

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore Maryland 21230-1719

1-800-633-6101 • <http://www.mde.state.md.us>

**Environmental Investigation and Drinking Water Well Impact
Exxon Service Station - #2-6463
8816 Fingerboard Road
Frederick County, Maryland
Case No. 2006-0245 FR (open)**

The Maryland Department of the Environment (MDE), Oil Control Program (OCP), continues to evaluate the impact of methyl tertiary-butyl ether (MTBE) at the Exxon service station/convenience store. This active gasoline retail facility has been in operation since the 1970s. In 1971, four (4) four underground storage tanks (USTs) comprising fiberglass reinforced plastic with piping of similar material were installed. These first-generation tanks included two 8,000-gallon gasoline, a 4,000-gallon gasoline and a 1,000 gallon used oil that were then removed in 1989.

The facility in the 1970s came under scrutiny when the Frederick County Health Department (FCHD) collected routine water sample from the on-site supply well and discovered bacterial contamination and benzene at 6 parts per billion. A granular activated carbon (GAC) system was subsequently installed.

In September 2005, the MDE-OCP was made aware of environmental problems at the Exxon service station upon receiving sampling results from the four newly installed monitoring wells. A new case was subsequently opened. MTBE contamination was detected in monitoring wells at up to 71200 parts per billion (ppb).

The station's drinking water supply well has been sampled on a quarterly basis since August 2005. MTBE has been the only petroleum constituent detected in the supply well below the State's action level of 20 ppb. The facility is served by a private well, several properties adjacent are either served by private well or are vacant. At this time, the MDE-OCP does not anticipate expanding the off-site residential sampling effort beyond sampling needed to ensure community safety.

MTBE is a fuel additive commonly used to reduce carbon monoxide and ozone levels caused by auto emissions. There is no national regulatory standard for MTBE in drinking water. In 1997, the U.S. Environmental Protection Agency (EPA) issued an advisory for MTBE of 20 to 40 ppb, based on taste and odor. Although the EPA has not established a regulated Maximum Contaminant Level (MCL) for MTBE, the MDE has adopted an action level of 20 ppb. Benzene is a major constituent of gasoline with an MCL of 5 ppb.

ExxonMobil has been the registered operator of the facility and currently operates three USTs comprising fiberglass reinforced plastic and piping of similar material are in operation. These second-generation gasoline tanks include a 12,000-gallon and two 10,000-gallon tanks. The UST system has Stage I and Stage II vapor recovery systems. Currently eleven (11) monitoring wells, two tank field observation pipes, and a transient non-community supply well are located on-site.

The Frederick Limestone that is composed of limestone interbedded with shale underlies the station. Competent limestone is encountered between 30 and 40 feet. Depth to groundwater ranged from 7.62 to 29.43 feet. Groundwater flow direction varies from north to northeasterly.

Chronology:

- April 16, 1984. Maryland Department of Natural Resources –Water Resources Administration (precursors to the MDE) received letter from the FCHD dated 04/16/84 to ExxonMobil.
 - Raw water samples collected from the station's supply well 03/08/84 detected benzene at 6 ppb and contamination from coliform bacteria.
 - Station required to provide safe water by continuously treating the water.



- April 30, 1984. Exxon's letter dated 04/23/84 to FCHD stating that the gasoline station is not the source of contamination in the area.
 - 05/1977. On-site supply well inadequate to meet demands. Water well had poor test, therefore a treatment system was installed.
 - 01/1979. A granular activated carbon filtration system installed.
 - 05/1982. Five monitoring wells installed on-site. No liquid phase hydrocarbons (LPH) detected but two wells had dissolved petroleum hydrocarbons.
 - 09/1982. Tightness tests performed on the second generation USTs. All tanks tested tight. The four improperly abandoned USTs will be removed.
 - 03/1984. Permit application submitted for a new supply well.
- May 17, 1984. FCHD letter to Exxon requiring that the four improperly abandoned USTs at the vacant facility be removed.
- September 15, 1995. MDE-OCP conducted a routine compliance inspection. No violations were cited.
- May 2, 1996. MDE-OCP conducted a routine compliance inspection. No violations were cited.
- September 8, 2005. MDE-OCP received the *Subsurface Investigation Results-September 7, 2005*. MDE opened *Case No. 06-0245FR*.
 - Groundwater flow direction is to generally east/northeast
 - Well survey completed for the ½ mile radius.
 - Four soil samples non-detect for petroleum constituents.
 - Four monitoring wells installed on 7/21/05 and sampled on 8/04/05.
 - MW1 (46 ft) MTBE – 6000 ppb
 - MW2 (40 ft) MTBE - 71200 ppb
 - MW3 (11 ft) MTBE – 2.5 ppb
 - MW4 (40 ft) MTBE – 12.1 ppb
 - PW (supply well) non-detect (ND)
- February 15, 2006. MDE-OCP directive letter sent to Exxon Mobil
 - Test the UST system for vapor leaks
 - Test all spill catchment basins and containment sumps
 - Perform a self-audit of the UST systems
 - Sample all on-site wells every six months.
- March 30, 2006. MDE-OCP received the following information from Exxon Mobil in response to the MDE-OCP letter dated 02/15/06.
 - Inventory records for December 2006 through February 2006
 - Tank/Line/Leak detection records – Veeder-Root
 - Corrosion protection not necessary – fiberglass tanks and piping
 - Ballfloat valves are for overflow protection
 - Problems indicated during testing (helium, hydrostatic, etc.) failure of Stage II testing, spill bucket – supreme gasoline grade and dry break on the regular and plus gasoline grade – failed 08/2005
 - Repairs completed – all passed
- May 2, 2006. MDE-OCP received *First Quarter 2006 Groundwater Monitoring Report – April 28, 2006*. (see table for results)
 - On-site monitoring wells and supply well sampled on 3/16 /06 and 03/06/06 respectively.
- July 28, 2006. MDE-OCP received the *Second Quarter 2006 Groundwater Monitoring Report – July 27, 2006*
 - Sampling event 6/05/06 (see table for sampling results)



- September 11, 2006. MDE-OCP received the *Work Plan for Additional Site Assessment-September 8, 2006*. Proposed site assessment activities include:
 - Advancement of four soil borings adjacent to the tank field;
 - Installation of seven additional monitoring wells;
 - Aquifer characterization using rising head slug tests on four selected monitoring wells; and
 - Geophysical analysis and packer testing of the transient non-community supply well
- September 22, 2006. MDE-OCP received *Work Plan Addendum Correspondence-September 21, 2006*. *Work Plan* detailed the geophysical and packer testing of the potable supply well.
- October 30, 2006. MDE-OCP approval letter, with modifications, regarding the *Work Plan for Additional Site Assessment-September 8, 2006* and the *Work Plan Addendum Correspondence-September 21, 2006*.
 - Prior to initiating activities identify the four monitoring wells at which slug tests will be conducted
 - MDE-OCP does not concur with geophysical analysis of the potable well
 - MDE-OCP recommends that all purge water be removed off-site for proper disposal
 - Continue to sample the monitoring wells on a quarterly basis
 - Continue to sample the supply well on a quarterly basis
- October 30, 2006. MDE-OCP received *Third Quarter 2006 Groundwater Monitoring Report – October 27, 2006*.
 - Enhanced fluid recovery (EFR) events conducted 07/07/06 on MW2 over a six-hour period. Approximately 124 gallons of water removed and properly disposed.
 - EFR events conducted 08/01/06 on MW2 over a six-hour period. Approximately 51 gallons of water removed and properly disposed.
 - Sampling event in September 2006 see *table for results*)
- January 26, 2007. MDE-OCP received the *Fourth Quarter 2006 Groundwater Monitoring Report – January 24, 2007*. (*see table for results*)
- April 24, 2007. MDE-OCP received the *Thirty Day Notification* for the removal of the UST system. Passing results, following minor repairs, for Petro Tite Leak testing completed on March 5, 2007.
- May 1, 2007. MDE-OCP received the *First Quarter 2007 Groundwater Monitoring Report-April 26, 2007*. (*see table for results*)
- May 2, 2007. MDE-OCP on-site to observe the initiation of UST system removal activities.

Future Activities:

- Since tank removal activities are pending further subsurface investigation will be delayed. MDE-OCP anticipating receiving a *Tank Closure Report* for this facility by late June 2007.
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Future Updates:

- Future updates on this case investigation will be posted at www.mde.state.md.us [at the MDE home page, (select) Land, (select) Program, (select) Oil Control, (select) Remediation Sites].

Contacts:

- Maryland Department of the Environment, Oil Control Program 410-537-3442
- Frederick County Health Department 301-600-1715



Monitoring Well Sample Results at the Exxon station located at 8816 Fingerboard Road

On-site Monitoring Wells at the Exxon 8816 Fingerboard Road station	Sampling Date	Benzene MCL – 5 ppb	MTBE	Tertiary butyl alcohol is an unregulated comp.	Other Constituents of Concern Ethylbenzene – MCL at 700 ppb Naphthalene's action level is 10 ppb
			Action Level – 20 ppb		
MW1 (Installed 07/21/2005) Total Depth – 46 ft FR-94-4734	08/04/05	Non-detect (ND)	6000	---	---
	03/16/06	ND	6910	---	TAME 150 ppb (est), DIPE 66.1 ppb (est),
	06/13/06	ND	8680	---	TAME 172 ppb, DIPE 59.3 ppb,
	09/08/06	ND	8620	---	TAME 203 ppb, DIPE 50.1 ppb,
	10/16/06	ND	9670	ND	TAME 259 ppb, DIPE 53.2 ppb,
	02/06/07	ND	11700	ND	TAME 304 ppb, DIPE 80.4 ppb (est)
	03/01/07	ND	10400	130 (est)	TAME 244 ppb, DIPE 63.6 ppb
MW2 (Installed 07/21/05) Total Depth- 40 ft FR-94-4735 Mobile remediation events on 07/07/06 and 08/01/06	08/04/05	1.92	71200	---	---
	03/16/06	ND	25000	24800	TAME 553 ppb, DIPE 118 ppb
	06/13/06	ND	25000	25700	TAME 454 ppb, DIPE 103 ppb,
	09/08/06	ND	23800	16400	TAME 344 ppb, DIPE 80.6 ppb (est),
	10/16/06	ND	36200	37500	TAME 548 ppb, DIPE 133 ppb
	02/06/07	ND	56700	47200	TAME 873 ppb
MW3 (Installed 07/21/05) Total Depth- 11 ft FR-94-4736	08/04/05	ND	2.5	---	---
	03/16/06	ND	1.7	---	---
	06/13/06	ND	0.71(est)	---	---
	09/08/06	0.57 (est)	ND	32.3	---
	10/26/06	DRY	DRY	DRY	DRY
	02/06/07	DRY	DRY	DRY	DRY
MW4 (Installed 07/21/05) Total Depth- 40 ft FR-94-4737	08/04/05	ND	12.1	---	---
	03/16/06	ND	18.1	---	TAME 2.7 ppb (est)
	06/13/06	0.46 (est)	8	---	TAME 1.9 ppb (est)
	09/08/06	ND	11.8	---	---
	10/16/06	ND	9.6	ND	DIPE 0.83 ppb (est)
	02/06/07	ND	5		DIPE 1.8 ppb (est)
MW5	10/16/06	ND	0.37 (est)	ND	---
	02/06/07	ND	1.0	ND	ND
MW6	10/16/06	ND	0.86	ND	---
	02/06/07	ND	2.7	ND	ND
MW7	10/26/06	ND	36300	32900	TAME 851 ppb, DIPE 198 ppb
	02/06/07	ND	30200	28900	TAME 674 ppb, DIPE 146 ppb (est)
	03/01/07	ND	37900	37000	TAME 615 ppb, DIPE 159 ppb
MW8	10/26/06	ND	4430	300	TAME 84.7, DIPE 25.3
	02/06/07	ND	21200	2690	TAME 586 ppb, DIPE 95.6 ppb (est)
	03/01/07	ND	7200	1340	TAME 157 ppb, DIPE 37.4 ppb
MW9	10/26/06	2.2	11.6	ND	naphthalene 45.9 ppb
	02/06/07	2.2	ND	ND	Naphthalene 9.8 ppb
MW10	10/26/06	ND	7.7	ND	TAME 2.3 ppb
	02/06/07	ND	11.3	ND	TAME 4.0 ppb(est)
MW11	10/26/06	1.1	5.0	ND	DIPE 2.4, naphthalene 41.3 ppb
	02/06/07	ND	11.9	ND	Naphthalene 49.5 ppb
TF1	06/13/06	DRY	DRY		
	09/08/06	DRY	DRY		
	10/16/06	DRY	DRY		
	02/06/07	DRY	DRY		
TF2	06/13/06	DRY	DRY		
	09/08/06	DRY	DRY		
	10/16/06	DRY	DRY		
	02/06/07	DRY	DRY		



Drinking Water Sampling

Sample location	Sample dates	Petroleum Constituents of Concern	
		MTBE (20 ppb – action level)	Other petroleum constituents
Transient Non-Community Supply Well			
Exxon station, 8816 Fingerboard Road FR-73-8958 Total Depth 560 ft. (approximate)	08/10/05	ND	ND
	03/06/06	0.67	ND
	06/05/06	0.63	ND
	09/13/06	0.85	ND
	12/13/06	1.9	ND
	02/02/07	0.89	ND

