

NEW MEXICO HYDROCARBON SOURCE
ROCK EVALUATION PROJECT

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SEC. 28 & 32, T31S, R14W
SEC. 5, T32S, R14W
GEOCHEM JOB NO. 4124

Prepared

for

NEW MEXICO BUREAU OF MINES & MINERAL RESOURCES
SOCORRO, NEW MEXICO

by

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CONFIDENTIAL
DECEMBER 1991
REVISED 1-14-92

Geochem lab # 4124 Received 11-12-91 ef

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose				
			petrography	paleontology	petroleum		
					source	reservoir	
	29-1	1581	Chert	x			
	29-2	1582	Ferruginous crust	x			
	29-8	1588	Limestone	x			
	29-10	1590	Limestone	x			
	29-12	1592	Ferruginous crust	x			
25	29-28	1608	Limestone	x			x
	30-4	1632	Limestone	x			
26	30-45	1673	Limestone	x			x
	30-65	1693	Chert	x			
	31-1	1699	Limestone	x			
27	31-49	1747	Limestone	x			x
	31-112	1810	Limestone	x	x		
	32-0	1811	Limestone	x			
	32-2	1813	Dolostone	x			
28	32-3	1814	Limestone	x			x
	32-16	1827	Burrow fill	x			
	32-17	1828	Limestone	x			
	32-34	1845	Limestone	x			
	32-36	1847	Chert	x			
	33-2	1857	Limestone	x	x		
	33-6	1861	Chert	x			
	34-0	1893	Limestone	x			
	34-1	1894	Chert	x			
29	34-29	1922	Limestone	x	x		x
	35-0	1940	Limestone	x			
	35-6	1946	Chert	x			
	36-1	1960	Limestone	x			
	36-2	1961	Chert	x			
	36-3	1962	Limestone	x			
	36-4	1963	Limestone	x	x		
30	37-1	1965	Limestone	x			x
	37-3	1967	Chert	x			
	37-17	1981	Limestone	x			
	37-27	1991	Limestone	x			
	37-37	2001	Limestone	x			
	37-48	2012	Limestone	x	x		
31	37-68	2032	Limestone	x			x
	37-99	2063	Limestone	x			
	37-100	2064	Chaetetids	x			
	37-106	2070	Limestone	x			
	38-7	2078	Limestone	x	x		
	38-8	2079	Chert	x			
32	38-27	2098	Limestone	x			x
	38-29	2100	Chert	x			

Geochem log # 4124 Received 11-12-91 J

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose				
			petrography	paleontology	petroleum source reservoir		
	38-51	2122	Limestone	x	x		
	38-61	2132	Limestone	x			
	38-63	2134	Limestone	x			
	38-64	2135	Limestone	x			
	38-78	2149	Limestone	x			
	39-0	2155	Limestone	x			
	39-9	2164	Limestone	x	x		
	39-17	2172	Chert	x			
33	39-44	2199	Limestone	x			x
	40-0	2231	Limestone	x			
	40-18	2249	Limestone	x			
	40-19	2250	Dolostone	x			
	40-44	2275	Limestone	x	x		
	40-46	2277	Chert	x			
	40-79	2310	Limestone	x	x		
34	40-102	2333	Limestone	x			x
	40-103	2334	Chert	x			
	41-3	2341	Limestone	x			
	41-4	2342	Chert	x			
	41-35	2373	Limestone	x	x		
	41-40	2378	Limestone	x	x		
	41-41	2379	Chert	x			
	41-53	2391	Dolostone	x			
35	41-60	2398	Limestone	x			x
	41-68	2406	Dolostone	x			
	42-0	2416	Limestone	x			
	42-5	2421	Limestone	x	x		
	42-8	2424	Dolostone	x			
	42-22	2438	Chert	x			
36	42-91	2507	Limestone	x	x		x
	42-108	2524	Limestone	x			
	42-109	2525	Chert	x			
	42-127	2543	Limestone	x	x		
	43-0	2550	Limestone	x			
	43-9	2559	Chert	x			
	43-13	2563	Limestone	x	x		
	43-40	2590	Limestone	x	x		
	43-100	2650	Limestone	x	x		
	44-36	2706	Dolostone	x			
37	45-1	2757	Limestone	x	x		x
	45-18	2774	Chert	x			
	45-37	2793	Siltstone	x			
	45-56	2812	Limestone	x	x		
	45-64	2820	Calcite	x			

Geothem Job # 4124 Revised 11-12-91

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose			
			petrography	paleontology	petroleum source reservoir	
45-66	2822	Calcarenite	x			
46-0	2835	Limestone	x	x		
46-5	2840	Limestone	x			
47-1	2930	Limestone	x			
38 47-9	2938	Limestone	x			x
47-38	2967	Limestone	x	x		
48-1	3019	Limestone	x			
48-39	3057	Limestone	x	x		
39 48-53	3071	Mudstone, red	x			
40 49-1	3074	Limestone	x			x
50-0	3141	Limestone	x	x		x
50-9	3150	Limestone	x			
50-21	3162	Limestone	x			
50-31	3172	Limestone	x	x		
51-0	3225	Limestone	x			
51-6	3231	Limestone	x	x		
41 51-55	3280	Limestone	x	x		
52-1	3304	Limestone	x	x		x
52-12	3315	Limestone	x	x		
53-0	3350	Limestone	x	x		
53-69	3419	Limestone	x	x		
53-95	3445	Limestone	x	x		
53S-0	3350	Limestone	x	x		
53S-23	3373	Limestone	x	x		
53S-41	3391	Limestone	x	x		
53S-45	3395	Limestone	x	x		
53S-78	3428	Limestone	x	x		
53S-90	3440	Limestone	x	x		
53S-98	3448	Limestone	x	x		
53S-113	3463	Limestone	x			
53S-128	3478	Limestone	x			
53S-130	3480	Chert	x			
53S-143	3493	Limestone	x	x		
53S-163	3513	Limestone	x	x		
54-0	3515	Limestone	x			
54-1	3516	Chert	x			
42 54-7	3522	Limestone	x			
54-20	3535	Limestone	x			x
54-42	3557	Limestone	x	x		
54-73	3588	Limestone	x			
54-90	3605	Limestone	x			
54-94	3609	Limestone	x			
54-99	3614	Limestone	x			
54-105	3620	Limestone	x	x		

Geochem Job # 4124

Revised 11-12-91 H

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose			
			petrography	paleontology	petroleum	
					source	reservoir
54-111	3626	Limestone	x			
54-127	3642	Limestone	x			
54-131	3646	Chert	x			
54-167	3682	Limestone	x	x		
54-182	3697	Limestone	x			
55-0	3709	Limestone	x			
55-12	3721	Limestone	x	x		
55-22	3731	Limestone	x			
55-28	3737	Limestone	x	x		
55-44	3753	Limestone	x			
55-54	3763	Limestone	x			
043 55-60	3769	Limestone	x			x
55-65	3774	Limestone	x			
55-66	3775	Chert	x			
55-69	3778	Limestone	x	x		
55-93	3802	Limestone	x			
55-100	3809	Limestone	x			
55-112	3821	Limestone	x	x		
56-1	3829	Limestone	x	x		
56-7	3835	Chert	x			
56-12	3840	Limestone	x	x		
56-20	3848	Limestone	x	x		
56-63	3891	Limestone	x			
56-93	3921	Limestone	x	x		
56-100	3928	Limestone	x			
56-109	3937	Limestone	x			
56-110	3938	Chert	x			
56-118	3946	Dolostone	x			
56-127	3955	Limestone	x	x		
57-1	3964	Limestone	x			
57-5	3968	Limestone	x	x		x
57-9	3972	Chert	x			
57-70	4033	Limestone	x			
57-131	4094	Dolostone	x			x
57-150	4113	Limestone	x	x		

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

WELL NAME: NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 API NO.: OUTCROP SAMPLES
 AREA: HIDALGO COUNTY, NEW MEXICO
 LOCATION: SEC.28 & 32,T31S,R14W and SEC.5,T32S,R14W
 GEOCHEM JOB NO.: 4124
 TOTAL DEPTH: 4113 FT. THICKNESS
 INTERVAL SAMPLED:
 TOTAL NUMBER OF SAMPLES: 44

GEOCHEM SAMPLE NUMBER	CLIENT SAMPLE I.D.	STRATIGRAPHIC INTERVAL	ANALYSES				
			TOC	LITHO	ROCK-EVAL	KEROGEN	OTHER
4124-001	NWP 1-9	Paradise Formation (Mississippian)	X	X	X	X	
4124-002	NWP 2-0		X	X	X	X	
4124-003	NWP 3-0	↓ Horquilla Formation (Pennsylvanian-Permian) ↓	X	X	X	X	
4124-004	NWP 3-57		X	X	X	X	
4124-005	NWP 4-13		X	X	X	X	
4124-006	NWP 4-84		X	X	X	X	
4124-007	NWP 5-0		X	X	X	X	
4124-008	NWP 5-41		X	X	X	X	
4124-009	NWP 6-0		X	X	X	X	
4124-010	NWP 7-7		X	X	X	X	
4124-011	NWP 7-44		X	X	X	X	
4124-012	NWP 8-1		X	X	X	X	
4124-013	NWP 9-2		X	X	X	X	
4124-014	NWP 10-6		X	X	X	X	
4124-015	NWP 12-0		X	X	X	X	
4124-016	NWP 12-26		X	X	X	X	
4124-017	NWP 12-144		X	X	X	X	
4124-018	NWP 14-0		X	X	X	X	
4124-019	NWP 17-13a		X	X	X	X	
4124-020	NWP 21-2		X	X	X	X	
4124-021	NWP 22-14		X	X	X	X	
4124-022	NWP 25-1		X	X	X	X	
4124-023	NWP 26-43	X	X	X	X		
4124-024	NWP 27-32	X	X	X	X		
4124-025	NWP 29-28	X	X	X	X		
4124-026	NWP 30-45	X	X	X	X		
4124-027	NWP 31-49	X	X	X	X		
4124-028	NWP 32-3	X	X	X	X		
4124-029	NWP 34-29	X	X	X	X		

NEW MEXICO HYDROCARBON SOURCE ROCK EVALUATION

WELL NAME: NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 API NO.: OUTCROP SAMPLES
 AREA: HIDALGO COUNTY, NW MEXICO
 LOCATION: SEC.28 & 32,T31S,F14W and SEC.5,T32S,R14W
 GEOCHEM JOB NO.: 4124
 TOTAL DEPTH: 4113 FT. THICKNESS
 INTERVAL SAMPLED:
 TOTAL NUMBER OF SAMPLES: 44

GEOCHEM SAMPLE NUMBER	CLIENT I.D. NUMBER	STRATIGRAPHIC INTERVAL	ANALYSES				
			TOC	LITHO	ROCK-EVAL	KEROGEN	OTHER
4124-030	NWP 37-1	Horquilla Formation (Pennsylvanian-Permian) ↓	X	X	X	X	
4124-031	NWP 37-68		X	X	X	X	
4124-032	NWP 38-27		X	X	X	X	
4124-033	NWP 39-44		X	X	X	X	
4124-034	NWP 40-102		X	X	X	X	
4124-035	NWP 41-60		X	X	X	X	
4124-036	NWP 42-91		X	X	X	X	
4124-037	NWP 45-1		X	X	X	X	
4124-038	NWP 47-9		X	X	X	X	
4124-039	NWP 49-1		X	X	X	X	
4124-040	NWP 50-0		X	X	X	X	
4124-041	NWP 52-1		X	X	X	X	
4124-042	NWP 54-20		X	X	X	X	
4124-043	NWP 55-60		X	X	X	X	
4124-044	NWP 57-5		X	X	X	X	

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

TABLE I
 SAMPLE IDENTIFICATION
 AND
 TOTAL ORGANIC CARBON (TOC) RESULTS

GeoChem Sample No.	Client Identification	T.O.C. (wt%)
4124-001	NWP 1-9	0.10 ; 0.11
4124-002	NWP 2-0	0.25
4124-003	NWP 3-0	0.26
4124-004	NWP 3-57	0.12
4124-005	NWP 4-13	0.19
4124-006	NWP 4-84	0.25
4124-007	NWP 5-0	0.17
4124-008	NWP 5-41	0.32
4124-009	NWP 6-0	0.23 ; 0.27
4124-010	NWP 7-7	0.16
4124-011	NWP 7-44	0.26
4124-012	NWP 8-1	0.47
4124-013	NWP 9-2	0.07
4124-014	NWP 10-6	0.32
4124-015	NWP 12-0	0.27
4124-016	NWP 12-26	0.13
4124-017	NWP 12-144	0.23
4124-018	NWP 14-0	0.38
4124-019	NWP 17-13a	0.30
4124-020	NWP 21-2	0.22
4124-021	NWP 22-14	0.46
4124-022	NWP 25-1	0.24
4124-023	NWP 26-43	0.20
4124-024	NWP 27-32	0.14 ; 0.15
4124-025	NWP 29-28	0.14
4124-026	NWP 30-45	0.24
4124-027	NWP 31-49	0.27
4124-028	NWP 32-3	0.31
4124-029	NWP 34-29	0.21
4124-030	NWP 37-1	0.24
4124-031	NWP 37-68	0.23
4124-032	NWP 38-27	0.26 ; 0.22
4124-033	NWP 39-44	0.31
4124-034	NWP 40-102	0.23
4124-035	NWP 41-60	0.25
4124-036	NWP 42-91	0.21
4124-037	NWP 45-1	0.17
4124-038	NWP 47-9	0.27
4124-039	NWP 49-1	0.21
4124-040	NWP 50-0	0.21
4124-041	NWP 52-1	0.09
4124-042	NWP 54-20	0.05

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTION 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

TABLE I
(cont'd.)
SAMPLE IDENTIFICATION
AND
TOTAL ORGANIC CARBON (TOC) RESULTS

GeoChem Sample No.	Client Identification	T.O.C. (wt%)
4124-043	NWP 55-60	0.05
4124-044	NWP 57-5	0.05

TABLE II
LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

GeoChem Sample Number	Client Identification	Gross Lithological Description	GSA Color Code	Total Organic Carbon (% of Rock)
4124-001				0.10/0.11
-A	NWP 1-9	100% Limestone, fine crystalline, laminated, grayish red.	10R4/2	
4124-002				0.25
-A	NWP 2-0	100% Limestone, fine crystalline grayish red.	5R4/2	
4124-003				0.26
-A	NWP 3-0	100% Limestone, medium crystalline, fossiliferous, medium dark gray, iron stained.	N4	
4124-004				0.12
-A	NWP 3-57	100% Limestone, fine crystalline, laminated, grayish red.	10R4/2	
4124-005				0.19
-A	NWP 4-13	100% Limestone, fine crystalline grayish red.	5R4/2	
4124-006				0.25
-A	NWP 4-48	100% Limestone, medium crystalline, medium dark gray, iron stained.	N4	
4124-007				0.17
-A	NWP 5-0	100% Limestone, fine crystalline, medium dark gray.	N4	
4124-008				0.32
-A	NWP 5-41	100% Limestone, very fine crystal- line, dark gray.	N3	
4124-009				0.23/0.27
-A	NWP 6-0	100% Limestone, medium crystalline, fossiliferous, medium dark gray, iron stained.	N4	
4124-010				0.16
-A	NWP 7-7	100% Limestone, very fine crystal- line, dark gray.	N3	

TABLE II
LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

GeoChem Sample Number	Client Identification	Gross Lithological Description	GSA Color Code	Total Organic Carbon (% of Rock)
4124-011				0.26
-A	NWP 7-44	100% Limestone, very fine crystalline, dark gray.	N3	
4124-012				0.47
-A	NWP 8-1	100% Limestone, medium crystalline, fossiliferous, medium dark gray, iron stained.	N4	
4124-013				0.07
-A	NWP 9-2	100% Limestone, very fine crystalline, dark gray.	N3	
4124-014				0.32
-A	NWP 10-6	100% Limestone, very fine crystalline, dark gray.	N3	
4124-015				0.27
-A	NWP 12-0	100% Limestone, very fine crystalline, dark gray.	N3	
4124-016				0.13
-A	NWP 12-26	100% Limestone, very fine crystalline, medium dark gray.	N4	
4124-017				0.23
-A	NWP 12-144	100% Limestone, very fine crystalline, medium dark gray.	N4	
4124-018				0.38
-A	NWP 14-0	100% Limestone, very fine crystalline, dark gray.	N3	
4124-019				0.30
-A	NWP 17-13a	100% Limestone, very fine crystalline, medium dark gray.	N4	
4124-020				0.22
-A	NWP 21-2	100% Limestone, very fine crystalline, medium dark gray.	N4	

TABLE II
LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

GeoChem Sample Number	Client Identification	Gross Lithological Description	GSA Color Code	Total Organic Carbon (% of Rock)
4124-021				0.46
-A	NWP 22-14	100% Limestone, fine crystalline, dark gray.	N3	
4124-022				0.24
-A	NWP 25-1	100% Limestone, fine crystalline, dark gray.	N3	
4124-023				0.20
-A	NWP 26-43	100% Limestone, fine crystalline, dark gray.	N3	
4124-024				0.14/0.15
-A	NWP 27-32	100% Limestone, fine crystalline, fossiliferous?, dark gray.	N3	
4124-025				0.14
-A	NWP 29-28	100% Limestone, fine crystalline, dark gray.	N3	
4124-026				0.24
-A	NWP 30-45	100% Limestone, medium to fine crystalline, grayish black.	N2	
4124-027				0.27
-A	NWP 31-49	100% Limestone, fine crystalline, dark gray.	N3	
4124-028				0.31
-A	NWP 32-3	100% Limestone, medium crystalline, medium dark gray.	N4	
4124-029				0.21
-A	NWP 34-29	100% Limestone, fine crystalline, medium gray.	N5	
4124-030				0.24
-A	NWP 37-1	100% Limestone, fine crystalline, grayish brown.	5YR4/1	

TABLE II
LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

NEW WELL PEAK SECTION IV BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

GeoChem				Total Organic
Sample	Client		GSA	Carbon
Number	Identification	Gross Lithological Description	Color Code	(% of Rock)
4124-031				0.23
-A	NWP 37-68	100% Limestone, fine crystalline, pale yellow brown.	10YR6/2	
4124-032				0.26/0.22
-A	NWP 38-27	100% Limestone, fine crystalline, dark gray.	N3	
4124-033				0.31
-A	NWP 39-44	100% Limestone, fine crystalline, dark gray.	N3	
4124-034				0.23
-A	NWP 40-102	100% Limestone, fine crystalline, medium gray.	N5	
4124-035				0.25
-A	NWP 41-60	100% Limestone, fine crystalline, medium gray.	N5	
4124-036				0.21
-A	NWP 42-91	100% Limestone, fine crystalline, medium gray.	N5	
4124-037				0.17
-A	NWP 45-1	100% Limestone, fine crystalline, medium gray.	N5	
4124-038				0.27
-A	NWP 47-9	100% Limestone, fine crystalline, medium gray.	N5	
4124-039				0.21
-A	NWP 49-1	100% Limestone, fine crystalline, olive gray.	5Y4/1	
4124-040				0.21
-A	NWP 50-0	100% Limestone, fine crystalline, dark gray.	N3	

TABLE II
LITHOLOGICAL DESCRIPTIONS AND ORGANIC CARBON ANALYSES

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
HIDALGO COUNTY, NEW MEXICO
SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
SECTION 5, TOWNSHIP 32S, RANGE 14W

GeoChem Sample Number	Client Identification	Gross Lithological Description	GSA Color Code	Total Organic Carbon (% of Rock)
4124-041				0.09
-A	NWP 52-1	100% Limestone, fine crystalline, dark gray.	N3	
4124-042				0.05
-A	NWP 54-20	100% Limestone, fine crystalline, dark gray.	N3	
4124-043				0.05
-A	NWP 55-60	100% Limestone, fine crystalline, olive gray.	5Y4/1	
4124-044				0.05
-A	NWP 57-5	100% Limestone, fine crystalline, medium dark gray.	N4	

TABLE IV

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

GEOCHEM SAMPLE NUMBER	CLIENT IDENTIFICATION NUMBER	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
4124-001	NWP 1-9	0.10/0.11	Am**;-H;-;-	0	50	50	0	0	2 to 2+	2.4
4124-002	NWP 2-0	0.25	H;Am**;-	0	37	63	0	0	2 to 2+	2.3
4124-003	NWP 3-0	0.26	Am**;H*;I	0	50	28	0	12	2 to 2+	2.4
4124-004	NWP 3-57	0.12	Am**;H;I	0	57	29	0	14	2	2.2
4124-005	NWP 4-13	0.19	H;Am**;W	0	40	50	10	0	2 to 2+	2.3
4124-006	NWP 4-84	0.25	Am**;H;W-I	0	50	26	12	12	2 to 2+	2.4
4124-007	NWP 5-0	0.17	Am**;H;I	0	50	28	0	12	2 to 2+	2.3
4124-008	NWP 5-41	0.32	Am**;-H*;-;I	0	44	44	0	12	2 to 2+	2.5
4124-009	NWP 6-0	0.23/0.27	Am**;-H*;-;I	0	44	44	0	12	2	2.2
4124-010	NWP 7-7	0.16	H*;Am**;I	0	28	50	0	12	2+	2.6
4124-011	NWP 7-44	0.26	Am**;H*;I	0	50	28	0	12	2	2.2
4124-012	NWP 8-1	0.47	Am**;H*;W-I	0	45	33	11	11	2	2.2
4124-013	NWP 9-2	0.07	Am**;H*;I	0	50	28	0	12	2 to 2+	2.3
4124-014	NWP 10-6	0.32	Am**;-H*;-;-	0	50	50	0	0	2	2.2
4124-015	NWP 12-0	0.27	Am**;-H*;-;-	0	50	50	0	0	2 to 2+	2.3
4124-016	NWP 12-26	0.13	Am**;H*;I	0	50	28	0	12	2	2.2
4124-017	NWP 12-144	0.23	Am**;H*;I	0	50	28	0	12	2	2.2
4124-018	NWP 14-0	0.38	Am**;-H*;-;I	0	44	44	0	12	2 to 2+	2.5
4124-019	NWP 17-13a	0.30	H;Am**;I	0	33	45	0	22	2+ to 3-	2.7
4124-020	NWP 21-2	0.22	Am**;H*;I	0	57	29	0	14	2 to 2+	2.4

LEGEND:

KEROGEN KEY

Predominant; Secondary; Trace
 40-100% 20-40% 0-20%

Al = Algal
 Am = Amorphous-Sapropel
 Am** = Relic Amorphous-Sapropel
 H = Herbaceous-Spore/Pollen
 H* = Degraded Herbaceous
 W = Woody-Structured
 C = Coaly
 I = Inertinite
 U = Unidentified Material

TABLE IV (cont'd.)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

GEOCHEM SAMPLE NUMBER	CLIENT IDENTIFICATION NUMBER	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX	
				Al	Am	H	W	I			
4124-021	NWP 22-14	0.46	Am**;H*;-	0	57	43	0	0	2	2.2	
4124-022	NWP 25-1	0.24	H*;Am**;W-I	0	33	45	11	11	2 to 2+	2.5	
4124-023	NWP 26-43	0.20	Am**;H*;I	0	33	45	0	22	2+	2.6	
4124-024	NWP 27-32	0.14/0.15	Am**;H*;I	0	50	28	0	12	2+ to 3-	2.7	
4124-025	NWP 29-28	0.14	Am**;-;H*-I	0	66	17	0	17	2+ to 3-	2.7	
4124-026	NWP 30-45	0.24	Am**;H*;I	0	57	29	0	14	2 to 2+	2.5	
4124-027	NWP 31-49	0.27	H*;Am**;I	0	33	45	0	22	2+	2.6	
4124-028	NWP 32-3	0.31	H*;Am**;I	0	33	45	0	22	2+ to 3-	2.7	
4124-029	NWP 34-29	0.21	Am**;H*;I	0	45	33	0	22	2 to 2+	2.4	
4124-030	NWP 37-1	0.24	H*;Am**;I	0	33	45	0	22	2 to 2+	2.3	
4124-031 (1)	NWP 37-68	0.23	Am**;H*-I;-	(1)	0	50	25	0	2- to 2 (1)	2.0 (1)	
-031 (2)			H;-;-	(2)	0	0	100	0	1 to 1+ (2)	1.2 (2)	
4124-032	NWP 38-27	0.26/0.22	Am**;H*;W-I	0	50	26	12	12	3- to 3	3.2	
4124-033	NWP 39-44	0.31	Am**;-H*;-;-	0	50	50	0	0	(2)(3- to 3)	2.2 / 3.3	
4124-034	NWP 40-102	0.23	Am**;H*;-	0	57	43	0	0	3- to 3	3.3	
4124-035	NWP 41-60	0.25	H;Am**;I	0	28	50	0	12	2+	2.6	
4124-036 (1)	NWP 42-91	0.21	Am**;H*;I	(1)	0	50	33	0	3- to 3 (1)	3.1 (1)	
-036 (2)			H;-;-	(2)	0	0	100	0	1 to 1+ (2)	1.2 (2)	
4124-037 (1)	NWP 45-1	0.17	Am**;H*;I	(1)	0	50	33	0	2 to 2+ (1)	2.5 (1)	
-037 (2)			H;-;-	(2)	0	0	100	0	1 to 1+ (2)	1.2 (2)	
4124-038 (1)	NWP 47-9	0.27	Am**;H*;-	(1)	0	57	43	0	2 to 2+ (1)	2.5 (1)	
-038 (2)			H;-;-	(2)	0	0	100	0	1 to 1+ (2)	1.2 (2)	
4124-039	NWP 49-1	0.21	H;Am**;-	0	44	56	0	0	2	2.2	
4124-040 (1)	NWP 50-0	0.21	H*;Am**;I	(1)	0	29	57	0	14	2+ (1)	2.6 (1)
-040 (2)			H;-;-	(2)	0	0	100	0	1 to 1+ (2)	1.2 (2)	

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
40-100%	20-40%	0-20%

Al = Algal
 Am = Amorphous-Sapropel
 Am** = Relic Amorphous-Sapropel
 H = Herbaceous-Spore/Pollen
 H* = Degraded Herbaceous
 W = Woody-Structured
 C = Coaly
 I = Inertinite
 U = Unidentified Material

NOTE: (1) First Population
 (2) Second Population

TABLE IV (cont'd.)

SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

GEOCHEM SAMPLE NUMBER	CLIENT IDENTIFICATION NUMBER	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				Al	Am	H	W	I		
4124-041	NWP 52-1	0.09	H*;-;Am**	0	20	80	0	0	2+ to 3-	2.7
4124-042	NWP 54-20	0.05	Am**;H*;I	0	50	28	0	12	3-	3.0
4124-043	NWP 55-60	0.05	H*;Am**;-	0	43	57	0	0	3-	3.0
4124-044	NWP 57-5	0.05	H*;Am**;I	0	29	57	0	14	2 to 2+	2.4

LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
40-100%	20-40%	0-20%

Al = Algal
 Am = Amorphous-Sapropel
 Am** = Relic Amorphous-Sapropel
 H = Herbaceous-Spore/Pollen
 H* = Degraded Herbaceous
 W = Woody-Structured
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 I = Inertinite
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NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

TABLE III
 RESULTS OF ROCK-EVAL PYROLYSIS

GeoChem Sample No.	Client Identification	Tmax (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4124-001	NWP 1-9	248	0.04	0.01	0.34	1.00	0.00	0.11	9	309
4124-002	NWP 2-0	271	0.04	0.08	0.60	0.33	0.01	0.25	32	240
4124-003	NWP 3-0	386	0.03	0.06	0.35	0.37	0.00	0.26	23	134
4124-004	NWP 3-57	240	0.04	0.02	0.48	0.67	0.00	0.12	16	400
4124-005	NWP 4-13	239	0.05	0.01	0.42	0.83	0.00	0.19	5	221
4124-006	NWP 4-84	240	0.04	0.02	0.43	0.67	0.00	0.25	8	172
4124-007	NWP 5-0	302	0.04	0.03	0.29	0.67	0.00	0.17	17	170
4124-008	NWP 5-41	283	0.03	0.10	0.22	0.25	0.01	0.32	31	68
4124-009	NWP 6-0	436	0.08	0.10	0.39	0.44	0.01	0.25	40	156
4124-010	NWP 7-7	346	0.04	0.04	0.27	0.50	0.00	0.16	25	168
4124-011	NWP 7-44	243	0.02	0.06	0.28	0.25	0.00	0.26	23	107
4124-012	NWP 8-1	243	0.02	0.02	0.31	0.50	0.00	0.47	4	65
4124-013	NWP 9-2	243	0.02	0.02	0.27	0.50	0.00	0.07	28	385
4124-014	NWP 10-6	288	0.03	0.03	0.34	0.50	0.00	0.32	9	106
4124-015	NWP 12-0	274	0.01	0.03	0.21	0.25	0.00	0.27	11	77
4124-016	NWP 12-26	312	0.08	0.08	0.31	0.50	0.01	0.13	61	238
4124-017	NWP 12-144	296	0.05	0.03	0.22	0.62	0.00	0.23	13	95
4124-018	NWP 14-0	280	0.05	0.05	0.26	0.50	0.00	0.38	13	68
4124-019	NWP 17-13a	298	0.05	0.08	0.38	0.42	0.01	0.30	26	126
4124-020	NWP 21-2	243	0.06	0.12	0.38	0.33	0.01	0.22	54	172
4124-021	NWP 22-14	243	0.12	0.01	0.55	1.00	0.01	0.46	2	113
4124-022	NWP 25-1	304	0.11	0.01	1.13	0.92	0.01	0.24	4	470
4124-023	NWP 26-43	243	0.07	0.08	0.33	0.50	0.01	0.20	40	165
4124-024	NWP 27-32	289	0.01	0.02	0.23	0.50	0.00	0.15	13	153
4124-025	NWP 29-28	377	0.02	0.04	0.26	0.33	0.00	0.14	28	185
4124-026	NWP 30-45	351	0.00	0.02	0.20	0.00	0.00	0.24	8	83
4124-027	NWP 31-49	433	0.02	0.05	0.27	0.33	0.00	0.27	18	100
4124-028	NWP 32-3	345	0.02	0.07	0.28	0.25	0.00	0.31	22	90
4124-029	NWP 34-29	375	0.04	0.05	0.26	0.50	0.00	0.21	23	123
4124-030	NWP 37-1	350	0.01	0.03	0.14	0.25	0.00	0.24	12	58
4124-031	NWP 37-68	307	0.01	0.11	0.37	0.08	0.01	0.23	47	160

T.O.C. = Total organic carbon, wt.%
 S1 = Free Hydrocarbons, mg HC/g of rock
 S2 = Residual hydrocarbon potential
 (mg HC/g of rock)

S3 = CO2 produced from kerogen pyrolysis
 (mg CO2/g of rock)
 PC* = 0.083 (S1 + S2)
 Hydrogen index = mg HC/g organic carbon

Oxygen
 Index = mg CO2/g organic carbon
 PI = S1/(S1+S2)
 Tmax = Temperature Index, degree C.

NEW WELL PEAK SECTION IN BIG HATCHET MOUNTAINS
 HIDALGO COUNTY, NEW MEXICO
 SECTIONS 28 & 32, TOWNSHIP 31S, RANGE 14W
 SECTION 5, TOWNSHIP 32S, RANGE 14W

TABLE III
 (cont'd.)
 RESULTS OF ROCK-EVAL PYROLYSIS

GeoChem Sample No.	Client Identification	Tmax (c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4124-032	NWP 38-27	328	0.01	0.02	0.14	0.50	0.00	0.24	8	58
4124-033	NWP 39-44	305	0.00	0.01	0.12	0.00	0.00	0.31	3	38
4124-034	NWP 40-102	314	0.01	0.04	0.14	0.25	0.00	0.23	17	60
4124-035	NWP 41-60	298	0.01	0.03	0.18	0.25	0.00	0.25	12	72
4124-036	NWP 42-91	307	0.00	0.06	0.20	0.00	0.00	0.21	28	95
4124-037	NWP 45-1	243	0.11	0.29	0.26	0.27	0.03	0.17	170	152
4124-038	NWP 47-9	263	0.00	0.04	0.21	0.00	0.00	0.27	14	77
4124-039	NWP 49-1	207	0.02	0.03	0.34	0.50	0.00	0.21	14	161
4124-040	NWP 50-0	218	0.03	0.11	0.20	0.21	0.01	0.21	52	95
4124-041	NWP 52-1	228	0.01	0.00	0.21	0.01	0.00	0.09	0	233
4124-042	NWP 54-20	243	0.01	0.05	0.23	0.17	0.00	0.05	100	460
4124-043	NWP 55-60	444	0.01	0.03	0.31	0.25	0.00	0.05	60	620
4124-044	NWP 57-5	623	0.00	0.00	0.35	0.00	0.00	0.05	0	700

T.O.C. = Total organic carbon, wt.%
 S1 = Free Hydrocarbons, mg HC/g of rock
 S2 = Residual hydrocarbon potential
 (mg HC/g of rock)

S3 = CO2 produced from kerogen pyrolysis
 (mg CO2/g of rock)
 PC* = 0.083 (S1 + S2)
 Hydrogen index = mg HC/g organic carbon

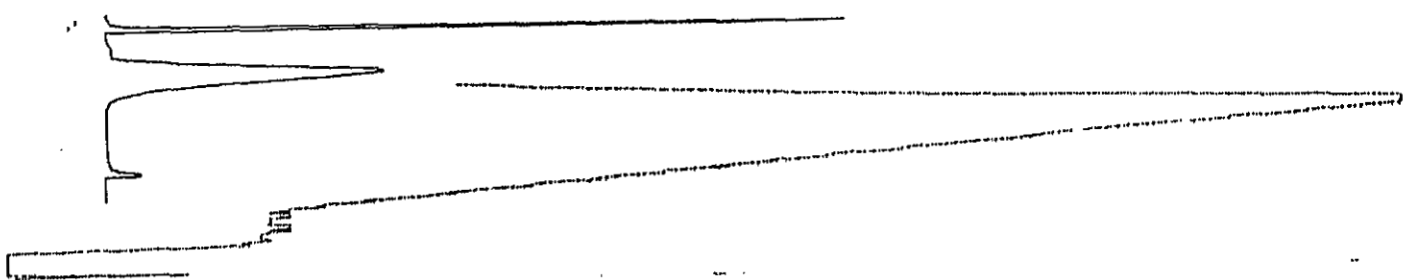
Oxygen
 Index = mg CO2/g organic carbon
 PI = S1/(S1+S2)
 Tmax = Temperature Index, degree C.

APPENDIX I

ROCK-EVAL PYROGRAMS

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT = 25 TRAP STOP T = 390

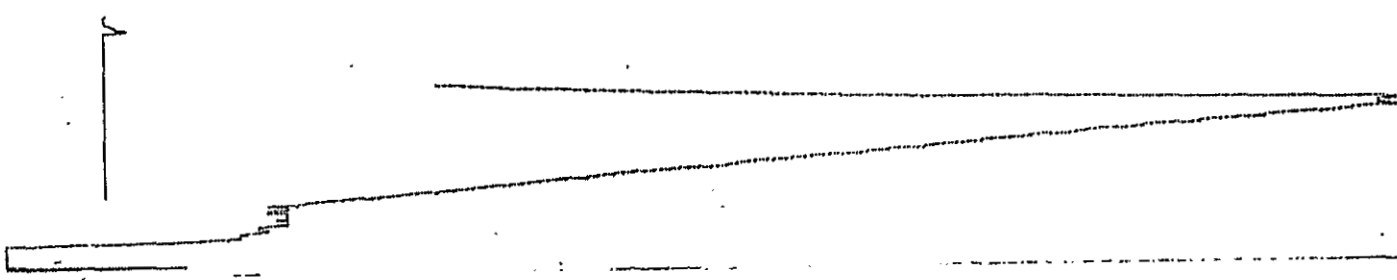
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
11	100.0	430	0.12	2.73	0.93	0.04	2.93	0.23			



DATE: 11-19-91 BLANK CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT = 25 TRAP STOP T = 390

S 1 = 00000000 S 2 = 00000000 S 3 = 00000340

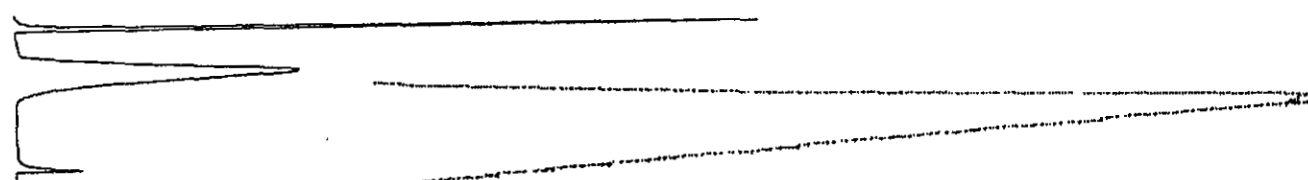


DATE: 11-19-91 STANDARD CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT = 25 TRAP STOP T = 390

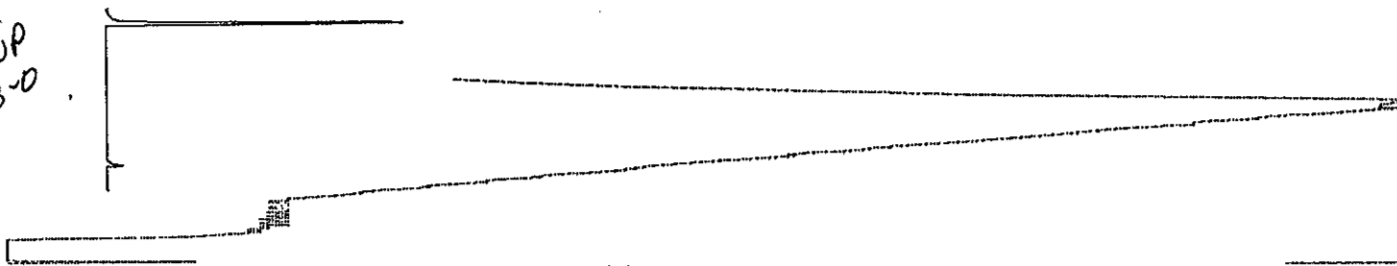
OTHER STD : S2 = 2.82 S3 = 0.96 S4 = 0.00 TMAX = 429

STD QTY = 100.0 S 1 = 00000654 S 2 = 00012766 S 3 = 00003728 TMAX = 461



DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-003	97.6	386	0.03	0.06	0.35	0.37	0.17	0.00	0.26	23	134

NWP
3-0

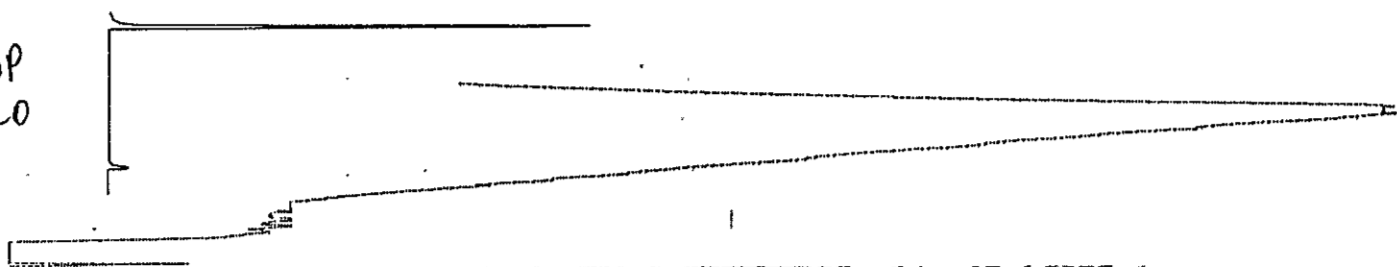


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-002	98.7	271	0.04	0.08	0.60	0.33	0.13	0.01	0.25	32	240

NWP
2-0

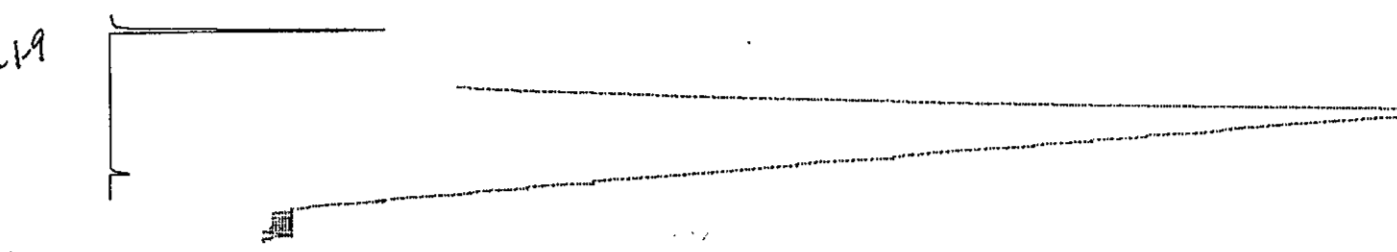


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

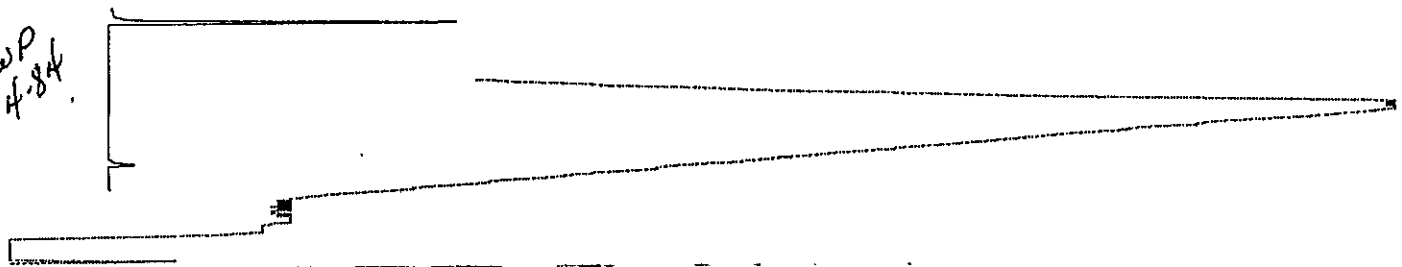
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-001	93.5	248	0.04	0.01	0.34	1.00	0.02	0.00	0.11	9	309

NWP-19



DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-006	97.8	240	0.04	0.02	0.43	0.67	0.04	0.00	0.25	8	172

NWP
4-84

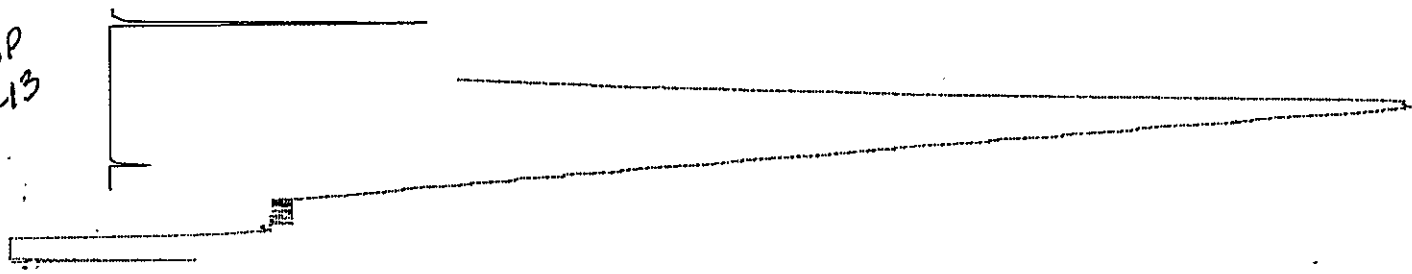


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-005	95.1	239	0.05	0.01	0.42	0.83	0.02	0.00	0.19	5	221

NWP
4-13

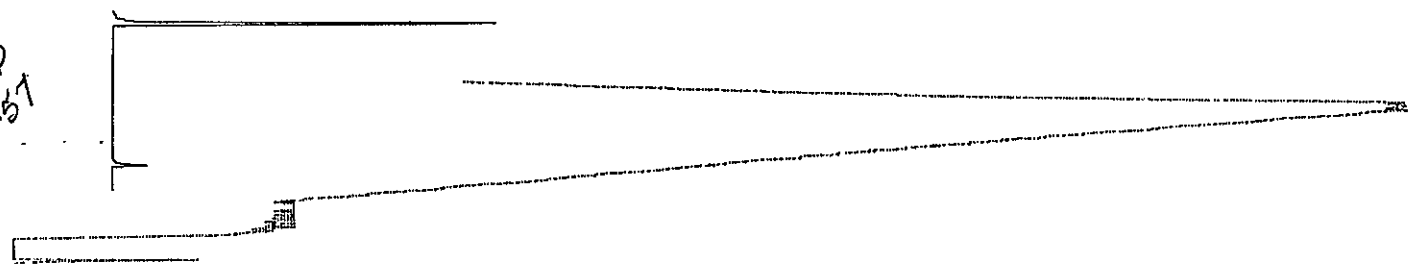


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-004	94.8	240	0.04	0.02	0.48	0.67	0.04	0.00	0.12	16	400

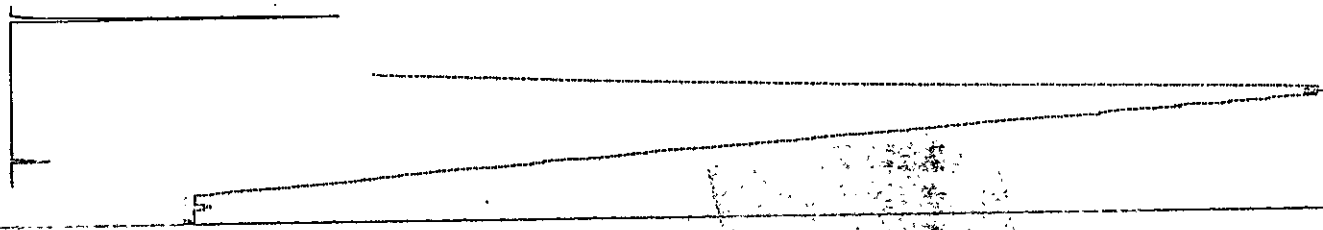
NWP
3-57



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-009	97.2	436	0.08	0.10	0.39	0.44	0.25	0.01	0.25	40	156

NWP
6-0



DATE: 11-19-91

TIME: 15:15

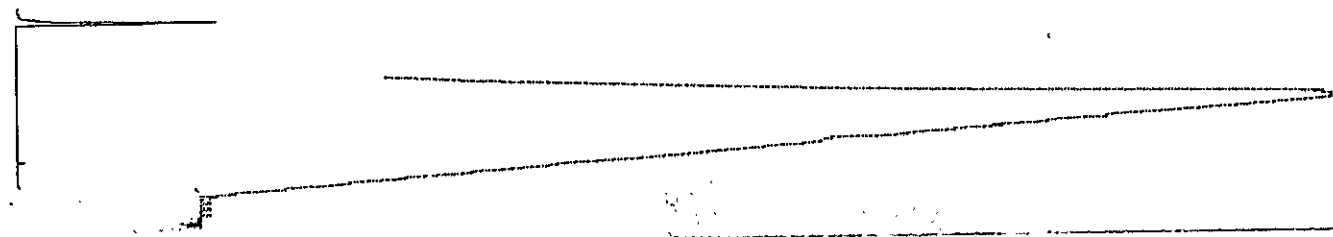
CYCLE : 4

SCALE

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-008	93.4	283	0.03	0.10	0.22	0.25	0.45	0.01	0.32	31	68

NWP
5-41



DATE: 11-19-91

TIME: 15:15

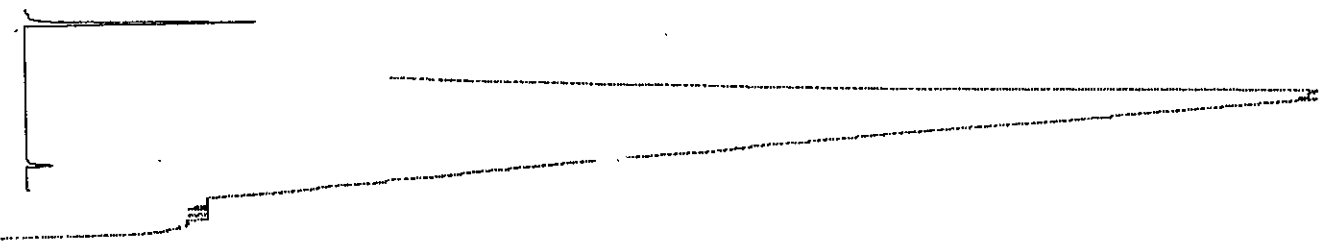
CYCLE : 4

SCALE

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-007	94.3	302	0.04	0.03	0.29	0.67	0.10	0.00	0.17	17	170

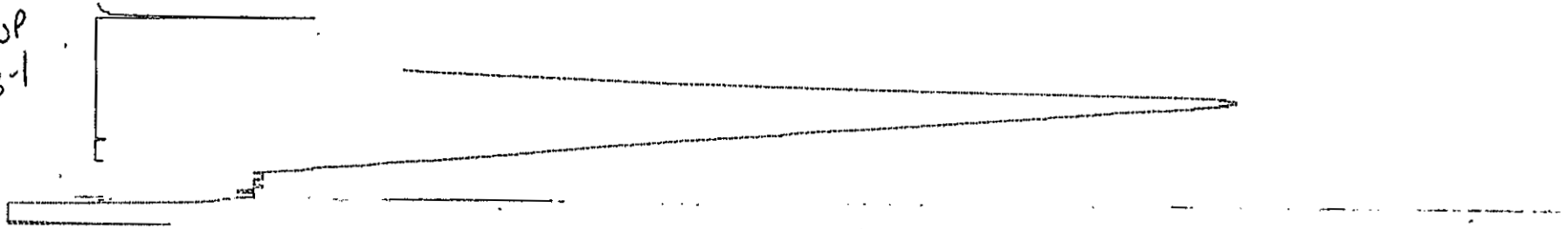
NWP
5-0



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-012	96.7	243	0.02	0.02	0.31	0.50	0.06	0.00	0.47	4	65

DWP
8-1

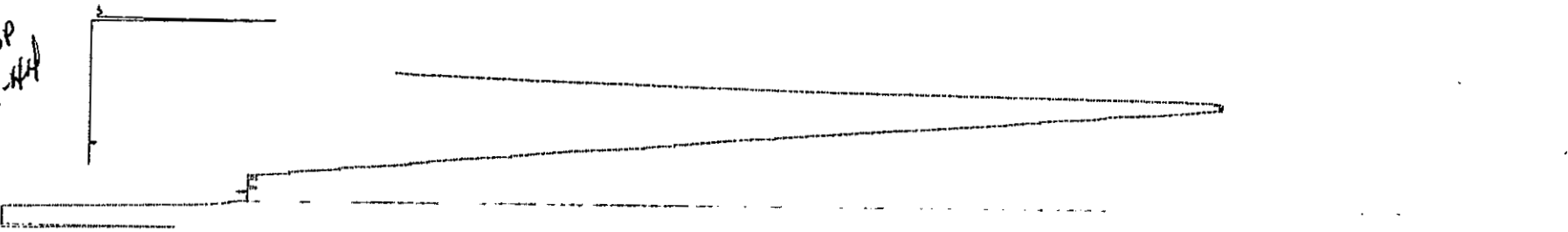


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-011	98.7	243	0.02	0.06	0.28	0.25	0.21	0.00	0.26	23	107

DWP
7-44

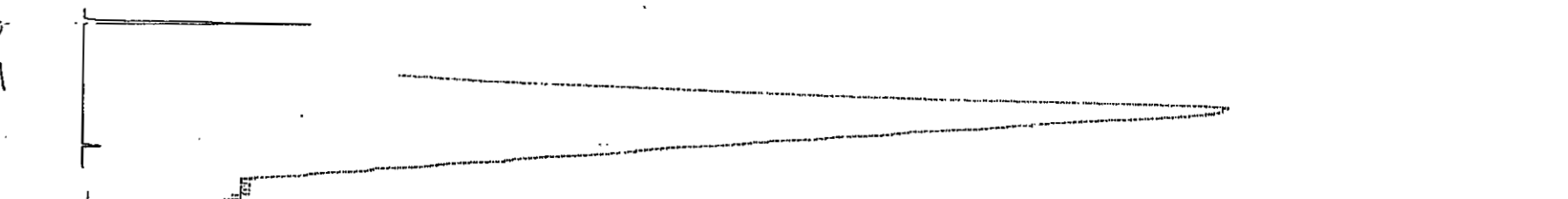


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-010	94.7	346	0.04	0.04	0.27	0.50	0.14	0.00	0.16	25	168

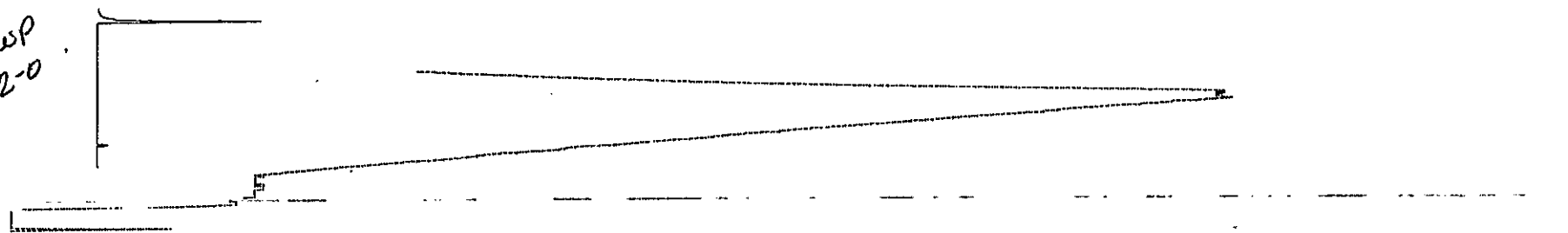
DWP
7-7



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-015	92.5	274	0.01	0.03	0.21	0.25	0.14	0.00	0.27	11	77

NWP
12-0

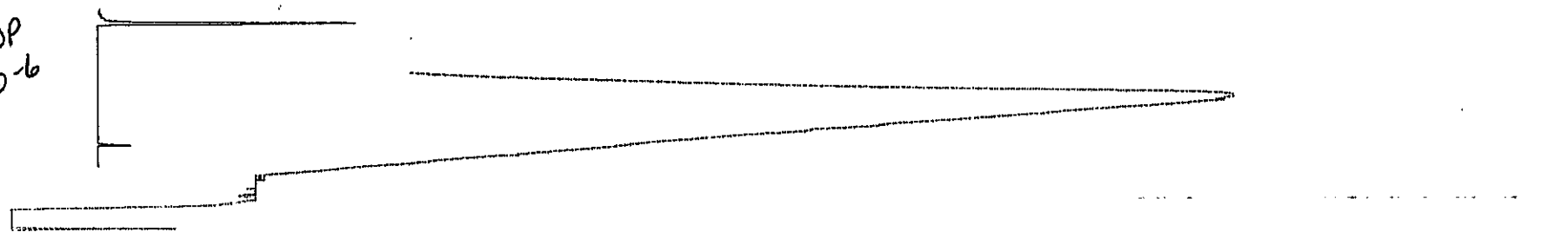


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-014	99.1	288	0.03	0.03	0.34	0.50	0.08	0.00	0.32	9	106

NWP
10-6

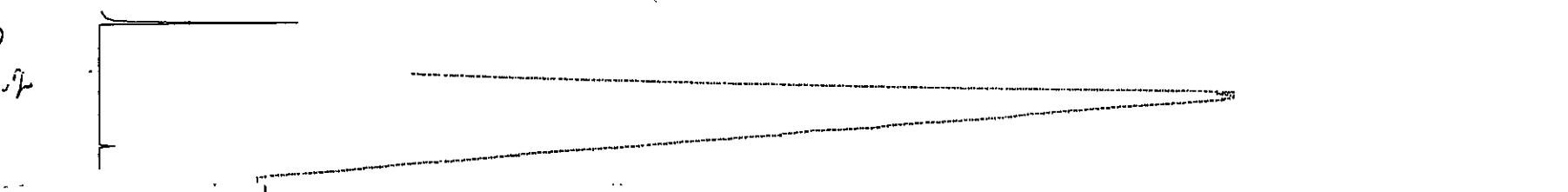


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-013	96.5	243	0.02	0.02	0.27	0.50	0.07	0.00	0.07	28	385

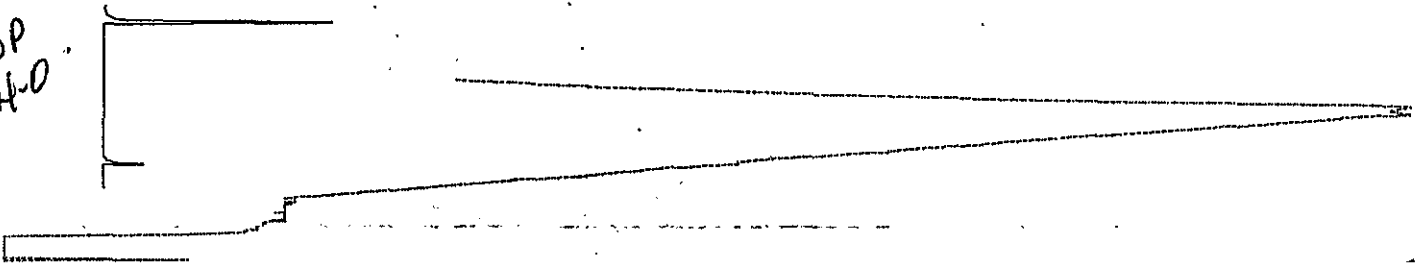
NWP
9-2



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124018	97.2	280	0.05	0.05	0.26	0.50	0.19	0.00	0.38	13	68

NWP
11-0

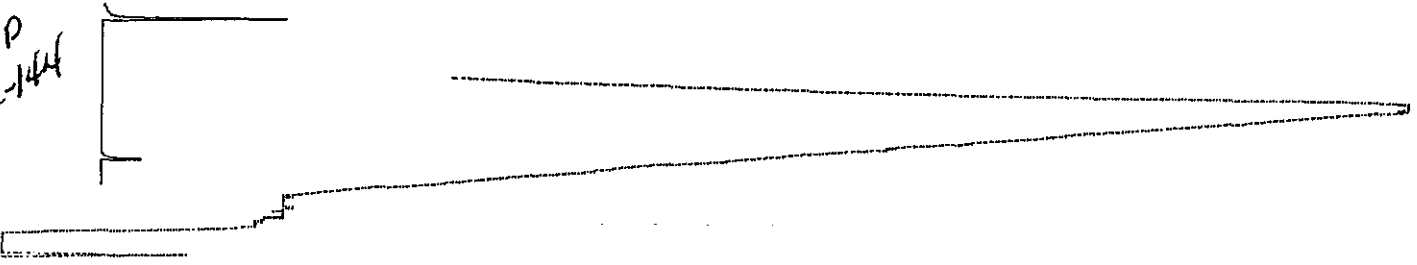


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124017	93.8	296	0.05	0.03	0.22	0.62	0.13	0.00	0.23	13	95

NWP
12-144

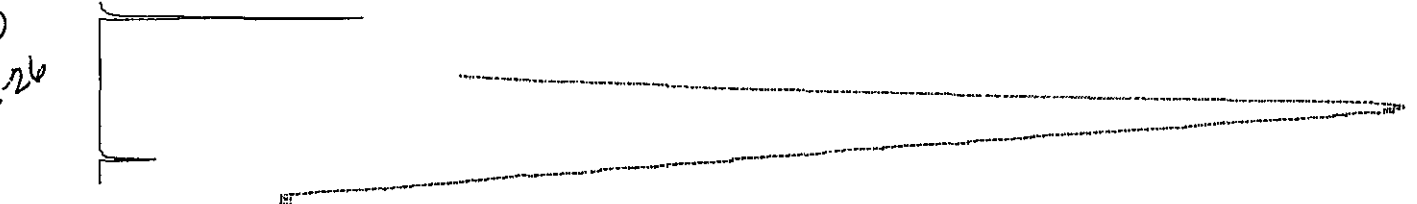


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124016	99.3	312	0.08	0.08	0.31	0.50	0.25	0.01	0.13	61	238

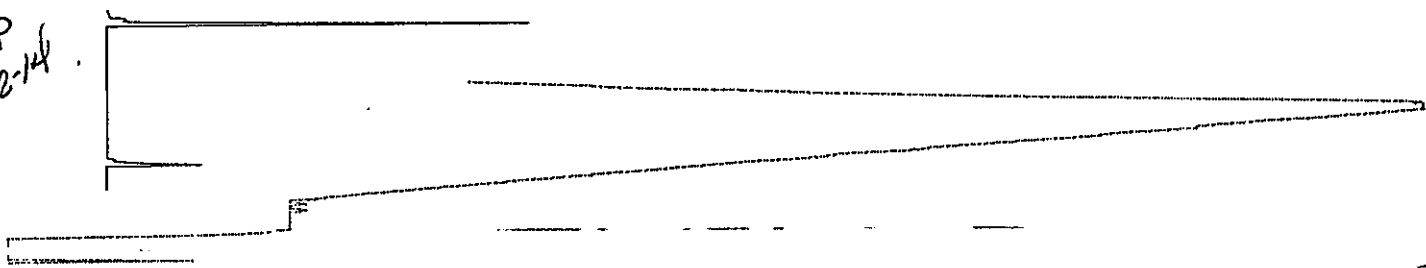
NWP
12-26



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124021	97.0	243	0.12	0.01	0.52	1.00	0.01	0.01	0.46	2	113

NWP
22-14

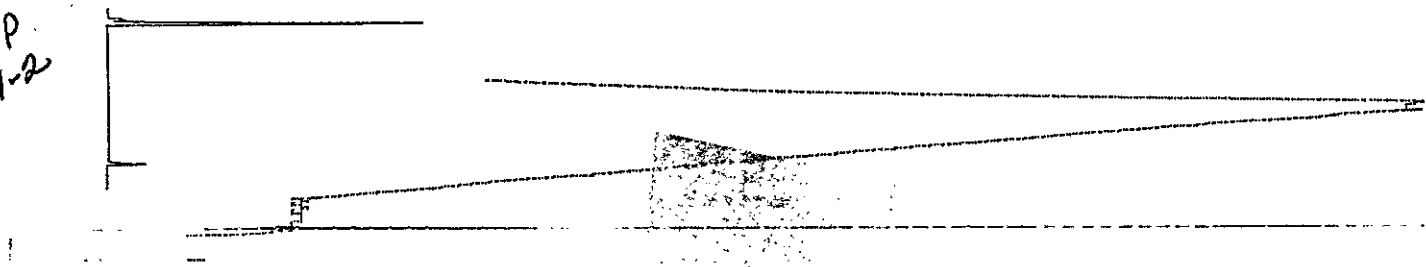


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124020	95.1	243	0.06	0.12	0.38	0.33	0.31	0.01	0.22	54	172

NWP
21-2

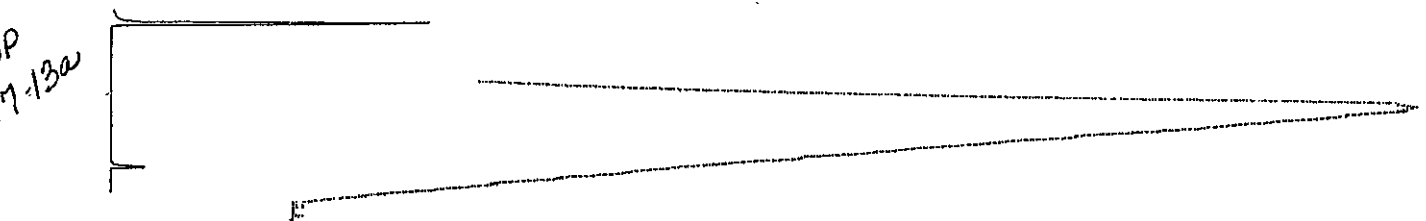


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124019	99.5	298	0.05	0.08	0.38	0.42	0.21	0.01	0.30	26	126

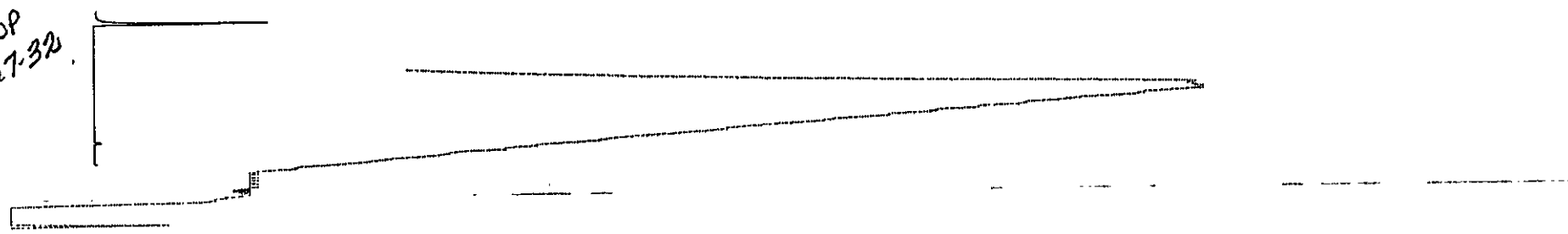
NWP
17-13a



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124024	92.1	289	0.01	0.02	0.23	0.50	0.08	0.00	0.15	13	153

NWP
27-32

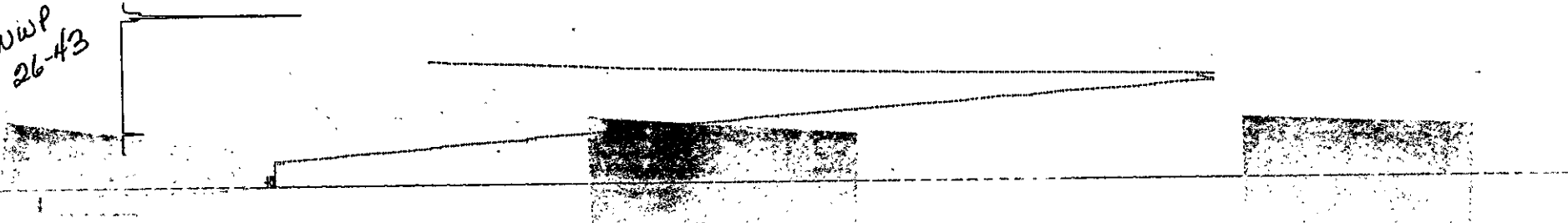


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124023	99.5	243	0.07	0.08	0.33	0.50	0.24	0.01	0.20	40	165

NWP
26-43

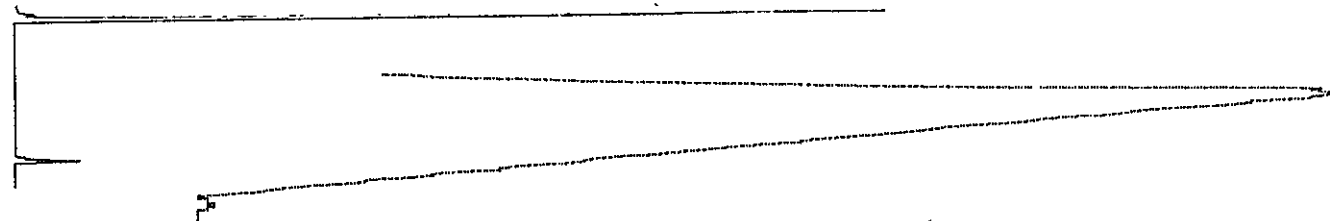


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124022	99.7	304	0.11	0.01	1.13	0.92	0.00	0.01	0.24	4	470

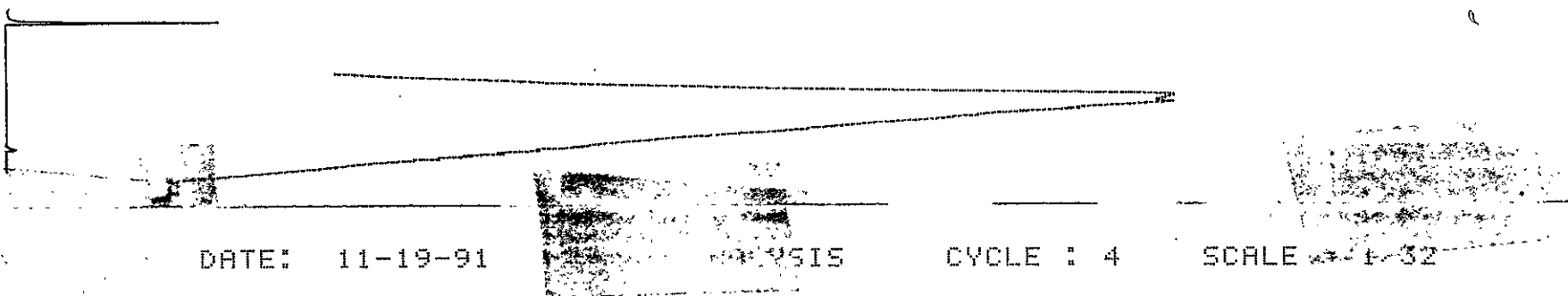
NWP
25-1



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124027	93.6	433	0.02	0.05	0.27	0.33	0.18	0.00	0.27	18	100

NWP
31-49

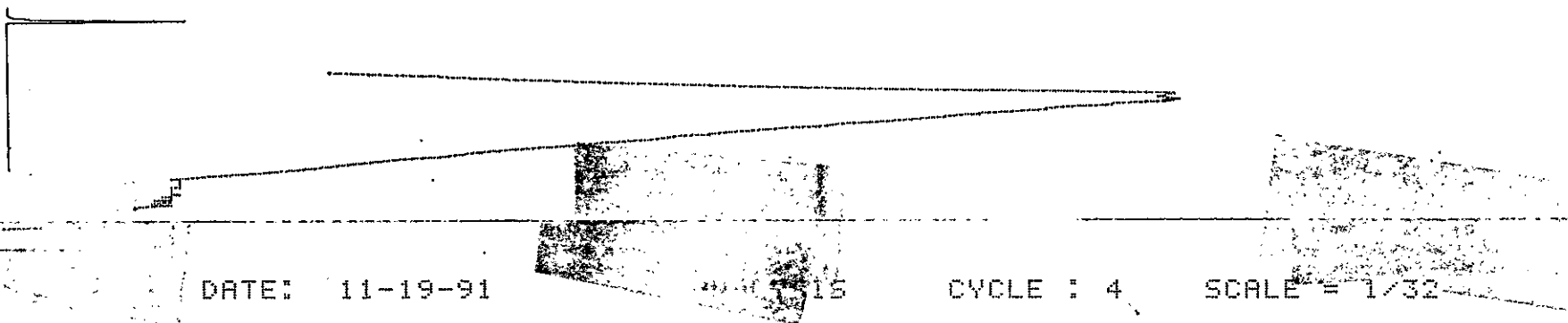


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124026	97.4	351	0.00	0.02	0.20	0.00	0.10	0.00	0.24	8	83

NWP
32-43

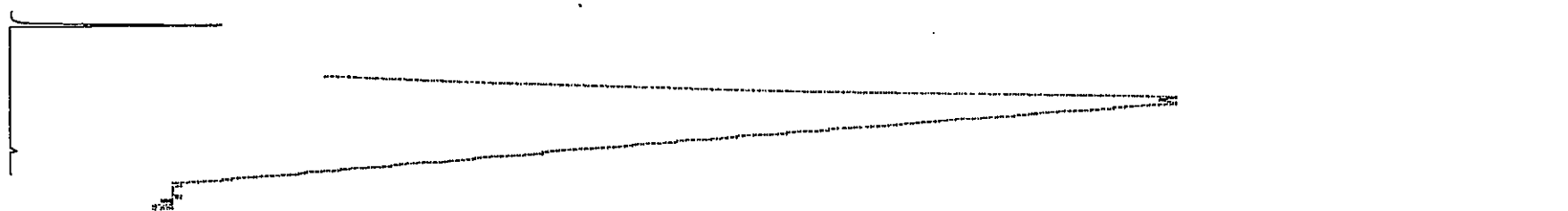


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

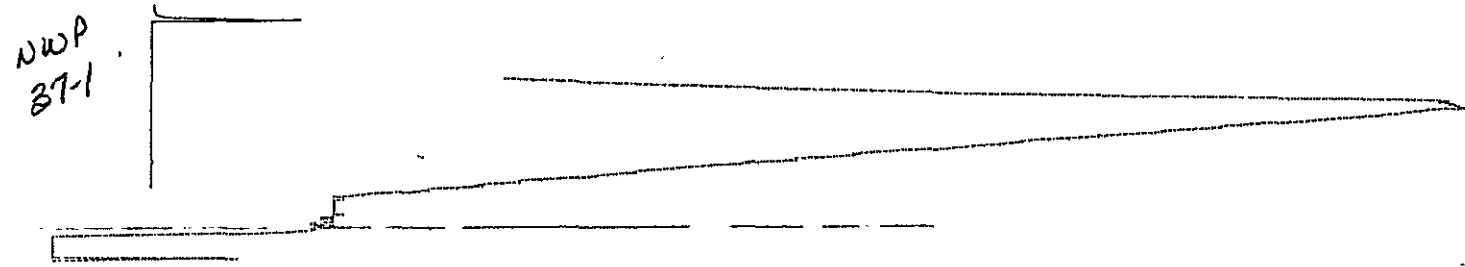
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124025	98.3	377	0.02	0.04	0.26	0.33	0.15	0.00	0.14	28	185

NWP
29-28



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

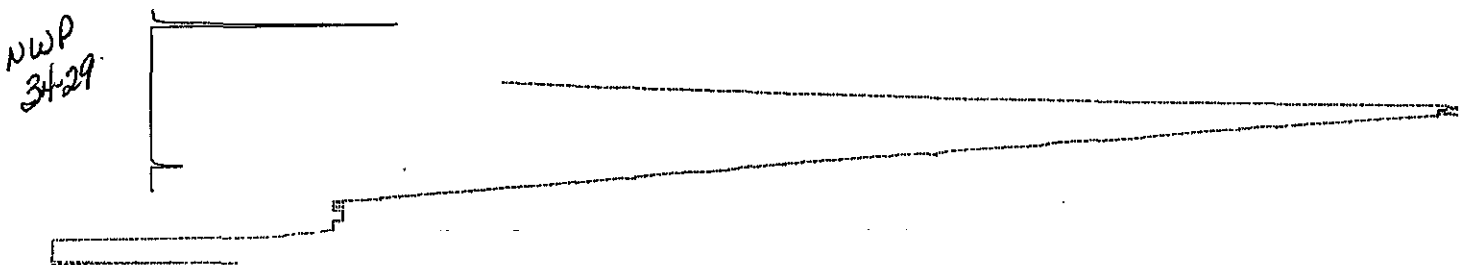
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124030	95.8	350	0.01	0.03	0.14	0.25	0.21	0.00	0.24	12	58



DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

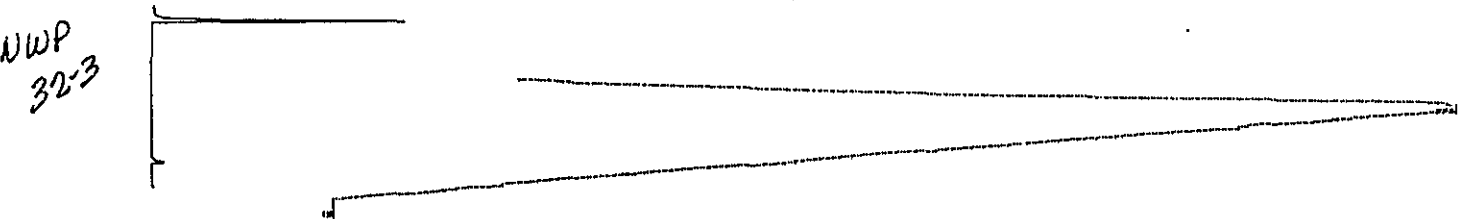
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124029	98.8	375	0.04	0.05	0.26	0.50	0.19	0.00	0.21	23	123



DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124028	97.8	345	0.02	0.07	0.28	0.25	0.25	0.00	0.31	22	90

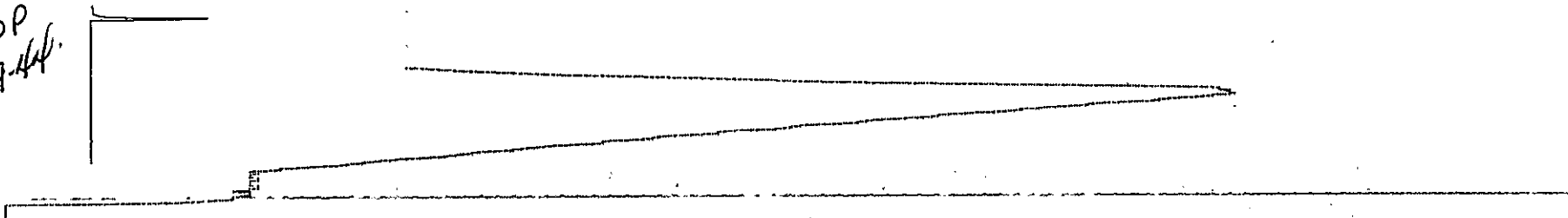


INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :

4124033: 98.6: 305: 0.00: 0.01: 0.12: 0.00: 0.08: 0.00: 0.31: 3 : 38 :

NWP
37-44



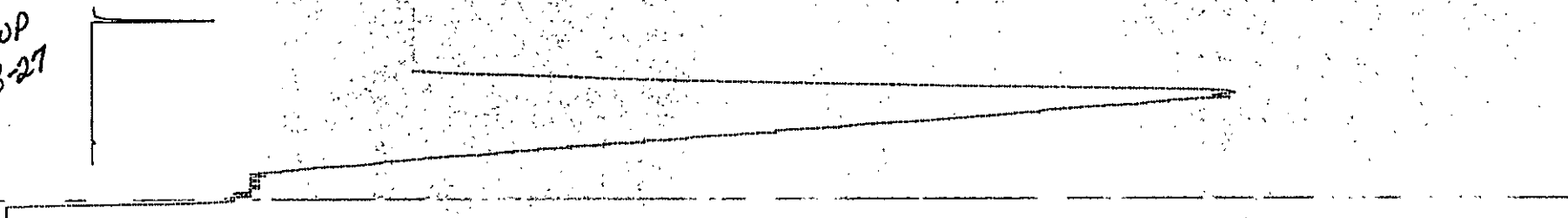
DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :

4124032: 98.8: 328: 0.01: 0.02: 0.14: 0.50: 0.14: 0.00: 0.24: 8 : 58 :

NWP
38-27



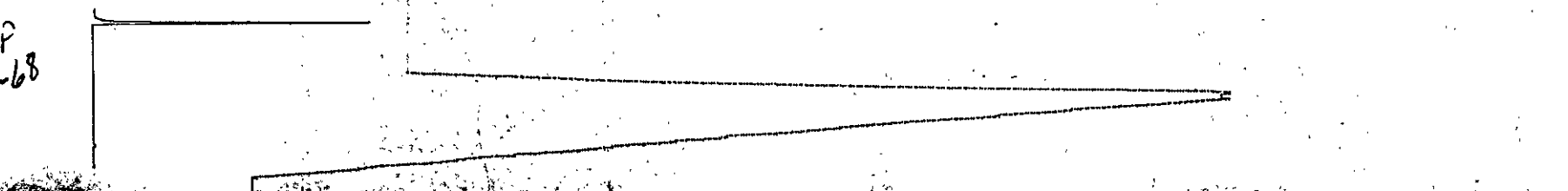
DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :

4124031: 99.5: 307: 0.01: 0.11: 0.37: 0.08: 0.29: 0.01: 0.23: 47 : 160 :

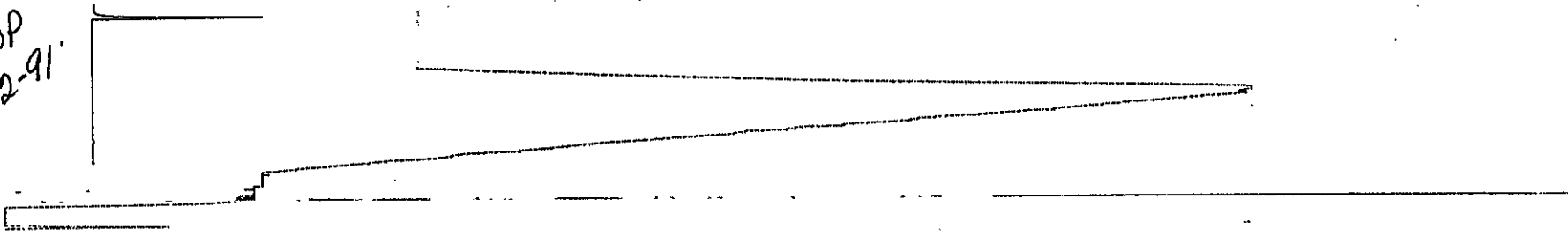
NWP
37-68



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124036	94.2	307	0.00	0.06	0.20	0.00	0.30	0.00	0.21	28	95

NWP
42-91

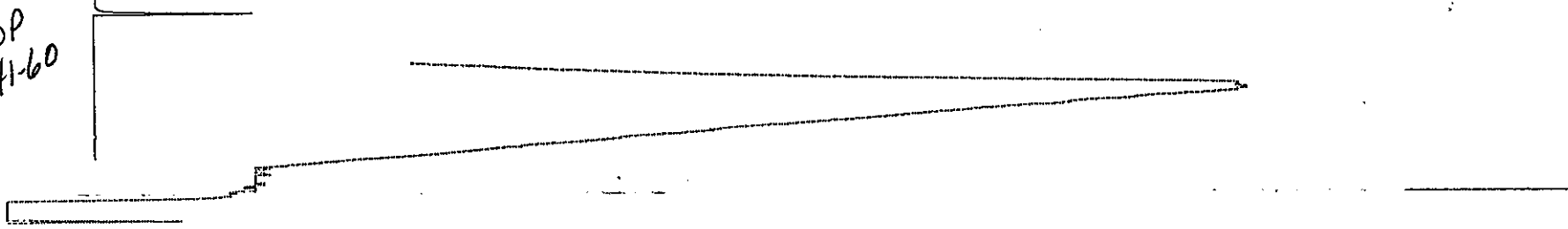


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124035	96.1	298	0.01	0.03	0.18	0.25	0.16	0.00	0.25	12	72

NWP
41-60

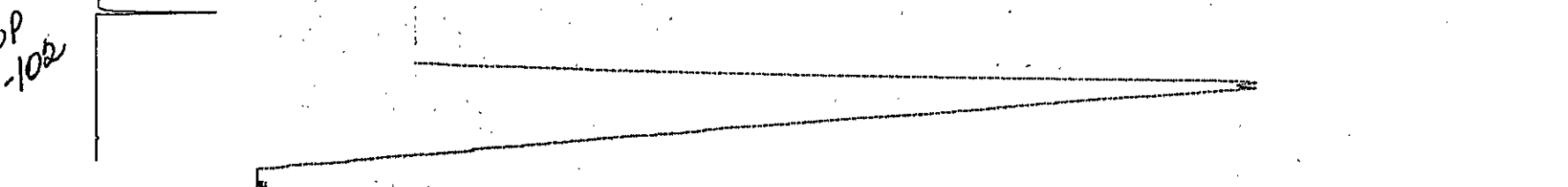


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124034	94.6	314	0.01	0.04	0.14	0.25	0.28	0.00	0.23	17	60

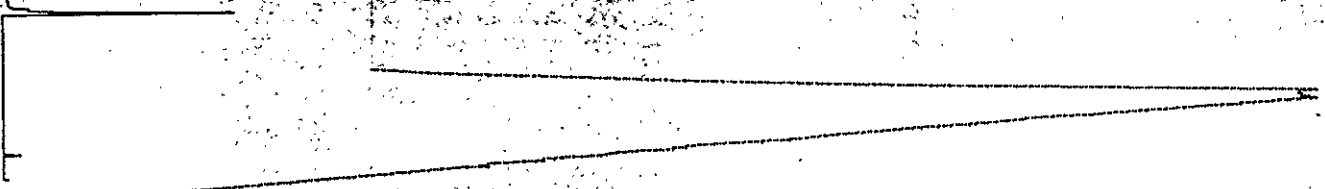
NWP
40-102



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-039	94.1	207	0.02	0.03	0.34	0.50	0.08	0.00	0.21	14	161

NWP
49-1

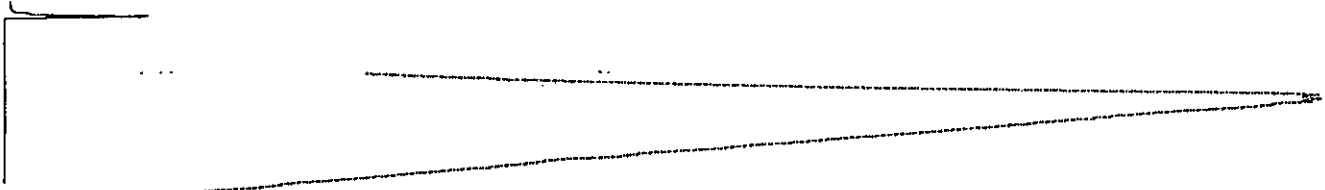


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-038	93.7	263	0.00	0.04	0.21	0.00	0.19	0.00	0.27	14	77

NWP
49-9

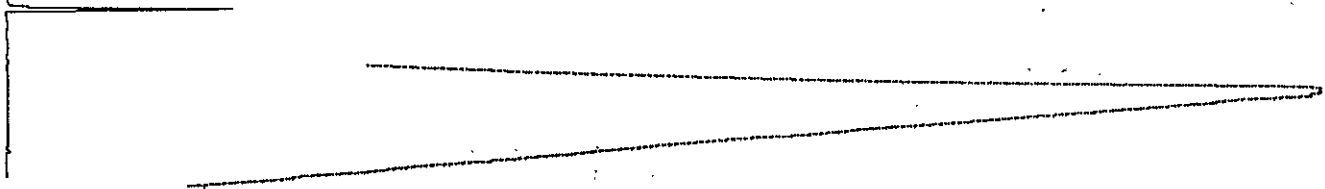


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

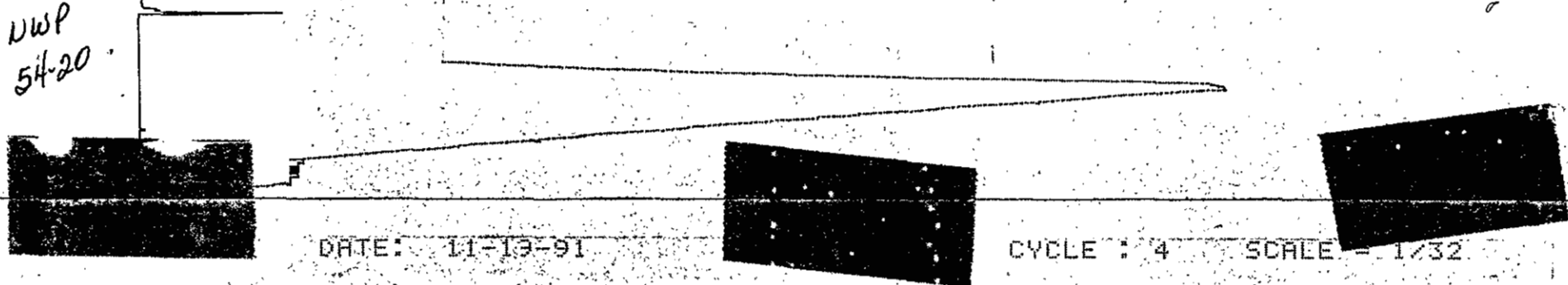
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124-037	98.5	243	0.11	0.29	0.26	0.27	1.11	0.03	0.17	170	152

NWP
45-1



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390
 :DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :
 4127-042: 93.8: 243: 0.01: 0.05: 0.23: 0.17: 0.21: 0.00: 0.05: 100 : 460 :

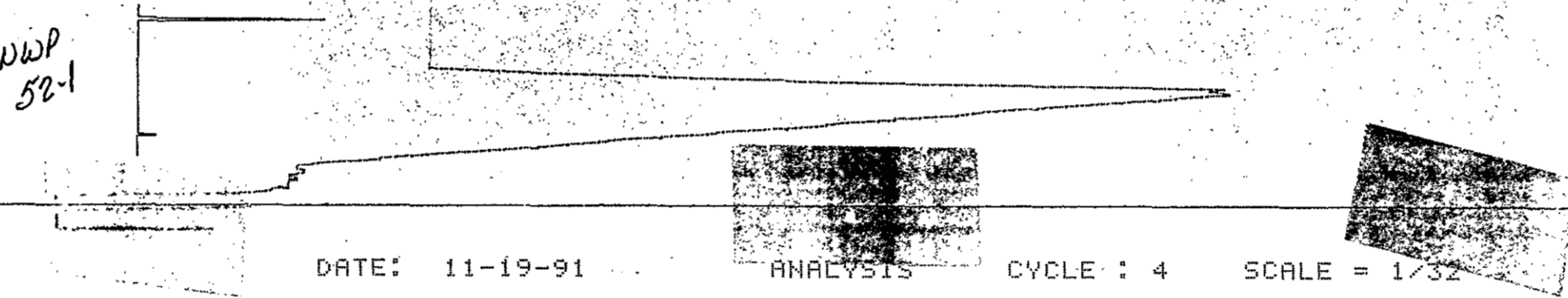
NWP
54-20



DATE: 11-13-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390
 :DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :
 4124-041: 99.1: 228: 0.01: 0.00: 0.21: 0.01: 0.00: 0.00: 0.09: 0 : 233 :

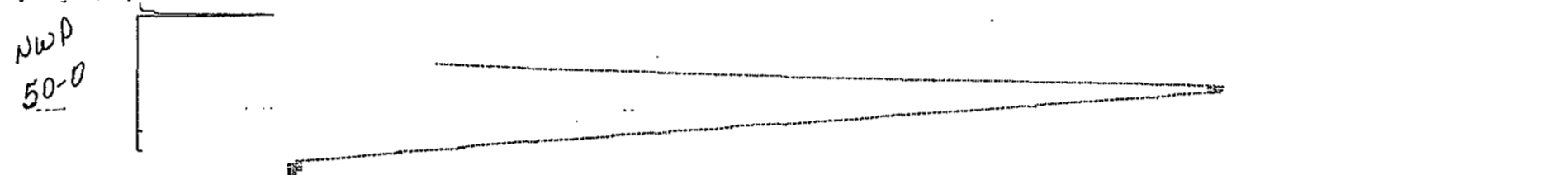
NWP
52-1



DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390
 :DEPTH: QTY :TMAX: S 1 : S 2 : S 3 : P I :S2/S3 : P C : TOC : H I : O I :
 4124-040: 93.5: 218: 0.03: 0.11: 0.20: 0.21: 0.55: 0.01: 0.21: 52 : 95 :

NWP
50-0

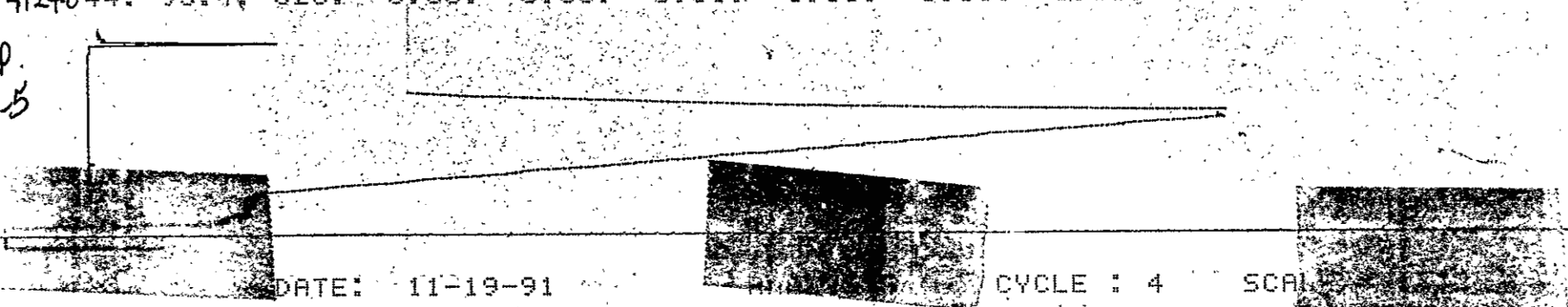


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124044	95.4	623	0.00	0.00	0.35	0.00	0.00	0.00	0.05	0	700

NWP
57-5

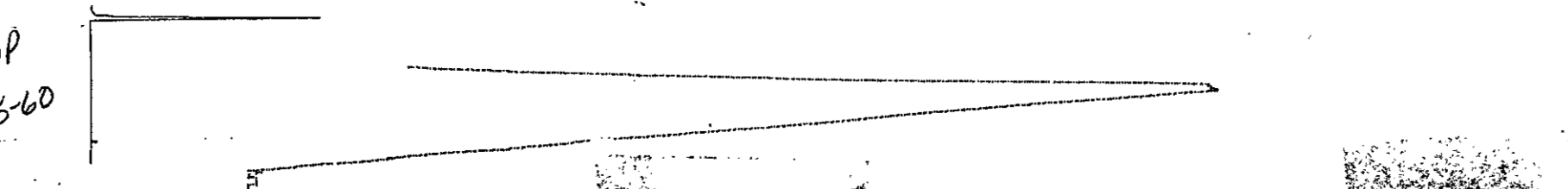


DATE: 11-19-91 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4124043	94.7	444	0.01	0.03	0.31	0.25	0.09	0.00	0.05	60	620

NWP
55-60



APPENDIX II

MEASUREMENT OF THERMAL MATURITY (TAI) CHART

MEASUREMENT OF THERMAL MATURITY (TAI)

Visual Kerogen Thermal Alteration Index (TAI)	Numerical Scale (TAI)	Descriptive Maturity Terminology	Vitrinite Reflectance (%Ro)
1	1.00	Immature	
<u>1</u> to 1+	1.10	Immature	
1 to 1+	1.20	Immature	
1 to <u>1+</u>	1.30	Immature	0.30
1+	1.40	Immature	0.33
<u>1+</u> to 2-	1.50	Immature	0.37
1+ to 2-	1.60	Immature	0.40
1+ to <u>2-</u>	1.70	Immature	0.43
2-	1.80	Moderately Immature	0.45
<u>2-</u> to 2	1.90	Moderately Immature	0.48
2- to 2	2.00	Moderately Immature	0.50
2- to <u>2</u>	2.10	Moderately Immature	0.55
2	2.20	Moderately Mature	0.60
<u>2</u> to 2+	2.30	Moderately Mature	0.70
2 to 2+	2.40	Moderately Mature	0.75
2 to <u>2+</u>	2.50	Moderately Mature	0.80
2+	2.60	Mature	0.90
<u>2+</u> to 3-	2.70	Mature	0.93
2+ to 3-	2.80	Mature	0.95
2+ to <u>3-</u>	2.90	Mature	0.98
3-	3.00	Mature	1.00
<u>3-</u> to 3	3.10	Mature	1.13
3- to 3	3.20	Mature	1.25
3- to <u>3</u>	3.30	Mature	1.38
3	3.40	Mature	1.50
<u>3</u> to 3+	3.50	Mature	1.63
3 to 3+	3.60	Very Mature	1.75
3 to <u>3+</u>	3.70	Very Mature	1.88
3+	3.80	Very Mature	2.00
<u>3+</u> to 4-	3.90	Very Mature	2.13
3+ to 4-	4.00	Very Mature	2.25
3+ to <u>4-</u>	4.10	Very Mature	2.38
4-	4.20	Severely Altered	2.50
<u>4-</u> to 4	4.30	Severely Altered	2.75
4- to 4	4.40	Severely Altered	3.00
4- to <u>4</u>	4.50	Severely Altered	3.50
4	4.60	Severely Altered	4.00
<u>4</u> to 5	4.70	Severely Altered	
4 to 5	4.80	Severely Altered	
4 to <u>5</u>	4.90	Severely Altered	
5	5.00	Metamorphosed	4.50

In the scale shown, the subjective + and - notation is preferred for practical reasons only. This notation can be cross-referenced with a numerical scale or with the % Ro Vitrinite Reflectance Values as shown.

APPENDIX III

BRIEF DESCRIPTION OF ORGANIC GEOCHEMICAL ANALYSES
CARRIED OUT BY GEOCHEM

AND

GEOHERMAL DIAGENETIC CRITERIA CHART

APPENDIX

Brief Description of Organic Geochemical analyses Carried Out by GeoChem

C₁-C₇ Hydrocarbon

The C₁-C₇ hydrocarbon content and composition of sediments reflects source type, source quality and thermal maturity.

The C₁-C₇ hydrocarbon content of well cuttings is determined by analyzing both a sample of the cuttings and the air space at the top of the can. The results of the two analyses are summed to give an inventory of the C₁-C₇ hydrocarbon content of the well cuttings prior to any losses from the cuttings during the lapsed time period between collection at the wellsite and laboratory analysis.

The air space C₁-C₇ hydrocarbon analysis involves taking a measured volume of the air space gas out of the can with a syringe and injecting same into a gas chromatograph. GeoChem uses a Varian Aerograph Model 1400 instrument equipped with a Porapac Q column. The gas sample is taken through the column by a carrier gas and before reaching the detector is separated into its various C₁ (methane), C₂ (ethane), C₃ (propane), iC₄ (isobutane), nC₄ (normal butane), and C₅, C₆, C₇ hydrocarbon components.

This particular analysis gives a complete separation of the C₁-C₄ gas-range hydrocarbons and a partial separation of the C₅-C₇ gasoline-range hydrocarbons. (A detailed C₄-C₇ analysis, to be discussed later, involving a capillary column, effects a complete separation of this molecular range into its several individual molecular species.)

The electrical response of the various hydrocarbons as they reach the detector is recorded on a paper strip chart as a peak. This response is simultaneously fed to an integrator which computes the area of each peak. The concentration of C₁-C₇ hydrocarbons in the air space, expressed as volumes of gas per million volumes of cuttings, is determined by a calculation involving the volume of cuttings, volume of air space in the can, volume of sample injected, volume of standard gas sample used in the calibration, calibration factor for C₁, C₂, C₃, etc. determined by gc analysis of a standard gas sample, and the gc peak response.

The C₁-C₇ hydrocarbon content of the cuttings is determined by degasification of a measured volume of cuttings (in a medium of a measured volume of water) in a closed blender, sampling of the air space at the top of the blender, and injection of a measured volume of gas into the gas chromatograph.

The C₁-C₇ hydrocarbon data from the air space and cuttings gas analyses are summed to give a "restored" C₁-C₇ hydrocarbon content of the cuttings.

Sample Washing and Hand-Picking of Uncaved Lithology Samples

The cuttings samples are washed to remove all drilling mud from the cuttings. Care is taken in the washing procedure not to remove any soft clays, claystones, etc. and any loose fine sand and silt. The washed cuttings are usually kept under water cover until picked, to prevent loss of any gasoline-range hydrocarbons. Using the C₁-C₇ hydrocarbon data profile and the electrical well log supplied to us and our visual examination of the cuttings material under the binocular microscope, we carefully hand-pick and describe a suite of uncaved lithologies representative of the various stratigraphic zones penetrated by the well. The lithological data is used to compile a gross litho percentage log which is shown on all Figures. The 2-4 gram picked lithology samples are stored under water in small glass vials in those instances where we wish to run detailed C₄-C₇ hydrocarbon analyses. This sample set is used not only for the C₄-C₇ hydrocarbon analysis, but also for the visual kerogen and total organic carbon analyses. All remaining cuttings material is dried and packaged in labelled plastic bags for possible C₁₅₊ soxhlet extraction and/or eventual return to the client. Sample material from this study will be retained at GeoChem until advised of disposition.

Detailed C₄-C₇ Hydrocarbon

The C₄-C₇ gasoline-range hydrocarbon content of sediments reflects source quality, thermal maturation and organic facies. Compositional data can be used in crude oil-parent rock correlation work.

The C₄-C₇ hydrocarbon content and detailed molecular composition of hydrocarbon, in hand-picked lithologies, is determined by a gc analysis of the light hydrocarbon extracted from 1-2 gram cuttings samples macerated in a microblender. A measured volume of sample is placed in a sealed microblender along with a measured volume of hot water. The rock sample is pulverized by the blades of the blender. A sample of the liberated light hydrocarbons which collect in the air space at the top of the blender is injected into our Varian Aerograph 1400 gc unit which is equipped with a capillary column. Data recording, computations, etc. are comparable to those used for the C₁-C₇ analysis discussed previously in this report. Hydrocarbon concentration is expressed as volume gas per million volumes of cuttings.

Organic Carbon

The total organic carbon content of a rock is a measure of its total organic richness. This data is used, in conjunction with visual kerogen and C₁-C₄, C₄-C₇ and C₁₅₊ hydrocarbon content of a rock, to indicate the hydrocarbon source quality of rocks.

The procedure for determining the total organic carbon content of a rock involves drying the sample, grinding to a powder, weighing out 0.2729 gram sample into a crucible, acidizing with hot and cold hydrochloric acid to remove calcium and magnesium carbonate, and carbon analysis by combustion in a Leco carbon analyzer.

We run several blank crucibles, standards (iron rings of known carbon content) and duplicate rock samples in this analysis at no additional charge to the client for purposes of data quality control.

C₁₅₊ Soxhlet Extraction, Deasphalting and Chromatographic Separation

The amount and composition of the organic matter which can be solvent-extracted from a rock reflects source quality and source type. C¹³/C¹² carbon isotopic, high mass spectrometric and gc analyses of the paraffin-naphthene and aromatic hydrocarbon fractions of the soluble extract gives data which is used in crude oil-parent rock correlations. This analysis involves grinding of a dry rock sample to a powder and removal of the soluble organic matter by soxhlet extraction using a co-distilled toluene-methanol azeotrope solvent. Where the amount of available sample material permits, we like to use at least 100 grams of rock for this analysis.

The extracted bitumen is separated into an asphaltene (ASPH) and a pentane soluble fraction by normal pentane precipitation. The pentane soluble components are separated into a C₁₅₊ paraffin-naphthene (P-N) hydrocarbon, C₁₅₊ aromatic hydrocarbon (AROM) and C₁₅₊ nitrogen-sulfur-oxygen containing fraction (NSO) by adsorption chromatography on a silica gel-alumina column using pentane, toluene and toluene-methanol azeotrope eluents.

GC Analysis of C₁₅₊ Paraffin-Naphthene (P-N) Hydrocarbons

The content and molecular composition of the heavy C₁₅₊ paraffin-naphthene (P-N) hydrocarbons of rocks, as determined by gc analysis, reflects source quality, source type and degree of thermal maturation.

In this analysis, we subject a very small fraction of the total amount of the P-N fraction extracted from a rock sample to gc analysis. The gas chromatograph is a Varian Aerograph Model 1400 equipped with a solid rod injection system and a eutectic column.

The calculated C. P. I. (carbon preference index) values for the normal paraffin data is defined as the mean of two ratios which are determined by dividing the sum of concentrations of odd-carbon numbered n-paraffins by the sum of even-carbon numbered n-paraffins. The C. P. Indices A and B were obtained by the formulas:

$$\text{C. P. Index A} = \frac{\frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}}}{2}$$

$$\text{C. P. Index B} = \frac{\frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}}}{2}$$

Visual Kerogen

A visual study of kerogen, the insoluble organic matter in rocks, can indicate the relative abundance, size, and state of preservation of the various recognizable kerogen types and thereby indicate the hydrocarbon source character of a rock. The color of the kerogen can be used to indicate the state of thermal maturity of the sediments (i. e. their time-temperature history). Thermal maturation plays an important role in the generation of hydrocarbons from organic matter, and also affects the composition of reservoired hydrocarbons.

Our procedure for visual kerogen slide preparation involves isolation of the organic matter of a rock by removal of the rock material with hydrochloric and hydrofluoric acid treatment and heavy liquid separation. This procedure is comparable to that used by the palynologist except it does not include an oxidation stage. (The oxidation treatment is deleted from our procedure because it removes a great deal of kerogen and blanches any remaining kerogen to an extent whereby it is useless for our kerogen color observations.) The kerogen residue is mounted on a glass slide and is examined visually under a high power microscope.

Vitrinite Reflectance

Measurement of the reflectivity of vitrinite particles (R_o) present in the kerogen isolated from sedimentary rocks provides a method of determining the state of maturation, and the diagenetic (time-temperature) history of the organic matter present in the sediments.

The kerogen, obtained from a 25 gram aliquot of crushed rock by the acid procedure previously discussed, is dried and embedded in a Bioplastic plug. The surface of the plug is polished using 0.05 micron alumina and the reflectivity determined under oil using a Zeiss high resolution microscope. A minimum of 40 values are required to adequately determine the Maturation Rank.

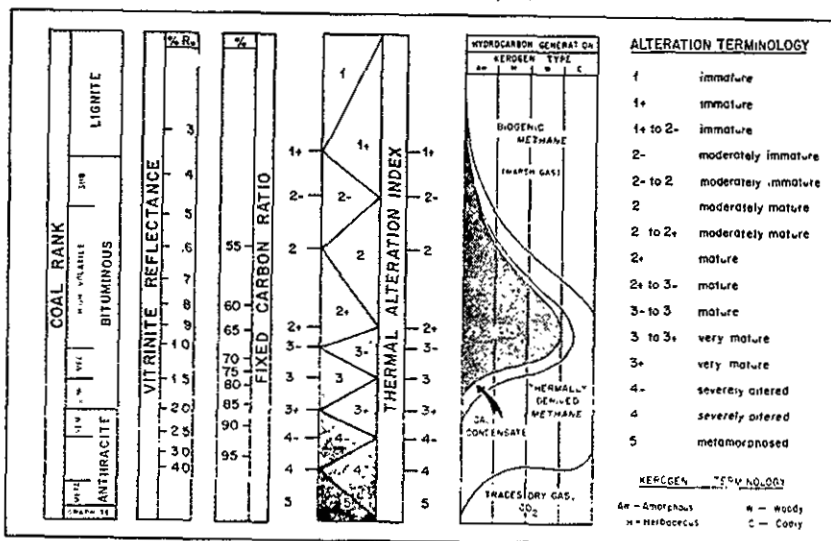
Fluorescence Spectrophotometric Analysis

Fluorescence spectrophotometry can be used to characterize and fingerprint crude oils, establish crude oil-source rock relationships, and to measure the hydrocarbon source potential of fine-grained sediments.

A one (1) microliter aliquot of either (i) a crude oil or (ii) the solvent extractable rock bitumen, is passed through an alumina/silica gel micro column and the C₁₀₊ aromatic hydrocarbons isolated. The aromatic hydrocarbon is diluted and the emission and excitation spectra determined at 240 nm and 420 nm using a Perkin-Elmer Model 512 Double Beam Fluorescence Spectrophotometer.

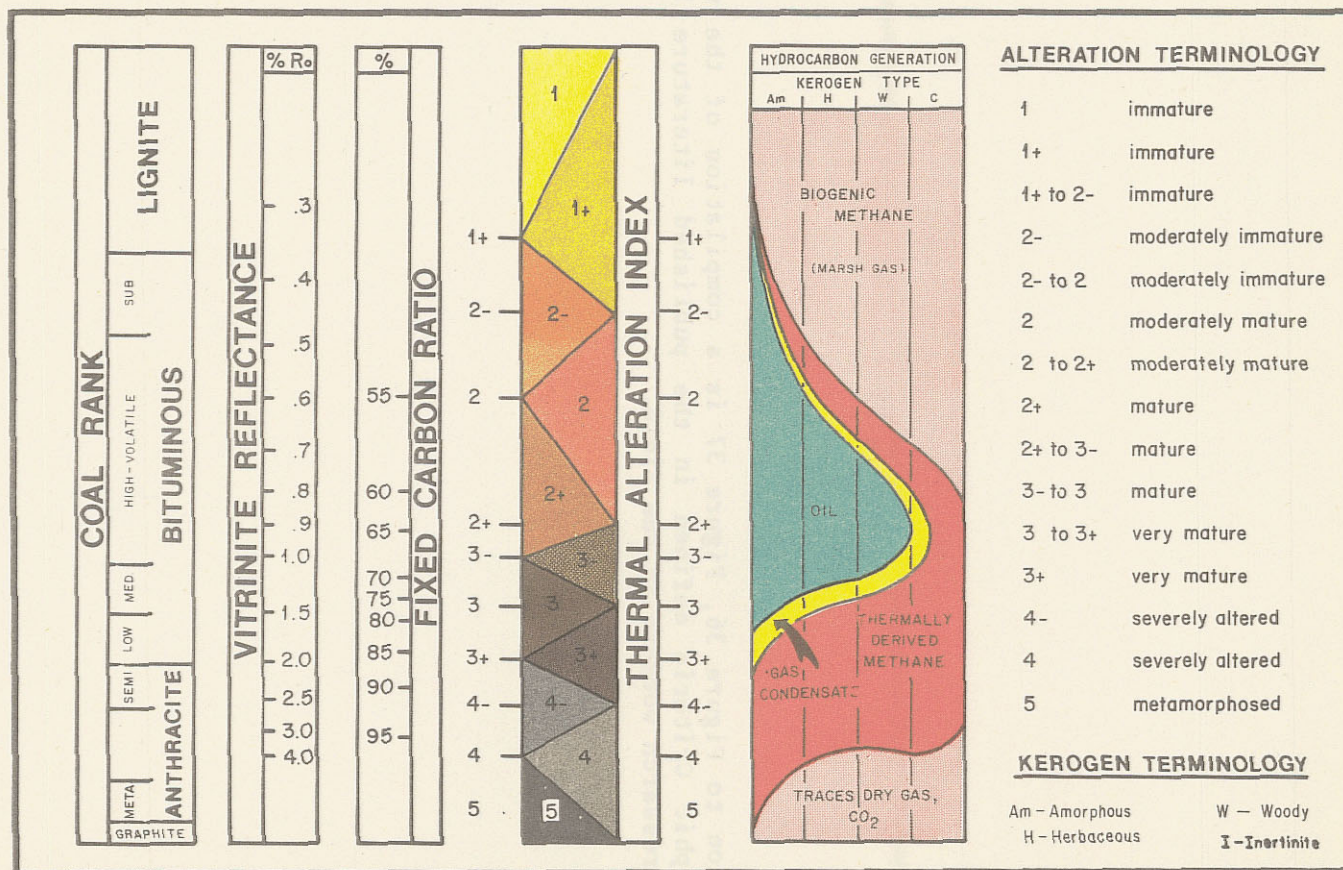
GEOTHERMAL DIAGENETIC CRITERIA

(GEOCHEM LABORATORIES, INC)



Geothermal Diagenetic Criteria

[GEOCHEM LABORATORIES, INC.]



APPENDIX IV

NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

TABLE 3F

SAMPLES COLLECTED FROM NEW WELL PEAK SECTION

Geothem Lab # 4/24 Recvd 11-12-91 J

Table 3F—Samples collected from New Well Peak section. Sample notation indicates NWP unit number and footage above base of unit.

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose				
			petrography	paleontology	petroleum		
					source	reservoir	
	1-1	1	Sandstone, siltstone	x			
-001	1-9 ✓	9	Limestone, siltstone	x			x
	1-10	10	Limestone, siltstone	x			
002	2-0	19	Limestone	x			x
	2-54	73	Limestone	x			
	2-57	76	Limestone, siltstone	x			
003	3-0	118	Limestone	x			x
-004	3-57	175	Limestone	x			x
	4-1	176	Conglomerate	x			
-005	4-13	189	Limestone	x			x
	4-58	234	Limestone	x			
-006	4-84	260	Limestone	x			x
	4-95	271	Sandstone	x			
	4-104	280	Limestone, altered	x			
-007	5-0	281	Limestone	x			x
	5-5	286	Chert	x			
	5-19	300	Limestone	x			
	5-21	302	Siltstone	x			
-008	5-41	322	Limestone	x			x
	5-46	327	Chert	x			
-009	6-0	329	Limestone	x			x
	6-4	333	Limestone	x			
	6-9	338	Limestone	x			
	6-16	345	Limestone	x			
-010	7-7	356	Limestone	x			x
	7-12	361	Chert	x			
	7-25	374	Limestone	x			
-011	7-34	383	Chert	x			
	7-44	393	Limestone	x			x
	7-50	399	Limestone	x			
	7-67	416	Limestone	x			
	7-71	420	Chert	x			
-012	8-1	431	Limestone	x			x
	8-14	444	Limestone	x			
-013	9-2	446	Limestone	x			x
	9-20	464	Chert	x			
	9-37	481	Limestone	x			

Geochem Job # 4124 Recd. 11-12-91 ef

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose			
			petrography	paleontology	petroleum	
					source	reservoir
	9-42	Chert	x			
	9-60	Limestone	x			
	10-1	Limestone	x			
014	10-6	Limestone	x			x
	10-7	Chert	x			
	10-8	Limestone, corals	x			
	10-13	Calclitic, ferrug.	x			
	10-30	Limestone	x			
	10-39	Limestone	x			
	10-60	Chert	x			
	10-61	Limestone	x			
	10-62	Chert, zebra	x			
	10-64	Limestone	x	x		
	11-0	Limestone	x			
	11-13	Chert	x			
	11-19	Limestone	x			
	11-25	Limestone, chaetetids	x			
015	12-0	Limestone	x			x
	12-1	Chert	x			
016	12-26	Limestone	x			x
	12-27	Chert	x			
	12-46	Limestone	x	x		
	12-66	Limestone, intraclasts	x			
	12-67	Limestone, bioturbated	x			
	12-99	Limestone	x			
017	12-144	Limestone	x			x
	12-145	Chert	x			
	12-155	Limestone		x		
	12-167	Limestone, burrowed	x			
	13-0	Limestone	x			
	13-2	Ferruginous material	x			
018	14-0	Limestone	x	x		x
	13W-1	Limestone	x			
	14W-0	Limestone	x	x		
	14W-4	Limestone	x	x		
	14W-18	Limestone	x			
	14W-33	Limestone	x	x		
	15-4	Limestone	x			
	16-1	Limestone	x			
	16-2	Limestone		x		
	16-4	Limestone		x		
019	17-13a	Limestone	x			x
	17-13b	Chert	x			
	17-17	Limestone	x			

Geochem Job # 4124

Received 11-12-91 *[Signature]*

Sample notation (NWP-)	Cumulative ft above base of section	Rock type	Purpose			
			petrography	paleontology	petroleum	
					source	reservoir
17-18	884	Chert	x			
17-21	887	Limestone	x	x		
18-3	893	Limestone	x	x		
18-5	895	Chert	x			
18-12	902	Limestone	x			
18-19	909	Limestone	x	x		
19-2	914	Limestone	x	x		
19-7	919	Chert	x			
19-8	920	Limestone	x			
19-19	931	Limestone	x			
19-25(SE)	937	Limestone	x			
20-1	945	Limestone	x	x		
20-0(SE)	944	Limestone, detrital	x			
20-2(SE)	946	Limestone, detrital	x			
20-19	963	Chert	x			
020 21-2	994	Limestone	x			x
21-6	998	Chert	x			
21-52	1044	Limestone	x	x		
21-70	1062	Limestone	x			
21-71	1063	Chert	x			
22-2	1082	Limestone	x			
021 22-4	1084	Limestone		x		
22-14	1094	Limestone	x	x		x
22-17	1097	Limestone	x	x		
22-19	1099	Limestone		x		
22-43(SE)	1123	Igneous diabase	x			
23-2	1135	Limestone	x	x		
23-4	1137	Limestone		x		
23-6	1139	Chert	x			
23-51	1184	Limestone	x			
24-2	1207	Limestone	x			
24-5	1210	Limestone	x	x		
24-11	1216	Chert	x			
022 25-1	1281	Limestone	x			x
26-1	1349	Limestone	x			
023 26-43	1391	Limestone	x			x
26-58	1406	Limestone	x	x		
26-73	1421	Chert	x			
27-1	1488	Limestone	x	x		
024 27-32	1519	Limestone	x	x		x
28-1	1531	Limestone	x			
28-34	1564	Limestone	x	x		
28-44	1574	Limestone	x			
29-0	1580	Limestone	x			