APPENDIX I

LABORATORY REPORTS FOR NAPL SAMPLES

February 22, 2005

Jeff Zukin
GeoSyntec
924 Anacapa St., Ste. 4A
Santa Barbara, CA 93101

Re: Ascon Landfill
PTS File 34791 Rev1

Dear Mr. Zukin:

Enclosed are Revised Fuel Fingerprinting data for samples submitted from your Ascon Land Fill, Huntington Beach, CA Project SB0202-21. Revisions were made by Dr. Slentz following your discussion regarding his interpretation. Previously reported Viscosity, Density and Interfacial Tension data are included for your convenience. Electronic versions of the data have been previously sent to your attention. All analyses were performed by applicable ASTM, EPA or API methodology. The samples are currently in storage and will be held for thirty days before disposal.

We appreciate the opportunity to be of service and trust these data will prove beneficial in the development of this project. Please call me at (562) 907-3607 with any questions or if you require additional information.

Sincerely,
PTS Laboratories, Inc.

Digitally signed by Larry Kunkel
cn=Larry Kunkel, o=PTS Laboratories, Inc., c=US
Date: 2005.02.22 11:38:02 -08'00'
Reason: <none>

Larry Kunkel
District Manager

LAK:vk

Encl.

Cc: L.W. Slentz

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Client: GeoSyntec PTS File No: 34791
Project Name: ASCON Landfill; Huntington Beach, CA
Project No: SB020-21

Hydrocarbon Characterization and Correlation

Introduction

A suite of four oils was received for hydrocarbon analysis and correlation of overall character. The fluids were from Wells identified as P1-GW04, P5-GW04, P6-GW04 AND P8-GW04, collected December 19, 2004.

Conclusions

The samples are quite similar in overall composition and are within the range of three or more petroleum fractions – gasoline range composition, diesel range composition, native (produced) crude oil and a kerosene range like fraction. The gasoline fraction has lost some of the very light ends (C_2 thru C_6) but in several samples there are still remnants of C_3 thru C_6 compounds. Benzene and toluene are absent from the gasoline range fraction. Also normal paraffins are low in concentration or missing from heavier fractions.

The only significant difference in composition among the four samples is the presences of some normal paraffins in the C_{11} plus fraction of P1 and P8 but not in P5 and P6. All the small differences noted among the four oils indicate that degradation activity varies with location in the landfill area.

Analysis & Discussion

The samples were analyzed by OIL PRINT™ that provides information on the detailed hydrocarbon composition of the C_2 to C_{34} fractions. The results of the analyses are presented in Table 1-3 and Figures 1-4. The figures are reduced scale versions of the chromatograms. Some peak identifications have been added for ease in following the discussion, which follows. Comparing P1 (Fig.1a) to P5 (Fig. 2a) shows there are differences in the amount of light gasoline fraction (C_3 thru C_6) and in normal paraffin content of the C_{13} to C_{25} fraction. However, the remainder of the hydrocarbon composition is almost identical in all four samples.

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Hydrocarbon Characterization and Correlation

Analysis & Discussion, continued

Thus, except for differences in the normal paraffin concentrations, the specific hydrocarbon make up of all four samples is nearly identical. Table 1 contains percentages of various fractions as defined by molecular weight, carbon number, or boiling points. The values were obtained from peak areas on the chromatograms. The values are not precise because there is overlap of some of the fractions. For example, diesels usually contain some light ends even in the light gasoline fraction and also some small amounts of compounds heavier than C_{20}. Fuel oils also can contain lighter than C_{20} constituents.

The samples were arranged in Table 1 on the basis of decreasing amounts of gasoline with P1 having the most – approximately 20% and P5 the least about 9%. Most of this difference is reflected or compensated for by larger amounts of the heaviest fractions – C_{25} to C_{29} and C_{29} to C_{34}.

The writer can offer no obvious explanation for these differences. It seems likely that the environmental factors – nature of the sediments lying above the groundwater table, depth, thickness, and movement of the ground water table, relative time of emplacement in the landfill of the hydrocarbon products, could all have contributed to small variations in the amount of degradation that has occurred over time. Field personnel familiar with the site are in the best position to make such interpretations.

L.W. Slentz

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Table 1
Hydrocarbon Range Composition

GC Run No.	Sample ID	Gasoline C_3 to C_8	Heavy Gasoline C_8 to C_9	Kerosene C_9 to C_{11}	Diesel C_{11} to C_{20}	Fuel Oils, Lube Oils, Bunker Fuel		
						C_{25} to C_{25}	C_{25}-C_{28}	C_{29}-C_{34}
4391	P-1-GW04	10.3	10.0	14.9	44.8	7.1	5.3	7.6
4390	P-8-GW04	7.2	7.2	13.6	55.7	5.5	4.3	8.6
4392	P-6-GW04	5.4	7.2	13.9	45.4	7.1	8.4	12.6
4389	P-5-GW04	2.5	6.7	14.0	51.8	7.6	6.7	10.7

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Figure 1a
P-1-GW04 Chromatogram – Gasoline Range (0-10min)

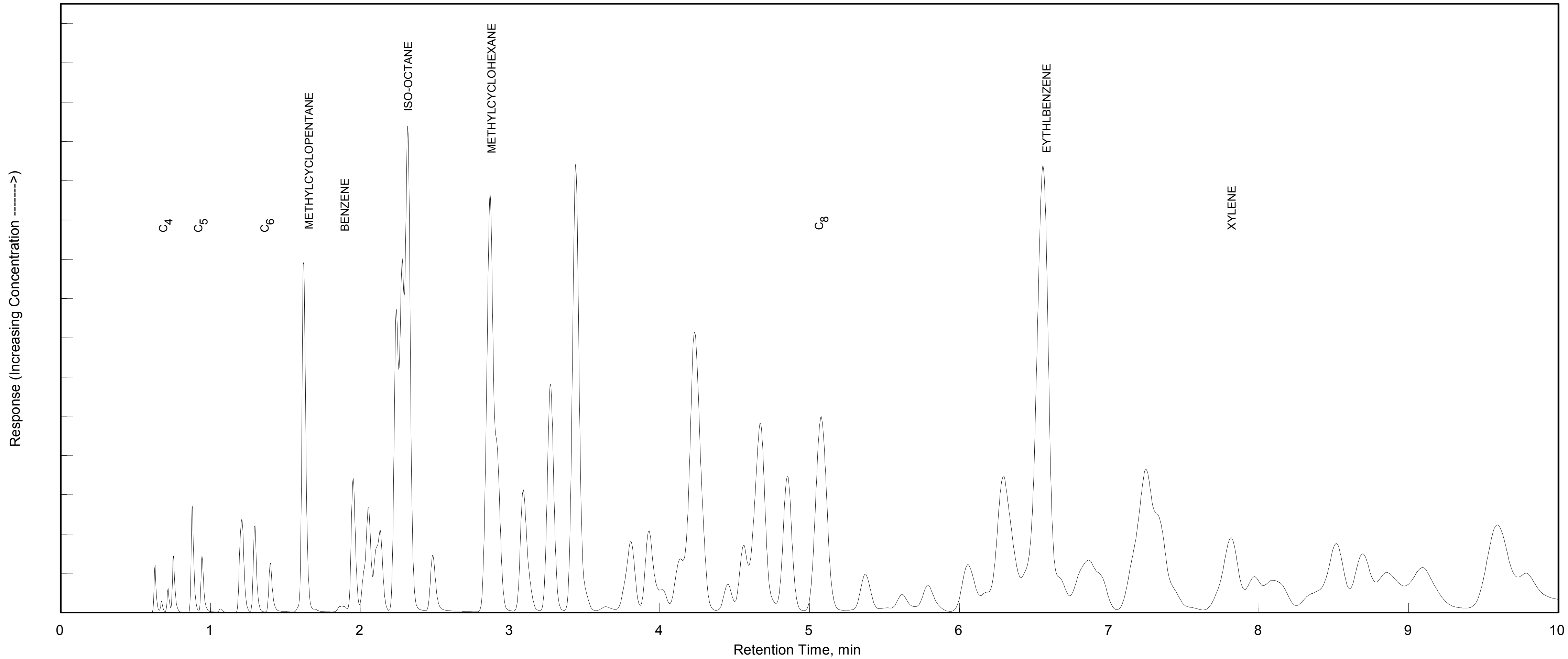

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Figure 1b
P-1-GW04 Chromatogram – C_4 to C_{34} (0-90min)

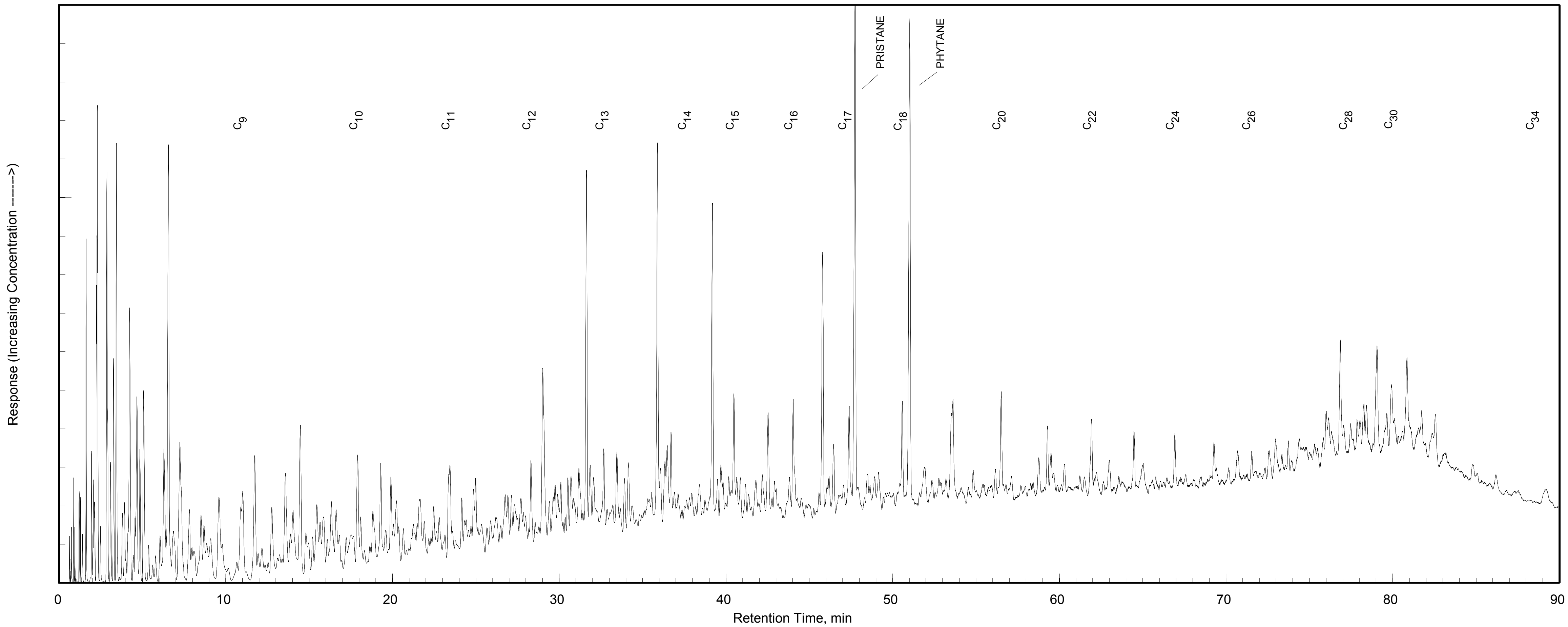

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Figure 2a
P-5-GW04 Chromatogram – Gasoline Range (0-10min)

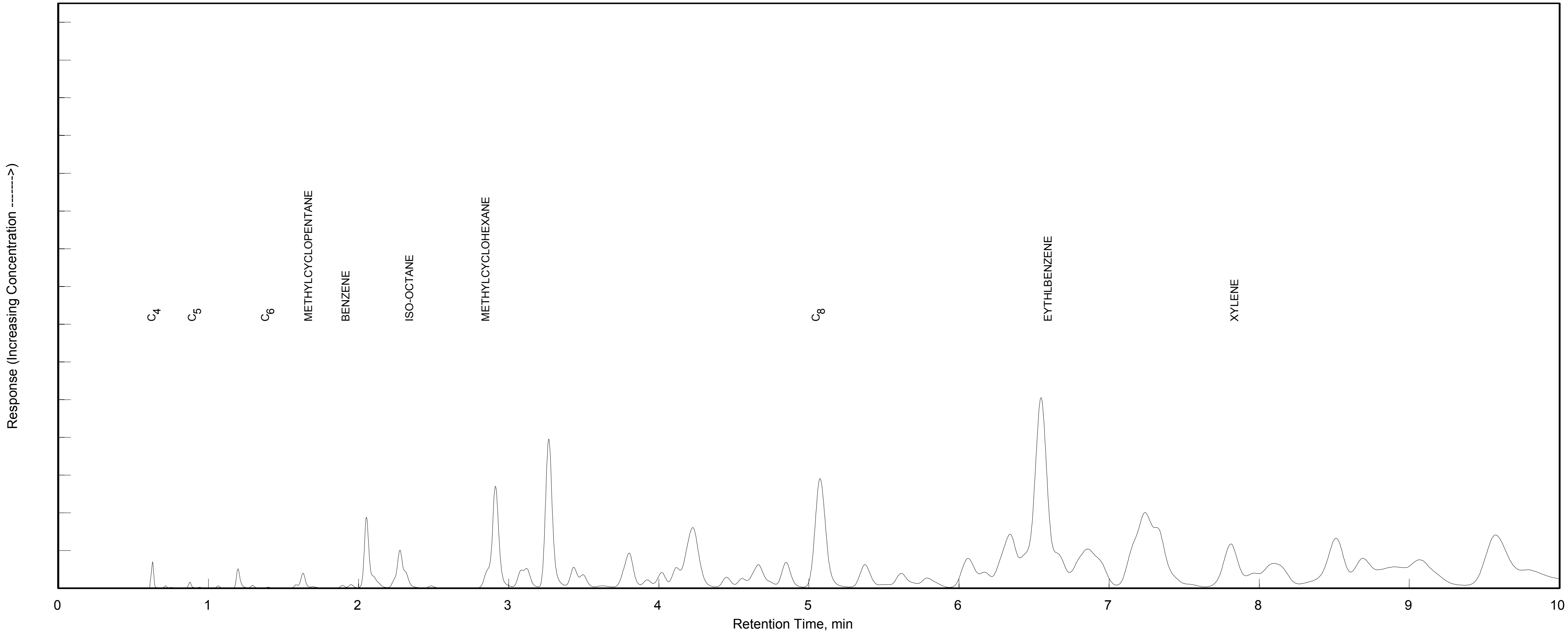

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Figure 2a
P-5-GW04 Chromatogram – C_4 to C_{34} (0-90min)

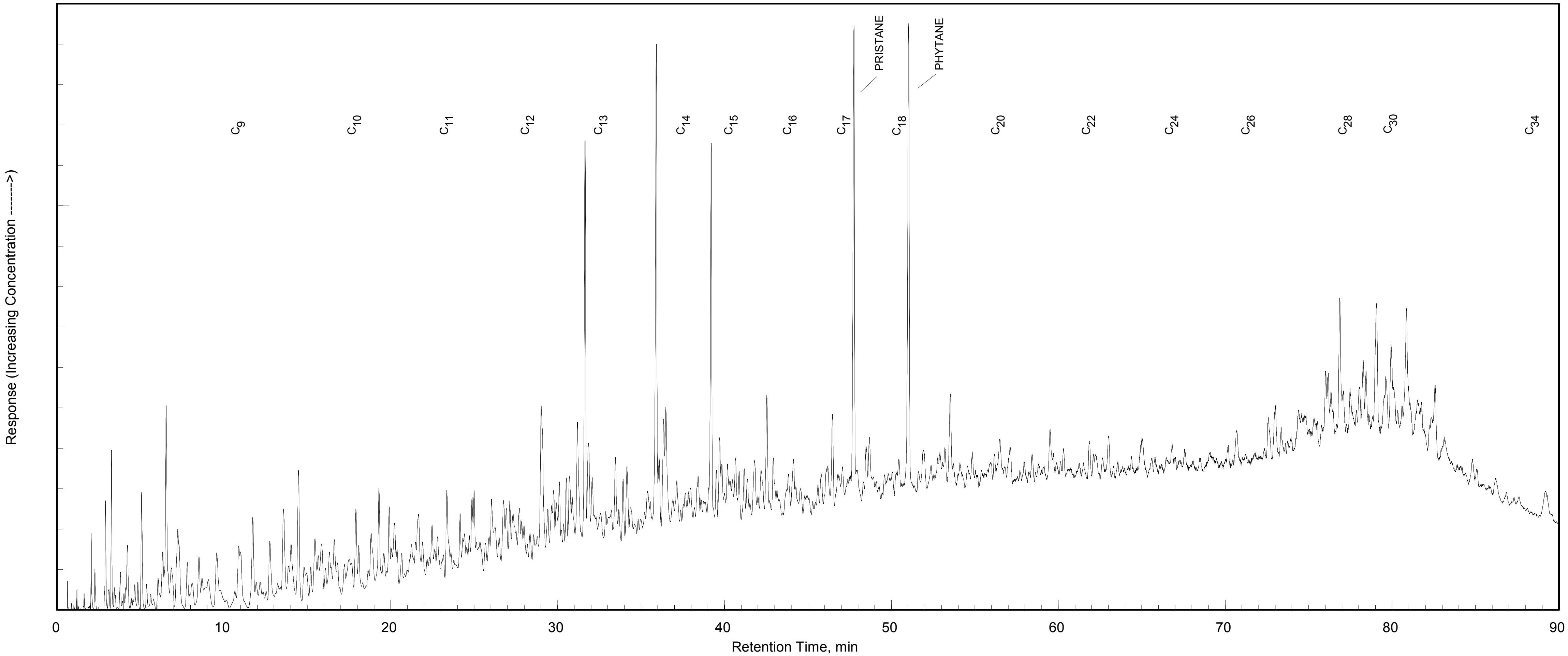

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Figure 3

P-8-GW04 Chromatogram – C_4 to C_{34} (0-90min)

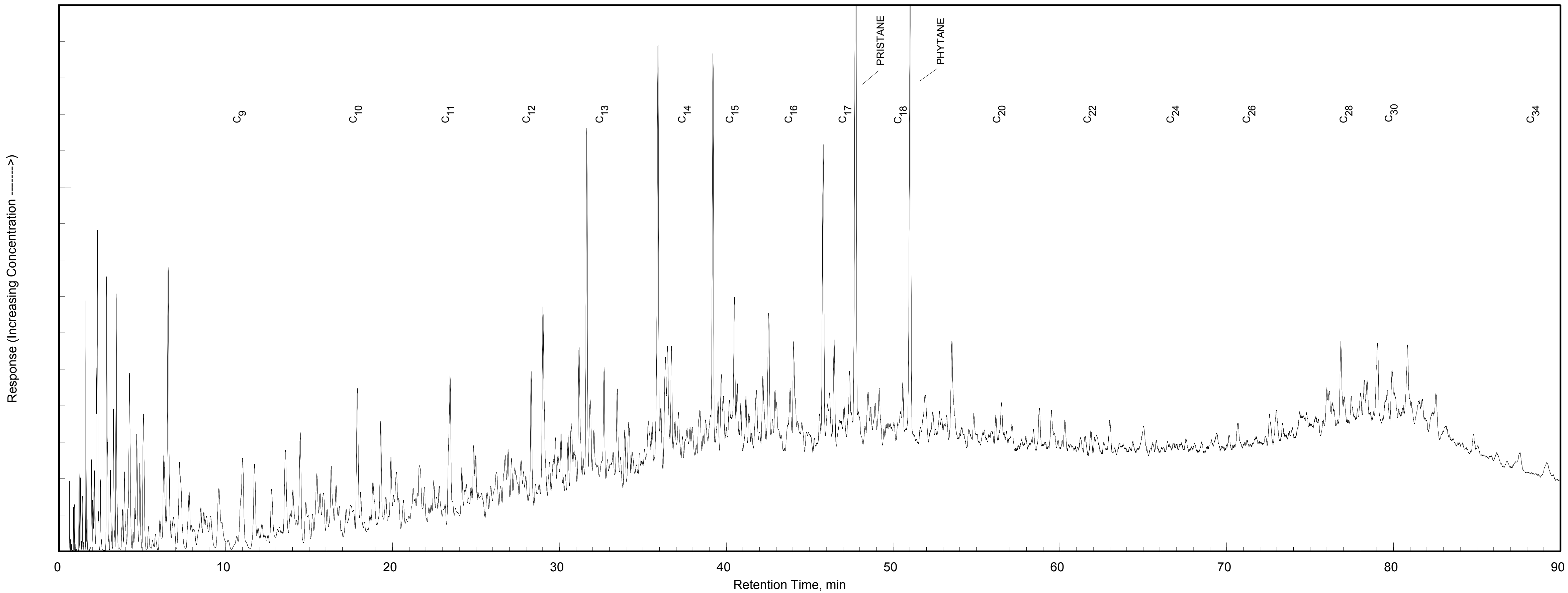

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Figure 4
P-6-GW04 Chromatogram – C_4 to C_{34} (0-90min)

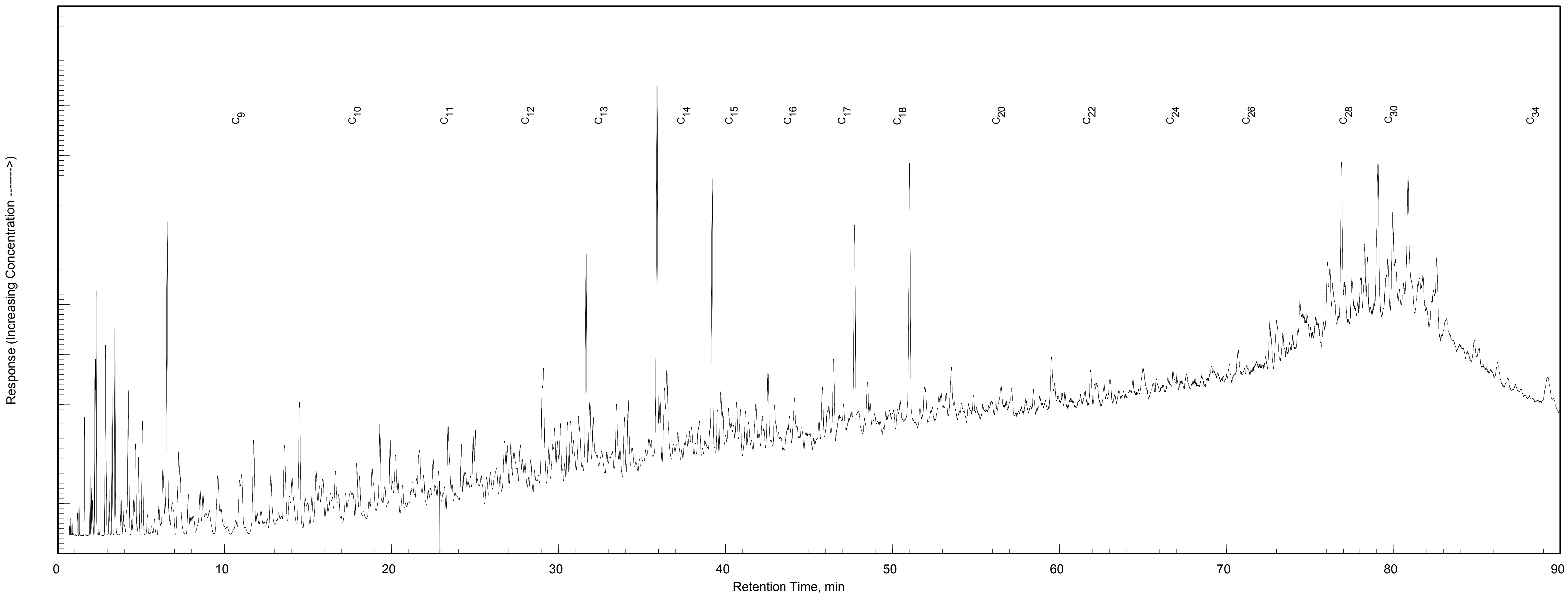

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Table 2
Interfacial / Surface Tension Data – ASTM D971

Phase Pair		Temperature, °F	Interfacial Tension, Dynes/centimeter
Sample ID / Phase	Sample ID / Phase		
P1-GW04-12/04 NAPL	Air	70.0	31.2
P1-GW04-12/04 NAPL	Tap Water	70.0	28.2
P5-GW04-12/04 NAPL	Air	70.0	32.9
P5-GW04-12/04 NAPL	Tap Water	70.0	25.8
P6-GW04-12/04 NAPL	Air	70.0	32.9
P6-GW04-12/04 NAPL	Tap Water	70.0	34.5
P8-GW04-12/04 NAPL	Air	70.0	30.9
P8-GW04-12/04 NAPL	Tap Water	70.0	16.3
Tap Water	Air	70.0	71.8

Quality Control Data

Phase Pair:	DIWATER / AIR
Temp., °F:	70.0
IFT, measured:	73.3
IFT, published:	72.6
RPD:	1.03

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Table 3
Viscosity Data – ASTM D445, API RP40

Sample ID	Matrix	Temp., °F	Specific Gravity	Density, g/cc	Viscosity	
					centistokes	centipoise
P1-GW04-12/04	NAPL	70	0.9515	0.9496	776	737
		100	0.9469	0.9404	219	206
		130	0.9454	0.9322	86.4	80.5
P5-GW04-12/04	NAPL	70	0.9683	0.9664	4111	3973
		100	0.9652	0.9585	923	885
		130	0.9625	0.9490	265	251
P6-GW04-12/04	NAPL	70	0.9842	0.9822	12463	12241
		100	0.9835	0.9767	6968	6806
		130	0.9824	0.9686	1473	1427
P8-GW04-12/04	NAPL	70	0.9434	0.9415	453	426
		100	0.9396	0.9331	143	133
		130	0.9356	0.9225	59.0	54.4