

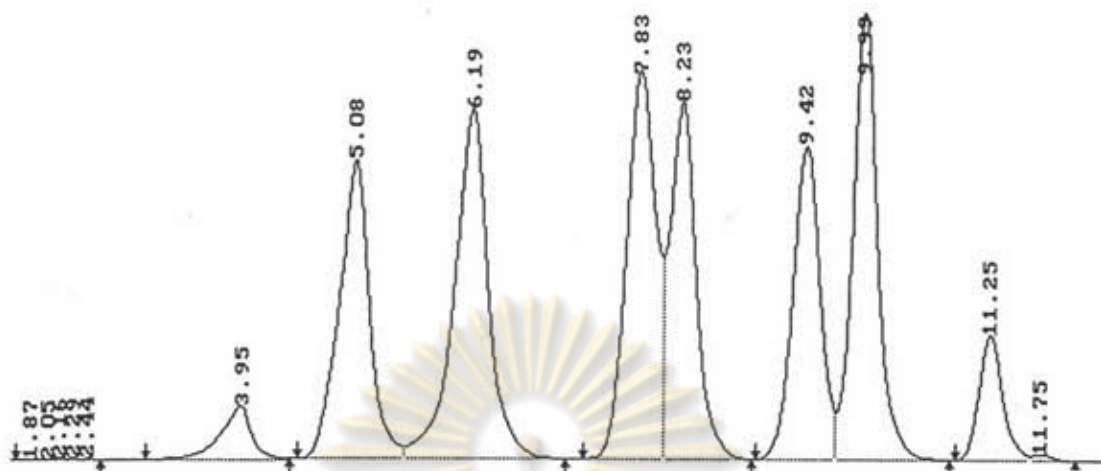
REFERENCES

1. Fuels and lubes Asia Conference. "Air quality of Bangkok in 1996", The Regent Hotel, Singapore, January, 20, 1997.
2. Miss Suputta Midpanon. "Effect of organotin in gasoline on exhaust emission from car", Thesis Master, Chulalongkorn University, 1995.
3. Pouden, C.C., "Basic engine types and their operation", Gasoline Engine Principles and Practice. London : Butter & Tamer Ltd., 1962.
4. Eng C., Mech F.I. "Properties of gasoline" Automotive Fuel and Fuel Systems. vol.1, England, 1991.
5. Owen, K., Gasoline and Diesel Fuel additive. vol.25, New York : John Wiley & Sons Inc., 1990.
6. Lenone D.L., "Gasoline additive solve injector deposit problems", SAE Tech. Paper No.861533, 1986.
7. Bitting B., Gachwendtner F. "Intake valve deposit fuel detergency requirements revisited", SAE Tech. Paper No.872117, 1987.
8. Coler,C.C. and Gergel, W.C. "Detergent and dispersants" Chemistry and Technology of Lubricants,1992.
9. Hobson, G.D., Modern Petroleum Technology. 5th, Great Britain, Galliard Ltd., Great Yarmoth, 1986.
10. Pupovich M., Hering. Fuel and Lubricants. London : John Wiley & Sons Inc., 1959.
11. Keating L., " Energy and Combustion", Applied Combustion., Marcel Marcel Dekker Inc., New York, 1993.

12. Huknail, D.J., Chemistry of Hydrocarbon Combustion, Chapman and Hall, London, 1985.
13. Springer G.S., Patterson, D.J. Engine Emission Pollutant Formation and Measurement. New York : Plenum Press, 1973.
14. Benson R.S., Internal Combustion Engine, Pergamon Press, Oxford, 1979.
15. John B., "Combustion Formation and emission of trace species" Applied Combustion, Ann Arbor Science Publishers, Michigan, 1993.
16. Lowry S.O., "Exhaust emission from a single cylinder engine", Combustion Science and Technology, vol.12, 1976.
17. Gordon E., Advance in Combustion Toxicology. Technomic Publishing Company, Pennsylvania, 1989.
18. Preuss A.W., "Effect of oxygenate from their product" Aternate Fuel for Spark Ignition and Diesel Engine, Automotive Engineers Inc., 1983.
19. William J., "Effect of heavy hydrocarbon in gasoline on exhaust mass emissions, air toxic, and calculated reactivity. SAE Tech. Paper No.932723, 1994.
20. Anders, Laveskoy. " Testing the effects on exhaust emission of two gasoline additive in lead-free gasoline", Report for Adibis, Motertest Center, June, 1994.
21. SAE Recommended Practice. "Chemical method for the measurement of nonregulated diesel emissions", Report of the Diesel Emission Standard Committee Approve, Oct., 1989.
22. Miss Suputta Midpanon. "Effect of organotin in gasoline on exhaust emission from car", Thesis Master, Chulalongkorn University, 1995.



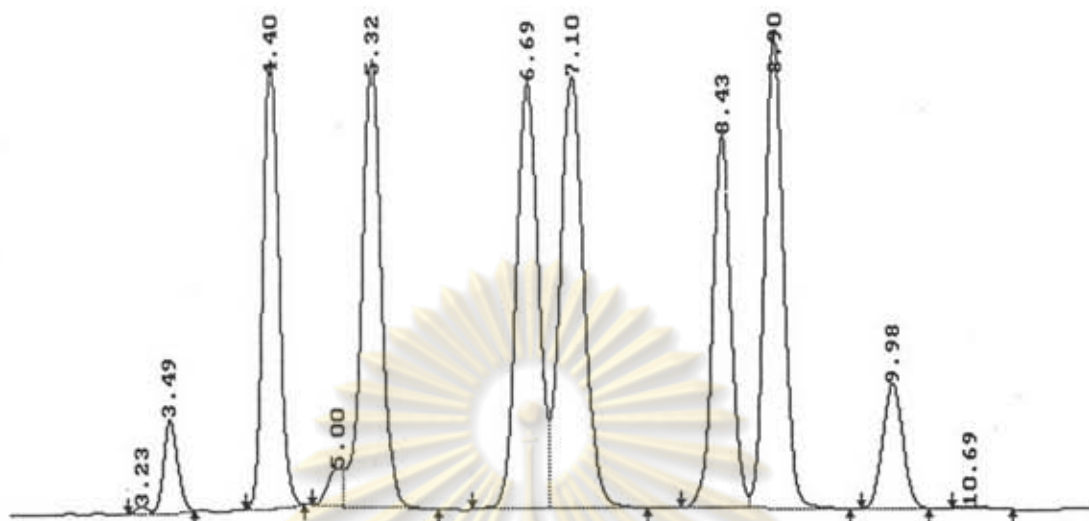
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Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 20:19:59 Acquisition Time : 20:20:22
 File Name : std01

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.19	Unknown	1125	0.02	7330	0.01
2	1.87	Unknown	1239	0.02	8662	0.01
3	2.05	Unknown	2574	0.04	19443	0.02
4	2.16	Unknown	3773	0.06	26162	0.02
5	2.29	Unknown	3340	0.05	18382	0.02
6	2.44	Unknown	4297	0.07	23507	0.02
7	3.95	Unknown	123366	2.00	2593005	2.37
8	5.08	Unknown	697513	11.30	14080099	12.88
9	6.19	Unknown	816432	13.23	18699297	17.11
10	7.83	Unknown	904662	14.66	17410592	15.93
11	8.23	Unknown	829704	13.45	14616186	13.38
12	9.42	Unknown	733702	11.89	13514648	12.37
13	9.99	Unknown	1069969	17.34	17943373	16.42
14	11.25	Unknown	293521	4.76	4754352	4.35
15	11.75	Unknown	16503	0.27	220080	0.20
Total			6170882	100.00	109277052	100.00

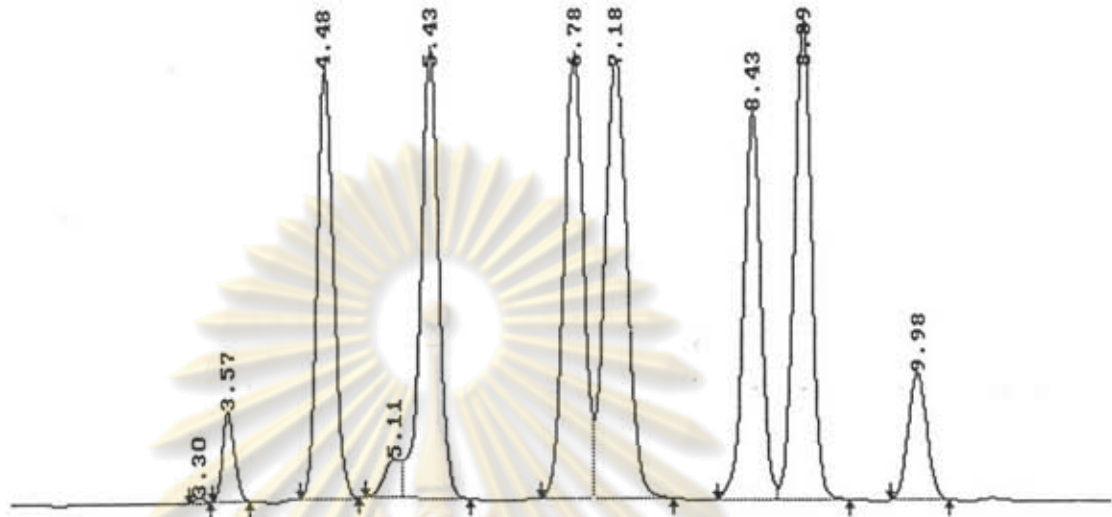
Figure A1 : HPLC Chromatogram of 378 ppm formaldehyde in mixed standard



Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 21:11:05 Acquisition Time : 20:20:22
 File Name : std02

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.23	Unknown	7414	0.21	49887	0.12
2	3.49	Unknown	105941	2.97	879134	2.10
3	4.40	Unknown	510310	14.32	5140378	12.27
4	5.00	Unknown	43043	1.21	373393	0.89
5	5.32	Unknown	510548	14.32	6291475	15.01
6	6.69	Unknown	490453	13.76	6662796	15.90
7	7.10	Unknown	495034	13.89	7351468	17.54
8	8.43	Unknown	428826	12.03	4985586	11.90
9	8.90	Unknown	548059	15.37	6419097	15.32
10	9.98	Unknown	143265	4.02	1818374	4.34
11	10.69	Unknown	2929	0.08	45007	0.11
Total			3564809	100.00	41905916	100.00

Figure A2 : HPLC Chromatogram of 151.20 ppm formaldehyde in mixed standard

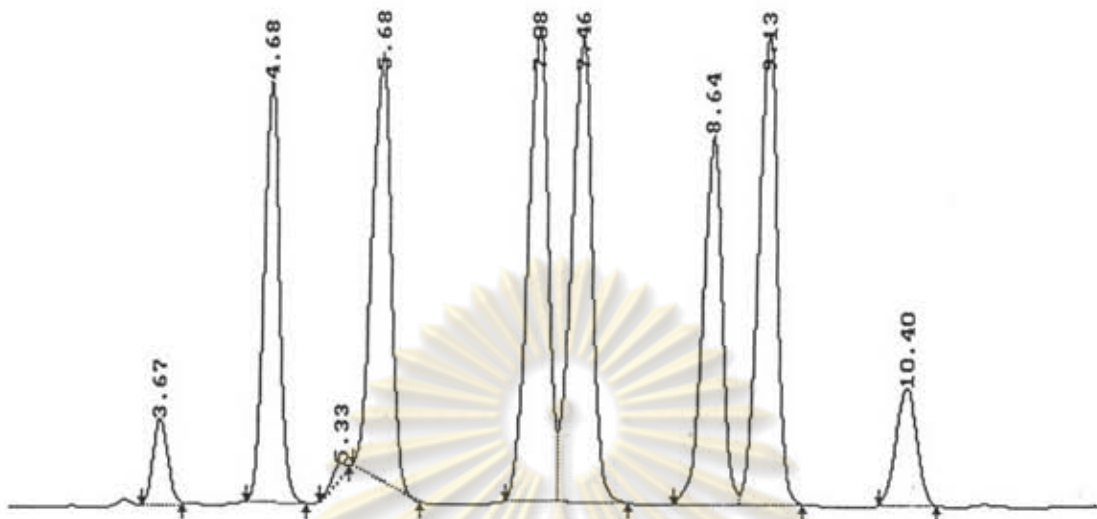


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 21:55:52 Acquisition Time : 20:20:22
 File Name : std03

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.30	Unknown	1925	0.18	12364	0.10
2	3.57	Unknown	31324	2.88	243625	1.98
3	4.48	Unknown	149050	13.71	1540673	12.50
4	5.11	Unknown	13364	1.23	138647	1.12
5	5.43	Unknown	156807	14.43	1796197	14.57
6	6.78	Unknown	154863	14.25	1994271	16.18
7	7.18	Unknown	153156	14.09	2212697	17.95
8	8.43	Unknown	135062	12.43	1440356	11.69
9	8.89	Unknown	167637	15.42	1868748	15.16
10	9.98	Unknown	44277	4.07	546791	4.44
Total			1086840	100.00	12326501	100.00

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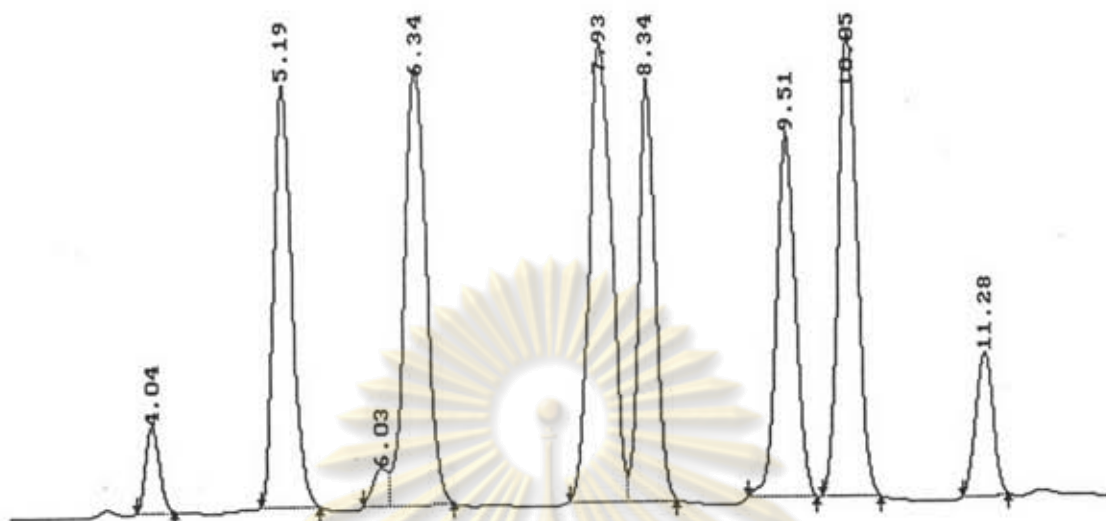
Figure A3 : HPLC Chromatogram of 60.48 ppm formaldehyde in mixed standard



Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 22:31:12 Acquisition Time : 20:20:22
 File Name : std04

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.67	Unknown	15852	2.79	143977	2.24
2	4.68	Unknown	78027	13.72	770224	11.97
3	5.33	Unknown	2259	0.40	16551	0.26
4	5.68	Unknown	78946	13.88	934453	14.53
5	7.08	Unknown	87776	15.43	1097411	17.06
6	7.46	Unknown	85315	15.00	1123456	17.46
7	8.64	Unknown	68597	12.06	790417	12.29
8	9.13	Unknown	86933	15.29	999695	15.54
9	10.40	Unknown	21806	3.83	285034	4.43
Total			568739	100.00	6433034	100.00

Figure A4 : HPLC Chromatogram of 24.19 ppm formaldehyde in mixed standard

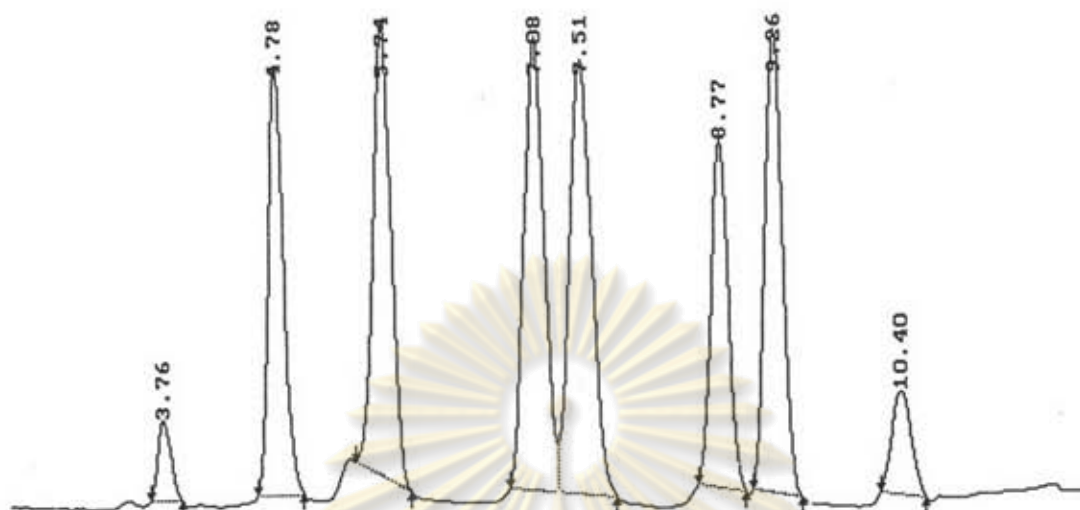


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 23:18:03 Acquisition Time : 20:20:22
 File Name : std05

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	4.04	Unknown	6367	2.78	52565	2.09
2	5.19	Unknown	31309	13.67	328951	13.11
3	6.03	Unknown	2808	1.23	24809	0.99
4	6.34	Unknown	32464	14.17	413196	16.46
5	7.93	Unknown	33837	14.77	459600	18.31
6	8.34	Unknown	31301	13.66	301373	12.01
7	9.51	Unknown	26993	11.78	307507	12.25
8	10.05	Unknown	34288	14.97	399958	15.93
9	11.28	Unknown	10667	4.66	111059	4.42
Total			229109	100.00	2510108	100.00

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Figure A5 : HPLC Chromatogram of 9.68 ppm formaldehyde in mixed standard

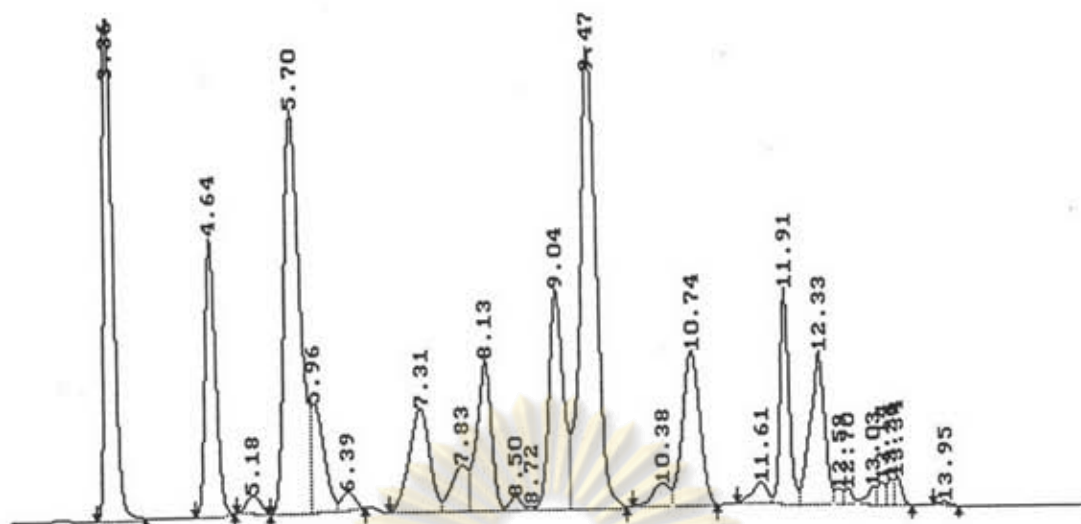


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-20 Acquisition Date : 1997-02-10
 Time : 23:50:21 Acquisition Time : 20:20:22
 File Name : std06

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.76	Unknown	2422	2.65	19632	1.94
2	4.78	Unknown	13048	14.28	121272	11.98
3	5.74	Unknown	14132	15.47	163478	16.15
4	7.08	Unknown	13735	15.03	175850	17.37
5	7.51	Unknown	13136	14.38	184388	18.21
6	8.77	Unknown	10572	11.57	112611	11.12
7	9.26	Unknown	14085	15.42	153613	15.17
8	10.40	Unknown	3122	3.42	37489	3.70
Total			91373	100.00	1012325	100.00

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Figure A6 : HPLC Chromatogram of 3.87 ppm formaldehyde in mixed standard

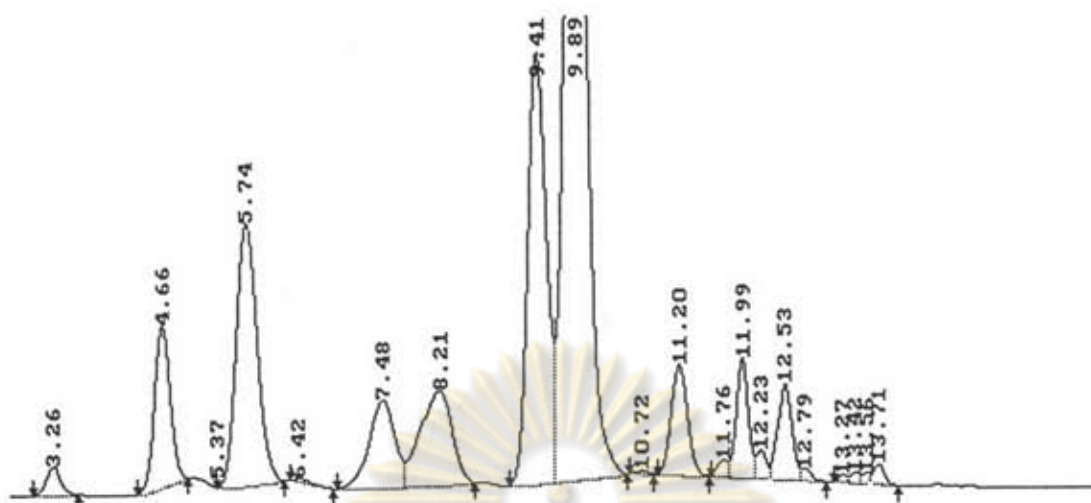


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-02-10
 Time : 02:03:51 Acquisition Time : 20:20:22
 File Name : 1B0001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.27	Unknown	2289	0.10	19949	0.08
2	3.36	Unknown	447836	19.33	3302479	12.62
3	4.64	Unknown	206727	8.92	1983593	7.58
4	5.18	Unknown	14245	0.61	170705	0.65
5	5.70	Unknown	296679	12.80	4165863	15.92
6	5.96	Unknown	79003	3.41	887973	3.39
7	6.39	Unknown	11910	0.51	142103	0.54
8	7.31	Unknown	76942	3.32	1356625	5.18
9	7.83	Unknown	33096	1.43	474595	1.81
10	8.13	Unknown	111725	4.82	1392760	5.32
11	8.50	Unknown	9195	0.40	87828	0.34
12	8.72	Unknown	2598	0.11	17054	0.07
13	9.04	Unknown	161994	6.99	1995184	7.62
14	9.47	Unknown	341525	14.74	4774241	18.24
15	10.38	Unknown	17114	0.74	247272	0.94
16	10.74	Unknown	114731	4.95	1670850	6.38
17	11.61	Unknown	16411	0.71	208605	0.80
18	11.91	Unknown	160074	6.91	1204126	4.60
19	12.33	Unknown	114073	4.92	1406643	5.37
20	12.59	Unknown	11626	0.50	89460	0.34
21	12.70	Unknown	12109	0.52	79678	0.30
22	13.03	Unknown	14188	0.61	117969	0.45
23	13.14	Unknown	17526	0.76	107637	0.41
24	13.26	Unknown	19205	0.83	102813	0.39
25	13.34	Unknown	21590	0.93	141493	0.54
26	13.95	Unknown	2960	0.13	27227	0.10
Total			2317370	100.00	26174725	100.00

Figure A7 : HPLC Chromatogram of sample from gasoline base

at 1000 rpm

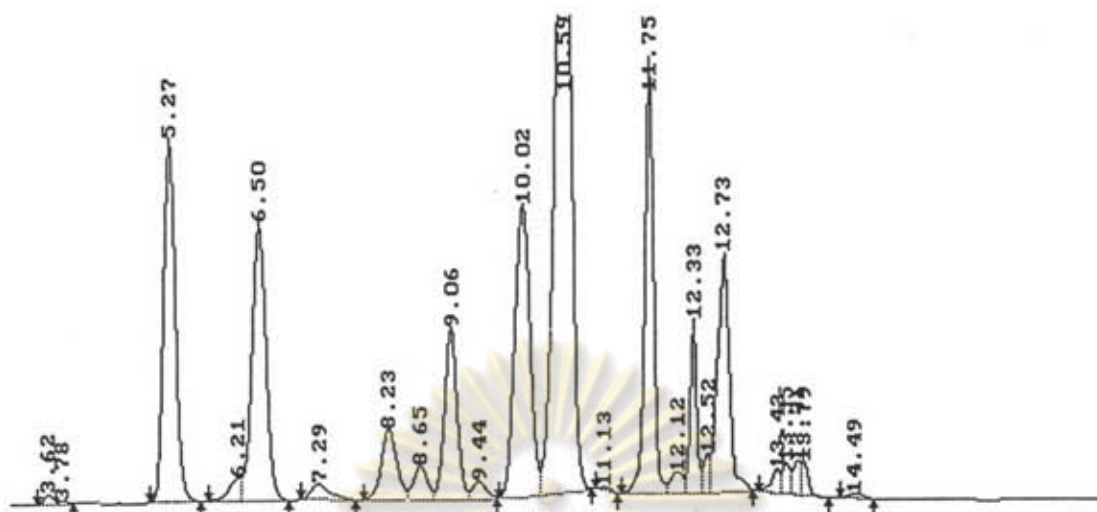


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 22:28:47 Acquisition Time : 20:20:22
 File Name : 1B0001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.89	Unknown	1002	0.06	5864	0.02
2	3.26	Unknown	18109	1.02	227750	0.79
3	4.66	Unknown	104648	5.89	1479353	5.16
4	5.37	Unknown	5705	0.32	2849	0.01
5	5.74	Unknown	170012	9.56	3173584	11.06
6	6.42	Unknown	2024	0.11	28753	0.10
7	7.48	Unknown	55986	3.15	1260463	4.39
8	8.21	Unknown	59927	3.37	1620509	5.65
9	9.41	Unknown	279481	15.72	4363935	15.21
10	9.89	Unknown	795654	44.74	13309362	46.39
11	10.72	Unknown	2401	0.14	26373	0.09
12	11.20	Unknown	71700	4.03	1045235	3.64
13	11.76	Unknown	11336	0.64	96339	0.34
14	11.99	Unknown	77743	4.37	817974	2.85
15	12.23	Unknown	18383	1.03	155390	0.54
16	12.53	Unknown	62901	3.54	754647	2.63
17	12.79	Unknown	8186	0.46	67732	0.24
18	13.27	Unknown	4775	0.27	30957	0.11
19	13.42	Unknown	7218	0.41	54989	0.19
20	13.56	Unknown	7539	0.42	49786	0.17
21	13.71	Unknown	13468	0.76	117637	0.41
Total			1778199	100.00	28689478	100.00

Figure A8 : HPLC Chromatogram of sample from gasoline base

at 1500 rpm

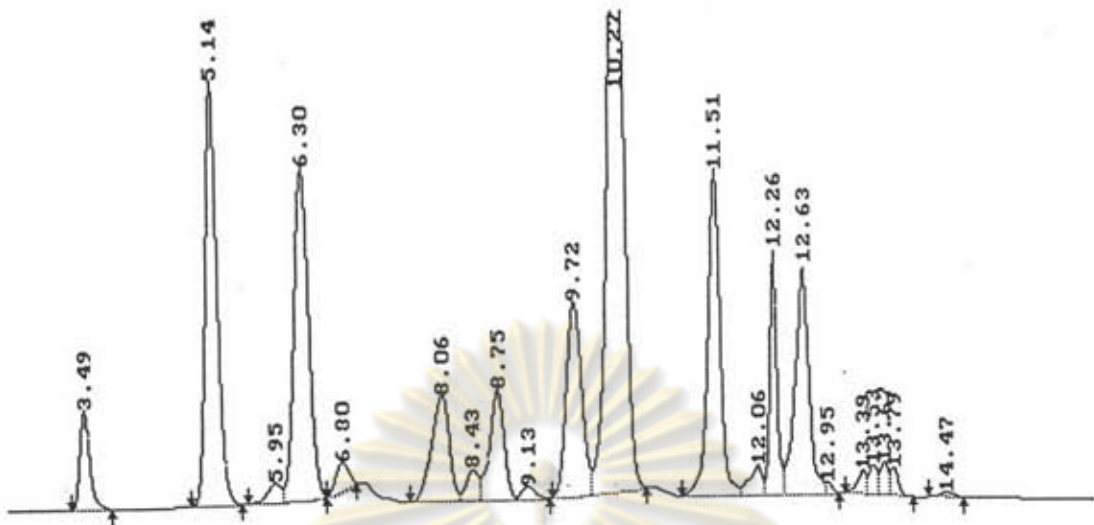


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 23:58:43 Acquisition Time : 20:20:22
 File Name : 1B0002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.27	Unknown	1153	0.04	8202	0.03
2	3.62	Unknown	8004	0.31	64698	0.22
3	3.78	Unknown	2722	0.11	21641	0.07
4	5.27	Unknown	288501	11.26	3217533	11.08
5	6.21	Unknown	17421	0.68	189803	0.65
6	6.50	Unknown	220329	8.60	2884884	9.93
7	7.29	Unknown	12284	0.48	209563	0.72
8	8.23	Unknown	56457	2.20	778562	2.68
9	8.65	Unknown	25715	1.00	325056	1.12
10	9.06	Unknown	136640	5.33	1589564	5.47
11	9.44	Unknown	12884	0.50	155880	0.54
12	10.02	Unknown	231658	9.04	3278972	11.29
13	10.59	Unknown	720275	28.11	9624749	33.14
14	11.13	Unknown	2813	0.11	28705	0.10
15	11.75	Unknown	346485	13.52	2788293	9.60
16	12.12	Unknown	15776	0.62	172611	0.59
17	12.33	Unknown	137454	5.36	753163	2.59
18	12.52	Unknown	30382	1.19	169917	0.58
19	12.73	Unknown	191124	7.46	2052566	7.07
20	13.43	Unknown	19452	0.76	149021	0.51
21	13.55	Unknown	25328	0.99	177953	0.61
22	13.71	Unknown	27549	1.08	177511	0.61
23	13.79	Unknown	27614	1.08	177119	0.61
24	14.49	Unknown	4100	0.16	50225	0.17
Total			2562119	100.00	29046188	100.00

Figure A9 : HPLC Chromatogram of sample from gasoline base

at 2000 rpm

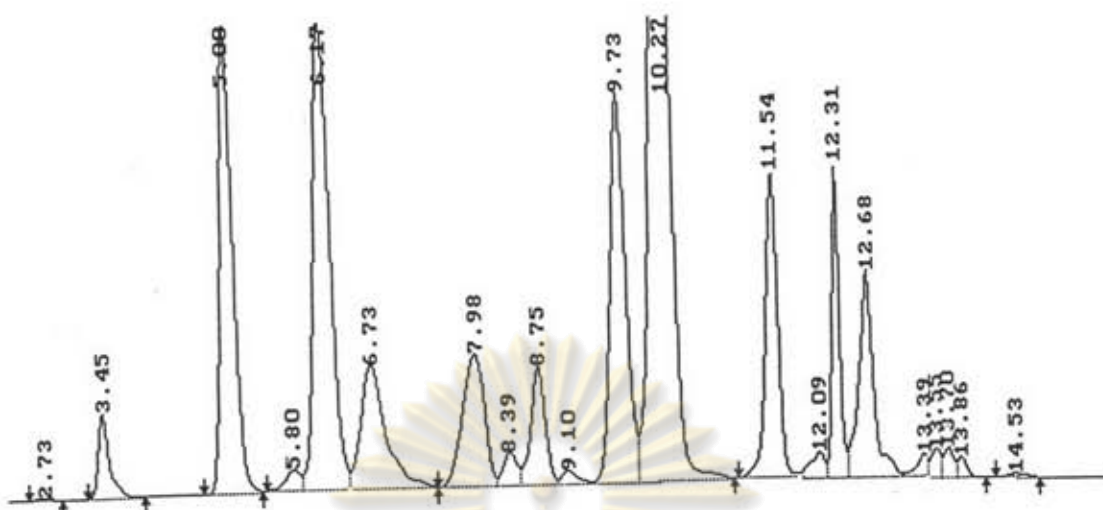


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 23:04:00 Acquisition Time : 20:20:22
 File Name : 1B0002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.27	Unknown	1137	0.05	7996	0.03
2	3.49	Unknown	71146	3.28	625506	2.51
3	5.14	Unknown	300649	13.88	3227837	12.97
4	5.95	Unknown	13044	0.60	154006	0.62
5	6.30	Unknown	234544	10.83	3008087	12.08
6	6.80	Unknown	19006	0.88	205990	0.83
7	8.06	Unknown	75480	3.48	1140145	4.58
8	8.43	Unknown	22257	1.03	235261	0.95
9	8.75	Unknown	78200	3.61	951187	3.82
10	9.13	Unknown	8633	0.40	100852	0.41
11	9.72	Unknown	137754	6.36	1847376	7.42
12	10.27	Unknown	523567	24.17	7070425	28.40
13	11.51	Unknown	230753	10.65	2508040	10.08
14	12.06	Unknown	20438	0.94	222633	0.89
15	12.26	Unknown	174037	8.03	1016855	4.08
16	12.63	Unknown	162813	7.52	1902856	7.64
17	12.95	Unknown	7809	0.36	43516	0.17
18	13.39	Unknown	16437	0.76	126006	0.51
19	13.53	Unknown	21166	0.98	155753	0.63
20	13.67	Unknown	23216	1.07	162267	0.65
21	13.79	Unknown	20534	0.95	133780	0.54
22	14.47	Unknown	3549	0.16	46585	0.19
Total			2166169	100.00	24892957	100.00

Figure A10 : HPLC Chromatogram of sample from gasoline base

at 2500 rpm

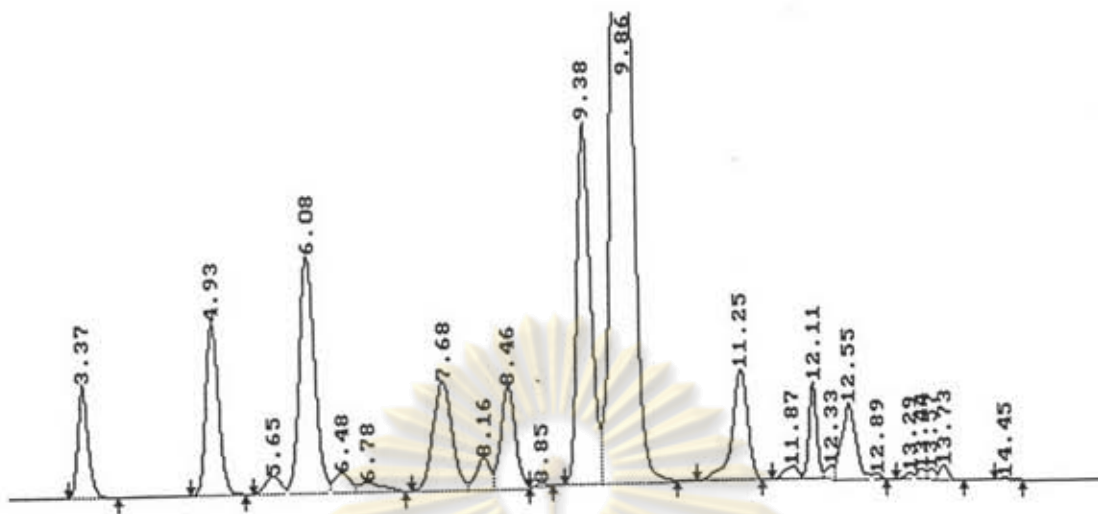


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-02-10
 Time : 00:27:46 Acquisition Time : 20:20:22
 File Name : 1B0003000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.25	Unknown	3733	0.05	30251	0.03
2	2.73	Unknown	3652	0.05	39494	0.04
3	3.45	Unknown	165018	2.19	1524361	1.60
4	5.00	Unknown	938313	12.44	10336420	10.86
5	5.80	Unknown	38716	0.51	470504	0.49
6	6.17	Unknown	937412	12.42	12562426	13.20
7	6.73	Unknown	238005	3.15	4954451	5.21
8	7.98	Unknown	254768	3.38	4589615	4.82
9	8.39	Unknown	62007	0.82	706324	0.74
10	8.75	Unknown	228318	3.03	2701727	2.84
11	9.10	Unknown	22013	0.29	263757	0.28
12	9.73	Unknown	747098	9.90	9689275	10.18
13	10.27	Unknown	2037388	27.00	29894551	31.42
14	11.54	Unknown	596363	7.90	6087863	6.40
15	12.09	Unknown	51405	0.68	618437	0.65
16	12.31	Unknown	611384	8.10	3738939	3.93
17	12.68	Unknown	402438	5.33	5139510	5.40
18	13.39	Unknown	45524	0.60	456124	0.48
19	13.55	Unknown	55510	0.74	453055	0.48
20	13.70	Unknown	58594	0.78	473817	0.50
21	13.86	Unknown	39334	0.52	294550	0.31
22	14.53	Unknown	8198	0.11	120563	0.13
Total			7545189	100.00	95146011	100.00

Figure A11 : HPLC Chromatogram of sample from gasoline base

at 3000 rpm

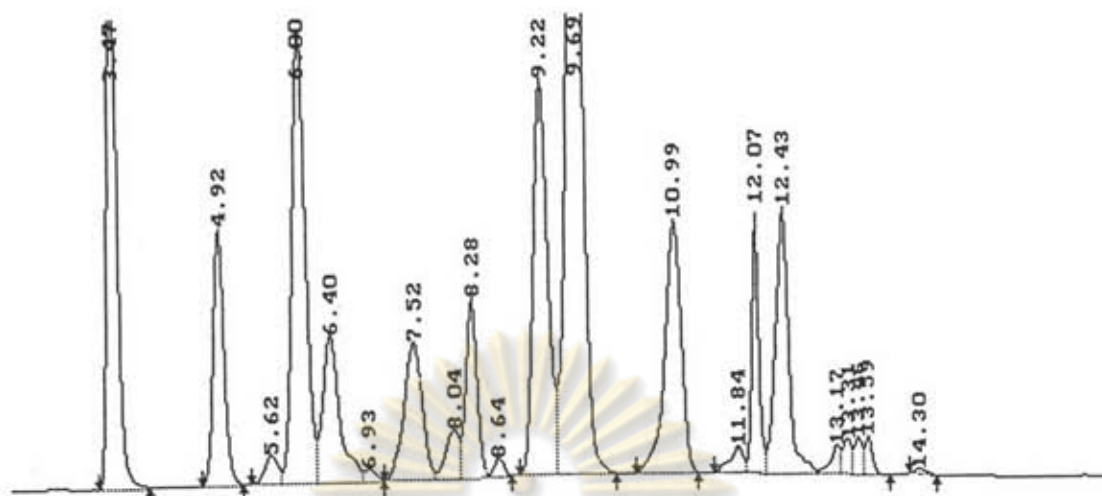


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 17:07:43 Acquisition Time : 20:20:22
 File Name : 1B3001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.37	Unknown	136306	4.00	1135401	2.75
2	4.93	Unknown	205751	6.03	2171824	5.26
3	5.65	Unknown	20200	0.59	256860	0.62
4	6.08	Unknown	284670	8.35	3579247	8.67
5	6.48	Unknown	22424	0.66	310160	0.75
6	6.78	Unknown	11494	0.34	219079	0.53
7	7.68	Unknown	130561	3.83	1989651	4.82
8	8.16	Unknown	36512	1.07	402523	0.98
9	8.46	Unknown	121278	3.56	1414952	3.43
10	8.85	Unknown	3961	0.12	32277	0.08
11	9.38	Unknown	434606	12.74	4819622	11.68
12	9.86	Unknown	1565224	45.90	20734851	50.23
13	11.25	Unknown	132312	3.88	1702929	4.13
14	11.87	Unknown	15712	0.46	184820	0.45
15	12.11	Unknown	118182	3.47	729827	1.77
16	12.33	Unknown	16827	0.49	99185	0.24
17	12.55	Unknown	91465	2.68	1067628	2.59
18	12.89	Unknown	7308	0.21	46279	0.11
19	13.29	Unknown	8498	0.25	57062	0.14
20	13.44	Unknown	12818	0.38	91968	0.22
21	13.57	Unknown	13887	0.41	90104	0.22
22	13.73	Unknown	18143	0.53	123225	0.30
23	14.45	Unknown	2122	0.06	19923	0.05
Total			3410261	100.00	41279397	100.00

Figure A12 : HPLC Chromatogram of sample from gasoline base

blended with 300 ppm of LZ8195 at 1000 rpm

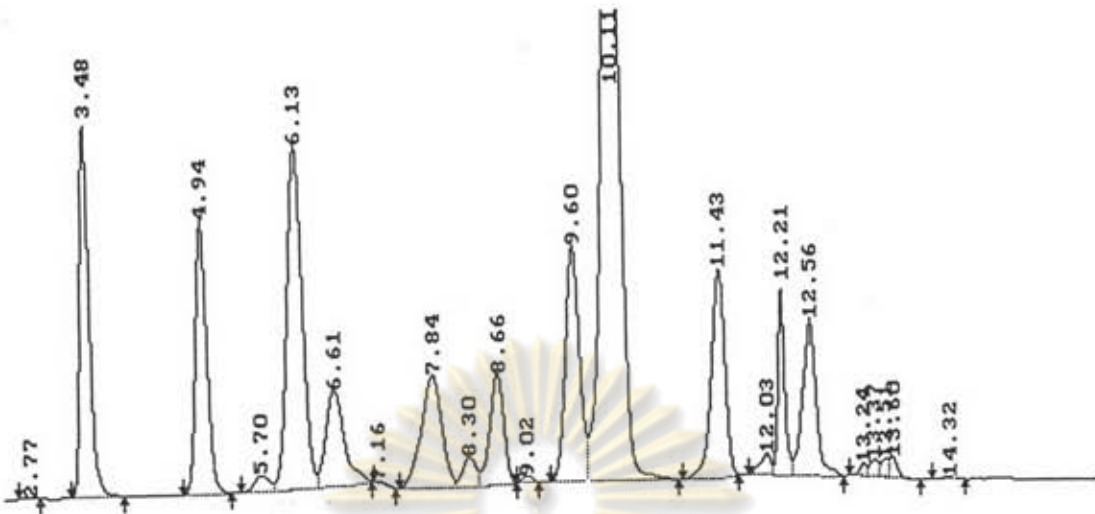


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 20:30:38 Acquisition Time : 20:20:22
 File Name : 1B3001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.25	Unknown	2029	0.07	13965	0.04
2	3.47	Unknown	433488	15.55	3559963	11.07
3	4.92	Unknown	163729	5.87	1619560	5.04
4	5.62	Unknown	18043	0.65	210867	0.66
5	6.00	Unknown	288565	10.35	3522549	10.96
6	6.40	Unknown	93052	3.34	1464076	4.55
7	6.93	Unknown	7181	0.26	75416	0.23
8	7.52	Unknown	86928	3.12	1405579	4.37
9	8.04	Unknown	30106	1.08	368603	1.15
10	8.28	Unknown	114456	4.11	1158097	3.60
11	8.64	Unknown	11004	0.39	94825	0.29
12	9.22	Unknown	250866	9.00	3305777	10.28
13	9.69	Unknown	672308	24.11	8811931	27.41
14	10.99	Unknown	162108	5.81	2438188	7.59
15	11.84	Unknown	17047	0.61	207273	0.64
16	12.07	Unknown	171452	6.15	1065306	3.31
17	12.43	Unknown	170645	6.12	2066814	6.43
18	13.17	Unknown	19243	0.69	180779	0.56
19	13.31	Unknown	23325	0.84	184355	0.57
20	13.46	Unknown	23878	0.86	169838	0.53
21	13.59	Unknown	24954	0.90	183720	0.57
22	14.30	Unknown	3571	0.13	37365	0.12
Total			2787976	100.00	32144848	100.00

Figure A13 : HPLC Chromatogram of sample from gasoline base

blended with 300 ppm of LZ8195 at 1500 rpm

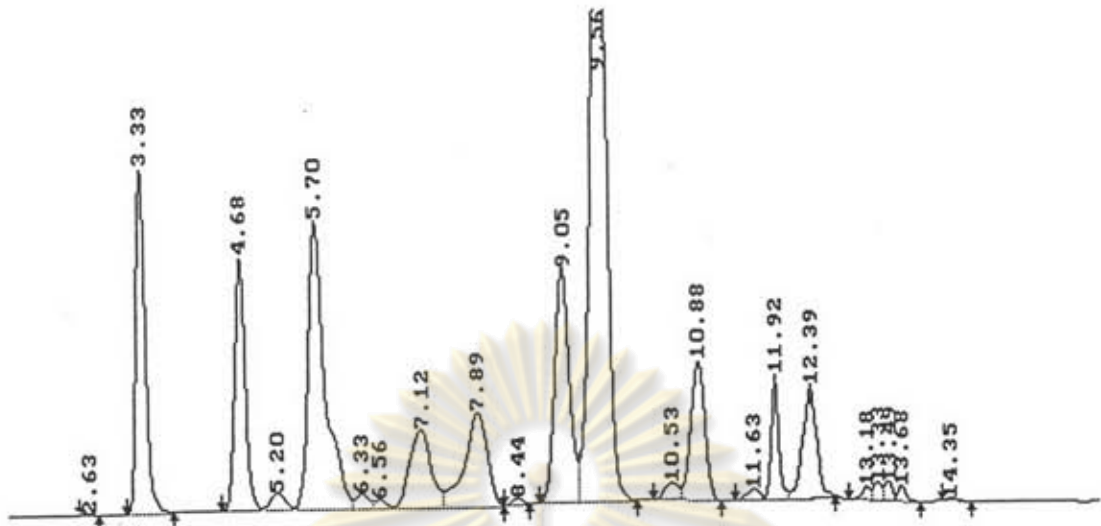


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 21:38:25 Acquisition Time : 20:20:22
 File Name : 1B3002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.23	Unknown	2529	0.08	18536	0.05
2	2.77	Unknown	1585	0.05	13545	0.04
3	3.48	Unknown	395127	12.27	3231105	8.46
4	4.94	Unknown	285021	8.85	2852373	7.47
5	5.70	Unknown	15729	0.49	193662	0.51
6	6.13	Unknown	355943	11.05	4701835	12.31
7	6.61	Unknown	99152	3.08	1555949	4.07
8	7.16	Unknown	1603	0.05	13743	0.04
9	7.84	Unknown	116140	3.61	2032631	5.32
10	8.30	Unknown	29445	0.91	327358	0.86
11	8.66	Unknown	115977	3.60	1382350	3.62
12	9.02	Unknown	7061	0.22	59345	0.16
13	9.60	Unknown	246993	7.67	3046045	7.98
14	10.11	Unknown	859220	26.68	12454231	32.62
15	11.43	Unknown	219013	6.80	2518188	6.59
16	12.03	Unknown	23899	0.74	223635	0.59
17	12.21	Unknown	203717	6.33	1135318	2.97
18	12.56	Unknown	165184	5.13	1902727	4.98
19	13.24	Unknown	13255	0.41	85567	0.22
20	13.37	Unknown	17993	0.56	125596	0.33
21	13.51	Unknown	20624	0.64	134645	0.35
22	13.60	Unknown	21871	0.68	135504	0.35
23	14.32	Unknown	3583	0.11	41467	0.11
Total			3220665	100.00	38185356	100.00

Figure A14 : HPLC Chromatogram of sample from gasoline base

blended with 300 ppm of LZ8195 at 2000 rpm

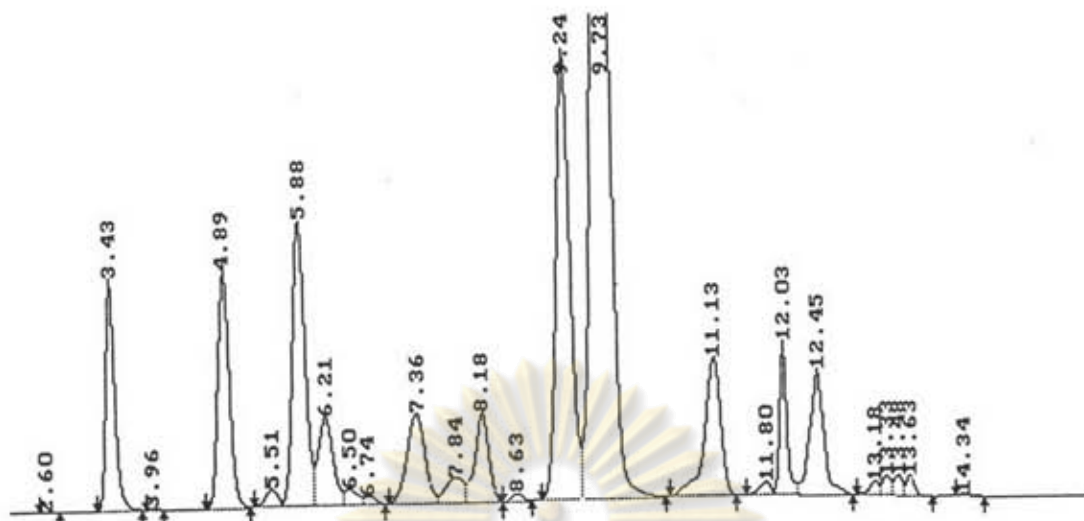


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 16:35:18 Acquisition Time : 20:20:22
 File Name : 1B3002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.22	Unknown	1209	0.04	13072	0.04
2	2.63	Unknown	1816	0.06	15863	0.04
3	3.33	Unknown	389950	13.38	3457215	9.32
4	4.68	Unknown	287943	9.88	2819766	7.60
5	5.20	Unknown	19142	0.66	252396	0.68
6	5.70	Unknown	326581	11.20	5045373	13.60
7	6.33	Unknown	16106	0.55	204088	0.55
8	6.56	Unknown	9120	0.31	102587	0.28
9	7.12	Unknown	87654	3.01	1723069	4.65
10	7.89	Unknown	105821	3.63	2276078	6.14
11	8.44	Unknown	7531	0.26	74277	0.20
12	9.05	Unknown	264837	9.08	3552361	9.58
13	9.56	Unknown	855788	29.36	11906664	32.10
14	10.53	Unknown	20071	0.69	259570	0.70
15	10.88	Unknown	159428	5.47	2050347	5.53
16	11.63	Unknown	12672	0.43	152332	0.41
17	11.92	Unknown	141069	4.84	969106	2.61
18	12.39	Unknown	128229	4.40	1604591	4.33
19	13.18	Unknown	15811	0.54	123891	0.33
20	13.33	Unknown	21013	0.72	169049	0.46
21	13.49	Unknown	22056	0.76	163885	0.44
22	13.68	Unknown	18294	0.63	125333	0.34
23	14.35	Unknown	2977	0.10	32663	0.09
Total			2915115	100.00	37093576	100.00

Figure A15 : HPLC Chromatogram of sample from gasoline base

blended with 300 ppm of LZ8195 at 2500 rpm

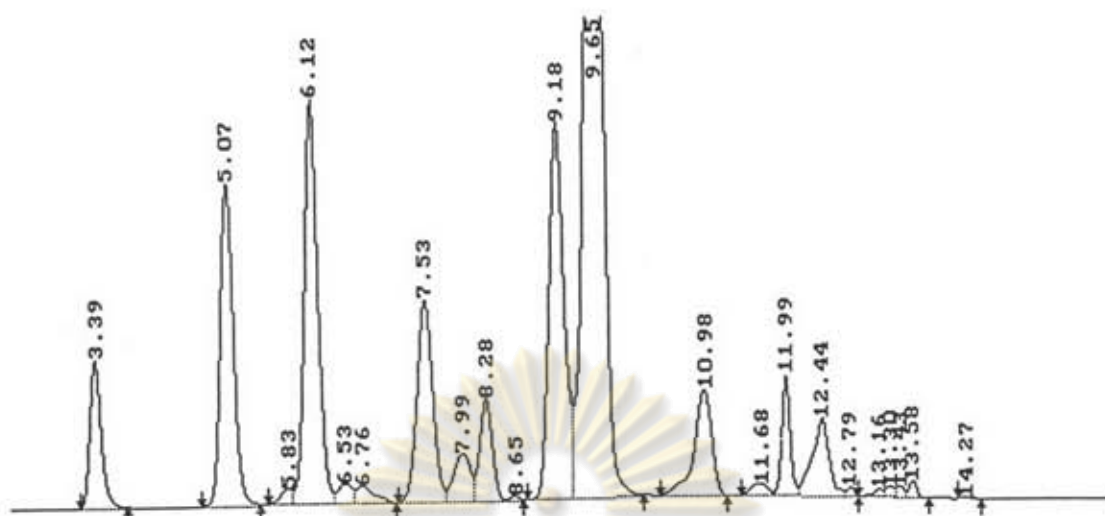


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 19:56:59 Acquisition Time : 20:20:22
 File Name : 1B3003000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.20	Unknown	1493	0.03	10868	0.02
2	2.60	Unknown	1081	0.03	8683	0.02
3	3.43	Unknown	298572	6.98	2369618	4.68
4	3.96	Unknown	1906	0.04	13501	0.03
5	4.89	Unknown	304954	7.13	3066361	6.05
6	5.51	Unknown	21301	0.50	219389	0.43
7	5.88	Unknown	369118	8.63	4147493	8.19
8	6.21	Unknown	113712	2.66	1479394	2.92
9	6.50	Unknown	19974	0.47	237230	0.47
10	6.74	Unknown	10955	0.26	118431	0.23
11	7.36	Unknown	116538	2.72	1778413	3.51
12	7.84	Unknown	33342	0.78	516907	1.02
13	8.18	Unknown	115979	2.71	1395005	2.75
14	8.63	Unknown	10105	0.24	98092	0.19
15	9.24	Unknown	579759	13.56	7194031	14.20
16	9.73	Unknown	1619578	37.87	21326425	42.10
17	11.13	Unknown	179097	4.19	2542730	5.02
18	11.80	Unknown	17317	0.40	173845	0.34
19	12.03	Unknown	198635	4.64	1223157	2.41
20	12.45	Unknown	162693	3.80	1974818	3.90
21	13.18	Unknown	18423	0.43	138711	0.27
22	13.33	Unknown	24816	0.58	198681	0.39
23	13.48	Unknown	27384	0.64	197160	0.39
24	13.63	Unknown	26697	0.62	193289	0.38
25	14.34	Unknown	3260	0.08	35829	0.07
Total			4276688	100.00	50658060	100.00

Figure A16 : HPLC Chromatogram of sample from gasoline base

blended with 300 ppm of LZ8195 at 3000 rpm

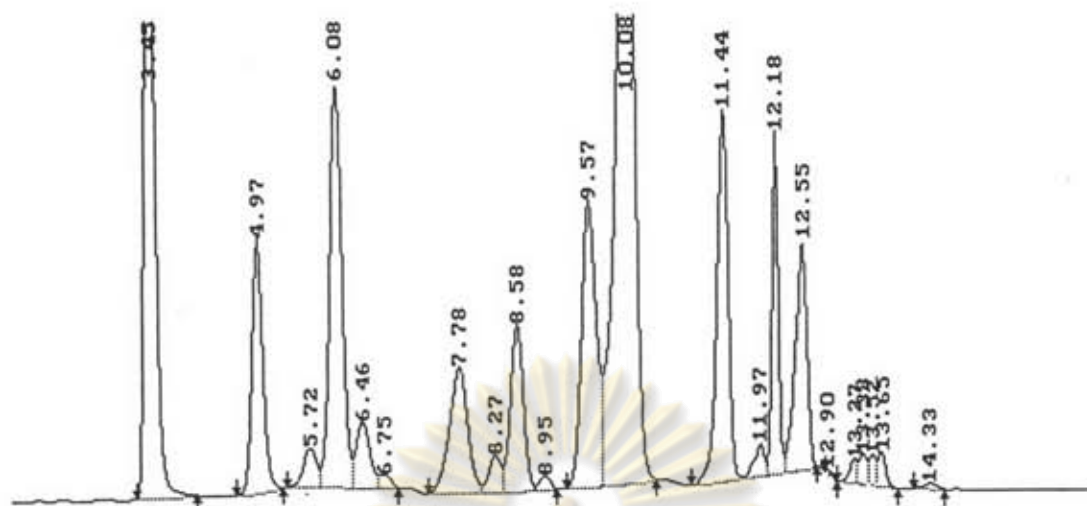


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-01-10
 Time : 21:18:59 Acquisition Time : 11:43:24
 File Name : 1B4001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.39	Unknown	133504	4.33	1319670	3.51
2	5.07	Unknown	288845	9.36	3355349	8.93
3	5.83	Unknown	13600	0.44	125599	0.33
4	6.12	Unknown	361947	11.73	4155040	11.06
5	6.53	Unknown	17881	0.58	217377	0.58
6	6.76	Unknown	15650	0.51	244041	0.65
7	7.53	Unknown	181672	5.89	2466196	6.56
8	7.99	Unknown	41973	1.36	579309	1.54
9	8.28	Unknown	91026	2.95	975277	2.59
10	8.65	Unknown	3284	0.11	23735	0.06
11	9.18	Unknown	335410	10.87	4341827	11.55
12	9.65	Unknown	1263293	40.95	16100757	42.84
13	10.98	Unknown	95564	3.10	1433391	3.81
14	11.68	Unknown	10999	0.36	159844	0.43
15	11.99	Unknown	109500	3.55	776791	2.07
16	12.44	Unknown	69771	2.26	963801	2.56
17	12.79	Unknown	7869	0.26	46349	0.12
18	13.16	Unknown	7048	0.23	50781	0.14
19	13.30	Unknown	9561	0.31	69448	0.18
20	13.43	Unknown	9992	0.32	64598	0.17
21	13.58	Unknown	15211	0.49	101881	0.27
22	14.27	Unknown	1471	0.05	13570	0.04
Total			3085071	100.00	37584631	100.00

Figure A17 : HPLC Chromatogram of sample from gasoline base

blended with 400 ppm of LZ8195 at 1000 rpm

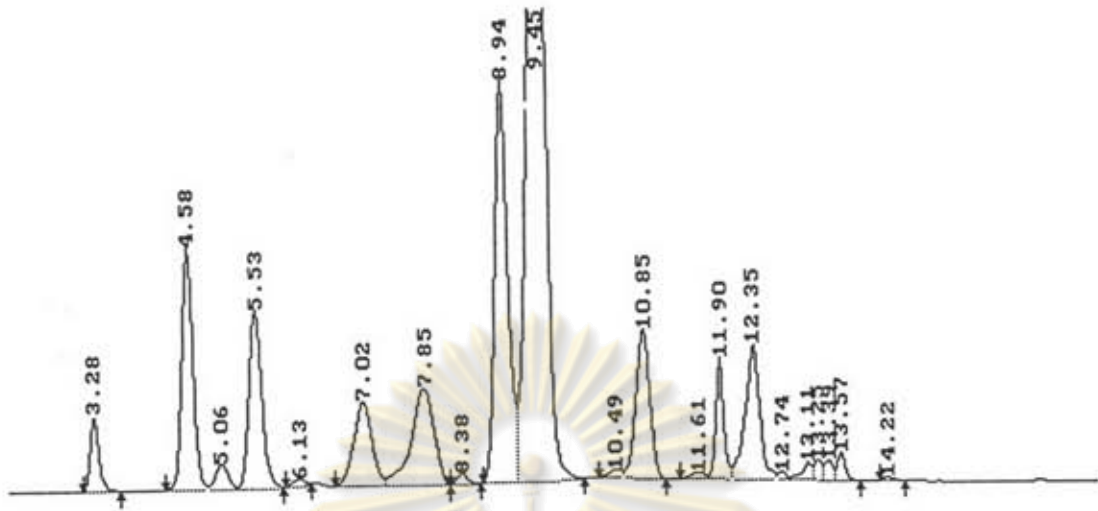


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-01-10
 Time : 16:48:04 Acquisition Time : 11:43:24
 File Name : 1B4001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.45	Unknown	885508	25.17	7186483	18.33
2	4.97	Unknown	192099	5.46	2004952	5.11
3	5.72	Unknown	30253	0.86	398354	1.02
4	6.08	Unknown	308211	8.76	3721379	9.49
5	6.46	Unknown	50315	1.43	690073	1.76
6	6.75	Unknown	9876	0.28	105426	0.27
7	7.78	Unknown	94747	2.69	1611898	4.11
8	8.27	Unknown	27635	0.79	298901	0.76
9	8.58	Unknown	126216	3.59	1559677	3.98
10	8.95	Unknown	10355	0.29	101123	0.26
11	9.57	Unknown	217164	6.17	3008201	7.67
12	10.08	Unknown	721467	20.51	11109128	28.34
13	11.44	Unknown	281731	8.01	3076257	7.85
14	11.97	Unknown	24575	0.70	220441	0.56
15	12.18	Unknown	259054	7.36	1481894	3.78
16	12.55	Unknown	174469	4.96	1891454	4.82
17	12.90	Unknown	4250	0.12	18793	0.05
18	13.27	Unknown	19352	0.55	138650	0.35
19	13.38	Unknown	24931	0.71	176443	0.45
20	13.52	Unknown	24240	0.69	159352	0.41
21	13.65	Unknown	27358	0.78	195596	0.50
22	14.33	Unknown	4159	0.12	49866	0.13
Total			3517964	100.00	39204342	100.00

Figure A18 : HPLC Chromatogram of sample from gasoline base

blended with 400 ppm of LZ8195 at 1500 rpm

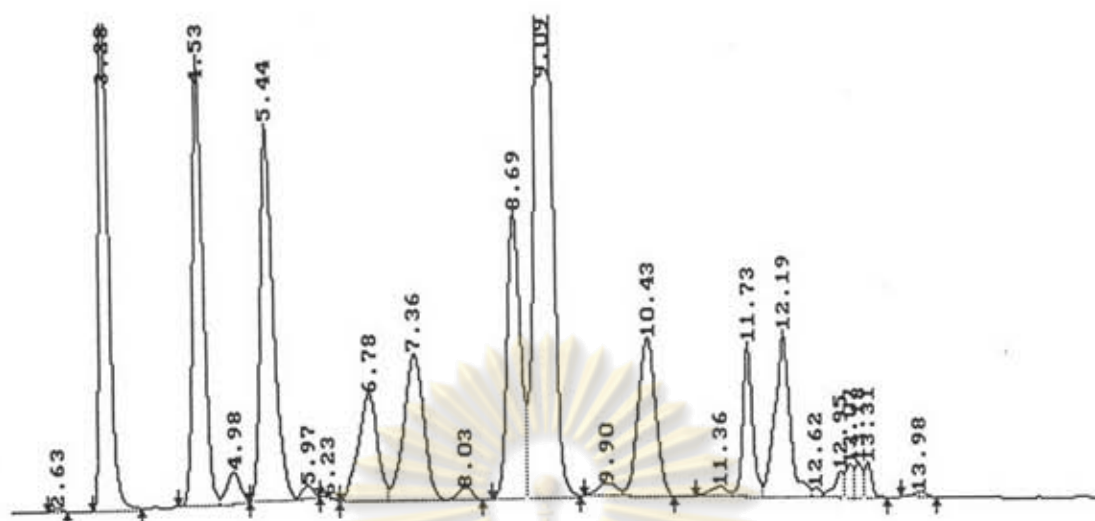


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-01-10
 Time : 21:41:52 Acquisition Time : 11:43:24
 File Name : 1B4002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.28	Unknown	78839	2.72	630889	1.68
2	4.58	Unknown	245607	8.49	2574265	6.87
3	5.06	Unknown	24100	0.83	283463	0.76
4	5.53	Unknown	179485	6.20	2216509	5.92
5	6.13	Unknown	6011	0.21	62924	0.17
6	7.02	Unknown	86075	2.97	1465085	3.91
7	7.85	Unknown	98686	3.41	2143606	5.72
8	8.38	Unknown	10787	0.37	109599	0.29
9	8.94	Unknown	409602	14.16	5158398	13.77
10	9.45	Unknown	1219018	42.13	17017321	45.44
11	10.49	Unknown	9066	0.31	112683	0.30
12	10.85	Unknown	152231	5.26	1974807	5.27
13	11.61	Unknown	7776	0.27	108311	0.29
14	11.90	Unknown	125268	4.33	920025	2.46
15	12.35	Unknown	138700	4.79	1874188	5.00
16	12.74	Unknown	8706	0.30	64157	0.17
17	13.11	Unknown	18034	0.62	172602	0.46
18	13.25	Unknown	21272	0.74	161521	0.43
19	13.39	Unknown	21649	0.75	155549	0.42
20	13.57	Unknown	29658	1.03	217309	0.58
21	14.22	Unknown	2881	0.10	30449	0.08
Total			2893451	100.00	37453657	100.00

Figure A19 : HPLC Chromatogram of sample from gasoline base

blended with 400 ppm of LZ8195 at 2000 rpm

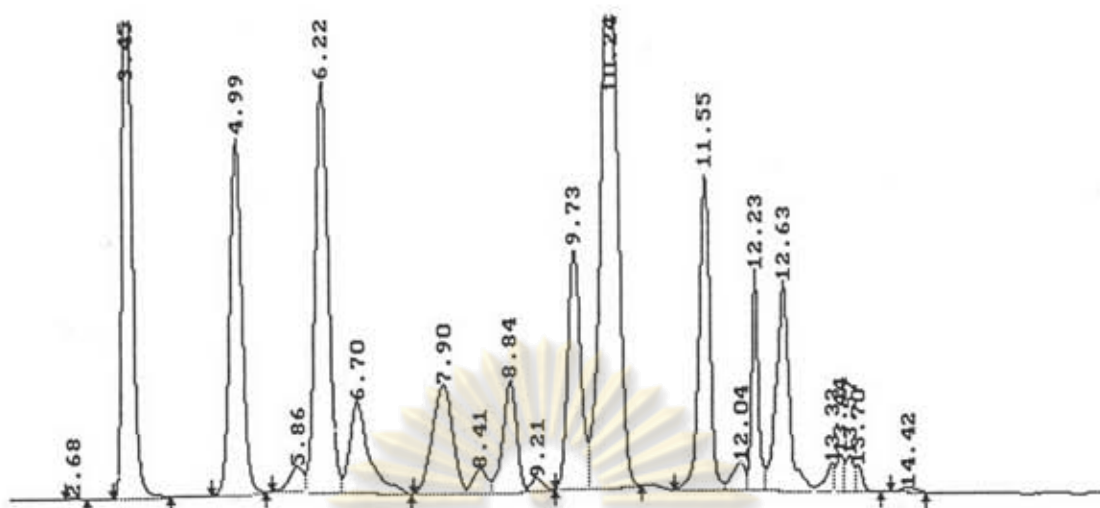


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-01-10
 Time : 20:53:47 Acquisition Time : 11:43:24
 File Name : 1B4002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	2.63	Unknown	2301	0.07	19784	0.05
2	3.28	Unknown	618030	18.60	4698557	12.38
3	4.53	Unknown	407349	12.26	3801817	10.02
4	4.98	Unknown	28578	0.86	347331	0.92
5	5.44	Unknown	341658	10.28	4111210	10.83
6	5.97	Unknown	11269	0.34	100346	0.26
7	6.23	Unknown	3198	0.10	25679	0.07
8	6.78	Unknown	97767	2.94	1654762	4.36
9	7.36	Unknown	133959	4.03	2409776	6.35
10	8.03	Unknown	11203	0.34	158900	0.42
11	8.69	Unknown	260645	7.84	3119334	8.22
12	9.09	Unknown	822526	24.75	10759314	28.35
13	9.90	Unknown	11385	0.34	197623	0.52
14	10.43	Unknown	143755	4.33	2254346	5.94
15	11.36	Unknown	8240	0.25	122787	0.32
16	11.73	Unknown	139621	4.20	1170161	3.08
17	12.19	Unknown	150203	4.52	2055236	5.42
18	12.62	Unknown	8908	0.27	64496	0.17
19	12.95	Unknown	24084	0.72	205138	0.54
20	13.07	Unknown	30772	0.93	200956	0.53
21	13.18	Unknown	31775	0.96	205433	0.54
22	13.31	Unknown	31497	0.95	202980	0.53
23	13.98	Unknown	4809	0.14	60267	0.16
Total			3323532	100.00	37946232	100.00

Figure A20 : HPLC Chromatogram of sample that used gasoline base

blended with 400 ppm of LZ8195 at 2500 rpm

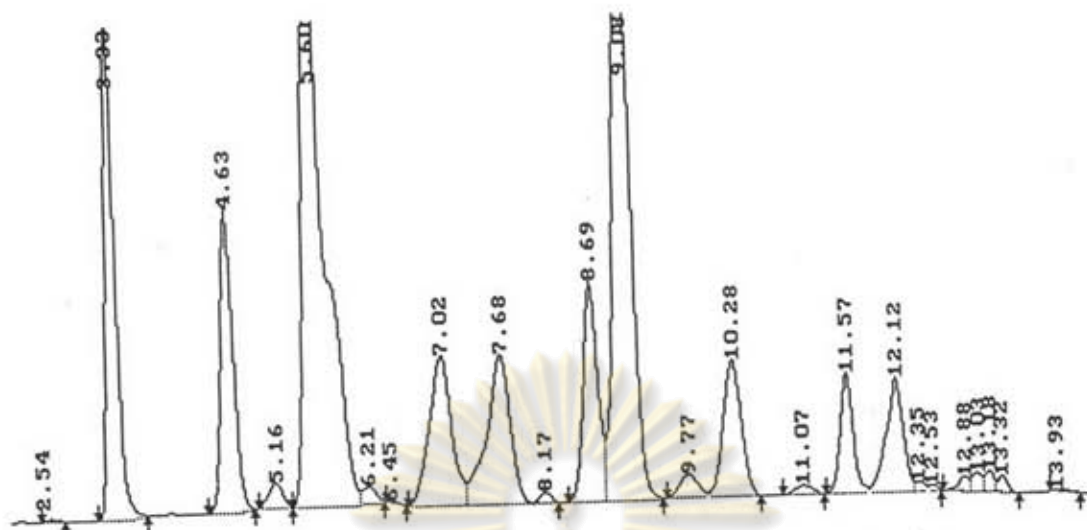


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-01-10
 Time : 17:38:19 Acquisition Time : 11:43:24
 File Name : 1B4003000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.65	Unknown	2138	0.06	16636	0.04
2	2.68	Unknown	1741	0.05	17821	0.04
3	3.45	Unknown	640167	18.64	5446561	13.43
4	4.99	Unknown	345932	10.07	4110632	10.13
5	5.86	Unknown	24428	0.71	322141	0.79
6	6.22	Unknown	398885	11.61	5073840	12.51
7	6.70	Unknown	88009	2.56	1624697	4.01
8	7.90	Unknown	103664	3.02	2011082	4.96
9	8.41	Unknown	21957	0.64	292178	0.72
10	8.84	Unknown	107704	3.14	1396459	3.44
11	9.21	Unknown	11217	0.33	122783	0.30
12	9.73	Unknown	234582	6.83	2847199	7.02
13	10.24	Unknown	567342	16.52	8794909	21.68
14	11.55	Unknown	311393	9.07	3230239	7.96
15	12.04	Unknown	28995	0.84	331374	0.82
16	12.23	Unknown	214186	6.24	1321553	3.26
17	12.63	Unknown	201684	5.87	2590948	6.39
18	13.33	Unknown	28245	0.82	245635	0.61
19	13.44	Unknown	36652	1.07	261581	0.64
20	13.57	Unknown	35276	1.03	255766	0.63
21	13.70	Unknown	25821	0.75	182974	0.45
22	14.42	Unknown	4994	0.15	69099	0.17
Total			3435015	100.00	40566108	100.00

Figure A21 : HPLC Chromatogram of sample that used gasoline base

blended with 400 ppm of LZ8195 at 3000 rpm

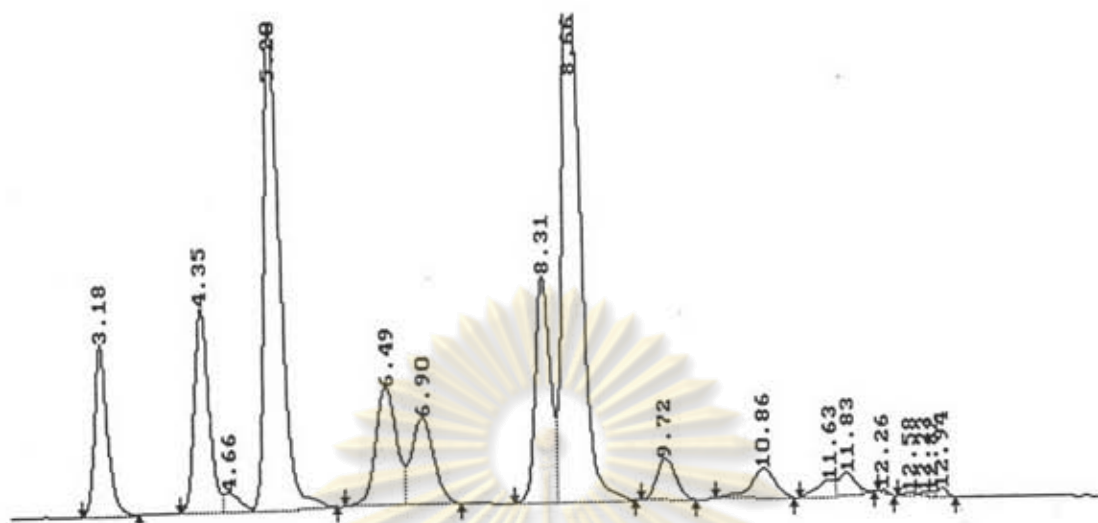


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-19 Acquisition Date : 1997-02-10
 Time : 19:40:31 Acquisition Time : 20:20:22
 File Name : 1B5001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.30	Unknown	1977	0.09	27298	0.10
2	2.54	Unknown	7142	0.32	15083	0.06
3	3.33	Unknown	345855	15.47	2586641	9.60
4	4.63	Unknown	200716	8.98	1921949	7.13
5	5.16	Unknown	15989	0.72	173148	0.64
6	5.60	Unknown	478176	21.38	7218196	26.79
7	6.21	Unknown	10069	0.45	101148	0.38
8	6.45	Unknown	1041	0.05	8500	0.03
9	7.02	Unknown	99711	4.46	1652839	6.13
10	7.68	Unknown	99216	4.44	1811593	6.72
11	8.17	Unknown	6861	0.31	57584	0.21
12	8.69	Unknown	145898	6.52	1619870	6.01
13	9.08	Unknown	494749	22.13	5941009	22.05
14	9.77	Unknown	14610	0.65	210600	0.78
15	10.28	Unknown	90702	4.06	1274860	4.73
16	11.07	Unknown	5971	0.27	83742	0.31
17	11.57	Unknown	80584	3.60	803128	2.98
18	12.12	Unknown	76106	3.40	991451	3.68
19	12.35	Unknown	6610	0.30	52121	0.19
20	12.53	Unknown	4081	0.18	24163	0.09
21	12.88	Unknown	9921	0.44	78301	0.29
22	13.03	Unknown	12855	0.57	97159	0.36
23	13.18	Unknown	14330	0.64	102545	0.38
24	13.32	Unknown	11281	0.50	75220	0.28
25	13.93	Unknown	1590	0.07	16614	0.06
Total			2236039	100.00	26944757	100.00

Figure A22 : HPLC Chromatogram of sample from gasoline base

blended with 500 ppm of LZ8195 at 1000 rpm

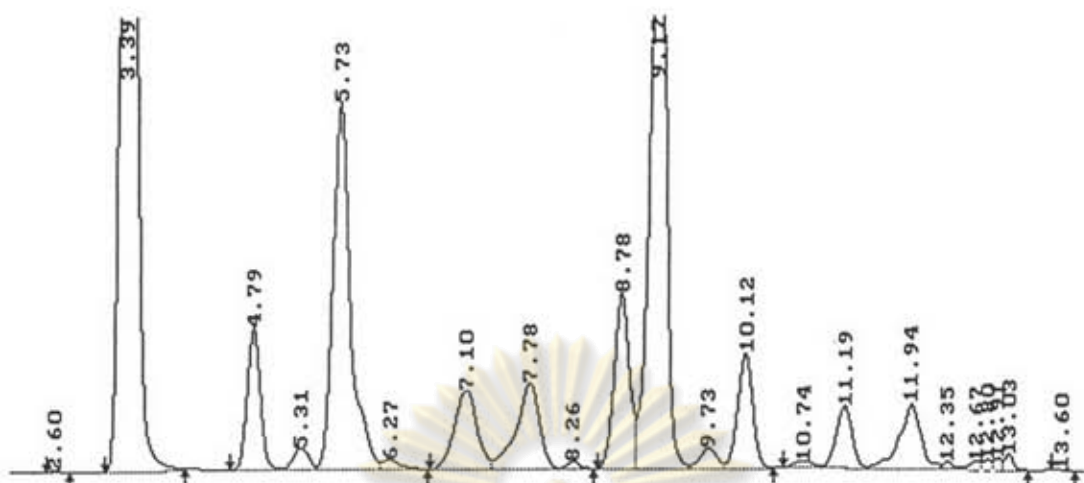


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-19 Acquisition Date : 1997-02-10
 Time : 20:23:20 Acquisition Time : 20:20:22
 File Name : 1B5001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	3.18	Unknown	125066	8.21	1276318	6.44
2	4.35	Unknown	149638	9.82	1737966	8.76
3	4.66	Unknown	13013	0.85	168421	0.85
4	5.20	Unknown	355002	23.30	4510802	22.75
5	6.49	Unknown	86007	5.65	1424796	7.19
6	6.90	Unknown	63161	4.15	1101207	5.55
7	8.31	Unknown	165706	10.88	1986719	10.02
8	8.66	Unknown	468845	30.78	6274497	31.64
9	9.72	Unknown	30553	2.01	463379	2.34
10	10.86	Unknown	20965	1.38	407589	2.06
11	11.63	Unknown	11363	0.75	162059	0.82
12	11.83	Unknown	15666	1.03	199185	1.00
13	12.26	Unknown	2193	0.14	11710	0.06
14	12.58	Unknown	2933	0.19	23201	0.12
15	12.73	Unknown	2977	0.20	19154	0.10
16	12.82	Unknown	3377	0.22	17714	0.09
17	12.94	Unknown	6834	0.45	45376	0.23
Total			1523301	100.00	19830091	100.00

Figure A23 : HPLC Chromatogram of sample from gasoline base

blended with 500 ppm of LZ8195 at 1500 rpm

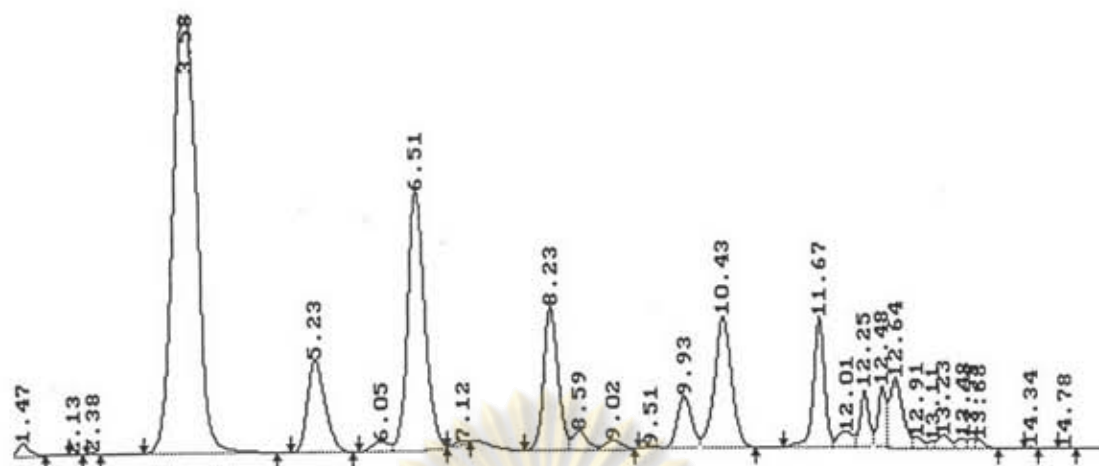


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-19 Acquisition Date : 1997-02-10
 Time : 20:00:53 Acquisition Time : 20:20:22
 File Name : 1B5002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.24	Unknown	1589	0.03	11509	0.02
2	1.51	Unknown	2725	0.06	41871	0.08
3	2.60	Unknown	1927	0.04	15559	0.03
4	3.39	Unknown	2049983	42.00	21865608	39.23
5	4.79	Unknown	207031	4.24	2066202	3.71
6	5.31	Unknown	31865	0.65	371886	0.67
7	5.73	Unknown	532478	10.91	6984561	12.53
8	6.27	Unknown	15267	0.31	217800	0.39
9	7.10	Unknown	115069	2.36	1967041	3.53
10	7.78	Unknown	124651	2.55	2184426	3.92
11	8.26	Unknown	11020	0.23	99999	0.18
12	8.78	Unknown	256059	5.25	2825139	5.07
13	9.17	Unknown	1058741	21.69	11584887	20.79
14	9.73	Unknown	29195	0.60	348755	0.63
15	10.12	Unknown	167923	3.44	1835299	3.29
16	10.74	Unknown	9928	0.20	138715	0.25
17	11.19	Unknown	89868	1.84	1090138	1.96
18	11.94	Unknown	95896	1.96	1534266	2.75
19	12.35	Unknown	10416	0.21	72524	0.13
20	12.67	Unknown	12928	0.26	114456	0.21
21	12.80	Unknown	14876	0.30	97164	0.17
22	12.91	Unknown	16368	0.34	101156	0.18
23	13.03	Unknown	22819	0.47	145814	0.26
24	13.60	Unknown	2198	0.05	15754	0.03
Total			4880819	100.00	55730529	100.00

Figure A24 : HPLC Chromatogram of sample from gasoline base

blended with 500 ppm of LZ8195 at 2000 rpm

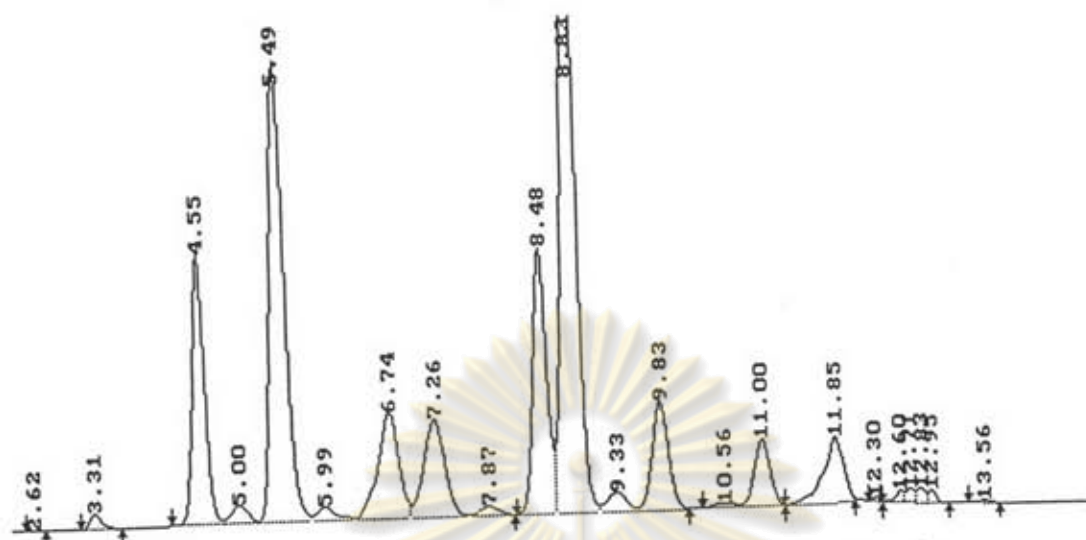


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-19 Acquisition Date : 1997-02-10
 Time : 18:57:44 Acquisition Time : 20:20:22
 File Name : 1B5002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.47	Unknown	21408	0.77	251729	0.62
2	2.13	Unknown	1271	0.05	6347	0.02
3	2.38	Unknown	3420	0.12	17979	0.04
4	3.58	Unknown	798145	28.69	16114928	39.81
5	5.23	Unknown	162198	5.83	2439076	6.03
6	6.05	Unknown	15199	0.55	221208	0.55
7	6.51	Unknown	449628	16.16	6775087	16.74
8	7.12	Unknown	4482	0.16	39702	0.10
9	8.23	Unknown	248992	8.95	2988416	7.38
10	8.59	Unknown	32757	1.18	402944	1.00
11	9.02	Unknown	15984	0.57	208478	0.52
12	9.51	Unknown	3473	0.12	46215	0.11
13	9.93	Unknown	90670	3.26	1151064	2.84
14	10.43	Unknown	230524	8.29	3514757	8.68
15	11.67	Unknown	229476	8.25	2204297	5.45
16	12.01	Unknown	28799	1.04	405623	1.00
17	12.25	Unknown	104115	3.74	748272	1.85
18	12.28	Unknown	110471	3.97	751926	1.86
19	12.64	Unknown	122064	4.39	1319759	3.26
20	12.91	Unknown	18339	0.66	165703	0.41
21	13.11	Unknown	13516	0.49	74196	0.18
22	13.23	Unknown	22800	0.82	238176	0.59
23	13.48	Unknown	17579	0.63	135244	0.33
24	13.59	Unknown	15975	0.57	97032	0.24
25	13.68	Unknown	14536	0.52	102199	0.25
26	14.34	Unknown	1014	0.04	6644	0.02
27	14.78	Unknown	1139	0.04	8635	0.02
28	16.40	Unknown	3749	0.13	42325	0.10
Total			2781723	100.00	40477958	100.00

Figure A25 : HPLC Chromatogram of sample from gasoline base

blended with 500 ppm of LZ8195 at 2500 rpm

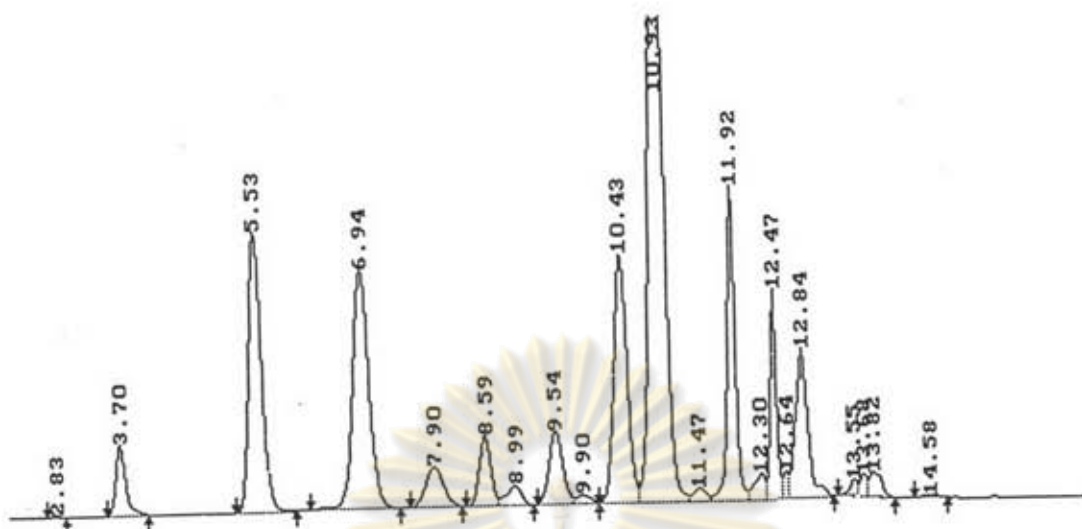


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-19 Acquisition Date : 1997-02-10
 Time : 22:00:21 Acquisition Time : 20:20:22
 File Name : 1B5003000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	2.62	Unknown	1881	0.05	13222	0.03
2	3.31	Unknown	23314	0.67	212873	0.53
3	4.55	Unknown	401817	11.56	3906566	9.70
4	5.00	Unknown	27140	0.78	365492	0.91
5	5.49	Unknown	688446	19.80	7978472	19.82
6	5.99	Unknown	20905	0.60	316310	0.79
7	6.74	Unknown	158548	4.56	2581452	6.41
8	7.26	Unknown	144732	4.16	2408181	5.98
9	7.87	Unknown	12985	0.37	186966	0.46
10	8.48	Unknown	398691	11.47	4249382	10.56
11	8.83	Unknown	1119771	32.21	12270660	30.48
12	9.33	Unknown	27818	0.80	390326	0.97
13	9.83	Unknown	160606	4.62	2008250	4.99
14	10.56	Unknown	7379	0.21	112704	0.28
15	11.00	Unknown	99477	2.86	1221718	3.03
16	11.85	Unknown	94190	2.71	1457868	3.62
17	12.30	Unknown	6007	0.17	27039	0.07
18	12.60	Unknown	16865	0.49	113271	0.28
19	12.71	Unknown	20767	0.60	136276	0.34
20	12.83	Unknown	21664	0.62	139500	0.35
21	12.95	Unknown	19736	0.57	123828	0.31
22	13.56	Unknown	3562	0.10	34936	0.09
Total			3476301	100.00	40255290	100.00

Figure A26 : HPLC Chromatogram of sample from gasoline base

blended with 500 ppm of LZ8195 at 3000 rpm

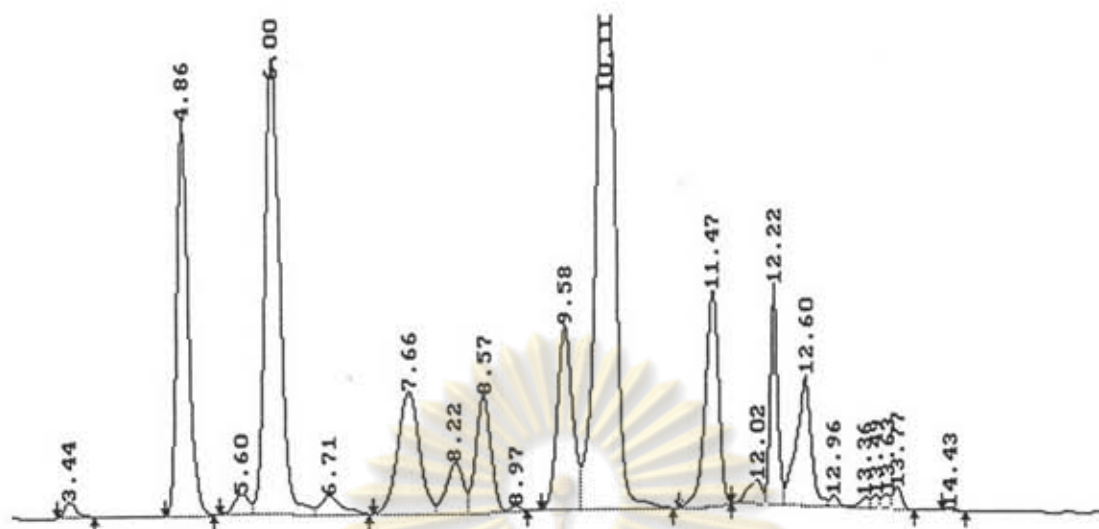


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-02-10
 Time : 01:19:28 Acquisition Time : 20:20:22
 File Name : 1B6001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.24	Unknown	1552	0.05	10490	0.03
2	2.83	Unknown	1161	0.04	11557	0.04
3	3.70	Unknown	79475	2.65	728126	2.22
4	5.53	Unknown	311470	10.38	3634458	11.10
5	6.94	Unknown	264403	8.81	4015654	12.26
6	7.90	Unknown	44800	1.49	739542	2.26
7	8.59	Unknown	80067	2.67	832656	2.54
8	8.99	Unknown	22508	0.75	304183	0.93
9	9.54	Unknown	81342	2.71	1030662	3.15
10	9.90	Unknown	8897	0.30	111003	0.34
11	10.43	Unknown	277388	9.25	3308001	10.10
12	10.93	Unknown	938120	31.27	11191775	34.18
13	11.47	Unknown	12870	0.43	134010	0.41
14	11.92	Unknown	348695	11.62	2520036	7.70
15	12.30	Unknown	27698	0.92	260963	0.80
16	12.47	Unknown	232037	7.73	1248384	3.81
17	12.64	Unknown	28091	0.94	150477	0.46
18	12.84	Unknown	164895	5.50	1859943	5.68
19	13.55	Unknown	18354	0.61	127760	0.39
20	13.68	Unknown	25478	0.85	176725	0.54
21	13.82	Unknown	27320	0.91	305647	0.93
22	14.58	Unknown	3474	0.12	45347	0.14
Total			3000098	100.00	32747399	100.00

Figure A27 : HPLC Chromatogram of sample from gasoline base

blended with 600 ppm of LZ8195 at 1000 rpm

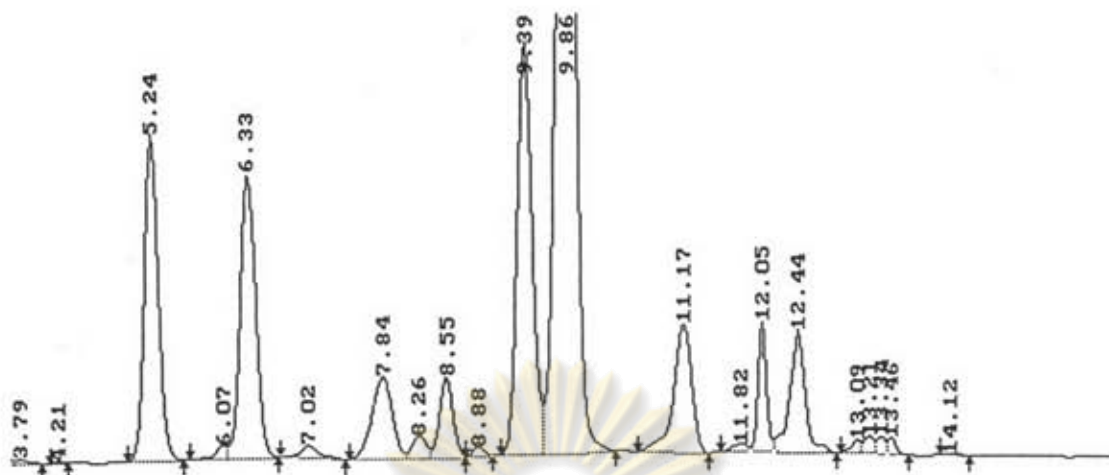


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-02-10
 Time : 01:41:15 Acquisition Time : 20:20:22
 File Name : 1B6001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.19	Unknown	1282	0.05	15442	0.05
2	3.44	Unknown	13433	0.56	133934	0.45
3	4.86	Unknown	336627	13.96	3363668	11.41
4	5.60	Unknown	17316	0.72	222963	0.76
5	6.00	Unknown	393560	16.32	5081657	17.24
6	6.71	Unknown	15620	0.65	281187	0.95
7	7.66	Unknown	103947	4.31	1822270	6.18
8	8.22	Unknown	43189	1.79	574514	1.95
9	8.57	Unknown	100331	4.16	1248207	4.24
10	8.97	Unknown	3576	0.15	35249	0.12
11	9.58	Unknown	158473	6.57	2079076	7.05
12	10.11	Unknown	651935	27.03	9255364	31.40
13	11.47	Unknown	184902	7.67	2146144	7.28
14	12.02	Unknown	20087	0.83	227924	0.77
15	12.22	Unknown	188988	7.84	1099934	3.73
16	12.60	Unknown	112267	4.66	1404804	4.77
17	12.96	Unknown	9563	0.40	66822	0.23
18	13.36	Unknown	9496	0.39	75727	0.26
19	13.49	Unknown	11957	0.50	85295	0.29
20	13.63	Unknown	13235	0.55	90169	0.31
21	13.77	Unknown	19497	0.81	143076	0.49
22	14.43	Unknown	2234	0.09	17672	0.06
Total			2411516	100.00	29471098	100.00

Figure A28 : HPLC Chromatogram of sample from gasoline base

blended with 600 ppm of LZ8195 at 1500 rpm

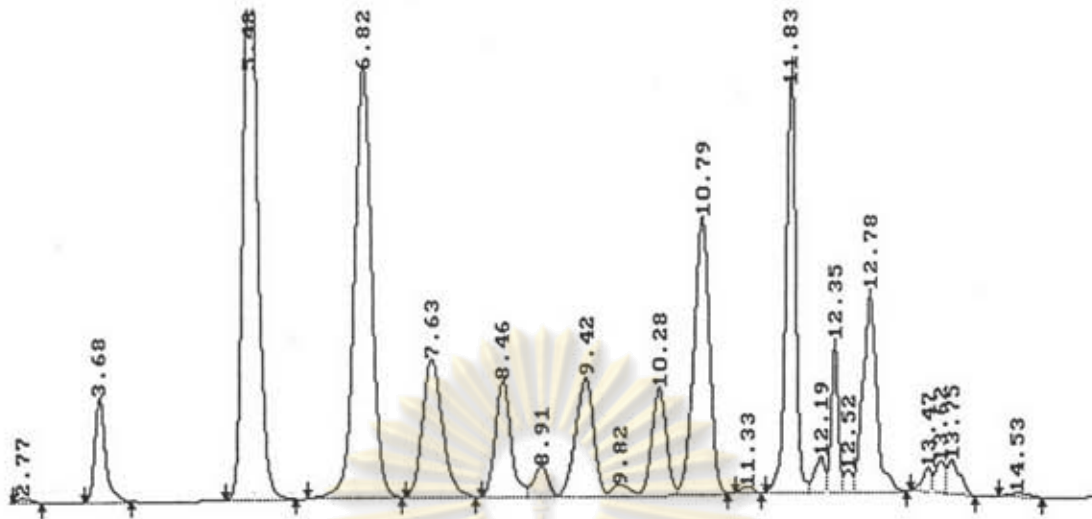


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 22:00:27 Acquisition Time : 20:20:22
 File Name : 1B6002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.20	Unknown	1609	0.04	12364	0.03
2	2.75	Unknown	1881	0.04	16617	0.03
3	3.62	Unknown	9725	0.23	78273	0.16
4	3.79	Unknown	5255	0.12	44632	0.09
5	4.21	Unknown	1035	0.02	7050	0.01
6	5.24	Unknown	415121	9.84	4621787	9.58
7	6.07	Unknown	17553	0.42	162422	0.34
8	6.33	Unknown	362727	8.60	4239724	8.79
9	7.02	Unknown	15890	0.38	224791	0.47
10	7.84	Unknown	103629	2.46	1583758	3.28
11	8.26	Unknown	27445	0.65	280195	0.58
12	8.55	Unknown	101222	2.40	971034	2.01
13	8.88	Unknown	11116	0.26	88913	0.18
14	9.39	Unknown	522155	12.38	5926205	12.28
15	9.86	Unknown	2037256	48.31	24069541	49.88
16	11.17	Unknown	163661	3.88	2310606	4.79
17	11.82	Unknown	11977	0.28	142047	0.29
18	12.05	Unknown	166597	3.95	1076924	2.23
19	12.44	Unknown	156054	3.70	1814029	3.76
20	13.09	Unknown	17275	0.41	117552	0.24
21	13.21	Unknown	22103	0.52	147288	0.31
22	13.34	Unknown	22567	0.54	155362	0.32
23	13.46	Unknown	21004	0.50	140539	0.29
24	14.12	Unknown	2399	0.06	21131	0.04
Total			4217255	100.00	48252782	100.00

Figure A29 : HPLC Chromatogram of sample from gasoline base

blended with 600 ppm of LZ8195 at 2000 rpm

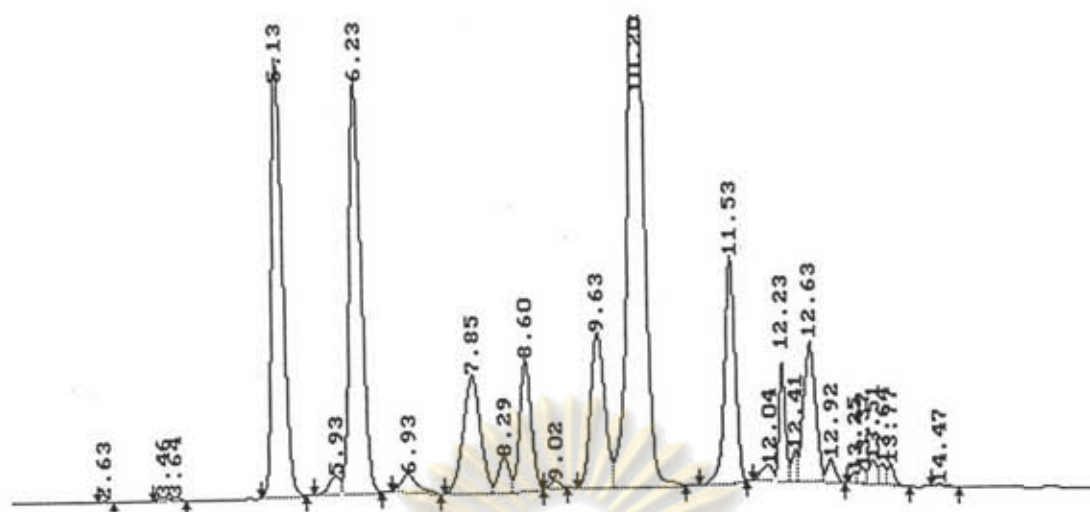


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-13 Acquisition Date : 1997-02-10
 Time : 00:54:38 Acquisition Time : 20:20:22
 File Name : 1B6002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.26	Unknown	2247	0.12	15487	0.07
2	2.77	Unknown	3129	0.16	35296	0.17
3	3.68	Unknown	67799	3.57	594038	2.81
4	5.48	Unknown	417348	21.99	4692478	22.21
5	6.82	Unknown	280170	14.76	3908808	18.50
6	7.63	Unknown	89183	4.70	1448691	6.86
7	8.46	Unknown	75584	3.98	942301	4.46
8	8.91	Unknown	19323	1.02	210443	1.00
9	9.42	Unknown	76464	4.03	1070844	5.07
10	9.82	Unknown	6375	0.34	81261	0.38
11	10.28	Unknown	69181	3.65	786194	3.72
12	10.79	Unknown	178846	9.42	2297453	10.87
13	11.33	Unknown	3981	0.21	35640	0.17
14	11.83	Unknown	280988	14.81	2180221	10.32
15	12.19	Unknown	22803	1.20	196707	0.93
16	12.35	Unknown	99001	5.22	541616	2.56
17	12.52	Unknown	14213	0.75	89712	0.42
18	12.78	Unknown	130598	6.88	1465868	6.94
19	13.47	Unknown	15494	0.82	120689	0.57
20	13.62	Unknown	20761	1.09	150644	0.71
21	13.75	Unknown	21384	1.13	220312	1.04
22	14.53	Unknown	2958	0.16	41968	0.20
Total			1897832	100.00	21126669	100.00

Figure A30 : HPLC Chromatogram of sample from gasoline base

blended with 600 ppm of LZ8195 at 2500 rpm

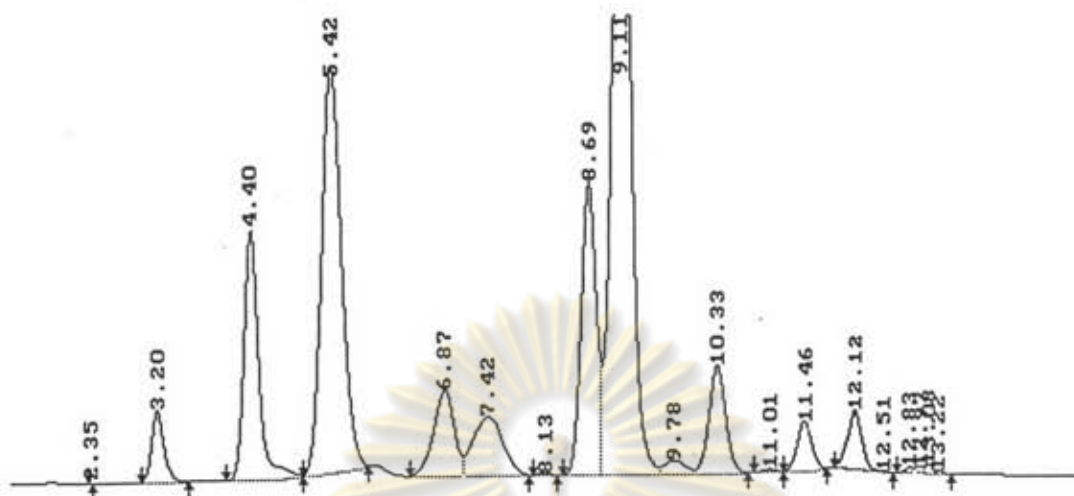


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-12 Acquisition Date : 1997-02-10
 Time : 23:33:08 Acquisition Time : 20:20:22
 File Name : 1B6003000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.23	Unknown	1091	0.04	7576	0.02
2	2.63	Unknown	1134	0.04	7878	0.02
3	3.46	Unknown	4569	0.16	37830	0.11
4	3.64	Unknown	3294	0.11	28556	0.08
5	5.13	Unknown	479112	16.43	5154146	15.07
6	5.93	Unknown	19139	0.66	195192	0.57
7	6.23	Unknown	447180	15.33	5137887	15.02
8	6.93	Unknown	19073	0.65	291627	0.85
9	7.85	Unknown	126751	4.35	2125367	6.22
10	8.29	Unknown	37678	1.29	378118	1.11
11	8.60	Unknown	141487	4.85	1561904	4.57
12	9.02	Unknown	8505	0.29	81898	0.24
13	9.63	Unknown	167110	5.73	2273515	6.65
14	10.20	Unknown	734223	25.17	10606470	31.02
15	11.53	Unknown	244287	8.38	2492506	7.29
16	12.04	Unknown	18188	0.62	187410	0.55
17	12.23	Unknown	142837	4.90	776385	2.27
18	12.41	Unknown	35038	1.20	199989	0.58
19	12.63	Unknown	156154	5.35	1770193	5.18
20	12.92	Unknown	24970	0.86	183883	0.54
21	13.25	Unknown	12027	0.41	62735	0.18
22	13.37	Unknown	16933	0.58	106132	0.31
23	13.51	Unknown	25509	0.87	191520	0.56
24	13.64	Unknown	23763	0.81	150659	0.44
25	13.77	Unknown	24003	0.82	159538	0.47
26	14.47	Unknown	2603	0.09	26962	0.08
Total			2916656	100.00	34195876	100.00

Figure A31 : HPLC Chromatogram of sample from gasoline base

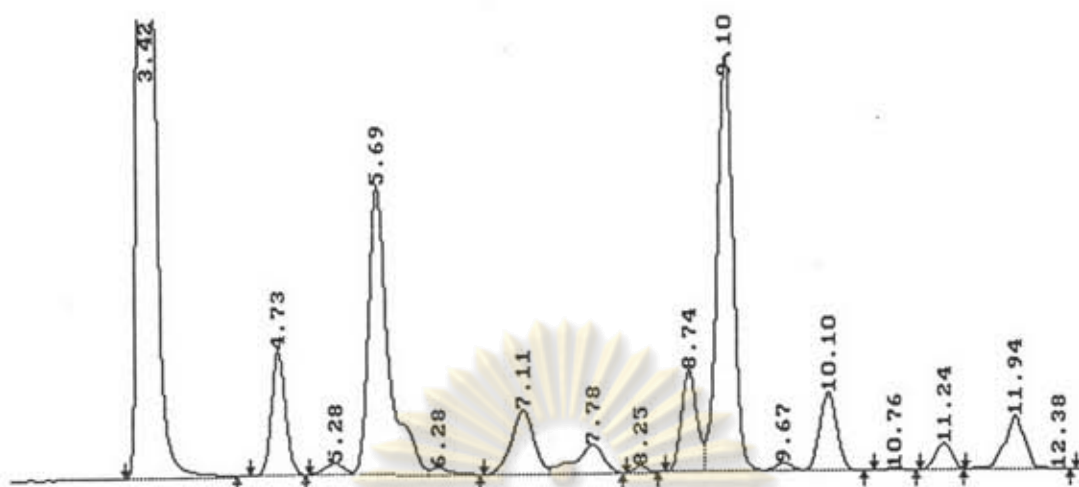
blended with 600 ppm of LZ8195 at 3000 rpm



Quantitation Report for Chromatographic Analysis
 Date : 1997-02-17 Acquisition Date : 1996-10-16
 Time : 17:23:36 Acquisition Time : 12:47:28
 File Name : 1B7001000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	2.35	Unknown	4889	0.17	2427	0.01
2	3.20	Unknown	88514	3.05	931955	2.15
3	4.40	Unknown	308798	10.65	3907116	9.00
4	5.42	Unknown	498250	17.18	8459981	19.48
5	6.87	Unknown	105764	3.65	1920936	4.42
6	7.42	Unknown	72183	2.49	1867948	4.30
7	8.13	Unknown	2763	0.10	25305	0.06
8	8.69	Unknown	360533	12.43	4769396	10.98
9	9.11	Unknown	1135701	39.16	17258149	39.75
10	9.78	Unknown	16773	0.58	303425	0.70
11	10.33	Unknown	133496	4.60	1979039	4.56
12	11.01	Unknown	3816	0.13	45938	0.11
13	11.46	Unknown	59790	2.06	758963	1.75
14	12.12	Unknown	74539	2.57	962803	2.22
15	12.51	Unknown	2243	0.08	13076	0.03
16	12.83	Unknown	7647	0.26	50761	0.12
17	12.97	Unknown	9061	0.31	58753	0.14
18	13.08	Unknown	10625	0.37	76439	0.18
19	13.22	Unknown	4675	0.16	29600	0.07
Total			2900060	100.00	43422007	100.00

**Figure A32 : HPLC Chromatogram of sample from gasoline base
 blended with 700 ppm of LZ8195 at 1000 rpm**

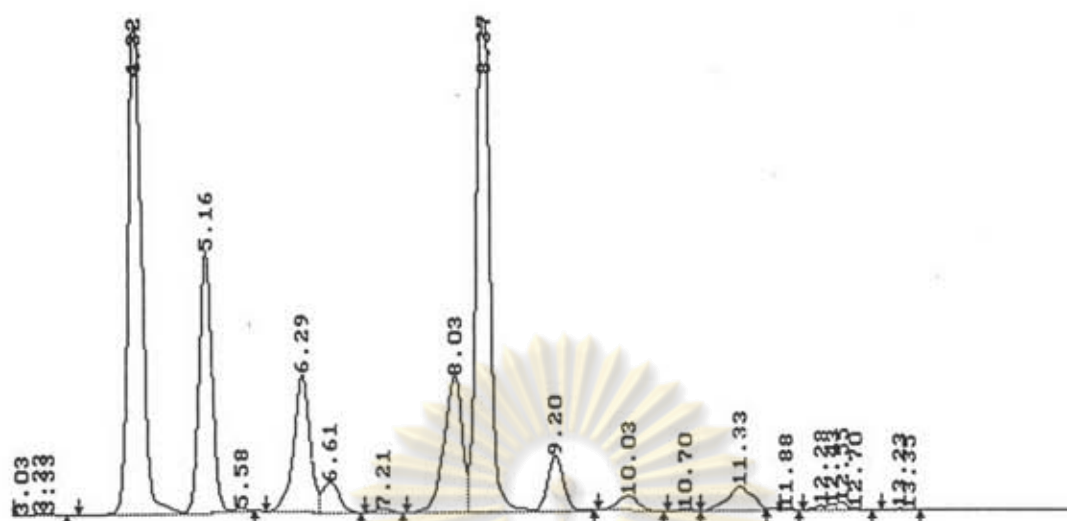


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-17 Acquisition Date : 1996-10-16
 Time : 16:48:28 Acquisition Time : 12:47:28
 File Name : 1B7001500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.61	Unknown	1208	0.03	8729	0.02
2	3.42	Unknown	2049660	50.95	21797501	48.47
3	4.73	Unknown	198167	4.93	1883987	4.19
4	5.28	Unknown	17973	0.45	225126	0.50
5	5.69	Unknown	455435	11.32	6058888	13.47
6	6.28	Unknown	10180	0.25	145180	0.32
7	7.11	Unknown	101666	2.53	1503670	3.34
8	7.78	Unknown	45528	1.13	882962	1.96
9	8.25	Unknown	9985	0.25	84877	0.19
10	8.74	Unknown	162995	4.05	1706546	3.80
11	9.10	Unknown	659795	16.40	7105867	15.80
12	9.67	Unknown	13667	0.34	167151	0.37
13	10.10	Unknown	124293	3.09	1451412	3.23
14	10.76	Unknown	3576	0.09	45767	0.10
15	11.24	Unknown	42596	1.06	467569	1.04
16	11.94	Unknown	84211	2.09	1135318	2.52
17	12.38	Unknown	1390	0.03	8890	0.02
18	12.73	Unknown	9836	0.24	69999	0.16
19	12.87	Unknown	11229	0.28	75840	0.17
20	13.01	Unknown	13784	0.34	102241	0.23
21	13.19	Unknown	4927	0.12	31090	0.07
22	13.74	Unknown	1032	0.03	8565	0.02
Total			4023132	100.00	44967176	100.00

Figure A33 : HPLC Chromatogram of sample from gasoline base

blended with 700 ppm of LZ8195 at 1500 rpm

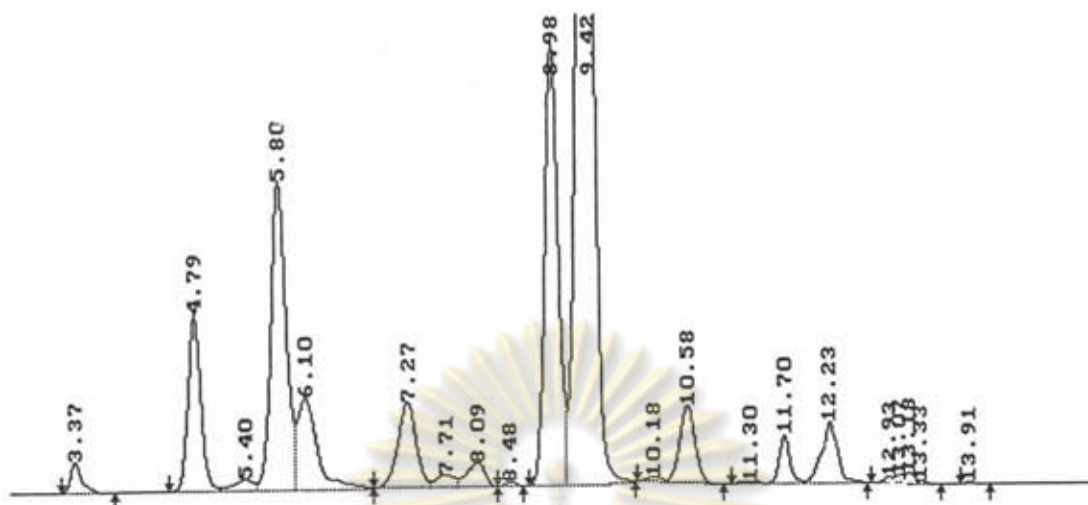


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-17 Acquisition Date : 1996-10-16
 Time : 20:47:22 Acquisition Time : 12:47:28
 File Name : 1B7002000

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.23	Unknown	2547	0.04	19244	0.02
2	2.55	Unknown	3516	0.05	27223	0.03
3	3.03	Unknown	1040	0.01	5635	0.01
4	3.23	Unknown	12027	0.17	83140	0.10
5	3.33	Unknown	10625	0.15	81543	0.10
6	4.32	Unknown	2043128	29.22	22370728	27.75
7	5.16	Unknown	1091431	15.61	11069033	13.73
8	5.58	Unknown	15242	0.22	132392	0.16
9	6.29	Unknown	574553	8.22	7318253	9.08
10	6.61	Unknown	120743	1.73	1635668	2.03
11	7.21	Unknown	15984	0.23	191878	0.24
12	8.03	Unknown	565617	8.09	8116377	10.07
13	8.37	Unknown	2043949	29.23	23154538	28.72
14	9.20	Unknown	230795	3.30	2851678	3.54
15	10.03	Unknown	60351	0.86	987719	1.23
16	10.70	Unknown	4768	0.07	60197	0.07
17	11.33	Unknown	96076	1.37	1825903	2.26
18	11.88	Unknown	2164	0.03	15274	0.02
19	12.28	Unknown	19080	0.27	131973	0.16
20	12.43	Unknown	26230	0.38	182627	0.23
21	12.55	Unknown	31989	0.46	216489	0.27
22	12.70	Unknown	11229	0.16	71560	0.09
23	13.23	Unknown	5254	0.08	43432	0.05
24	13.35	Unknown	4002	0.06	25516	0.03
Total			6992341	100.00	80618019	100.00

Figure A34 : HPLC Chromatogram of sample from gasoline base

blended with 700 ppm of LZ8195 at 2000 rpm

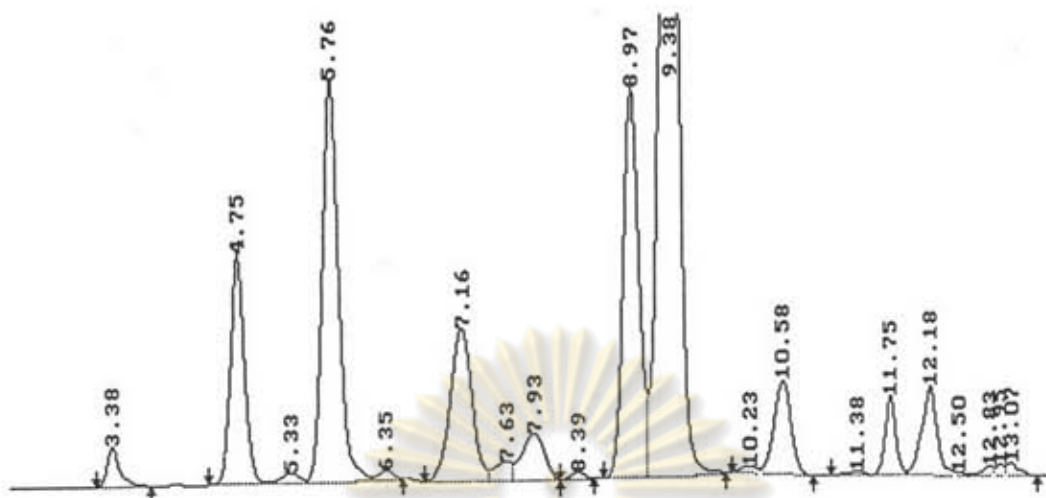


Quantitation Report for Chromatographic Analysis
 Date : 1997-02-17 Acquisition Date : 1996-10-16
 Time : 18:32:31 Acquisition Time : 12:47:28
 File Name : 1B7002500

No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.68	Unknown	1784	0.03	23181	0.03
2	3.37	Unknown	79164	1.39	754244	1.00
3	4.79	Unknown	458165	8.05	4713031	6.25
4	5.40	Unknown	27136	0.48	464406	0.62
5	5.80	Unknown	795609	13.97	9674535	12.82
6	6.10	Unknown	238619	4.19	3610704	4.79
7	7.27	Unknown	221668	3.89	3264724	4.33
8	7.71	Unknown	32114	0.56	518186	0.69
9	8.09	Unknown	62883	1.10	922076	1.22
10	8.48	Unknown	12737	0.22	109660	0.15
11	8.98	Unknown	1137316	19.97	12742734	16.89
12	9.42	Unknown	2037577	35.79	32320592	42.84
13	10.18	Unknown	12993	0.23	149235	0.20
14	10.58	Unknown	199725	3.51	2391904	3.17
15	11.30	Unknown	6167	0.11	73539	0.10
16	11.70	Unknown	126667	2.22	1057696	1.40
17	12.23	Unknown	158973	2.79	2076579	2.75
18	12.93	Unknown	18791	0.33	130696	0.17
19	13.07	Unknown	24072	0.42	149747	0.20
20	13.18	Unknown	29486	0.52	213085	0.28
21	13.33	Unknown	9806	0.17	59419	0.08
22	13.91	Unknown	2403	0.04	25228	0.03
Total			5693857	100.00	75445201	100.00

Figure A35 : HPLC Chromatogram of sample from gasoline base

blended with 700 ppm of LZ8195 at 2500 rpm



Quantitation Report for Chromatographic Analysis
 Date : 1997-02-17 Acquisition Date : 1996-10-16
 Time : 17:54:28 Acquisition Time : 12:47:28
 File Name : 1B7003000

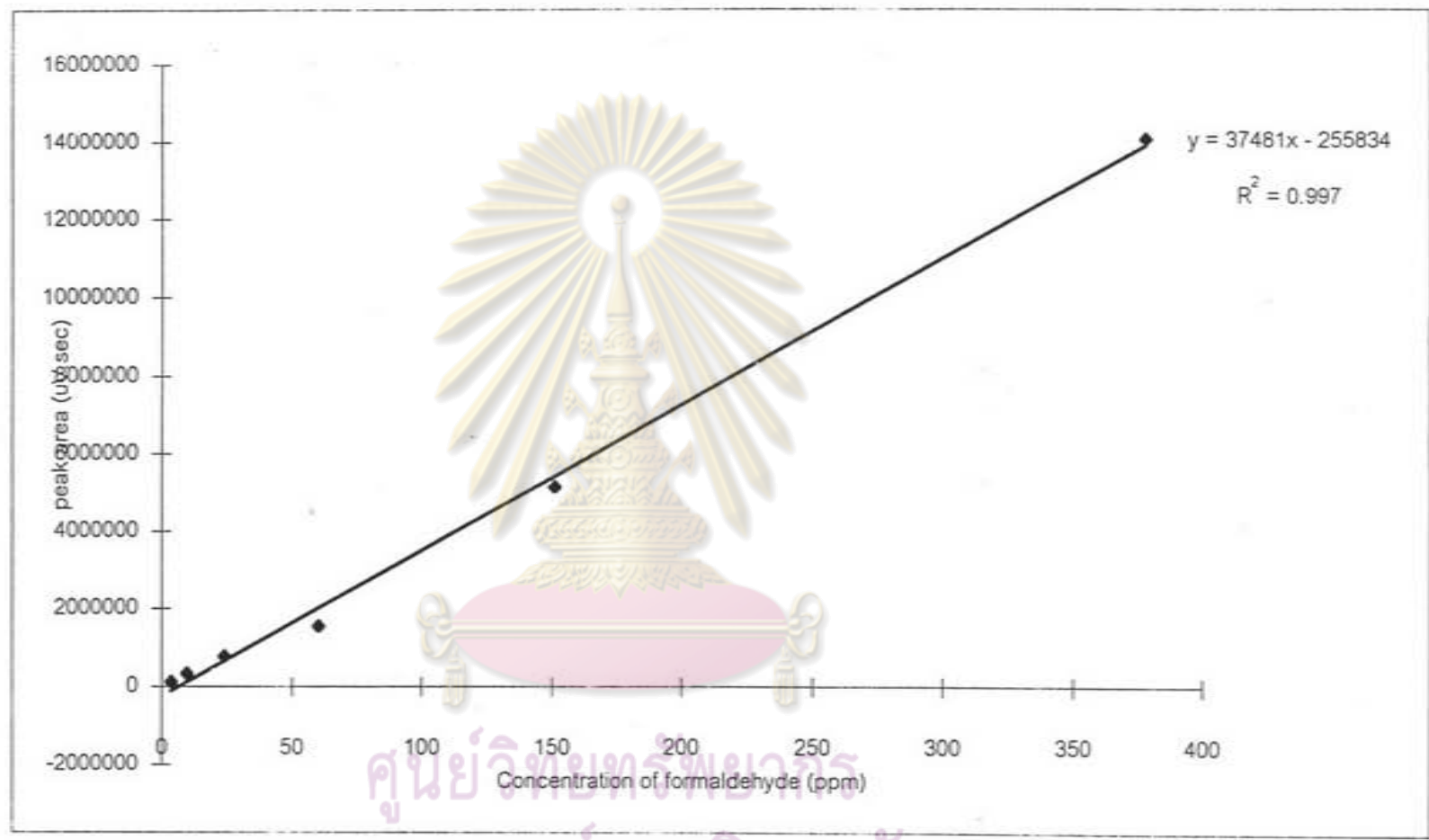
No.	R.Time (min.)	Comp.	Height (uV)	Height%	Area (uV.sec)	Area%
1	1.70	Unknown	2229	0.04	29167	0.04
2	3.38	Unknown	85664	1.56	776522	1.10
3	4.75	Unknown	490473	8.91	5088707	7.22
4	5.33	Unknown	19698	0.36	251915	0.36
5	5.76	Unknown	864860	15.71	10238229	14.53
6	6.35	Unknown	18294	0.33	187315	0.27
7	7.16	Unknown	326376	5.93	5120272	7.27
8	7.63	Unknown	40010	0.73	521188	0.74
9	7.93	Unknown	99437	1.81	1647198	2.34
10	8.39	Unknown	13837	0.25	134619	0.19
11	8.97	Unknown	833396	15.14	9623202	13.65
12	9.38	Unknown	2038503	37.02	29837891	42.34
13	10.23	Unknown	14002	0.25	160098	0.23
14	10.58	Unknown	201268	3.66	2484114	3.52
15	11.38	Unknown	7959	0.14	114943	0.16
16	11.75	Unknown	172342	3.13	1412593	2.00
17	12.18	Unknown	192424	3.49	2191750	3.11
18	12.50	Unknown	9297	0.17	58054	0.08
19	12.83	Unknown	20547	0.37	162590	0.23
20	12.95	Unknown	24799	0.45	160266	0.23
21	13.07	Unknown	27921	0.51	250042	0.35
22	13.76	Unknown	2411	0.04	24811	0.04
Total			5505750	100.00	70475486	100.00

Figure A36 : HPLC Chromatogram of sample from gasoline base

blended with 700 ppm of LZ8195 at 3000 rpm



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Figure B1 : Calibration curve of formaldehyde

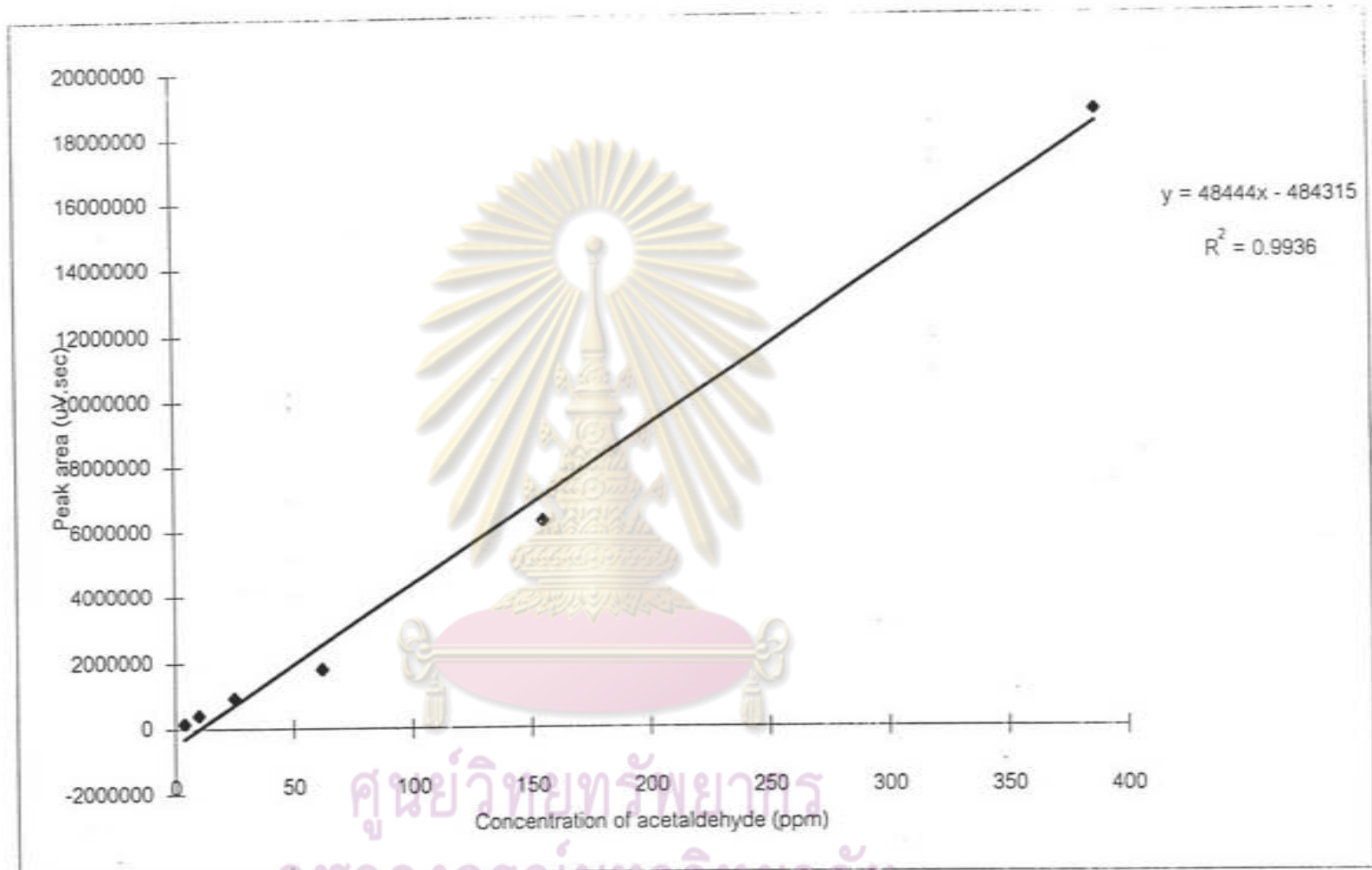
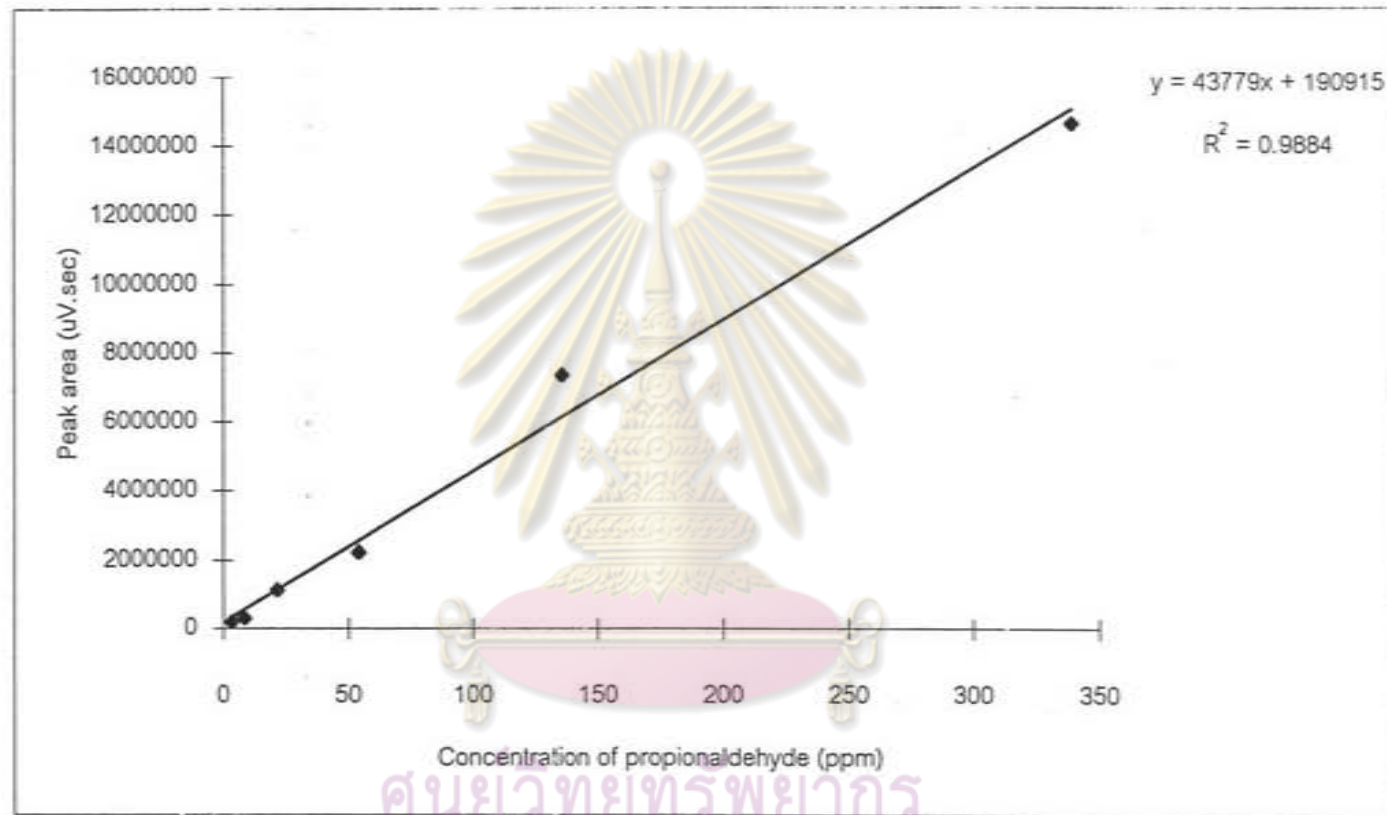
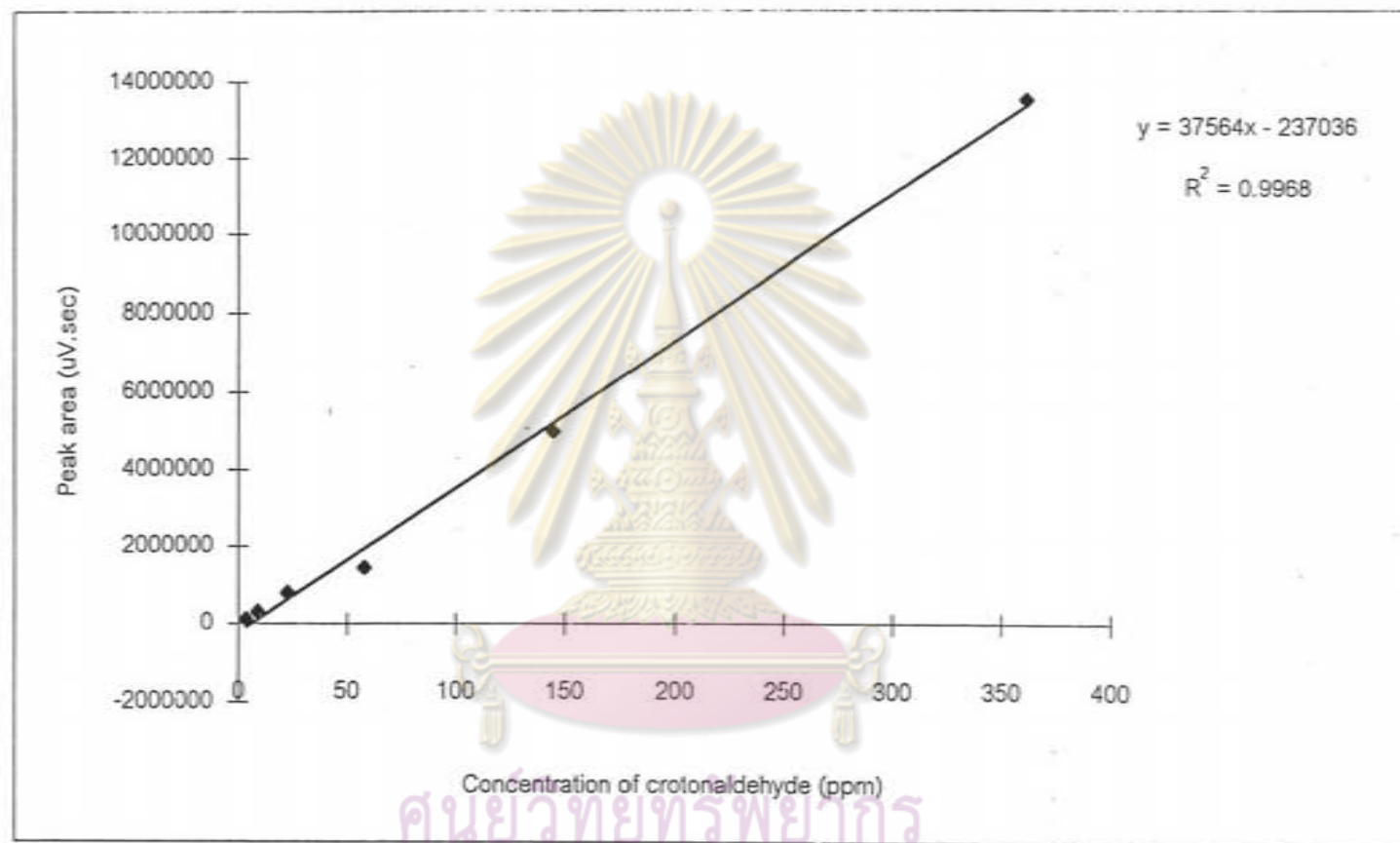


Figure B2 : Calibration curve of acetaldehyde



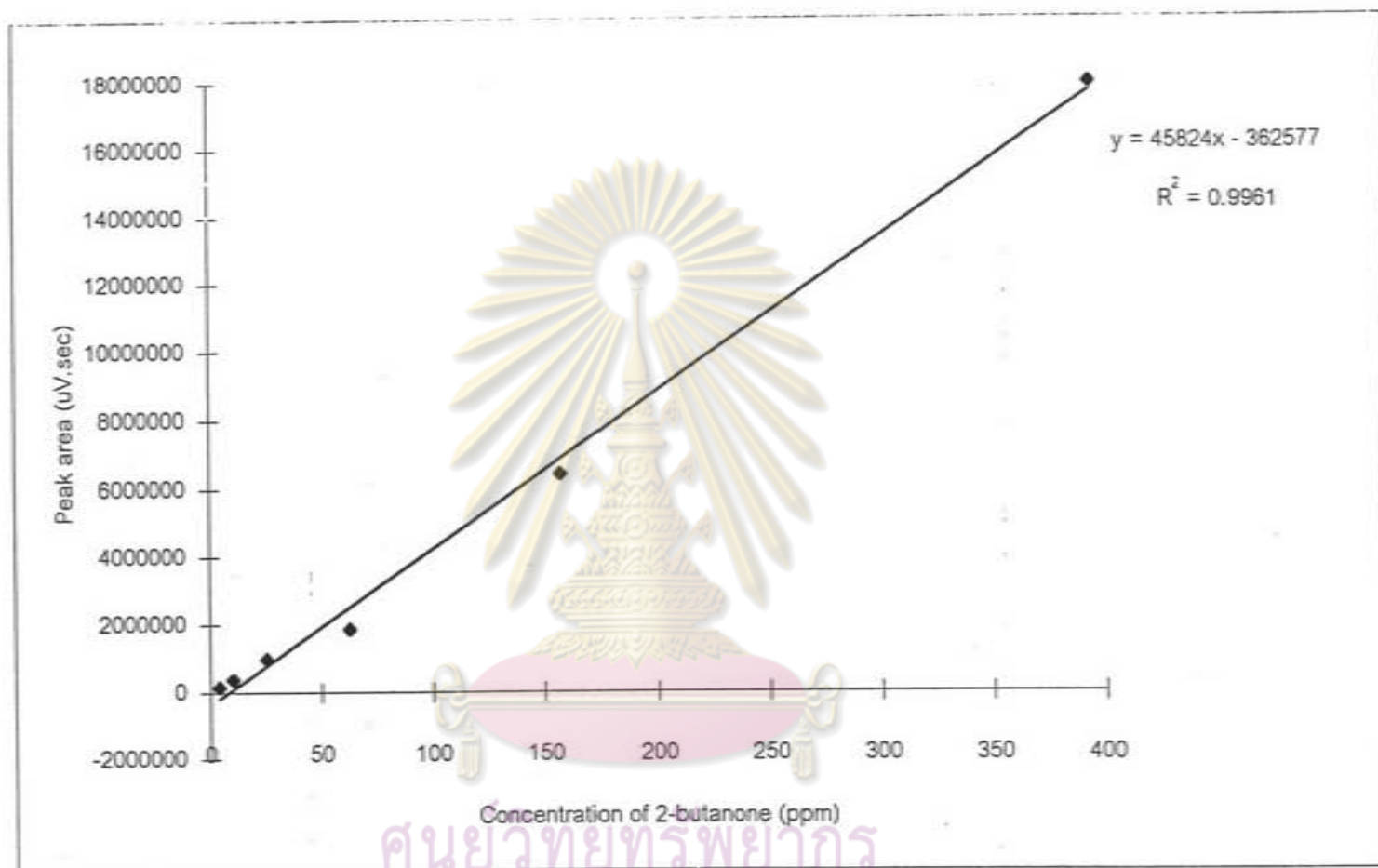
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Figure B3 : Calibration curve of propionaldehyde



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Figure B4 : Calibration curve of crotonaldehyde



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Figure B5 : Calibration curve of 2-butanone



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Two-Way Analysis of Variance

Example : analysis of CO

CO (% volume)		
time 1	time 2	time 3
0.74	0.75	0.72
0.19	0.18	0.18
0.65	0.62	0.62
0.76	0.76	0.74
1.31	1.19	1.21

Hypothesis 1 : $H_0 : \sigma_1^2 = \sigma_2^2 = \sigma_3^2$

H_1 : difference at least 1 pair

$$\begin{aligned} \text{Test Statistics} &= R = \text{Max } S_j^2 / \Sigma S_j^2 \\ &= 0.16 / 0.43 \\ &= 0.372 \end{aligned}$$

Open table : $R_{0.05;5,3} = 0.7457$

not difference

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Hypothesis 2 : $H_0 : \mu_1 = \mu_2 = \mu_3$

H_1 : difference at least 1 pair

speed (rpm)	time1	time2	time3	total
1000	0.74	0.75	0.72	2.21
1500	0.19	0.18	0.18	0.55
2000	0.65	0.62	0.62	1.89
2500	0.76	0.76	0.74	2.26
3000	1.31	1.19	1.21	3.73
total	3.65	3.52	3.47	10.640
\bar{X}	0.73	0.70	0.69	
S^2	0.16	0.14	0.13	

CT = CORRECTION TERM

SST = TOTAL SUM OF SQUARE

SS_t = TREATMENT SUM OF SQUARE

SS_b = BLOCK SUM OF SQUARE

SSE = ERROR SUM OF SQUARE

STEP 2

$$CT = G^2/N = (10.64)^2/15$$

$$SST = \Sigma Y^2 - CT = 9.22 - 7.55 = 1.67$$

$$SS_t = \Sigma T^2/Y - CT = 7.55076 - 7.55 = 0.00076$$

$$SS_b = \Sigma B^2/K - CT = 9.26 - 7.55 = 1.71$$

$$SSE = SST - SS_t - SS_b = 1.67 - 1.71 = -0.04$$

ANOVA TABLE

Source	df	ss
Treatment	$df_t = k-1$	$ss_t = 0.00076$
Block	$df_b = r-1$	$ss_b = 1.71$
Error	$df_e = 14-4-2 = 8$	$ss_e = -0.04$
Total	$df_T = N-1 = 14$	

$$MS_t = 0.00019 \text{ F-Ratio}$$

$$MS_b = 0.4275 \quad MS_t / MSE = 0.00019/0.005 \\ = 0.038$$

If $F > F_{0.05} \text{ } Df_t, Df_e \Rightarrow P\text{-value} < 0.05$ difference

.... $F < F_{0.05} \text{ } Df_t, Df_e \Rightarrow P\text{-value} > 0.05$ not difference

$$F_{0.05; 2,8} = 0.67978$$

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

VITA

Mr. Banjong Marksoong was born on February 4, 1971 in Nakhonsawan. He received his Bachelor of Science degree from the Department of chemistry, Faculty of Science, Srinakarinwirot University Southern Legion in 1994. He began his studies in towards the Multidisciplinary of Petrochemistry and Polymer, Graduate School, Chulalongkorn University, in 1994 and completed the program in 1997



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย