

# MARYLAND DEPARTMENT OF THE ENVIRONMENT

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**Environmental Investigation  
Royal Farm Store No. 1  
2620 Mountain Road, Joppa  
Harford County, Maryland  
2005-0357-HA**

The Maryland Department of the Environment (MDE), Oil Control Program (OCP), in coordination with the Harford County Health Department (HCHD), is evaluating the impact of methyl tertiary-butyl ether (MTBE) in monitoring wells and tank field observation pipes at Royal Farms Store No. 1, located in Harford County.

In July 2004, sampling of the tank field observation pipes first detected benzene, a gasoline compound, at 20.3 ppb and MTBE was reported at an estimated value of 11,632 ppb. Tank field observation pipes, required by Code of Maryland Regulations (COMAR), are installed near the underground storage tank (UST) systems as an early warning device to detect releases and to provide access to the tank field backfill. Typically, these pipes are placed at opposite ends of the UST system at the time of installation. They are screened at shallow depths in the pea gravel of the backfill, usually intercepting perched groundwater or the shallow groundwater table.

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.

Pursuant to the new MTBE emergency regulation, in July 2005, the MDE-OCP received groundwater sampling results from the three newly installed monitoring wells. MTBE contamination was detected in a monitoring well up to 730 ppb. The station's drinking water supply well was sampled in October 2004 and again in June 2006, showing no petroleum constituents. The facility was subsequently retrofitted with a granular activated carbon (GAC) treatment system. Sampling of the drinking water supply well in July 2007 detected MTBE in the pre-filtration sample at 18 ppb. Sampling post-filtration was non-detect for petroleum constituents.

The Royal Farm Store, operated by Two Farms Inc., has been an active service station since 1996 when two USTs were installed. The 20,000-gallon compartmentalized gasoline UST and the 12,000-diesel fuel oil UST comprise double-walled composite steel wrapped in fiberglass-reinforced plastic and utilizes double-walled flexible plastic piping. Three monitoring wells, two tank field observation pipes, and a transient non-community drinking water supply well are located on-site.

## Chronology

- September 1, 2004. MDE-OCP conducted a routine site inspection. Minor violations identified. Two tank field monitoring pipes and the on-site drinking water supply well were sampled. A point-of-use treatment system was installed at the sink for food preparation at the store.
- September 28, 2004. MDE-OCP received UST systems testing data as required by 9/1/04 site inspection.

Stage II pressure decay test:	passed 2/25/04
Air to Liquid Ratio	tested 4/8/04 (dispenser #5 failed)
Stage II Line Blockage	passed 2/25/04
Product Line Test	passed 2/25/04
Tank Tightness Test	passed 7/1/96
- October 7, 2004. MDE-OCP received the results of site sampling collected 9/1/04 (*see Table*).

- November 1, 2004. MDE-OCP letter to Royal Farm regarding sampling results for the on-site drinking water supply well.
- November 4, 2004. Royal Farm submits the outstanding compliance data required by the 09/01/04 site inspection.
- March 8 and April 6, 2005. MDE-OCP received HCHD letter to the property owner regarding a request to expand the Royal Farms store on the property.
- August 31, 2005. MDE-OCP received *Groundwater Monitoring Well Installation and Sampling Results - July 22, 2005*.
  - Groundwater flow northeasterly.
  - In June 2005 monitoring wells were installed pursuant to the new MTBE emergency regulations.
  - July 12, 2005 sampling event (*see Table*).
- April 18, 2006. MDE-OCP received *February 2006 Groundwater Sampling Results - February 10, 2006*.
  - February 6, 2006 sampling event (*see Table*).
- April 19, 2006. MDE-OCP site visit to verify presence of granular activated carbon (GAC) filtration system on the drinking water supply well. A GAC system was present.
- August 1, 2006. MDE-OCP received *June 2006 Groundwater Sampling Results - July 26, 2006*.
  - June 29, 2006 sampling event (*see Table*).
- August 30, 2006. MDE-OCP faxed HCHD with an update on the sampling data.
- September 7, 2006. MDE-OCP directive letter to Royal Farms requiring the following:
  - Perform a helium test to check vapor leaks in the gasoline UST system by October 9, 2006;
  - Test all spill catchment basins and containment sumps by October 9, 2006;
  - Conduct a self-audit of UST system by October 9, 2006;
  - Conduct semi-annual (every 6 months) sampling of all monitoring wells and tank field monitoring pipes;
  - Conduct semi-annual sampling of the transient non-community drinking water supply well on-site.
- January 17, 2007. MDE-OCP received UST system test results - *October 10, 2006*.
  - UST system testing results:
    - Helium test:                      passed 2/5/06 (repairs made)
    - Catch basin test:                passed 6/20/06
    - No containment sumps on-site
- January 25, 2007. MDE-OCP informed that 1/8-inch of LPH observed in both tank field monitoring pipes. UST to be tested.
- January 26, 2007. MDE-OCP verbally informed that a vac truck would be on-site to removed LPH from tank field monitoring pipes.
- January 31, 2007. MDE-OCP received *January 2007 Groundwater Sampling Results - January 30, 2007*.
  - January 25, 2007 sampling event (*see Table*).
- April 3, 2007. MDE informed by consultant that tank pit would be dewatered into a frac tank due to the continued presence of LPH in tank field monitoring pipes. Gauging of the monitoring wells did not indicate the presence of LPH.

- August 1 and 6, 2007. MDE received *Summary of Tank Pit Dewatering Activities - April 30, 2007*.
  - LPH were noted in tank field monitoring pipes during the January sampling event:
    - TP-1 contained 0.01 ft. LPH
    - TP-2 contained 0.02 ft. LPH
  - Vacuum extraction events conducted on 1/26/07 and 2/21/07, removed approximately 15,900 gallons of water and oil mixture;
  - Gauging of the tank field monitoring pipes on 4/23/07 indicated:
    - TP-1 contained 0.01 ft LPH
    - TP-2 contained 0.01 ft LPH
  - Sorbent material being utilized within the tank field monitoring pipes and changed on a weekly basis.
- August 27, 2007. MDE received *July 2007 Groundwater Sampling Results - August 23, 2007*.
  - July 25, 2007 sampling event (*see Table*).
  - Sheen was present in tank field monitoring pipes.
- September 7, 2007. MDE directive letter to Royal Farms requiring the following:
  - Submit a *Corrective Action Plan* to address LPH and dissolve-phase concentrations within the active tank field;
  - A *Subsurface Investigation*;
  - Quarterly sampling of all monitoring wells and tank field monitoring pipes; and
  - Quarterly sampling of the on-site drinking water supply well.
- November 15, 2007. MDE received *Interim Corrective Action Work Plan – October 15, 2007*, requesting a one to nine month extension for the submittal of a Corrective Action Work Plan, due to pending upgrades at the facility. Upgrades to include removal and replacement of the existing USTs.
- November 16, 2007. MDE received *Subsurface Investigation Work Plan – October 15, 2007*, proposing the installation of two borings and slug testing of the existing groundwater monitoring wells.
- January 15, 2008. MDE received *Quarterly Groundwater Monitoring Report Fourth Quarter, 2007 – January 9, 2008*.
  - October 30, 2007 sampling event (*see Table*).
  - Sheen was present in tank field monitoring pipes.
- January 24, 2008. MDE email request to provide helium test data from 2006 and 2007.

### **Related Case**

1996-1038-HA (Closed)

### **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
- Harford County Health Department (HCHD)                              443-643-0322 or 443-643-0321

### **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 guilt, involvement in a wrongful act or contribution to environmental damage.

## Groundwater Sampling Results for Royal Farms No. 1 in Joppa, Harford County

Well Information	Sample Dates	Benzene (MCL –5 ppb)	MTBE (Action Level – 20 ppb)	Other petroleum constituents of concern <i>Ethylbenzene – MCL at 700 ppb</i> <i>Toluene – MCL at 1000 ppb</i> <i>Xylene – MCL at 10,000 ppb</i>
<b>Monitoring Wells</b>				
<b>MW-1</b> 2 in. diameter well; Borehole depth 35 ft. Screen depth 10 to 34.5 ft; Casing depth 0-10 ft.	7/9/05	Non-detect (ND)	ND	ND
	2/6/06	ND	ND	ND
	6/29/06	ND	ND	ND
	1/25/07	ND	ND	ND
	7/25/07	ND	ND	ND
	10/30/07	ND	ND	ND
<b>MW-2</b> 2 in. diameter well; Borehole depth 30 ft. Screen depth 5 to 29.5 ft; Casing depth 0-5ft.	7/9/05	ND	740	ND
	2/6/06	ND	560	ND
	6/29/06	ND	960	ND
	1/25/07	74	15,000	Below levels of concern
	7/25/07	59	21,000	Below levels of concern
	10/30/07	12	4,800	Below levels of concern
<b>MW-3</b> 2 in. diameter well; Borehole depth 30 ft. Screen depth 5 to 29.5 ft; Casing depth 0-5 ft.	7/9/05	ND	9.7	ND
	2/6/06	ND	ND	ND
	6/29/06	ND	5.4	ND
	1/25/07	ND	91	ND
	7/25/07	ND	220	ND
	10/30/07	9.6	74	Below levels of concern
<b>Tank field Monitoring Pipes</b>				
<b>TF-1 (unknown depth)</b>	9/1/04	20.3	11,632 (estimated)	---
	1/25/07	0.01 ft. LPH	0.01 ft LPH	0.01 ft LPH
	2/5/07	0.01 ft LPH	0.01 ft LPH	0.01 ft LPH
	3/30/07	0.01 ft LPH	0.01 ft LPH	0.01 ft LPH
	4/27/07	0.01 ft LPH	0.01 ft LPH	0.01 ft LPH
	5/25/07	Sheen	Sheen	Sheen
	6/15/07	Sheen	Sheen	Sheen
	7/25/07	2,700	100,000	Toluene at 43,500 ppb Ethylbenzene at 7,300 ppb Xylene at 21,500 ppb
	10/30/07	2,300	29,000	Toluene at 28,000 ppb Ethylbenzene at 6,400 ppb Xylene at 24,100 ppb
<b>TF-2 (unknown depth)</b>	9/1/04	20.1	4,116	---
	1/25/07	0.02 ft LPH	0.02 ft LPH	0.02 ft LPH
	2/5/07	0.01 ft LPH	0.01 ft LPH	0.01 ft LPH
	3/30/07	0.02 ft LPH	0.02 ft LPH	0.02 ft LPH
	4/27/07	0.01ft LPH	0.01ft LPH	0.01ft LPH
	5/25/07	Sheen	Sheen	Sheen
	7/25/07	3400	128,000	Toluene at 41,400 ppb Ethylbenzene at 6,300 ppb Xylene at 21,800 ppb
	10/30/07	2,400	38,000	Toluene at 32,200 ppb Ethylbenzene at 7,500 ppb Xylene at 21,700 ppb
	<b>Transient Non-community Supply well</b>			
<b>High's Station's Supply Well (73 ft.)</b>	9/1/04	ND (pre/post)	ND (pre/post)	ND (pre/post-filtration)
	2/6/06	ND (post)	ND (post)	ND (post-filtration)
	6/29/06	ND (pre/mid/post)	ND (pre/mid/post)	ND (pre/mid/post-filtration)
	1/25/07	ND (pre/mid/post)	ND (pre/mid/post)	ND (pre/mid/post-filtration)
	7/25/07	ND (pre/mid/post)	18 – pre; ND – mid & post	ND (pre/mid/post-filtration)
	10/30/07	ND (pre/mid/post)	ND (pre/mid/post)	ND (pre/mid/post-filtration)