

# MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Suite 620 • Baltimore, Maryland 21230-1719

410-537-3442 • 800-633-6101 x 3442 • [www.mde.state.md.us](http://www.mde.state.md.us)

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Land Management Administration • Oil Control Program

## DRINKING WATER SAMPLING AND ENVIRONMENTAL INVESTIGATION

**7- Eleven Store #32785**

**125 Hanover Pike**

**Hampstead, Carroll County Maryland**

**Case No. 2006-0282 CL**

The Maryland Department of the Environment (MDE), Oil control Program (OCP), in coordination with the Carroll County Health Department (CCHD), is evaluating the impact of methyl tertiary-butyl ether (MTBE) at the Hanover Pike 7-Eleven service station/convenience store.

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 parts per billion (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.

In September 2005, the MDE-OCP was made aware of environmental problems at the Hanover Pike 7-Eleven upon receiving groundwater sampling results from the three newly installed monitoring wells. MTBE contamination was detected in the monitoring wells at concentrations up to 31,000 ppb. Two additional groundwater monitoring wells were installed on-site in November 2005. Sampling of the monitoring well network in January 2007 detected MTBE at a maximum concentration of 4 ppb after the underground storage tank system (UST) system was tested and tightened to prevent vapor leaks. The station's drinking water supply well remains non-detect for petroleum constituents.

The Hanover Pike 7-Eleven is an active gasoline retail station and convenience store that has been in operation since early 2000. The facility has one 15,000-gallon, fiberglass reinforced plastic tank, storing gasoline, and with flexible plastic piping and one 10,000-gallon, fiberglass reinforced plastic tank, storing gasoline, and with flexible plastic piping. These second generation tanks have Stage I and Stage II vapor recovery systems. Eight (8) monitoring wells, two tank field observation pipes, and a transient non-community drinking water supply well are located on-site.

Based on the elevated levels of petroleum contaminants in the station's groundwater monitoring network and pursuant to Section 4-411.2 of the Environment Article, Annotated Code of Maryland, the MDE opened a case, issued a directive letter to the responsible party. Residents living near the 7-Eleven were notified by the CCHD of the petroleum impacts since the site is located in a high-risk groundwater use area. In November 2005, the CCHD proactively sampled nine (9) nearby drinking water wells. There were no petroleum constituents detected above Federal drinking water standards or State of Maryland Action Levels. MTBE was detected at up to 4.49 ppb in one of the private supply well. In July 2007, the Department required 7-Eleven to collect samples from six (6) nearby private drinking water wells. This sampling effort revealed the presence of MTBE above the State's action level in one of the private wells. The Department is currently monitoring this drinking water well contamination under Case No. 2008-0086CL. At this time, the MDE-OCP does not anticipate expanding the off-site residential sampling effort beyond sampling needed to ensure community safety.

### Chronology:

- June 14, 2005. MDE Oil Control Program (OCP) internal memo requesting that a full compliance assistance inspection be conducted at the 7-Eleven.
- June 21, 2005. MDE-OCP conducted a Compliance Assistance Inspection. The following items need to be addressed:

- Monitoring pipes lack grout at the top eight inches thereby allowing for possible surface water inflow.
  - Vent pipes are not protected properly
  - Spill bucket for the Regular gasoline fill contains gasoline
  - Copy of tank insurance not available
  - Tank capacity and product placard not visible in a conspicuous location
  - Sample required from the on-site domestic supply well
- June 23, 2005. MDE-OCP submitted a copy of the 6/21/05 Compliance Assistance Inspection to 7-Eleven representative via facsimile.
  - July 13, 2005. MDE-OCP received documentation regarding the corrective actions taken in response to the comments listed in the 6/21/05 Compliance Assistance Inspection. Attached documentation included passing results for the tank tightness testing conducted on 4/27/00 and the results of the water sample collected from the drinking water supply well on 7/01/05.
    - PW (on-site supply well untreated) – non-detect for petroleum constituents
  - September 19, 2005. MDE-OCP received a copy of the *Monitoring Well Installation and Observation Report – September 15, 2005*
    - Three monitoring wells installed in July 2005
    - Groundwater encountered at approximately 25 ft. below ground surface
    - Groundwater flow is towards the East
    - Water samples collected from monitoring wells on 7/25/05. Tank field wells were dry
      - MW-1 MTBE at 31,000 ppb, TBA at 28,000 ppb, TAME at 1300 ppb
      - MW-2 Below action levels for petroleum constituents
      - MW-3 MTBE at 290 ppb, TBA at 180 ppb
      - PW (on-site supply well untreated) – non-detect for petroleum constituents (sampled 7/1/05)
  - October 5, 2005. MDE-OCP letter to 7-Eleven, Inc. requiring the following:
    - By November 7 2005, conduct a self audit
    - Submit report of self audit by 11/28/05
    - By Nov. 28, 2005 complete a half-mile well survey
    - Monitoring wells must be sampled every 6 months (8260 and 8015B)
    - MDE approved the installation of two additional monitoring wells
  - October 24, 2005. MDE-OCP received a copy of the notification letter, distributed by the CCHD, to residents within a half-mile radius regarding the presence of MTBE in the on-site monitoring wells.
  - November 8, 2005. MDE-OCP received, via email, notification of field activities for the installation of two, 4-inch monitoring wells.
  - November 21 and 23, 2005. MDE-OCP received the following information in response to the directive letter dated 10/5/05
    - Results of helium test conducted on 11/8/05 – passed - two spill buckets replaced. Secondary piping was not capable of being tested due to fittings present.
    - Self audit conducted on 11/26/05 – passed
    - Stage II vapor recovery tested- passed after repairs made to dry break riser
    - Summary of repairs to UST equipment
    - Log of interstitial monitoring calls 09/2004 thru 09/2005 – normal
    - Inventory records for the period 10/2004 through 10/2005 – passed. High variance noted in April 2005
    - Product pipe test results – passed
    - Line leak detector testing – passed

- November 23, 2005. MDE-OCP received copies of results for drinking water samples collected by the CCHD in November 2005
- November 29, 2005. MDE-OCP received, via email, the inventory variation records for the period 8/01/05 through 11/25/05. All variances were within ½ of 1% of the sales gallons.
- December 1, 2005. MDE-OCP conducted a routine site inspection. All requirements regarding the 6/21/05 Compliance Assistance Inspection have been completed.
- January 27, 2006. MDE-OCP received the results of the ½ mile well receptor survey.
  - Majority of private wells in the area are 6-inches in diameter; cased to 21 to 113 feet; open borehole ranging from 78 to 345 feet bgs
- February 14, 2006. MDE-OCP received the results of a water sample collected by the CCHD at 118 Hanover Pike on 11/17/05. (*see table for results*)
- February 21, 2006. MDE-OCP received the *First Half 2006 Semiannual Monitoring Report – Feb 15, 2006*.
  - Five monitoring wells are located on site and two tank field pipes
  - Groundwater flow towards Northeast
  - Groundwater sampling conducted on 01/25/06 – (*See Table for results*)
- June 2, 2006. MDE-OCP completed a Compliance Assistance Inspection. Following activities required:
  - Complete helium testing to determine cause of elevated PID readings in ATG manway
  - Perform annual testing of spill buckets and maintain them free of liquids and other debris at all times
- August 10, 2006. MDE-OCP received the *Second Half 2006 Semiannual Monitoring Report – July 27, 2006*.
  - Five monitoring wells are located on site and two tank field pipes
  - Groundwater flow towards Northeast
  - Groundwater sampling conducted on July 11, 2006 (*see table for results*)
- August 25, 2006. MDE-OCP directive letter requiring the submittal of an *Interim Corrective Action Plan and Subsurface Investigation Work Plan*.
- October 16, 2006. MDE-OCP received *Subsurface Investigation Work Plan/Interim Corrective Action Plan-October 13, 2006*.
- January 22, 2007. MDE-OCP approved, with modifications, the *Subsurface Investigation Work Plan/Interim Corrective Action Plan-October 13, 2006*.
  - Install two additional borings on opposite corners of the dispenser island
  - Develop a site conceptual model
  - Complete annual UST system testing
- January 29, 2007. MDE-OCP received the *First Half 2007 Semiannual Monitoring Report-January 24, 2007*.
  - Groundwater flow towards Northeast
  - Groundwater samples collected on 01/09/07 (*see table for results*)
- March 13, 2007. MDE-OCP received the *Work Plan Schedule-February 28, 2007*.
  - 7-Eleven proposal to complete and analyze two quarters of sampling prior to making a final decision on the implementation *Subsurface Investigation Work Plan/Interim Corrective Action Plan-October 13, 2006*.
- March 28, 2007. MDE-OCP received, via email, the passing results of UST system testing.
  - Pressure decay leak testing completed on 10/20/06
  - Sump and under dispenser containment testing completed on 04/25/06

- Ten minute helium test

- April 27, 2007. MDE-OCP letter regarding the *Work Plan Schedule-February 28, 2007*.
  - Immediately implement the activities approved in the *Interim Corrective Action Plan*.
  - Sample all monitoring wells and tank field pipes on a quarterly basis
  - Sample the drinking water supply well on a semi-annual basis
  - Sample immediately adjacent, off-site private drinking water supply wells
- May 16, 2007. MDE-OCP received *Private Supply Well Sampling Approval Letter – May 15, 2007*.
  - Off-site private well sampling slated for five (5) adjacent properties 123, 124, 130, 135, and 136 Hanover Pike
- May 29, 2007. MDE-OCP received, via email, notice of field activities tentatively scheduled in June 2007.
- June 20, 2007. MDE-OCP approved letter for off-site sampling to be completed at 123, 124, 130 and 135 Hanover Pike.
- June 26, 2007. MDE-OCP received copies of the sampling request letters for 114, 123, 124, 130 and 135 Hanover Pike
- July 13, 2007. MDE-OCP received the *Second Half 2007 Semi-annual Monitoring Report-July 11, 2007*. Groundwater monitoring completed on 06/14/07. (*see table for results*)
  - SVE pilot testing completed- report to be submitted under separate cover
- July 26, 2007. MDE-OCP received, via facsimile, the results of water samples collected from private drinking water wells on 07/17/07. (*see table for results*)
- July 30, 2007. MDE-OCP received the *Interim CAP SVE Pilot Test Summary-July 27, 2007*.
  - Five soil borings (SB-1 through SB-5) advanced to depths ranging from 22 to 28 feet
  - Maximum concentration of MTBE detected in groundwater (SB4) at 17000 ppb
  - Maximum concentration of MTBE detected in soils (SB2) at 37 ppb
  - Groundwater encountered at approximately 27 feet
  - Soil vapor extraction pilot test completed on 06/14/07 indicated SVE is not a viable remedial option
- August 2, 2007. MDE-OCP received, via facsimile, the results of the confirmatory water sample collected from the private drinking water well at 124 Hanover Pike on 07/30/07. (*see table for results*)
- August 8, 2007. MDE-OCP received a copy of the correspondence sent by the consultant for 7-Eleven, including the analytical results, for samples collected from adjacent private supply wells.
- August 22, 2007. MDE-OCP received the summary of the *Private Supply Well Sampling Results-August 23, 2007*. (*see table for results*)
- September 19, 2007. MDE-OCP verified there are no underground storage tanks on the residential property at 136 Hanover Pike.
- October 15, 2007. MDE-OCP personnel visited the commercial operation at 137 Hanover Pike. On this date OCP personnel verified that no underground storage tanks exist at 137 Hanover Pike. Prior OCP case 90-2843CL was closed in November 1990.

- October 26, 2007. MDE-OCP received, via email, the results of UST system testing completed in 2007.
  - Spill catchment basin hydrostatic testing completed 10/09/07- all passed except regular unleaded fill- retest scheduled for 11/01/07
  - Helium testing completed – results pending
  - Containment sump testing, line leak detector testing, Stage II testing and self-audit completed 01/24/07 – all passed
- January 16, 2008. MDE-OCP received the *Fourth Quarter 2007-Quarterly Monitoring Report-January 14, 2008*.
  - Groundwater monitoring completed on November 30, 2007. (*see table for results*)
- March 20, 2008. MDE-OCP received, via email, the *Quarterly Monitoring Report-First Quarter 2008*.
  - Groundwater monitoring completed on February 14, 2008. (*see table for results*)
- May 9 and 12, 2008. MDE-OCP received, via email, the passing results, following minor repairs, for UST system testing ( i.e. Helium, spill catchment basin) completed in October and November 2007
- July 1, 2008. MDE-OCP received the *Second Quarter 2008-Quarterly Monitoring Report-June 30, 2008*.
  - Groundwater monitoring completed on 05/23/08 (*see table for results*)
- July 10, 2008. MDE-OCP request for corrective action plan to 7-Eleven.
- August 15, 2008. MDE-OCP received the *Delineation Work Plan-August 13, 2008*.
  - Proposed installation of two (2) shallow and three (3) deep monitoring wells
  - Geophysical testing of the three (3) deep monitoring wells
- September 15, 2008. MDE-OCP received the *Third Quarter 2008-Quarterly Monitoring Report-September 10, 2008*.
  - Groundwater monitoring completed on 08/07/08 (*see table for results*)
- October 7, 2008. MDE-OCP work plan approval letter to 7-Eleven approving:
  - Installation of a shallow and two deep monitoring wells on-site
  - Geophysical testing of the deep monitoring wells
  - Continued quarterly sampling of the monitoring wells and tank field pipes
  - Continued semi-annual sampling of the on-site drinking water well
- January 5, 2009. MDE-OCP received the *Fourth Quarter 2008-Quarterly Monitoring Report-December 30, 2008*.
  - Three additional monitoring wells (MW6, MW7, MW8) installed in November 2008
  - Geophysical testing completed on deep monitoring wells MW7 and MW8 with fractures striking northeast and dipping to the west.
  - Groundwater monitoring completed on 08/07/08 (*see table for results*)

**Future Updates:**

- Future updates on this case investigation will be posted at [www.mde.state.md.us](http://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 (MDE), Oil Control Program: 410-537-3443
- Carroll County Health Department: 410-876-1884

**Disclaimer**

The intent of this fact sheet is to provide the reader a summary of site events as they are contained within documents available to MDE. To fully understand the site and surrounding environmental conditions, MDE recommends that the reader review the case file that is available at MDE through the Public Information Act. The inclusion of a person or company's name within this fact sheet is for informational purposes only and should not be considered a conclusion by MDE on liability, involvement in a wrongful act or contribution to environmental damage.

**Related Cases****Hanover Pike Groundwater Investigation Case No. 2008-0086CL**

- July 26, 2007. MDE-OCP received notification, via email, from the consultant for 7-Eleven that sampling of the off-site drinking water well on 07/17/07 at 124 Hanover Pike detected MTBE at 44 ppb. (*see table for results*)
- July 27, 2007. MDE-OCP, via email, requested 7-Eleven to arrange for the collection of a confirmatory sample at 124 Hanover Pike.
- July 31, 2007. MDE-OCP phone conversation with property owner at 124 Hanover Pike regarding the sampling results and recommended future action.
- August 2, 2007. MDE-OCP received notification, via email, from the consultant for 7-Eleven that confirmatory sampling of the off-site drinking water well on 07/31/07 at 124 Hanover Pike detected MTBE at 150 ppb. (*see table for results*)
- August 8, 2007. MDE-OCP received copies of the sampling results letter, including analytical data, sent to the owners of the properties that were sampled by the consultant for 7-Eleven.
- August 17, 2007. MDE-OCP letter to owner of 124 Hanover Pike recommending completion of the following activities.
  - Properly install a granular activated carbon (GAC) treatment system on the supply well and collect samples on a monthly basis for the first three months and quarterly thereafter
  - Perform precision testing of the heating oil underground storage tank (UST) or complete proper UST abandonment activities.
- May 5, 2008. MDE-OCP personnel were on-site at 124 Hanover Pike to observe the removal of the 550-gallon heating oil UST.
  - Perforation observed near bottom of UST and LPH observed in excavation
  - Approximately 1.78 tons of petroleum contaminated soil removed for proper disposal
  - Private drinking water well to be sampled in August 2008

**Monitoring Well Sample Results at the 7-Eleven station located at 125 Hanover Pike**

<b>On-site Monitoring Wells</b>	<b>Sampling Date</b>	<b>Benzene MCL – 5 ppb</b>	<b>MTBE Action Level – 20 ppb</b>	<b>Tertiary butyl alcohol is an unregulated comp.</b>	<b>Other Constituents of Concern TAME is an unregulated compound</b>
<b>MW1</b> (Installed 07/2005) Total Depth - 35 ft Screened 15 to 35 ft Quarterly	07/25/05	ND	31000	28000	TAME 1300
	01/25/06	ND	22000	17000	TAME 1000 (est)
	07/11/06	ND	22000 (est)	12000	TAME 600 (est)
	01/09/07	ND	ND	13000	---
	06/14/07	ND	6500 (est)	680 (est)	TPH-GRO- 450 ppb
	11/30/07	ND	11000	2900	TPH-GRO- 720 ppb
	02/14/08	ND	16000	2900	TAME 370; TPH-GRO-16000 ppb
	05/23/08	ND	23000	14000	TPH-GRO- 40000 ppb
	08/07/08	ND	4600	ND	TPH-GRO- 1100 ppb
	12/03/08	ND	1200	ND	TPH-GRO- 670 ppb
<b>MW2</b> (Installed 07/2005) Total Depth - 35 ft Screened 15 to 35 ft	07/25/05	ND	1	ND	ND
	01/25/06	ND	ND	ND	ND
	07/11/06	ND	ND	30	ND
	01/09/07	ND	ND	ND	ND
	06/14/07	ND	ND	ND	ND
	11/30/07	ND	ND	ND	ND
	02/14/08	ND	ND	ND	ND
	05/23/08	ND	ND	ND	ND
	08/07/08	ND	ND	ND	ND
	12/03/08	ND	ND	ND	ND
<b>MW3</b> (Installed 07/2005) Total Depth – 35 ft Screened 15 to 35 ft	07/25/05	ND	290	180	ND
	01/25/06	ND	ND	ND	ND
	07/11/06	ND	390	140	ND
	01/09/07	ND	4	ND	ND
	06/14/07	ND	ND	ND	ND
	11/30/07	ND	ND	ND	---
	02/14/08	ND	ND	ND	ND
	05/23/08	ND	ND	ND	ND
	08/07/08	ND	ND	ND	ND
	12/03/08	ND	ND	ND	ND
<b>MW4</b> (Installed 11/2005) Total Depth 35 ft Screened 15 to 35 ft	01/25/06	ND	2	ND	ND
	07/11/06	ND	6	ND	ND
	01/09/07	ND	4	ND	ND
	06/14/07	ND	ND	ND	ND
	11/30/07	ND	ND	ND	ND
	02/14/08	ND	ND	ND	ND
	05/23/08	ND	ND	ND	ND
	08/07/08	ND	ND	ND	ND
12/03/08	ND	ND	ND	ND	

<b>MW5</b> (Installed 11/2005) Total Depth 35 ft Screened 15 to 35 ft	01/25/06	ND	ND	ND	ND
	07/11/06	ND	ND	ND	ND
	01/09/07	ND	ND	ND	ND
	06/14/07	ND	ND	ND	ND
	11/30/07	ND	ND	ND	ND
	02/14/08	ND	ND	ND	ND
	05/23/08	ND	ND	ND	ND
	08/07/08	ND	7	ND	ND
	12/03/08	ND	1	ND	ND
<b>MW6</b> (Installed 11/2008) Total Depth 40ft Screened 15 to 40 ft	12/03/08	ND	20000	ND	TPH-GRO- 9600 ppb
<b>MW7</b> (Installed 11/2008) Casing to 92 ft Open borehole Total Depth 200 ft	12/03/08	ND	ND	ND	ND
<b>MW8</b> (Installed 11/2008) Casing to 100 ft Open borehole Total Depth 200 ft	12/03/08	ND	ND	ND	ND
<b>TF-1</b>	07/25/05	DRY	---	---	---
	01/25/06	DRY	---	---	---
	07/11/06	DRY	---	---	---
	01/09/07	DRY	---	---	---
	06/14/07	DRY	---	---	---
	11/30/07	DRY			
	02/14/08	DRY			
	05/23/08	DRY			
	08/07/08	DRY			
12/03/08	DRY				
<b>TF-2</b>	07/25/05	DRY	---	---	---
	01/25/06	DRY	---	---	---
	07/11/06	DRY	---	---	---
	01/09/07	DRY	---	---	---
	06/14/07	DRY	---	---	---
	11/30/07	DRY			
	02/14/08	DRY			
	05/23/08	DRY			
	08/07/08	DRY			
12/03/08	DRY				

### Drinking Water Sampling results at the 7-Eleven Facility and Adjacent Private Wells

Sample location	Sample dates	Petroleum Constituents of Concern	
		MTBE (20 ppb – action level)	Other petroleum constituents
<b>Transient Non-Community Supply Well</b>			
7-Eleven station 125 Hanover Pike (semi-annual)	07/01/05	ND	ND
	01/25/06	ND	ND
	07/11/06	ND	ND
	01/09/07	ND	ND
	11/30/07	ND	ND
	05/23/08	ND	ND
	08/07/08	ND	ND
	12/03/08	ND	ND
<b>Off-site Private Wells</b>			
114 Hanover Pike	07/17/07- 7-Eleven	0.6	ND
118 Hanover Pike	11/17/05 CCHD	4.49	ND
	07/17/07- 7-eleven	2.9	ND
123 Hanover Pike	11/17/05 CCHD	ND	ND
	07/17 07- 7-Eleven	ND	ND
124 Hanover Pike LUST-heating oil- removed May 2008	11/17/05 CCHD	1.49	ND
	07/17/07 – 7-Eleven	44	ND
	07/30/07 – 7-Eleven	150	TBA – 6 ppb
	12/15/08- MDE	179.54	TAME- 34.58
130 Hanover Pike	11/17/05 CCHD	0.75	ND
	07/17/07 – 7-Eleven	ND	ND
135 Hanover Pike	07/1707 – 7- Eleven	0.6	ND
136 Hanover Pike	Sample results found in fact sheet for Crown		
95 Phillips Drive	11/17/05 CCHD	2	ND
97 Phillips Drive	11/17/05 CCHD	1.24	ND
193 Phillips Drive	11/17/05 CCHD	ND	ND
195 Phillips Drive	11/17/05 CCHD	ND	ND
197 Phillips Drive	11/17/05 CCHD	ND	ND