray soil

*Spectra not given

JN-15	Wastch Fm., buff, gray soil
JN-16	Wastch Fm., buff, sandstone
JN-17	Wastch Fm., yellow-buff sandstone
JN-18	Wastch Fm., yellow sandstone
JN-19	Wastch Fm., red sandstone
JN-20	Wastch Fm., buff sandstone
JN-21	Wastch Fm., gray shale


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)
S/MORRISON FEA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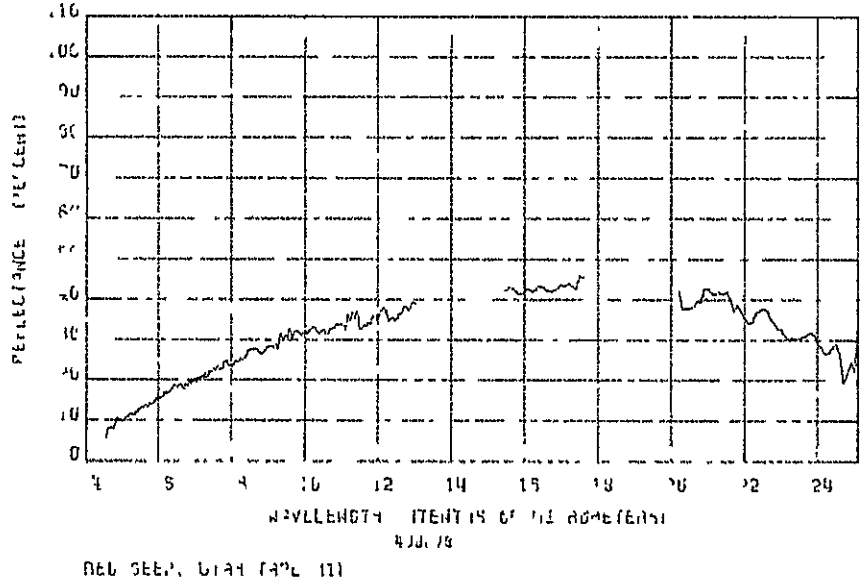
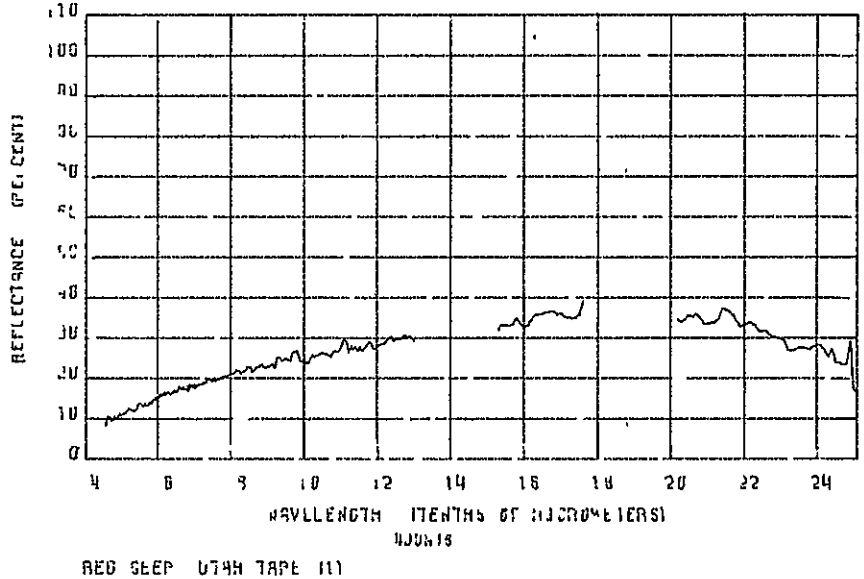
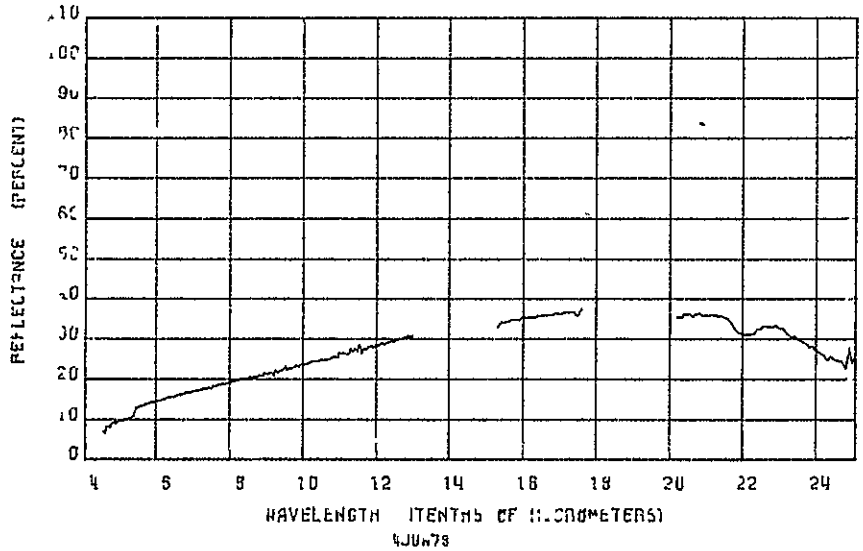
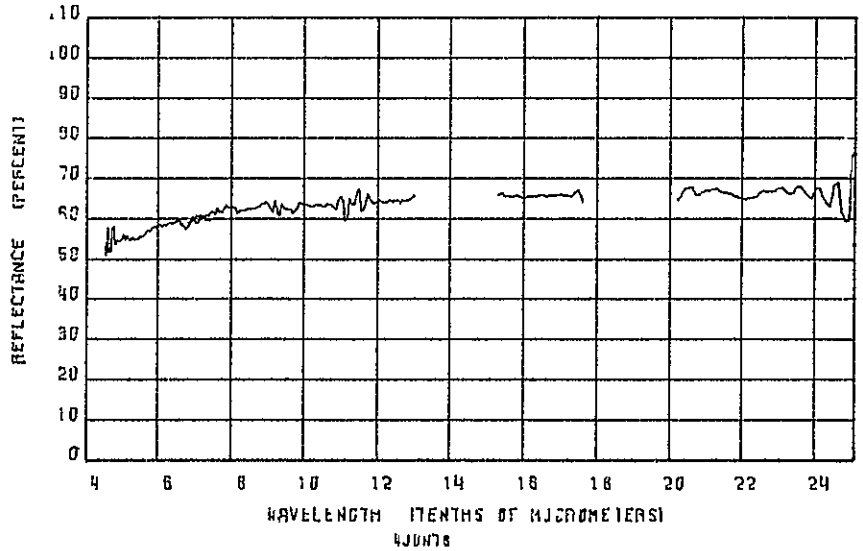
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)
7/CARB.+ANTIDUS SLT


WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)

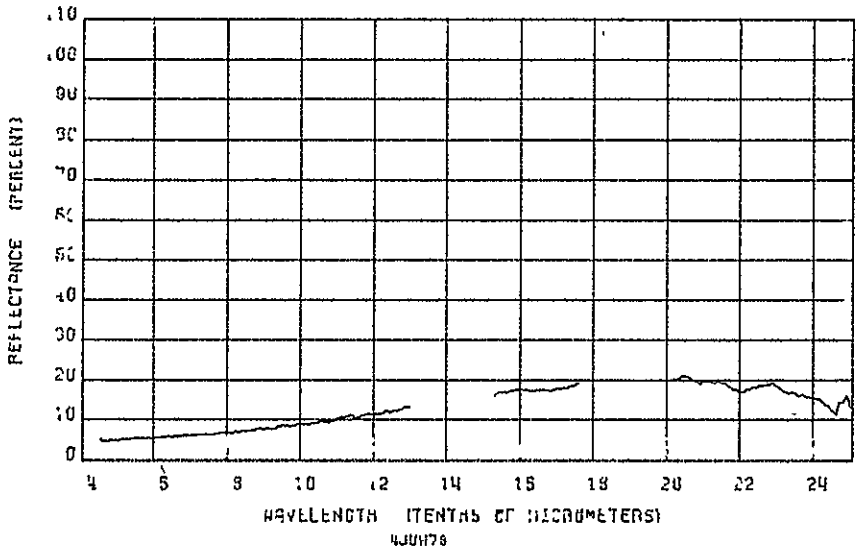

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP UTAH TAPE (1)
5/CRUSHED LIMES



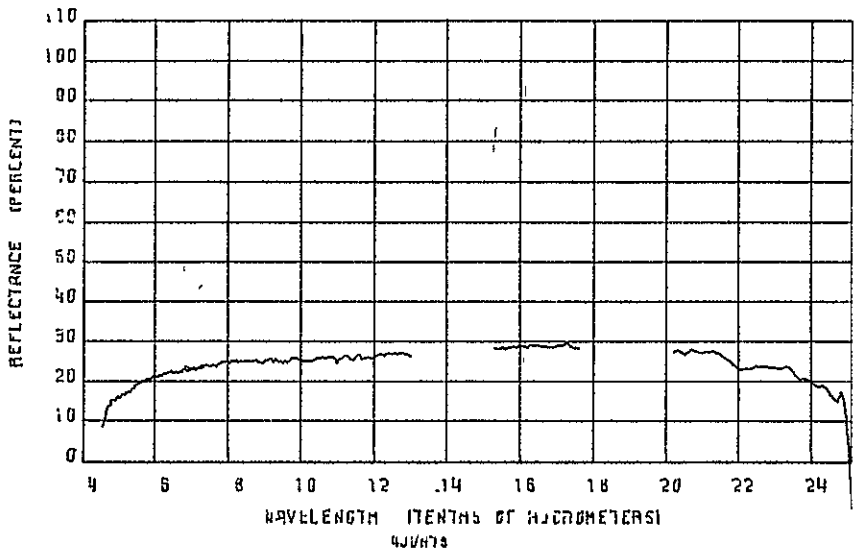
RED SEEP, UTAH TAPE (1)
10/CARBONACEOUS SOIL 530P 33/ 34



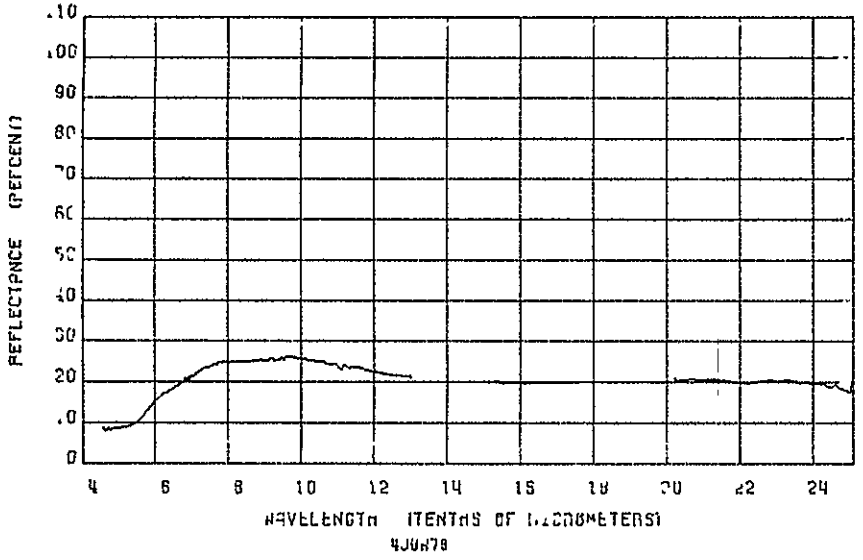
RED SEEP, UTAH TAPE (1)
11/WHT MUSTN 530P 36/ 37



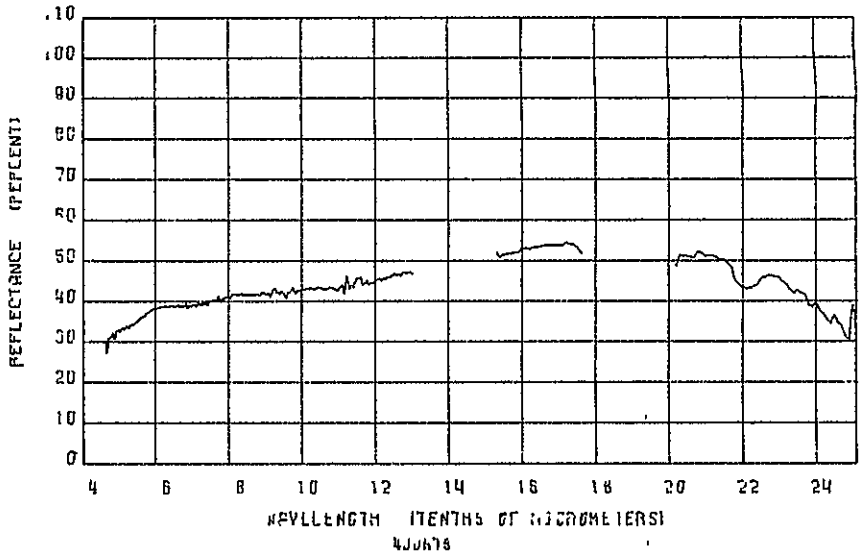
RED SEEP, UTAH TAPE (1)
9/BLK CARBON SAND 530P 24/ 25



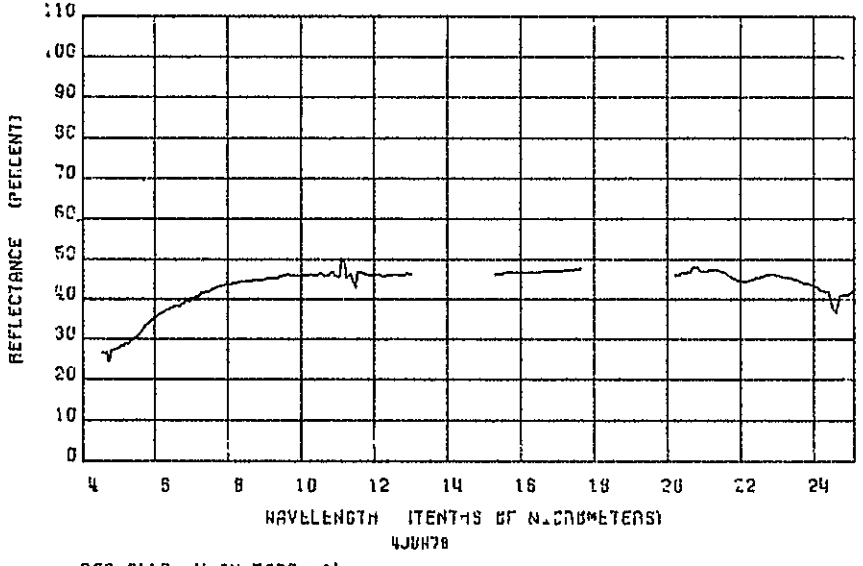
RED SEEP, UTAH TAPE (1)
9/GRY MUSTN 530P 27/ 31



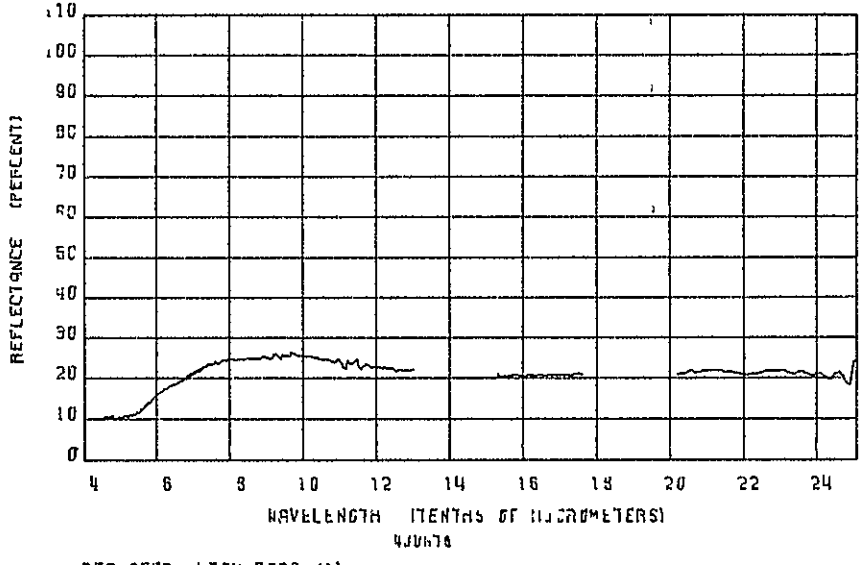
RED SEEP, UTAH TAPE (1)
14/RD MUSTN 530P 46/ 50



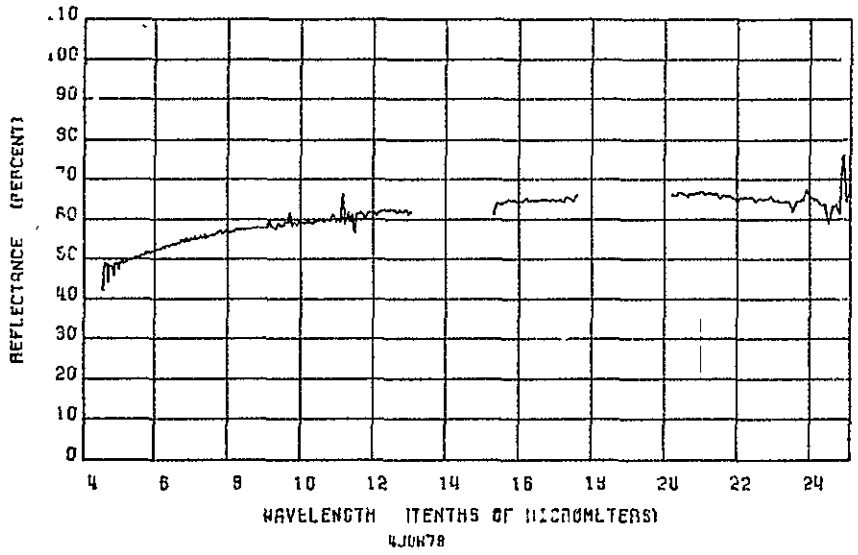
RED SEEP, UTAH TAPE (1)
15/WHT MUSTN 530P 52/ 53

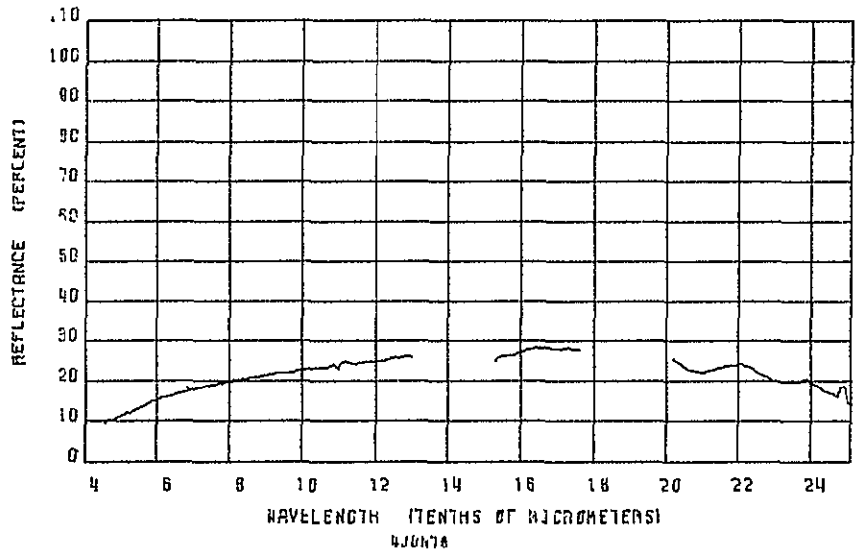


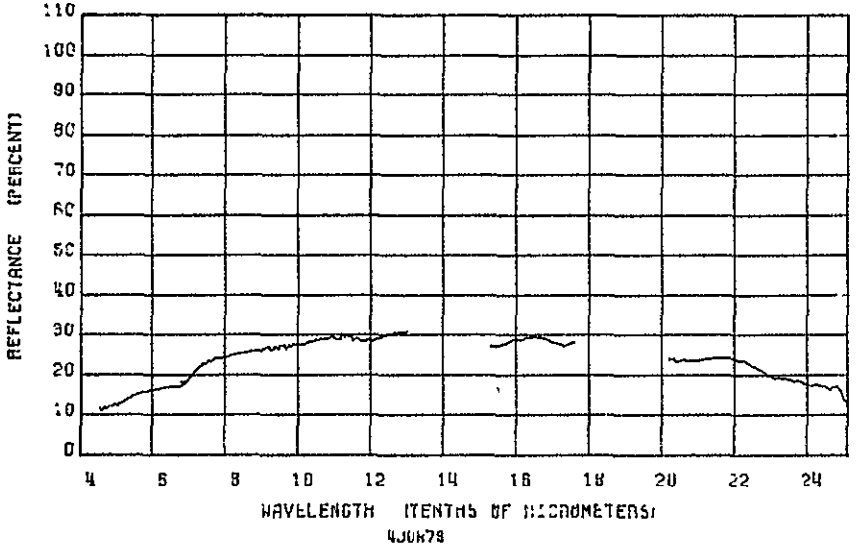
RED SEEP, UTAH TAPE (1)
12/35 LENS 530P 40/ 41

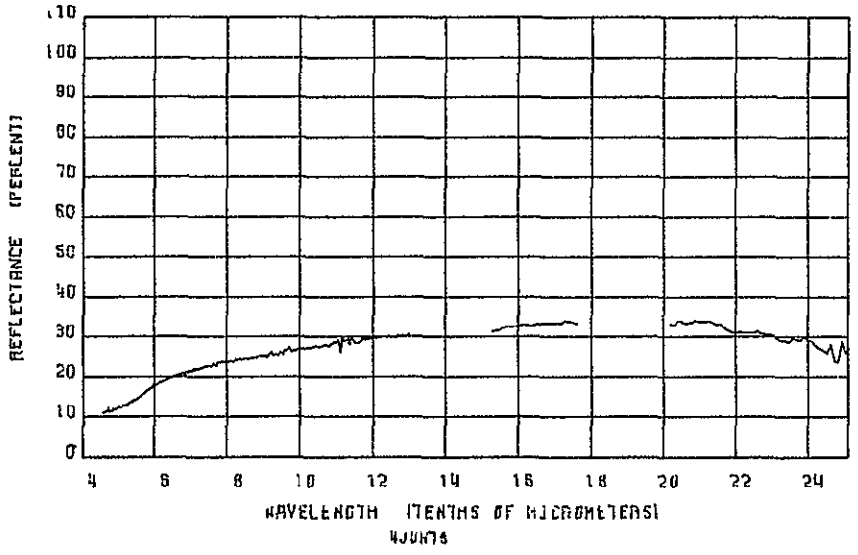


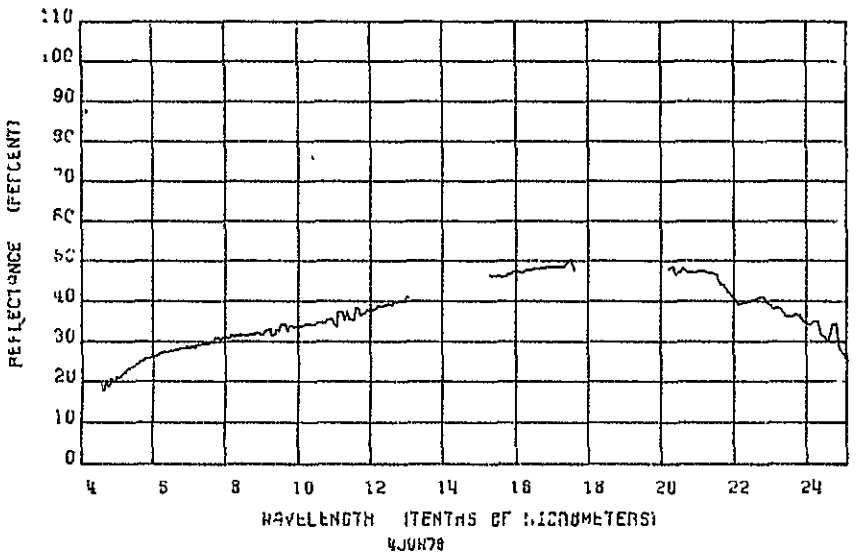
RED SEEP, UTAH TAPE (1)
13/PPPL MUSTN 530P 43/ 44


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
19/GRASS & LS
5:30P 64/ 62

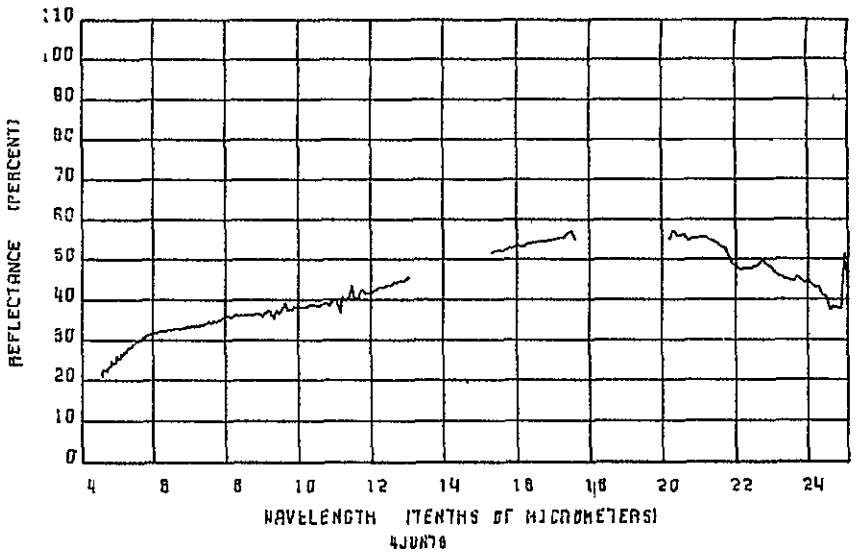

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
19/GRASS
5:30P 65/ 66


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
15/BUCKWHEAT?
5:30P 55/ 57

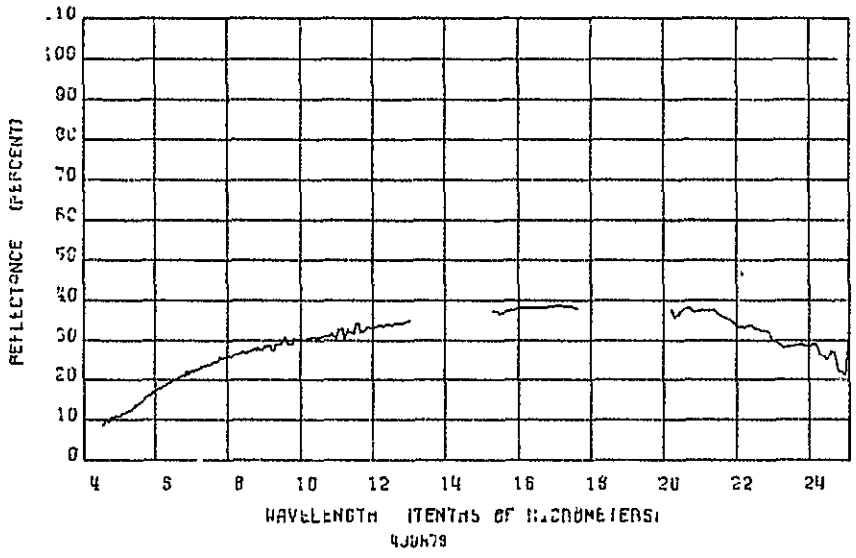

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
17/GRS & LS SLP DEB
5:30P 61/ 62



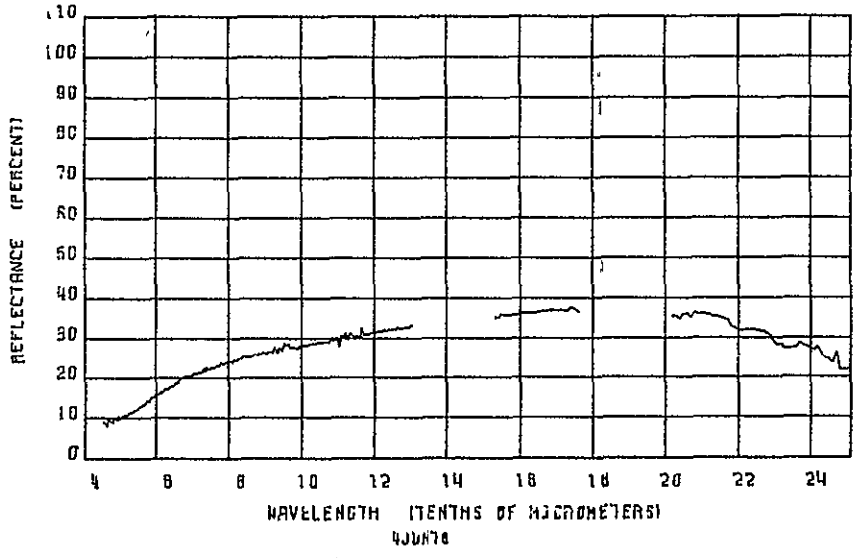
RED SEEP, UTAH TAPE (1)
27/BASALT MOSTN
530P 114/115



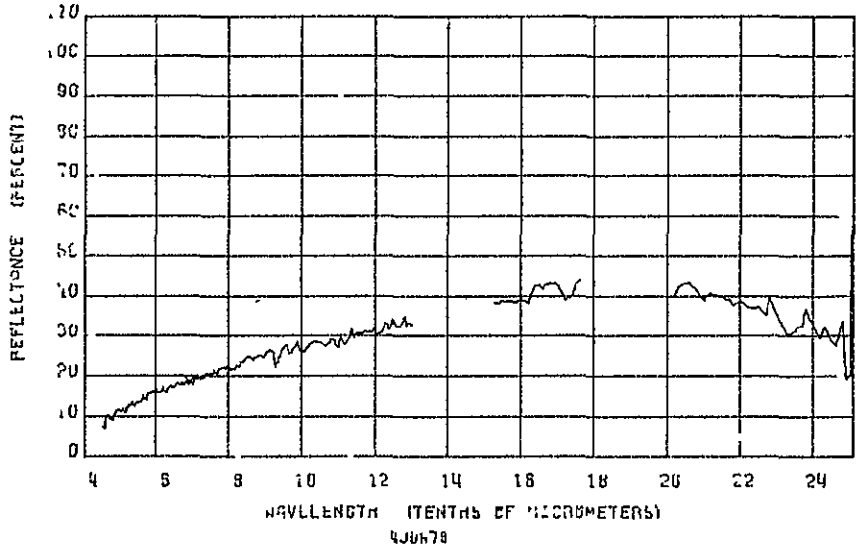
RED SEEP, UTAH TAPE (1)
28/RHT MOSTN
530P 117/120



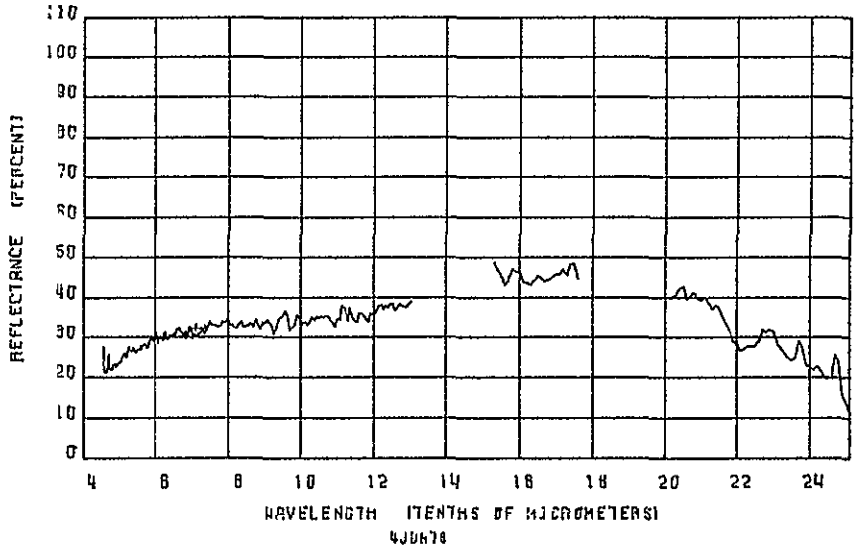
RED SEEP, UTAH TAPE (1)
20/LS DEBRIS
530P 67/ 70



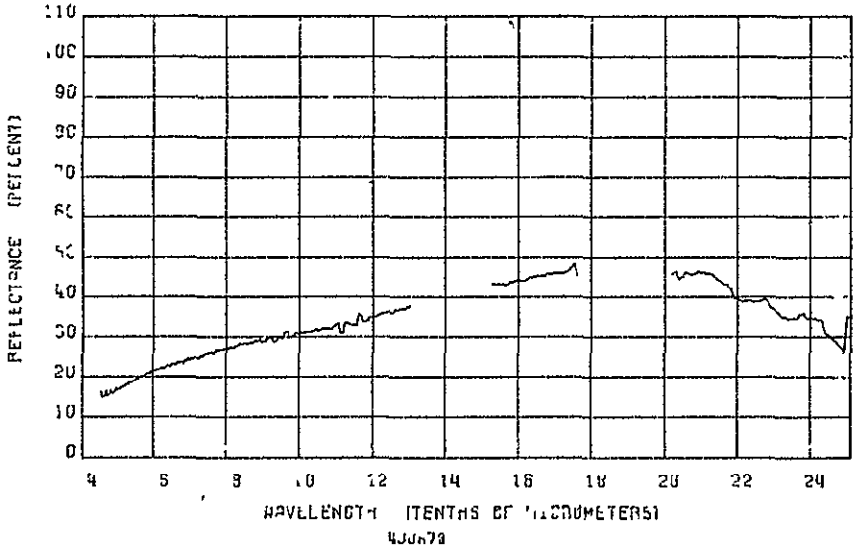
RED SEEP, UTAH TAPE (1)
21/LS DEBRIS
530P 71/ 74



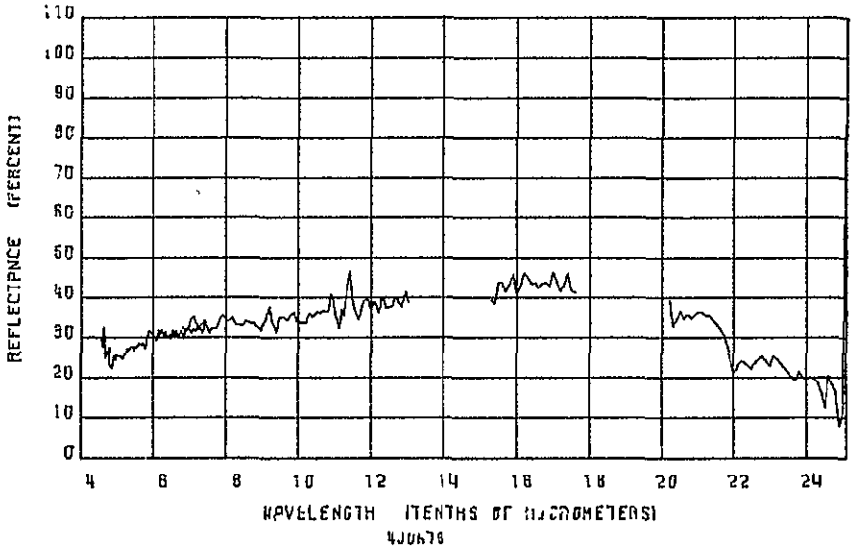
RED SEEP, UTAH TAPE (1)
31/LS FLOAT 530P 125/126



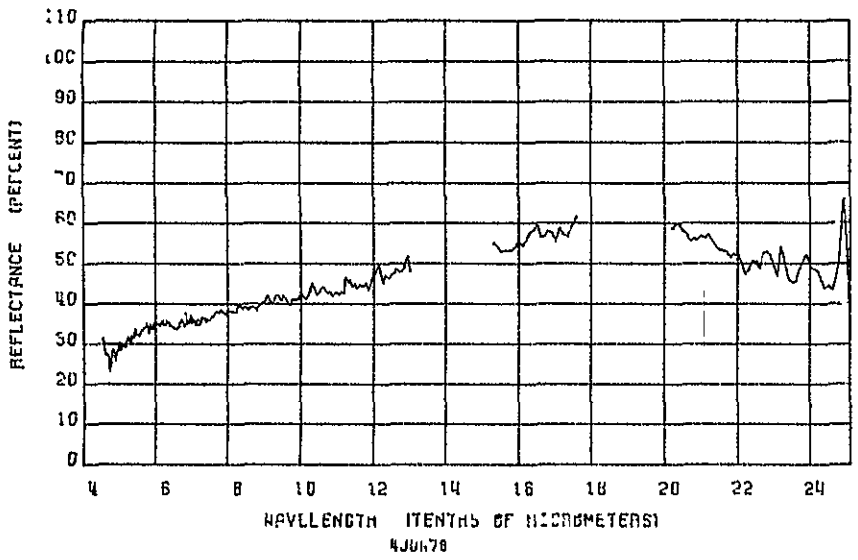
RED SEEP, UTAH TAPE (1)
32/UNALT GRY MUSTN 530P 127/130



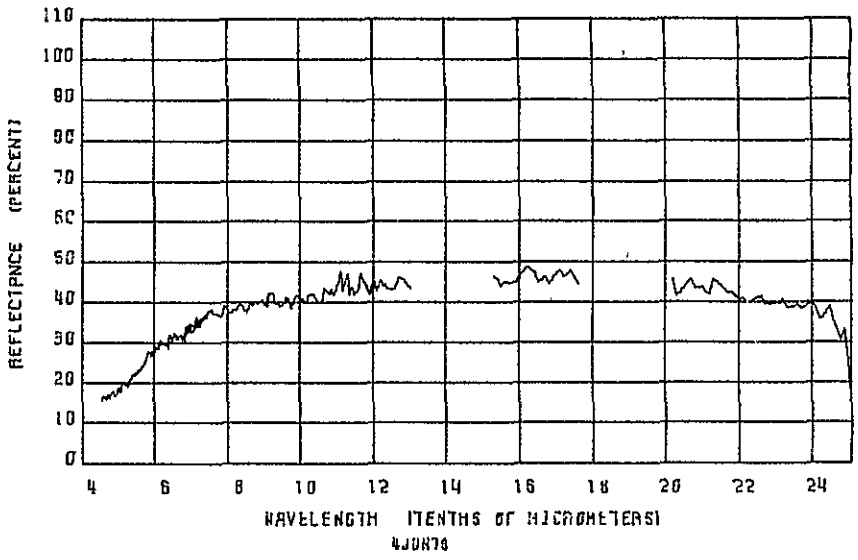
RED SEEP, UTAH TAPE (1)
29/LS LENS 530P 121/122



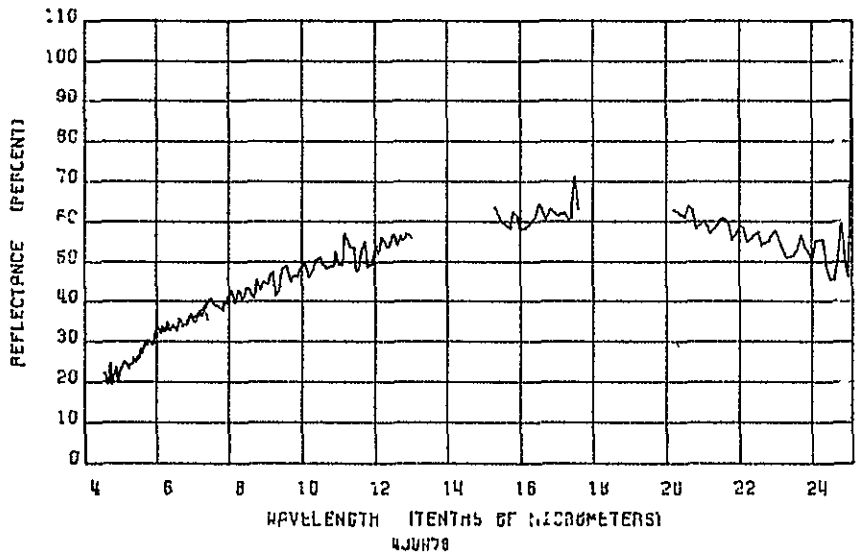
RED SEEP, UTAH TAPE (1)
30/UNALT GRY MUSTN 530A 123/124



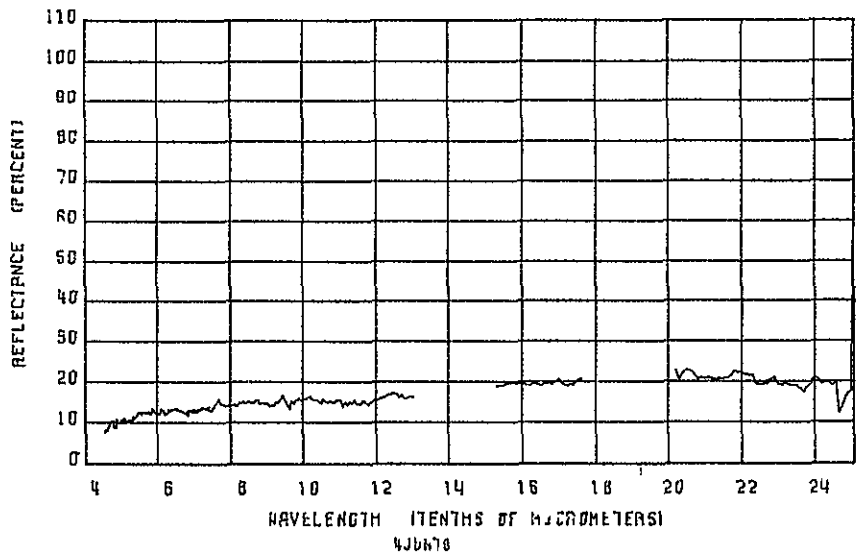
RED SEEP, UTAH TAPE (1)
35/WHT MOSTN
S30P 135/137



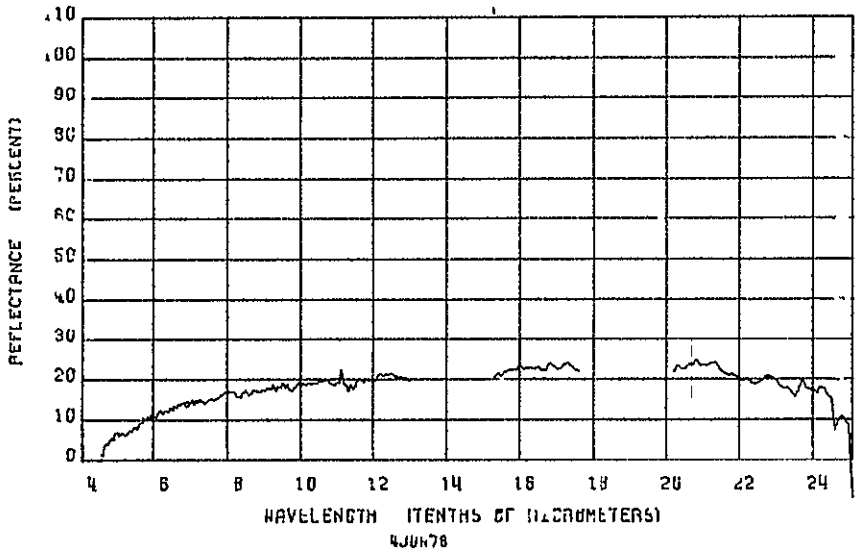
RED SEEP, UTAH TAPE (1)
37/SS GTC
S30P 143/144



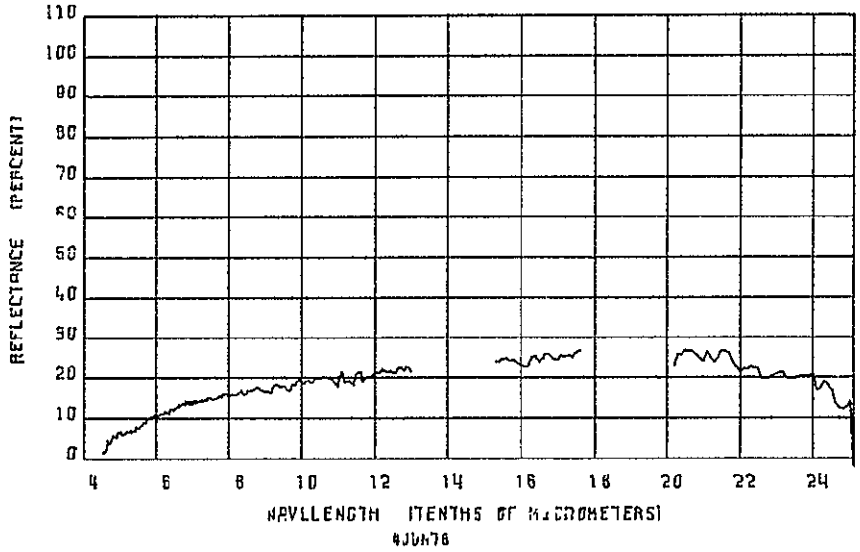
RED SEEP, UTAH TAPE (1)
33/SS
S30P 131/132



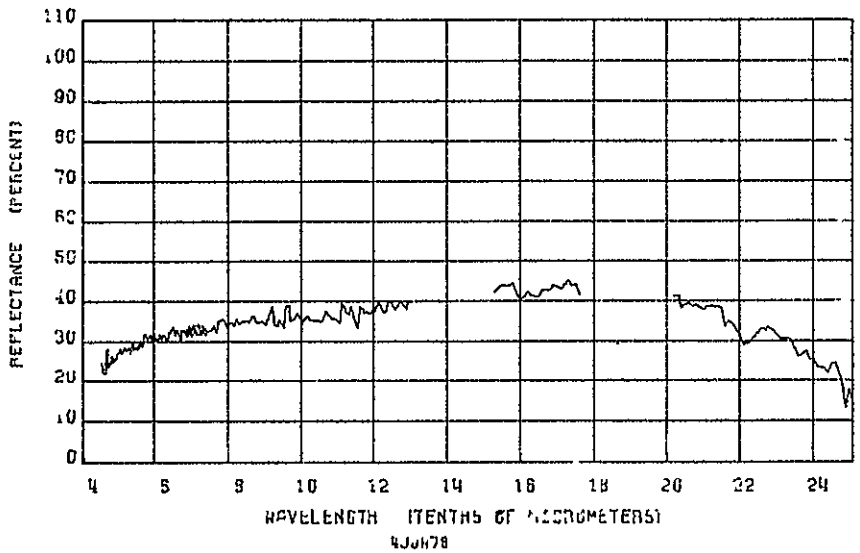
RED SEEP, UTAH TAPE (1)
34/GRN SS
S30P 133/134



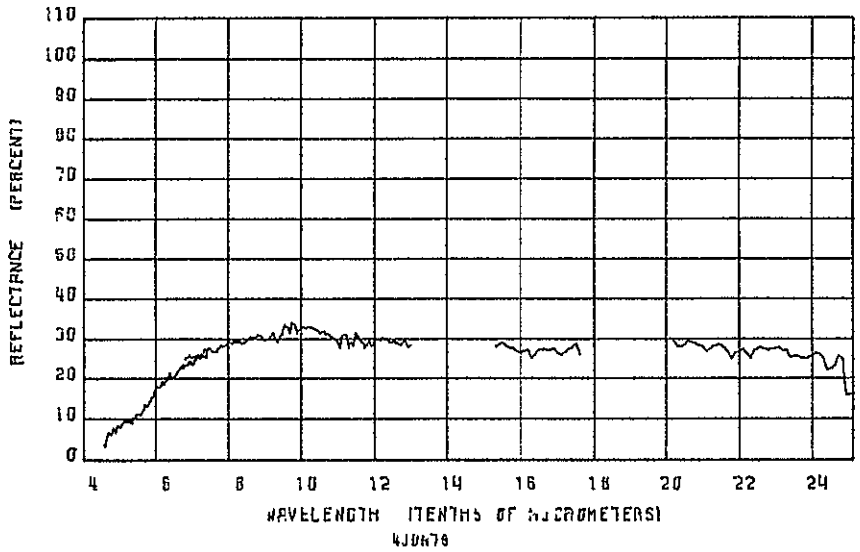
RED SEEP, UTAH TAPE (1)
40/ALUVIAL SURF
530P 151/152



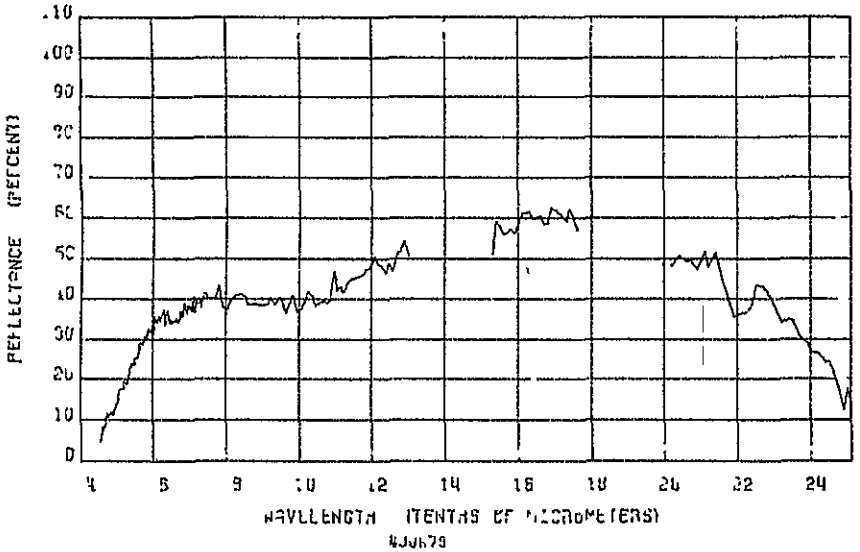
RED SEEP, UTAH TAPE (1)
41/ALUVIAL SURF
530P 153/154

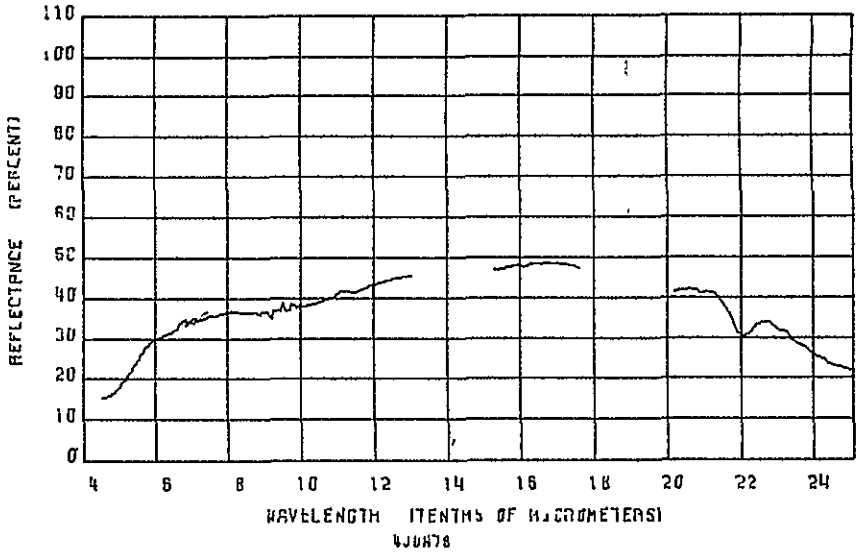


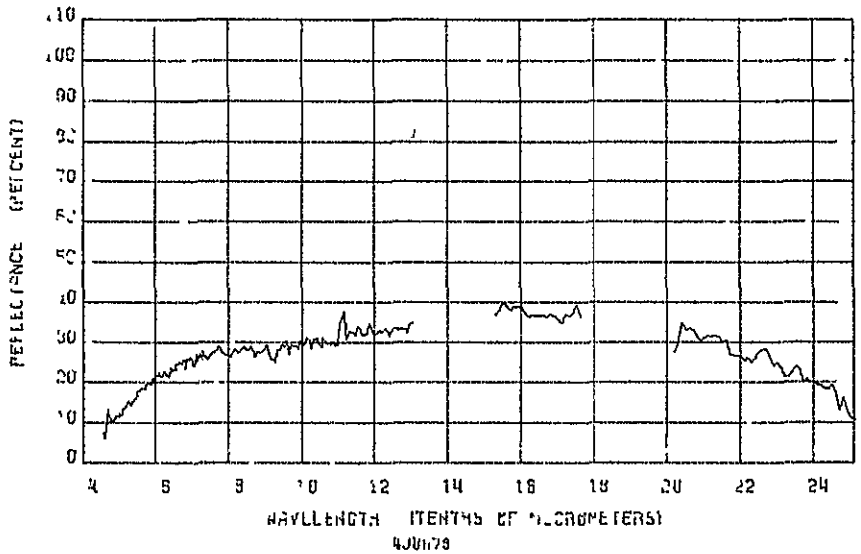
RED SEEP, UTAH TAPE (1)
38/GRY MUSTN
530P 145/146

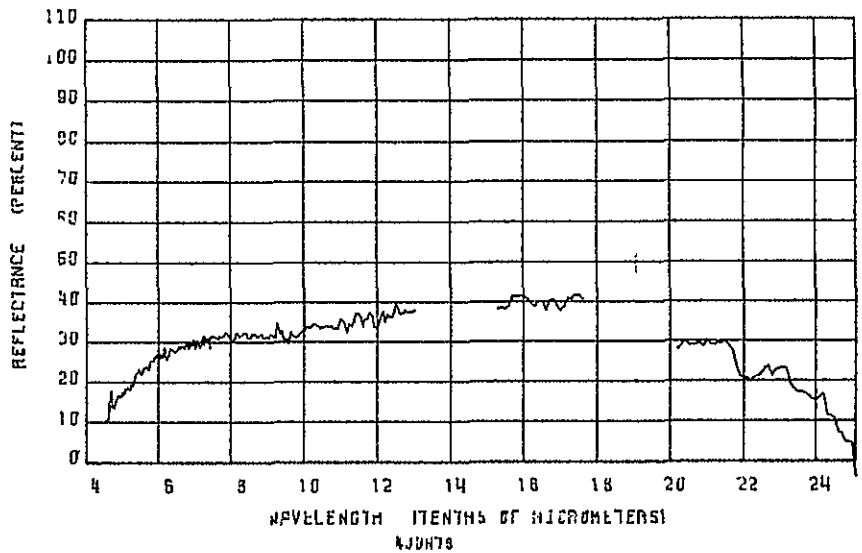


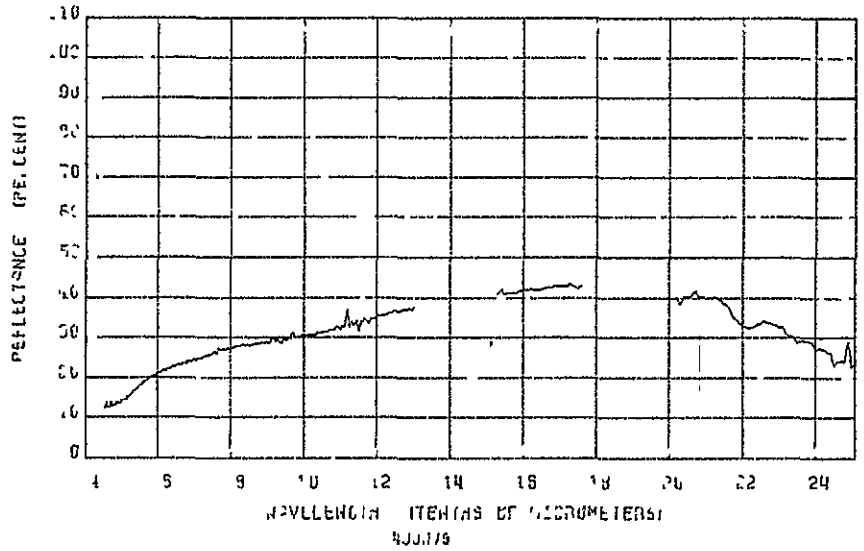
RED SEEP, UTAH TAPE (1)
39/SM SLOR FLOPT
530P 147/150


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED CEEP, UTAH TAPE (1)
3/INTSLY ALT ROCK


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)
22/ALT 50' BELOW

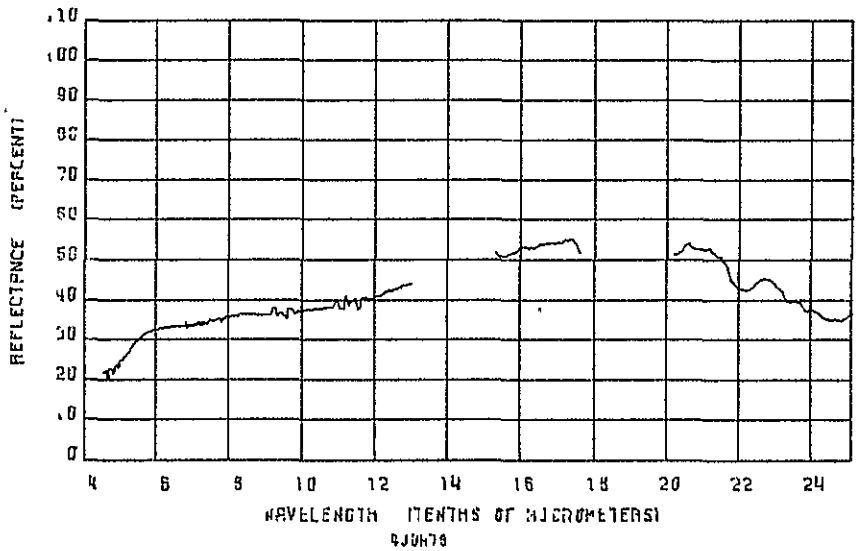

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)
1/MINE DUMP


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (1)
2/MINE DUMP



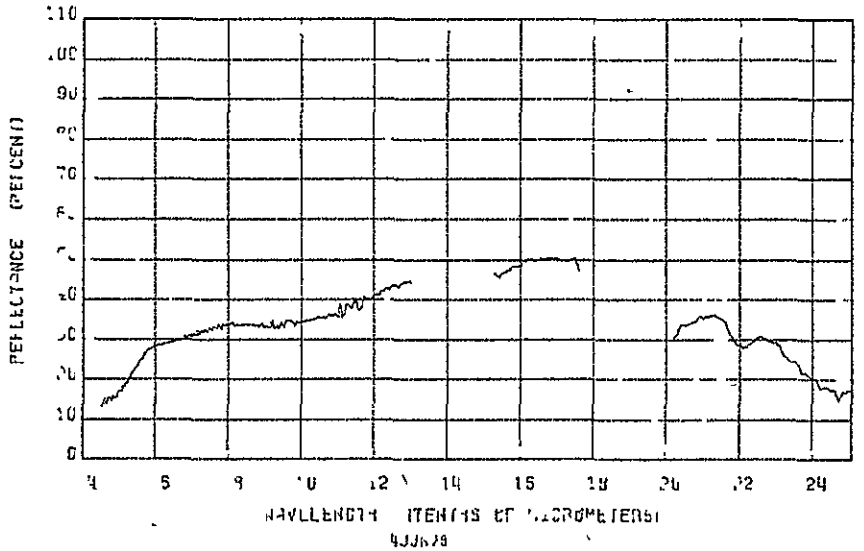
RED SEEP, UTAH TAPE (1)
24/MOSIN 20' DWN

S26A 105/106



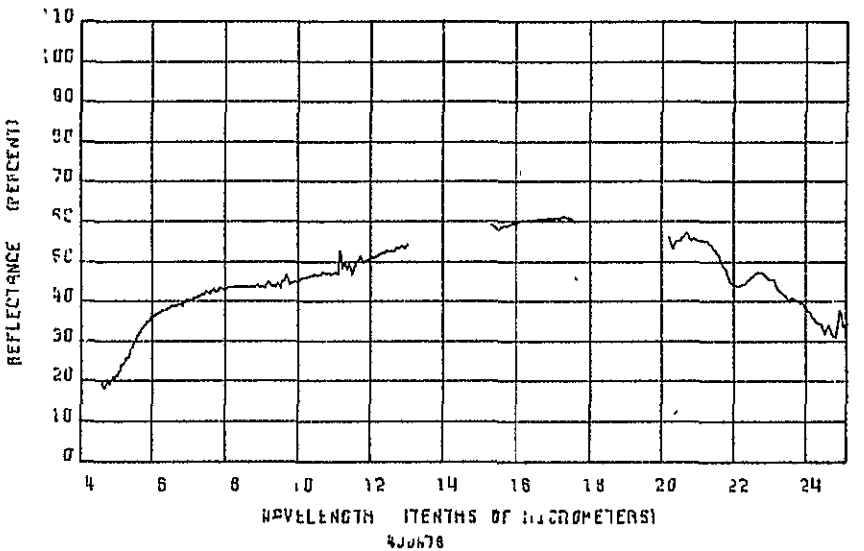
RED SEEP, UTAH TAPE (1)
25/MOSIN

S30F 107/110



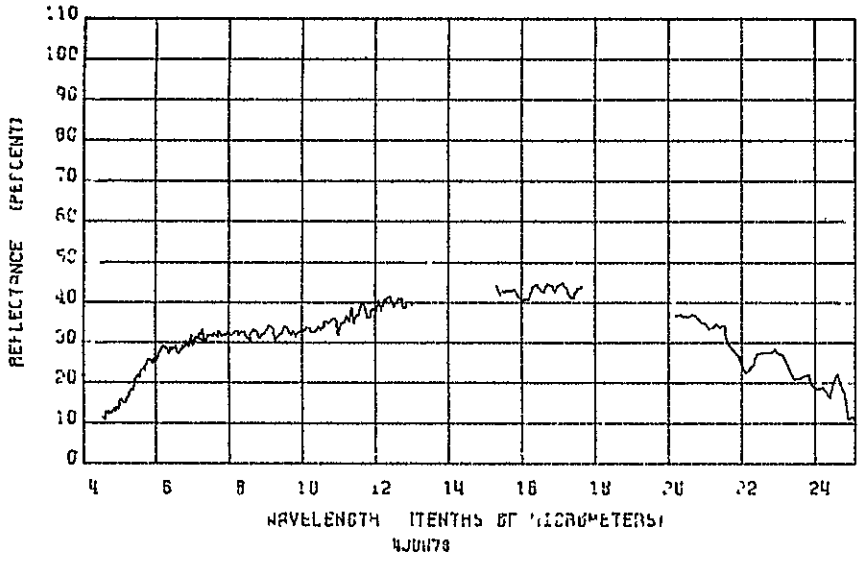
RED SEEP, UTAH TAPE (1)
22A/BK BELOW SURF

S10A 102/10



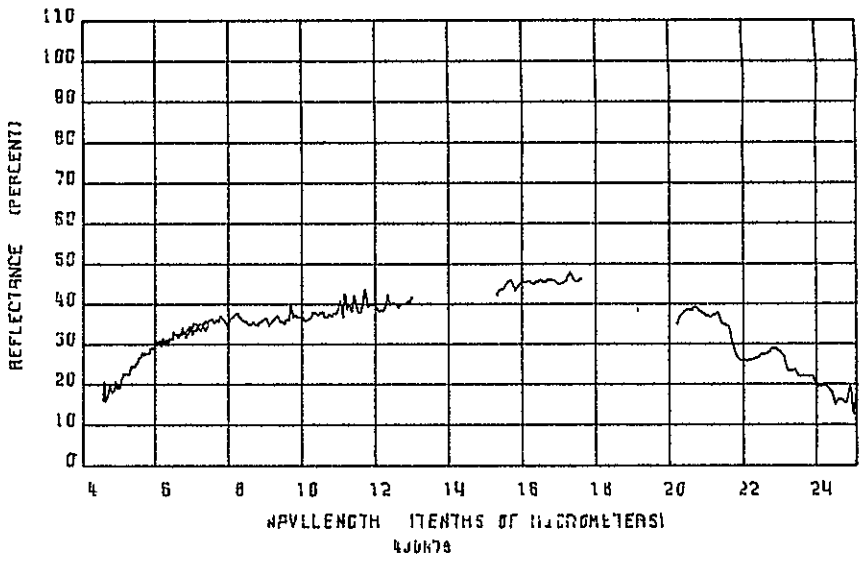
RED SEEP, UTAH TAPE (1)
23/ALT 7' DWN SEC

S30A 103/104



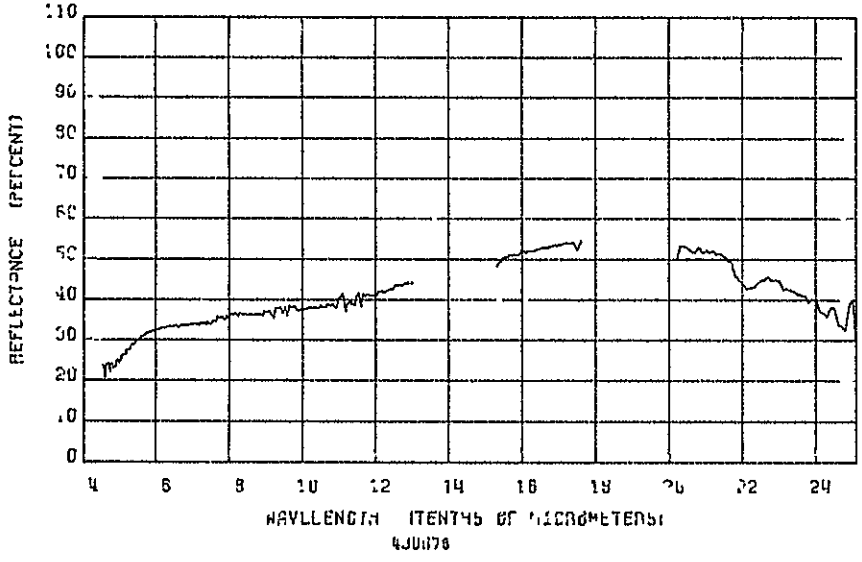
RED SLEP, UTAH TAPE (2)

530A 7/ 10



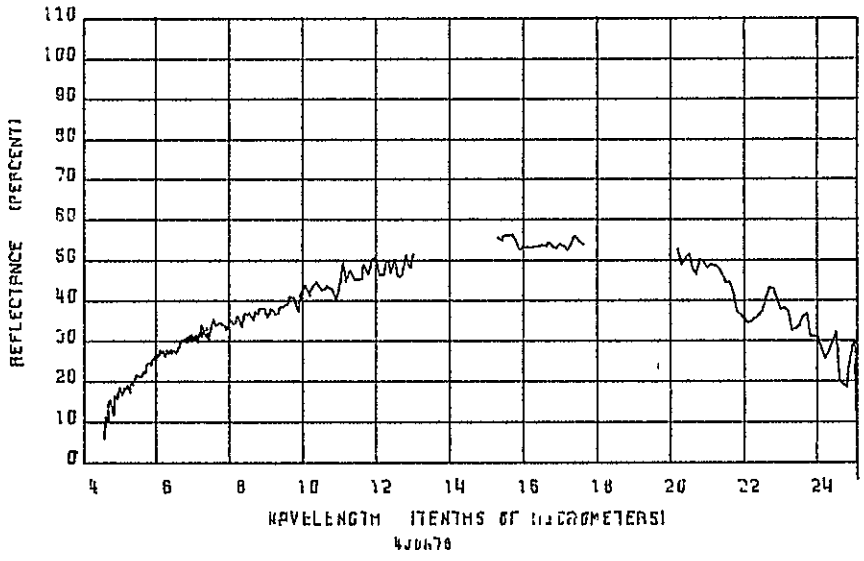
RED SEEP, UTAH TAPE (2)

530A 13/ 14



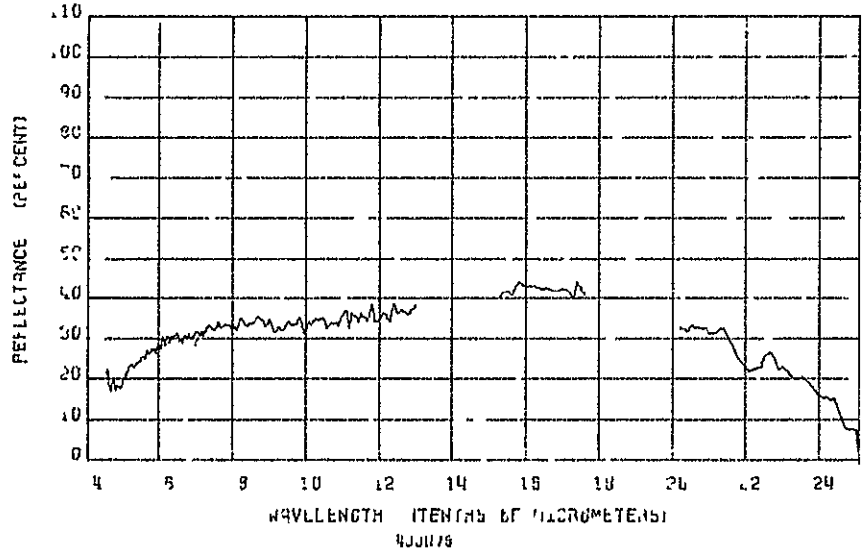
RED SEEP, UTAH TAPE (1)
25/GRN-GRY MUD

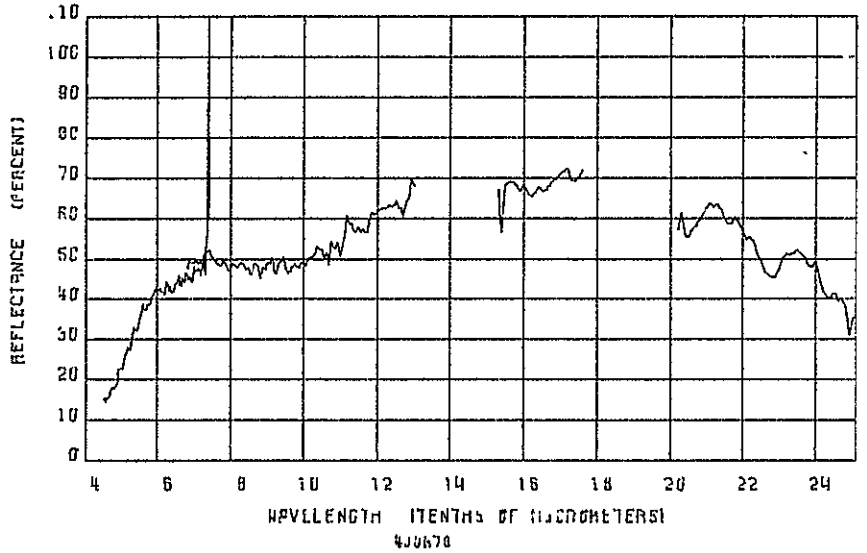
530A 111/113

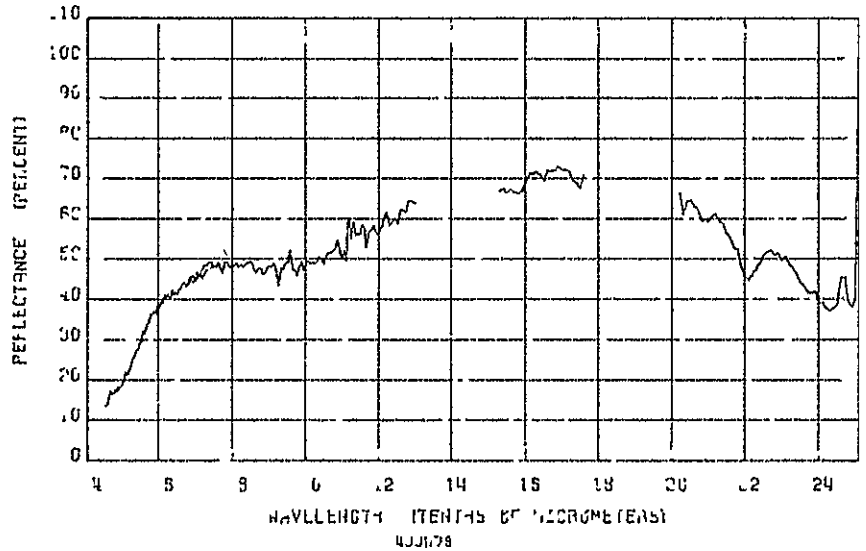


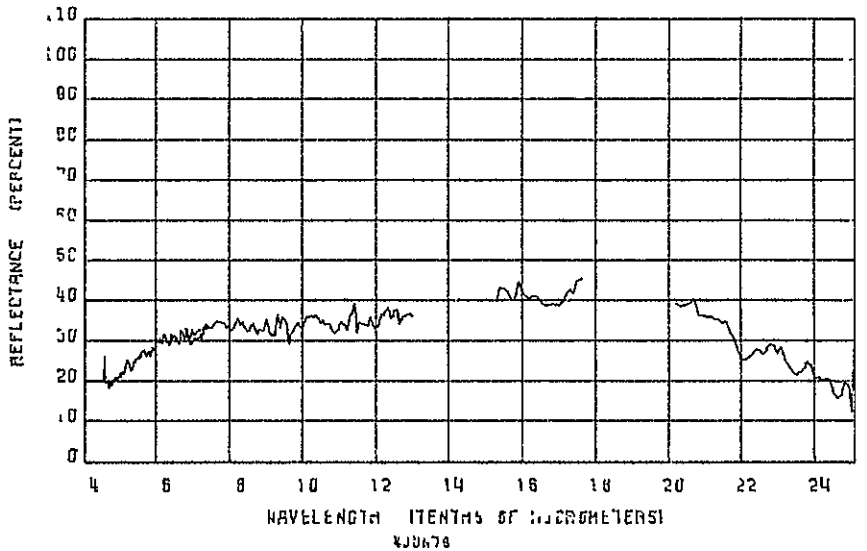
RED SEEP, UTAH TAPE (1)
35/GRY MUDIN EX PIT

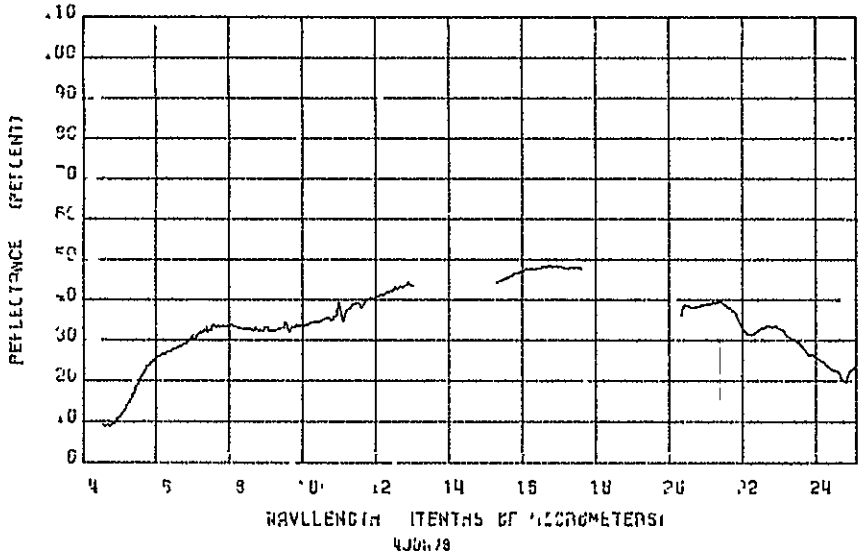
530A 140/142


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (2)

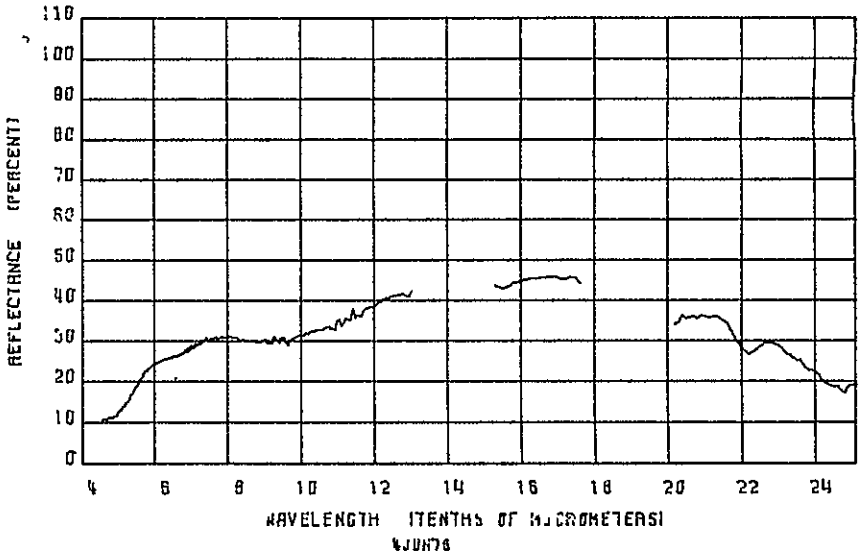

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (3)
B/YEL MOSTN BLOB


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (2)

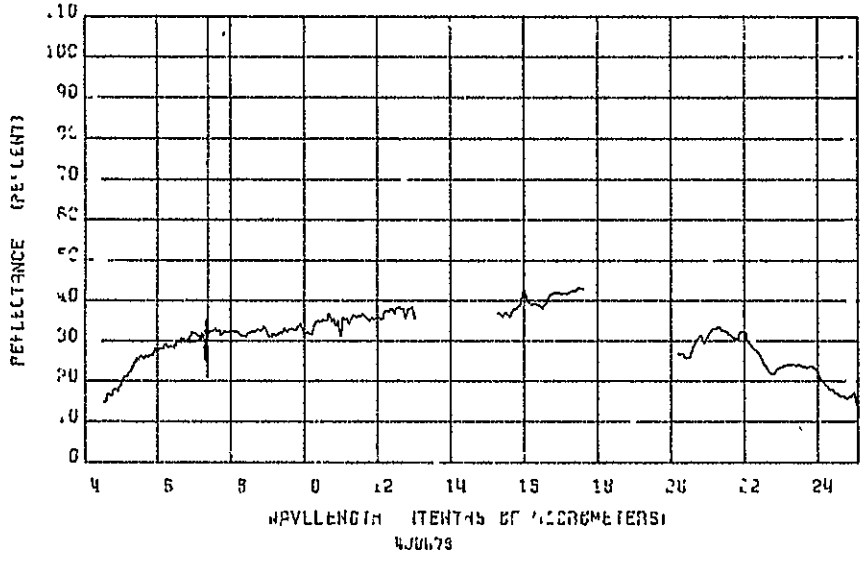

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE (2)



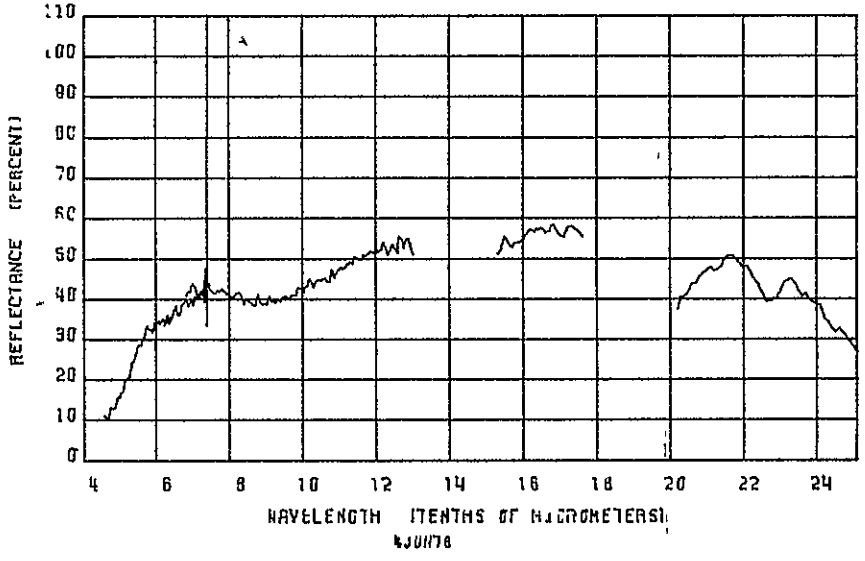
RED SEEP, UTAH TAPE (1)
1/INTSLY ALT BLOP 7288 14/ 18



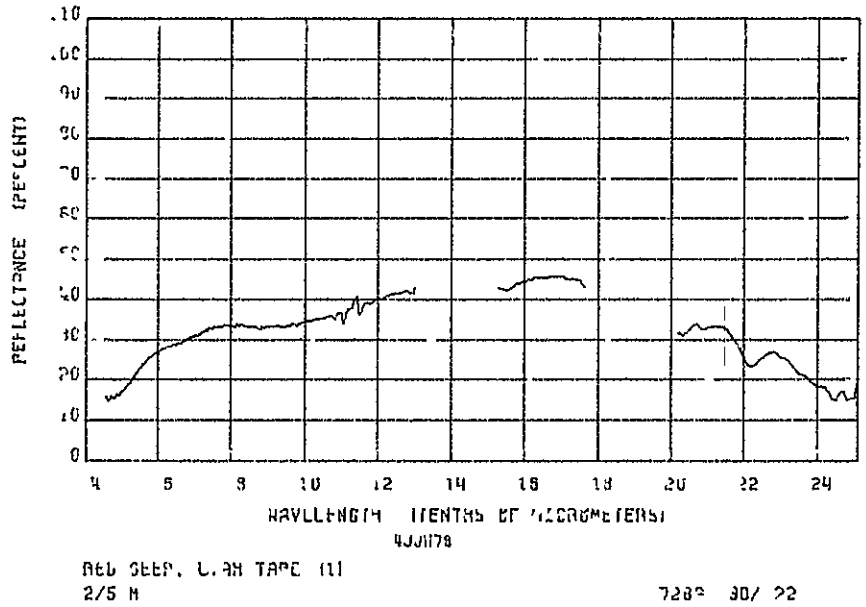
RED SEEP, UTAH TAPE (1)
2/2' 7288 20/ 22

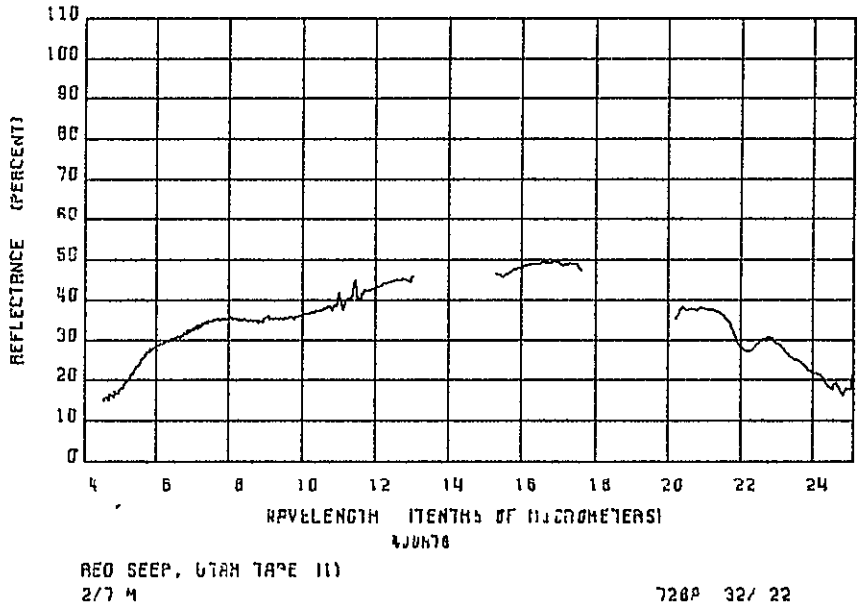


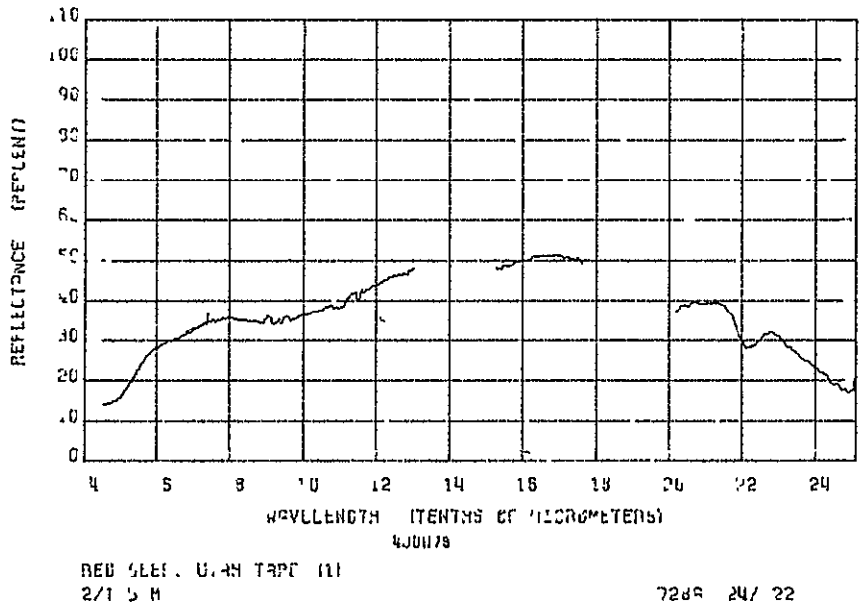
RED SEEP, UTAH TAPE (3)
2/GRY-YEL SENT SURF 6288 21/ 24

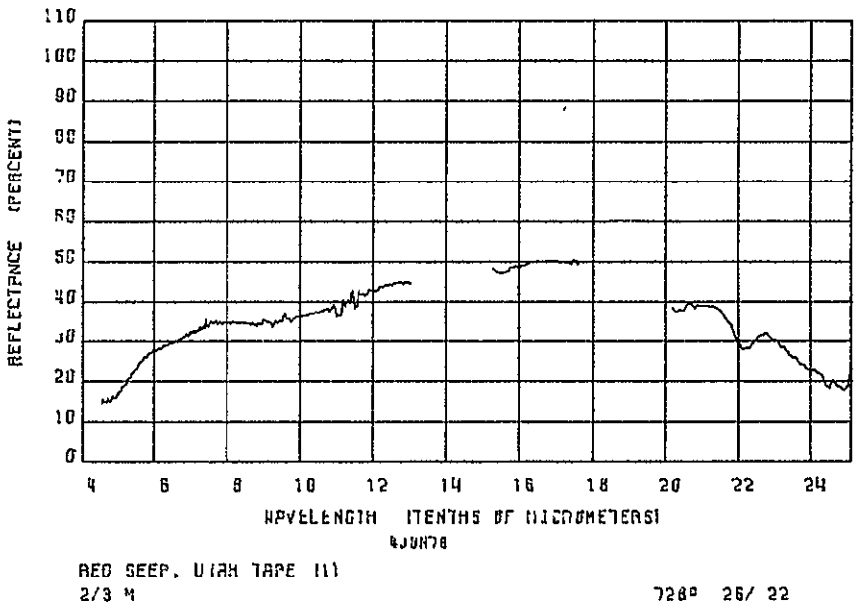


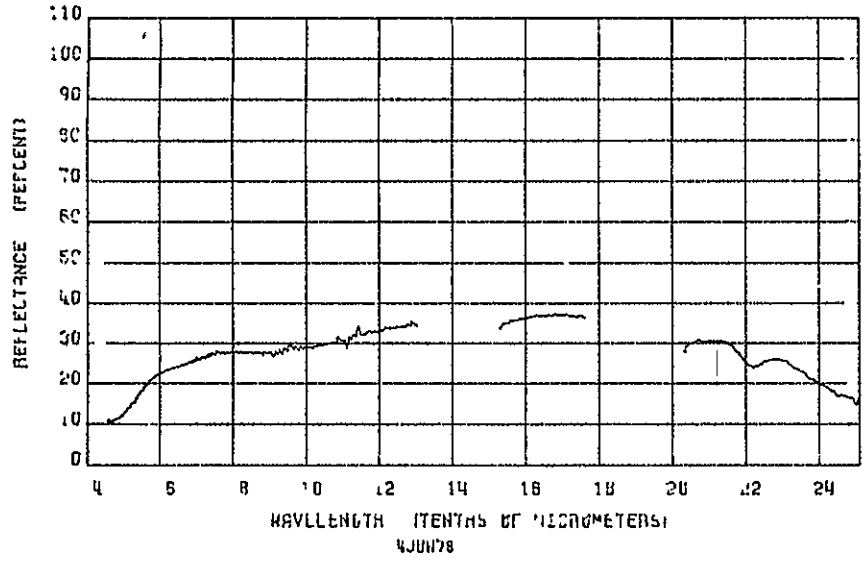
RED SEEP, UTAH TAPE (3)
3/YEL-GR MUSTN BLOR 6288 30/ 32


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE III
2/5 M
7288 30/ 22

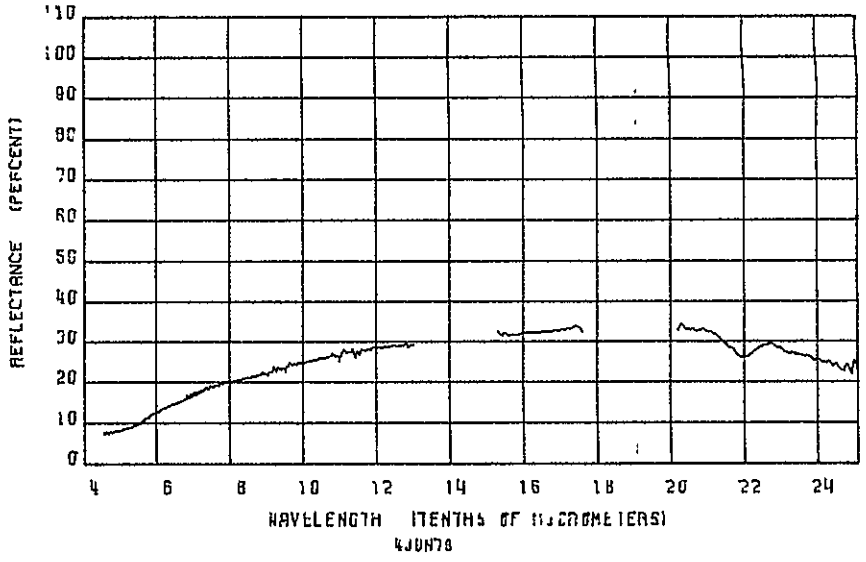

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE III
2/7 M
7288 32/ 22


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE III
2/1 M
7288 24/ 22

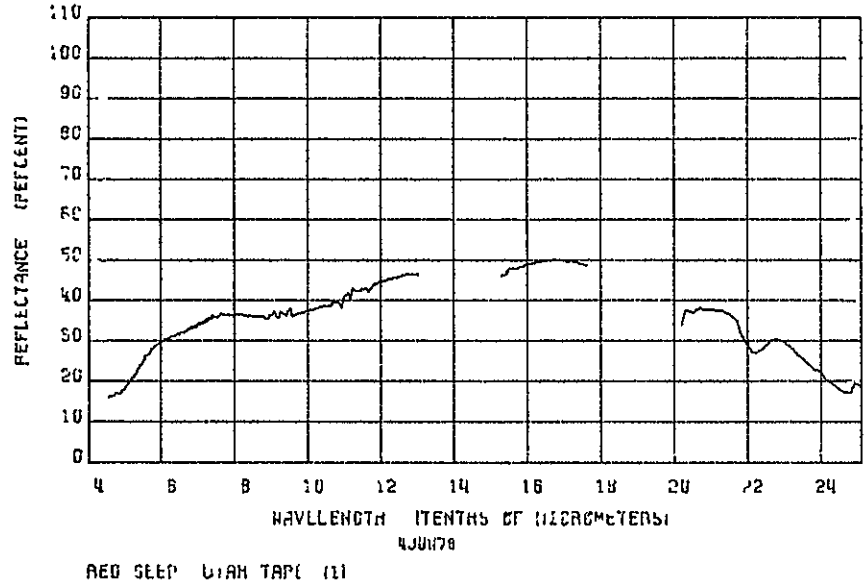

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
RED SEEP, UTAH TAPE III
2/3 M
7288 26/ 22



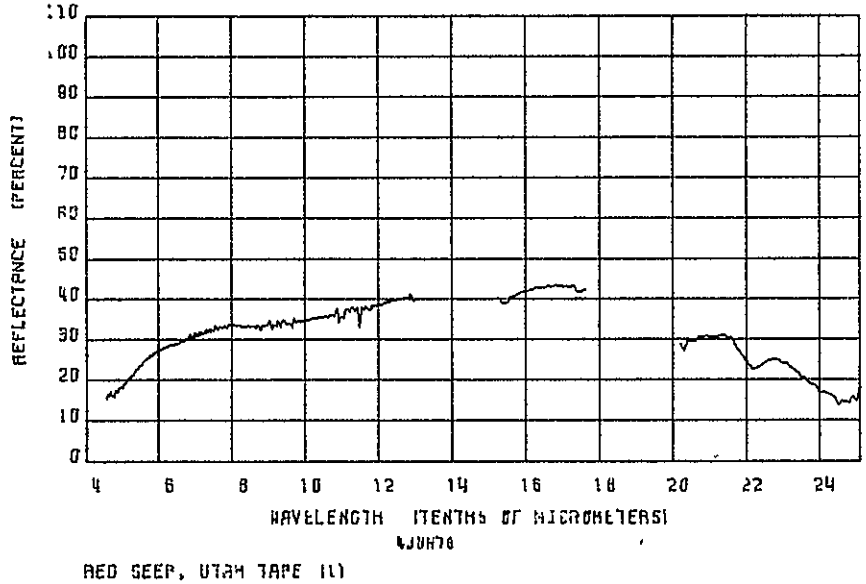
RED SEEP, UTAH TAPE (1)
4/YEL MINE DUMP MUD
7289 42/ 44



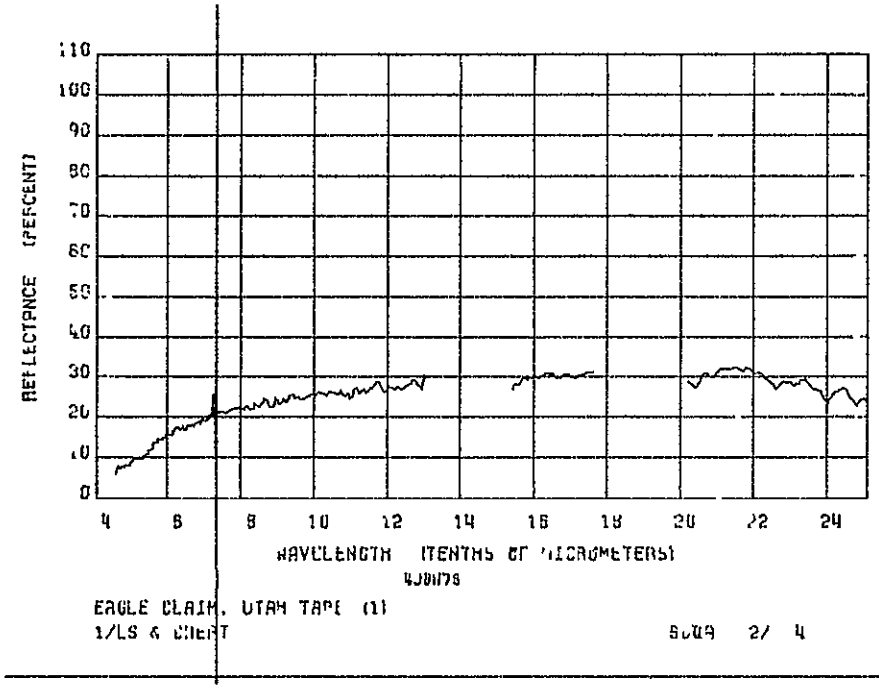
RED SEEP, UTAH TAPE (1)
15/COLORED BLDR
7289 116/120

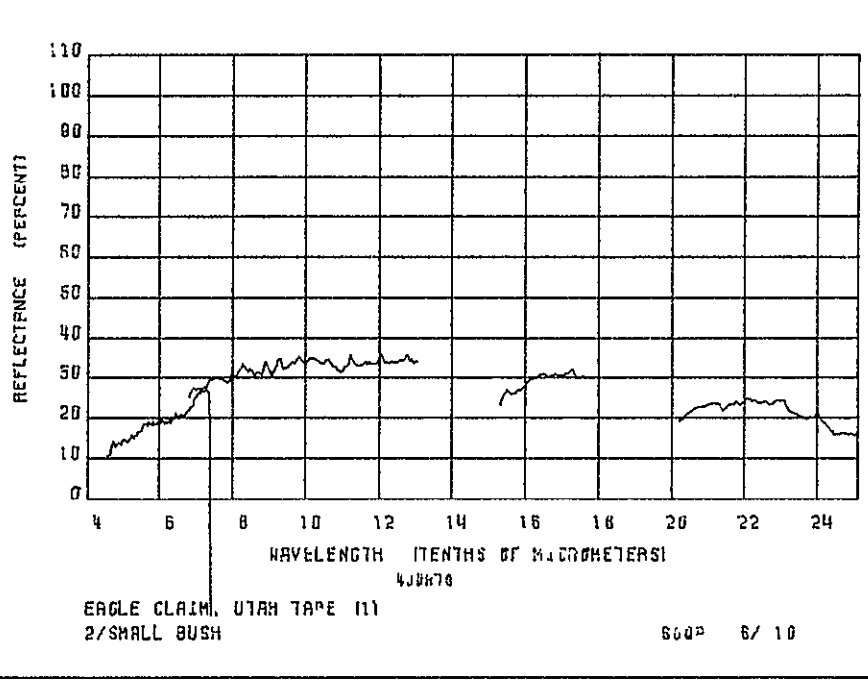


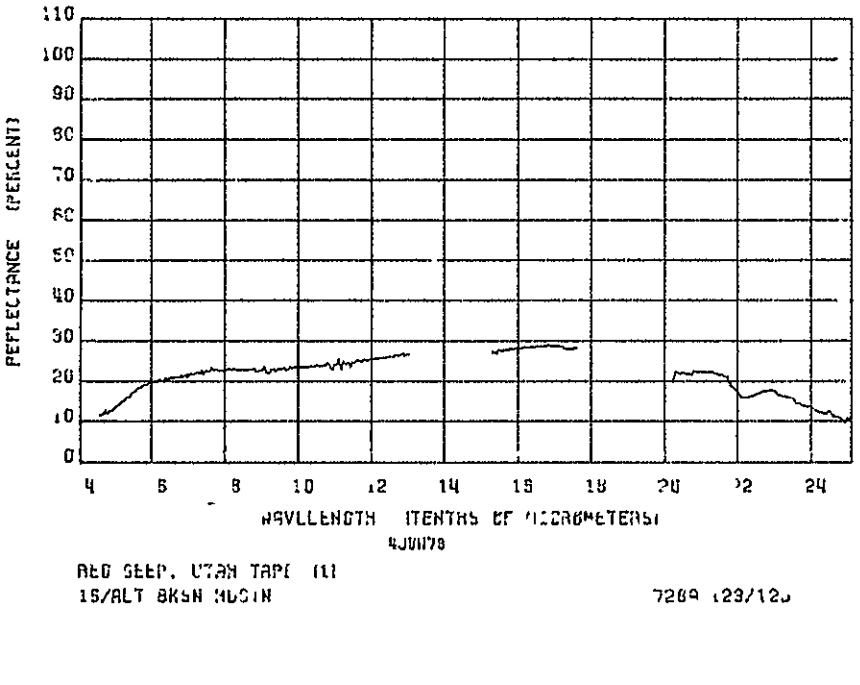
RED SEEP UTAH TAPE (1)
2/9 M
7289 34/ 22

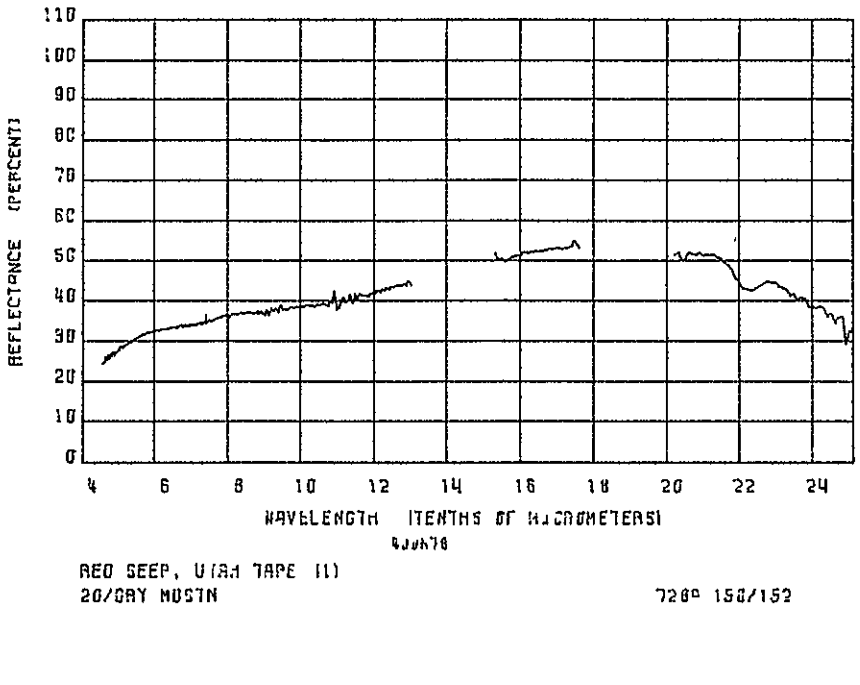


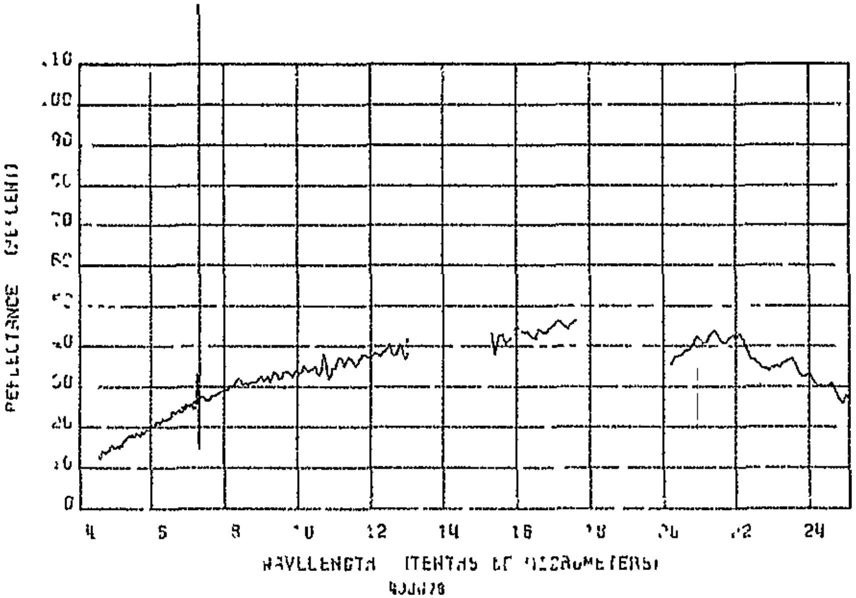
RED SEEP, UTAH TAPE (1)
3/GRY MINE DUMP MUD
7289 36/ 40


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
EAGLE CLAIM, UTAH TAPE (1)
1/LS & CHERT
6089 2/ 4

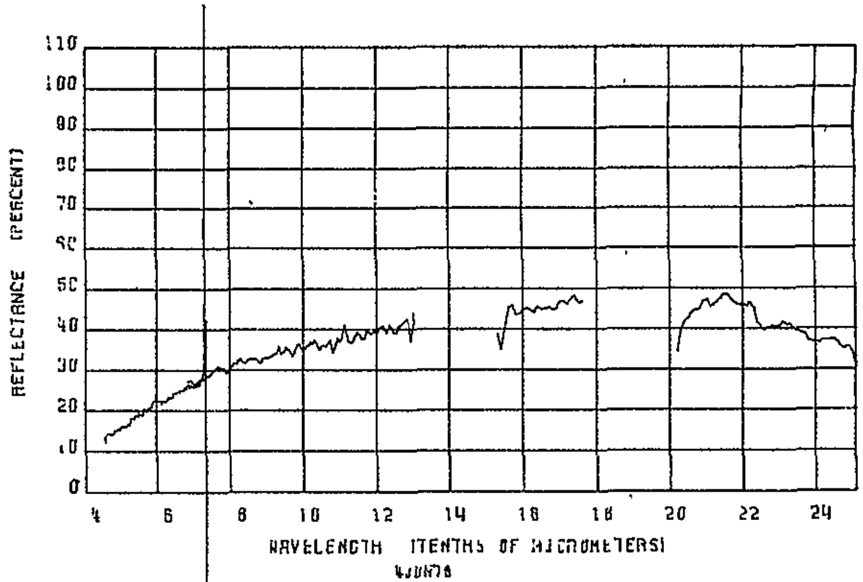

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
EAGLE CLAIM, UTAH TAPE (1)
2/SMALL BUSH
6089 6/ 10


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
15/ALT BKSH MDSTN
7289 123/126

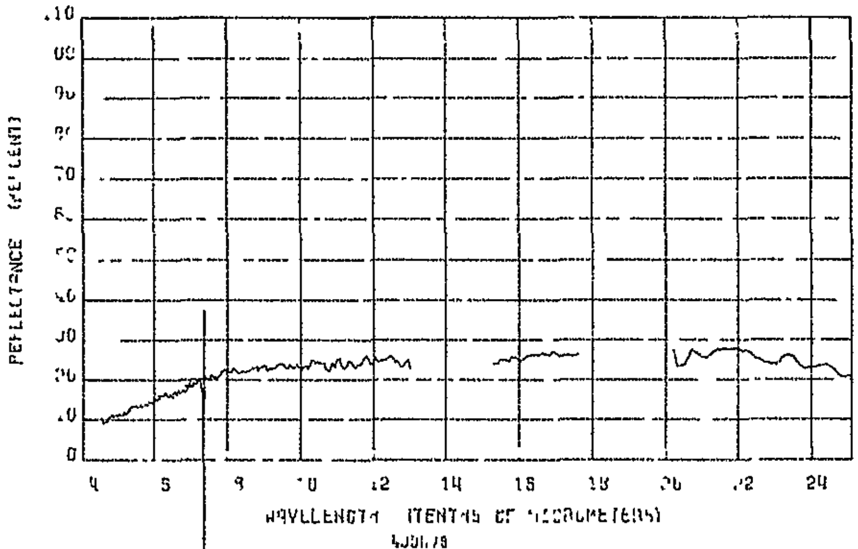

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
4JUN78
RED SEEP, UTAH TAPE (1)
20/GRY MDSTN
7289 150/152



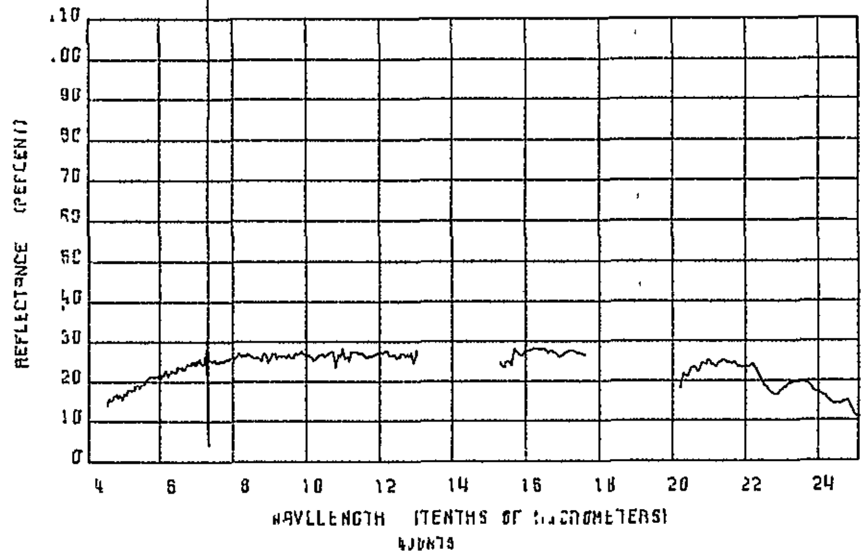
EAGLE CLAIM, UTAH TAPE (1)
5/BRN BTN FRAGS SGOA 22/ 24



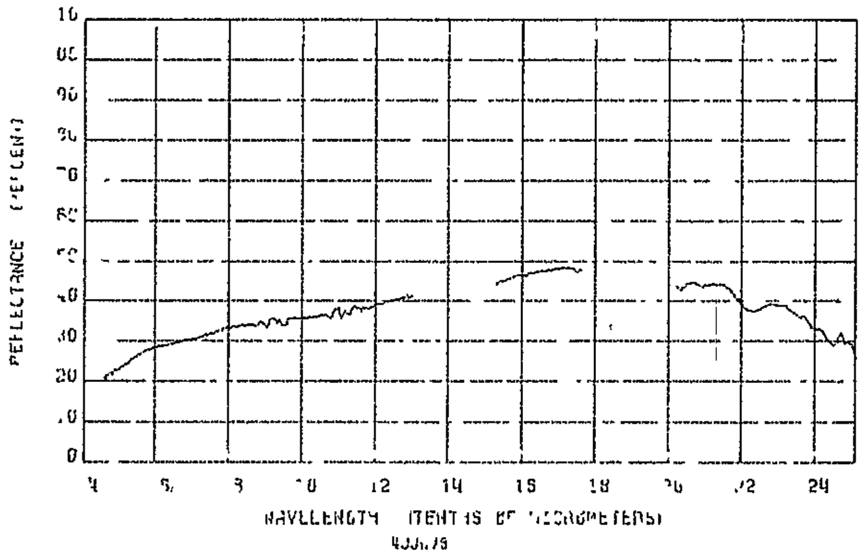
EAGLE CLAIM, UTAH TAPE (1)
5/BRN LS FRAGS SGOA 26/ 31



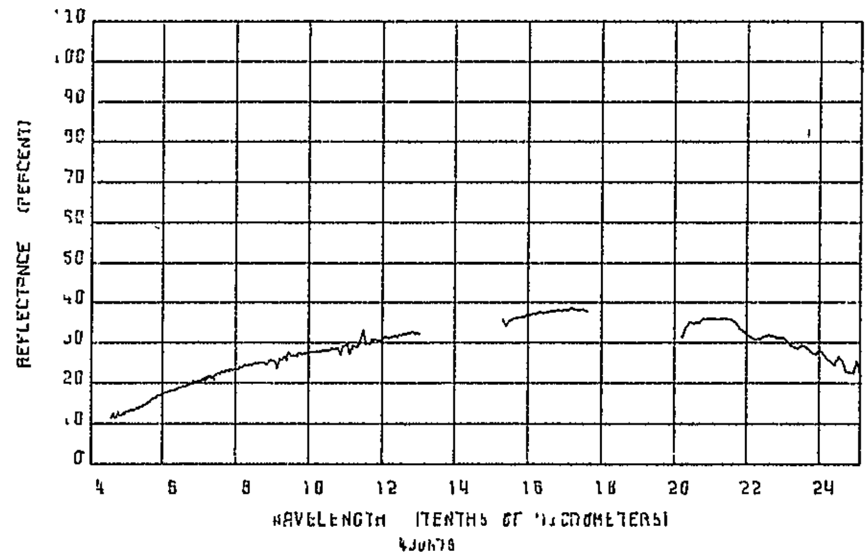
EAGLE CLAIM, UTAH TAPE (1)
3/LS CHLPPTL-GRY MU SGOA 12/ 14



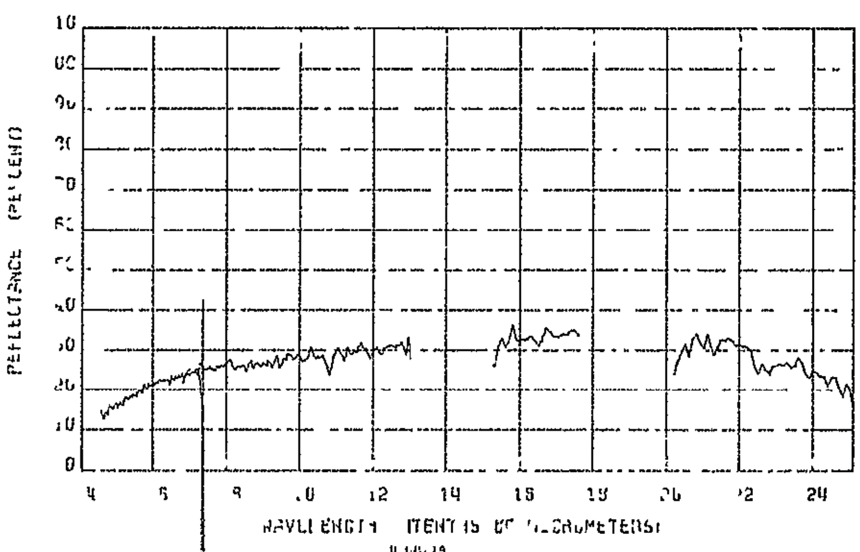
EAGLE CLAIM, UTAH TAPE (1)
4/GPY BENT SUPF SGOA 16/ 20



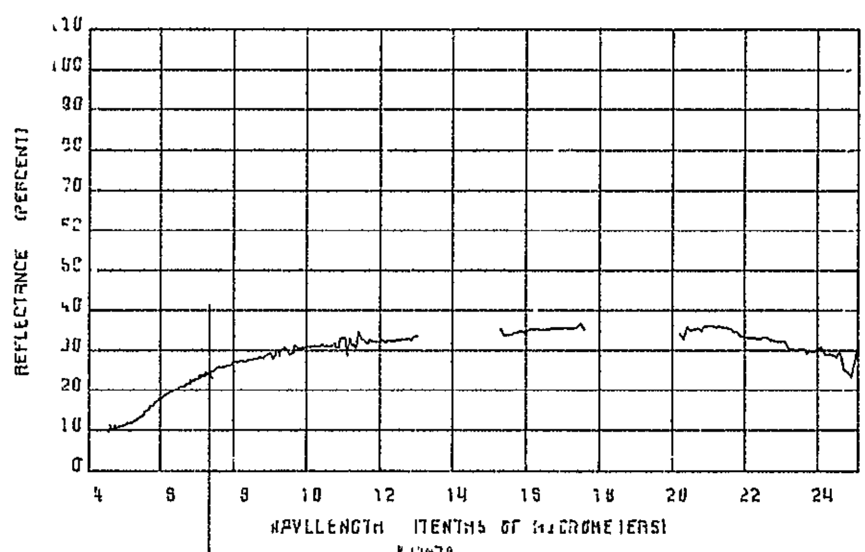
EAGLE CLAIM UTAH TAPE (1)
2/GRY UENT MUD 72SA 11/ 13



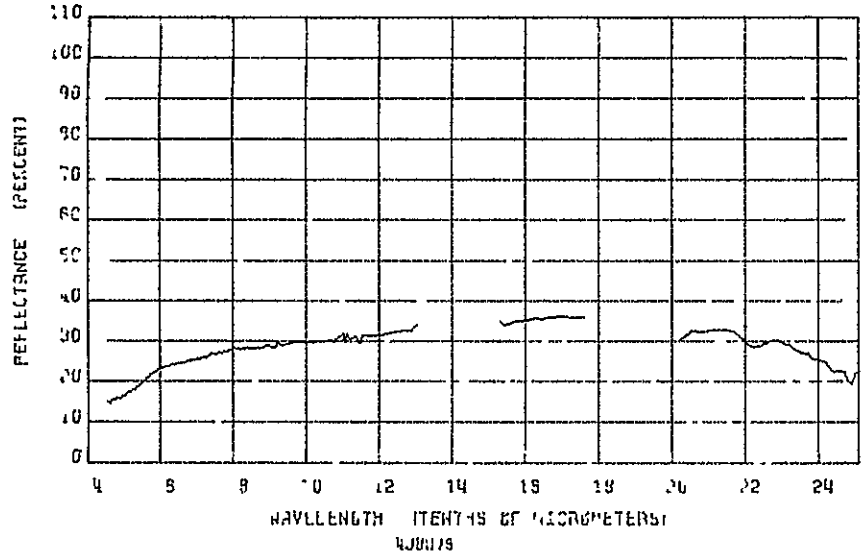
EAGLE CLAIM, UTAH TAPE (1)
3/GRY SGILAICH PBLS 72BA 15/ 17

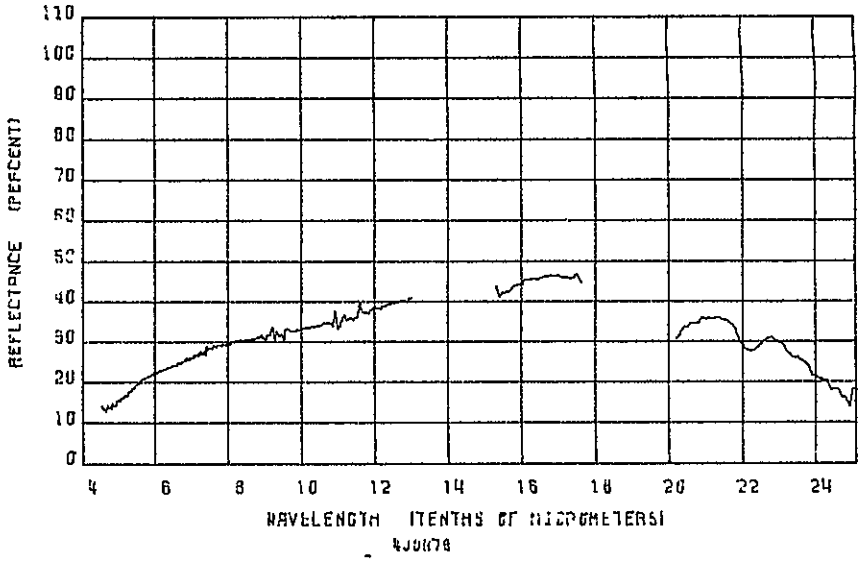


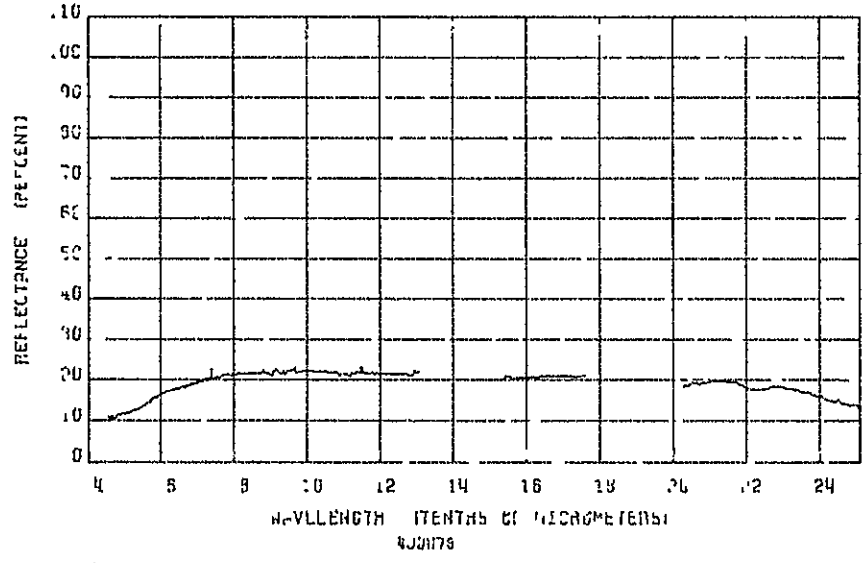
EAGLE CLAIM UTAH TAPE (1)
7/GRY UENT SURF 30AB 33/ 35

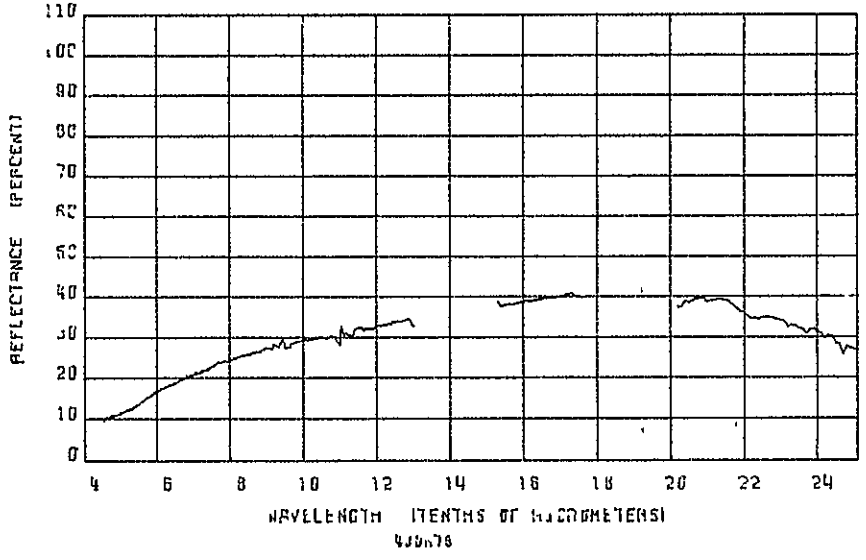


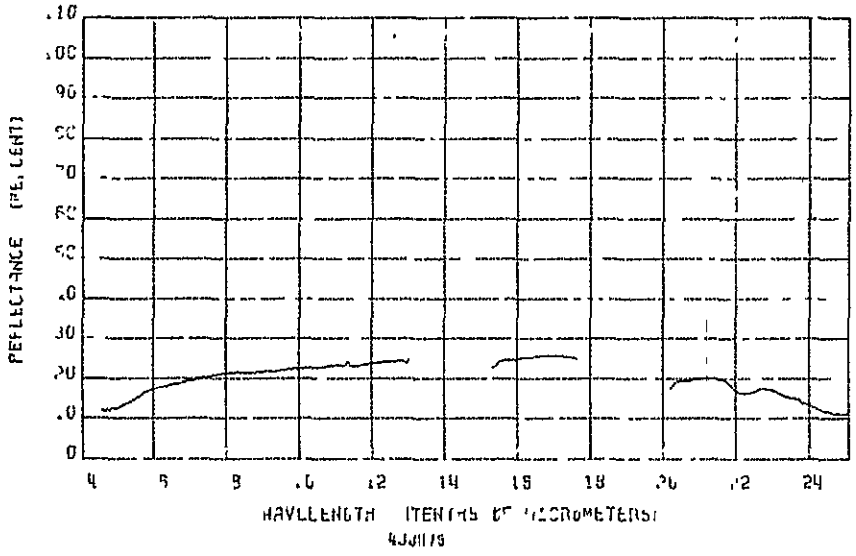
EAGLE CLAIM, UTAH TAPE (1)
1/40/SGIL ON LS CH 72BA 5/ 7

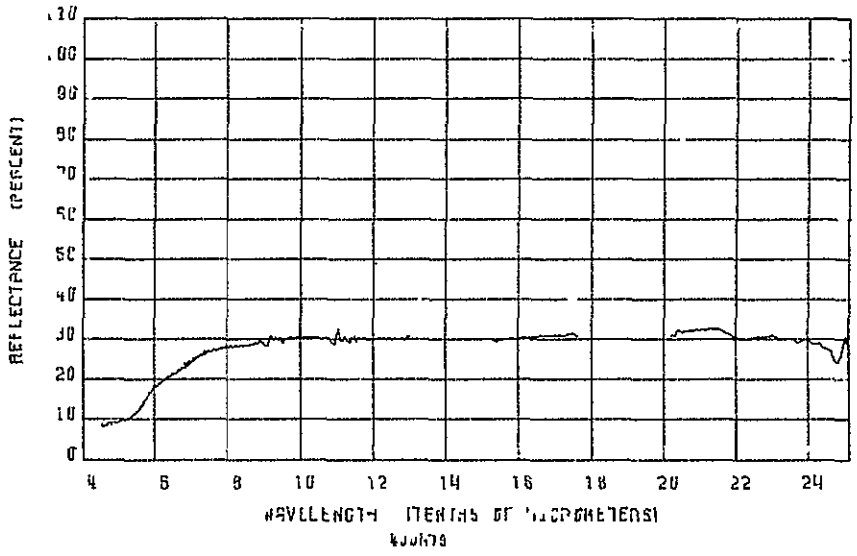

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, UTAH TAPE (1)
6/TAN BENT MUD
728A 31/ 33

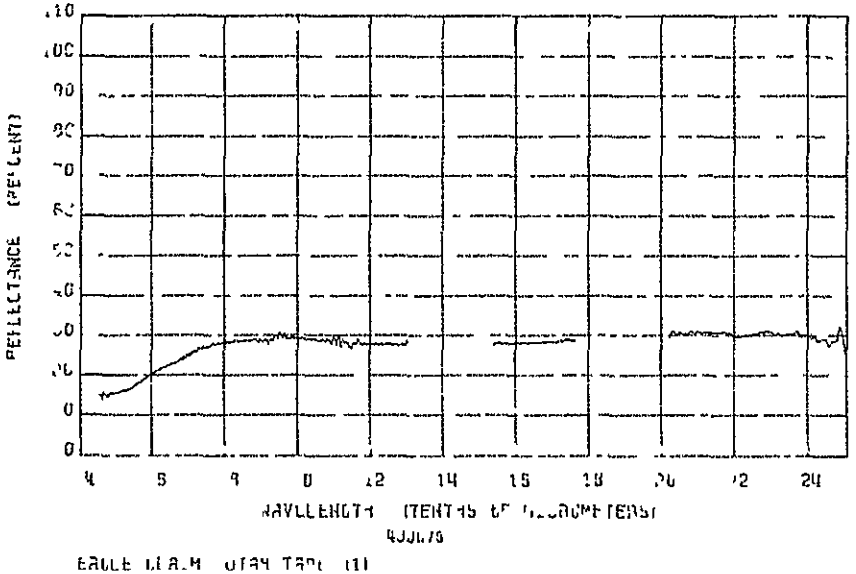

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, UTAH TAPE (1)
7A/GRY SHLY RUBBLE
728A 41/ 37


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, UTAH TAPE (1)
4/PPPL BENT MUD
728A 21/ 23


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, UTAH TAPE (1)
5/SBILAGA DRN CHIPS
728A 25/ 27


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, GRAY TAPE (1)
11/17 BRN SENT MUL
)26A 57' 6


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, GRAY TAPE (1)
12/RD SOIL & PRLS
)26A 53' 65


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, GRAY TAPE (1)
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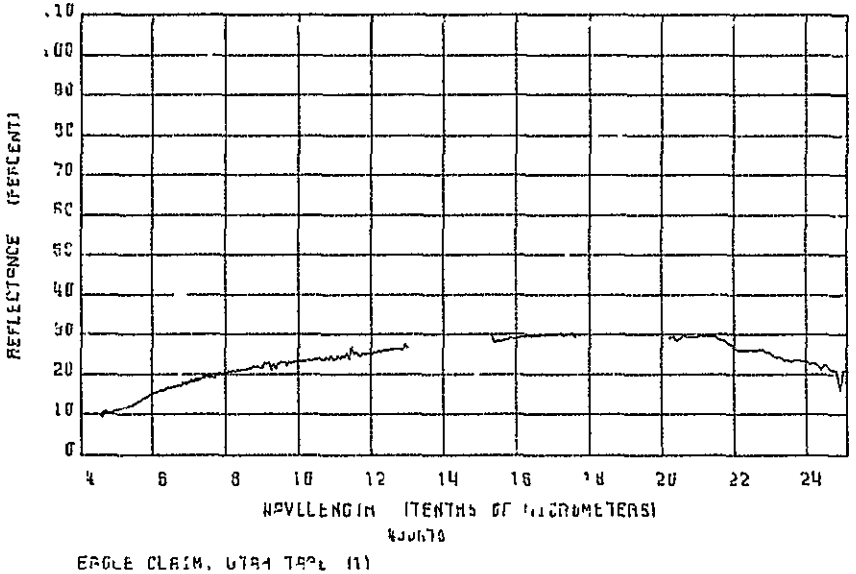
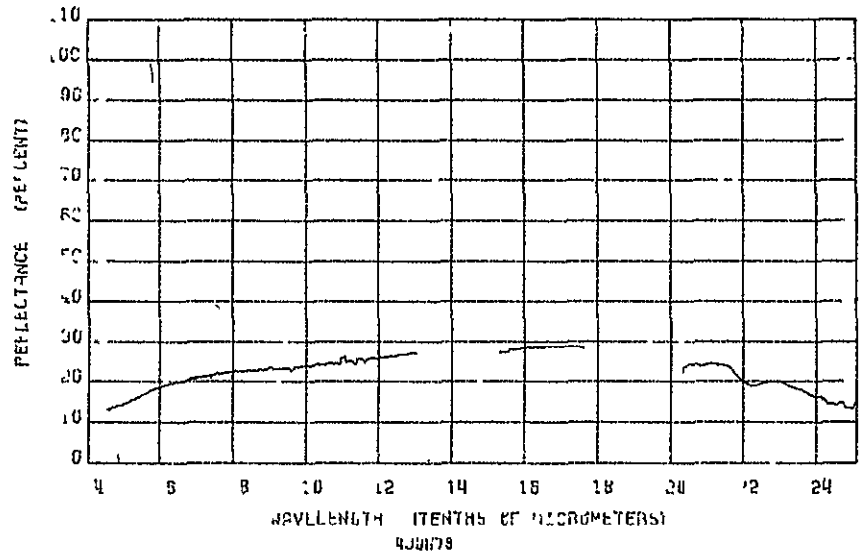
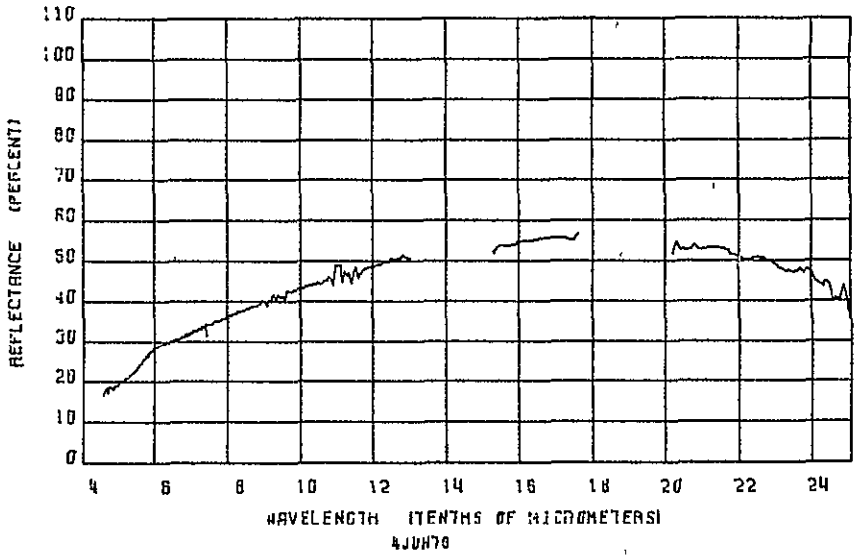
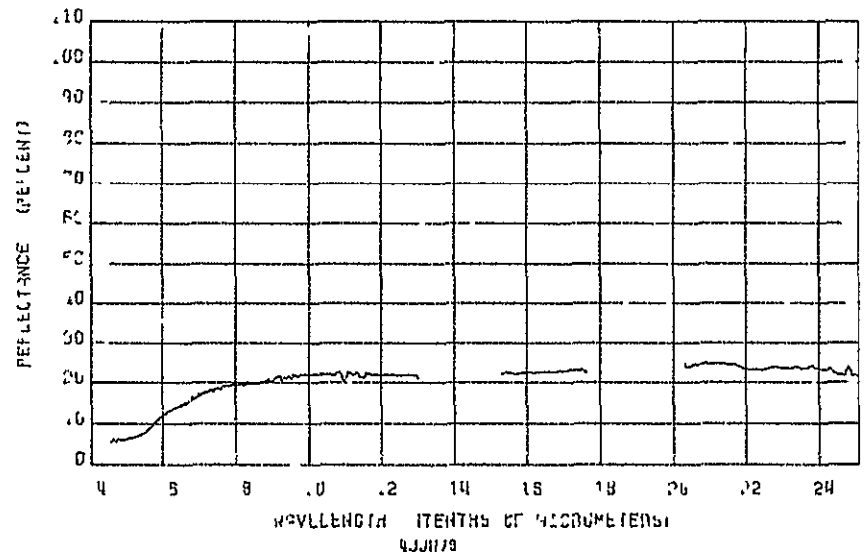

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM, GRAY TAPE (1)
10/BRN LS CHPS
)26A 53' 55



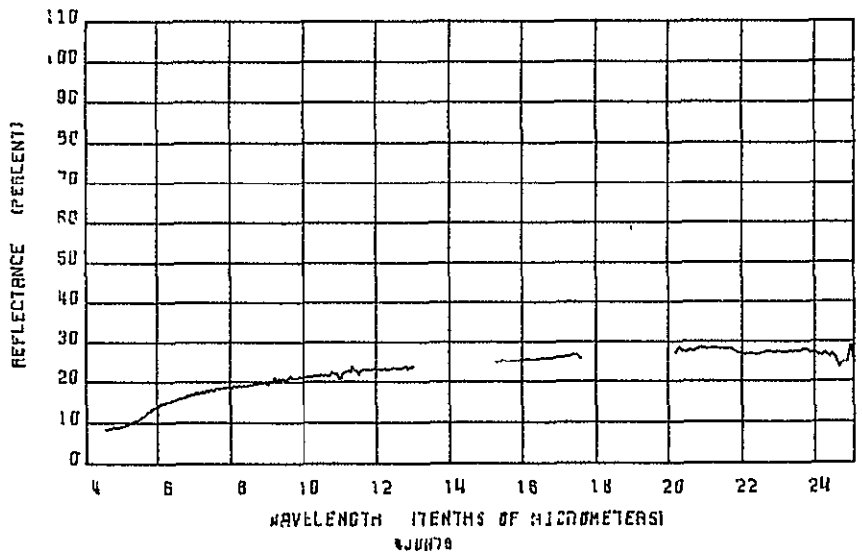
EAGLE CLAIM, UTAH TAPE (1)
17/GRY DENT MUD 726A 107/112



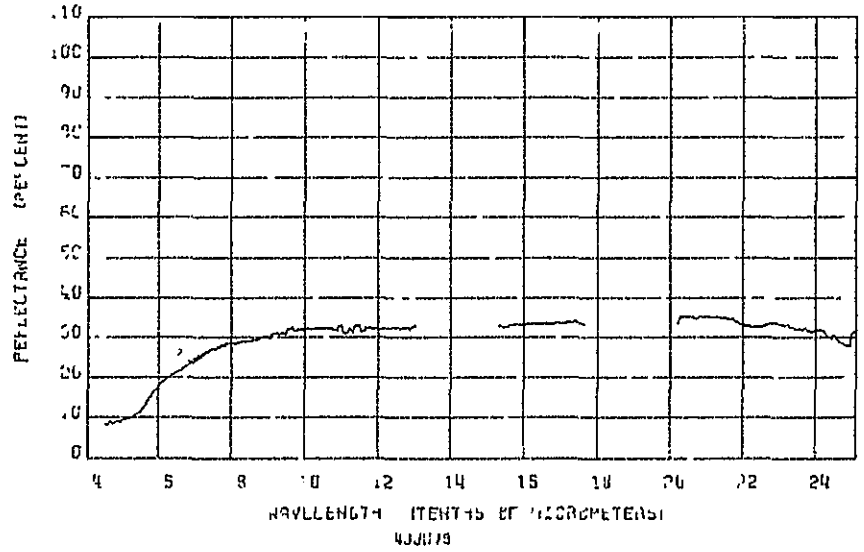
EAGLE CLAIM, UTAH TAPE (1)
19/BUFF SS DIC 726A 123/122



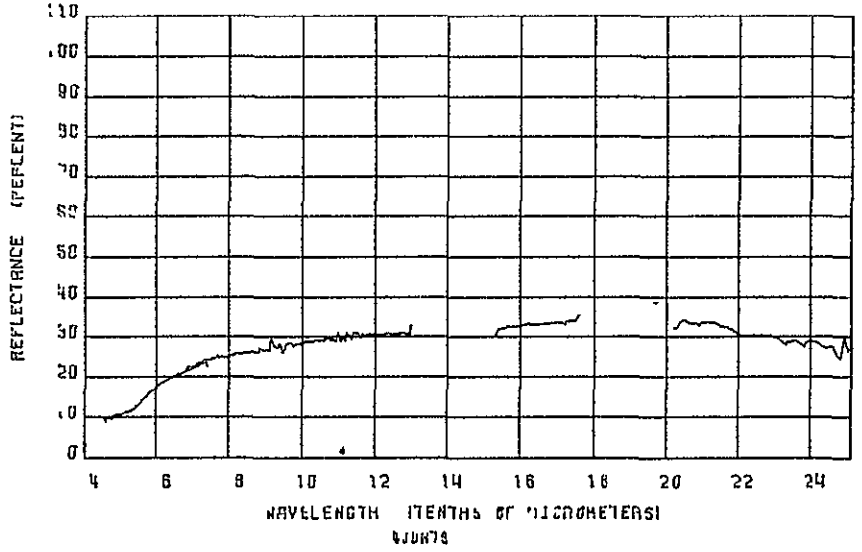
EAGLE CLAIM, UTAH TAPE (1)
13/RD PALS W/ SGTL 726A 97/ 71



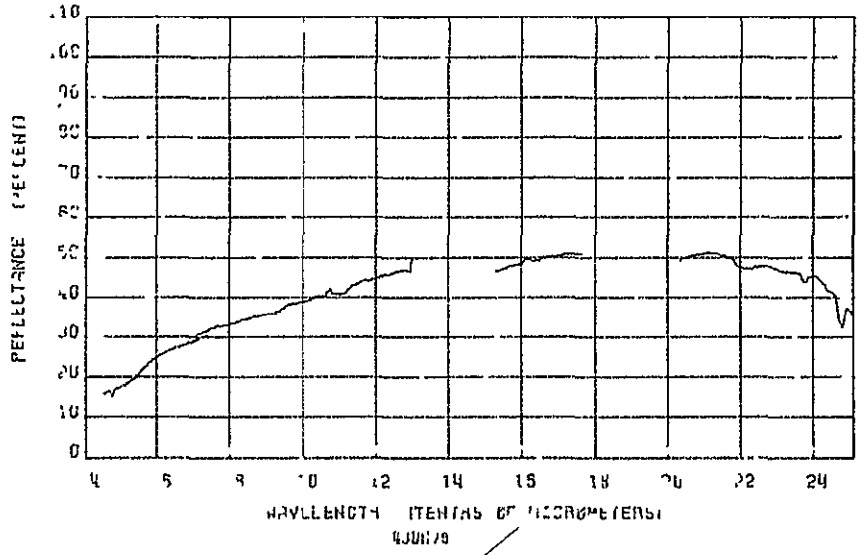
EAGLE CLAIM, UTAH TAPE (1)
14/DK RD SS BLDR 726A 73/ 71



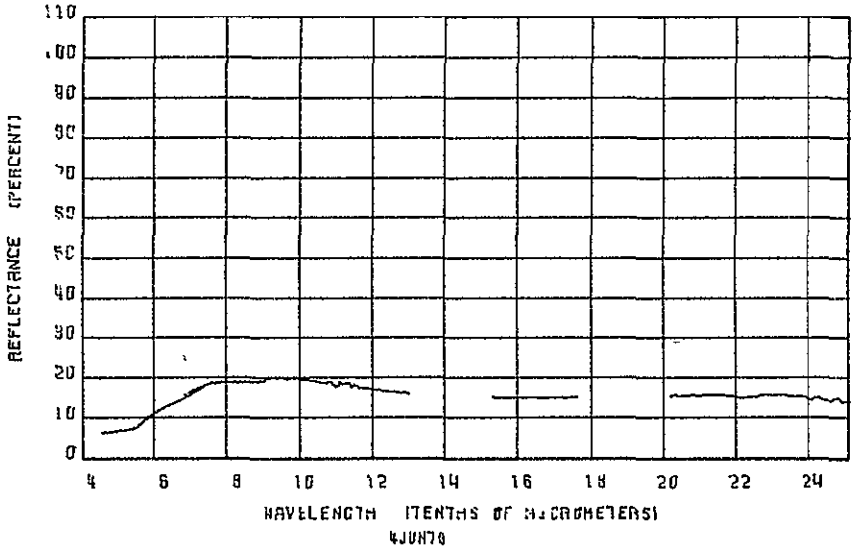
EAGLE CLAIM, UTAH TAPE (1)
21/RG SOIL & LS CHP 726A 137/141



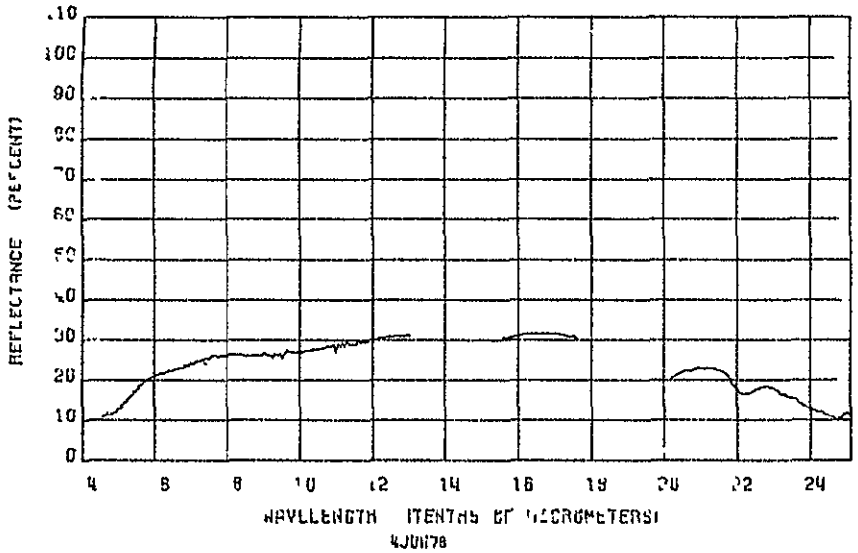
EAGLE CLAIM, UTAH TAPE (1)
22/T SOIL & LAG DEP 726A 145/144



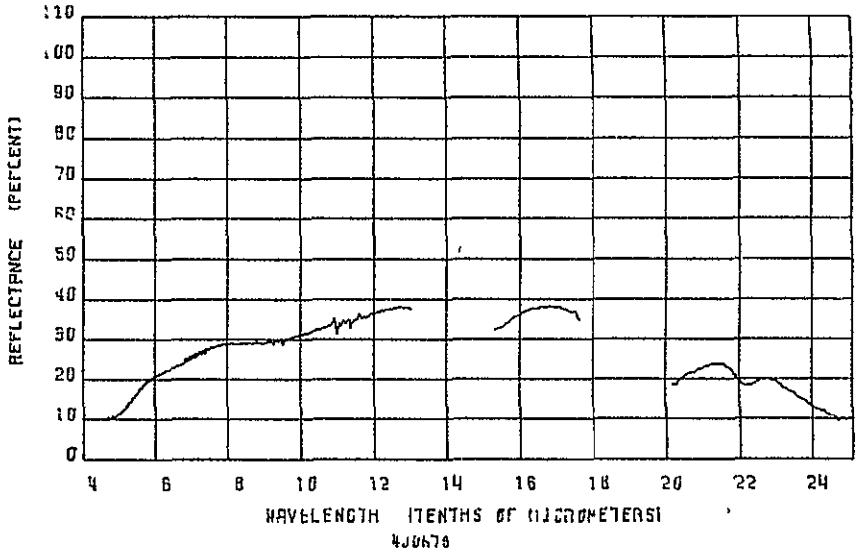
EAGLE CLAIM, UTAH TAPE (1)
19/DK SS CTC 726A 124/125



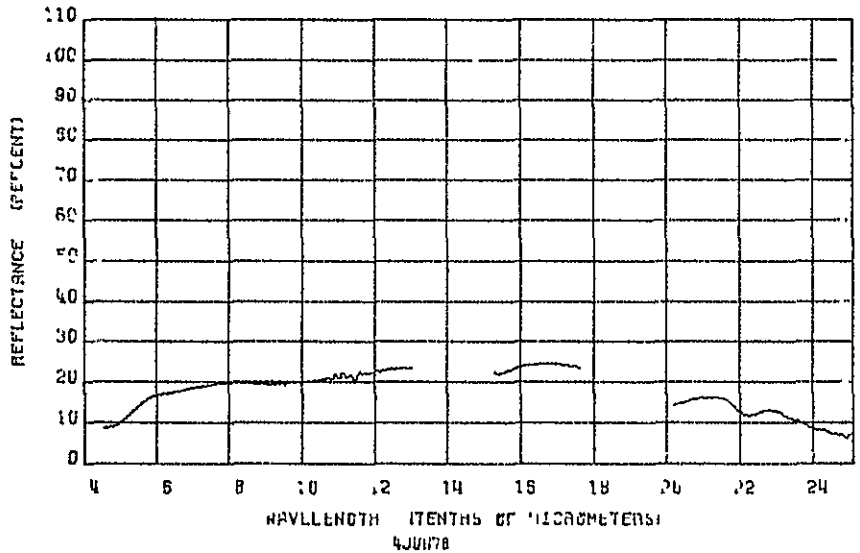
EAGLE CLAIM, UTAH TAPE (1)
20/PPPL SENT MUD 726A 132/134



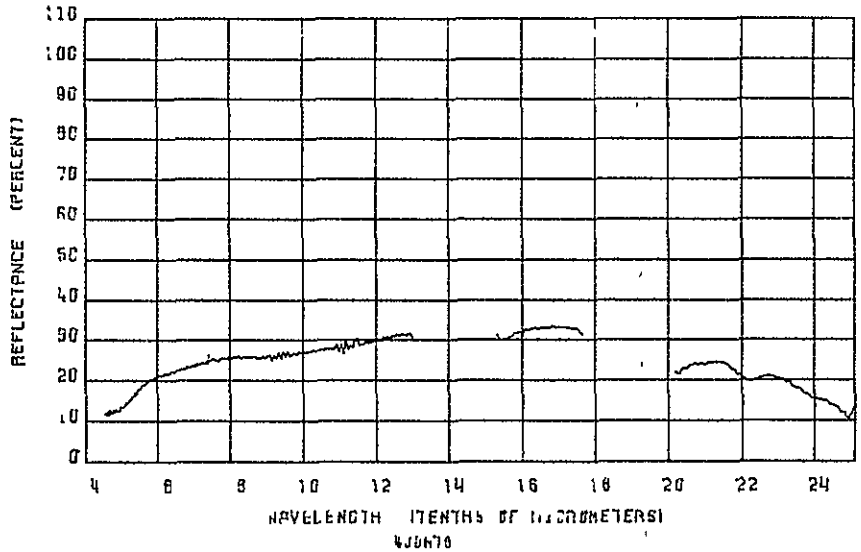
EAGLE CLAIM, UTAH TAPE (1)
15/BKSN BENT MUD 726A 75/ 77



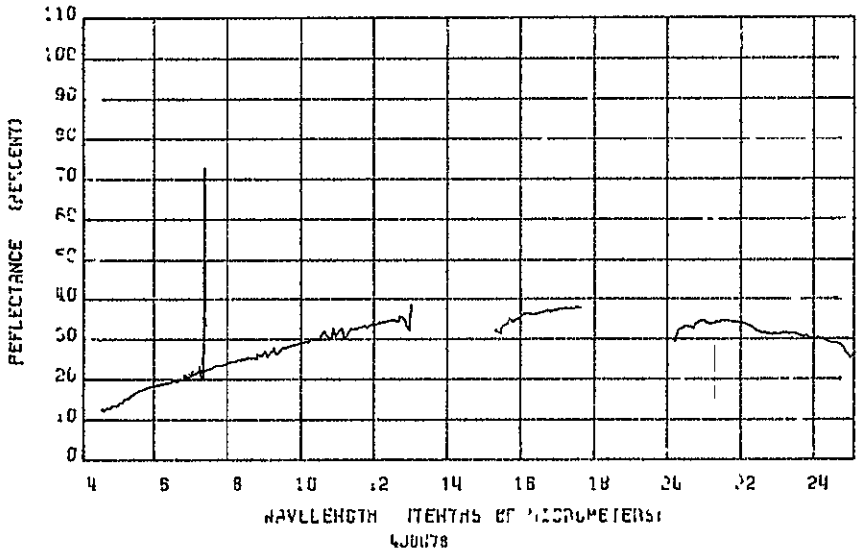
EAGLE CLAIM, UTAH TAPE (1)
15A/YLW MS BLW SURF 726A 101/ 77

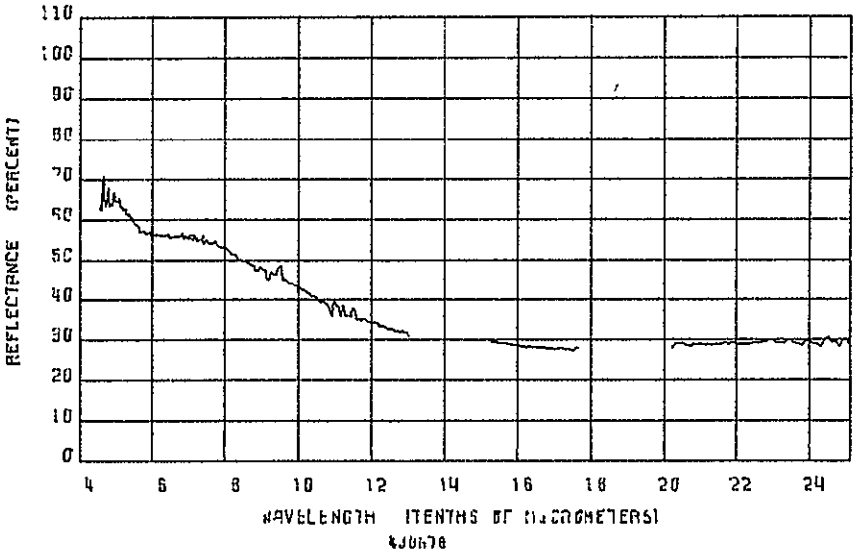


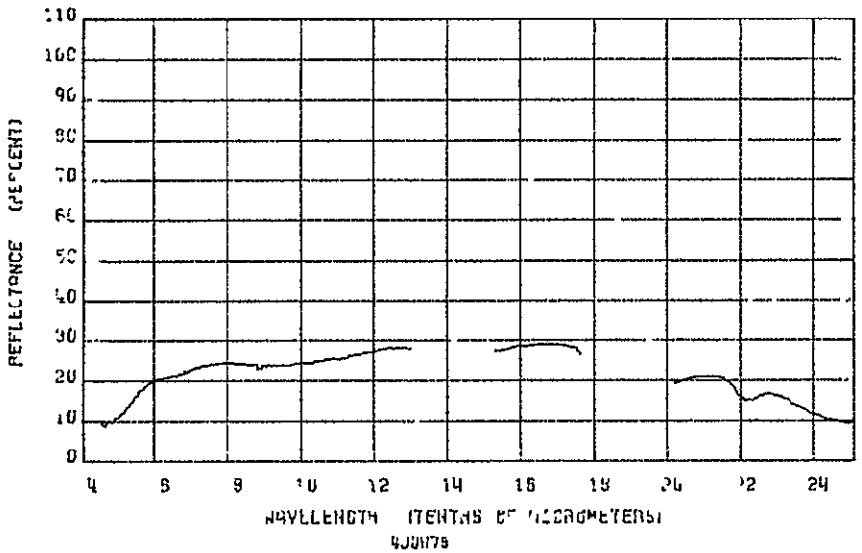
EAGLE CLAIM, UTAH TAPE (1)
7/YELLOW BENT MUD 726A 35/ 37

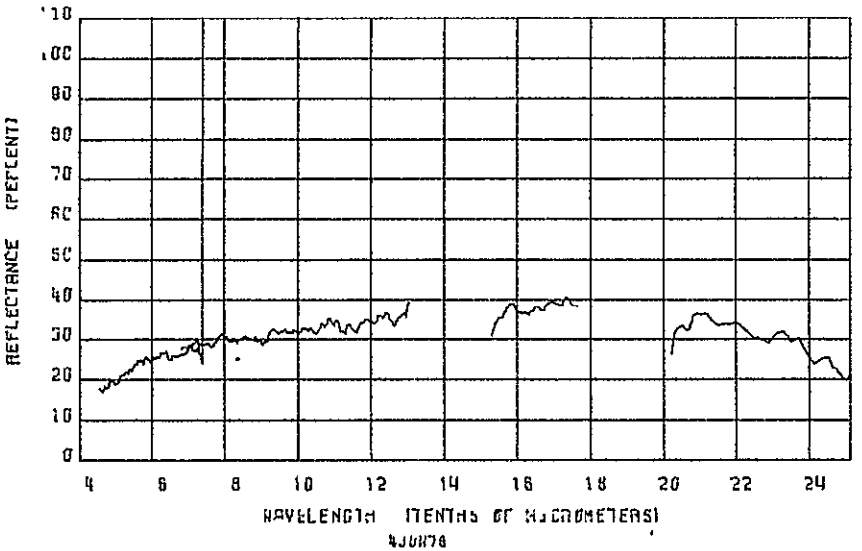


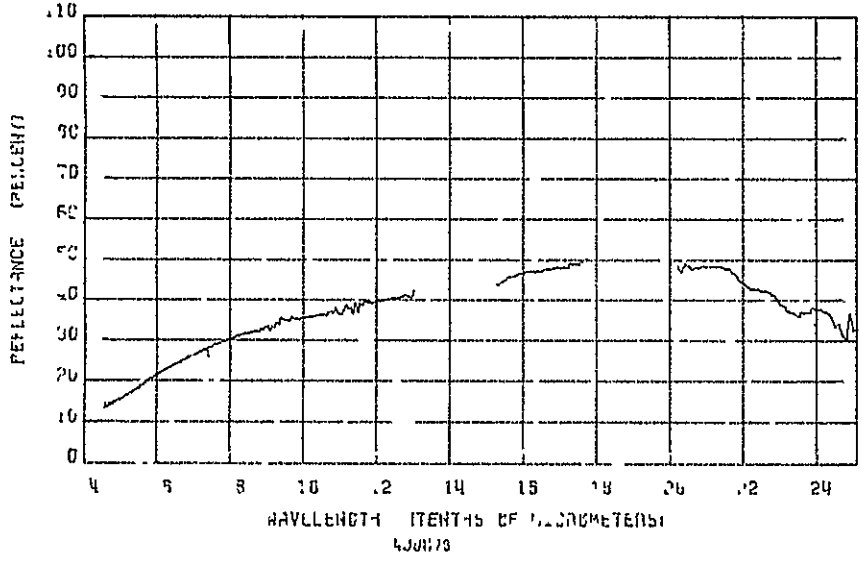
EAGLE CLAIM, UTAH TAPE (1)
8/ TAN BENT MUD 726A 43/ 45

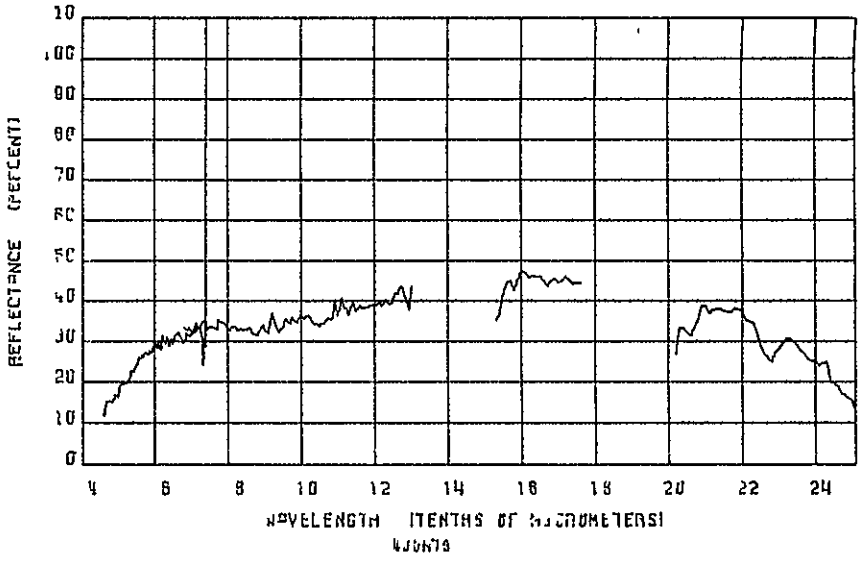

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
ARCO CLAIM,UTAH TAPE (1)
S/BKRN CONGL

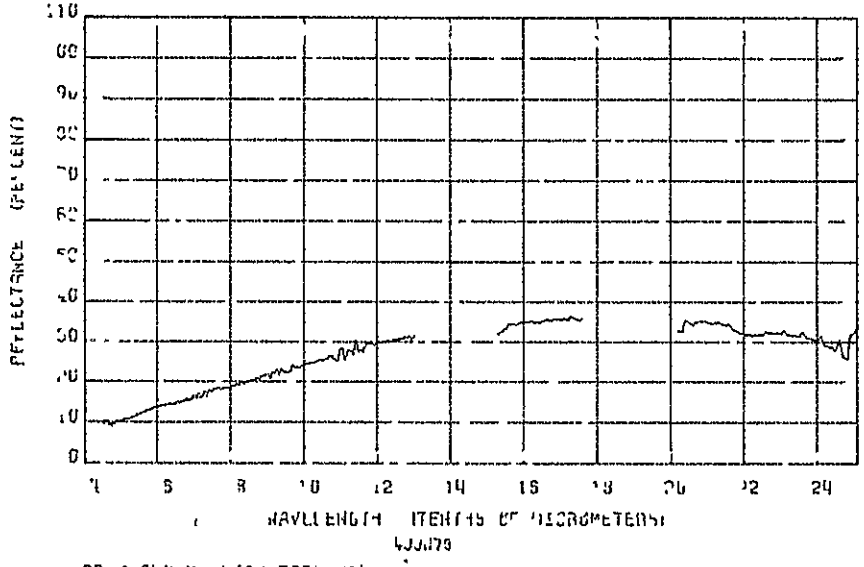

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
ARCO CLAIM, UTAH TAPE (1)
L/GRY SHLY MDSTN

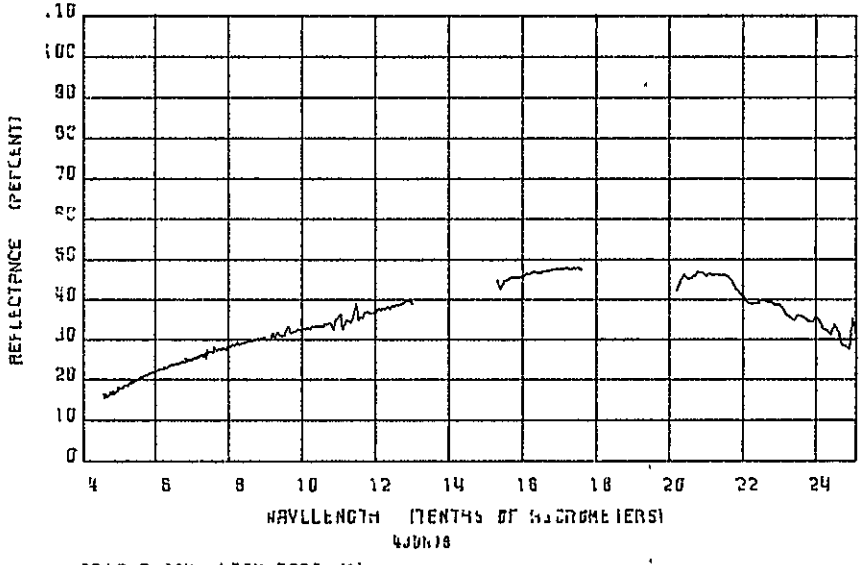

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
EAGLE CLAIM UTAH TAPE (1)

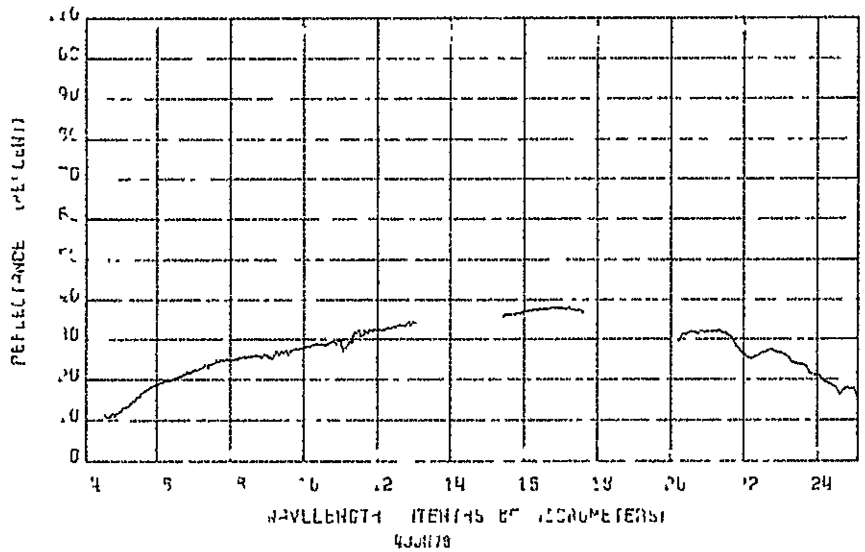

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
ARCO CLAIM,UTAH TAPE (1)
Z/GRY MUD SURF


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
AREA CLAIM, UTAH TAPE (1)
S/BRN LIMEY SLTSTN

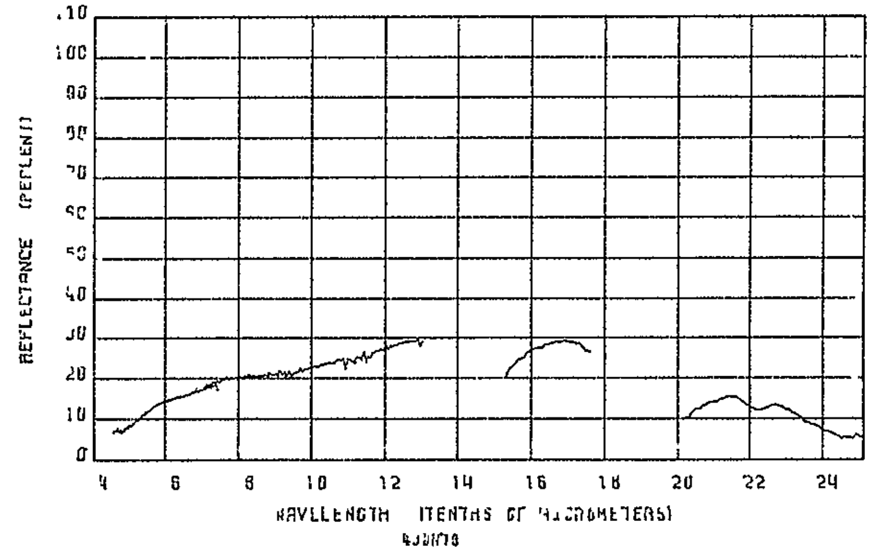

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
AREA CLAIM,UTAH TAPE (1)
I/ALT YEL CLY SUPF


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
AREA CLAIM, UTAH TAPE (1)

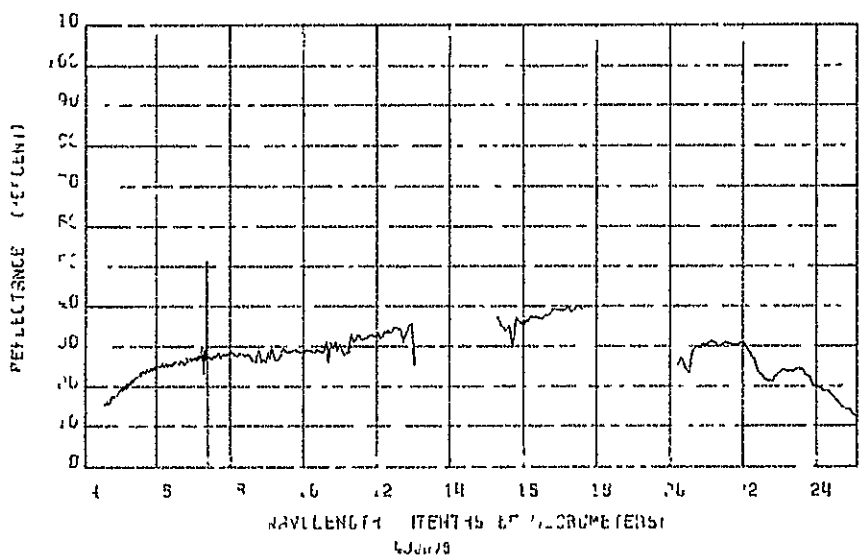

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
AREA CLAIM, UTAH TAPE (1)
S/GRY MOSTN W/LS CH



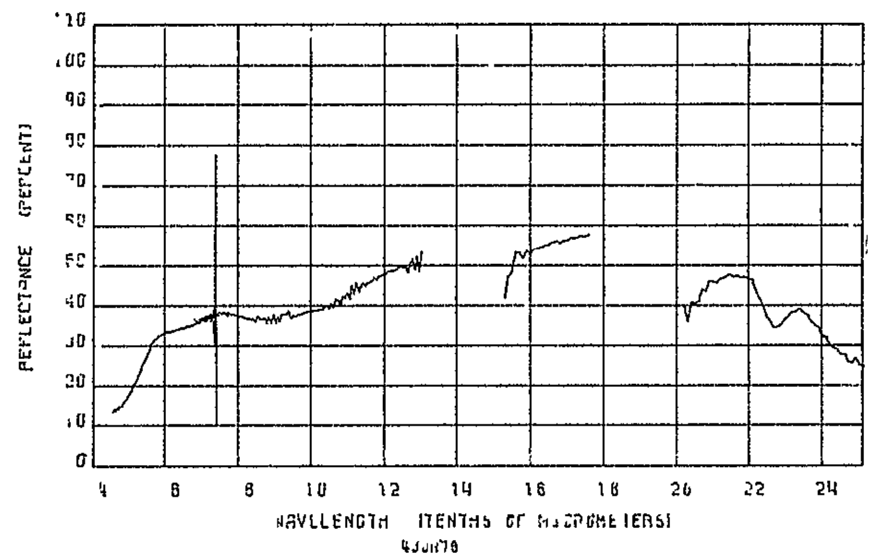
ARGO CLAIM, UTAH TAPE (1)
4/BRN & TN ALT HUG 7207 24/ 26



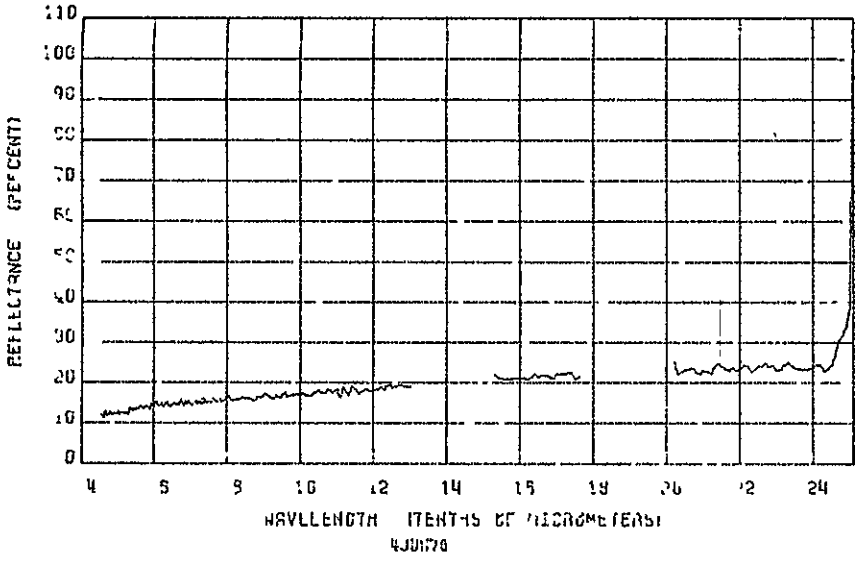
ARGO CLAIM, UTAH TAPE (1)
3B/MOIST TAN HUG 7209 16/ 7



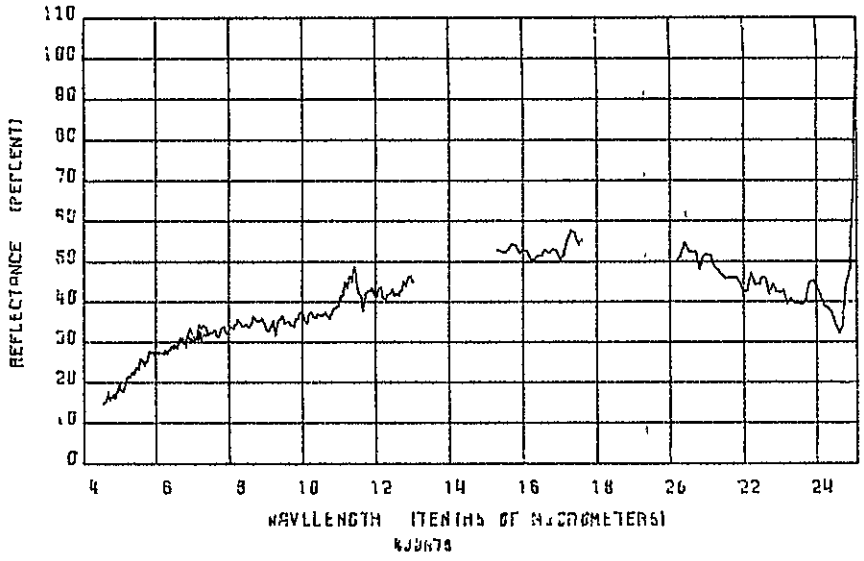
ARGO CLAIM UTAH TAPE (1)
3/ORANGE BUFF 5UDF 15/ 21



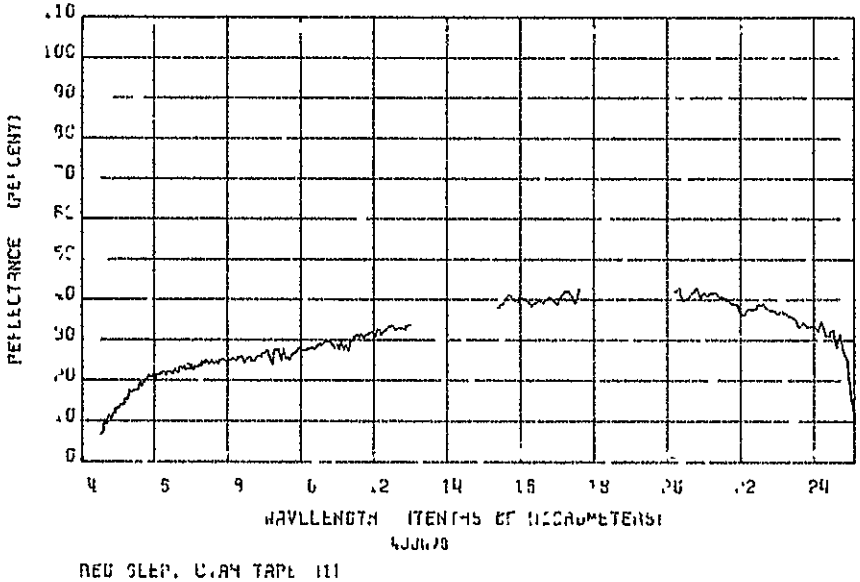
ARGO CLAIM,UTAH TAPE (1)
4/GR & GRY HOSTN 3J0A 23/ 25



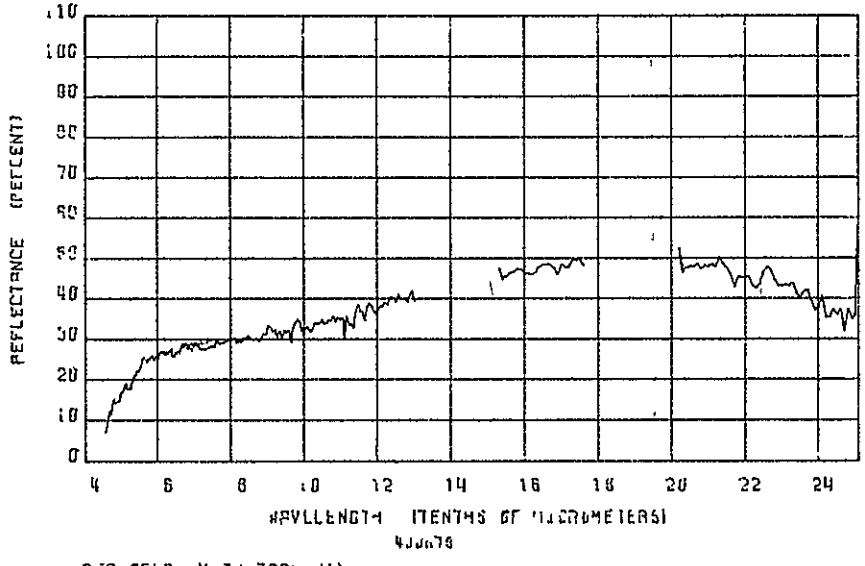
RED SEEP, UTAH TAPE (1)
W4/BLK MANCOS FACIE



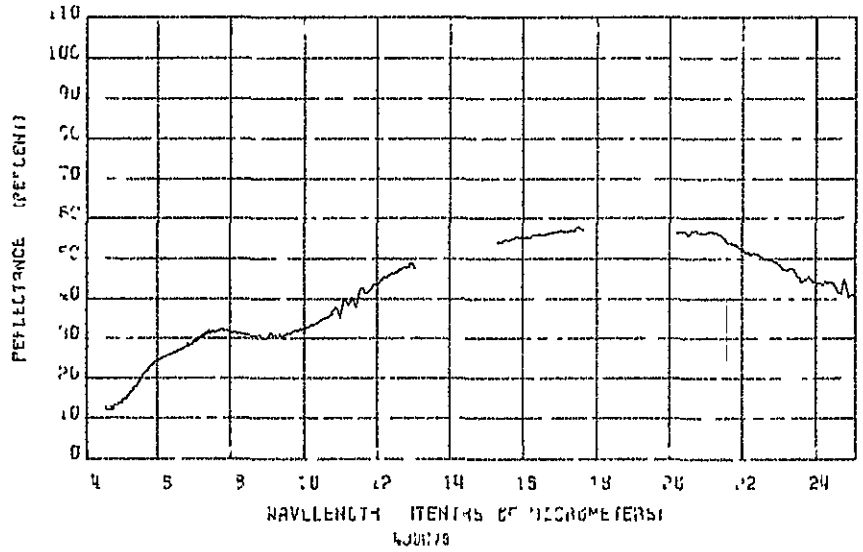
RED SEEP, UTAH TAPE (2)



RED SEEP, UTAH TAPE (1)
W2/YEL FACIES

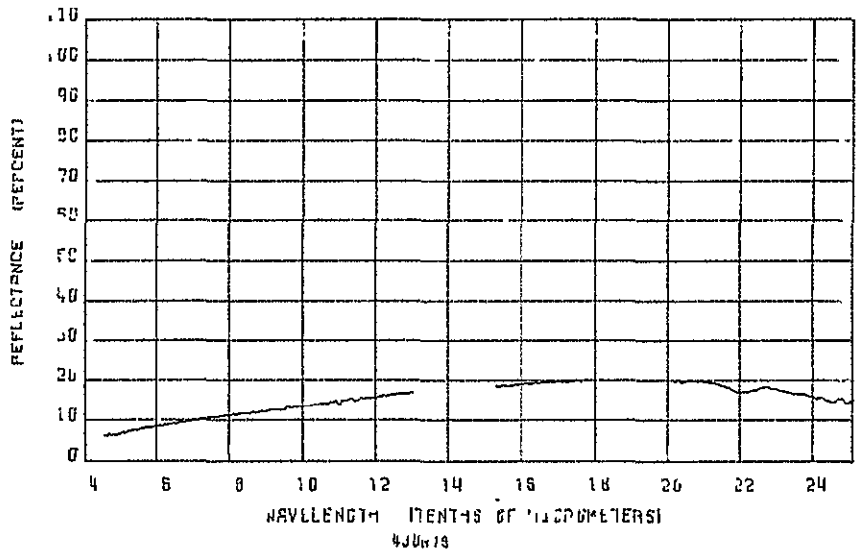


RED SEEP, UTAH TAPE (1)
W3/YEL FACIES



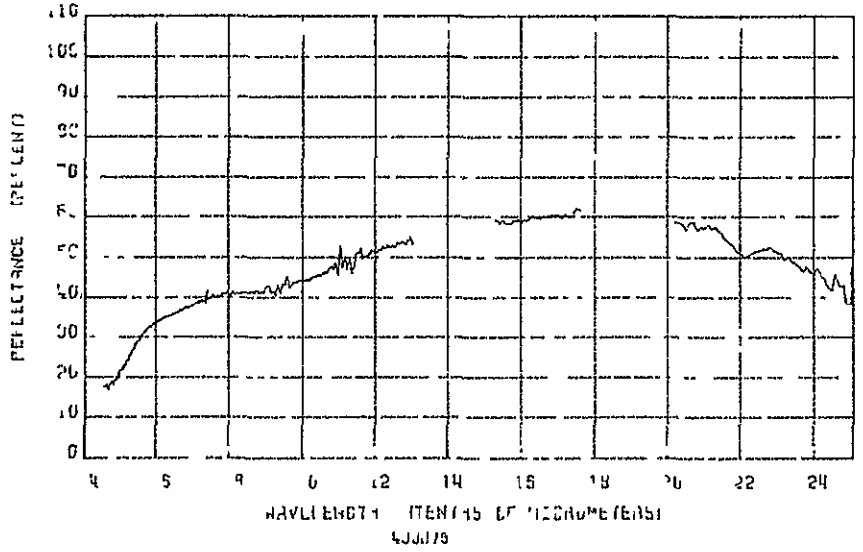
REG SEEP, U.S.A TAPE (2)
24/SDN FLAGG/ LS

7282 170/172



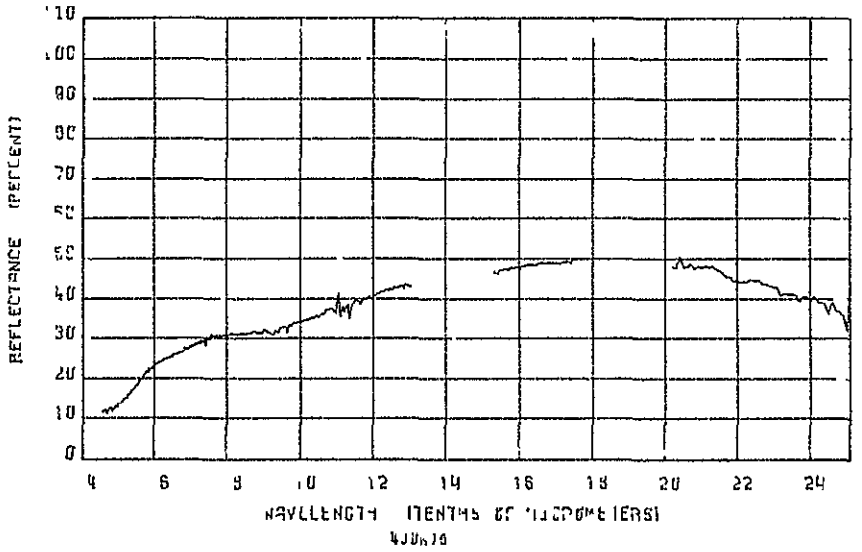
REG SEEP, U.S.A TAPE (2)
25/BLK MANGOS SHL

7285 174/176



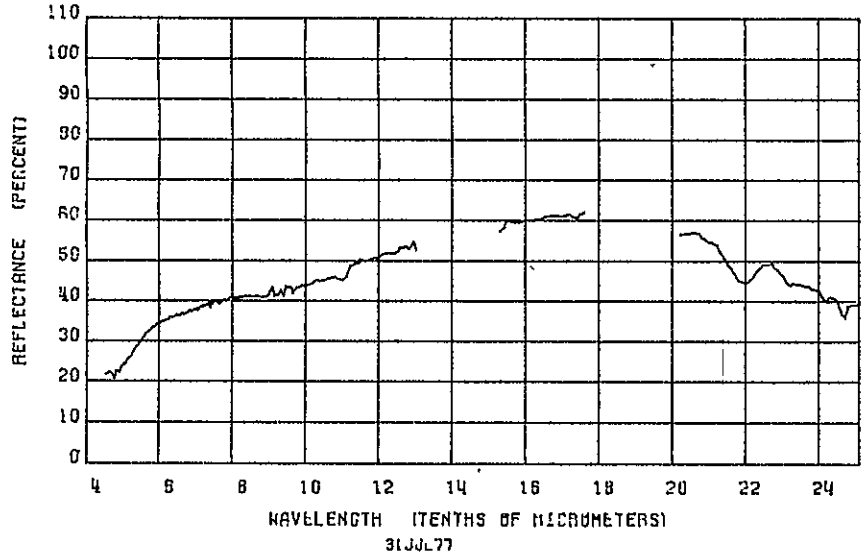
REG SEEP, U.S.A TAPE (1)
22/

7289 150/151

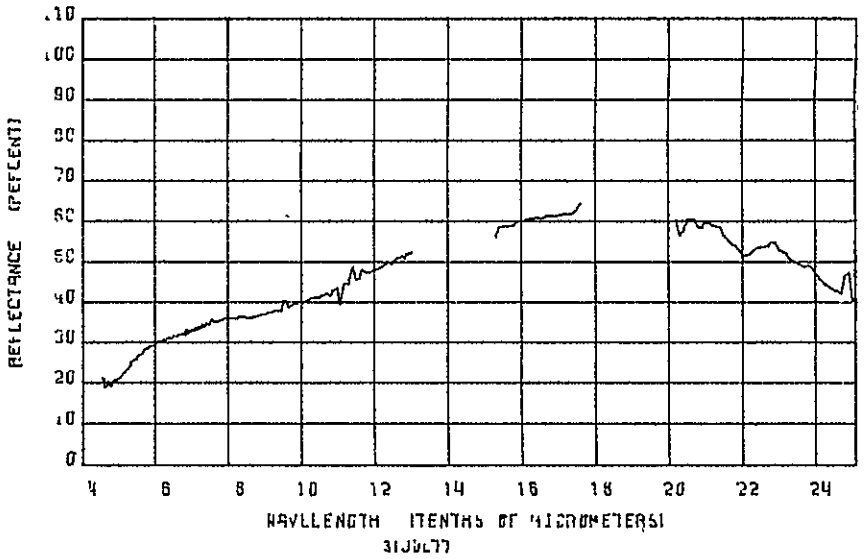


REG SEEP, U.S.A TAPE (1)
23/TP OF FERRUG SND

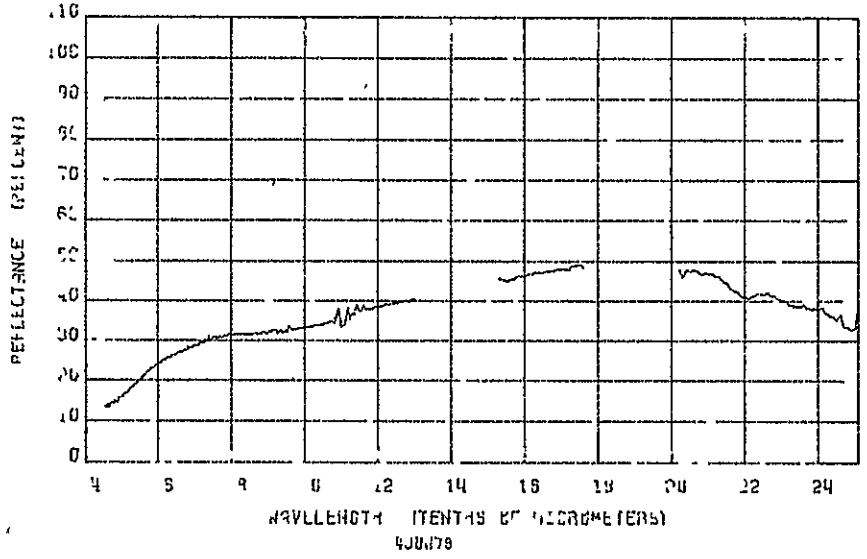
7287 163/161



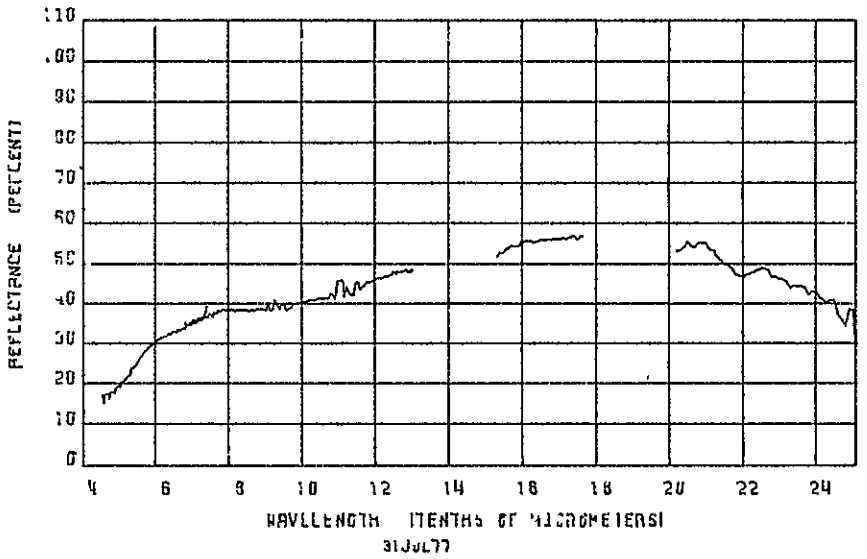
MOORE, UTAH, TAPE 1
2/LT TAN/GRAY SS
0 107/110



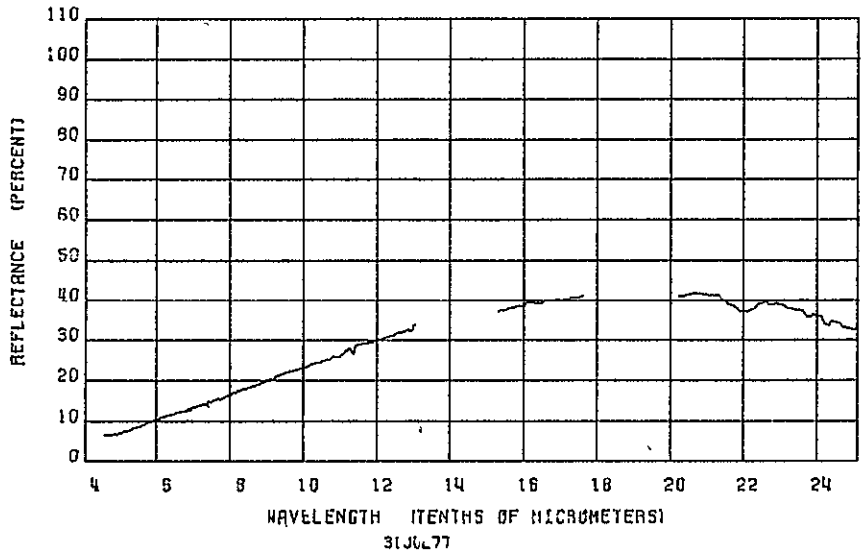
MOORE, UTAH, TAPE 1
3/LT BRN SHALE,SOIL
0 113/114



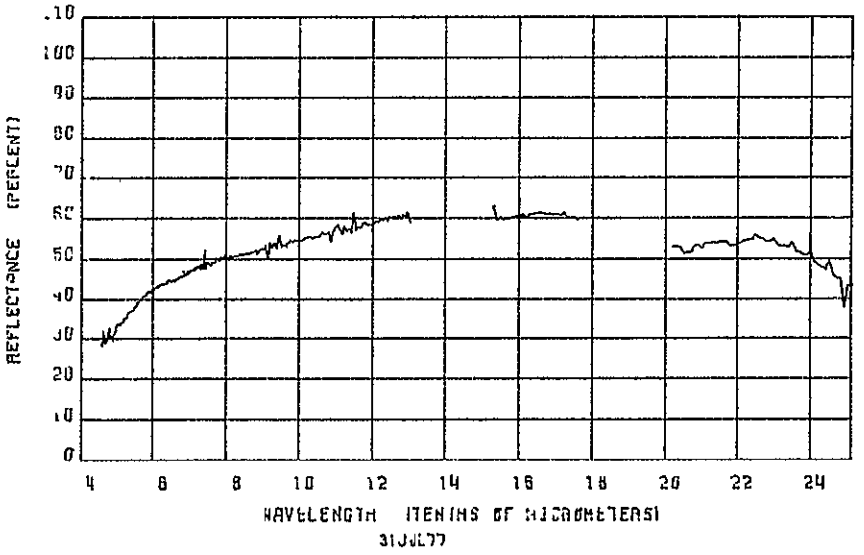
RED DEER, UTAH TAPE (2)
2S/BUFF SS
/208 265/262



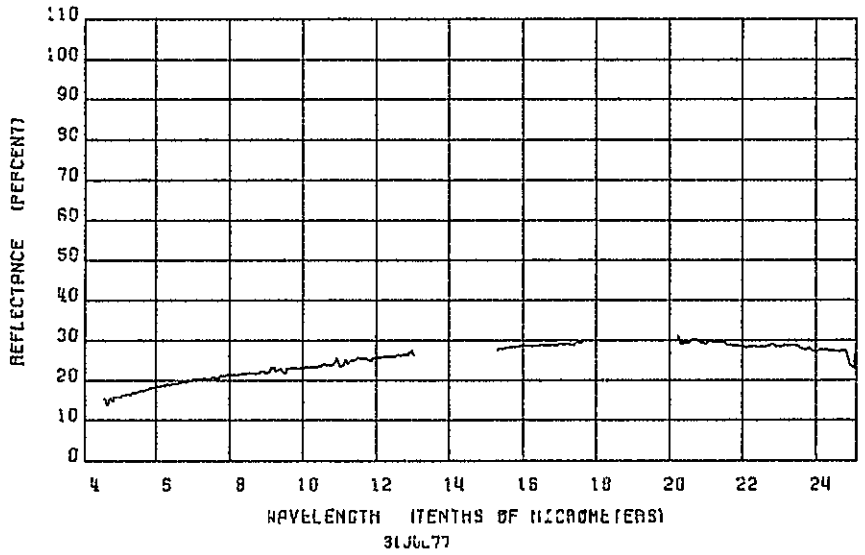
MOORE, UTAH, TAPE 1
1/BUFF SS STC
0 103/104



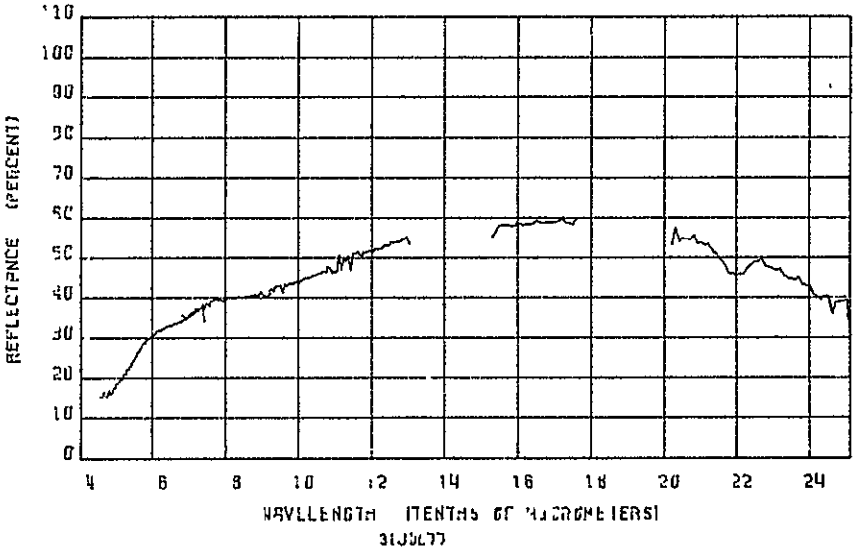
MOORE, UTAH, TAPE 1
7/SS,DESERT VARNISH
U 134/135



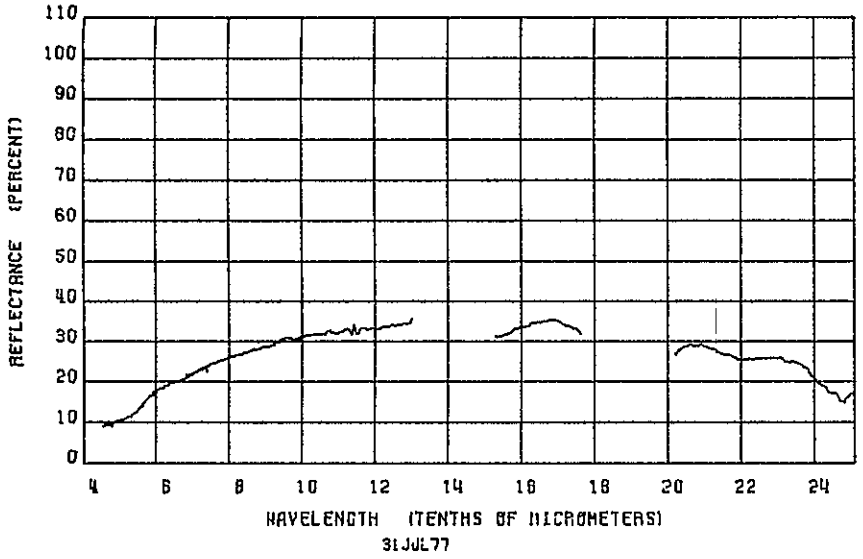
MOORE, UTAH, TAPE 1
9/WHITE SS
U 141/142



MOORE, UTAH, TAPE 1
4/BLK TUNUNK SHALE
U 117/120

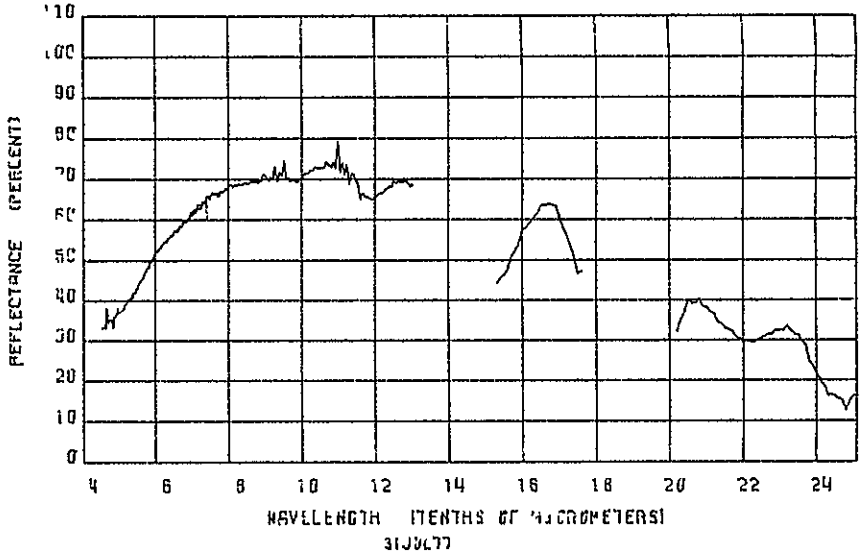


MOORE, UTAH, TAPE 1
FF
U 127/132



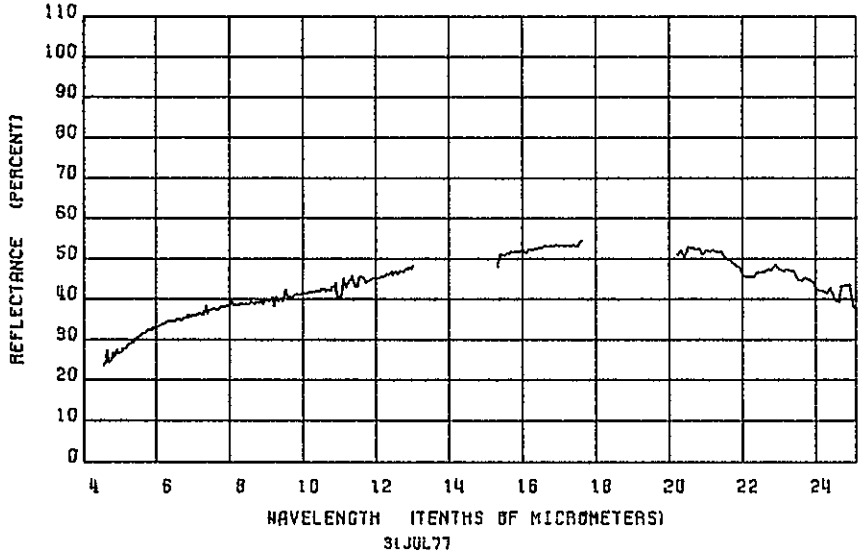
MOORE, UTAH, TAPE 1
11/PINK,BLK GYPSUM

Q 155/157



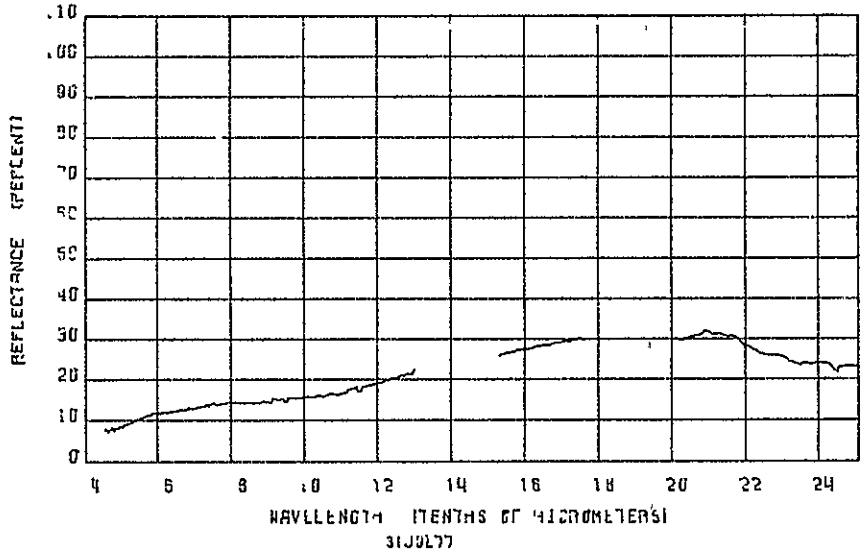
MOORE, UTAH, TAPE 1
12/WHT,PINK GYPSUM

Q 171/172



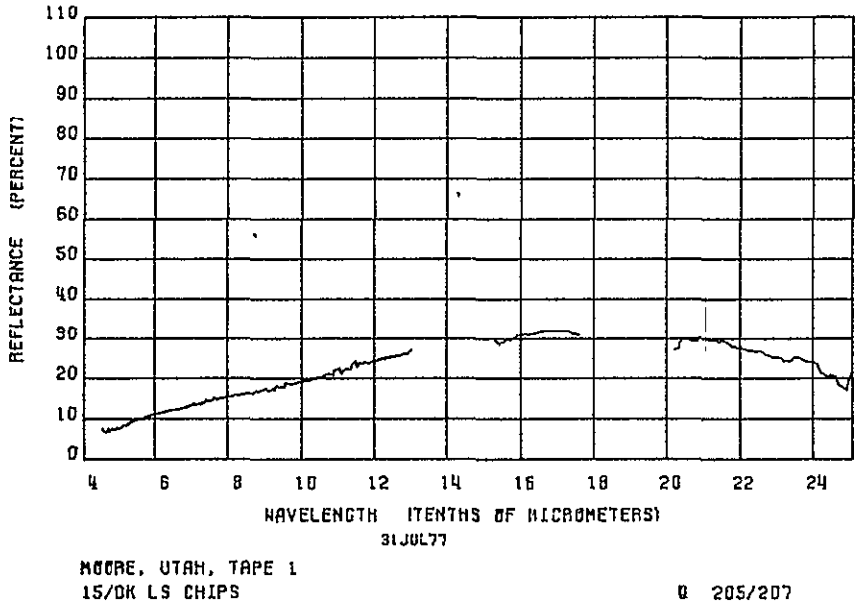
MOORE, UTAH, TAPE 1
9/LT GRAY MUD

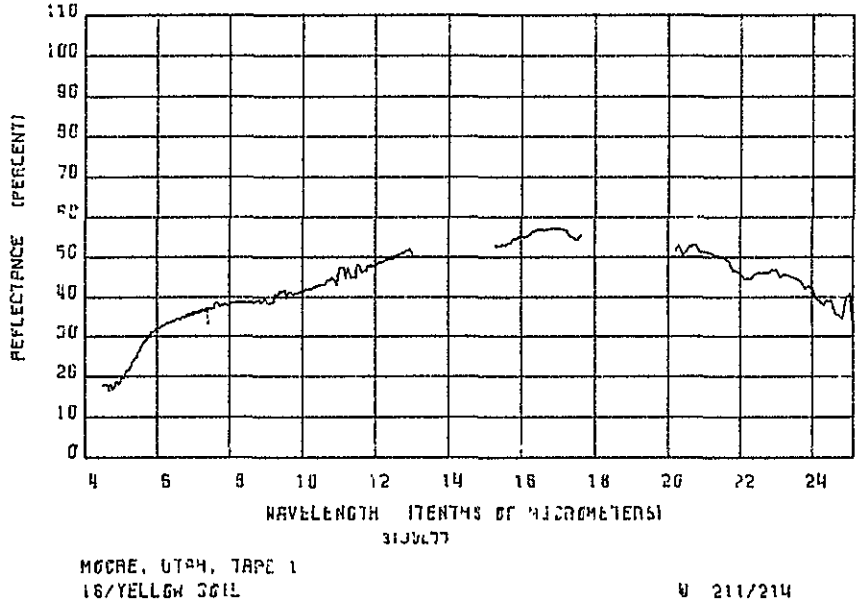
Q 145/147

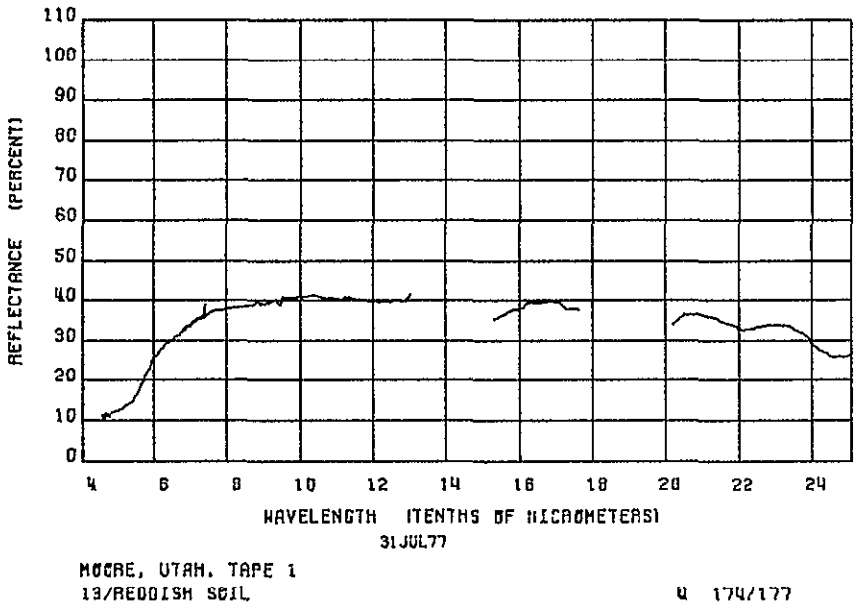


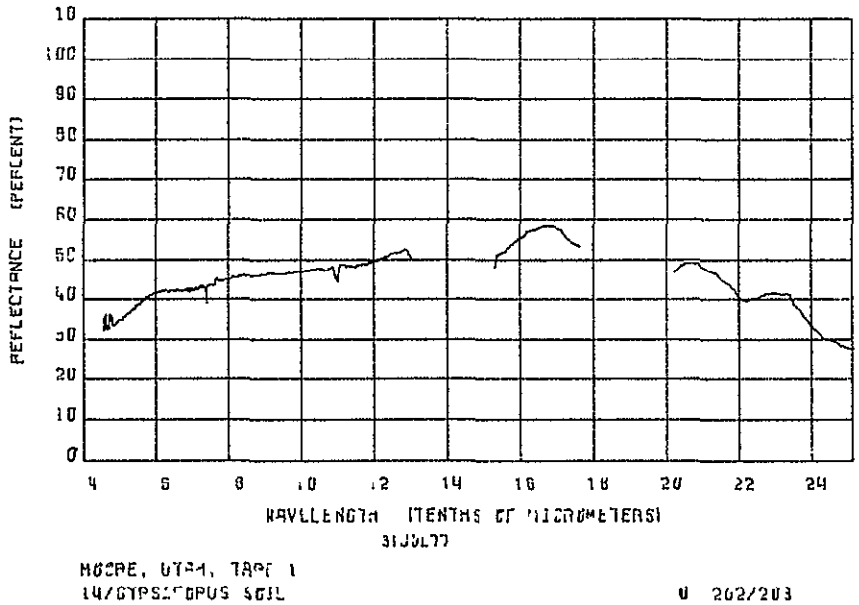
MOORE, UTAH, TAPE 1
10/GRAY SS CHIPS

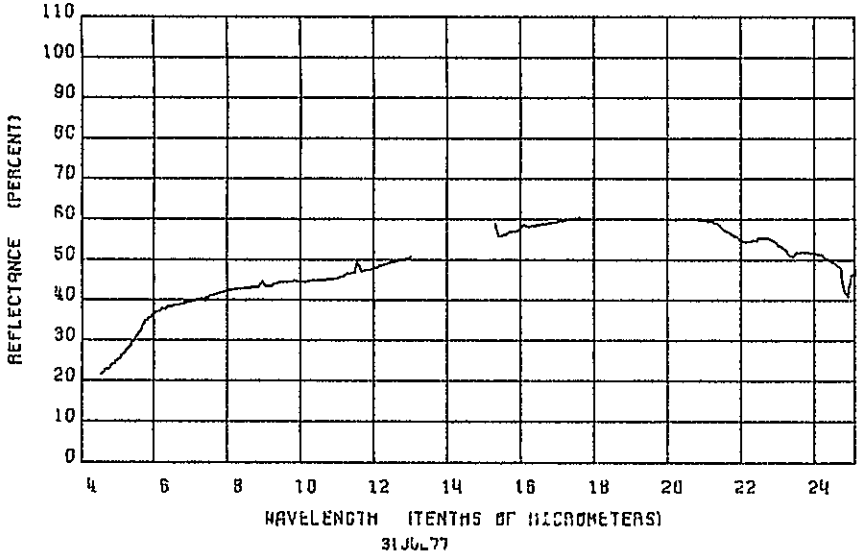
Q 152/153


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
31JUL77
MOORE, UTAH, TAPE 1
15/DK LS CHIPS
0 205/207


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
31JUL77
MOORE, UTAH, TAPE 1
16/YELLOW SOIL
0 211/214

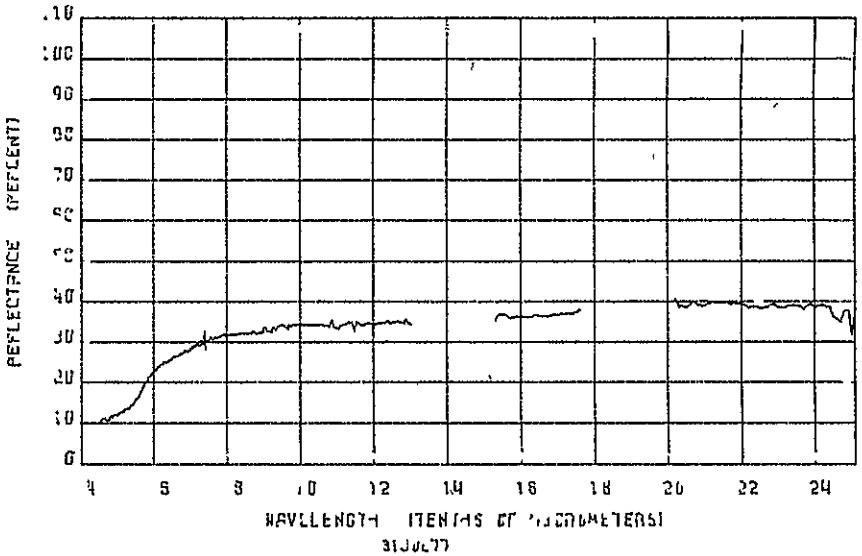

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
31JUL77
MOORE, UTAH, TAPE 1
13/REDDISH SOIL
0 174/177


REFLECTANCE (PERCENT)
10
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
31JUL77
MOORE, UTAH, TAPE 1
0 202/203



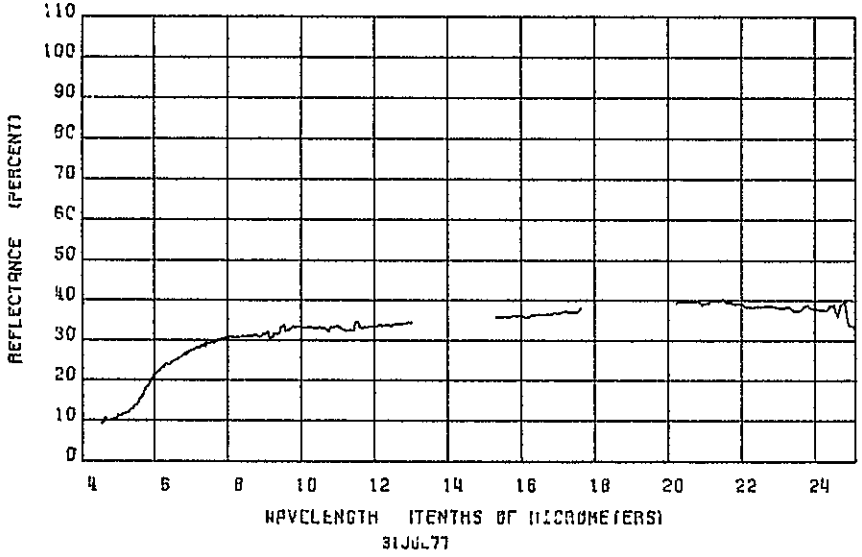
MOORE, UTAH, TAPE 1
19/LT GRN SS DTC

U 227/231



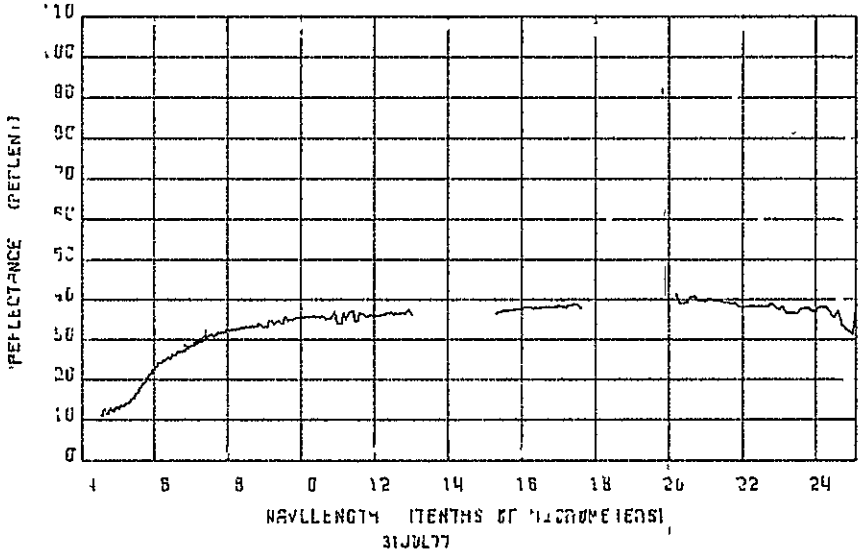
MOORE, UTAH, TAPE 1
20/RED SS

U 233/235



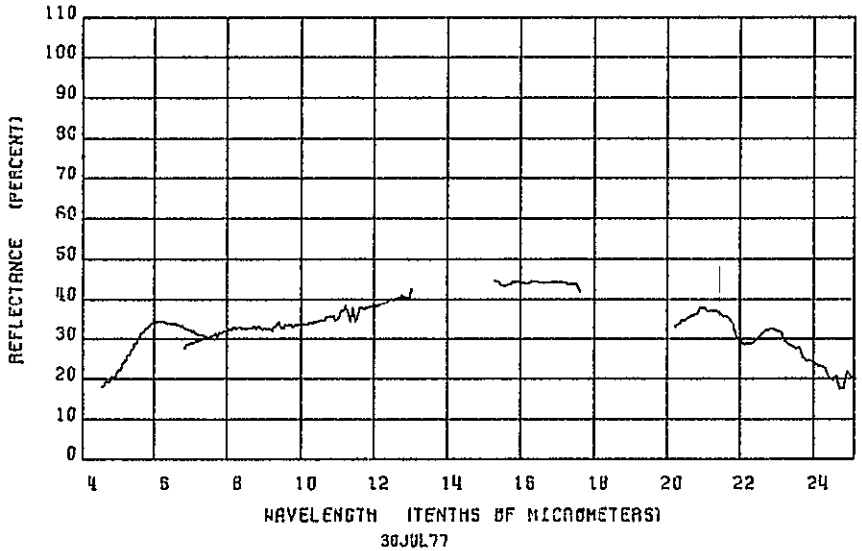
MOORE, UTAH, TAPE 1
17/RED SOIL,CHIPS

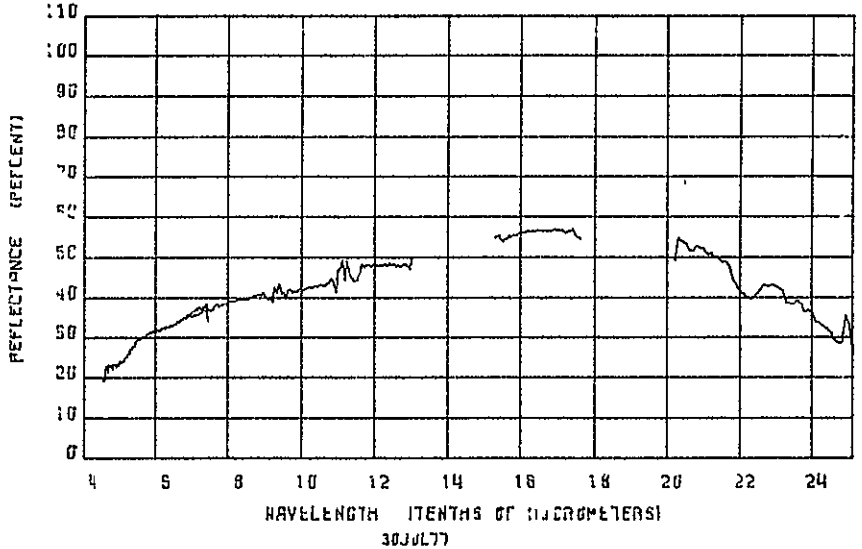
U 217/221

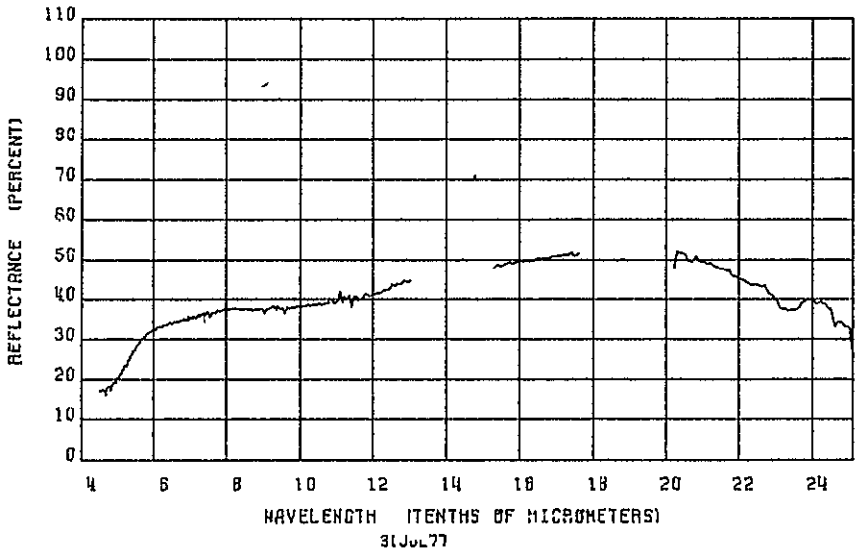


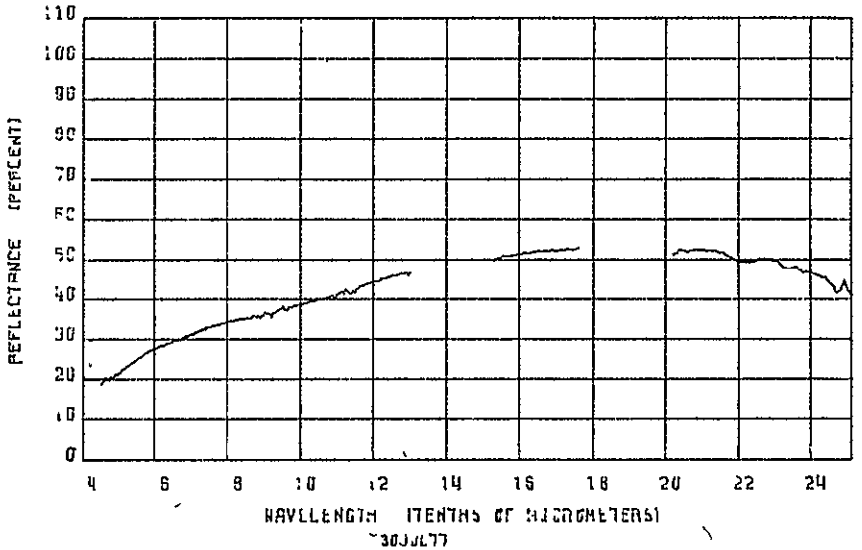
MOORE, UTAH, TAPE 1
18/RED SILTST DTC

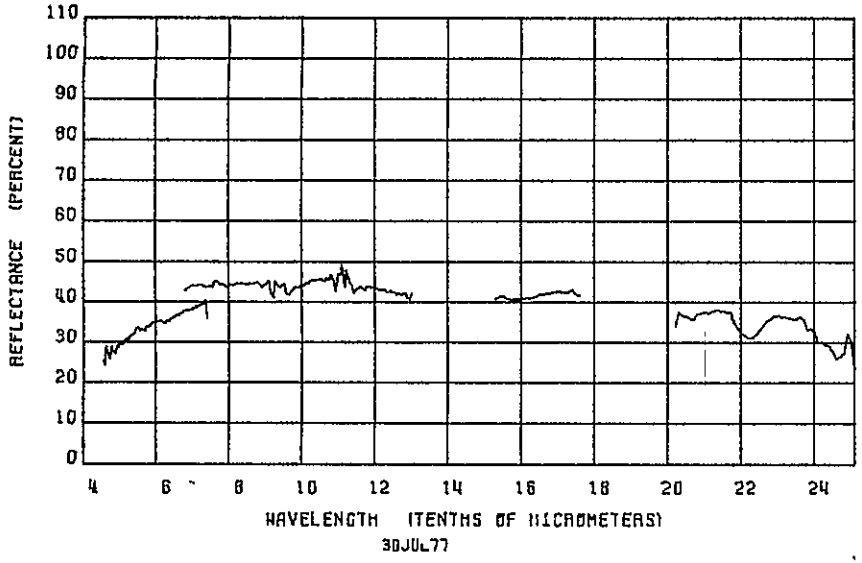
U 223/225

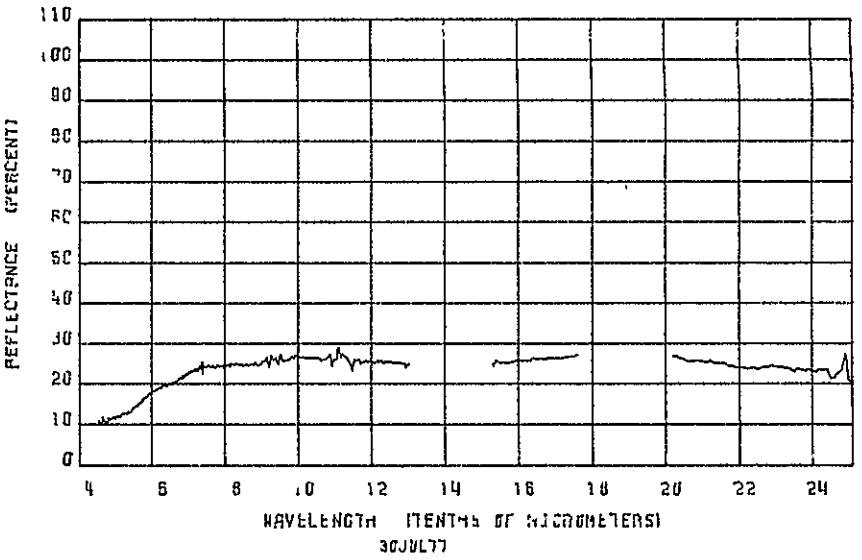

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
8/RS MINE OMP
/30P 17/ 0

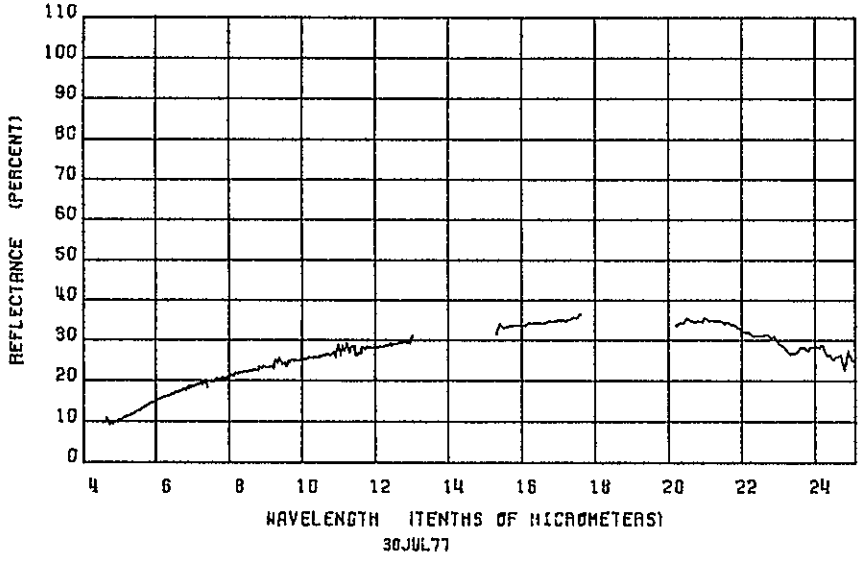

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
8/RS MINE OMP N END
/30P 20/ 0

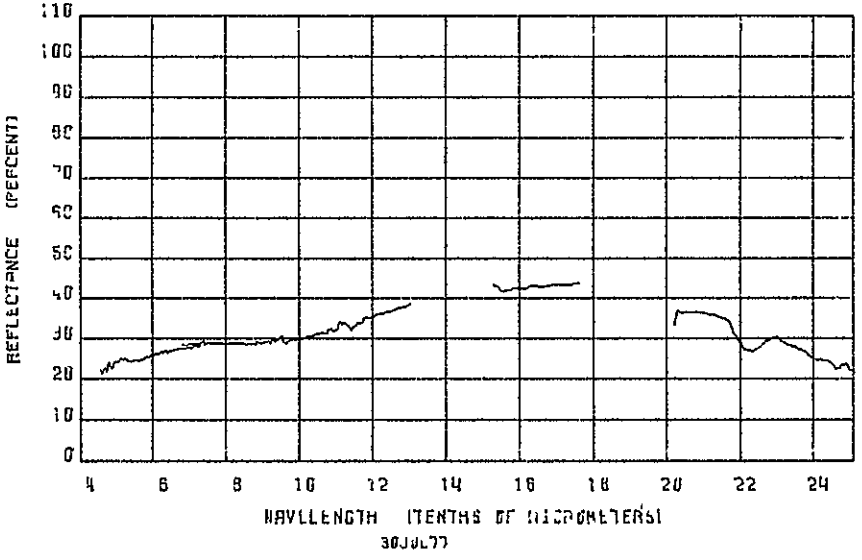

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
31JUL77
MOORE, UTAH, TAPE 1
21/MUDSTONE
Q 237/241

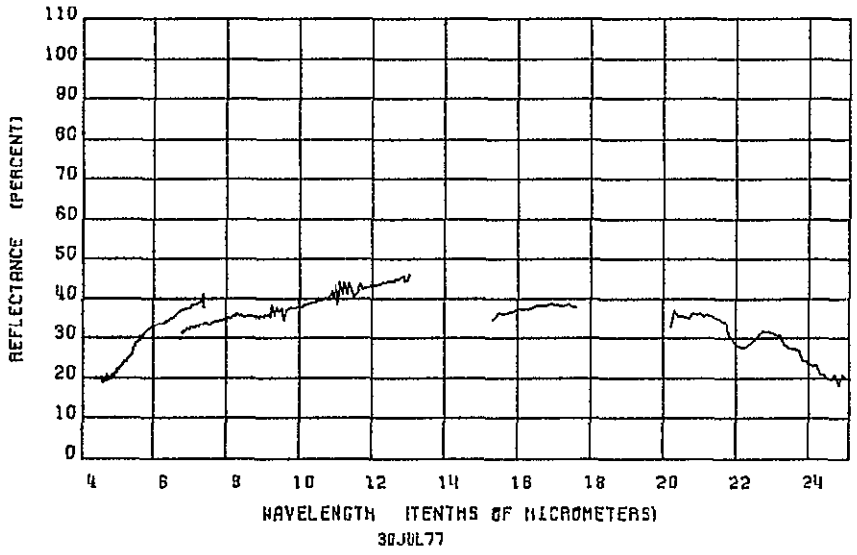

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
7/SP
7308 16/ 0

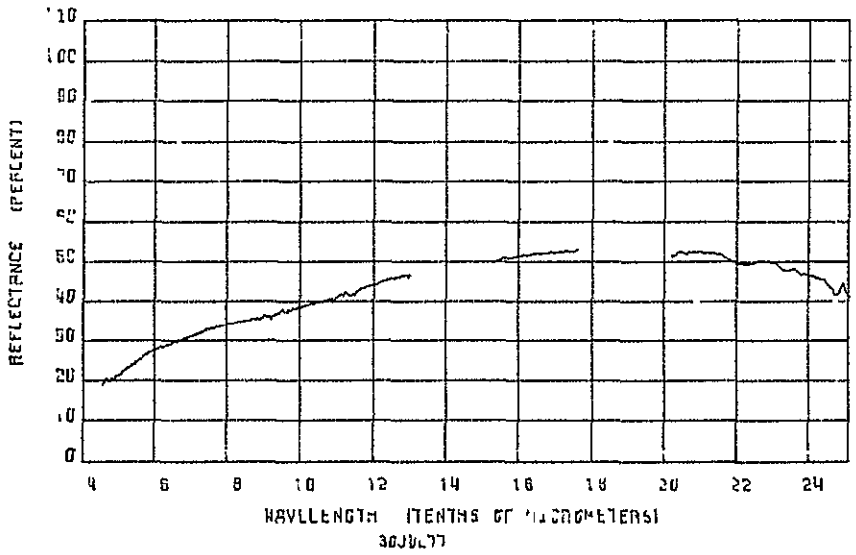

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
12/RS PRPL BENT MUD
730P 23/ 0

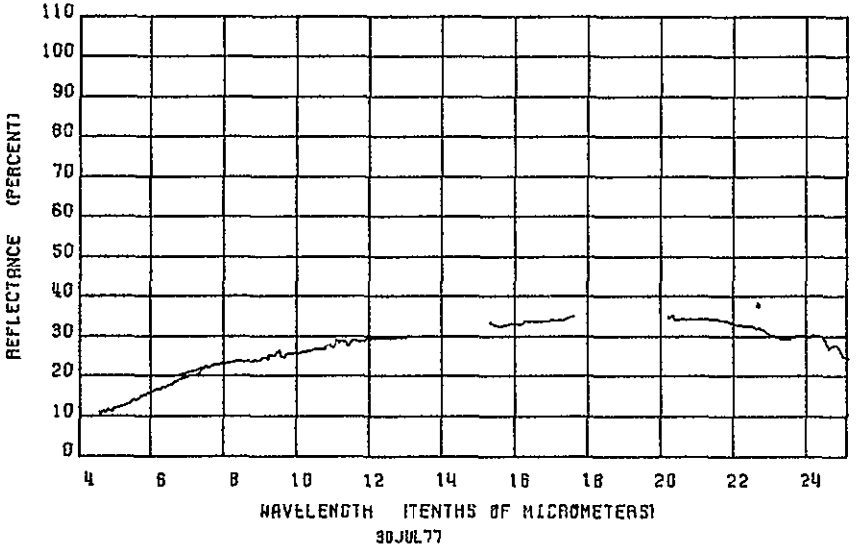

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
13/RS DK RD SND BLD
730P 24/ 0

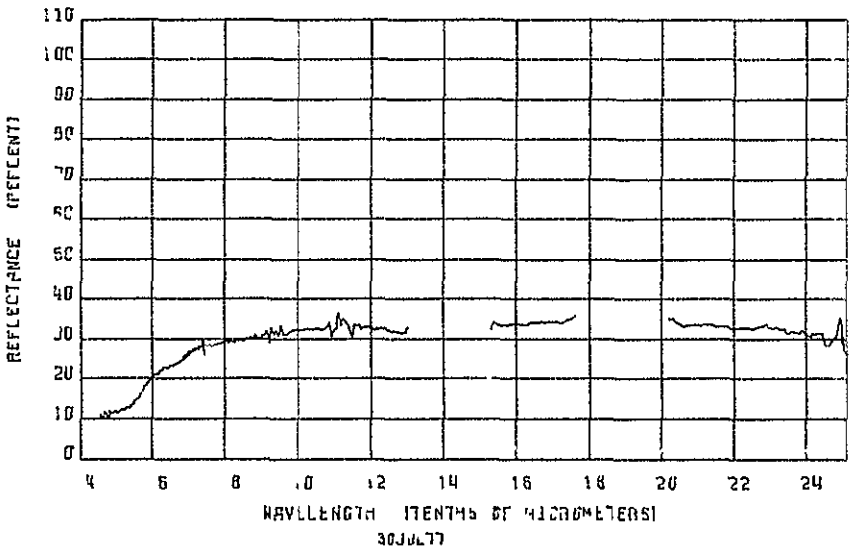

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
10/RS DIP SLOPE
730P 21/ 0

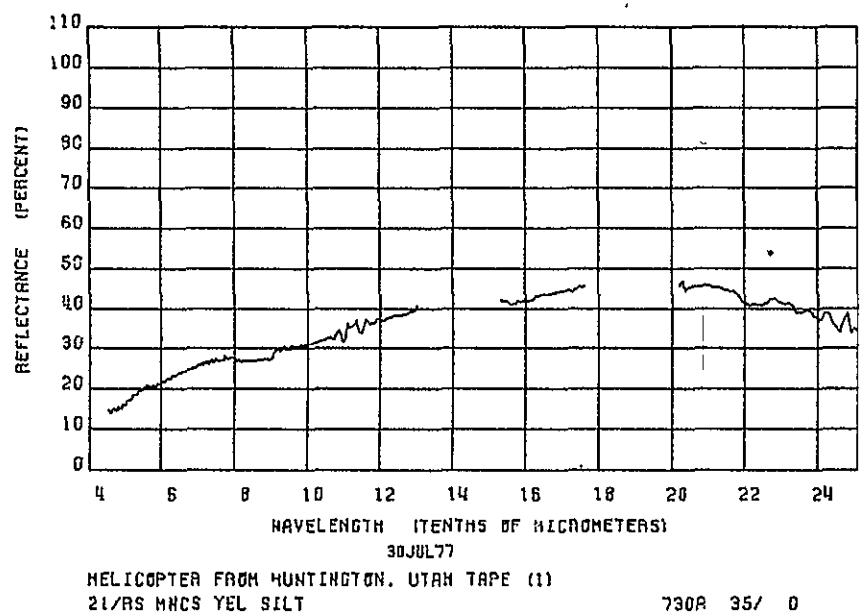

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4
6
8
10
12
14
16
18
20
22
24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
11/RS GRY BENT MUD
730P 22/ 0


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
17/RS N MINE DMP
/30R 30/ 0

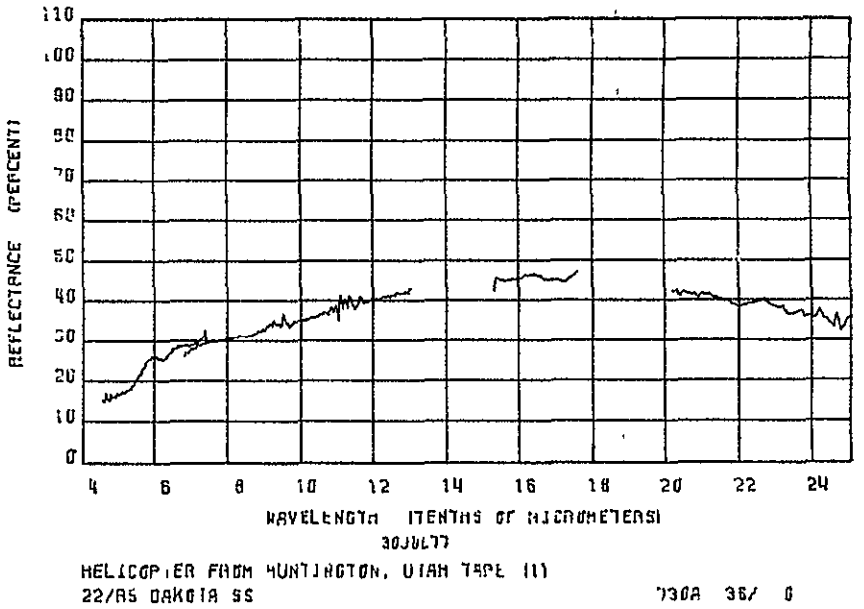

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
18/SF
730R 32/ 0


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
14/RS SOIL ON BKHAN
730R 25/ 0

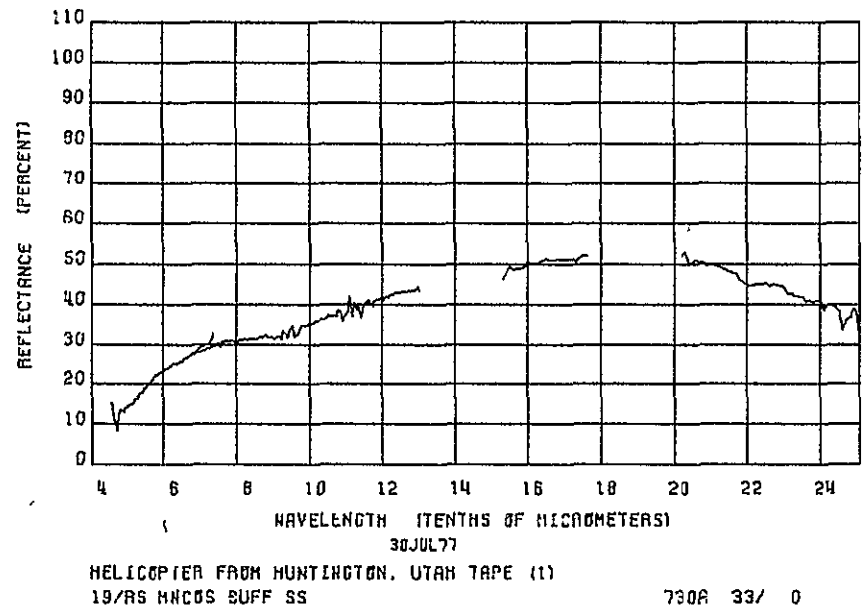

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
15/RS RD SS BIC
730R 26/ 0



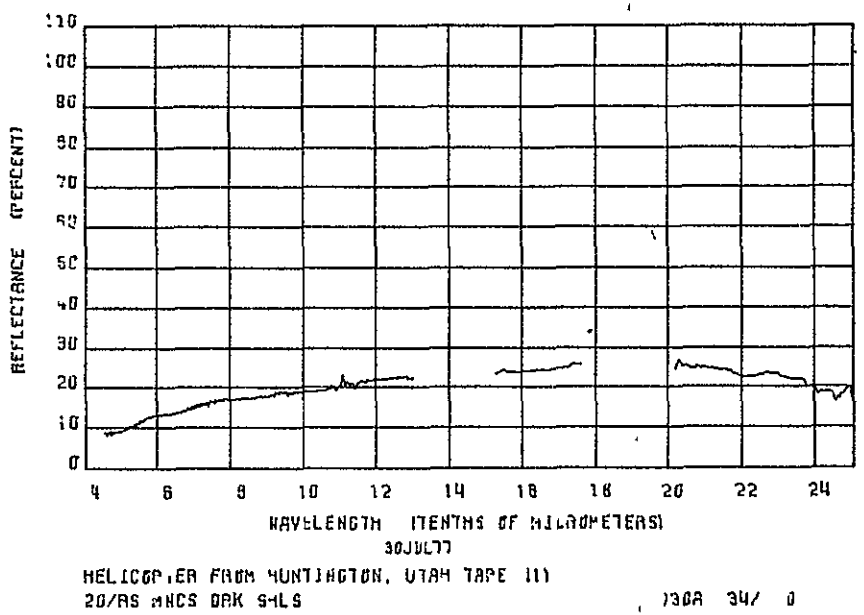
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
21/RS MNCS YEL SILT 730A 35/ 0



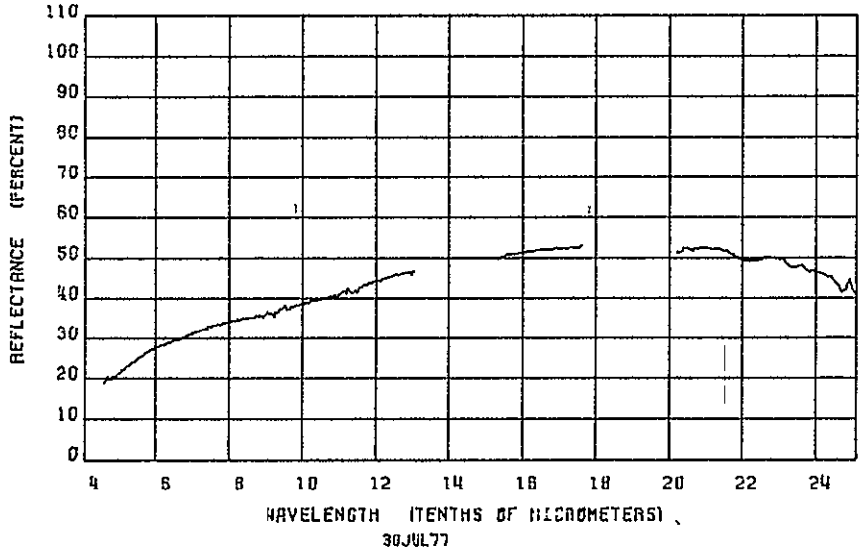
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
22/RS DAKOTA SS 730A 36/ 0

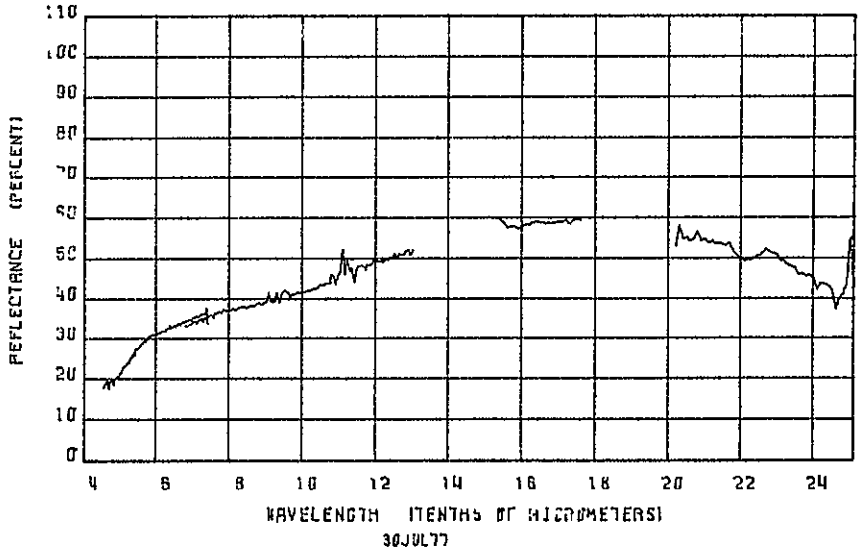


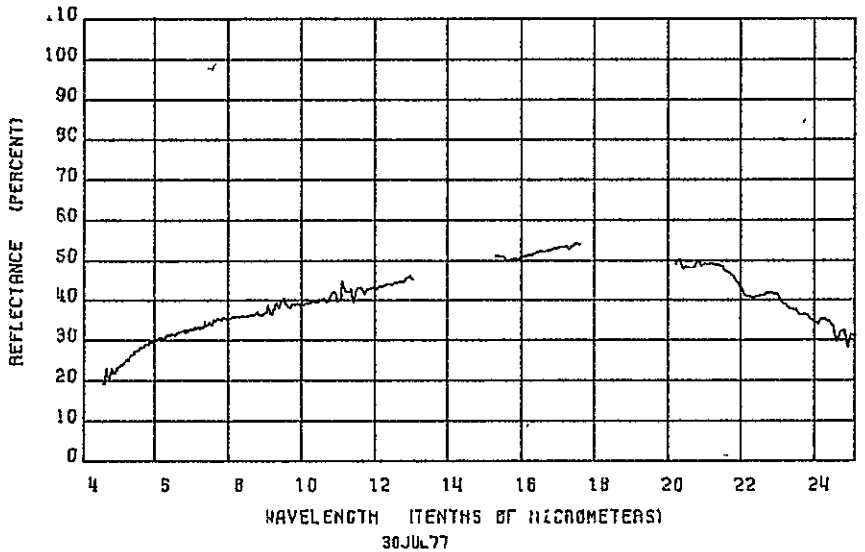
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
19/RS MNCOS BUFF SS 730A 33/ 0

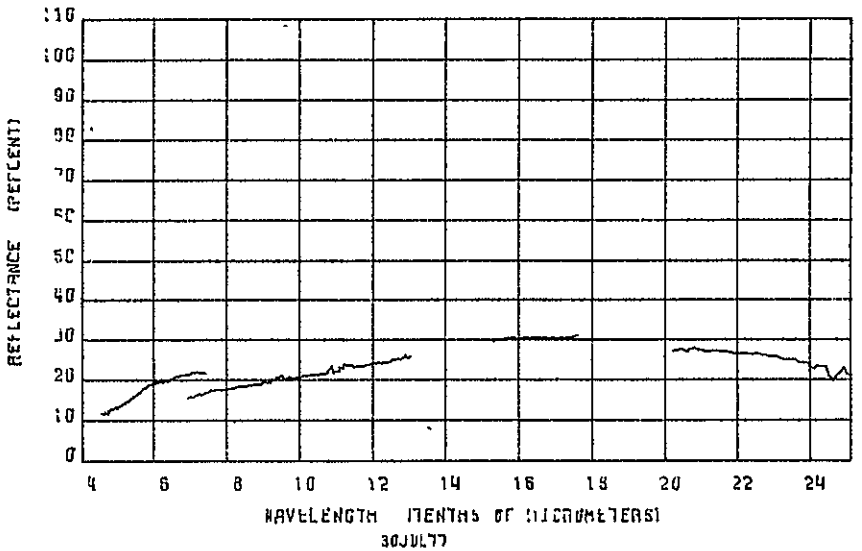


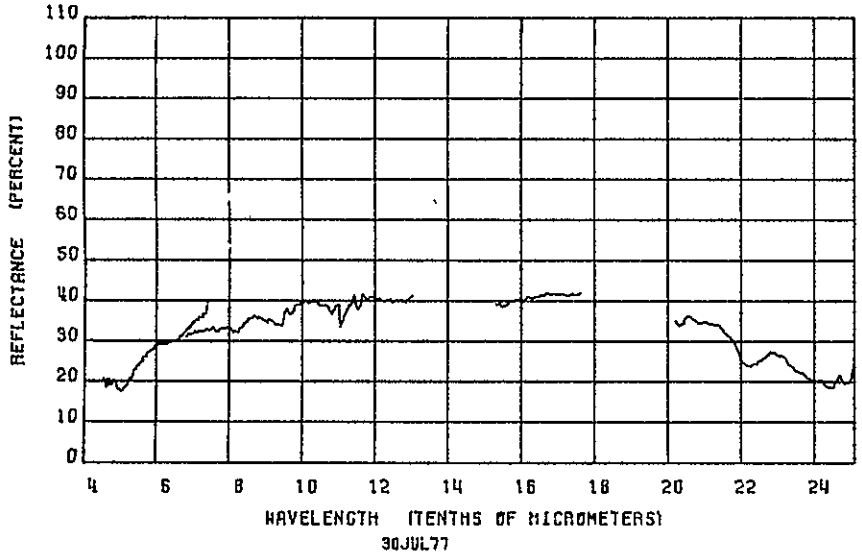
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
20/RS MNCS DRK SHLS 730A 34/ 0


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
26/SF
730P 42/ 0

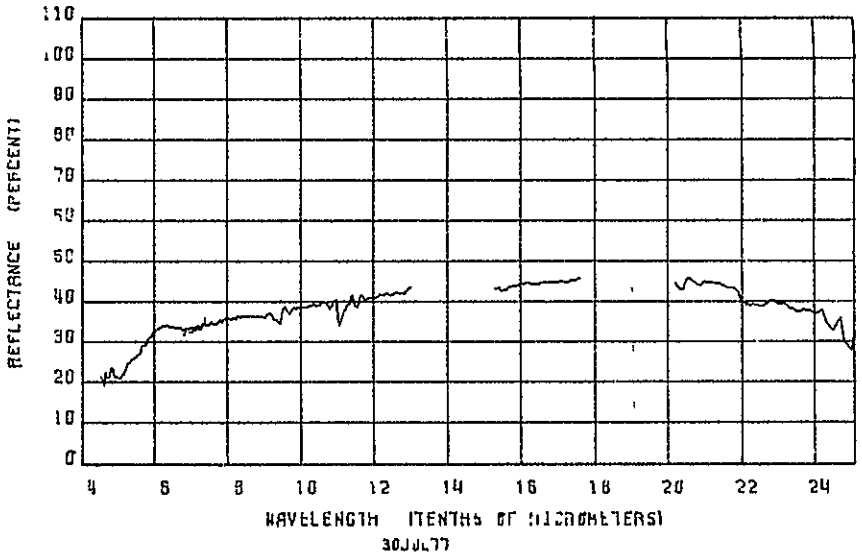

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
27/RS MNCS YEL SHL
730P 43/ 0


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
24/RS DOR MTN GRY S
730P 40/ 0

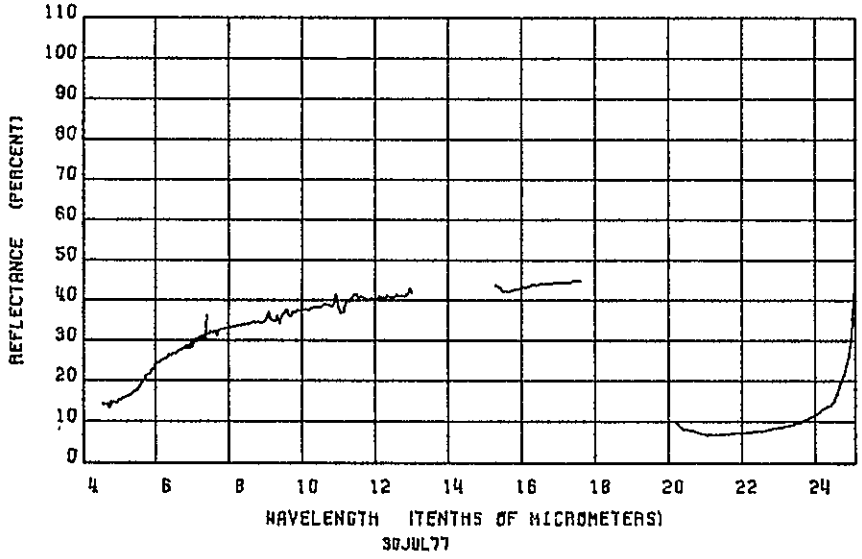

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
25/RS BKHAN BRN BLG
730P 41/ 0



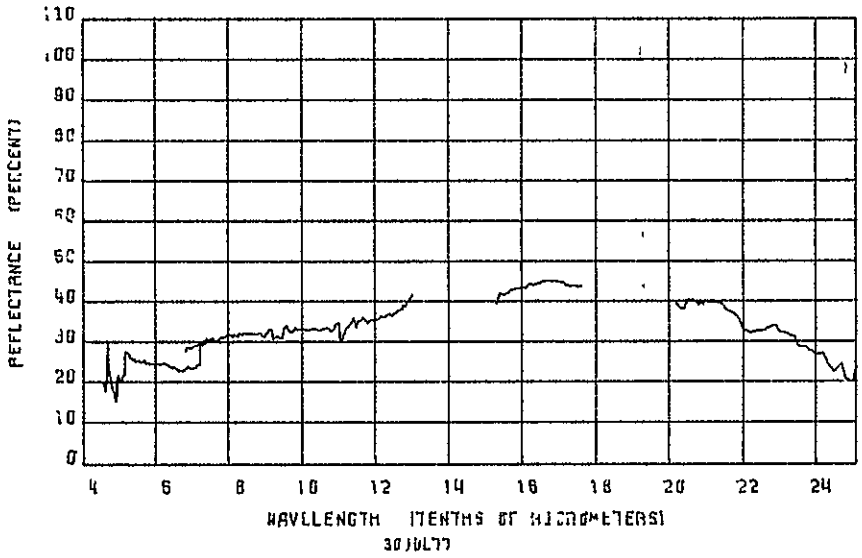
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
32/E ALT BKSN 730P 62/ 0



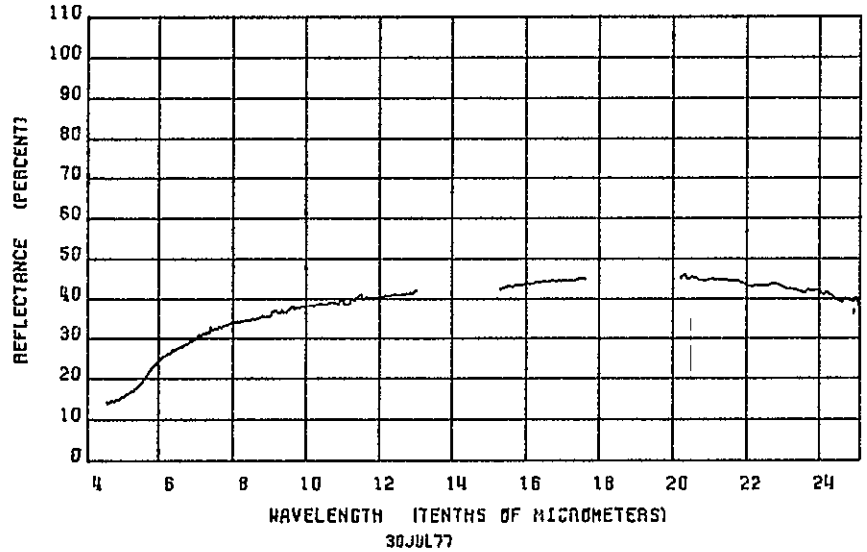
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
33/E AREA OF DRD SP 730P 63/ 0

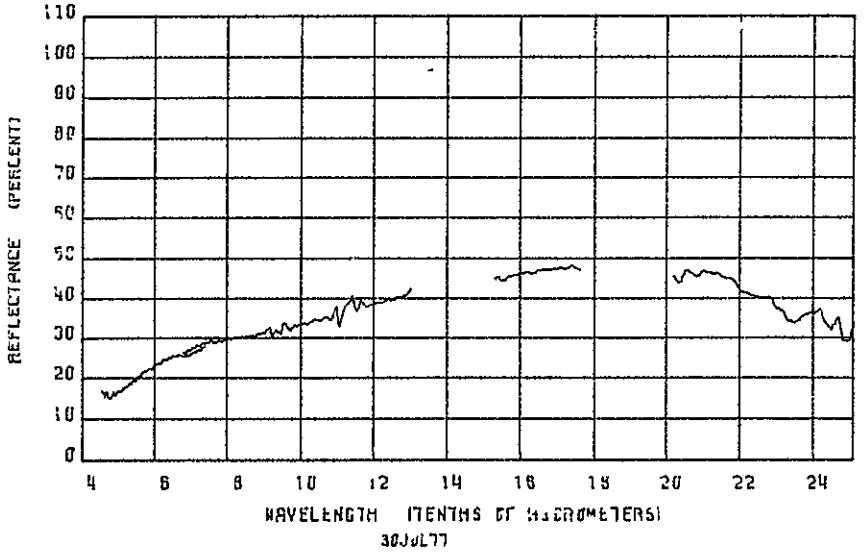


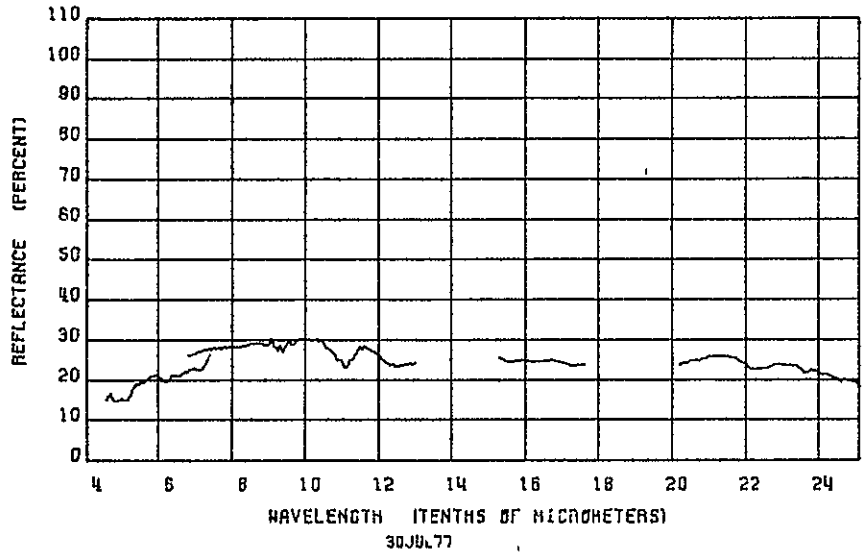
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
30/SF2 300' 730P 60/ 0

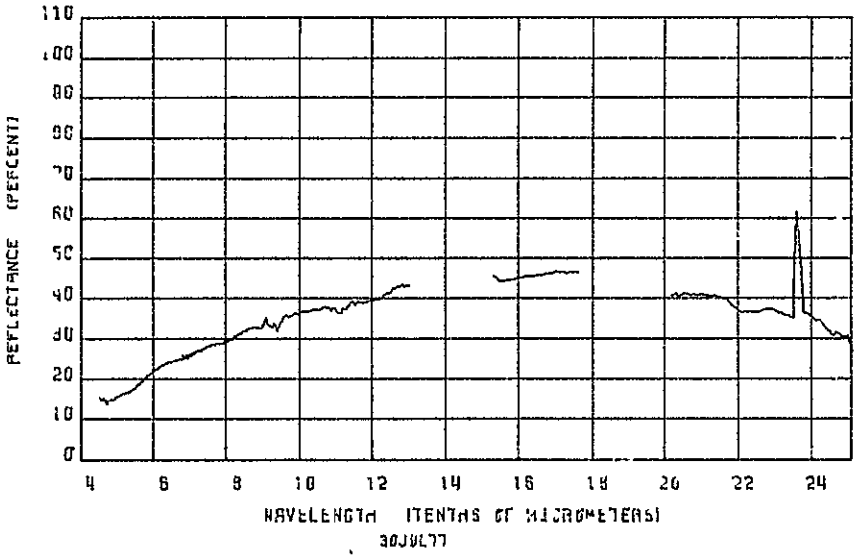


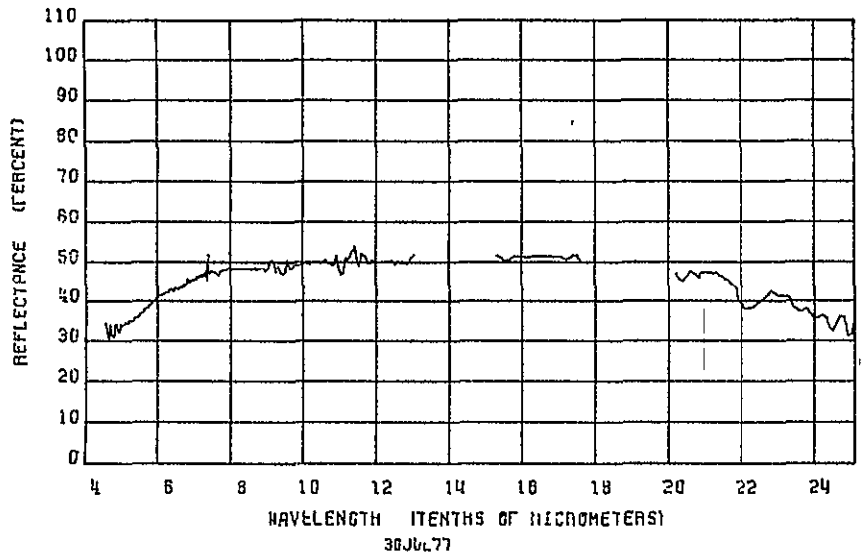
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
31/E LT YEL BENT 730P 61/ 0


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
36/SF2
730P 66/ 0

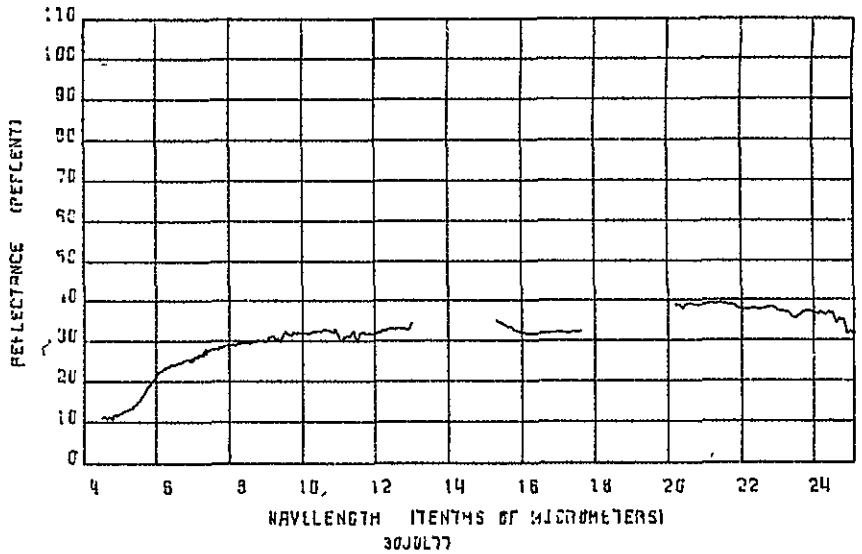

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
37/E BK DAM S & CAP
730P 70/ 0


REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
34/E BENT SHLES
730P 64/ 0

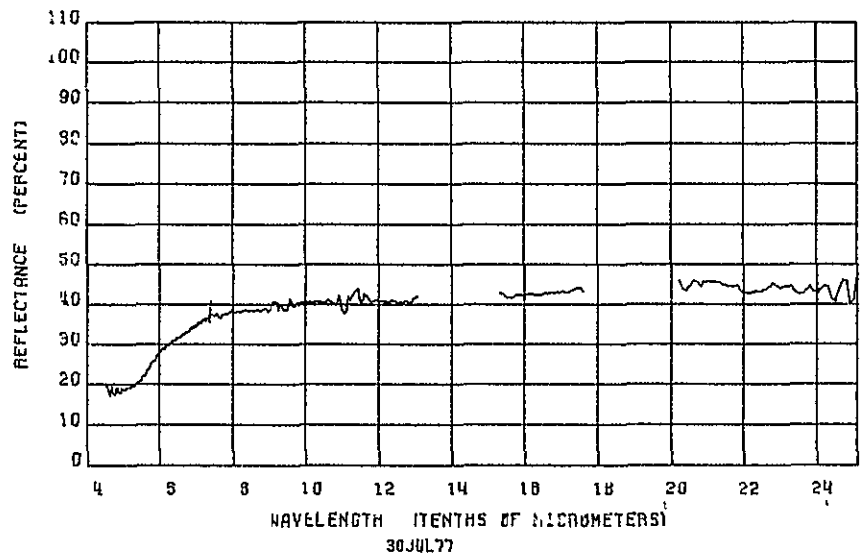

REFLECTANCE (PERCENT)
110
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
35/E SLT MSH W/TRS
730P 65/ 0



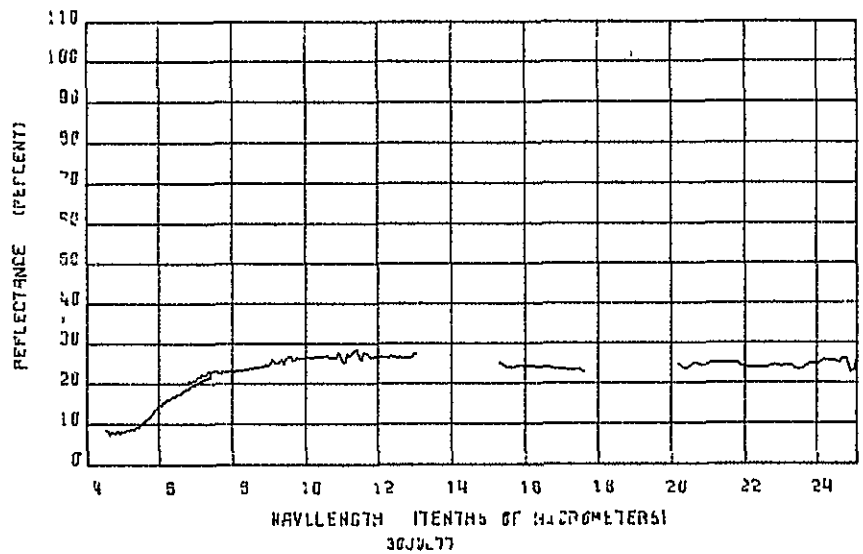
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
40/E WHT BENTANITE 7309 73/ 0



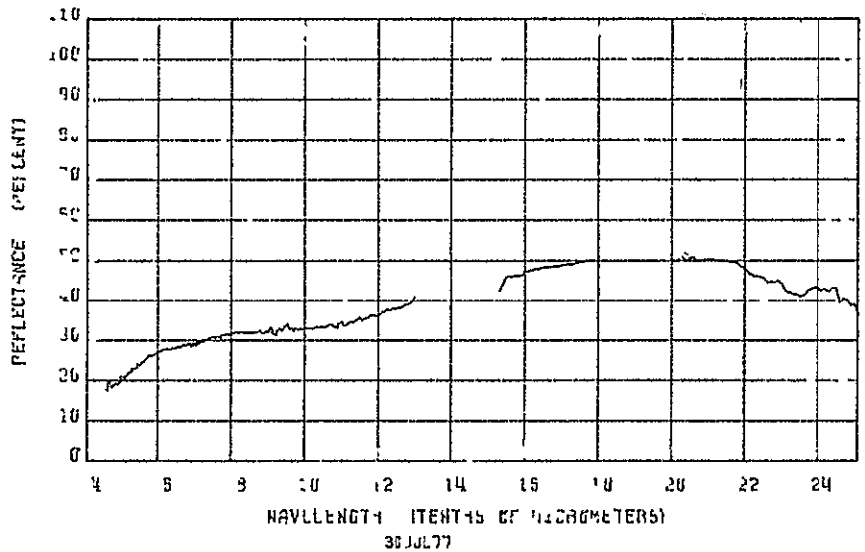
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
41/E SHRVL PK SS&SL 7308 74/ 0

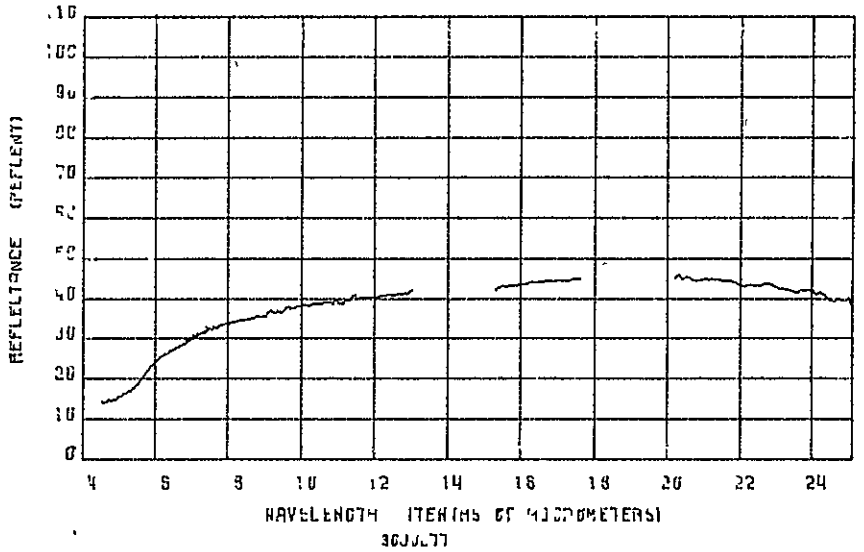


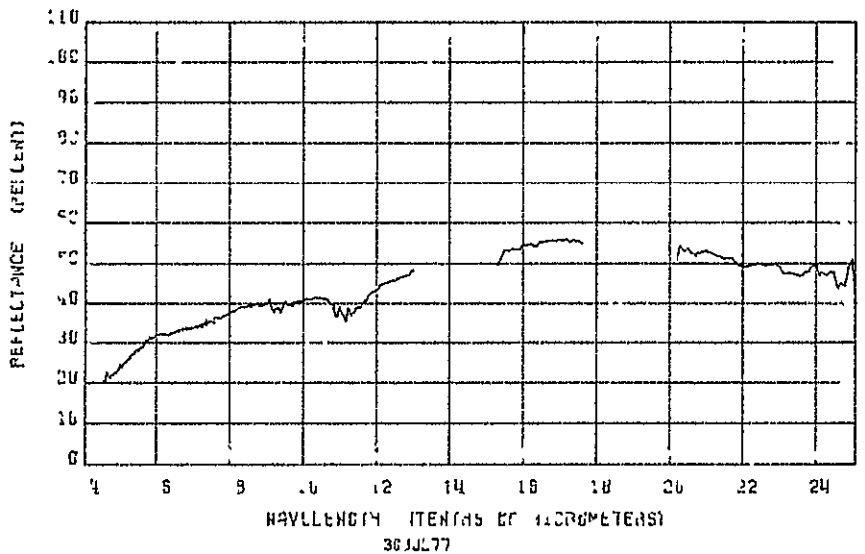
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
39/E PNK ALLUVIUM 7308 71/ 0

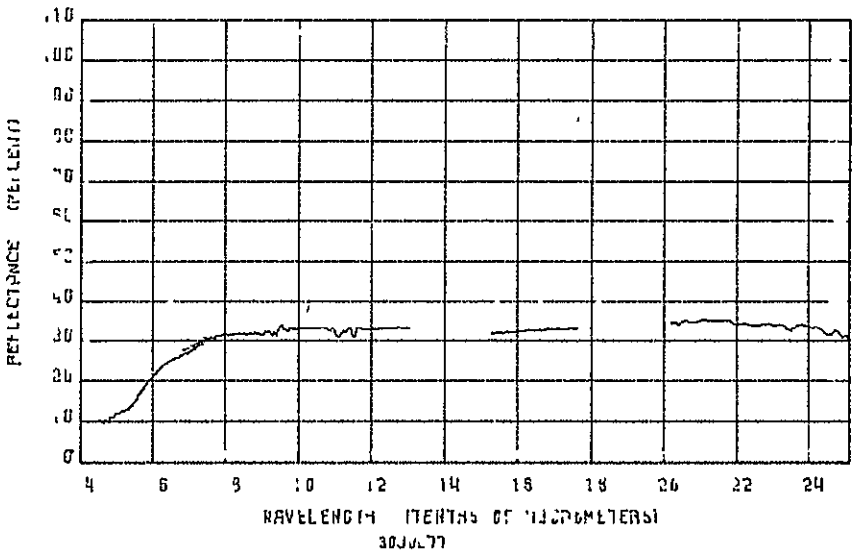


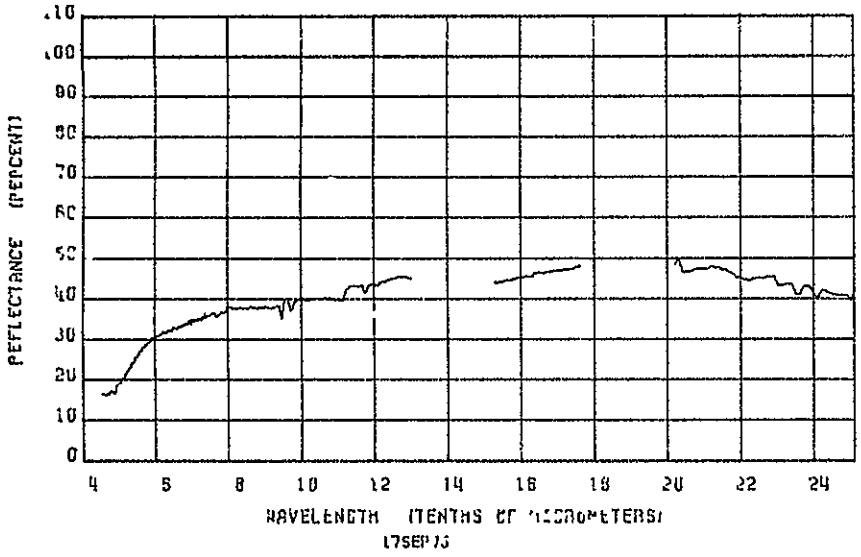
HELICOPTER FROM HUNTINGTON, UTAH TAPE (1)
39/E PEG ALLUVIUM 7308 72/ 0

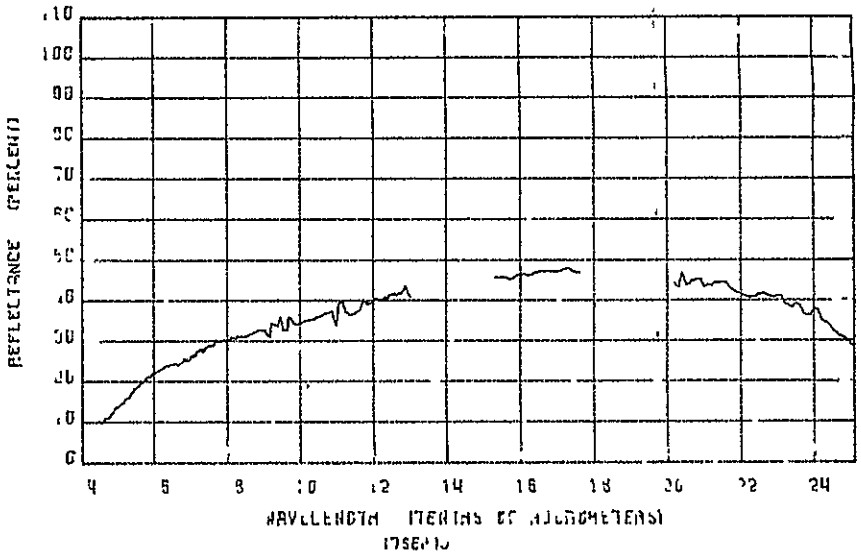

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE III
44/E CAMEL GRAY SS
/30F 77/ 0

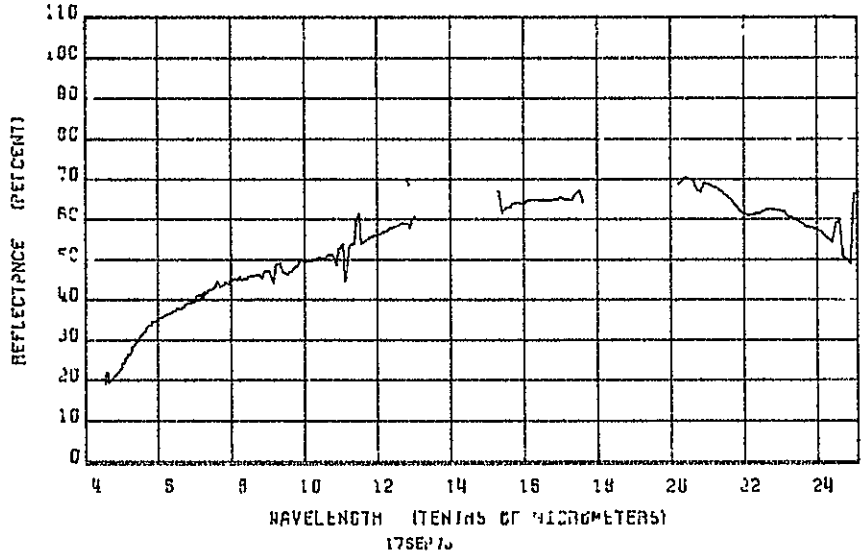

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE III
45/3F2
/30F 100/ 0

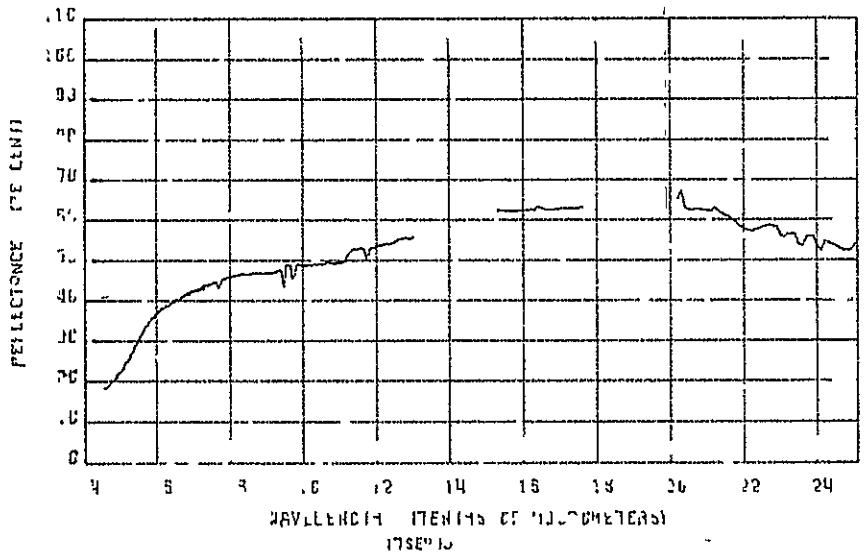

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE III
42/E COPLIS WHT SS
/30F 75/ 0

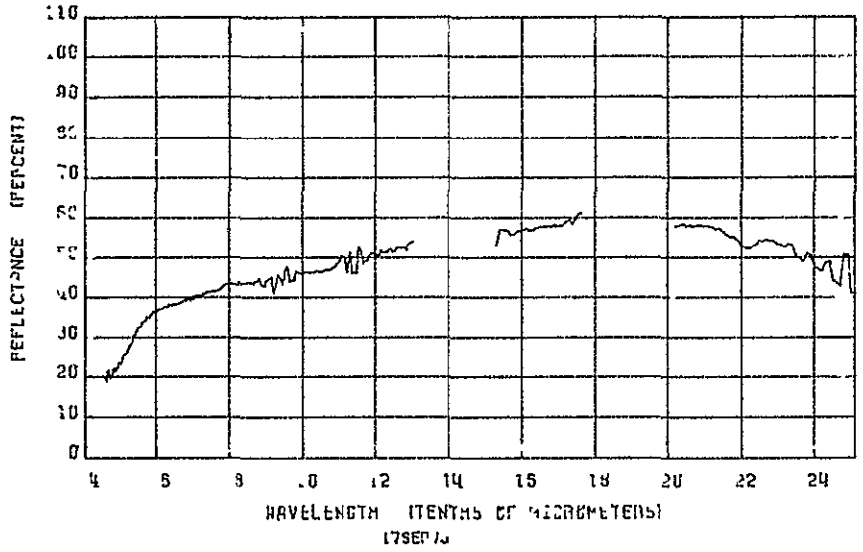

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
30JUL77
HELICOPTER FROM HUNTINGTON, UTAH TAPE III
43/E ENTRADA RED SS
/30F 76/ 0

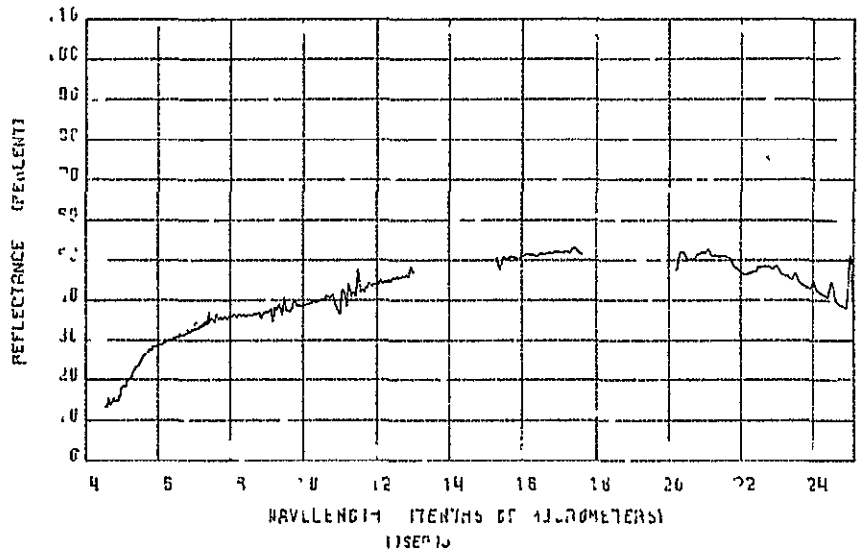

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
593/BUFF SS
6 7/ 10

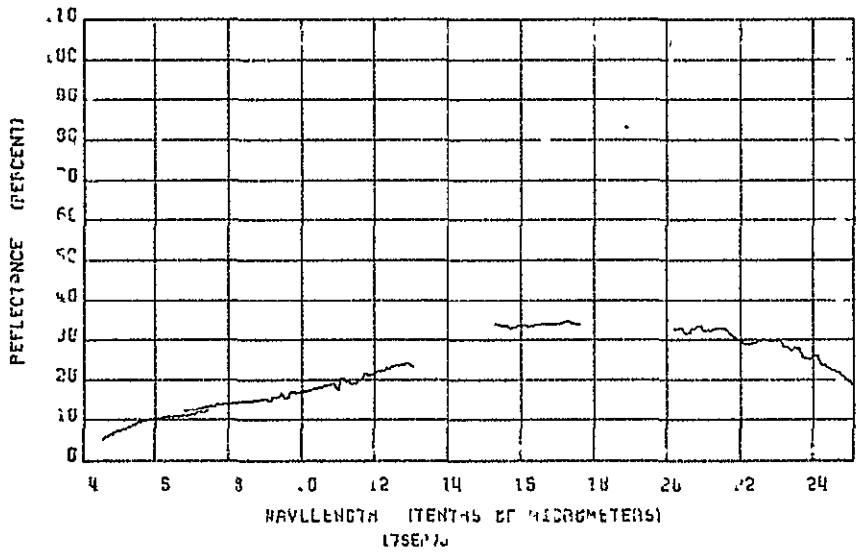

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
6 11/ 12

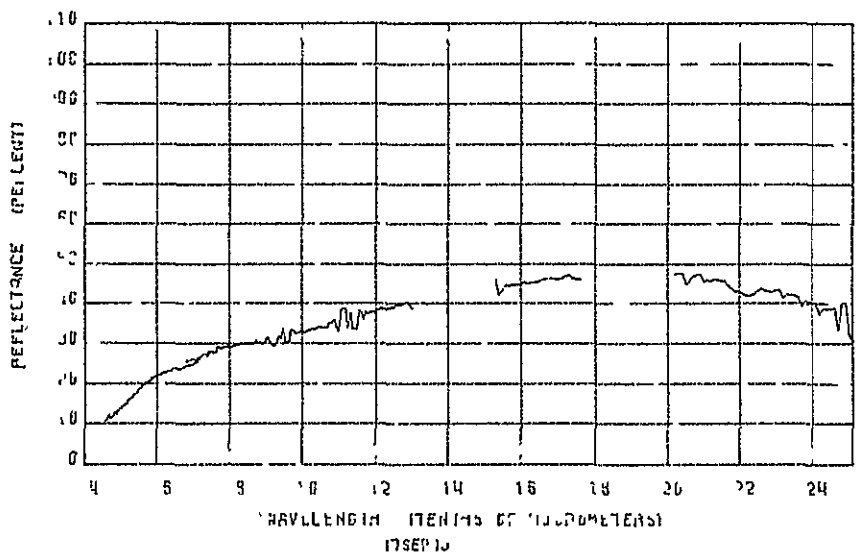

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
591/BUFF SS
6 1/ 10

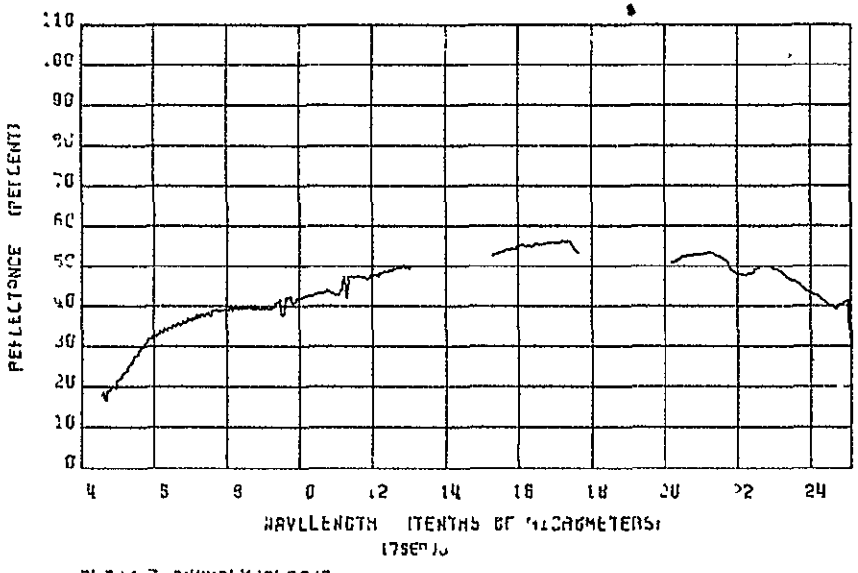

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
6 5/ 10

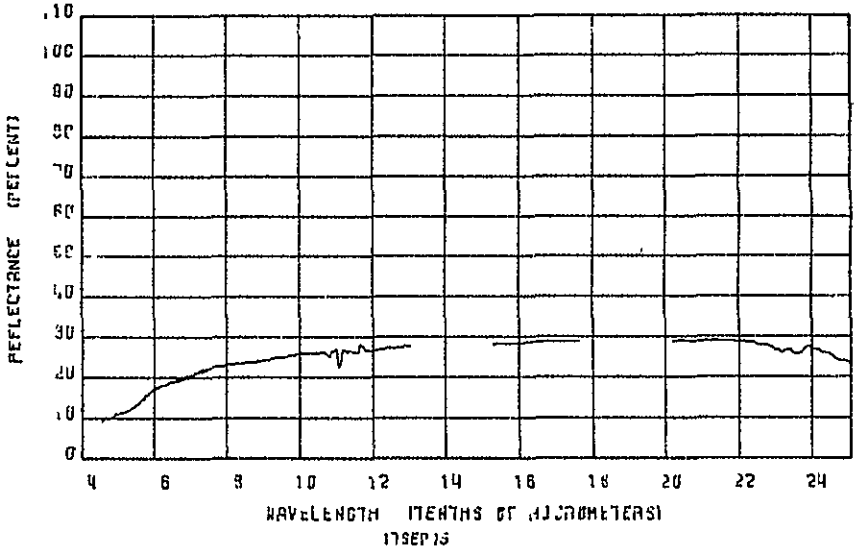

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
597/BUFF SS CTC
17/ 20

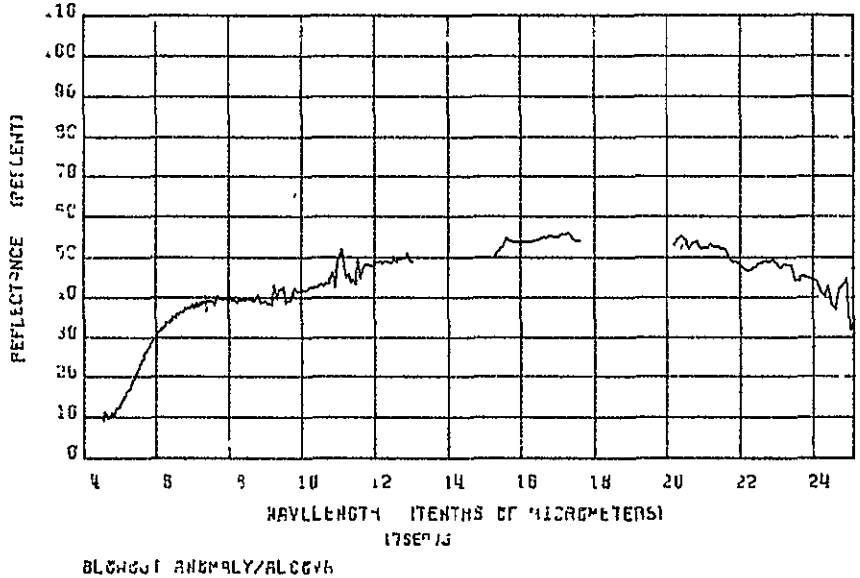

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
21/ 22

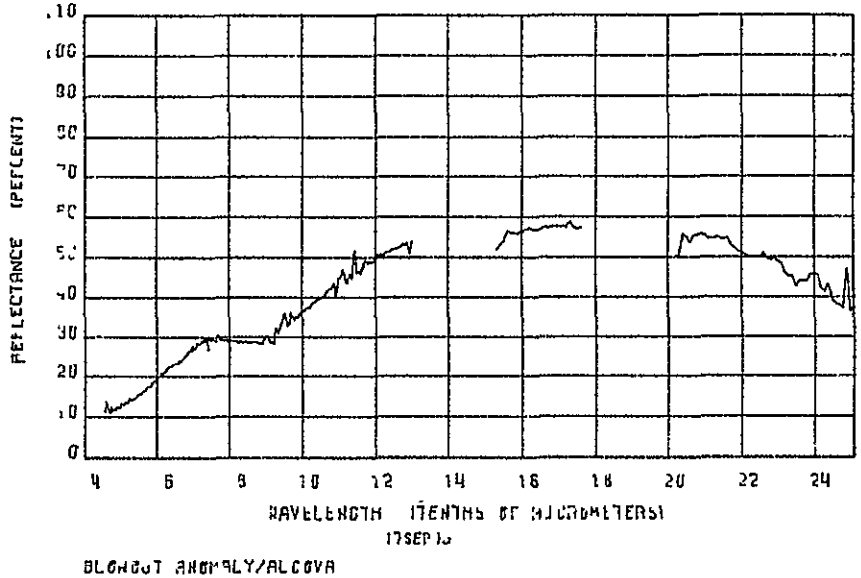

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
13/ 12


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
5R11/GRAY 5S 6/1
C 27/ 30


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
5L1/GRAY LS 6/1
B 32/ 34


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
5R3/YELLOW 5S 3/6
C 23/ 24


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
5R10/RED 5S 6/1
B 25/ 26

JET PROPULSION LABORATORY *California Institute of Technology • 4800 Oak Grove Drive, Pasadena, California 91103*

October 4 1978
In reply refer to: 655-GAM:br

NASA Scientific and Technical
Information Facility
P.O. Box 8757
Baltimore-Washington International Airport
Maryland 21240

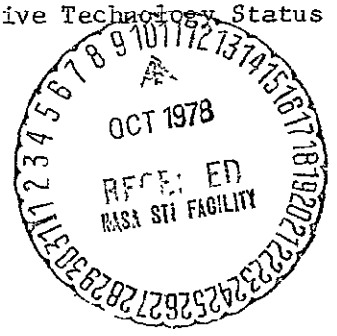
Attention: NASA Representative (S-AK-RKT)

Gentlemen:

Attached or included with the document* are COSATI Technical Report Standard Title Pages for JPL Technical Documents released during September 1978.

Two copies each of the following JPL Publications are enclosed for your systems input and listing in the unlimited, unclassified category of STAR:

JPL Publication 78-15 Vol. III	Characterization of Solar Cells for Space Applications
JPL Publication 78-21	Automotive Fuel Economy and Emissions Program
JPL Publication 78-64	The Energetic Particle Environment of the Solar Probe Mission
JPL Publication 78-66 Vols. I & II	A Study of Alteration Associated with Uranium Occurrences in Sandstone and Its Detection By Remote Sensing Methods
JPL Publication 78-69	Development and Evaluation of Elastomeric Materials for Geothermal Applications
JPL Publication 78-70	A Close-Up of the Sun
JPL Publication 78-71 Vols. I & II	Automotive Technology Status and Projections



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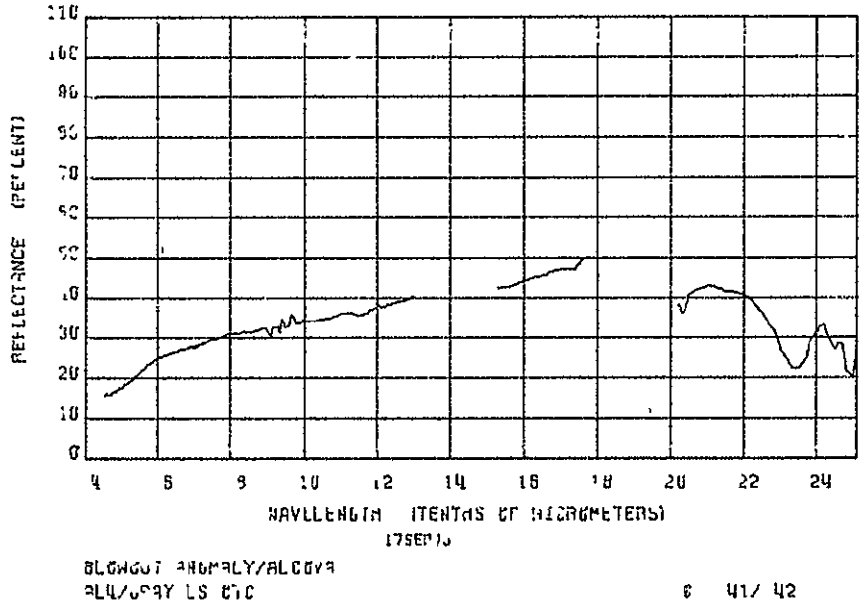
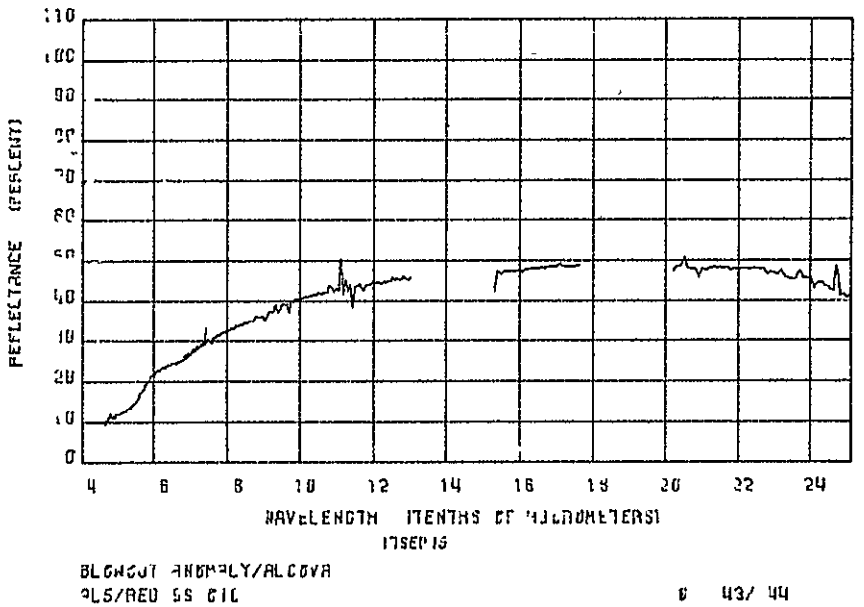
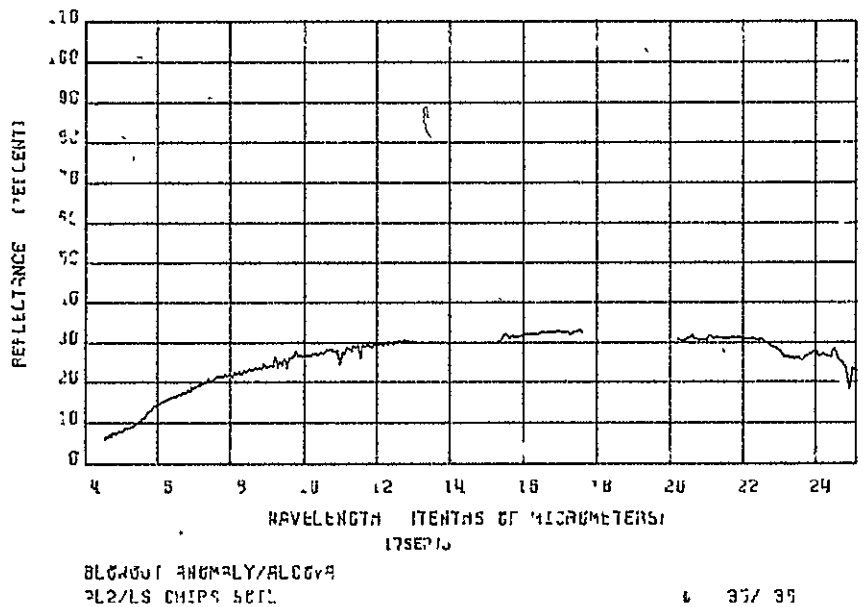
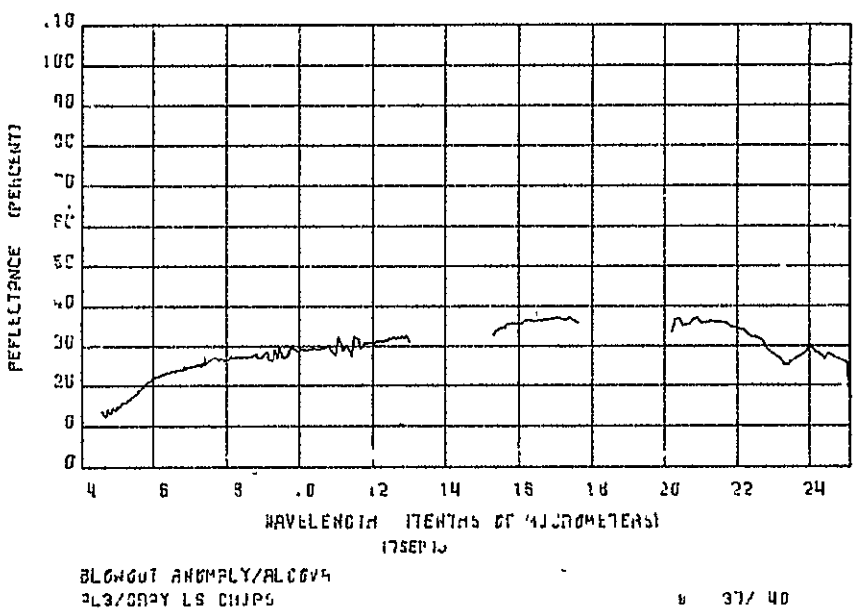
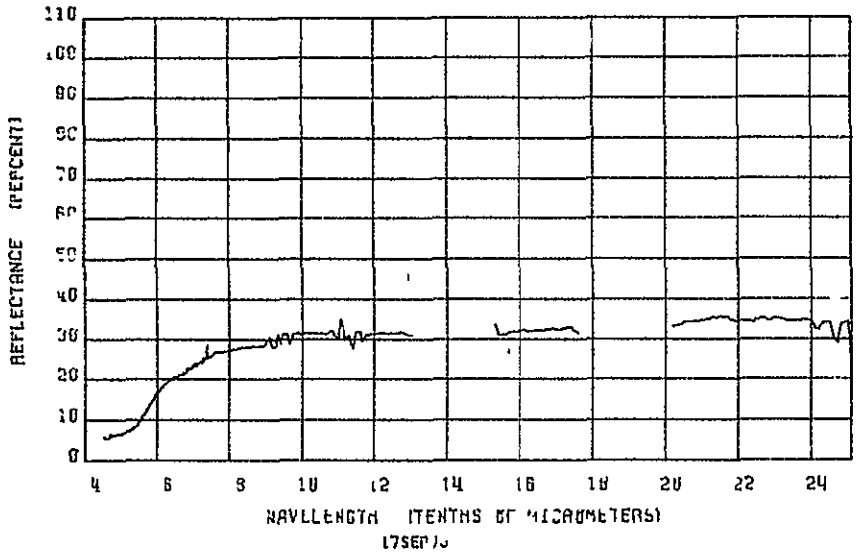
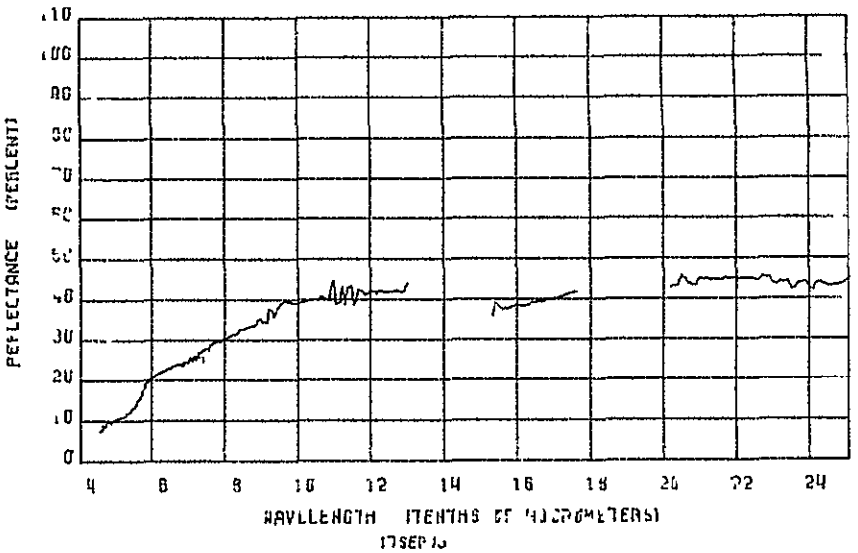

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL4/GRAY LS CTC
41/ 42

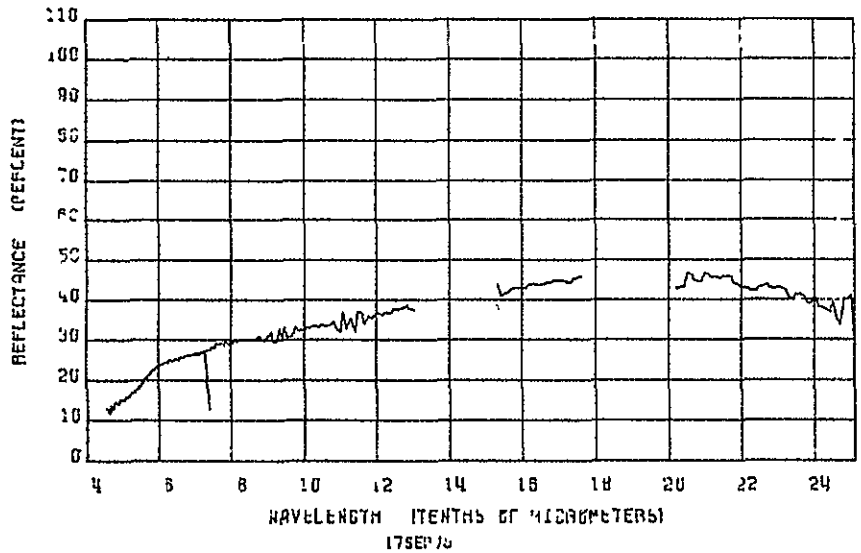

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL5/RED SS CTC
43/ 44

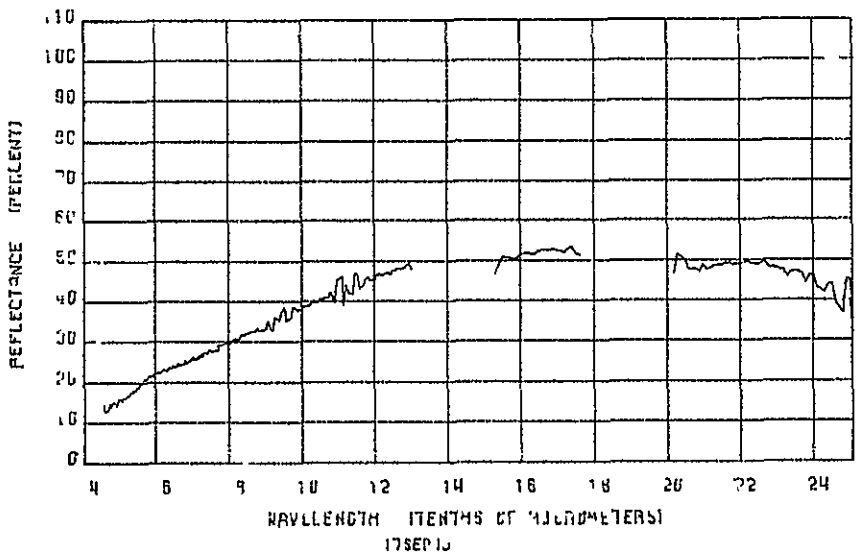

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL2/LS CHIPS SCTC
35/ 36

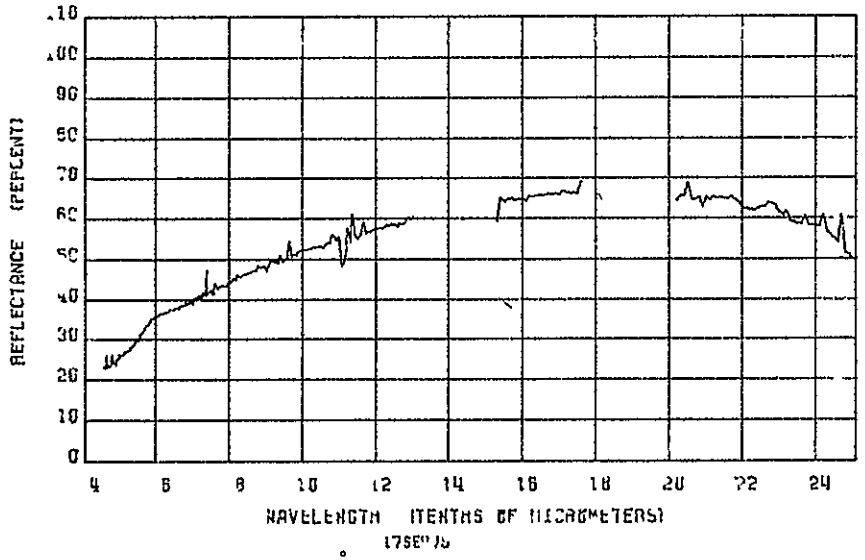

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL3/GRAY LS CHIPS
37/ 40

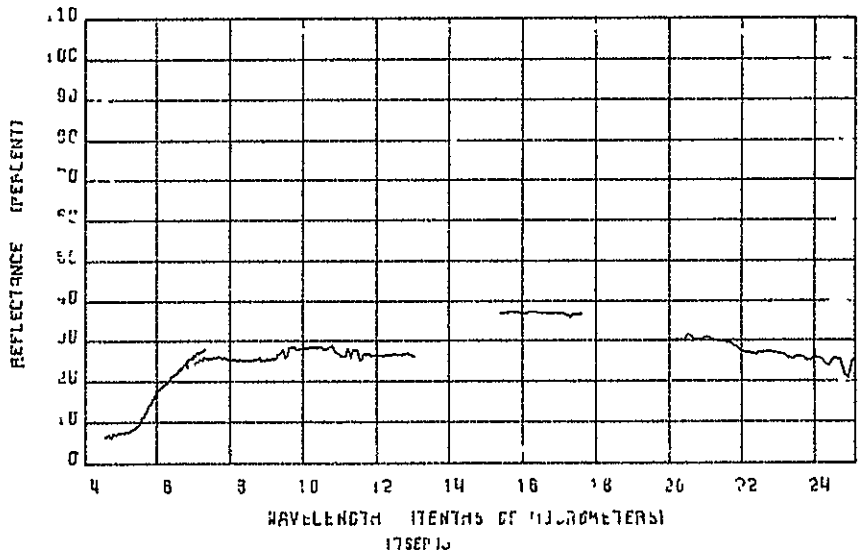

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL8/RED SAND SOIL
6 51/ 52

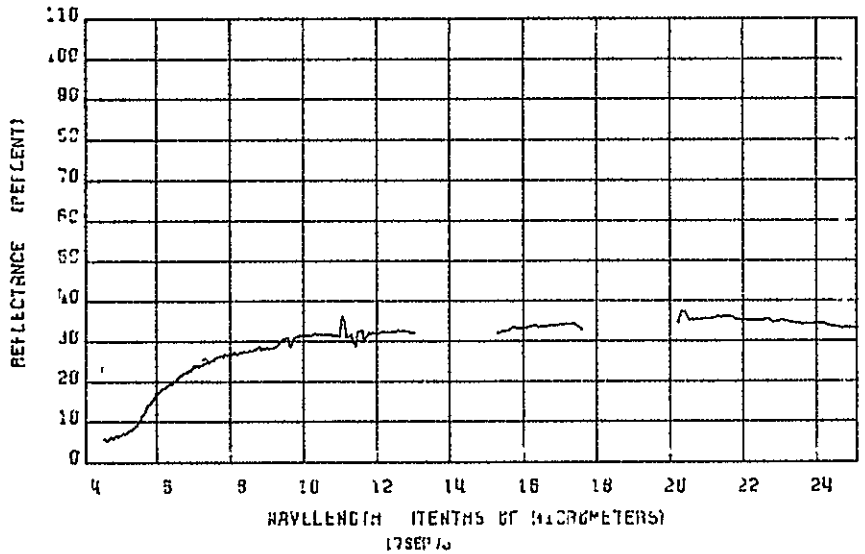

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL9/RED SS DIC
1 55/ 56

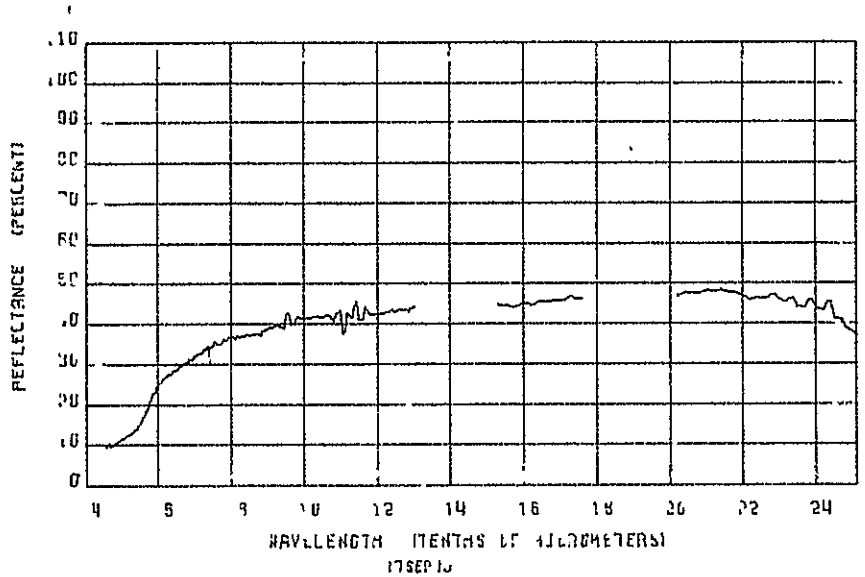

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL6/WHT SS CHIPS
6 45/ 46

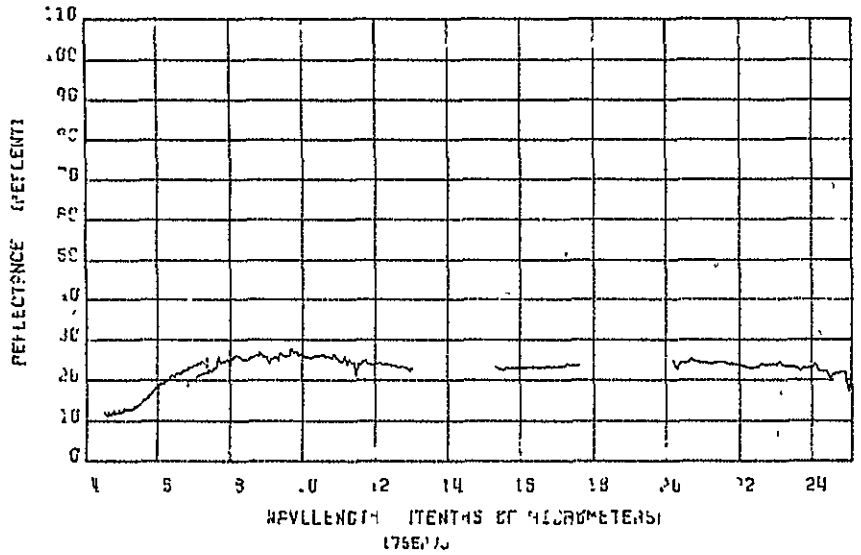

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVE
BL7/WHT SS DIC
0 47/ 50

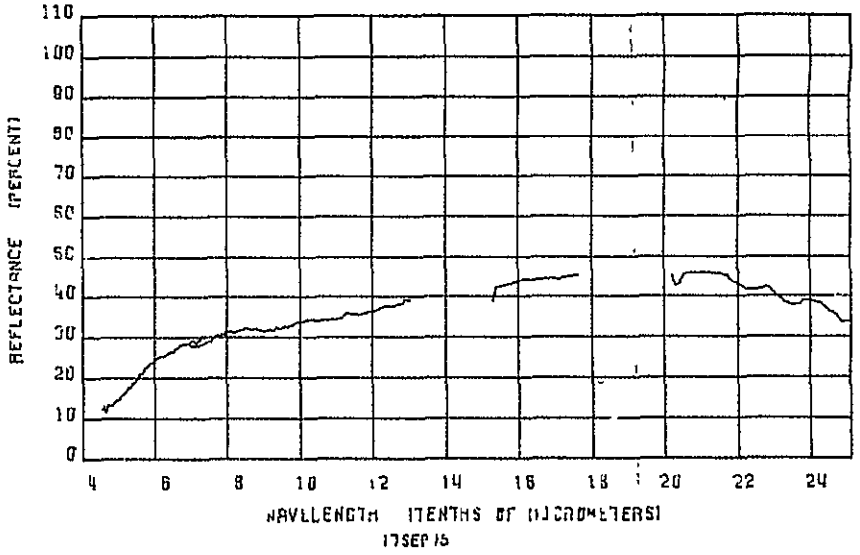

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVA
PL12
6 60/ 64

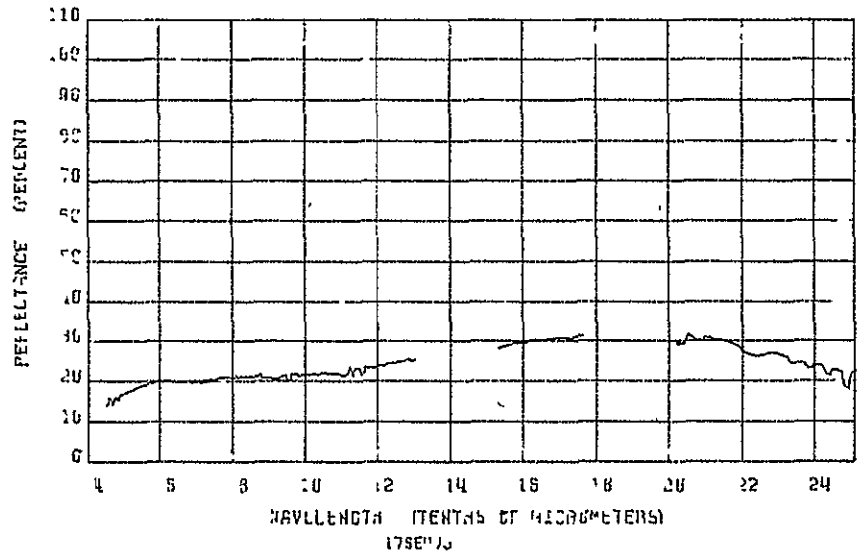

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVA
PL13/RED SOIL
6 65/ 67

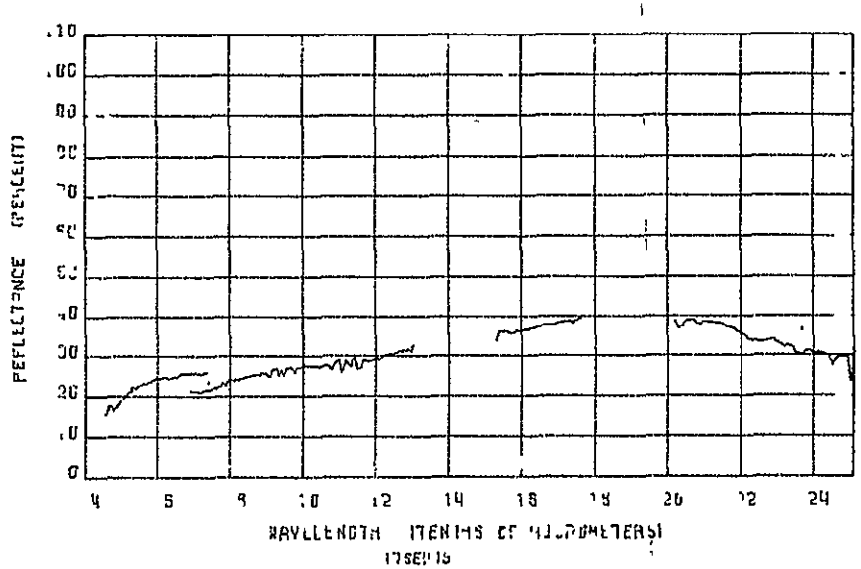

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVA
PL10/RED SOIL
6 57/ 60

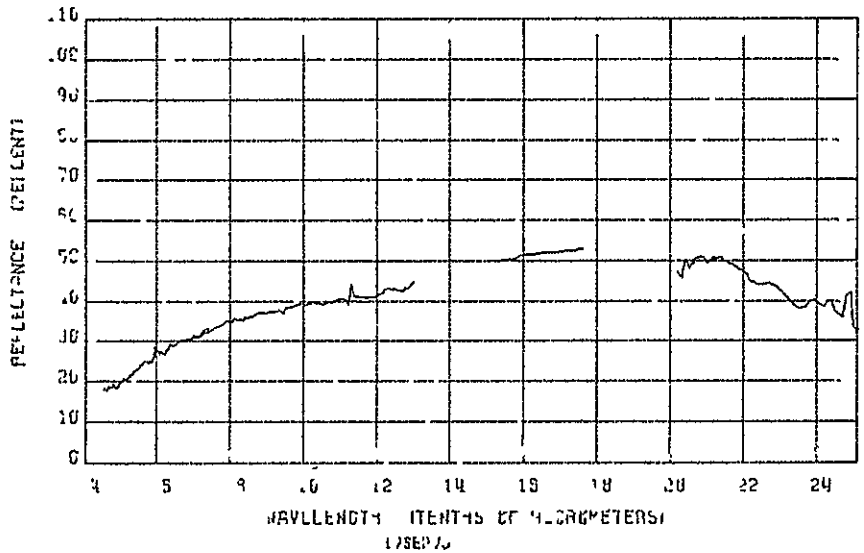

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVA
PL11/RED.WHT SS
6 61/ 62


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
PL20/PURPLE SHALE
B 115/117

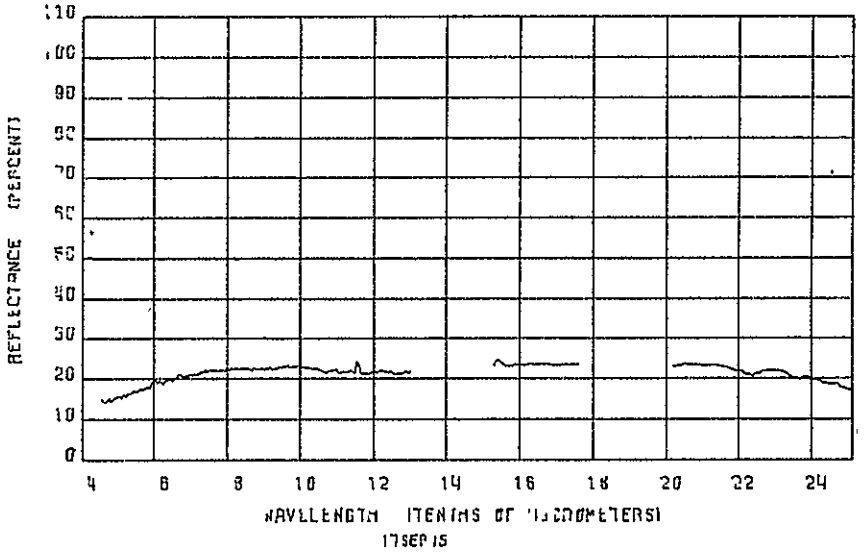

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
PL21/YELLOW SS
B 120/121


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
B 70/ 71

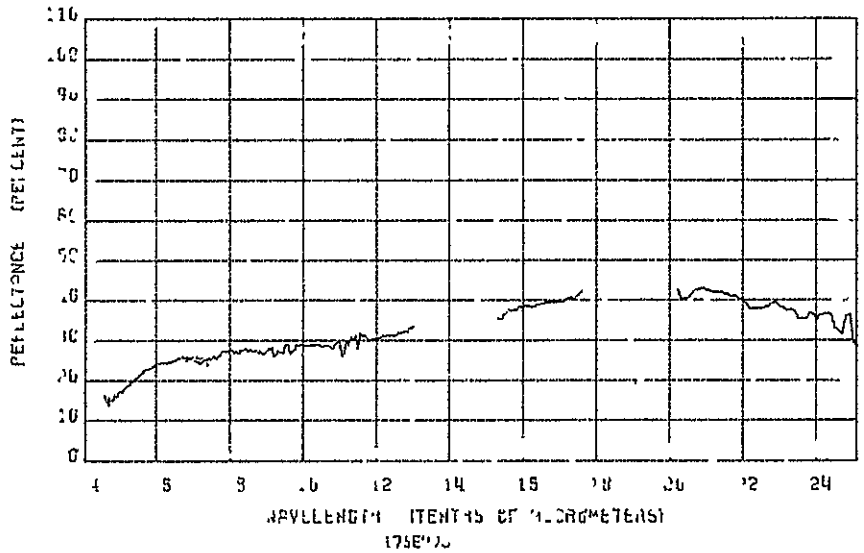

REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
BLOWOUT ANOMALY/ALCOVA
PL19/BUFF SHALE
B 100/10



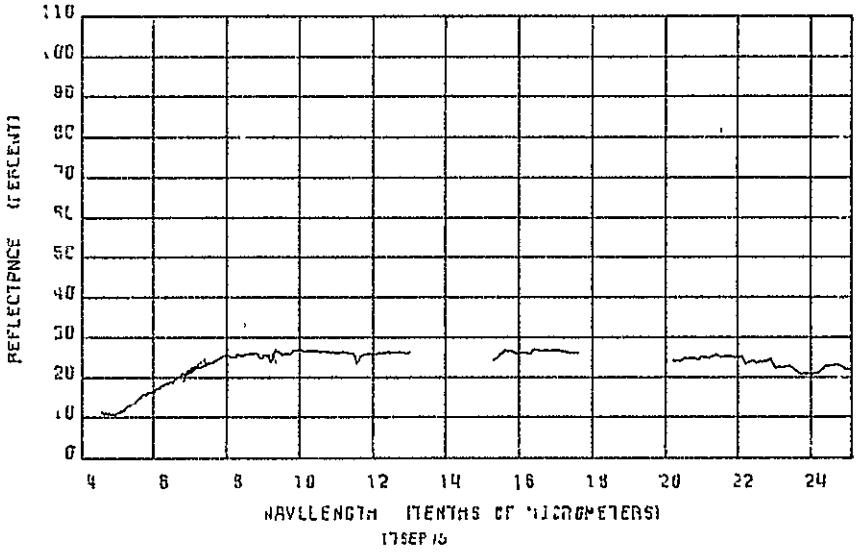
BLOWOUT ANOMALY/ALLOYA
BL24/GRAY SS 6 129/127



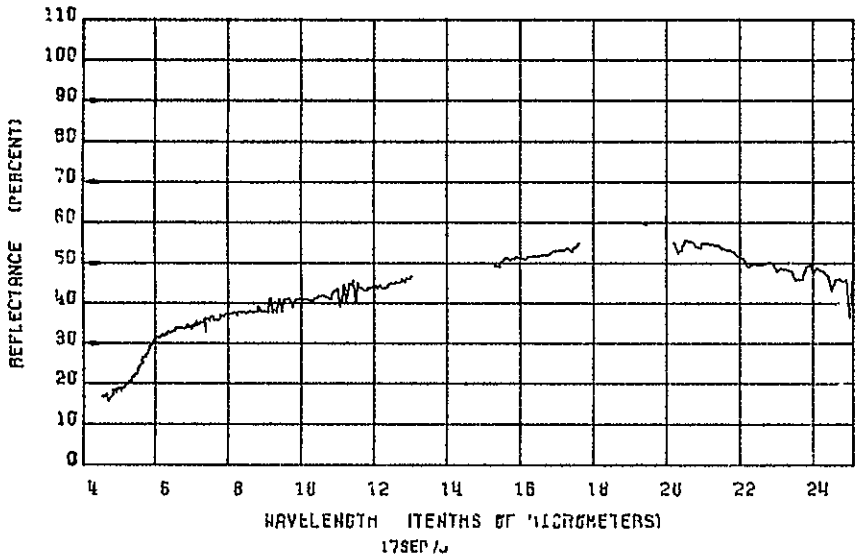
BLOWOUT ANOMALY/ALLOYA
BL25/GRY SHALE,SOIL 0 130/127

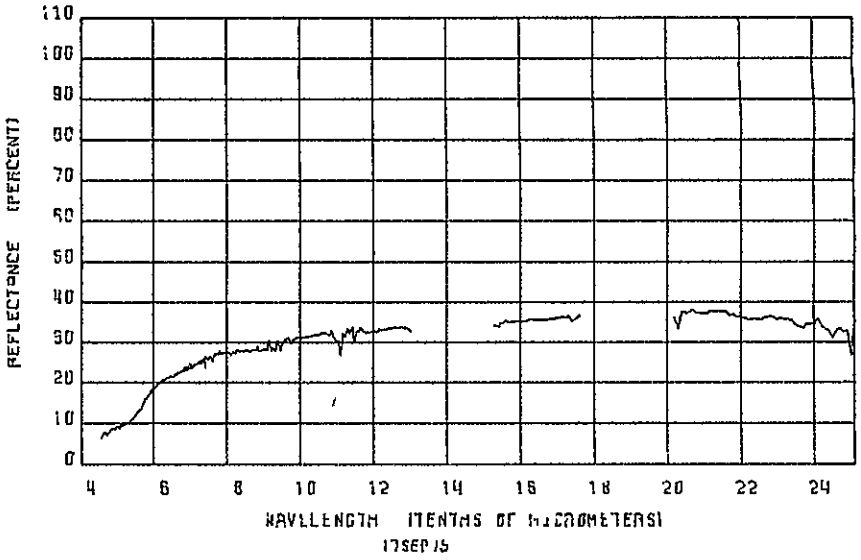


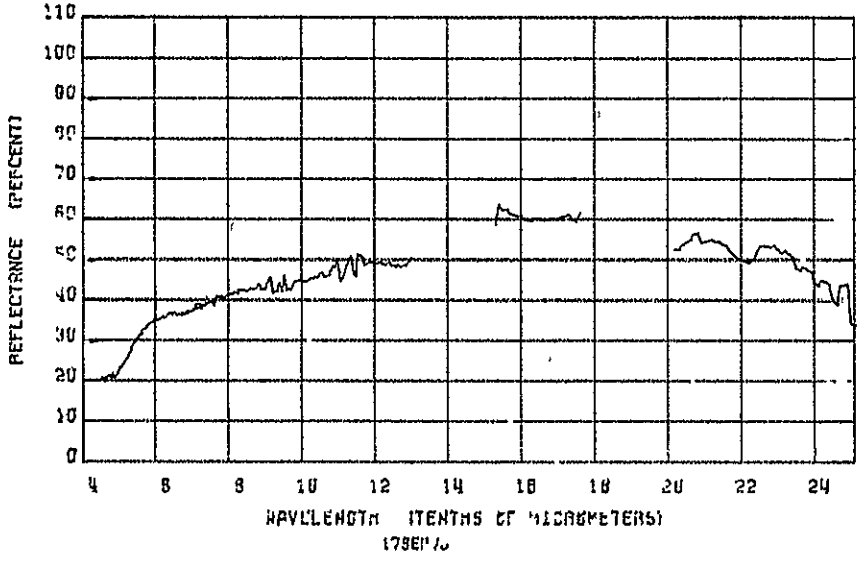
BLOWOUT ANOMALY/ALLOYA
BL22/GRAY SHALE 6 122/123



BLOWOUT ANOMALY/ALLOYA
BL23/RED GRAY SHALE 0 124/125


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
BL30/GRAY LS
@ 144/145


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
BL31/RED SHALE SOIL
@ 146/145


REFLECTANCE (PERCENT)
WAVELENGTH (TENTHS OF MICROMETERS)
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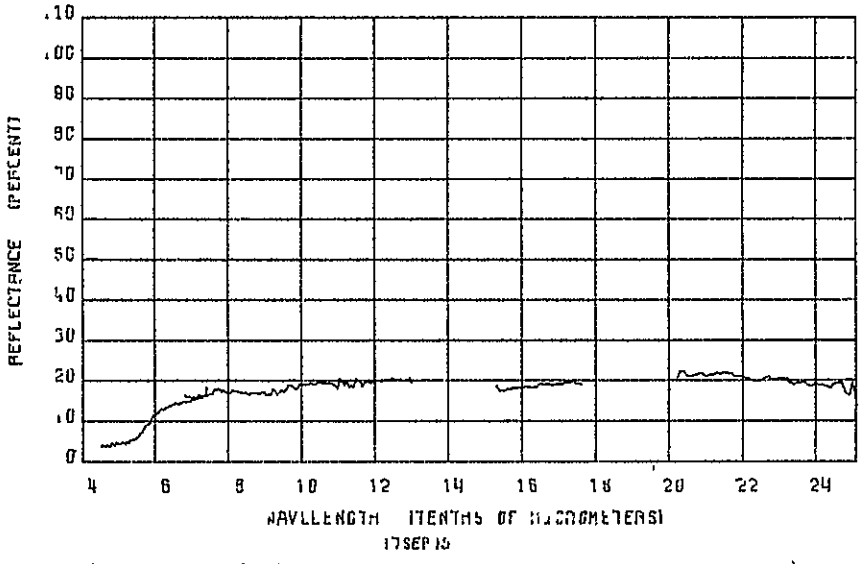
BLOWOUT ANOMALY/ALCOVE
BL29/BUFF SS
@ 137/140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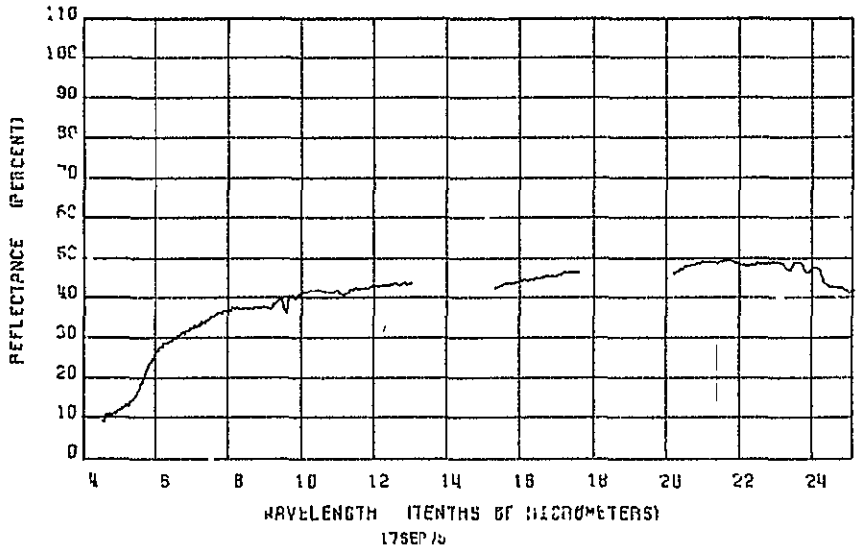
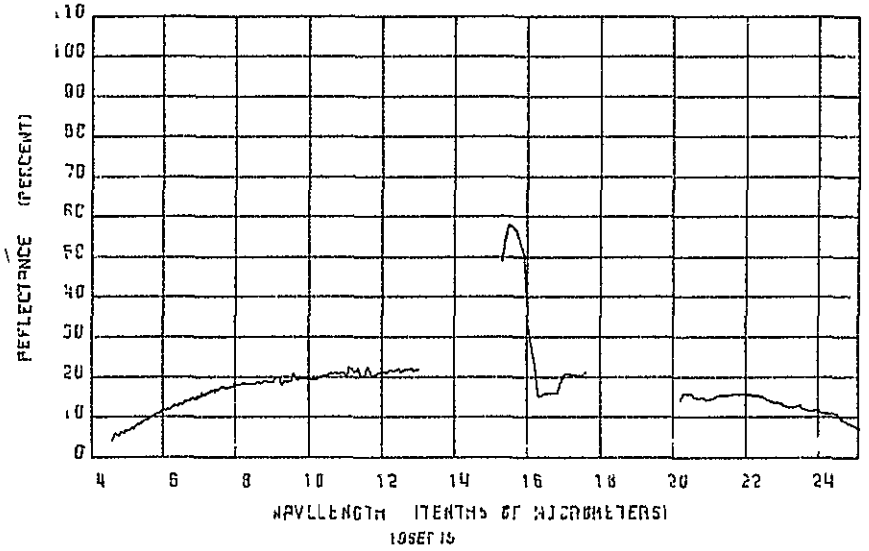
WAVELENGTH (TENTHS OF MICROMETERS)
17SEP15
BLOWOUT ANOMALY/ALCOVE
BL28/RED SHALE
@ 142/143



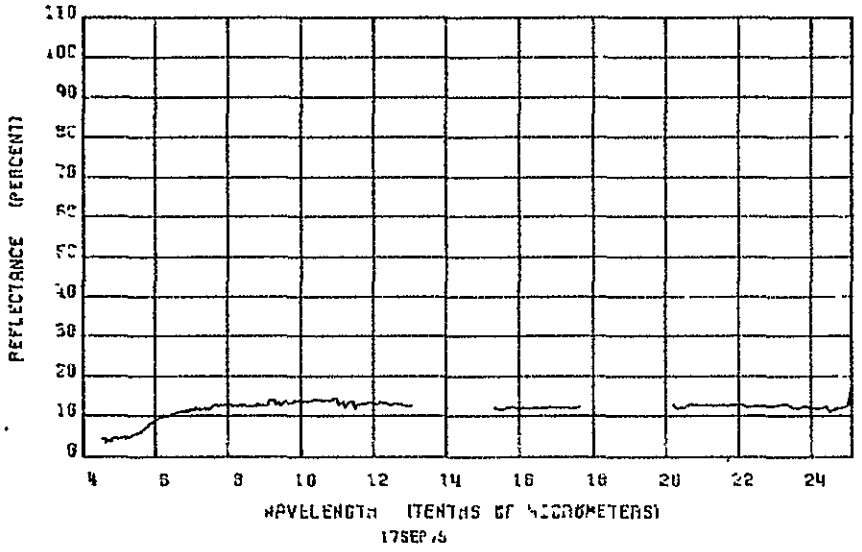
BLOWOUT ANOMALY/ALCOVE
BL34/RED SS

0 155/156



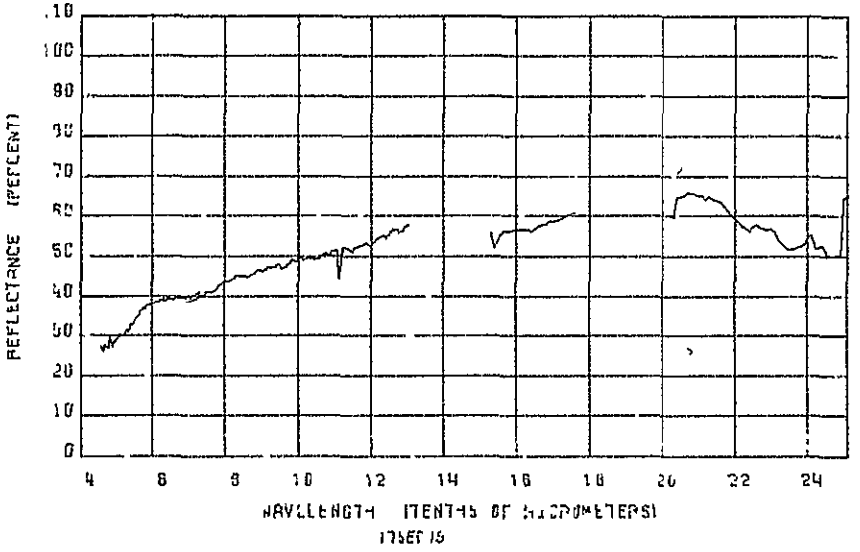
JEANETTE, WYO TAPE 24
JW1/PINK SOIL, GRASS

0 160/161



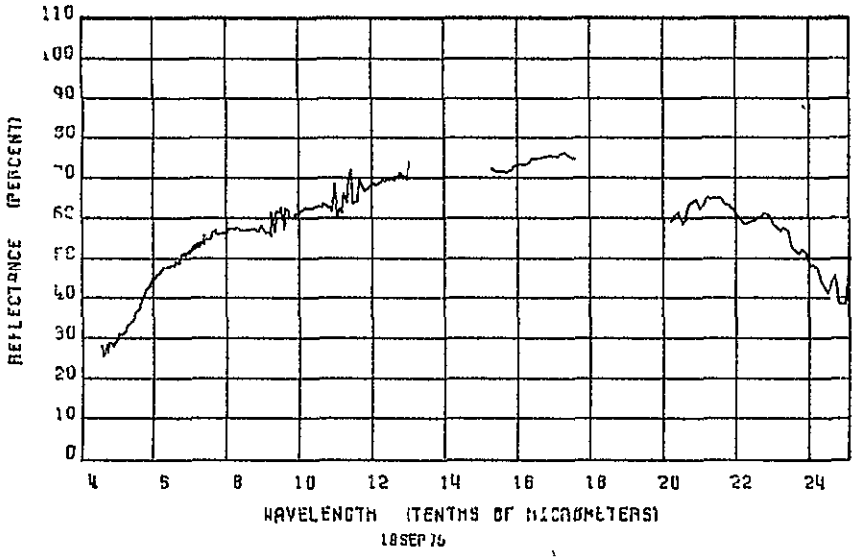
BLOWOUT ANOMALY/ALCOVE
BL32/PURPLE SHALE

0 150/151

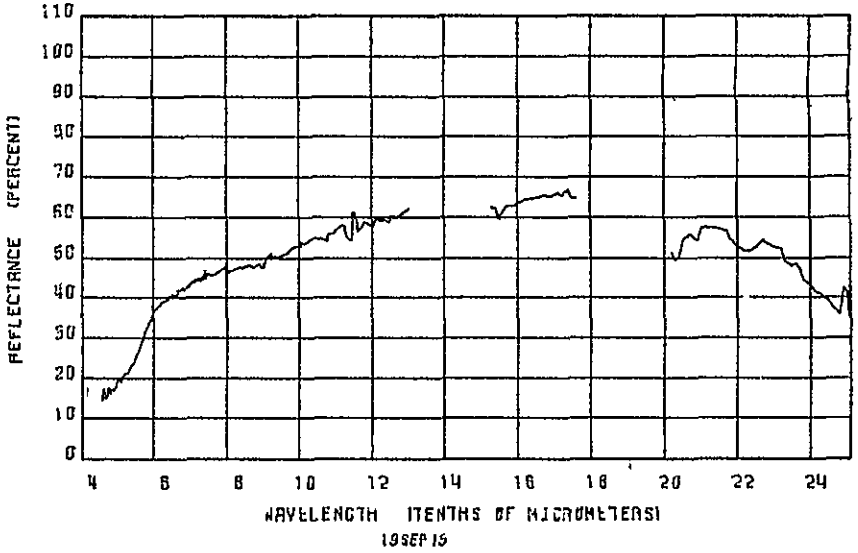


BLOWOUT ANOMALY/ALCOVE
BL33/BUFF SS

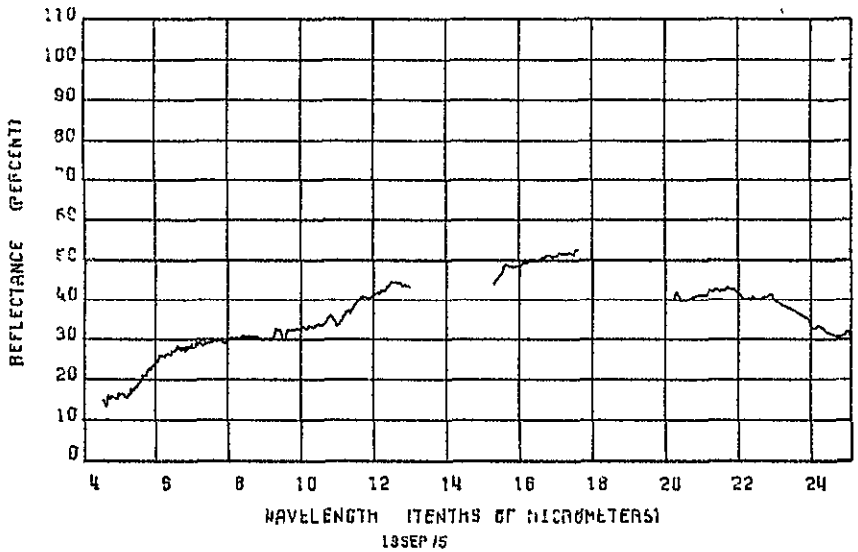
0 152/153



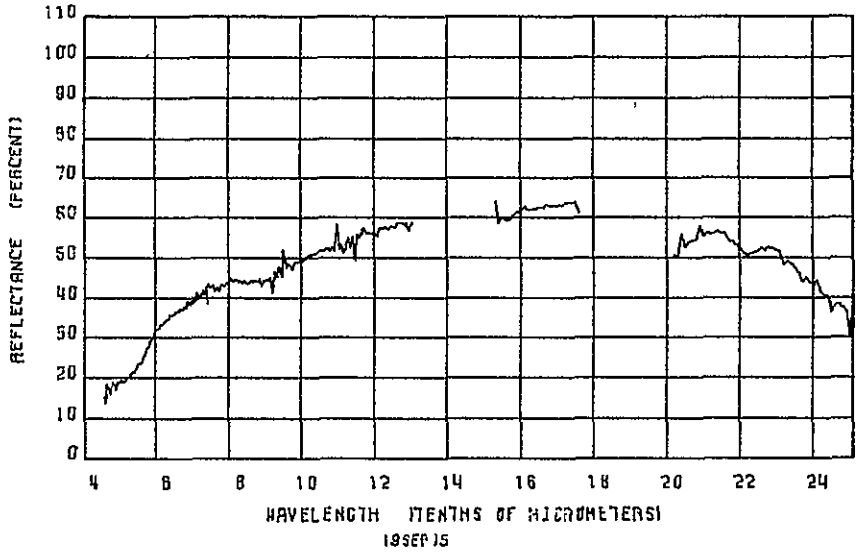
JEANETTE, WYO TAPE 24
JN4/GRAY SS
B 171/170



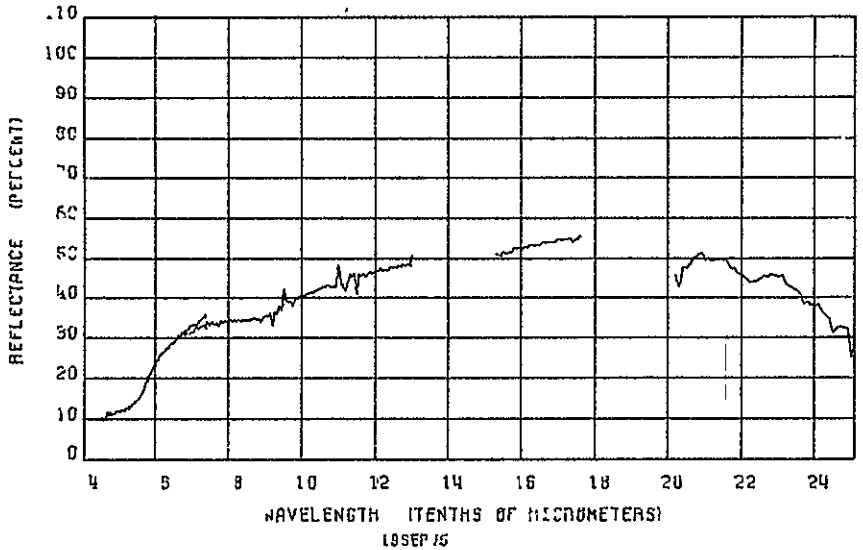
JEANETTE, WYO TAPE 24
JN5/YELLOW SS
B 173/174



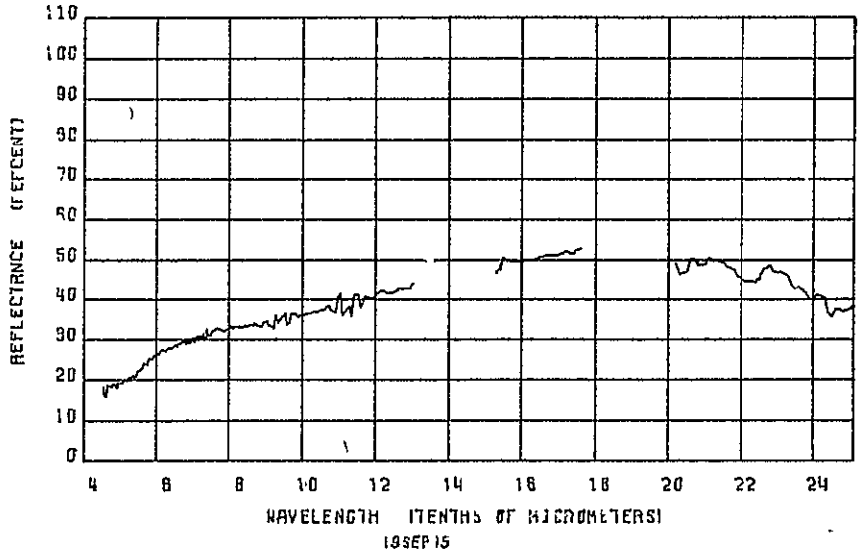
JEANETTE, WYO TAPE 24
JN2/PINK SOIL
B 164/165



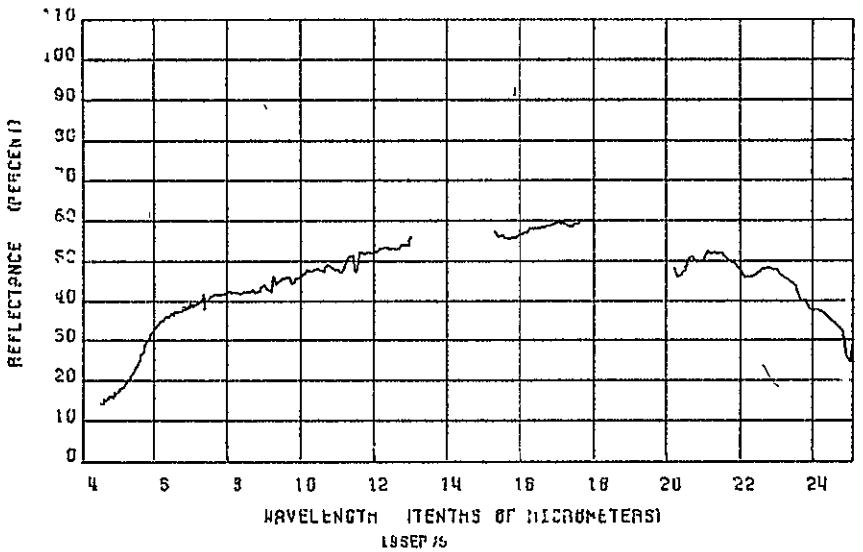
JEANETTE, WYO TAPE 24
JN3/PINK SS
B 167/170



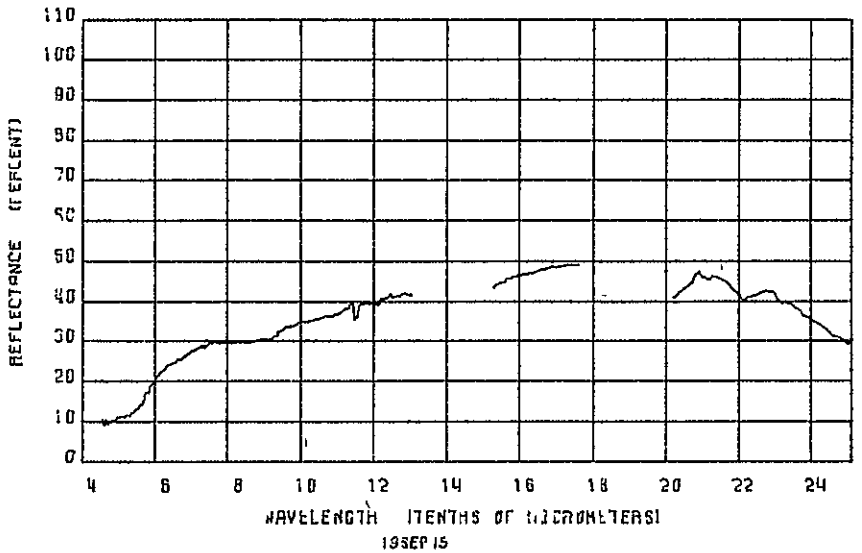
JEANETTE, WYØ TAPE 28
JW8/RED SS @ 201/202



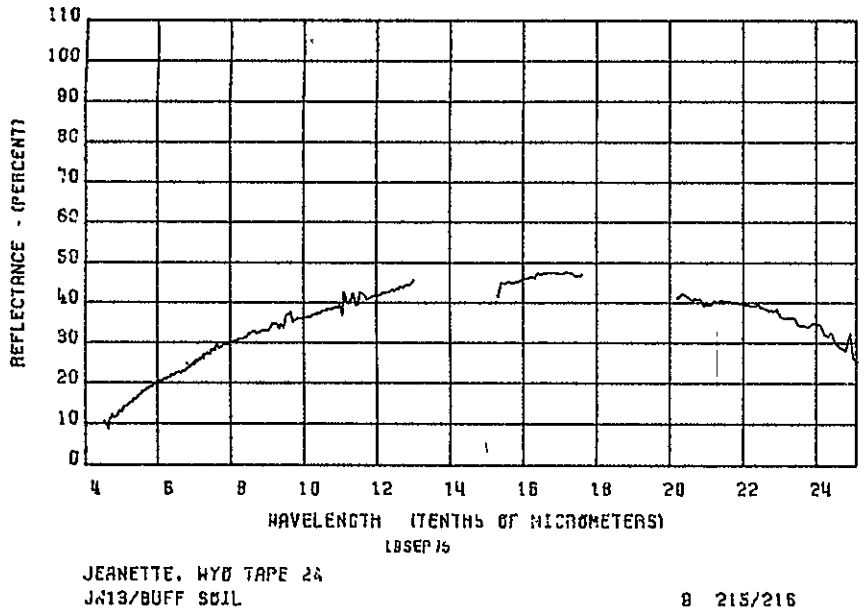
JEANETTE, WYØ TAPE 28
JW8/GRAY SHALE, SOIL @ 204/205



JEANETTE, WYØ TAPE 28
JW8/YELLOW RED SS @ 175/176

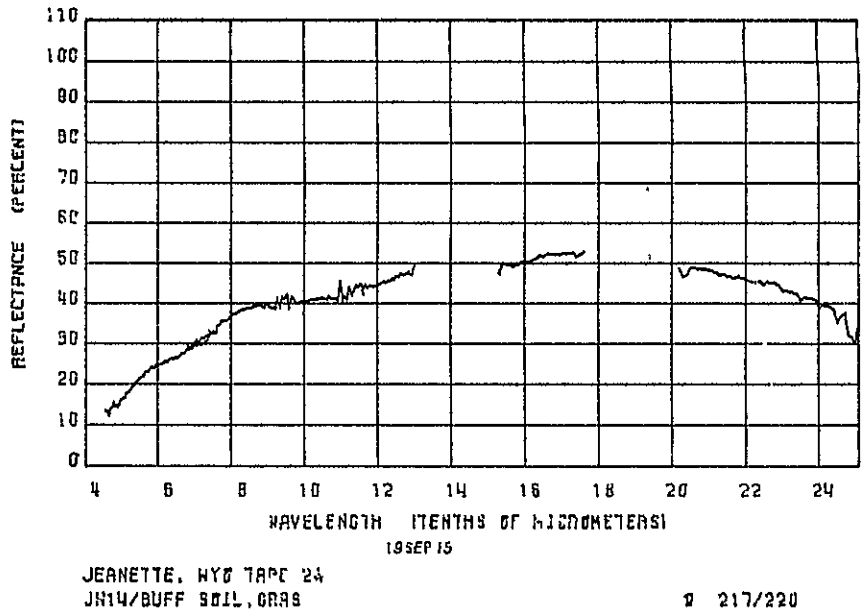


JEANETTE, WYØ TAPE 28
JW7/RED SOIL @ 177/200



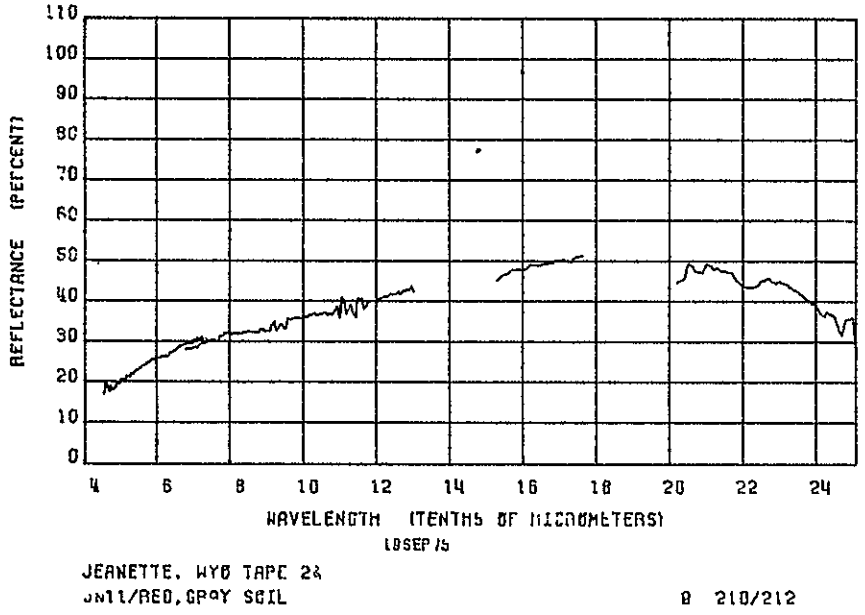
JEANETTE, WYO TAPE 24
JN13/BUFF SOIL

@ 215/216



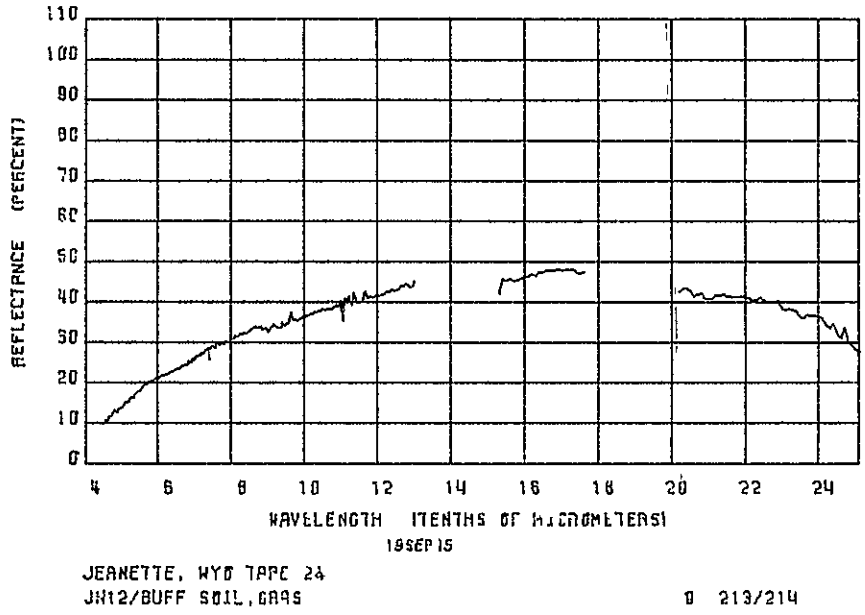
JEANETTE, WYO TAPE 24
JN14/BUFF SOIL,GRAS

@ 217/220



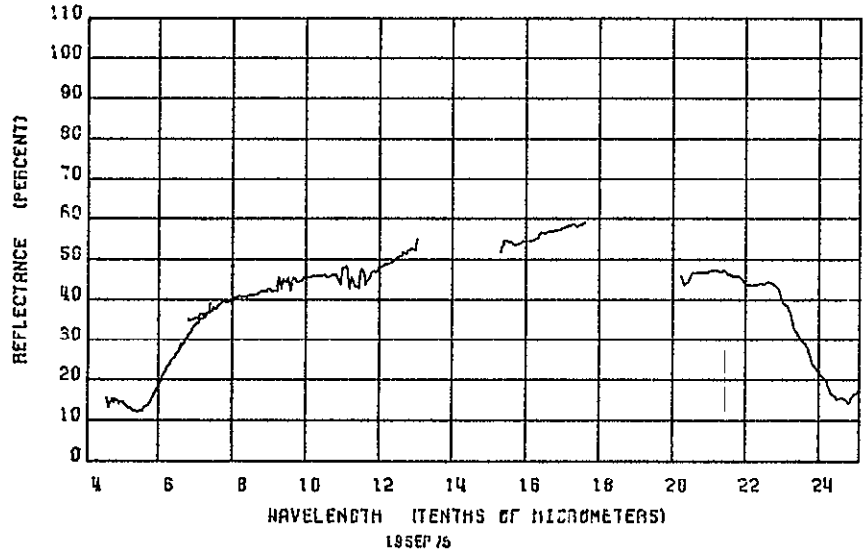
JEANETTE, WYO TAPE 24
JN11/RED,GRAY SOIL

@ 210/212



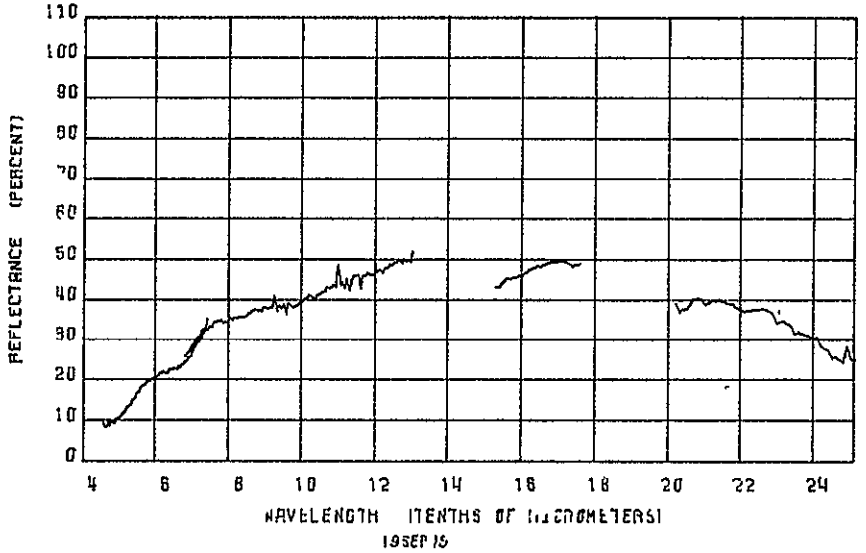
JEANETTE, WYO TAPE 24
JN12/BUFF SOIL,GRAS

@ 213/214



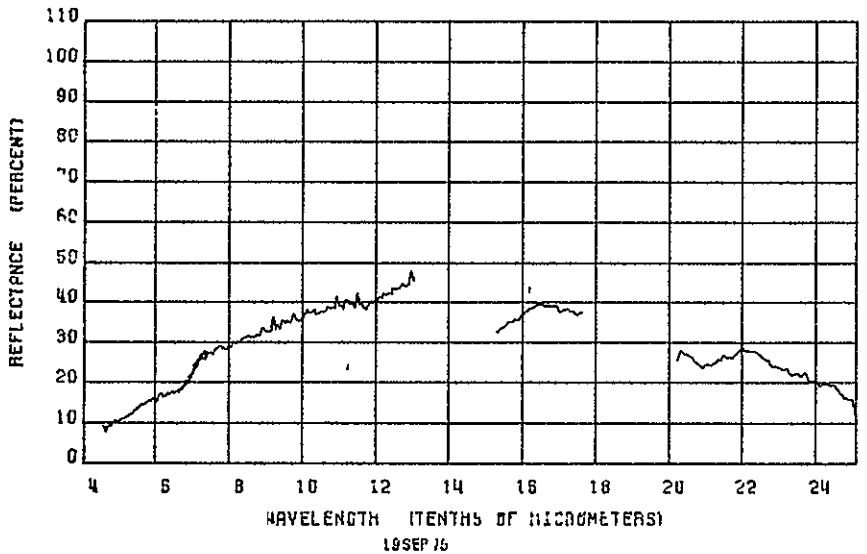
JEANETTE, WYO TAPE 24
JN17/YELLOW SS

8 225/226



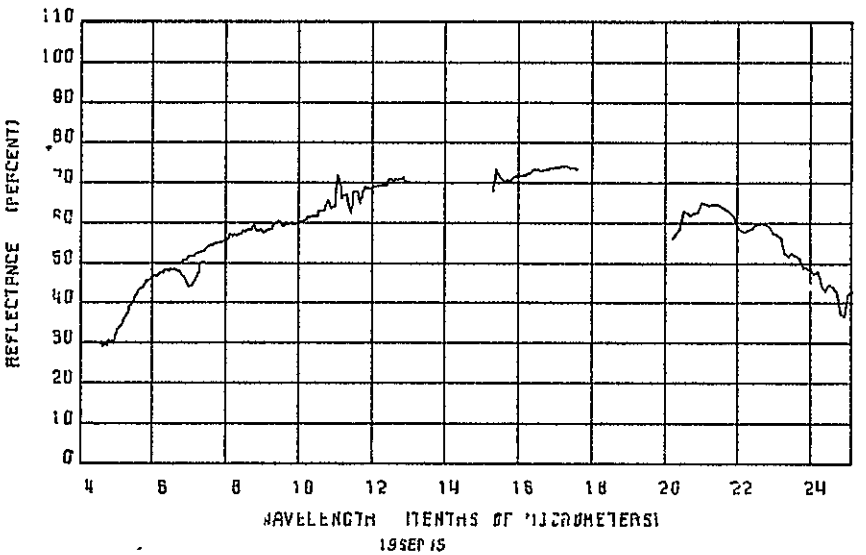
JEANETTE, WYO TAPE 24
JN18/YELLOW SS

8 227/228



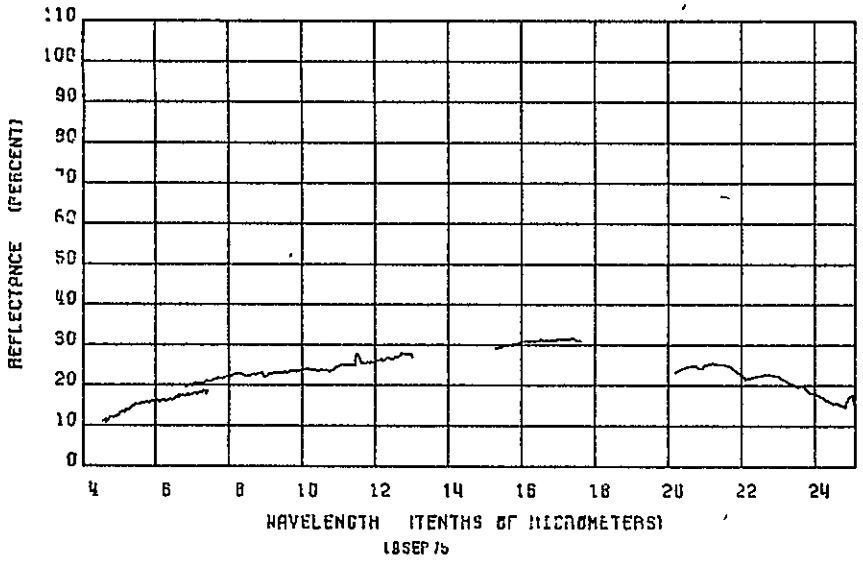
JEANETTE, WYO TAPE 24
JN15/GRAY SOIL

8 221/222



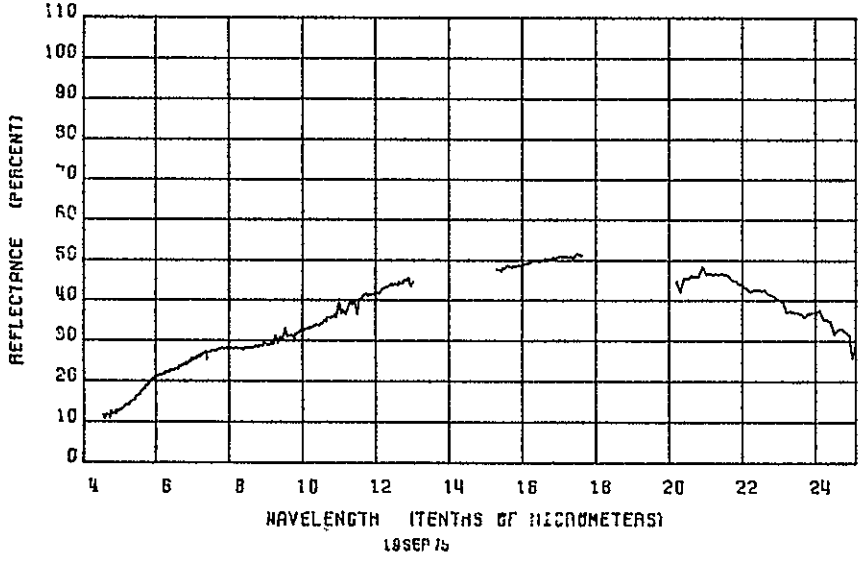
JEANETTE, WYO TAPE 24
JN18/BUFF SS

8 223/224



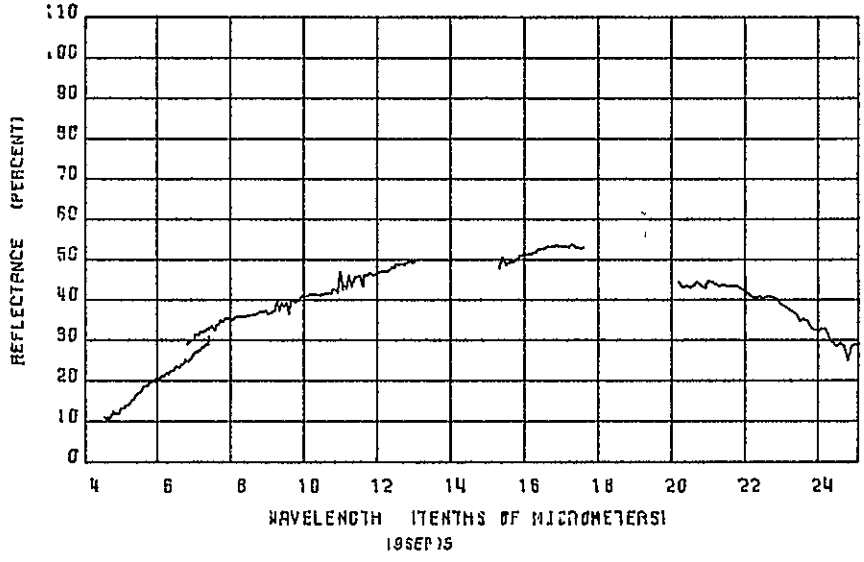
JEANETTE, WYO TAPE 28
JW21/GRAY SHALE

9 235/234



JEANETTE, WYO TAPE 28
JW19/RED SS DTC

9 231/232



JEANETTE, WYO TAPE 28
JW20/BUFF SS,SOIL

9 233/234

APPENDIX E

CANONICAL COEFFICIENTS FOR 11 VARIATE SETS

CANONICAL COEFICIENTS FOR 11 VARIATE SETS

CASE	DATA SET	VARIABLES
1A	Utah	Landsat D bands: 6 raw bands
1B	Utah	Landsat 1, 2 bands: 4 raw bands
1C	Utah	Equal $\Delta\lambda$ (30)
1D	Utah	Landsat D bands: 15 ratios
1E	Utah	Landsat D bands: 6 raw bands , 15 ratios
1F	Utah	Landsat 1, 2 bands: 6 ratios
1G	Utah	Landsat 1, 2 bands: 4 raw bands, 6 ratios
1H	Utah	Landsat D bands: 5 raw bands
1I	Utah	Landsat D bands: 5 raw bands, 10 ratios
1J	Utah	First 11 $\Delta\lambda$ from 1C
1K	Utah	First 11 $\Delta\lambda$ from 2C
2A	Utah & General	Landsat D bands: 6 raw bands
2B	Utah & General	Landsat 1, 2 bands: 4 raw bands
2C	Utah & General	Equal $\Delta\lambda$ (30)
2D	Utah & General	Landsat D bands: 15 ratios
2E	Utah & General	Landsat D bands: 6 raw bands, 15 ratios
2F	Utah & General	Landsat 1, 2 bands: 6 ratios
2G	Utah & General	Landsat 1, 2 bands: 4 raw bands, 6 ratios
2H	Utah & General	Landsat D bands: 5 raw bands
2I	Utah & General	Landsat D bands: 5 raw bands, 10 ratios
2J	Utah & General	First 11 $\Delta\lambda$ from 1C
2K	Utah & General	First 11 $\Delta\lambda$ from 2C
3A	Utah & Powder River	Landsat D bands: 6 raw bands
3B	Utah & Powder River	Landsat 1, 2 bands: 4 raw bands
3C	Utah & Powder River	Equal $\Delta\lambda$ (30)
3D	Utah & Powder River	Landsat D bands: 15 ratios
3E	Utah & Powder River	Landsat D bands: 6 raw bands, 15 ratios
3F	Utah & Powder River	Landsat 1, 2 bands: 6 ratios
3G	Utah & Powder River	Landsat 1, 2 bands: 4 raw bands, 6 ratios
4A	Utah & General & Powder River	Landsat D bands: 6 raw bands
4B	Utah & General & Powder River	Landsat 1, 2 bands: 4 raw bands
4C	Utah & General & Powder River	Equal $\Delta\lambda$ (30)
4D	Utah & General & Powder River	Landsat D bands: 15 ratios
4E	Utah & General & Powder River	Landsat D bands: 6 raw bands, 15 ratios
4F	Utah & General & Powder River	Landsat 1, 2 bands: 6 ratios
4G	Utah & General & Powder River	Landsat 1, 2 bands: 4 raw bands, 6 ratios

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	-20.59383	55.84428	41.29840	-3.74921	-2.52903	-15.92654
2	18.39569	-123.86050	-32.46223	14.21188	-7.64829	42.29408
3	20.37047	109.01419	-24.40041	4.51208	-3.79628	-4.60903
4	-17.73428	-48.98955	10.04440	-4.34037	3.73614	-29.20660
5	14.67845	16.43451	23.78873	-9.28351	4.02181	-2.36701
6	-16.81567	-8.02802	-16.89095	-3.36082	-3.30190	7.07015
CONSTANT	-0.61570	0.05800	-0.14074	2.59417	1.41413	2.18153

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4
1	-19.89311	-52.28017	11.88002	12.39494
2	8.47576	133.70038	-16.87802	36.47406
3	89.89508	-133.48993	-5.17603	-40.83713
4	-77.81119	51.90549	19.92995	-6.62722
CONSTANT	-0.30101	-0.82054	-2.73331	2.00864

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-26.51096	22.39592	38.45479	-22.36671	-11.05051	-32.94228	-9.29468	-88.51259	-1.76048
2	40.63164	-86.69104	-86.67162	100.08820	-5.53413	34.59193	-7.63677	141.07358	15.23123
3	-53.19635	244.60162	52.21234	-97.24414	23.40027	13.27932	50.47656	2.47215	-9.85208
4	62.93085	-269.90820	-38.98486	-155.10883	39.15274	-25.61502	-42.86617	-69.79150	-3.72472
5	-23.03149	74.50812	110.01804	227.04178	-39.40140	81.68188	6.63347	3.27265	-45.20909
6	39.35756	43.25755	-121.99699	-76.52486	-145.41943	-68.63553	-22.00063	-21.45813	42.08537
7	-26.09561	10.12336	-10.17072	51.56844	139.36270	-74.17036	67.15875	16.45313	19.24303
8	-5.70519	-135.69531	122.13107	-77.00688	24.24606	44.62534	-51.49239	-15.59311	-7.51425
10	-17.42090	154.23271	-33.96547	128.41000	97.73694	-15.08707	-8.23672	41.14317	11.64307
11	29.66428	-20.66782	-175.00259	-23.40077	-53.95297	82.32759	-0.56992	42.42320	4.90095
12	-39.34775	-27.76772	147.37318	-42.64731	-165.44789	-17.62921	45.61168	-41.09195	-11.63195
14	-13.24597	-3.16918	-26.07878	-63.65485	110.71400	1.19541	36.63254	-5.75374	7.08943
15	13.21702	46.52840	74.29105	-58.70990	-48.04826	44.40660	-81.28975	-3.58709	2.41081
16	40.88922	-81.09996	-53.35829	83.14383	55.30350	-84.14719	0.28594	0.67052	-41.32782
17	-1.60138	40.86546	11.17027	9.00626	-11.42481	16.14439	-1.84008	14.97418	-23.07927
18	-10.33881	-37.71613	61.95764	74.51051	10.27122	-26.69461	-1.97119	73.70244	34.19229
19	-25.06126	54.10378	-40.57851	-2.76248	-20.31409	65.79247	27.63043	-37.33263	28.09668
21	30.81013	-10.42012	-20.57304	-46.44299	-15.88870	-24.48672	23.39287	-72.86440	-11.20853
22	-14.98851	-15.28206	-18.34480	10.27224	11.38960	-7.53079	-6.40236	-0.42254	-13.04273
23	-5.28657	1.52674	31.04645	-41.02347	-31.37582	10.83188	21.76950	39.28593	-32.19972
24	38.81044	-12.85131	-38.99786	41.37561	39.05769	-22.23364	-41.50580	-32.17651	42.26773
25	-33.99887	15.09447	61.44743	-36.84285	-20.94334	16.84184	-18.15326	48.27811	3.64325
26	-11.83214	-27.81244	-49.39668	-6.55368	-0.83506	-3.03564	24.78156	-47.83757	40.35799
27	11.56311	18.43127	48.26959	-50.07312	-3.89322	-12.93156	-79.47562	62.92636	-21.14221
28	-18.32834	-12.63348	-70.81020	43.67096	30.51830	-12.65648	65.35342	-52.73628	-42.15175
29	5.62045	29.86539	18.43097	39.91049	25.22800	2.36902	-41.46136	0.89097	-16.07188
30	10.60231	-13.70367	9.79731	-8.89539	-36.31007	13.39175	52.86238	1.81544	31.65096
CONSTANT	-0.60229	-0.26952	-0.04104	-0.50599	0.69718	0.41504	1.10761	-0.12982	-1.17918

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	-9.90823	-7.11151	4.14904	-4.83210	9.41161	-3.68672	-1.85600	29.57074	-26.89993
2	2.98690	42.23335	5.95405	7.73243	12.33889	-2.29951	-0.57844	-36.36060	4.08773
3	-12.60715	-19.12892	-34.59721	14.40400	-18.53508	3.88951	18.86349	16.49620	56.23505
4	33.52980	-22.99417	4.94094	-0.87600	-1.48108	0.02016	3.04868	4.13229	-6.33003
5	-24.10789	-0.86531	13.89680	-8.38252	17.31754	-6.27870	-15.92605	-22.18089	-35.60733
6	-7.73046	-13.31851	42.91115	6.16528	2.01226	1.56726	-10.54049	-1.56264	-2.90967
7	-0.78323	5.95352	9.40350	-3.76931	3.26098	-0.24302	7.60672	2.91325	-0.61513
8	16.54591	3.74449	-48.79187	6.98217	-6.61957	-1.69865	-4.37497	-10.08166	22.78758
10	7.91253	-14.14532	-30.51979	-28.32359	-8.48236	-0.44025	21.69348	24.80835	12.65812
11	19.14972	-13.28506	7.62591	-2.26824	-12.88222	5.03566	12.30520	11.54770	25.91931
12	0.29476	17.96837	11.58690	-5.01545	14.02259	-4.00961	-16.39937	-13.93398	-45.26883
14	-50.56744	29.93112	65.44867	-13.50931	16.81676	-2.68817	-31.28288	3.36129	-21.52562
15	27.77652	7.58272	-6.39125	14.79353	-12.03331	3.05929	-5.24373	-33.33064	12.66344
16	-10.48602	2.83017	-44.23471	6.78260	-18.28413	4.68725	33.39667	20.04561	17.61917
17	-20.19580	-5.06481	9.37729	3.47301	-6.33949	4.01776	19.30745	24.43140	3.28325
18	9.07282	-16.60306	7.68635	4.12096	0.44133	0.12378	4.45413	-7.46722	8.90309
19	15.21699	-0.13266	-1.53272	4.88437	10.36033	-4.75325	-22.19037	-16.75471	-18.23587
21	0.68805	6.19091	-30.40462	-8.26992	-2.04008	-1.21075	2.50314	8.42003	-4.15675
22	28.37202	14.20509	-3.86815	3.47199	5.36468	-0.75553	-5.95401	1.57303	10.48631
23	-14.95599	9.56257	12.17206	-9.55617	2.22780	-1.31551	-14.64515	0.28237	-6.16645
24	17.57637	-12.02919	21.96304	-3.90257	-2.31087	0.10338	-8.89404	13.14629	1.49571
25	7.76967	-3.69573	9.89757	5.74609	4.35912	-0.44850	7.16403	-16.74699	-23.88475
26	-64.56651	-25.39214	-16.31107	0.16907	-12.66234	2.56981	12.07008	24.44490	45.89806
27	14.91793	15.26258	7.59385	-3.73231	12.75472	-4.55929	-12.90245	-24.34543	-31.01154
28	0.46522	-25.71996	-26.66141	-4.52168	2.21621	-3.31949	3.56291	16.48384	-28.41887
29	-21.21712	8.05147	8.06982	14.02494	-2.05965	1.36906	10.45869	-12.37200	10.47511
30	33.36357	16.81023	2.33021	1.78636	-9.51501	1.84125	-3.27590	-6.17169	19.84300
CONSTANT	-0.30678	0.30098	-0.29354	2.10555	1.72508	2.43797	1.67662	-0.46644	0.37525

1C

ORIGINAL VARIABLE	19	20	21	22	23	24	25	26	27
1	-11.84674	-14.09505	-22.06802	12.46328	-41.54716	22.26050	41.75642	1.26563	44.72670
2	-0.69571	44.25371	23.61493	-42.25543	97.66588	18.24667	-83.73056	-5.84369	-124.62117
3	41.33356	-35.59511	-21.14189	47.27451	-90.05762	-93.90764	34.28690	-36.32100	220.21167
4	13.62183	-35.48218	43.86110	50.51454	-23.62961	6.14847	40.40646	77.84096	-308.85571
5	-34.41110	38.19897	-19.94678	-32.48854	131.37413	-1.77495	8.71322	-72.74289	280.74194
6	-38.99055	13.28446	-45.18857	6.99836	-99.24951	-6.32464	-23.48094	120.01945	-61.72833
7	-23.60660	-6.78131	39.73578	-56.49179	23.75041	28.49994	67.07948	-218.78221	-191.58298
8	71.62009	-22.28276	-42.45837	-73.01611	-7.99354	66.65208	-152.66246	135.51315	169.41312
10	-0.97243	26.53809	72.15137	37.20001	74.10033	-28.97354	94.72375	184.37270	-54.22725
11	2.95995	-11.98909	13.89838	45.29483	-65.57719	104.43109	28.32507	-201.99843	94.76682
12	-24.12320	6.73675	-11.85738	-12.45417	-34.13290	-156.72302	-94.93864	-2.38673	-94.75308
14	-55.66321	26.78693	-7.98038	12.94627	51.64026	-45.16660	12.21363	1.16447	55.08562
15	67.08739	-13.82715	-59.69035	50.27495	37.45415	95.61955	-39.67686	-62.31792	-117.03314
16	32.06923	-47.84047	23.81560	-21.72185	-19.38133	-17.34367	99.16586	68.00601	89.42577
17	-37.64600	6.46049	-11.27811	2.91185	-9.45729	-2.91416	-5.11256	31.20593	21.75813
18	-26.56778	40.91035	30.37650	46.78728	-68.96620	54.56787	-26.39659	17.40308	-9.80471
19	-11.07224	15.78823	-59.20851	-37.32672	-25.77348	-20.98666	2.63772	-13.07213	-11.21414
21	23.94768	-20.97673	74.69910	-30.56766	52.80135	-6.23148	-8.36567	-18.37584	8.93409
22	-11.67104	-38.58385	-16.85747	4.47294	25.99915	19.05983	-1.77567	-26.72159	9.05734
23	29.52158	11.53298	-4.73428	-10.09946	-4.02558	11.11363	45.55850	38.04115	-4.01081
24	27.83232	5.73734	-7.13806	27.18602	5.19404	-58.35724	-51.54105	-31.63515	-19.58736
25	-25.30708	-23.06714	-10.91283	-3.88536	-6.08786	25.69856	40.65520	14.30042	45.37712
26	-10.11613	-24.57596	-4.73327	-0.71631	31.05467	-53.70534	17.40215	-38.43657	-53.79991
27	1.67769	63.40413	5.78651	-22.87462	-5.92263	8.38895	26.21176	22.19887	16.17397
28	-14.55660	-18.82623	-0.30466	8.17418	14.36054	21.38576	-74.19455	0.83651	0.76337
29	-12.00275	-18.93478	7.43455	-27.32204	-57.87666	9.59657	-5.21248	12.07777	-26.00743
30	28.38739	34.06873	9.90792	22.83061	14.42760	0.44098	9.75656	3.03496	21.80913
CONSTANT	0.59273	0.52870	-0.80957	-0.01108	-0.15110	-0.42694	-0.15084	0.88386	-0.11524

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	11.46001	82.60681	-92.45206	-55.57291	-5.92779	2.72857	7.17861	-3.03260	-6.76745
2	-104.17101	-440.03589	181.71051	14.43358	-17.96622	-3.34022	-7.41005	4.64651	0.76343
3	95.24422	405.21680	-48.88129	59.85706	28.37450	8.44532	-0.04298	-1.25371	0.07055
4	-60.13794	-19.67259	-86.61913	29.32947	31.78987	11.04058	5.89491	-4.54646	-0.34185
5	66.98120	-10.14716	48.55243	-28.76862	-23.36963	-3.29867	6.85091	-1.32274	-4.72483
6	130.61197	466.00317	-42.53204	-53.72554	23.44464	-2.28877	-10.15728	9.11660	-1.25515
7	-106.24593	-473.70337	-106.24207	-17.79919	-31.39417	7.33331	-0.79139	-2.87289	5.37485
8	27.38103	1.61125	134.83620	-42.73416	-40.45761	-9.03864	3.90625	-2.11026	-0.24234
9	-62.20146	35.09164	-72.07849	75.63995	16.31329	-21.83167	-10.92895	7.90434	-0.15076
10	8.88139	152.76987	110.55687	7.71098	4.25137	8.98251	4.48602	-3.73025	1.86518
11	40.80003	-36.90271	-11.44413	-80.58704	33.99178	3.26210	-0.90571	-0.28634	2.08934
13	-24.76065	46.13559	-18.21140	71.81909	-52.77667	5.31608	-4.44391	-1.15552	0.69826
14	10.59968	-22.49619	9.02071	-29.89240	29.88651	4.99423	-1.36381	-2.29178	1.49771
15	-5.75955	1.31164	13.64246	-6.31322	-23.47990	11.28635	6.07220	-3.18570	-3.05949
CONSTANT	-27.88623	-187.07150	-19.31693	59.62117	28.08800	-23.74202	1.39569	3.50598	3.19832

ORIGINAL VARIABLE	10	11	12	13	14
1	-0.55934	-1.92485	-2.37673	29.33467	-23.53754
2	-0.89235	10.19323	-13.93162	86.98293	-20.66490
3	7.09069	4.10790	69.64421	-93.11273	20.87372
4	6.72469	-14.03565	30.34895	-45.14471	155.01146
5	-4.08458	3.95083	-85.94627	-6.29794	-78.80441
6	-4.22701	-12.75573	-7.40904	-180.22427	184.53865
7	10.66750	-4.07394	-44.49957	93.46231	-220.66429
8	-1.36626	-18.08699	-14.77107	151.96169	-203.63991
9	-14.26277	23.57808	80.15977	11.79250	133.10638
10	7.99484	6.73248	-31.50374	23.65277	218.22919
11	2.75572	0.21894	1.59593	-144.54079	-65.02353
13	3.28012	4.33170	-10.54646	53.84933	89.03610
14	3.49715	-3.48481	-3.26835	-14.57317	-31.77875
15	5.73165	-10.59753	-8.37951	6.14826	-16.86354
CONSTANT	-18.76877	11.27676	43.40511	27.01810	-141.01912

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COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	36.18071	-167.52281	-149.93874	32.62459	96.65594	-3.98319	93.86450	17.92595	3.19694
2	-72.87320	266.39990	438.39185	-129.63994	-46.73285	5.58548	-81.61725	-51.17145	-4.94213
3	64.74901	-67.94971	-541.98242	112.88289	-69.28534	-70.13477	-33.37671	-15.09573	-10.88813
4	-30.19287	-39.18527	283.82666	10.62863	17.34030	60.45937	24.61909	2.93377	-2.42085
5	18.94380	-17.90401	-38.10222	-16.14384	72.55862	6.33488	32.24431	9.70271	11.77807
6	-14.50445	20.57660	2.99160	-8.47005	-52.89897	-7.62203	-27.90843	22.74162	-0.49955
7	-7.57707	63.30171	11.23518	108.88399	8.66585	-77.30124	-10.36130	-0.29653	-0.42353
8	98.56953	-478.16187	41.35094	-285.66724	-24.04646	38.83522	-16.92151	-25.61960	-2.72490
9	-93.51048	516.29272	-68.91788	141.41728	19.04210	64.74121	-9.27391	22.46863	-9.69913
10	63.13783	-27.38354	49.46140	102.33385	32.58424	80.91350	-22.39709	-7.64015	-7.24337
11	-82.30154	13.76219	8.93650	-71.74390	-67.28506	-68.75482	35.86067	11.57521	14.00990
12	-124.48325	526.36426	-65.92984	144.53650	109.88599	-20.28767	15.81976	39.02458	-3.55684
13	110.68712	-638.71094	54.88568	25.83098	-111.64748	-58.65273	15.85816	-8.42099	0.39368
14	-44.83705	111.09180	-102.49028	-200.17284	-157.89780	-85.13033	-1.87413	-13.57065	7.96876
15	92.83554	-72.76958	-8.30855	154.23096	145.17390	77.50540	-18.31934	-16.85872	8.47767
16	-26.78310	231.13605	48.28856	-100.66352	34.31274	42.05441	26.56473	2.34041	-7.87094
17	-17.92657	-223.82646	149.02016	55.00659	255.88338	-61.02608	-12.94223	19.41127	-8.89715
18	-19.30507	130.05013	-53.31517	-67.45160	-133.98459	24.36842	-9.04127	17.55775	3.85825
19	17.29756	123.93533	-95.93285	24.09496	-141.78658	43.97401	39.76044	-6.44102	3.67726
20	-6.38248	-61.87479	43.59325	-10.80410	70.02321	-18.71506	-12.82319	4.70389	-8.07242
21	1.40840	-0.49995	3.96017	-5.54401	-32.69606	-18.64458	7.15987	-5.40016	-6.34598
CONSTANT	37.15776	-207.62759	-14.55158	-15.30949	-11.38802	43.66106	-30.76114	-28.13515	17.41200

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	-1.87807	-0.78745	-0.90861	-0.69380	-6.85440	-11.09256	-14.83075	65.48863	74.38078
2	-1.95424	2.92793	0.75282	-0.28274	-0.68386	-0.91027	-13.72615	-37.42099	-150.01126
3	3.62088	-0.00142	-0.87283	-1.11767	-2.34263	11.02950	2.22755	-28.68970	27.55731
4	-4.05657	-0.11095	0.72909	-3.15710	0.97887	-8.22039	12.68623	-15.48570	69.19601
5	-6.94777	-2.81610	-2.39177	4.50196	5.88269	-3.16338	22.49728	10.80742	-18.24287
6	3.75990	0.14634	-1.66737	2.74006	-2.72821	12.46913	-19.50949	13.75889	-1.60551
7	3.16688	0.20288	-3.14785	5.32278	-7.52746	7.54005	7.87594	5.26161	13.05987
8	-5.55048	2.30401	-0.97554	-0.48729	2.69583	-9.36165	-1.70371	-13.82875	-76.13858
9	6.33686	1.57868	1.07517	-5.69370	-2.76461	9.04551	18.73857	1.50169	41.15819
10	3.15503	2.25544	1.43662	-3.33059	1.23141	10.18464	22.09456	22.95531	-32.34860
11	4.80779	-3.22882	-2.55501	7.37372	-0.52452	1.31444	-32.64519	-40.76053	28.01453
12	-4.43842	0.53205	-3.57670	0.82678	2.80297	-16.65312	9.70797	34.78943	115.55632
13	-0.43741	0.20768	0.27039	-4.30783	4.95301	1.16195	-15.06253	-11.81936	-53.56172
14	3.88076	1.50766	0.76413	-0.15177	10.52370	7.29884	-11.35194	-33.08408	7.15512
15	-10.44093	-0.24053	-0.48204	2.54626	-0.73366	-15.58416	17.11426	28.97292	-25.45073
16	2.74972	-1.17916	1.14725	-7.08791	-3.80483	7.12650	-2.26632	-14.93342	14.30074
17	1.28869	0.41267	2.01666	-9.01232	5.18607	10.65975	11.39129	28.15343	84.76489
18	-0.70333	-1.97796	-1.82129	5.73555	-15.91531	-11.92648	-6.28015	13.90992	-41.05254
19	-9.54863	0.81821	0.94690	2.74273	1.30316	-14.22965	9.37699	-10.73058	-43.28554
20	4.39363	2.67276	0.91253	-3.82909	2.99212	13.52690	-7.32189	-2.56616	16.46602
21	3.96257	2.25283	1.00148	-1.67196	6.03162	9.43034	9.83485	-3.95013	16.74434
CONSTANT	1.15448	-5.84460	3.44200	7.35120	-4.16011	-8.56249	-24.34923	-7.68267	-66.82359

ORIGINAL VARIABLE	19	20	21
1	2.71631	109.00343	58.05414
2	-48.96214	-140.12233	-92.06480
3	125.49315	7.21448	19.87869
4	-75.61436	19.81923	-1.56085
5	-1.53000	25.42534	31.33287
6	1.49976	-18.76796	-20.24127
7	11.87630	15.10456	29.40338
8	-99.02539	51.52040	7.99030
9	34.96767	-113.65675	-12.91726
10	32.99309	38.20442	-133.28479
11	40.26170	-19.06444	45.16675
12	123.57472	-53.57785	-208.92363
13	8.39086	52.33549	226.63832
14	-5.81354	101.78526	292.40210
15	-134.97946	-41.88068	-150.60442
16	-43.15361	115.44949	-181.85655
17	-75.10132	-270.42334	-135.89439
18	121.43089	110.32872	96.92241
19	34.66568	132.37105	2.64324
20	-19.78851	-46.86760	-4.56596
21	-6.92355	-12.15306	2.05358
CONSTANT	-25.31554	-61.10419	137.43719

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	83.92435	-149.62193	-39.69595	-2.44873	-11.38941	-23.04907
2	-40.14754	352.15845	75.25060	-2.18936	8.05894	297.58154
3	-66.99355	-189.01465	-47.85522	-5.91664	-6.87968	-291.63110
4	-86.92351	-256.12964	-282.54956	11.08341	36.07759	-381.30566
5	184.63309	124.76787	303.94434	-9.13206	-14.36306	403.75073
6	-90.28299	27.51274	-241.25833	13.16042	4.75395	-165.33443
CONSTANT	14.23428	92.82466	233.78658	-7.29605	-16.38535	158.83206

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E 8

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-47.79707	231.59956	-162.75621	-69.59151	-37.46169	-12.29838	-2.02608	-1.36322	11.03191
2	121.34259	-694.42627	276.45776	180.44876	66.69714	-12.90931	-0.41991	-7.12621	93.72420
3	-136.42149	690.14380	-59.06017	58.38963	10.52841	6.38674	0.00328	5.23421	-42.75546
4	59.93108	-225.60391	-63.46138	-160.87067	-38.18608	10.79123	-6.27052	7.63437	-50.17844
5	-80.66386	-107.49274	-140.35660	54.57790	38.85114	-7.12294	2.73845	-5.36809	-6.67256
6	-13.01024	431.05371	230.21956	-41.24583	-49.99402	4.71129	3.23233	8.18000	-30.74686
7	134.82179	-398.83325	-20.72107	-7.47120	32.37636	-6.01280	3.39826	-5.59244	36.35448
8	149.25002	-465.21655	-115.64838	-8.76664	251.41281	9.62741	-0.77657	4.86535	157.07893
9	-286.41821	609.77197	-100.54454	23.28938	-289.11108	14.92173	0.09880	14.09116	-204.65060
10	152.06638	-338.64917	83.54535	-75.15417	222.02380	-13.85676	1.10037	-20.82683	147.78694
CONSTANT	-53.10910	268.91138	69.32777	49.99373	-208.15627	-0.80244	-4.52564	4.13824	-103.40395

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ORIGINAL VARIABLE	10
1	-5.78221
2	-147.65250
3	268.29541
4	-122.33867
5	9.63222
6	-245.61249
7	255.49002
8	314.70996
9	-301.16260
10	52.04353
CONSTANT	-81.68045

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5
1	-54.10153	-34.97748	15.32274	-1.57701	-2.74244
2	70.34244	96.94466	-8.60128	15.14263	29.97208
3	0.38874	-108.24609	-7.98546	6.40735	-11.18552
4	-13.12012	52.75615	-1.31426	-4.80323	-24.03990
5	-5.06593	-6.73275	10.45218	-10.05145	4.01797
CONSTANT	-0.35470	-0.15577	-2.33355	0.84377	2.70060

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-7.31225	190.09219	-46.30190	-44.41730	-12.55339	83.02045	-10.26810	2.44259	-14.76320
2	27.38831	-425.80176	186.30035	171.29451	50.81534	-72.63492	-23.36377	4.13130	8.30000
3	-63.65201	348.78833	-325.98560	-207.11624	10.85923	-38.73280	-5.91126	0.17008	4.97905
4	42.61742	-127.81242	216.86595	66.13441	-48.02914	-0.30770	5.08820	-2.10492	3.76501
5	-2.55446	19.30910	-33.01419	10.43344	6.71155	31.55101	15.07620	-1.71144	-2.92545
6	-4.78828	-64.06914	3.19070	-120.83420	44.89786	4.11501	-1.11766	-0.54739	-3.12346
7	-24.94977	378.28149	124.09308	283.78223	28.51062	-18.61153	-11.44269	0.54677	3.95717
8	37.81670	-392.67651	-202.20154	-123.22845	-76.88603	-4.16436	14.70421	-3.12472	0.21956
9	24.64235	-4.57497	82.87462	-20.30473	-20.72618	-8.18941	1.72955	0.34422	-2.34197
10	41.19167	-422.19800	-214.44336	-139.25237	-13.99876	39.93230	18.32742	-8.97037	2.62216
11	-44.86671	516.12109	286.23511	-68.24673	29.29317	3.62504	-7.58590	4.66402	-2.74579
12	-48.31371	28.40158	-97.21750	56.65480	30.02206	-25.84789	1.15991	4.95032	1.49562
13	22.80664	-208.09326	-35.86807	154.47266	-17.21733	11.82216	-6.82742	-0.02800	-4.34239
14	18.32793	-20.49255	0.51925	-30.04208	18.34662	33.67802	11.51861	-4.28186	-4.63084
15	0.49698	7.77559	5.66311	3.86596	-17.46976	6.37930	-2.84336	4.15166	4.42056
CONSTANT	-19.27490	178.43433	47.15826	5.32547	-10.98650	-44.81015	-9.64314	2.51738	2.33261

ORIGINAL VARIABLE	10	11	12	13	14	15
1	-11.29190	-6.27734	50.98882	80.02229	-87.75429	-28.09863
2	2.63081	-15.14882	-15.61878	-134.18388	98.56184	44.93103
3	4.50022	5.18081	-10.88610	15.73243	58.57101	-37.01097
4	3.25249	-3.53170	-24.83940	44.50591	-60.57019	2.70874
5	1.87421	18.09276	10.98057	-3.60133	-8.65538	10.78339
6	-0.79861	7.96068	3.65194	-0.56989	-23.97763	0.33539
7	2.96219	-11.93160	-6.51757	-81.68640	-67.34204	27.10315
8	2.37661	4.65074	-25.83644	68.31230	99.31493	33.32394
9	-1.15561	6.53026	4.82056	-13.16429	36.95930	-86.14627
10	8.46432	1.93533	3.17991	108.17781	109.30444	-198.73422
11	-1.16692	-3.72411	17.33328	-48.76863	-66.08112	140.25613
12	2.53723	0.24332	2.04652	-18.63956	-116.31456	129.10466
13	-5.27310	-5.57922	-9.84287	-28.74744	-61.32727	-158.90778
14	-3.24998	4.21614	-1.33232	56.96404	93.81369	-21.32764
15	3.01708	-2.55079	0.04833	-26.71025	-22.64143	-16.70638
CONSTANT	-6.67451	-2.23199	7.26645	-16.73314	19.11594	157.28015

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COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	4.87701	15.28891	-17.51552	24.38605	-2.68020	21.25708	1.88894	3.60867	-27.60023
2	-21.03090	-56.97499	-73.31166	-3.85405	3.88808	-7.33801	-4.62196	-9.34121	-35.43484
3	36.93799	15.31416	-25.89110	33.33505	-19.51387	-29.34262	-4.72947	-13.07318	44.15062
4	-20.23671	-43.12831	30.42155	-27.19327	3.05200	5.63354	0.07899	-2.08790	1.28892
5	-22.83940	12.98565	22.44965	2.95266	3.03418	-3.26487	-1.45422	0.23829	-34.34636
6	4.44683	85.78580	18.00615	-7.69200	-2.43735	-8.06631	0.08890	-0.20397	41.38562
7	-33.77306	36.86580	-7.96723	-8.41289	1.78704	31.76013	3.75553	11.49739	-16.18906
8	27.89037	-25.68256	30.12469	-19.60898	41.56075	-3.37753	-1.13342	9.24118	23.72791
9	19.03152	-42.70540	24.24622	13.89585	-29.44057	-4.16758	-1.47730	-8.28622	10.34867
10	-38.25992	-1.15270	-10.23785	49.40091	22.48576	-9.62571	-1.44388	11.54742	32.06625
11	40.76236	1.77907	7.50557	-57.17542	-22.65862	5.04174	0.85814	2.03587	-38.99007
CONSTANT	-0.68969	-0.26261	0.47252	0.34108	-0.99653	-0.12967	2.80010	0.37825	-0.26194

ORIGINAL VARIABLE	10	11
1	12.46030	-1.71486
2	13.18530	-28.27954
3	-46.30061	-17.29839
4	29.61127	43.79379
5	-18.57372	13.50091
6	23.67745	1.39371
7	-33.41954	36.27693
8	29.65288	-37.65956
9	-7.93167	-1.65024
10	4.38220	42.17310
11	-5.75006	-50.45636
CONSTANT	-0.11175	-0.80097

1J

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-27.20814	-39.23122	-60.64174	12.50229	13.07046	4.16034	0.92001	-14.49225	-5.17514
2	43.88815	42.34145	51.08185	38.74199	2.50458	4.86557	-2.94447	-7.37908	-4.88629
3	38.94710	15.08785	24.03357	-38.13882	-1.74422	3.44402	0.90233	6.65995	28.19972
4	-38.94547	-51.84050	5.31518	55.72052	-39.99301	0.04453	-2.97324	10.92638	-32.85846
5	15.74445	-0.32001	-24.51691	13.77955	-15.75409	-24.04161	1.12272	20.17825	13.77582
6	-41.79187	87.57661	-42.55727	13.45595	8.64132	1.04358	-0.14114	-26.17087	1.68958
7	-6.89013	0.12696	-9.19773	-1.52710	26.54248	5.85701	-3.23631	-1.28181	-4.06034
8	11.11001	11.88082	-13.15558	-29.11005	8.12063	8.79754	-0.40134	-39.95038	-15.69480
9	34.33556	-62.55370	73.88919	-18.23795	9.27721	2.90383	0.41674	13.77163	28.93118
10	2.12792	10.30085	24.93748	-14.17029	10.40004	-7.94375	-1.36679	23.76653	-13.61724
11	-29.51196	-14.14133	-28.11707	-31.37045	-23.01775	3.74843	-1.26027	14.47155	5.44706
CONSTANT	0.20776	-0.29686	-1.16880	-1.84003	0.88854	0.13602	2.78542	0.99112	-0.59451

ORIGINAL VARIABLE	10	11
1	35.10939	32.62888
2	-18.35570	-15.19180
3	21.65567	42.69336
4	40.08752	-76.70300
5	25.60095	19.43855
6	16.16516	-30.75330
7	-30.40479	-25.90881
8	-33.94864	51.71986
9	-50.41730	-33.38220
10	-14.20244	30.31898
11	6.75134	3.91589
CONSTANT	-0.69227	-0.07311

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COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	-14.56983	-59.76852	-11.13872	-7.83349	-12.38639	28.98840
2	35.53233	95.34070	-24.11508	-9.73856	-7.60067	-48.90399
3	-34.64034	-54.83104	76.51050	1.79258	0.54868	-0.86367
4	22.94633	19.65805	-37.43980	8.39737	12.84972	34.08530
5	-28.39287	-0.53465	-9.01533	-3.50729	-2.29621	-0.18930
6	21.91838	-3.08006	6.03418	11.06929	-2.75109	-9.12150
CONSTANT	0.89204	-0.72344	-0.49932	-1.78763	1.36043	-0.88010

2A

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4
1	-3.61773	19.38852	64.41674	13.03142
2	75.41223	-42.85928	-148.00346	28.00729
3	-153.30495	42.20767	109.72781	-5.25571
4	82.71310	-25.91089	-20.80423	-29.27663
CONSTANT	0.86905	2.37329	-0.38181	0.27340

2B

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	13.02051	41.68565	38.39436	9.16318	-18.90648	-25.69800	-13.58739	-21.70505	-10.77443
2	0.92285	-73.37886	-132.01418	0.17778	80.81421	22.35132	28.74802	22.03577	32.15442
3	-59.73880	70.37212	232.45802	-19.71291	-204.85623	2.04178	-60.78210	-7.63693	-45.39198
4	42.29166	-88.91508	-189.75633	27.39351	89.14107	-21.30669	106.32219	38.90424	8.97806
5	2.95534	116.27739	49.01491	-88.16173	166.70558	102.41525	-98.25540	-40.87160	8.16819
6	5.69385	-72.55716	102.57375	80.77875	-89.01024	-103.83202	86.62822	43.49684	53.40477
7	32.66658	-43.05046	-315.19336	28.17526	-183.42412	9.24302	-45.84053	-31.82854	-65.18147
8	-49.69749	58.13460	278.98413	-41.06030	190.09766	-93.65056	-100.34319	-5.56972	50.58907
9	23.94904	-6.26445	-8.77439	23.45293	9.83397	93.55687	144.08833	-81.67706	-2.11677
10	-5.22070	22.34550	-74.59619	-16.55141	74.04227	68.15755	-87.69839	59.05545	-31.84288
11	-13.41375	-51.94849	5.06060	-52.94675	-195.73932	20.41663	64.91252	81.73126	-68.56621
12	-33.14467	32.32620	-6.38835	54.70265	52.00029	-77.04143	-1.55481	-32.80333	141.27113
13	11.31078	0.46012	59.51535	5.50713	-2.48391	1.88100	29.20515	-37.23924	-28.17831
14	7.28931	-5.59408	-20.61935	-92.45139	22.67950	-72.39943	-74.52818	36.44449	-83.69786
15	-0.23545	1.42153	-36.68253	263.37354	21.95909	49.57820	-41.88185	-35.53171	-17.21719
16	32.14757	7.04149	0.96297	-204.07516	-13.57760	36.31384	56.25275	12.48543	58.09499
17	8.85788	9.44464	28.54417	-7.92162	8.36982	-6.80078	9.38432	38.35802	-15.37380
18	-30.24959	-6.42566	-31.85121	15.71292	32.79665	-72.89604	103.71167	-41.12244	-70.36368
19	-5.52631	57.55949	103.04222	149.31409	-29.68857	160.54213	-86.92996	21.45023	44.05363
20	-5.23126	-70.15103	-152.53178	-116.00545	10.65662	-170.45908	56.70125	-19.49881	44.48758
21	31.17577	-24.28932	87.34344	-19.71230	-26.35669	78.88089	-86.48433	-3.28194	-3.86378
22	13.58577	29.36642	-38.47833	-18.28799	-8.95146	5.03870	7.37440	-25.34073	-27.66129
23	4.89978	39.25417	82.77043	28.73112	11.02857	14.74305	-21.96397	57.51505	22.06644
24	-34.13501	-84.40773	-89.18823	-17.87759	6.32051	-21.15926	31.68784	-57.15749	0.72496
25	-12.89721	74.69186	59.23514	50.73296	20.64531	-5.91804	-1.89352	47.41061	-32.54599
26	32.30882	6.89501	-70.05073	-62.46254	-52.81477	8.05624	-1.12188	-53.85646	29.85632
27	-30.45995	-11.06457	54.74498	54.12410	56.07123	-47.10875	5.96671	95.53291	10.17447
28	29.37178	-2.33830	2.93703	-49.89474	-24.60329	51.69704	-10.19375	-98.67303	-30.16068
29	-10.47074	-20.70601	-60.30766	19.76491	-15.77508	0.46815	30.62929	74.96512	19.32126
30	-4.61419	-2.23847	41.70674	-2.83227	12.40696	-8.97478	-28.37970	-37.85596	9.59229
CONSTANT	-0.73071	0.27895	0.12392	-0.40604	-0.16043	0.29080	-0.12321	0.11294	0.01309

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	21.64745	-23.86174	-28.20552	17.64180	-5.04660	19.05898	0.11181	-5.66268	-2.35494
2	-6.71007	-7.94428	48.18172	-9.33964	13.20145	-13.20086	2.73394	0.03380	-0.03526
3	2.67302	73.50995	-12.99337	-6.43410	-21.15899	-16.15805	4.59890	2.71062	2.20230
4	-72.38197	35.14052	-60.74838	1.60315	16.75233	26.14626	3.64560	4.43911	-3.04257
5	6.22110	-78.62610	48.92271	-0.97553	-11.68871	-4.77128	25.23119	6.56501	-5.25271
6	53.19394	-17.36032	19.30685	-1.57376	2.58562	-1.76876	-0.58895	6.38914	-1.23906
7	-11.82442	-6.67952	-2.04585	-2.10777	8.55814	-10.79851	-3.98827	3.31885	0.88613
8	55.52132	3.63834	5.88634	-24.21968	-2.71116	-8.26408	-5.52802	1.47601	0.59520
9	-63.51595	5.38781	-31.76749	22.25836	7.21414	-7.33274	-8.43050	-2.19265	0.92172
10	80.37143	40.91335	25.69095	-4.43878	-1.16018	-7.81341	-2.58839	-7.93198	2.99745
11	-26.85556	-40.28244	-55.53481	1.76486	-4.65082	14.95251	-11.61150	-6.62288	0.73194
12	-72.38536	-9.44743	54.26799	23.28947	26.86877	4.00184	9.15146	-2.63821	-2.25098
13	49.88925	15.36537	12.24783	-7.68203	-23.94421	-3.62792	-13.95575	3.35168	1.51509
14	-57.71942	-10.00449	-1.61436	16.32796	-27.21414	-25.94804	-9.28101	11.41230	-0.84772
15	24.23895	36.64491	-35.23671	-10.33605	12.44277	36.47701	-3.74634	-2.94628	0.87872
16	10.73565	0.81850	10.66294	-37.71165	-7.82060	29.27084	6.85981	6.11689	-5.65145
17	14.49282	7.51151	30.26329	20.51561	19.28923	4.58816	-1.75717	-6.39959	1.80138
18	-27.55682	-1.01885	-40.74483	-12.83753	36.49638	-13.10154	0.38759	-1.43136	1.12115
19	-18.98729	0.58090	24.16435	16.45102	12.08066	-18.59236	-9.52468	0.92636	3.12947
20	25.98157	-11.03056	9.09393	-3.61529	-48.93877	-29.80272	3.23564	-4.08543	0.76562
21	-0.12504	-28.35300	-38.67387	19.73781	25.44588	16.61916	10.69149	-0.69329	-0.67728
22	7.01925	-5.08980	33.27734	-5.78258	-6.18638	-10.32305	6.97391	-3.87303	0.47553
23	-12.76542	3.93526	12.66809	-28.07031	-54.23613	7.16492	5.65172	-7.91904	-0.20700
24	15.71015	16.40607	-30.25502	-10.85102	18.59003	24.14119	-11.42104	-1.01468	3.09060
25	-24.25108	-11.58061	51.97827	18.17888	-7.44273	12.97763	11.04240	1.87973	-6.02520
26	-15.51073	49.10550	-9.07575	43.31813	2.02554	-3.83637	-8.38695	6.89996	-1.75823
27	40.32867	16.16786	-23.98074	-38.50282	6.92620	-3.58387	4.44245	-3.26821	0.82688
28	30.15257	-39.01299	-8.02679	29.78589	-11.02780	11.93281	10.48907	6.00013	-3.92669
29	7.83934	-21.55014	-6.88620	4.20856	3.34331	-18.55707	-4.95063	0.78423	-0.29847
30	-38.37125	4.78673	-3.70222	-31.08362	26.15860	-10.76532	-7.38505	-4.72166	1.13337
CONSTANT	0.52701	0.10645	-0.48731	0.02027	-0.11842	0.46673	0.38448	0.37409	2.33972

2C

ORIGINAL VARIABLE	19	20	21	22	23	24	25	26	27
1	-22.88837	8.89766	-10.73339	21.98593	-10.52972	-52.28851	41.17783	16.12872	9.71694
2	-3.65302	-20.55800	4.99886	-1.50614	-6.25457	120.93755	-74.31726	-19.45334	-26.84392
3	10.51337	-17.85178	30.31303	-29.96608	26.99615	-56.04123	42.13708	-49.23262	27.90964
4	9.27625	0.31944	-35.45520	-47.93416	36.84828	-67.49185	5.41550	92.60515	-10.56090
5	4.27983	22.29161	19.98775	30.10277	-40.56246	67.81284	-11.09773	-61.14232	-5.49333
6	1.91438	-13.77886	-30.44778	17.41786	-35.85762	-0.55933	3.66732	2.37295	101.53571
7	16.24162	11.36133	-0.98960	9.10357	1.59831	-59.91176	0.20674	-20.52646	-73.04187
8	-7.88313	7.25893	17.66571	51.06871	0.40043	71.08563	24.33377	43.10385	-190.71205
9	4.49547	16.38966	30.67624	-13.15628	8.50651	-16.75554	-10.84577	125.92276	213.85921
10	-18.47630	-3.72259	-15.48071	16.66336	-7.05955	-4.72170	-43.44707	-139.02443	-3.10075
11	-12.55413	17.81436	-6.62777	-15.53707	78.21164	-77.00523	69.95745	17.80151	-54.45459
12	-5.26392	19.09108	-22.04057	-64.37839	-55.12186	108.33125	-74.20514	-44.66824	11.21358
13	-3.19313	-58.92790	-13.49828	-34.71875	-11.13746	-62.15021	-15.85713	-17.26485	-29.57588
14	38.69867	-6.20490	49.57716	75.22838	1.72121	52.44473	77.99245	-12.35930	64.33195
15	-14.53700	12.23632	17.58949	-38.65027	-12.59550	-37.47348	-22.11807	131.33786	-42.59322
16	-10.08121	-3.36587	-41.74460	27.09877	28.10197	22.35748	-16.68711	-38.39117	8.91323
17	-8.15256	7.22020	38.00626	-8.93426	-23.68570	15.49653	0.73065	-14.19304	6.53352
18	6.52828	29.64337	-42.28821	19.15250	23.73938	-0.16087	-84.28500	-52.11946	-47.92940
19	7.92720	-20.41338	2.58207	-26.45129	-16.98628	14.02226	217.63510	-40.02245	19.07144
20	-4.07553	-10.50238	37.12462	53.34300	40.60725	-20.25874	-126.32974	35.50420	-0.33663
21	2.52591	3.77042	-32.49506	-39.65096	-31.01959	-33.91191	-10.77958	33.95625	21.34409
22	-8.19533	8.88491	-17.28397	-20.01077	20.72545	24.10837	16.51619	45.78961	9.69370
23	-22.34680	0.53976	41.87520	20.53078	25.30780	-25.62679	-34.12842	-26.71387	-20.75934
24	11.11493	-7.52451	-25.71030	-12.41791	-65.49406	31.87393	53.38258	-14.98743	5.01067
25	2.41549	3.31118	-9.58180	22.19707	75.45322	-4.95569	-19.64410	24.64618	7.90995
26	26.75163	-9.92496	0.25048	-0.67894	-112.78267	-29.60446	9.23813	-25.16743	-11.87322
27	-17.13052	0.63108	-21.68658	15.94064	76.69730	-3.86017	-31.59671	33.35701	44.94414
28	12.47767	20.86128	48.23280	-50.93727	0.47614	19.56413	26.54439	-23.28978	-10.51162
29	7.93576	-19.99875	-16.42329	28.42131	-34.75661	53.43546	7.17220	12.29824	-45.04286
30	-8.45749	1.37728	3.28149	-0.21132	16.72836	-48.93164	-20.15114	-18.84639	19.82516
CONSTANT	-0.51495	-0.72861	0.44519	-0.56908	0.28281	0.05699	-0.13295	0.29800	0.38320

ORIGINAL VARIABLE	28	29	30
1	17.62320	75.37973	-3.30741
2	-65.55466	-194.25580	34.93250
3	97.20877	174.77940	-223.08006
4	-11.60645	-24.19717	426.44727
5	-73.46942	-1.35118	-371.95801
6	175.22397	-95.23921	188.28220
7	-266.10132	42.53310	-70.93300
8	111.96913	63.69695	48.17801
9	-49.34227	-5.85346	-5.68959
10	90.53693	78.37590	82.31235
11	52.61473	-261.81421	-192.96895
12	-61.26375	163.97581	93.62762
13	-31.19081	-6.23742	-6.87390
14	-12.77771	-13.89478	4.00130
15	28.34741	5.13256	-34.00491
16	0.47131	-5.25985	36.34557
17	22.30177	16.20073	-6.33107
18	-48.48895	-8.36589	-18.76863
19	-48.57368	-27.87337	87.56701
20	133.13329	24.33107	-146.57011
21	-50.67612	17.62918	78.65036
22	14.35002	-16.49060	-26.51105
23	-38.37555	14.38478	50.94963
24	34.67726	-19.91393	-33.13287
25	-19.99600	25.69518	-11.88585
26	18.33337	-34.93140	28.15382
27	-99.04761	12.21044	-27.09259
28	26.15549	-36.71158	38.32262
29	20.09210	62.66516	-18.16851
30	-4.61167	-24.37808	-0.73724
CONSTANT	0.03418	-0.10625	0.01129

COEFFICIENTS FOR CANONICAL VARIABLE -

CRIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-11.97117	-13.94923	-37.09552	-33.05104	-45.48520	-71.49069	1.50788	2.89149	-3.53788
2	10.05957	67.79228	315.75000	-11.44563	22.25943	32.06528	17.20639	5.93914	-0.05977
3	8.40436	-60.77814	-323.73633	54.85178	73.62262	53.34320	-27.51060	-14.22627	-4.85521
4	-2.27733	-107.59691	-3.69448	-106.88593	-22.62621	4.55130	-1.93732	8.77172	0.99502
5	-2.36872	112.09456	24.14743	82.24112	-17.66519	5.52066	11.69215	-2.31559	-0.23422
6	12.80567	-61.93002	-379.08276	42.81197	0.50273	-24.22723	15.57113	15.89074	-1.73617
7	-22.94780	50.02942	423.02002	-70.99416	-52.02631	-14.31404	16.28038	-10.31475	-0.67397
8	-18.33148	170.29549	8.13081	84.90186	29.17978	-26.87448	-19.68321	-0.92184	-0.10609
9	19.98642	-165.15608	-34.71942	-64.71371	-23.42482	-8.88091	-25.18925	-3.50852	-1.07907
10	10.34593	3.83515	-149.93480	12.58159	-36.17680	-3.37374	13.11657	13.12966	5.25561
11	5.02652	-71.69554	6.16149	15.78321	36.78415	-5.98647	2.03758	4.88469	1.23641
12	-6.23727	58.86560	6.88099	-7.16578	20.14265	9.44607	19.72809	-11.19762	-1.04887
13	4.66539	5.75365	-2.80268	-6.60207	-29.99844	15.52584	6.40508	9.96678	1.78708
15	-11.47819	2.91896	5.56804	7.08402	7.20651	-3.43528	-4.44778	11.03166	-0.43854
CONSTANT	6.14115	9.84097	139.90244	-2.15380	40.06248	42.56786	-26.85104	-30.00836	2.07419

CRIGINAL VARIABLE	10	11	12	13	14
1	-5.02053	-6.09275	52.24194	37.00691	-25.39685
2	3.44131	1.93593	-96.21201	-78.69070	50.16510
3	5.61572	-10.27523	59.79895	-23.33177	-19.43706
4	-1.87568	9.15025	0.04018	14.64839	41.65451
5	0.35066	-2.28802	-26.12851	52.03900	-29.53333
6	-0.54546	15.74015	-28.00229	11.17366	15.11390
7	-4.36781	0.84363	61.22018	127.67308	-43.97816
8	0.41572	-3.00626	-1.75433	-27.10010	-151.68008
9	1.97374	-4.67872	26.41496	-88.30145	123.39032
10	-11.26563	16.62985	-68.34035	-95.70721	41.20644
11	-1.92347	2.23296	-6.93035	18.18297	122.87138
12	1.25285	-10.21406	-11.27867	44.32048	-96.51016
13	-3.59286	7.89536	11.98043	-11.15461	-8.42497
15	-2.23815	6.70229	3.31949	-2.57896	10.20350
CONSTANT	17.04092	-24.40797	23.47830	21.56033	-29.39919

2D

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-23.81253	-19.28812	-1.71043	11.64727	-36.62682	-26.13918	4.14369	-24.16936	-6.14254
2	24.67142	30.88739	4.92574	-86.23338	155.34134	4.69406	-50.10658	-3.38182	0.85796
3	-5.35781	-29.75920	7.78738	159.89902	-244.31093	27.10721	18.11955	27.49196	17.06039
4	4.92343	18.12131	-8.24324	-82.83098	135.25581	-7.69737	37.16035	-4.26974	-5.54875
5	-22.78751	0.12866	-4.89269	-18.05046	-6.99497	-12.17461	-35.03795	-19.29509	-4.10883
6	20.10503	-1.68177	5.28497	18.47078	-0.92610	9.47111	24.01855	19.75525	-2.08174
7	-8.41971	17.02875	-43.72386	-33.96442	7.28830	35.43382	58.13979	-25.56923	-21.39439
8	-8.07904	-78.09996	340.17212	-20.23790	-48.87117	1.85399	-20.71303	5.17969	-0.83195
9	22.82184	73.63310	-343.53931	70.33925	62.68759	-81.17175	-45.31454	44.30986	31.25008
10	-16.21965	108.90071	-29.40868	-101.81451	-52.04422	19.80775	3.46495	8.43592	1.48130
11	18.35254	-112.61629	48.06969	70.69588	33.68643	21.99068	-12.06330	-16.99509	0.88321
12	29.72588	67.38432	-397.65454	81.20525	15.64459	-46.32329	7.58589	-19.62238	-28.85887
13	-37.32919	-63.67236	451.88428	-110.31068	-59.32385	97.59808	11.91732	-13.93145	-4.86550
14	1.13847	-166.45580	29.57828	80.48079	50.14226	-34.41974	28.66310	-0.36035	7.89825
15	-6.01405	162.91237	-74.20154	-43.28490	-32.42216	25.83607	21.18874	16.38988	6.18949
16	14.78239	4.50744	-179.05865	12.50984	41.54675	1.13107	18.62170	-20.95598	-7.14332
17	-7.88338	65.90852	59.97716	22.28703	8.66693	-54.13570	-0.52493	5.42709	-10.00627
18	5.65275	-56.36453	-2.90501	-23.08543	-3.43097	-11.21239	-24.59201	-15.06643	-7.82236
19	10.01083	-4.09414	-54.37866	-7.39624	-15.12929	64.75381	-22.17761	15.49748	-15.98713
20	-4.75845	-0.81985	25.52232	1.07937	5.34846	-24.88583	8.42485	-10.61156	14.97986
21	-5.13120	-3.20744	6.02686	14.15531	3.18095	5.18116	9.19372	20.47588	-9.64562
CONSTANT	-6.05736	-14.52643	160.69418	-14.95282	-18.07326	-21.64293	-44.00838	12.04073	46.71704

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	14.36077	8.97154	2.42267	1.31297	3.04869	9.63824	-36.07217	2.59855	35.13525
2	16.09946	-1.70707	-0.35735	1.24153	-0.79050	-0.98644	-16.59294	-4.61066	-72.49118
3	8.56012	-1.14425	-4.73801	0.71632	-2.74807	-22.13838	22.80470	-21.89967	-15.31787
4	-10.06039	0.29084	-4.43594	-0.08311	-8.20220	-13.48228	29.54353	41.51257	47.42297
5	7.26891	-3.37943	9.78479	4.10440	6.44888	31.67430	3.50719	18.69534	-2.72683
6	-26.09357	2.22393	0.24804	-1.96438	-3.71842	-8.74477	-17.58513	-37.75601	2.78167
7	18.64072	-3.29716	1.49960	4.74901	-1.30714	22.57056	-7.06088	9.07540	-53.79895
8	-9.85501	10.28258	-4.14206	-0.05098	-0.31991	-15.31973	-13.38035	2.53214	81.30107
9	-12.44535	-9.11317	-4.64139	0.54372	-1.70979	-8.95255	48.99715	-28.93562	-51.20341
10	0.99463	1.60270	-0.47018	-0.19845	0.39931	-5.32382	-2.35048	12.66969	3.71843
11	-9.73901	2.27843	-2.53554	0.10460	-1.47209	-1.51428	-6.67181	-2.71469	22.39479
12	-10.54944	0.55318	-1.61324	0.72668	4.11160	2.13221	-17.19279	7.85850	13.21085
13	5.83813	-7.18913	1.55546	1.01680	1.19745	3.58426	2.18016	2.51044	-27.02484
14	10.90414	-1.23959	6.61169	1.34600	3.95892	14.24440	-1.80149	14.65571	-12.42068
15	17.18643	-0.51617	3.75337	1.48987	3.95366	4.71905	7.15378	-6.35361	-10.49349
16	-16.97401	2.48270	0.33119	-4.15792	-8.56332	-10.88675	-33.41655	33.73747	54.11740
17	2.73248	-2.20887	2.02315	-0.63808	-0.75330	4.71501	0.51252	-5.35921	-5.97170
18	-9.65260	-1.53660	-3.21636	-0.58964	-2.40818	1.25510	2.03344	-20.42526	12.32942
19	-6.92233	0.81833	-4.23923	-2.71193	-4.13627	-9.17328	-1.75610	-9.95702	8.82386
20	-5.80507	4.27142	0.99472	0.16395	0.44249	4.47787	-4.47423	16.51051	-11.61701
21	-0.08243	0.78692	-3.27613	-1.12530	-1.20390	-7.18097	-2.90125	-5.41853	-1.21264
CONSTANT	22.59804	3.54732	4.94575	-0.39524	9.35388	0.73063	35.51431	-20.04211	-20.24991

ORIGINAL VARIABLE	19	20	21
1	-140.56117	132.93456	36.16841
2	197.51335	-209.75121	-70.55080
3	-30.15785	100.30087	23.03181
4	-40.69637	-6.06328	11.25257
5	-1.93435	22.17195	7.33752
6	4.13033	-29.21748	-8.57042
7	-48.96048	-24.30405	-36.80641
8	87.29118	87.34731	154.09348
9	30.96101	-41.33439	-140.15640
10	-8.06468	13.68628	49.86284
11	-9.20691	-81.70656	-23.24304
12	10.38891	-72.60855	-82.64705
13	-156.58597	11.90813	100.25598
14	12.42794	-15.72352	-190.98331
15	24.66849	136.63670	119.44925
16	91.36037	30.63098	-18.64996
17	3.72787	-35.36269	240.42488
18	-18.69643	-51.44919	-146.39703
19	-1.57278	42.51163	-97.36469
20	0.59623	-14.69142	49.05687
21	3.58294	-3.38118	4.36402
CONSTANT	-16.60030	14.26866	18.24112

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	27.74513	-151.03893	43.04860	16.41406	-19.42830	34.94106
2	-52.78343	306.89893	98.97098	1.04861	6.22087	-164.17783
3	23.93687	-138.82880	-160.41960	-2.32464	9.94726	126.44308
4	81.35690	-305.60693	-268.68164	-13.77579	4.41213	-17.14534
5	-80.36708	176.09633	340.58911	-1.59376	3.01049	49.27216
6	76.61647	-63.11246	-197.13306	11.14804	-5.00210	-121.13078
CONSTANT	-78.28810	178.65840	142.02013	-9.15384	2.33048	91.71164

2F

E-16

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	17.53255	-14.04098	-93.53720	-121.13542	-74.29663	9.33218	3.18116	-30.33501	-9.28426
2	-10.21158	-36.25031	285.98657	312.80493	129.51924	-5.64197	-5.83255	-62.10596	-36.06140
3	-58.47758	90.20232	-317.53320	-277.44409	74.23940	-3.23469	0.84889	17.17123	35.24220
4	51.43674	-39.40150	122.28626	83.43234	-136.99634	1.24676	1.60252	58.64740	4.07143
5	-15.22214	77.55670	36.54294	-16.88104	-19.47098	-11.77306	-7.55158	4.86565	21.40851
6	23.13075	-163.97636	-194.62245	138.24384	62.20271	-9.85387	3.35787	24.26392	-137.20332
7	-13.55835	81.23877	185.60663	-96.59818	-18.10077	2.13329	3.82017	-23.59511	116.40753
8	-64.78357	172.51497	257.23706	-262.87402	-13.02608	21.17409	6.49334	32.94771	-22.48178
9	80.03508	-96.87772	-315.79907	192.93695	-43.73003	7.04869	3.13152	-13.81347	52.19576
10	-70.17216	17.81277	188.19203	-89.51297	15.51685	-13.80581	1.46322	39.91594	-116.63051
CONSTANT	62.04298	-90.06912	-156.50363	135.46617	19.36151	3.17973	-8.93249	-61.01938	87.91862

2G

ORIGINAL VARIABLE	10
1	-32.52664
2	-2.01454
3	47.45395
4	-16.16827
5	-141.13681
6	185.56349
7	-14.11170
8	-65.98613
9	-71.27847
10	66.16762
CONSTANT	44.68681

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5
1	2.08988	63.29774	2.95274	13.00479	20.24913
2	-30.29195	-94.64268	29.39687	11.89093	-44.01714
3	55.94093	44.90070	-69.91389	-1.44633	3.85357
4	-41.28622	-11.23858	29.53014	-15.65555	27.61061
5	12.69294	0.85922	7.40560	3.20952	-2.16547
CONSTANT	-1.29001	1.00675	-0.04136	-0.79740	-2.01490

2H

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	26.03175	48.90903	23.74176	52.76482	37.96774	17.61221	20.64888	0.66323	-1.21427
2	-59.33144	-77.47737	-46.20995	-179.09354	-23.30196	-36.22925	-3.70775	2.59191	-3.23952
3	55.66251	35.54117	35.95604	274.55005	-15.86117	-4.59064	-0.04058	7.52943	-7.62379
4	-33.67151	-8.77984	-15.63406	-153.35500	-3.91103	32.74722	3.76066	1.95652	-3.56746
5	12.63018	2.57602	4.04623	7.10217	12.09191	-9.26757	-9.24290	-10.66562	6.16918
6	20.07280	-11.10178	-25.73415	-36.31448	-45.60471	61.99094	-12.86419	-5.17723	-1.22083
7	-50.39098	61.29810	306.86353	57.52325	33.49963	-23.23061	22.45966	-0.41671	-1.12848
8	13.28896	-34.05327	-334.67529	-19.96347	56.86075	-57.26988	-15.85126	1.23924	-1.84196
9	8.40440	-16.06415	24.03189	-14.63216	-61.46149	-5.61129	3.55699	1.28913	-1.84813
10	57.10471	-37.66487	-368.56616	0.24474	-23.23448	25.09737	0.71554	-7.40283	4.44962
11	-39.85695	0.08540	423.11719	7.70782	-43.66856	21.70412	-14.35511	-1.52891	0.94813
12	7.47638	30.02965	-20.67628	10.30669	47.81041	20.51538	-3.42632	-0.11532	0.45732
13	38.60385	22.33673	-137.28491	-45.22238	-18.72733	10.69800	11.17173	7.60379	-2.64975
14	-26.26872	-16.08594	-2.91539	8.47896	26.51671	-2.11478	1.31211	-0.26906	0.43541
15	13.57484	2.88989	4.75824	-2.84703	-19.38495	-16.92932	-4.11106	-1.88418	3.16341
CONSTANT	-44.57243	-0.40808	128.68742	34.33647	45.11057	-43.77057	7.07926	5.82325	-0.19799

ORIGINAL VARIABLE	10	11	12	13	14	15
1	6.89121	-27.12186	-30.91400	-51.01276	-152.15517	-41.80597
2	2.99767	9.18031	-38.62160	83.62872	225.97618	56.73789
3	10.83580	19.84586	25.94612	24.56741	-59.47380	6.30822
4	-2.15458	5.46078	42.44342	-52.49359	-36.02528	-13.03756
5	-15.50166	-11.44399	-13.29514	-1.97804	7.26007	-8.02953
6	-16.45329	-14.05914	-16.61691	61.14540	-42.18991	-7.48922
7	12.50464	1.92958	-5.17005	-97.86044	53.94212	22.91133
8	-0.04684	35.68327	36.01639	44.17595	36.85333	34.10898
9	4.53564	-8.68006	7.09960	-3.68761	15.30361	-51.21072
10	-0.58085	-11.63575	-12.05199	-15.11456	36.11681	-3.37797
11	-4.37077	0.67862	-5.44372	44.80014	-132.00224	-106.22742
12	-3.87738	-15.04019	5.53985	11.00083	-32.10960	116.08296
13	3.52397	-3.23234	-16.96582	-71.49677	61.73074	70.80276
14	-2.43890	-3.28983	-4.95859	-10.00638	33.54750	-80.95491
15	-6.38170	12.92450	-9.91268	1.00584	-11.41831	15.38346
CONSTANT	14.12114	6.34025	28.85237	34.94675	-13.39594	-10.08830

2I

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	23.50983	-7.01236	-27.10158	42.12379	10.52431	-25.49641	4.13326	7.71074	-16.69496
2	7.43027	-37.02367	106.19211	67.24196	15.50511	22.97163	5.08744	-11.33586	1.90193
3	18.39786	54.58479	13.59445	-35.38559	-52.51955	-26.92177	-0.58689	8.47939	7.06190
4	-9.71807	-19.25729	25.50513	-26.29372	29.25505	49.64485	-7.91714	-14.35795	-7.14519
5	6.22693	-39.98517	-41.43298	-10.61821	29.64108	-1.74325	8.74239	-0.42827	36.13940
6	-5.31922	23.24338	-63.83856	-11.82307	-62.76865	-27.49231	-4.06508	7.69638	-12.41819
7	4.65610	-43.67564	-94.72244	-26.52106	0.96072	31.53523	-4.42877	-8.35745	11.73857
8	-43.35683	49.27049	51.08975	28.84256	4.49048	-20.62067	-6.26909	6.07086	-0.54030
9	4.49935	18.51118	32.36264	-30.43468	24.46483	-4.65435	-3.61782	-2.22370	-24.15897
10	14.07356	-29.54906	1.18756	-22.86108	-40.31091	-28.85316	7.98799	9.80222	14.03841
11	-22.20526	27.60457	0.14791	22.32095	41.07788	28.43074	7.23959	-11.85775	-13.48503
CONSTANT	-0.86628	-0.38196	-0.06055	-0.14497	-0.47054	-0.05996	0.00841	2.49151	-0.14078

ORIGINAL VARIABLE	10	11
1	-13.47463	-13.90882
2	-31.78603	-49.34729
3	31.22067	-94.32230
4	-25.22601	87.46683
5	15.72163	9.62088
6	54.19113	38.34285
7	-14.03515	-13.36295
8	-22.51683	44.38559
9	2.71483	-8.69158
10	-49.27802	8.78134
11	49.00845	-9.62343
CONSTANT	0.27910	-0.03955

2J

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-30.96690	-7.42536	43.46088	-7.43604	43.70549	3.35713	0.91236	-28.71889	8.81250
2	27.61191	-6.86659	-12.45933	47.53525	-4.08903	-15.87199	4.70243	22.11244	15.69573
3	-8.29557	-62.73230	-56.02176	-0.15930	6.30086	-1.78823	3.75346	-7.47300	28.82967
4	53.45468	74.83583	57.12494	0.46221	7.11683	15.34751	-6.00554	-13.09722	-15.46166
5	-8.90880	-39.49539	21.62881	16.74956	1.49139	-3.29690	1.53223	11.84956	-18.32642
6	-18.50845	64.84761	32.38078	-18.86658	-25.80701	-11.35405	0.61429	27.08682	27.65688
7	-0.15907	19.38379	20.59465	-14.94114	-31.00139	-2.99201	4.82342	5.85934	2.97931
8	-24.32970	-29.04733	-40.44269	-3.16443	43.71498	8.04478	0.74587	-6.95433	-14.47466
9	31.85623	-15.01626	-34.95644	-29.20999	-19.17719	-8.40686	2.18237	29.99490	1.17059
10	-12.19001	-6.57732	-30.78603	45.43973	-19.89844	14.79639	-4.48195	-26.89226	-13.96638
11	-7.23804	7.23986	-0.84775	-40.33043	-7.09571	0.66883	1.07119	-15.60473	-24.29187
CONSTANT	0.66815	-0.28592	0.51836	0.18119	-0.06007	-0.16856	-2.46157	-0.13070	0.06872

ORIGINAL VARIABLE	10	11
1	-16.79190	-17.37547
2	23.04039	10.54488
3	-27.84474	-25.14178
4	-29.21640	83.63016
5	-62.17665	-2.08378
6	-2.21177	-96.73578
7	32.05888	4.86229
8	73.70946	-57.51295
9	26.54474	119.03595
10	1.48478	-6.42496
11	-15.86234	-9.81941
CONSTANT	0.18021	-0.56732

2K

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	-20.59383	55.84428	41.29840	-3.74921	-2.52963	-15.92654
2	18.39569	-123.86050	-32.46223	14.21188	-7.64829	42.29408
3	20.37047	109.01419	-24.40041	4.51208	-3.79628	-4.60903
4	-17.73428	-48.98955	10.04440	-4.34037	3.73614	-29.20660
5	14.67845	16.43451	23.78873	-9.28351	4.02181	-2.36701
6	-16.81567	-8.02802	-16.89095	-3.36082	-3.30190	7.07015
CONSTANT	-0.61570	0.05800	-0.14074	2.59417	1.41413	2.18153

3A

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4
1	-19.89311	-52.28017	11.88002	12.39494
2	8.47576	133.70038	-16.87802	36.47406
3	89.89508	-133.48993	-5.17603	-40.83713
4	-77.81119	51.90549	19.92995	-6.62722
CONSTANT	-0.30101	-0.82054	-2.73331	2.00864

3B

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-26.51096	22.39592	38.45479	-22.36671	-11.05051	-32.94228	-9.29468	-88.51259	-1.76048
2	40.63164	-86.69104	-86.67162	100.08820	-5.53413	34.59193	-7.63677	141.07358	15.23123
3	-53.19635	244.60162	52.21234	-97.24414	23.40027	13.27932	50.47656	2.47215	-9.85208
4	62.93085	-269.90820	-38.98486	-155.10883	39.15274	-25.61502	-42.86617	-69.79150	-3.72472
5	-23.03149	74.50812	110.01804	227.04178	-39.40140	81.68188	6.03347	3.27265	-45.20909
6	39.35756	43.25755	-121.99699	-76.52486	-145.41943	-68.63553	-22.00063	-21.45813	42.08537
7	-26.09561	10.12336	-10.17072	51.56844	139.35270	-74.17036	67.15875	16.45313	19.24303
8	-5.70519	-135.69531	122.13107	-77.00688	24.24606	44.62534	-51.49239	-15.59311	-7.51425
10	-17.42090	154.23271	-33.96547	128.41000	97.73694	-15.08707	-8.23672	41.14317	11.64317
11	29.66428	-20.66782	-175.00259	-23.40077	-53.95297	82.32759	-0.56392	42.42320	4.90095
12	-39.34775	-27.76772	147.37318	-42.64731	-165.44789	-17.62921	35.61168	-41.09195	-11.63195
14	-13.24597	-3.16918	-26.07878	-63.65485	110.71400	1.19541	36.63254	-5.75374	7.08943
15	13.21702	46.52840	74.29105	-58.70990	-48.04826	44.40660	-81.28975	-3.58709	2.41081
16	40.88922	-81.09996	-53.35829	83.14383	55.30350	-84.14719	0.28594	0.67052	-41.32782
17	-1.60138	40.86546	11.17027	9.00626	-11.42481	16.14439	-1.84008	14.97418	-23.07927
18	-10.33881	-37.71613	61.95764	74.51051	10.27122	-26.69461	-1.97119	73.70244	34.19229
19	-25.06126	54.10378	-40.57851	-2.76248	-20.31409	65.79247	27.63043	-37.33263	28.09668
21	30.81013	-10.42012	-20.57304	-46.44299	-15.88870	-24.48672	23.39287	-72.86440	-11.20853
22	-14.98851	-15.28206	-18.34480	10.27224	11.38960	-7.53079	-6.40236	-0.42254	-13.04273
23	-5.28657	1.52674	31.04645	-41.02347	-31.37582	10.83188	21.76950	39.28593	-32.19972
24	38.81044	-12.85131	-38.99786	41.37561	39.06769	-22.23364	-41.50580	-32.17651	42.26775
25	-33.99887	15.09447	61.44743	-36.84285	-20.94334	16.84184	-18.15326	48.27811	3.64325
26	-11.83214	-27.81244	-49.39668	-6.55368	-0.83506	-3.03564	24.78156	-47.83757	40.35799
27	11.56311	18.43127	48.26959	-50.07312	-3.89322	-12.93156	-79.27562	62.92636	-21.14221
28	-18.32834	-12.63348	-70.81020	43.67096	30.51830	-12.65648	65.35342	-52.73628	-42.15175
29	5.62045	29.86539	18.43097	39.91049	25.22800	2.36902	-41.46136	0.89097	-16.07188
30	10.60231	-13.70367	9.79731	-8.89539	-36.31007	13.39175	52.86238	1.81544	31.65096
CONSTANT	-0.60229	-0.26952	-0.04104	-0.50599	0.69718	0.41504	1.10761	-0.12982	-1.17918

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	-9.90823	-7.11151	4.14904	-4.83210	9.41161	-3.68672	-1.85600	29.57074	-26.89993
2	2.98690	42.23335	5.95405	7.73243	12.33889	-2.29951	-0.57844	-36.36060	4.08773
3	-12.60715	-19.12892	-34.59721	14.40400	-18.53508	3.88951	18.86349	16.49620	56.23505
4	33.52980	-22.99417	4.94094	-0.87600	-1.46108	0.02016	3.04868	4.13229	-6.33003
5	-24.10789	-0.86531	13.89680	-8.38252	17.31754	-6.27870	-15.92605	-22.18089	-35.60733
6	-7.73046	-13.31851	42.91115	6.16528	2.01226	1.56726	-10.54049	-1.56264	-2.90967
7	-0.78323	5.95352	9.40350	-3.76931	3.26098	-0.24302	7.60672	2.91325	-0.61513
8	16.54591	3.74449	-48.79187	6.98217	-6.61957	-1.69865	-4.37497	-10.08166	22.78758
10	7.91253	-14.14532	-30.51979	-28.32359	-8.48236	-0.44025	21.09348	24.80835	12.65812
11	19.14972	-13.28506	7.62591	-2.26824	-12.88222	5.03566	12.30520	11.54770	25.91931
12	0.29476	17.96837	11.58690	-5.01545	14.02259	-4.00961	-16.39937	-13.93398	-45.26683
14	-50.56744	29.93112	65.44867	-13.50931	16.81676	-2.68817	-31.28288	3.36129	-21.52562
15	27.77652	7.58272	-6.39125	14.79353	-12.03331	3.05929	-5.24373	-33.33064	12.66344
16	-10.48602	2.83017	-44.23471	6.78260	-18.28413	4.68725	33.39667	20.04561	17.61917
17	-20.19580	-5.06481	9.37729	3.47301	-6.33949	4.01776	19.30745	24.43140	3.28325
18	9.07282	-16.60306	7.68635	4.12096	0.44133	0.12378	4.45413	-7.46722	8.90309
19	15.21699	-0.13266	-1.53272	4.88437	10.36033	-4.75325	-22.19037	-16.75471	-18.23587
21	0.68805	6.19091	-30.40462	-8.26992	-2.04008	-1.21075	2.50314	8.42003	-4.15675
22	28.37202	14.20509	-3.86815	3.47199	5.36468	-0.75553	-5.95401	1.57303	10.48631
23	-14.95599	9.56257	12.17206	-9.55617	2.22780	-1.31551	-14.64515	0.28237	-6.16645
24	17.57637	-12.02919	21.96304	-3.90257	-2.31087	0.10338	-8.89404	13.14629	1.49571
25	7.76967	-3.69573	9.89757	5.74609	4.35912	-0.44850	7.16403	-16.74699	-23.88475
26	-64.56651	-25.39214	-16.31107	0.16907	-12.66234	2.56981	12.07008	24.44490	45.89806
27	14.91793	15.26258	7.59385	-3.73231	12.75472	-4.55929	-12.90245	-24.34543	-31.01154
28	0.46522	-25.71996	-26.66141	-4.52168	2.21621	-3.31949	3.56291	16.48384	-28.41887
29	-21.21712	8.05147	8.06982	14.02494	-2.05965	1.36906	10.45869	-12.37200	10.47511
30	33.36357	16.81023	2.33021	1.78636	-9.51501	1.84125	-3.27590	-6.17169	19.84300
CONSTANT	-0.30678	0.30098	-0.29354	2.10555	1.72508	2.43797	1.07062	-0.46644	0.37525

ORIGINAL VARIABLE	19	20	21	22	23	24	25	26	27
1	-11.84674	-14.09505	-22.06802	12.46428	-41.54716	22.26050	41.75642	1.26563	44.72670
2	-3.69571	44.25371	23.61493	-42.25543	97.66588	18.24667	-83.73056	-5.84369	-124.62117
3	41.33356	-35.59511	-21.14189	47.27451	-90.05762	-93.90764	34.28690	-36.32100	220.21167
4	13.62183	-35.48218	43.86110	50.51454	-23.62961	6.14847	40.40646	77.84096	-308.85571
5	-34.41110	38.19897	-19.94678	-32.48854	131.37413	-1.77495	8.71322	-72.74289	280.74194
6	-38.99055	13.28446	-45.18857	6.99836	-99.24951	-6.32464	-23.48094	120.01945	-61.72833
7	-23.60660	-6.78131	39.73578	-56.49179	23.75041	28.49994	67.07948	-218.78221	-191.58298
8	71.62009	-22.28276	-42.45837	-73.01611	-7.99354	66.66208	-152.66246	135.51315	169.41312
10	-0.97243	26.53809	72.15137	37.20001	74.10033	-28.97354	94.72375	184.37270	-54.22725
11	2.95995	-11.98909	13.89838	45.29483	-65.57719	104.43109	28.32507	-201.99843	94.76682
12	-24.12320	6.73675	-11.85738	-12.45417	-34.13290	-156.72302	-94.93864	-2.38673	-94.75308
14	-55.66321	26.78693	-7.98038	12.94627	51.64026	-45.16660	12.21363	1.16447	55.08562
15	67.08739	-13.82715	-59.69035	50.27495	37.45415	95.61955	-39.67686	-62.31792	-117.03314
16	32.06923	-47.84047	23.81560	-21.72185	-19.38133	-17.34367	99.16586	68.00601	89.42577
17	-37.64600	6.46049	-11.27811	2.91185	-9.45729	-2.91416	-5.11256	31.20593	21.75813
18	-26.56778	40.91035	30.37650	46.78728	-68.96620	54.56787	-26.39659	17.40308	-9.80471
19	-11.07224	15.78823	-59.20851	-37.32672	-25.77348	-20.98666	2.03772	-13.07213	-11.21414
21	23.94768	-20.97673	74.69910	-30.56766	52.80135	-6.23148	-8.36567	-18.37584	8.93409
22	-11.67104	-38.58385	-16.85747	4.47294	25.99915	19.05983	-1.77567	-26.72159	9.05734
23	29.52158	11.53298	-4.73428	-10.09946	-4.02558	11.11363	45.55850	38.04115	-4.01081
24	27.83232	5.73734	-7.13806	27.18602	5.19404	-58.35724	-51.54105	-31.63515	-19.58736
25	-25.30708	-23.06714	-10.91283	-3.88536	-6.08786	25.69856	40.65520	14.30042	45.37712
26	-10.11613	-24.57596	-4.73327	-0.71631	31.05467	-53.70534	17.20215	-38.43657	-53.79991
27	1.67769	63.40413	5.78651	-22.87462	-5.92263	8.38895	26.21176	22.19887	16.17397
28	-14.55660	-18.82623	-0.30466	8.17418	14.36054	21.38576	-74.19455	0.83651	0.76337
29	-12.00275	-18.93478	7.43455	-27.32204	-57.87666	9.59657	-5.21248	12.07777	-26.00743
30	28.38739	34.06873	9.90792	22.83061	14.42760	0.44098	9.75656	3.03496	21.80913
CONSTANT	0.59273	0.52870	-0.80957	-0.01108	-0.15110	-0.42694	-0.15084	0.88386	-0.11524

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	11.46001	82.60681	-92.45206	-55.57291	-5.92779	2.72857	7.17861	-3.03260	-6.76725
2	-104.17101	-440.03589	181.71051	14.43358	-17.96622	-3.34022	-7.41005	4.64651	0.76343
3	95.24422	405.21680	-48.88129	59.85706	28.37450	8.44532	-0.04298	-1.25371	0.07055
4	-60.13794	-19.67259	-86.61913	29.32947	31.78987	11.04058	5.89491	-4.54646	-0.34185
5	66.98120	-10.14716	48.55243	-28.76862	-23.36963	-3.29867	6.85091	-1.32274	-4.72483
6	130.61197	466.00317	-42.53204	-53.72554	23.44464	-2.28877	-10.15728	9.11660	-1.25515
7	-106.24593	-473.70337	-106.24207	-17.79919	-31.39417	7.33331	-0.79139	-2.87289	5.37485
8	27.38103	1.61125	134.83620	-42.73416	-40.46761	-9.03864	3.90025	-2.11026	-0.24234
9	-62.20146	35.09164	-72.07849	75.63995	16.31329	-21.83167	-10.92895	7.90434	-0.15076
10	8.88139	152.76987	110.55687	7.71098	4.25137	8.98251	4.48602	-3.73025	1.86518
11	40.80003	-36.90271	-11.44413	-80.58704	33.99178	3.26210	-0.90571	-0.28634	2.08934
13	-24.76065	46.13559	-18.21140	71.81909	-52.77667	5.31608	-4.44391	-1.15552	0.69826
14	10.59968	-22.49619	9.02071	-29.89240	29.88651	4.99423	-1.36381	-2.29178	1.49771
15	-5.75955	1.31164	13.64246	-6.31322	-23.47990	11.28635	6.07220	-3.18570	-3.05949
CONSTANT	-27.88623	-187.07150	-19.31693	59.62117	28.08800	-23.74202	1.39569	3.50598	3.19832

ORIGINAL VARIABLE	10	11	12	13	14
1	-0.55934	-1.92485	-2.37673	29.33467	-23.53754
2	-0.89235	10.19323	-13.93162	86.98293	-20.66490
3	7.09069	4.10790	69.64421	-93.11273	20.87372
4	6.72469	-14.03565	30.34895	-45.14471	155.01146
5	-4.08458	3.95083	-85.94627	-6.29794	-78.80441
6	-4.22701	-12.75573	-7.40904	-180.22427	184.53865
7	10.66750	-4.07394	-44.49957	93.46231	-220.66429
8	-1.36626	-18.08699	-14.77107	151.96169	-203.63991
9	-14.26277	23.57808	80.15977	11.79250	133.10638
10	7.99484	6.73248	-31.50374	23.65277	218.22919
11	2.75572	0.21894	1.59593	-144.54079	-65.02353
13	3.28012	4.33170	-10.54646	53.84933	89.03610
14	3.49715	-3.48481	-3.26835	-14.57317	-31.77875
15	5.73165	-10.59753	-8.37951	6.14826	-16.86354
CONSTANT	-18.76877	11.27676	43.40511	27.01810	-141.01912

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	36.18071	-167.52281	-149.93874	32.62459	96.65594	-3.98319	93.86450	17.92595	3.19694
2	-72.87320	266.39990	438.39185	-129.63994	-46.73285	5.58548	-81.61725	-51.17145	-4.94213
3	64.74901	-67.94971	-541.98242	112.88289	-59.28534	-70.13477	-33.37671	-15.09573	-10.88813
4	-30.19287	-39.18527	283.82666	10.62863	17.34030	60.45937	24.61909	2.93377	-2.42085
5	18.94380	-17.90401	-38.10222	-16.14384	72.55862	6.33488	32.24431	9.70271	11.77807
6	-14.50445	20.57660	2.99160	-8.47005	-62.89897	-7.62203	-27.90833	22.74162	-0.49955
7	-7.57707	63.30171	11.23518	108.88399	8.66585	-77.30124	-10.36130	-0.29653	-0.42353
8	98.56953	-478.16187	41.35094	-285.66724	-24.04646	38.83522	-16.92151	-25.61960	-2.72490
9	-93.51048	516.29272	-68.91788	141.41728	19.04210	64.74121	-9.27391	22.46863	-9.69913
10	63.13783	-27.38354	49.46140	102.33385	32.58424	80.91350	-22.39709	-7.64015	-7.24337
11	-82.30154	13.76219	8.93650	-71.74390	-67.28506	-68.75482	35.86067	11.57521	14.00990
12	-124.48325	526.36426	-65.92984	144.53650	109.88599	-20.28767	15.81976	39.02458	-3.55684
13	110.68712	-638.71094	54.88568	25.83098	-111.64748	-58.65273	15.85816	-8.42099	0.39368
14	-44.83705	111.09180	-102.49028	-200.17284	-157.89780	-85.13033	-1.87413	-13.57065	7.96876
15	92.83554	-72.76958	-8.30855	154.23096	145.17390	77.50540	-18.31934	-16.85872	8.47767
16	-26.78310	231.13605	48.28856	-100.46352	34.31274	42.05441	26.56473	2.34041	-7.87094
17	-17.92657	-223.82646	149.02016	55.00659	255.88338	-61.02608	-12.94223	19.41127	-8.89715
18	-19.30507	130.05013	-53.31517	-67.45160	-133.90459	24.36842	-9.04127	17.55775	3.85825
19	17.29756	123.93533	-95.93285	24.09496	-141.78658	43.97401	39.76044	-6.44102	3.67726
20	-6.38248	-61.87479	43.59325	-10.80410	70.02321	-18.71506	-12.82319	4.70389	-8.07242
21	1.40840	-0.49995	3.96017	-5.54401	-32.69606	-18.64458	7.15987	-5.40016	-6.34598
CONSTANT	37.15776	-207.62759	-14.55158	-15.30949	-11.38602	43.66106	-30.76114	-28.13515	17.41200

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	-1.87807	-0.78745	-0.90861	-0.69380	-6.85440	-11.09256	-14.83075	65.48863	74.38078
2	-1.95424	2.92793	0.75282	-0.28274	-0.68386	-0.91027	-13.72615	-37.42099	-150.01126
3	3.62088	-0.00142	-0.87283	-1.11767	-2.34263	11.02950	2.22755	-28.68970	27.55731
4	-4.05657	-0.11095	0.72909	-3.15710	0.97887	-8.22039	12.68623	-15.48570	69.19601
5	-6.94777	-2.81610	-2.39177	4.50196	5.88269	-3.16338	22.49728	10.80742	-18.24287
6	3.75990	0.14634	-1.66737	2.74006	-2.72821	12.46913	-19.50949	13.75889	-1.60551
7	3.16688	0.20288	-3.14785	5.32278	-7.52746	7.54005	7.87594	5.26161	13.05987
8	-5.55048	2.30401	-0.97554	-0.48729	2.69583	-9.36165	-1.70371	-13.82875	-76.13858
9	6.33686	1.57868	1.07517	-5.69370	-2.76461	9.04551	18.73857	1.50169	41.15819
10	3.15503	2.25544	1.43662	-3.33059	1.23141	10.18464	22.09456	22.95531	-32.34860
11	4.80779	-3.22882	-2.55501	7.37372	-0.52452	1.31444	-32.64519	-40.76053	28.01453
12	-4.43842	0.53205	-3.57670	0.82678	2.80297	-16.65312	9.70797	34.78943	115.55632
13	-0.43741	0.20768	0.27039	-4.30783	4.95301	1.16195	-15.06253	-11.81936	-53.56172
14	3.88076	1.50766	0.76413	-0.15177	10.52370	7.29884	-11.35194	-33.08408	7.15512
15	-10.44093	-0.24053	-0.48204	2.54626	-0.73366	-15.58416	17.11426	28.97292	-25.45073
16	2.74972	-1.17916	1.14725	-7.08791	-3.80483	7.12650	-2.26632	-14.93342	14.30074
17	1.28869	0.41267	2.01666	-9.01232	5.18607	10.65975	11.39129	28.15343	84.76489
18	-0.70333	-1.97796	-1.82129	5.73555	-15.91531	-11.92648	-6.28015	13.90992	-41.05254
19	-9.54863	0.81821	0.94690	2.74273	1.30316	-14.22965	9.37699	-10.73058	-43.28554
20	4.39363	2.67276	0.91253	-3.82909	2.99212	13.52690	-7.32189	-2.56616	16.46602
21	3.96257	2.25283	1.00148	-1.67196	6.03162	9.43034	9.83485	-3.95013	16.74434
CONSTANT	1.15448	-5.84460	3.44200	7.35120	-4.16011	-8.56249	-24.34923	-7.68267	-66.82359

ORIGINAL VARIABLE	19	20	21
1	2.71631	109.00343	58.09414
2	-48.96214	-140.12233	-92.06480
3	125.49315	7.21448	19.87869
4	-75.61436	19.81923	-1.56085
5	-1.53000	25.42534	31.33287
6	1.49976	-18.76796	-20.24127
7	11.87630	15.10456	29.40338
8	-99.02539	51.52040	7.99030
9	34.96767	-113.65675	-12.91726
10	32.99309	38.20442	-133.28479
11	40.26170	-19.06444	45.16675
12	123.57472	-53.57785	-208.92363
13	8.39086	52.33549	226.63832
14	-5.81354	101.78526	292.40210
15	-134.97946	-41.88068	-158.60442
16	-43.15361	115.44949	-181.85655
17	-75.10132	-270.42334	-135.89439
18	121.43089	110.32872	96.92241
19	34.66568	132.37105	2.64324
20	-19.78851	-46.86760	-4.56596
21	-6.92355	-12.15306	2.05358
CONSTANT	-25.31554	-61.10419	137.43719

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	83.92435	-149.62193	-39.69595	-2.44873	-11.38941	-23.04907
2	-40.14754	352.15845	75.25060	-2.18936	8.05894	297.58154
3	-66.99355	-189.01465	-47.85522	-5.91664	-6.87968	-291.63110
4	-86.92351	-256.12964	-282.54956	11.08341	36.07759	-381.30566
5	184.63309	124.76787	303.94434	-9.13206	-14.36306	403.75073
6	-90.28299	27.51274	-241.25833	13.16042	4.76395	-165.33443
CONSTANT	14.23428	92.82466	233.78658	-7.29605	-16.38535	158.83206

3F

E-24

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-47.79707	231.59956	-162.75621	-69.59151	-37.46169	-12.29838	-2.02608	-1.36322	11.03191
2	121.34259	-694.42627	276.45776	180.44876	66.69714	-12.90931	-0.41991	-7.12621	93.72420
3	-136.42149	690.14380	-59.06017	58.38963	10.52841	6.38674	0.00328	5.23421	-42.75546
4	59.93108	-225.60391	-63.46138	-160.87067	-38.18608	10.79123	-6.27052	7.63437	-50.17844
5	-80.66386	-107.49274	-140.35660	54.57790	38.85114	-7.12294	2.73845	-5.36809	-6.67256
6	-13.01024	431.05371	230.21956	-41.24583	-49.99402	4.71129	3.23233	8.18000	-30.74686
7	134.82179	-398.83325	-20.72107	-7.47120	32.37636	-6.01280	3.39826	-5.59244	36.35448
8	149.25002	-465.21655	-115.64838	-8.76664	251.41281	9.62741	-0.77657	4.86535	157.07893
9	-286.41821	609.77197	-103.54454	23.28938	-289.11108	14.92173	0.09880	14.09116	-204.65060
10	152.06638	-338.64917	83.54535	-75.15417	222.02380	-13.85676	1.10037	-20.82683	147.78694
CONSTANT	-53.10910	268.91138	69.32777	49.99373	-208.15627	-0.80244	-4.52564	4.13824	-103.40395

3G

ORIGINAL VARIABLE	10
1	-5.78221
2	-147.65250
3	268.29541
4	-122.33867
5	9.63222
6	-245.61249
7	255.49002
8	314.70996
9	-301.16260
10	52.04353
CONSTANT	-81.68045

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	-14.56983	-59.76852	-11.13872	-7.83349	-12.38639	28.98840
2	35.53233	95.34070	-24.11508	-9.73856	-7.60067	-48.90399
3	-34.64034	-94.83104	76.51050	1.79258	0.54888	-0.86367
4	22.94633	19.65805	-37.43980	8.39737	12.84972	34.08530
5	-28.39287	-0.53465	-9.01533	-3.50729	-2.29621	-0.18930
6	21.91838	-3.08006	6.03418	11.06929	-2.75109	-9.12150
CONSTANT	0.89204	-0.72344	-0.49932	-1.78763	1.36043	-0.88010

4A

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4
1	-3.61773	19.38852	64.41672	13.03142
2	75.41223	-42.85928	-148.00346	28.00729
3	-153.30495	42.20767	109.72781	-5.25571
4	82.71310	-25.91089	-20.80423	-29.27663
CONSTANT	0.86905	2.37329	-0.38181	0.27340

4B

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	13.02051	41.68505	38.39436	9.16318	-18.90648	-25.69800	-13.58739	-21.70505	-10.77443
2	0.92285	-73.37886	-132.01416	0.17778	80.81421	22.35132	28.74802	22.03577	32.15442
3	-59.73880	70.37212	232.45802	-19.71291	-204.85623	2.04178	-60.78210	-7.63693	-45.39198
4	42.29166	-88.91508	-189.75633	27.39351	89.14107	-21.30669	106.32219	38.90424	8.97806
5	2.95534	116.27739	49.01491	-88.16173	166.70558	102.41525	-98.25540	-40.87160	8.16819
6	5.69385	-72.55716	102.57375	80.77875	-89.01024	-103.83202	86.62822	43.49684	53.40477
7	32.66658	-44.05046	-315.19336	28.17526	-183.42412	9.24302	-45.84053	-31.82854	-65.18147
8	-49.69749	58.13460	278.98413	-41.06030	190.09766	-93.65056	-100.34319	-5.56972	50.58907
9	23.94904	-8.26445	-8.77439	23.45293	9.83397	93.55687	144.08833	-81.67706	-2.11677
10	-5.22070	22.34550	-74.59619	-16.55141	74.04227	68.15755	-87.89839	59.05545	-31.84288
11	-13.41375	-51.94849	5.06060	-52.94675	-195.73932	20.41663	64.91252	81.73126	-68.56621
12	-33.14467	32.32620	-6.38835	54.70265	52.00029	-77.04143	-1.35481	-32.80333	141.27113
13	11.31078	0.46012	59.51535	5.50713	-2.48391	1.88100	29.20515	-37.23924	-28.17831
14	7.28931	-5.59408	-20.61935	-92.45139	22.67950	-72.39943	-74.52818	36.44449	-83.69786
15	-0.23545	1.42153	-36.68253	263.37354	21.95909	49.57820	-41.88185	-35.53171	-17.21719
16	32.14757	7.04149	0.96297	-204.07516	-13.57760	36.31384	56.25275	12.48543	58.09399
17	8.85788	9.44464	28.54417	-7.92162	8.36982	-6.80078	9.38432	38.35802	-15.37380
18	-30.24959	-6.42566	-31.85121	15.71292	32.79665	-72.89604	103.71167	-41.12244	-70.36368
19	-5.52631	57.55949	103.04222	149.31409	-29.68857	160.54213	-86.92996	21.45023	44.05363
20	-5.23126	-70.15103	-152.53178	-116.00545	10.65662	-170.45908	56.70125	-19.49881	44.48758
21	31.17577	-24.28932	87.34344	-19.71230	-26.35669	78.88089	-86.48433	-3.28194	-3.86378
22	13.58577	29.36642	-38.47833	-18.28799	-8.95146	5.03870	7.37440	-25.34673	-27.66129
23	4.89978	39.25417	82.77343	28.73112	11.02857	14.74305	-21.96397	57.51505	22.06644
24	-34.13501	-84.40773	-89.18823	-17.87759	6.32051	-21.15926	31.68784	-57.15749	0.72496
25	-12.89721	74.69186	59.23514	50.73296	20.64531	-5.91804	-1.89352	47.41061	-32.54599
26	32.30882	6.89561	-70.35873	-62.46254	-52.81477	8.05624	-1.12188	-53.85646	29.85632
27	-30.45995	-11.06457	54.74498	54.12410	56.07123	-47.10875	5.96671	95.53291	10.17447
28	29.37178	-2.33830	2.93703	-49.89474	-24.60329	51.69704	-10.19375	-98.67303	-30.16068
29	-10.47074	-20.70601	-60.30766	19.76491	-15.77568	0.46815	30.62929	74.96512	19.32126
30	-4.61419	-2.23847	41.70674	-2.83227	12.40696	-8.97478	-28.37970	-37.85596	9.59229
CONSTANT	-0.73071	0.27895	0.12392	-0.43604	-0.16043	0.29080	-0.12321	0.11294	0.01309

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	21.64745	-23.86174	-28.20552	17.64180	-5.04660	19.05898	0.11181	-5.66268	-2.35494
2	-6.71007	-7.94428	48.18172	-9.33964	13.20145	-13.20086	2.73394	0.03380	-0.03526
3	2.67302	73.50995	-12.99337	-6.43410	-21.16899	-16.15805	4.59890	2.71062	2.20230
4	-72.38197	35.14052	-60.74838	1.60315	16.75233	26.14626	3.04560	4.43911	-3.04257
5	6.22110	-78.62610	48.92271	-0.97553	-11.68871	-4.77128	25.23119	6.56501	-5.25271
6	53.19394	-17.36032	19.30685	-1.57376	2.58562	-1.16876	-0.58895	6.38914	-1.23906
7	-11.82442	-6.67952	-2.04585	-2.10777	8.55814	-10.79831	-3.98827	3.31885	0.88613
8	55.52132	3.63834	5.88634	-24.21968	-2.71116	-8.26408	-5.52802	1.47601	0.59520
9	-63.51595	5.38781	-31.76749	22.25836	7.21414	-7.33274	-8.43050	-2.19265	0.92172
10	80.37143	40.91335	25.69095	-4.43878	-1.16018	-7.81341	-2.58839	-7.93198	2.99745
11	-26.85556	-40.28244	-55.63481	1.76486	-4.66082	14.95251	-11.61150	-6.62288	0.73194
12	-72.38536	-9.44743	54.26799	23.28947	26.86877	4.00184	9.15146	-2.63821	-2.25098
13	49.88925	15.36537	12.24783	-7.68203	-23.94421	-3.62792	-13.95575	3.35168	1.51509
14	-57.71942	-10.00449	-1.61436	16.32796	-27.21414	-25.94804	-9.28101	11.41230	-0.84772
15	24.23895	36.64491	-35.23671	-10.33605	12.44277	36.47701	-3.74634	-2.94628	0.87872
16	10.73565	0.81850	10.66294	-37.71165	-7.82060	29.27084	6.85981	6.11689	-5.65145
17	14.49282	7.51151	30.26329	20.51561	19.28923	4.58816	-1.75717	-6.39959	1.80138
18	-27.55682	-1.01885	-40.74483	-12.83753	36.49638	-13.10154	0.38759	-1.43136	1.12115
19	-18.98729	0.58090	24.16435	16.45102	12.08066	-18.59236	-9.52468	0.92636	3.12547
20	25.98157	-11.03056	9.09393	-3.61529	-48.93877	-29.80272	3.23564	-4.08543	0.76562
21	-0.12504	-28.35300	-38.67387	19.73781	25.44588	16.61916	10.69149	-0.69329	-0.67728
22	7.01925	-5.08980	33.27734	-5.78258	-6.18638	-10.32305	6.97391	-3.87303	0.47553
23	-12.76542	3.93526	12.66809	-28.07031	-54.23613	7.16492	5.65172	-7.91904	-0.20700
24	15.71015	16.40607	-30.25502	-10.85102	18.59003	24.14119	-11.42104	-1.01468	3.09060
25	-24.25108	-11.58061	51.97827	18.17888	-7.44273	12.97763	11.04240	1.87973	-6.02520
26	-15.51073	49.10550	-9.07575	43.31813	2.02554	-3.83637	-8.38695	6.89996	-1.75823
27	40.32867	16.16786	-23.98074	-38.50282	6.92620	-3.58387	4.44245	-3.26821	0.82688
28	30.15257	-39.01299	-8.02679	29.78589	-11.02780	11.93281	10.48907	6.00013	-3.92669
29	7.83934	-21.55014	-6.88626	4.26856	3.34331	-18.55707	-4.95063	0.78423	-0.29847
30	-38.37125	4.78673	-3.70222	-31.08362	26.15860	-10.76532	-7.38505	-4.72166	1.13337
CONSTANT	0.52701	0.10645	-0.48731	0.02027	-0.11842	0.46673	0.38448	0.37409	2.33972

4C

ORIGINAL VARIABLE	19	20	21	22	23	24	25	26	27
1	-22.88837	8.89766	-10.73339	21.98593	-10.52972	-52.28851	41.17783	16.12872	9.71694
2	-3.65302	-20.55800	4.99886	-1.56614	-6.25457	120.93755	-74.31726	-19.45334	-26.84592
3	10.51337	-17.85178	30.31303	-29.96608	26.99615	-56.04123	42.13708	-49.23262	27.90964
4	9.27625	0.01944	-35.45520	-47.93416	36.84828	-67.49185	5.41550	92.60515	-10.56090
5	4.27983	22.29161	19.98775	30.10277	-40.58246	67.81284	-11.09773	-61.14232	-5.49333
6	1.91438	-13.77886	-30.44778	17.41786	-35.85762	-0.55933	3.66732	2.37295	101.53571
7	16.24162	11.36133	-0.98960	9.10357	1.59831	-59.91176	0.20674	-20.52646	-73.04187
8	-7.88313	7.25893	17.66571	51.06871	0.40043	71.08563	24.33377	43.10385	-190.71205
9	4.49547	16.38966	30.67624	-13.15628	8.50651	-16.75554	-10.84577	125.92276	213.85921
10	-18.47630	-3.72259	-15.48071	16.66336	-7.05955	-4.72170	-43.44707	-139.02443	-3.10075
11	-12.55413	17.81436	-6.62777	-15.53707	78.21164	-77.00523	69.93745	17.80151	-54.45459
12	-5.26392	19.09108	-22.04057	-64.37839	-55.12186	108.33125	-74.20514	-44.66824	11.21358
13	-3.19313	-58.92790	-13.49828	-34.71875	-11.13746	-62.15021	-15.83713	-17.26485	-29.57588
14	38.69867	-6.20490	49.57716	75.22838	1.72121	52.44473	77.99245	-12.35930	64.33195
15	-14.53700	12.23632	17.58949	-38.65027	-12.59550	-37.47348	-22.11807	131.33786	-42.59322
16	-10.08121	-3.36587	-41.74460	27.09879	28.10197	22.35748	-16.08711	-38.39117	8.91323
17	-8.15256	7.22020	38.00626	-8.93426	-23.68570	15.49653	0.73065	-14.19304	6.53352
18	6.52828	29.64337	-42.28821	19.15250	23.73938	-0.16087	-84.28500	-52.11946	-47.92940
19	7.92720	-20.41338	2.58207	-26.45129	-16.98628	14.02226	217.03510	-40.02245	19.07144
20	-4.07553	-10.50238	37.12462	53.34300	40.60725	-20.25874	-126.32974	35.50420	-0.33663
21	2.52591	3.77042	-32.49506	-39.65096	-31.01959	-33.91191	-10.77958	33.95625	21.34409
22	-8.19533	8.88491	-17.28397	-20.01077	20.72545	24.10837	16.51619	45.78961	9.69370
23	-22.34680	0.53976	41.87520	20.53078	25.30780	-25.62679	-34.12842	-26.71387	-20.75934
24	11.11493	-7.52451	-25.71030	-12.41791	-65.49406	31.87393	53.38258	-14.98743	5.01067
25	2.41549	3.31118	-9.58180	22.19707	75.45322	-4.95569	-19.64410	24.64618	7.90995
26	26.75163	-9.92496	0.25048	-0.67894	-112.78267	-29.60446	9.23813	-25.16743	-11.87322
27	-17.13052	0.63108	-21.68658	15.94064	76.69730	-3.86017	-31.59671	33.35701	44.94414
28	12.47767	20.86128	48.23280	-50.93727	0.47614	19.56413	26.54439	-23.28978	-10.51162
29	7.93576	-19.99875	-16.42329	28.42131	-34.75661	53.43546	7.17220	12.29824	-45.04286
30	-8.45749	1.37728	3.28149	-0.21132	16.72836	-48.93164	-20.15114	-18.84639	19.82516
CONSTANT	-0.51495	-0.72861	0.44519	-0.56908	0.28281	0.05699	-0.13295	0.29800	0.38320

ORIGINAL VARIABLE	28	29	30
1	17.62320	75.37973	-3.30741
2	-65.55466	-194.25580	34.93250
3	97.20877	174.77940	-223.08006
4	-11.60645	-24.19717	426.44727
5	-73.46942	-1.35118	-371.95801
6	175.22397	-95.23921	188.28220
7	-266.10132	42.53310	-70.93300
8	111.96913	63.69695	48.17801
9	-49.34227	-5.85346	-5.68959
10	90.53693	78.37590	82.31235
11	52.61473	-261.81421	-192.96895
12	-61.26375	163.97581	93.62762
13	-31.19081	-6.23742	-6.87390
14	-12.77771	-13.89478	4.00130
15	28.34741	5.13256	-34.00491
16	0.47131	-5.25985	36.34557
17	22.30177	16.20073	-6.33107
18	-48.48895	-8.36589	-18.76863
19	-48.57368	-27.87337	87.56781
20	133.13329	24.33107	-146.57011
21	-50.67612	17.62918	78.65036
22	14.35002	-16.49060	-26.51105
23	-38.37555	14.38478	50.94963
24	34.67726	-19.91393	-33.13287
25	-19.99600	25.69518	-11.88585
26	18.33337	-34.93140	28.15382
27	-59.04761	12.21044	-27.09259
28	26.15549	-36.71158	38.32262
29	20.09210	62.66516	-18.16853
30	-4.61167	-24.37888	-0.73724
CONSTANT	0.03418	-0.10625	0.01129

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-11.97117	-13.94923	-37.09552	-33.05164	-45.48520	-71.49069	1.50788	2.89149	-3.53788
2	10.05957	67.79228	315.75000	-11.44563	22.25943	32.06528	17.20639	5.93914	-0.05977
3	8.40436	-60.77814	-323.73633	54.85178	73.62262	53.34320	-27.51060	-14.22627	-4.85521
4	-2.27733	-107.59691	-3.69448	-106.88593	-22.62621	4.55130	-1.93732	8.77172	0.99502
5	-2.36872	112.09456	24.14743	82.24112	-17.66519	5.52066	11.69215	-2.31559	-0.23422
6	12.80567	-61.93002	-379.08276	42.81197	0.50273	-24.22723	15.57113	15.89074	-1.73617
7	-22.94780	50.02942	423.02002	-70.99416	-52.02631	-14.31404	16.28038	-10.31475	-0.67397
8	-18.33148	170.29549	8.13081	84.90186	29.17978	-26.87448	-19.68321	-0.92184	-0.10609
9	19.98642	-165.15608	-34.71942	-63.71371	-23.42482	-8.88091	-25.18925	-3.50852	-1.07907
10	10.34593	3.83515	-149.93480	12.58159	-36.17680	-3.37374	13.11657	13.12966	5.25561
11	5.02652	-71.69554	6.16149	15.78321	36.78415	-5.98647	2.03758	4.88469	1.23641
12	-6.23727	58.86560	6.88099	-7.16578	20.14265	9.44607	19.72809	-11.19762	-1.04887
13	4.66539	5.75365	-2.80268	-6.60207	-29.99844	15.52584	6.40508	9.96678	1.78708
15	-11.47819	2.91896	5.56804	7.08402	7.20651	-3.43528	-4.44778	11.03166	-0.43854
CONSTANT	6.14115	9.84097	139.90244	-2.15380	40.06248	42.56786	-26.85104	-30.00836	2.07419

ORIGINAL VARIABLE	10	11	12	13	14
1	-5.02053	-6.09275	52.24194	37.00691	-25.39685
2	3.44131	1.93593	-96.21201	-78.69070	50.16510
3	5.61572	-10.27523	59.79895	-23.33177	-19.43706
4	-1.87568	9.15025	0.04018	14.64839	41.65451
5	0.35066	-2.28802	-26.12851	52.03900	-29.53333
6	-0.54546	15.74015	-28.00229	11.17366	15.11390
7	-4.36781	0.84363	61.22018	127.67308	-43.97816
8	0.41572	-3.00626	-1.75433	-27.10010	-151.68008
9	1.97374	-4.67872	26.41496	-88.30145	123.39032
10	-11.26563	16.62985	-68.34035	-95.70721	41.20644
11	-1.92347	2.23296	-6.93035	18.18297	122.87138
12	1.25285	-10.21406	-11.27867	44.32048	-96.51016
13	-3.59286	7.89536	11.98043	-11.15461	-8.42497
15	-2.23815	6.70229	3.31949	-2.57896	10.20350
CONSTANT	17.04092	-24.40797	23.47830	21.56033	-29.39919

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	-23.81253	-19.28812	-1.71043	11.64727	-36.62662	-26.13918	4.14369	-24.16936	-6.14254
2	24.67142	30.88739	4.92574	-86.23338	155.34134	4.69406	-50.10658	-3.38182	0.85796
3	-5.35781	-29.75920	7.78738	159.89902	-244.31093	27.10721	18.11955	27.49196	17.06039
4	4.92343	18.12131	-8.24324	-82.83098	135.25581	-7.69737	37.16035	-4.26974	-5.54875
5	-22.78751	0.12866	-4.89269	-18.05046	-6.99497	-12.17461	-35.03795	-19.29509	-4.10883
6	20.10503	-1.68177	5.28497	18.47078	-0.92610	9.47111	24.01855	19.75525	-2.08174
7	-8.41971	17.02875	-43.72386	-33.96442	7.28830	35.43382	58.13979	-25.56923	-21.39439
8	-8.07904	-78.09996	340.17212	-20.23790	-48.87117	1.85399	-20.71303	5.17969	-0.83195
9	22.82184	73.63310	-343.53931	70.33925	62.68759	-81.17175	-45.31454	44.30986	31.25008
10	-16.21965	108.90071	-29.40868	-101.81451	-52.04422	19.80775	3.46495	8.43592	1.48130
11	18.35254	-112.61629	48.06969	70.69588	33.68643	21.99068	-12.06330	-16.99509	0.88321
12	29.72588	67.38432	-397.65454	81.20525	15.64459	-46.32329	7.58589	-19.62238	-28.85887
13	-37.32919	-63.67236	451.88428	-110.31068	-59.32385	97.59808	11.91732	-13.93145	-4.86550
14	1.13847	-166.45580	29.57828	80.48079	50.14226	-34.41974	28.66310	-0.36035	7.89825
15	-6.01405	162.91237	-74.20154	-43.28490	-32.42216	25.83607	21.18674	16.38988	6.18949
16	14.78239	4.50744	-179.05865	12.50984	41.54675	1.13107	18.62170	-20.95598	-7.14332
17	-7.88338	65.90852	59.97716	22.23703	8.66693	-54.13570	-0.52493	5.42709	-10.00627
18	5.65275	-56.36453	-2.90501	-23.03543	-3.43097	-11.21239	-24.59201	-15.06643	-7.82236
19	10.01083	-4.09414	-54.37866	-7.39624	-15.12929	64.75381	-22.17761	15.49748	-15.98713
20	-4.75845	-0.81985	25.52232	1.07937	5.34846	-24.88583	8.42485	-10.61156	14.97986
21	-5.13120	-3.20744	6.02686	14.15531	3.18095	5.18116	9.19372	20.47588	-9.64562
CONSTANT	-6.05736	-14.52643	160.69418	-14.95282	-18.07326	-21.64293	-44.00838	12.04073	46.71704

ORIGINAL VARIABLE	10	11	12	13	14	15	16	17	18
1	14.36077	8.97154	2.42267	1.31297	3.04889	9.63824	-46.07217	2.59855	35.13525
2	16.09946	-1.70707	-0.35735	1.24153	-0.79050	-0.98644	-16.59294	-4.61066	-72.49118
3	8.56012	-1.14425	-4.73801	0.71632	-2.74807	-22.13838	22.80470	-21.89967	-15.31787
4	-10.06039	0.29084	-4.43594	-0.08311	-8.20220	-13.48228	29.54353	41.51257	47.42297
5	7.26891	-3.37943	9.78479	4.10440	6.44888	31.67430	3.50719	18.69534	-2.72683
6	-26.09357	2.22393	0.24804	-1.96438	-3.71842	-8.74477	-17.58513	-37.75601	2.78167
7	18.64072	-3.29716	1.49960	4.78901	-1.30714	22.57056	-7.06088	9.07540	-53.79895
8	-9.85581	10.28258	-4.14206	-0.05098	-0.31991	-15.31973	-13.38035	2.53214	81.30107
9	-12.44535	-9.11317	-4.64139	0.54372	-1.70979	-8.95255	48.55715	-28.93562	-51.20341
10	0.99463	1.60270	-0.47018	-0.19845	0.39931	-5.32382	-2.35038	12.66969	3.71843
11	-9.73901	2.27843	-2.53554	0.10460	-1.47209	-1.51428	-6.67181	-2.71469	22.39479
12	-10.54944	0.55318	-1.61324	0.72668	4.11160	2.13221	-17.19279	7.85850	13.21085
13	5.83813	-7.18913	1.55546	1.01680	1.19745	3.58426	2.18016	2.51044	-27.02484
14	10.90414	-1.23959	6.61169	1.34600	3.95892	14.24440	-1.80149	14.65571	-12.42068
15	17.18643	-0.51617	3.75337	1.48987	3.95366	4.71905	7.15378	-6.35361	-10.49349
16	-16.97401	1.48270	0.33119	-4.15792	-8.56332	-10.88675	-33.41655	33.73747	54.11740
17	2.73248	-2.20887	2.02315	-0.63808	-0.75330	4.71501	0.51252	-5.35921	-5.97170
18	-9.65260	-1.53660	-3.21636	-0.58964	-2.40818	1.25510	2.63344	-20.42526	12.32942
19	-6.92333	0.81833	-4.23923	-2.71193	-4.13627	-9.17328	-1.75610	-9.95702	8.82386
20	-5.80507	1.27142	0.99472	0.16395	0.44249	4.47787	-4.47423	16.51051	-11.61701
21	-0.08243	0.78692	-3.27613	-1.12530	-1.20390	-7.18097	-2.90125	-5.41853	-1.21264
CONSTANT	22.59804	3.54732	4.94575	-0.39524	9.35388	0.73063	35.51431	-20.04211	-20.24991

ORIGINAL VARIABLE	19	20	21
1	-140.56117	132.93456	36.16841
2	197.51335	-209.75121	-70.55080
3	-30.15785	100.30087	23.03181
4	-40.69637	-6.36328	11.25257
5	-1.93435	22.17195	7.33752
6	4.13033	-29.21748	-8.57042
7	-48.96048	-24.30405	-36.80641
8	87.29118	87.34731	154.09348
9	30.96101	-41.33435	-140.15640
10	-8.06468	13.68628	49.86284
11	-9.20691	-81.70656	-23.24304
12	10.38891	-72.60855	-82.64705
13	-156.58597	11.90813	100.25598
14	12.42794	-15.72352	-190.98331
15	24.66849	136.63670	119.44925
16	91.36037	30.63098	-18.64946
17	3.72787	-35.36269	240.42488
18	-18.69643	-51.44919	-146.39703
19	-1.57278	42.51163	-97.36469
20	0.59623	-14.69142	49.05687
21	3.58294	-3.38118	4.36402
CONSTANT	-16.60030	14.26866	18.24112

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6
1	27.74513	-151.03893	43.04860	16.41406	-19.42830	34.94106
2	-52.78343	306.89893	98.97098	1.04861	6.22087	-164.17783
3	23.93687	-138.82880	-160.41960	-2.32464	9.94726	126.44308
4	81.35690	-305.60693	-268.68164	-13.77579	4.41213	-17.14534
5	-80.36708	176.09633	340.58911	-1.59376	3.01049	49.27216
6	76.61647	-63.11246	-197.13306	11.14804	-5.00210	-121.13078
CONSTANT	-78.28810	178.65840	142.02013	-9.15384	2.33048	91.71164

4F

COEFFICIENTS FOR CANONICAL VARIABLE -

ORIGINAL VARIABLE	1	2	3	4	5	6	7	8	9
1	17.53255	-14.04098	-93.53720	-121.13542	-74.29063	9.33218	3.18116	-30.33501	-9.28426
2	-10.21158	-36.25031	285.98657	312.80493	129.51924	-5.64197	-5.63255	-62.10596	-36.06140
3	-58.47758	90.20232	-317.53320	-277.44409	74.23940	-3.23469	0.84889	17.17123	35.24220
4	51.43674	-39.40150	122.38626	83.43234	-136.99634	1.24676	1.60252	58.64740	4.07143
5	-15.22214	77.55670	36.54294	-16.88104	-19.47098	-11.77306	-7.55158	4.86565	21.40851
6	23.13075	-163.97636	-194.62245	138.24384	62.20271	-9.85387	3.35787	24.26392	-137.20332
7	-13.55835	81.23877	185.60663	-96.59818	-18.10077	2.13329	3.82017	-23.59511	116.40753
8	-64.78357	172.51497	257.23706	-262.87402	-13.02608	21.17409	6.49333	32.94771	-22.48178
9	80.03508	-96.87772	-315.79907	192.93695	-43.73003	7.04869	3.13152	-13.81347	52.19576
10	-70.17216	17.81277	188.19203	-89.51297	15.51685	-13.80581	1.46322	39.91594	-116.63051
CONSTANT	62.04298	-90.06912	-156.50263	135.46617	19.36151	3.17973	-8.93249	-61.01938	87.91862

4G

ORIGINAL VARIABLE	10
1	-32.52664
2	-2.01454
3	47.45395
4	-16.16827
5	-141.13681
6	185.56349
7	-14.11170
8	-65.98613
9	-71.27847
10	66.16762
CONSTANT	44.68681