

## APPENDIX F

### Residual Levels of MTBE and Other Oxygenates in the Distribution System



## **Residual Levels of MTBE and Other Oxygenates in the Distribution System**

### **A. Background**

The CaRFG3 regulations establish a three-stage schedule for reducing residual levels of MTBE in CaRFG3 in the distribution system after the addition of MTBE is banned. The amended regulations, approved by the Board at a July 2002 hearing, requires that the concentration of MTBE in distributed CaRFG3 not exceed 0.3 percent, by volume, starting December 31, 2003. This level is reduced to 0.15 percent by volume starting December 31, 2004 and 0.05 percent by volume starting December 31, 2005. These limits are intended to account for MTBE contamination which could be either an unavoidable byproduct of the production process or the result of contact during storage and transfer operations between MTBE-free gasoline and gasoline or blendstocks containing residual amounts of MTBE.

In 1999, when the Board approved the schedule for implementation of the allowable MTBE residual levels, it directed the Executive Office to evaluate the practicality of the specified MTBE residual limits and report back to the Board with a recommendation on whether the limits should be revised. Staff examined residual MTBE levels in MTBE-free gasoline to determine whether the current limits on residual MTBE levels are practically achievable.

Starting December 31, 2003, the CaRFG3 regulations also place a conditional ban on the use of oxygenates other than MTBE and ethanol to produce California gasoline. This prohibition will apply unless a multimedia evaluation of the use of the oxygenate in California gasoline has been conducted and the California Environmental Policy Council (CEPC) has determined that such use will not have a significant adverse impact on public health or the environment. The regulations do not set prohibition levels for these oxygenates. Staff examined results from a survey of retail stations to determine appropriate allowable residual levels for these oxygenates.

### **B. Field Study**

The gasoline samples were collected at service stations in June and August of 2001 as part of a field study to evaluate the impacts of commingling fuels in vehicle fuel tanks. The field study included retail stations in the Lake Tahoe area, the San Francisco Bay area, and the Los Angeles area. Since all of the Los Angeles area stations selected for the study dispensed oxygenated gasoline containing MTBE, the results from these stations were not used to estimate residual levels of MTBE or other oxygenates.

Samples from the stations' underground storage tanks were obtained using the nozzle sampling procedure described in ASTM D 5842-95. "Standard Practice for Sampling and Handling of Fuels for Volatility Measurement." Staff collected two samples of each grade of fuel. The fuel sampling protocols are described in the ARB report "Draft Assessment of Real-World Impacts of Commingling Phase 3 Reformulated Gasoline" May 28, 2002. Fuel samples were analyzed by staff of the ARB's laboratory in El Monte using the method described in ASTM D 4815-94, "Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary -Amyl alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography."

### **C. Residual MTBE in Distributed Gasoline**

Table 1 shows the two types of fuels – non-oxygenated and ethanol gasoline – used to determine residual MTBE levels. The maximum number of samples at each station was six – two samples each for regular, medium, and premium grades. All grades of gasoline at the nine Lake Tahoe area stations were either non-oxygenated gasoline or ethanol gasoline and could all be used to estimate residual MTBE levels. The fuels shown for six Bay area stations were selected from a larger set of 12 samples which included non-oxygenated gasolines and oxygenated gasoline containing MTBE alone, or MTBE and TAME.

Average residual MTBE levels were calculated for samples containing less than 0.6 volume percent MTBE. The results are reported in Table 1 for nine retail stations in the Lake Tahoe area and six in the Bay Area. Table 3 and Table 4 report the complete set of data used to calculate the averages shown in Table 1.

Two stations, both in the Lake Tahoe area, showed average MTBE levels that exceeded 0.3 volume percent – the initial limit for residual MTBE in CaRFG3 gasoline. The range of concentrations for the Lake Tahoe stations was 0 to 0.42 volume percent, with nearly all of the samples in the range of 0.22 to 0.37 volume percent. MTBE concentrations in the Bay area samples ranged from 0 to 0.28 volume percent.

Gasoline sold in the Lake Tahoe region has been predominantly MTBE-free since 1999. The analyses of gasoline samples collected in August 2001 suggest that it may require more than the 12 months currently allowed by the CaRFG3 regulations to reduce MTBE levels below 0.30 volume percent.

### **D. Other Oxygenates in Distributed Gasoline**

There was no oxygenate other than ethanol and MTBE detected in the Lake Tahoe area samples and TAME was the only oxygenate other than MTBE detected in the Bay Area samples. Table 2 shows average TAME levels in samples from six of the 12 Bay Area stations included in the staff's survey. Table 5 shows the data used to calculate the averages reported in Table 2. Only samples containing both TAME and MTBE are reported in Table 2 and Table 5. The complete set of results for the Bay Area stations – including those gasolines that contained only MTBE – is reported in Table 4.

In gasolines oxygenated with both TAME and MTBE, TAME provided 30 to 35 percent of the total oxygen. Where TAME appeared to be at residual levels (stations 16 and 19), the oxygen content due to TAME was 0.02 percent by weight.

**Table 1**

**Residual MTBE Levels in Gasoline from Various Retail Stations**

<b>Retail Station ID</b>	<b>Oxygenate Used</b>	<b>MTBE Vol.%</b>	<b>MTBE Wt.%Oxygen</b>	<b>Total Wt.% Oxygen</b>
1 (6)	None	0.28	0.05	0.05
2 (6)	None	0.28	0.05	0.05
3 (6)	None	0.27	0.05	0.05
4 (6)	None	0.33	0.06	0.06
5 (6)	None	0.33	0.06	0.06
6 (2)	Ethanol	0.24	0.04	2.01
7 (6)	Ethanol	0.25	0.05	2.06
8 (6)	Ethanol	0.24	0.04	2.14
9 (6)	Ethanol	0.16	0.03	2.20
12 (4)	None	0.14	0.02	0.02
13 (4)	None	0.20	0.04	0.04
14 (4)	None	0.13	0.02	0.02
15 (2)	None	0.00	0.00	0.00
17 (4)	None	0.26	0.05	0.05
18 (4)	None	0.26	0.05	0.05

**Notes**

- Numbers in parentheses indicate the number of samples used to calculate the average value for that retail station.
- Stations #1 through #9 were located in the Lake Tahoe area
- All other stations were located in the San Francisco Bay Area.
- Station #6 - Only the 2 premium gasoline samples contained detectable levels of MTBE. The regular and medium grades did not.
- Stations #12 and 13 – values reported for regular and medium grades. The premium grade was oxygenated with MTBE (see Table 4).
- Stations #14, 17, and 18 – values reported for regular and medium grades. The premium grade was oxygenated with MTBE and TAME (see Table 2).
- Station #15 – value reported for regular grade only. The medium and premium grades were oxygenated (see Table 2).

**Table 2**  
**TAME Levels in MTBE Gasoline from Various Bay Area Retail Stations**

<b>Retail Station ID</b>	<b>MTBE Vol.%</b>	<b>TAME Vol.%</b>	<b>MTBE Wt.% O<sub>2</sub></b>	<b>TAME Wt.% O<sub>2</sub></b>	<b>TAME Percent of Total Wt.% O<sub>2</sub></b>
14	7.68	4.65	1.40	0.76	35%
15*	3.27	1.54	0.60	0.25	30%
15	7.94	3.97	1.45	0.65	31%
16	9.68	0.12	1.77	0.02	1.1%
17	8.09	4.11	1.48	0.67	31%
18	8.24	3.97	1.50	0.65	30%
19 (1)	12.39	0.05	2.26	0.02	0.7%

**Notes**

- The numbers in parentheses is the number of samples used to determine the average value for that retail station. The value for each of the other stations was the average of two samples.
- \* Medium grade. All other samples shown in this table are premium grade.
- Station #16 – the regular and medium grades contained MTBE but no detectable levels of TAME (see Table 4)
- Stations #14, 17, and 18 – see Table 1 for regular and medium grades

**Table 3**  
**OXYGEN CONTENT OF GASOLINE FROM LAKE TAHOE RETAIL STATIONS**

#	Sampling Date	SAMPLE ID	Grade	Wt%O2	EtOH mass%	EtOH vol%	EtOH Wt.% O2	MTBE Mass %	MTBE Vol%	MTBE Wt.% O2
1	080801	2287	R	0.06	0.00	0.00	0.00	0.33	0.33	0.06
		2288	M	0.05	0.00	0.00	0.00	0.28	0.28	0.05
		2289	P	0.05	0.00	0.00	0.00	0.25	0.25	0.05
		2304	R	0.06	0.00	0.00	0.00	0.32	0.32	0.06
		2305	M	0.05	0.00	0.00	0.00	0.28	0.27	0.05
		2306	P	0.04	0.00	0.00	0.00	0.24	0.24	0.04
			Average	0.05	0.00	0.00	0.00	0.28	0.28	0.05
2	080801	6707	R	0.05	0.00	0.00	0.00	0.30	0.30	0.05
		6708	M	0.05	0.00	0.00	0.00	0.29	0.28	0.05
		6709	P	0.04	0.00	0.00	0.00	0.24	0.24	0.04
		6717	R	0.06	0.00	0.00	0.00	0.31	0.31	0.06
		6718	M	0.05	0.00	0.00	0.00	0.30	0.30	0.05
		6719	P	0.05	0.00	0.00	0.00	0.25	0.25	0.05
			Average	0.05	0.00	0.00	0.00	0.28	0.28	0.05
3	080901	9507	R	0.06	0.00	0.00	0.00	0.31	0.31	0.06
		9508	M	0.05	0.00	0.00	0.00	0.27	0.27	0.05
		9509	P	0.05	0.00	0.00	0.00	0.25	0.25	0.05
		9476	R	0.05	0.00	0.00	0.00	0.29	0.29	0.05
		9477	M	0.05	0.00	0.00	0.00	0.26	0.26	0.05
		9478	P	0.04	0.00	0.00	0.00	0.24	0.24	0.04
			Average	0.05	0.00	0.00	0.00	0.27	0.27	0.05
4	080701	6687	R	0.07	0.00	0.00	0.00	0.40	0.40	0.07
		6688	M	0.06	0.00	0.00	0.00	0.34	0.34	0.06
		6689	P	0.05	0.00	0.00	0.00	0.26	0.26	0.05
		6704	R	0.08	0.00	0.00	0.00	0.42	0.42	0.08
		6705	M	0.06	0.00	0.00	0.00	0.31	0.30	0.06
		6706	P	0.04	0.00	0.00	0.00	0.24	0.24	0.04
			Average	0.06	0.00	0.00	0.00	0.33	0.33	0.06
5	080701	9441	R	0.08	0.00	0.00	0.00	0.42	0.42	0.08
		9442	M	0.06	0.00	0.00	0.00	0.32	0.32	0.06
		9443	P	0.05	0.00	0.00	0.00	0.26	0.26	0.05
		9444	R	0.07	0.00	0.00	0.00	0.37	0.37	0.07
		9445	M	0.06	0.00	0.00	0.00	0.34	0.34	0.06
		9446	P	0.05	0.00	0.00	0.00	0.26	0.26	0.05
			Average	0.06	0.00	0.00	0.00	0.33	0.33	0.06
6	080901	1021	R	1.97	5.68	5.30	1.97	0.00	0.00	0.00
		1022	M	1.99	5.72	5.35	1.99	0.00	0.00	0.00
		1023	P	2.07	5.84	5.46	2.03	0.24	0.24	0.04
		1018	R	2.00	5.76	5.38	2.00	0.00	0.00	0.00
		1019	M	1.98	5.71	5.34	1.98	0.00	0.00	0.00
		1020	P	2.08	5.87	5.49	2.04	0.23	0.23	0.04
			Average	2.01	5.76	5.39	2.00	0.08	0.08	0.01
7	080901	6720	R	2.03	5.73	5.36	1.99	0.22	0.22	0.04
		6721	M	2.09	5.84	5.46	2.03	0.35	0.35	0.06
		6722	P	2.09	5.84	5.46	2.03	0.37	0.36	0.07
		6738	R	2.00	5.76	5.38	2.00	0.00	0.00	0.00
		6739	M	2.06	5.78	5.40	2.01	0.27	0.27	0.05
		6740	P	2.09	5.86	5.48	2.03	0.33	0.33	0.06
			Average	2.06	5.80	5.42	2.01	0.26	0.25	0.05
8	080701	1015	R	2.28	6.44	6.02	2.24	0.23	0.23	0.04
		1016	M	2.07	5.83	5.45	2.02	0.24	0.24	0.04
		1017	P	2.08	5.86	5.48	2.03	0.25	0.25	0.05
		1996	R	2.26	6.40	5.98	2.22	0.24	0.23	0.04
		1997	M	2.07	5.85	5.47	2.03	0.24	0.23	0.04
		1998	P	2.09	5.88	5.50	2.04	0.25	0.25	0.05
			Average	2.14	6.04	5.65	2.10	0.24	0.24	0.04
9	080901	9447	R	2.09	5.89	5.50	2.04	0.25	0.25	0.05
		9448	M	2.20	6.35	5.93	2.20	0.00	0.00	0.00
		9449	P	2.28	6.44	6.02	2.24	0.23	0.23	0.04
		9473	R	2.08	5.87	5.49	2.04	0.26	0.26	0.05
		9474	M	2.24	6.46	6.04	2.24	0.00	0.00	0.00
		9475	P	2.30	6.52	6.09	2.26	0.23	0.23	0.04
			Average	2.20	6.25	5.85	2.17	0.16	0.16	0.03

**Table 4**  
**OXYGEN CONTENT OF GASOLINE FROM BAY AREA RETAIL STATIONS**

#	Sampling Date	SAMPLE ID	Grade	wt%O2	MTBE Mass %	MTBE Vol%	MTBE Wt.% O2	TAME Mass %	TAME Vol%	TAME Wt.% O2
10	062601	1856	R	0.25	1.37	1.36	0.25	0.00	0.00	0.00
		1857	M	0.53	2.94	2.92	0.53	0.00	0.00	0.00
		1858	P	1.74	9.61	9.56	1.74	0.00	0.00	0.00
		1875	R	0.25	1.37	1.37	0.25	0.00	0.00	0.00
		1876	M	0.90	4.96	4.93	0.90	0.00	0.00	0.00
		1877	P	1.77	9.75	9.70	1.77	0.00	0.00	0.00
11	062701	1878	R	0.14	0.78	0.78	0.14	0.00	0.00	0.00
		1879	M	0.89	4.92	4.89	0.89	0.00	0.00	0.00
		1880	P	1.74	9.59	9.54	1.74	0.00	0.00	0.00
		1909	R	0.14	0.79	0.78	0.14	0.00	0.00	0.00
		1910	M	0.90	4.97	4.94	0.90	0.00	0.00	0.00
		1911	P	1.75	9.64	9.58	1.75	0.00	0.00	0.00
12	062601	6578	R	0.05	0.28	0.28	0.05	0.00	0.00	0.00
		6579	M	0.05	0.27	0.27	0.05	0.00	0.00	0.00
		6580	P	1.73	9.54	9.49	1.73	0.00	0.00	0.00
		6593	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6594	M	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6595	P	1.76	9.69	9.64	1.76	0.00	0.00	0.00
			Average *	0.02	0.14	0.14	0.02	0.00		
13	062701	6607	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6608	M	0.05	0.27	0.27	0.05	0.00	0.00	0.00
		6609	P	1.74	9.62	9.56	1.74	0.00	0.00	0.00
		6610	R	0.05	0.27	0.27	0.05	0.00	0.00	0.00
		6611	M	0.05	0.27	0.26	0.05	0.00	0.00	0.00
		6612	P	1.74	9.61	9.56	1.74	0.00	0.00	0.00
	Average *	0.04	0.20	0.20	0.04	0.00				
14	062601	9314	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		9315	M	0.05	0.27	0.26	0.05	0.00	0.00	0.00
		9316	P	2.18	7.76	7.72	1.41	4.90	4.69	0.77
		9335	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		9336	M	0.05	0.25	0.25	0.05	0.00	0.00	0.00
		9337	P	2.15	7.68	7.64	1.39	4.83	4.62	0.76
	Average *	0.02	0.13	0.13	0.02	0.00				
15	062701	9338	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		9339	M	0.76	2.96	2.95	0.54	1.45	1.39	0.23
		9340	P	2.06	7.86	7.82	1.43	4.08	3.91	0.64
		9361	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		9362	M	0.93	3.62	3.60	0.66	1.78	1.70	0.28
		9363	P	2.13	8.10	8.06	1.47	4.21	4.03	0.66
	Average *	0.00	0.00	0.00	0.00	0.00				

\* NOTE: Average includes only samples with MTBE content lower than 0.60 volume percent. These met the labeling requirement for retail pumps dispensing non-MTBE gasoline.

**Table 4 (cont.)  
OXYGEN CONTENT OF GASOLINE FROM BAY AREA RETAIL STATIONS**

#	Sampling Date	SAMPLE ID	Grade	wt%O2	MTBE Mass %	MTBE Vol%	MTBE Wt.% O2	TAME Mass %	TAME Vol%	TAME Wt.% O2
16	082801	1056	R	1.96	10.82	10.77	1.96	0.00	0.00	0.00
		1057	M	1.83	10.10	10.04	1.83	0.00	0.00	0.00
		1058	P	1.76	9.63	9.57	1.75	0.11	0.11	0.02
		1068	R	1.96	10.80	10.74	1.96	0.00	0.00	0.00
		1069	M	1.86	10.27	10.21	1.86	0.00	0.00	0.00
		1070	P	1.81	9.84	9.79	1.79	0.14	0.13	0.02
17	082901	3901	R	0.04	0.23	0.23	0.04	0.00	0.00	0.00
		3902	M	0.05	0.30	0.30	0.05	0.00	0.00	0.00
		3903	P	2.12	8.01	7.97	1.45	4.26	4.08	0.67
		3924	R	0.04	0.23	0.23	0.04	0.00	0.00	0.00
		3925	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00
		3926	P	2.18	8.26	8.22	1.50	4.33	4.14	0.68
				Average *	0.05	0.26	0.26	0.05	0.00	0.00
18	082801	6781	R	0.04	0.22	0.22	0.04	0.00	0.00	0.00
		6782	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00
		6783	P	2.14	8.27	8.22	1.50	4.10	3.92	0.64
		6796	R	0.04	0.22	0.22	0.04	0.00	0.00	0.00
		6797	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00
		6798	P	2.16	8.31	8.27	1.51	4.20	4.02	0.66
				Average *	0.05	0.26	0.26	0.05	0.00	0.00
19	082901	6799	R	1.60	8.80	8.75	1.60	0.00	0.00	0.00
		6800	M	1.84	10.12	10.06	1.84	0.00	0.00	0.00
		6801	P	2.17	11.99	11.92	2.17	0.00	0.00	0.00
		6815	R	1.59	8.76	8.71	1.59	0.00	0.00	0.00
		6816	M	1.84	10.12	10.07	1.84	0.00	0.00	0.00
		6817	P	2.27	12.45	12.39	2.26	0.10	0.10	0.02
20	082801	7950	R	1.40	7.72	7.68	1.40	0.00	0.00	0.00
		7951	M	1.33	7.35	7.31	1.33	0.00	0.00	0.00
		7952	P	1.80	9.91	9.86	1.80	0.00	0.00	0.00
		7979	R	1.41	7.80	7.76	1.41	0.00	0.00	0.00
		7980	M	1.35	7.47	7.43	1.35	0.00	0.00	0.00
		7981	P	1.82	10.02	9.97	1.82	0.00	0.00	0.00
21	082901	7982	R	1.59	8.78	8.73	1.59	0.00	0.00	0.00
		7983	M	1.63	9.01	8.96	1.63	0.00	0.00	0.00
		7984	P	1.75	9.64	9.59	1.75	0.00	0.00	0.00
		7011	R	1.59	8.74	8.70	1.59	0.00	0.00	0.00
		7012	M	1.69	9.33	9.28	1.69	0.00	0.00	0.00
		7013	P	1.74	9.59	9.54	1.74	0.00	0.00	0.00

\* NOTE: Average includes only samples with MTBE content lower than 0.60 volume percent. These met the labeling requirement for retail pumps dispensing non-MTBE gasoline.

**Table 5**  
**TAME CONTENT OF GASOLINE FROM BAY AREA RETAIL STATIONS**

#	Sampling Date	SAMPLE ID	Grade	wt%O2	MTBE Mass %	MTBE Vol%	MTBE Wt.% O2	TAME Mass %	TAME Vol%	TAME Wt.% O2	RATIO	
											TAME O2/ TOTAL O2	MTBE O2/ TAME O2
14	062601	9314	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		9315	M	0.05	0.27	0.26	0.05	0.00	0.00	0.00		
		9316	P	2.18	7.76	7.72	1.41	4.90	4.69	0.77	0.35	1.84
		9335	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		9336	M	0.05	0.25	0.25	0.05	0.00	0.00	0.00		
		9337	P	2.15	7.68	7.64	1.39	4.83	4.62	0.76	0.35	1.84
		Average *		2.16	7.72	7.68	1.40	4.86	4.65	0.76	0.35	1.84
15	062701	9338	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		9339	M	0.76	2.96	2.95	0.54	1.45	1.39	0.23	0.30	2.4
		9340	P	2.06	7.86	7.82	1.43	4.08	3.91	0.64	0.31	2.2
		9361	R	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		9362	M	0.93	3.62	3.60	0.66	1.78	1.70	0.28	0.30	2.4
		9363	P	2.13	8.10	8.06	1.47	4.21	4.03	0.66	0.31	2.2
			Average *	M	0.85	3.29	3.27	0.60	1.61	1.54	0.25	0.30
		P	2.10	7.98	7.94	1.45	4.15	3.97	0.65	0.31	2.23	
16	082801	1056	R	1.96	10.82	10.77	1.96	0.00	0.00	0.00		
		1057	M	1.83	10.10	10.04	1.83	0.00	0.00	0.00		
		1058	P	1.76	9.63	9.57	1.75	0.11	0.11	0.02	0.01	101
		1068	R	1.96	10.80	10.74	1.96	0.00	0.00	0.00		
		1069	M	1.86	10.27	10.21	1.86	0.00	0.00	0.00		
		1070	P	1.81	9.84	9.79	1.79	0.14	0.13	0.02	0.01	83.3
		Average *		1.78	9.73	9.68	1.77	0.12	0.12	0.02	0.01	92.4
17	082901	3901	R	0.04	0.23	0.23	0.04	0.00	0.00	0.00		
		3902	M	0.05	0.30	0.30	0.05	0.00	0.00	0.00		
		3903	P	2.12	8.01	7.97	1.45	4.26	4.08	0.67	0.31	2.2
		3924	R	0.04	0.23	0.23	0.04	0.00	0.00	0.00		
		3925	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00		
		3926	P	2.18	8.26	8.22	1.50	4.33	4.14	0.68	0.31	2.2
		Average *		2.15	8.14	8.09	1.48	4.30	4.11	0.67	0.31	2.19
18	082801	6781	R	0.04	0.22	0.22	0.04	0.00	0.00	0.00		
		6782	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00		
		6783	P	2.14	8.27	8.22	1.50	4.10	3.92	0.64	0.30	2.3
		6796	R	0.04	0.22	0.22	0.04	0.00	0.00	0.00		
		6797	M	0.05	0.29	0.29	0.05	0.00	0.00	0.00		
		6798	P	2.16	8.31	8.27	1.51	4.20	4.02	0.66	0.30	2.3
		Average *		2.15	8.29	8.24	1.50	4.15	3.97	0.65	0.30	2.31
19	082901	6799	R	1.60	8.80	8.75	1.60	0.00	0.00	0.00		
		6800	M	1.84	10.12	10.06	1.84	0.00	0.00	0.00		
		6801	P	2.17	11.99	11.92	2.17	0.00	0.00	0.00		
		6815	R	1.59	8.76	8.71	1.59	0.00	0.00	0.00		
		6816	M	1.84	10.12	10.07	1.84	0.00	0.00	0.00		
		6817	P	2.27	12.45	12.39	2.26	0.10	0.10	0.02	0.01	144
		Average *		2.22	12.22	12.16	2.22	0.05	0.05	0.02	0.01	144

\* NOTE: Average calculated for those samples that contained detectable levels of both MTBE and TAME.