

**Land Management Administration ● Oil Control Program**

**Environmental Investigation  
Stark Farm (Susquehanna Meadows)  
4104 Webster-Lapidum, Havre de Grace  
Harford County, Maryland  
MDE Case No. 2006-0566-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 petroleum constituents identified on a portion of the Stark Farm property following the removal of a 550-gallon gasoline underground storage tank (UST) on August 8, 2005. Since the MDE does not regulate the operation of farm tanks, it is unclear when the tank was installed. The property owner indicates the tank was possibly installed in the 1970s and last used in 2000.

Stark Elwood V *et al.* is the long-term owner of this 400-acre farm property. The subject property is served by two drinking water wells and is improved with a barn and a large graveled parking lot. An environmental investigation conducted in 2005 by the prospective purchaser, Susquehanna Meadows LLC, for the due diligence process, identified petroleum contamination in soil and groundwater in the vicinity of the former 550-gallon UST located near the western wall of the shed structure at the farm. The residences and pole barn were razed prior to soil excavation activities in 2007. The Department understands that the Stark Farm property is currently being considered for redevelopment as a residential subdivision (Susquehanna Meadows), with individual lots to be served by private drinking water wells.

Based on the levels of petroleum constituents 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 property owners, and notified HCHD of petroleum impacts since the site is located in a high-risk groundwater use area. At this time, the Department does not have any indication that this contamination has migrated off-site and is working with the property owners to remediate on-site impacts.

### **Chronology**

- August 31, 2005. MDE-OCP received *UST Tank Investigation – August 31, 2005* report.
  - UST removed on August 8, 2005.
  - Contractor detected petroleum odors during tank removal; no perforations observed in the tank.
  - Two samples collected on opposing ends of the UST and 3 feet below the tank bottom.
  - Samples analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), methyl-tertiary butyl ether (MTBE), and total petroleum hydrocarbons/diesel-range organics and gasoline range organics (TPH/DRO and TPH/GRO).
    - SS1 Benzene – 52.6 parts per million (ppm) (*MDE residential soil cleanup standard – 12 ppm*);  
TPH-GRO – 8700 (ppm) (*MDE residential soil cleanup standard – 230 ppm*);  
TPH-DRO – 2430 ppm (*MDE residential soil cleanup standard – 230 ppm*);
    - NS1 Toluene – 2570 ppm (*MDE residential soil cleanup standard – 1600 ppm*);  
Benzene – 265 (ppm); TPH-GRO – 22800 ppm; TPH-DRO – 2670 ppm
- December 21, 2005. MDE received the Limited *Phase II Environmental Assessment - September 29, 2005* commissioned by the prospective purchaser.
  - A geoprobe study was conducted in the vicinity of the former 550-gallon UST and the shed areas.
  - Soil samples collected from ten borings (SB1 to SB10) were analyzed for petroleum constituents.
  - Petroleum contaminated soil are still present in the vicinity of the former UST.
  - July 2005 - sampling event

- SB1 benzene – 24,800 ppm;  
ethylbenzene – 162,000 ppm (*MDE residential soil cleanup standard – 780 ppm*);  
MTBE – 58,400 ppm (*MDE residential soil cleanup standard – 650 ppm*);  
naphthalene – 19,900 ppm (*MDE residential soil cleanup standard – 160 ppm*);  
xylene – 745,000 ppm (*MDE residential soil cleanup standard – 16000 ppm*);  
TPH/GRO – 4,720 ppm; TPH/DRO – 1,770 ppm
- SB2 benzene – 6,960 ppm; ethylbenzene – 43,000 ppm; MTBE – 38,400 ppm;  
naphthalene – 16,500 ppm; xylene – 207,500 ppm; TPH/GRO – 1,960 ppm;  
TPH/DRO – 1,370 ppm
- SB4 MTBE – 10,800 ppm
- SB5 benzene – 43,100 ppm; ethylbenzene – 194,000 ppm; MTBE – 70,200 ppm;  
naphthalene – 43,900 ppm; xylene – 351,700 ppm; TPH/GRO – 5,570 ppm;  
TPH/DRO – 2,260 ppm
- SB6 benzene – 64,700 ppm; ethylbenzene – 223,000 ppm; MTBE – 56,000 ppm;  
naphthalene – 62,900 ppm; xylene – 1,029,000 ppm; TPH/GRO – 7,110 ppm;  
TPH/DRO – 2,290 ppm
- SB7 benzene – 1,960 ppm; ethylbenzene – 9,780 ppm; MTBE – 704 ppm;  
naphthalene – 4,310 ppm; xylene – 63,600 ppm
- Eight groundwater samples (SB2, SB3, SB5-SB10) collected from geoprobe points were analyzed for petroleum constituents.
- Petroleum contaminants present in the groundwater in the vicinity of the former UST.
- *July 2005 - sampling event*
  - SB2 benzene - 17 ppb (*MCL – 5 ppb*);  
MTBE – 80 ppb (*MDE action level – 20 ppb*);  
TPH/GRO – 519 ppb; TPH/DRO – 520 ppb
  - SB5 benzene – 10,900 ppb; ethylbenzene – 1,830 ppb (*MCL - 700 ppb*);  
MTBE – 5,290 ppb; TPH/GRO – 81,800 ppb; TPH/DRO – 3,980 ppb
  - SB6 benzene – 13,200 ppb; ethylbenzene – 1,010 ppb; MTBE – 46,900 ppb;  
Tertiary butyl alcohol (TBA) – 8,540 ppb (*an unregulated compound*);  
TPH/GRO – 13,300 ppb; TPH/DRO – 6,050 ppb
  - SB7 benzene – 6,520 ppb; ethylbenzene – 2,360 ppb; MTBE – 25,000 ppb;  
xylene – 10,920 ppb (*MCL – 10,000 ppb*);  
naphthalene – 456 ppb; TPH/GRO – 91,000 ppb; TPH/DRO – 4,260 ppb
- Four drinking water samples were collected from the two existing potable wells and the two test wells were earmarked for drinking water purposes. Samples were analyzed for petroleum constituents, pesticides, and select semi-volatile organic compounds.
- *July 2005 - sampling event*
  - SM-W1 Main House (raw) non-detect (ND)
  - SM-W2 Cooley Mill House (raw) ND
- *August-September 2005 - sampling event*
  - Lot 27 Well (test well – raw) ND for petroleum constituents; tetrachloroethene (PCE)  
a chlorinated solvent – 0.9 ppb (*MCL – 5ppb*)
  - Lot 41 Well (test well – raw) ND for most petroleum constituents except MTBE – 2.4 ppb
- 9 of the 10 geoprobe points were converted to wells (MW1 – MW9).
- *December 2005 - sampling event*
  - MW1, MW2, MW8 and MW9 ND
  - MW3 benzene – 3,900 ppb; ethylbenzene – 2,780 ppb; MTBE – 5,460 ppb; toluene – 18,000 ppb;  
xylene – 14,240 ppb; naphthalene – 584 ppb; tertiary amyl methyl ether (TAME) –  
433 ppb (*an unregulated compound*); TPH/GRO – 48,800 ppb; TPH-DRO – 4,290 ppb
  - MW4 TPH/DRO – 600 ppb
  - MW5 benzene – 1,320 ppb; MTBE – 8,400 ppb; toluene – 2,620 ppb; naphthalene – 173 ppb;  
TAME – 865 ppb; TPH/GRO – 17/500 ppb; TPH/DRO – 2/150 ppb
  - MW6 benzene – 1,080 ppb; MTBE – 4,560 ppb; TAME – 117 ppb; TPH-GRO – 8,550 ppb;  
TPH/DRO – 1,150 ppb

- MW7 benzene - 55 ppb; TAME – 14 ppb; MTBE – 775 ppb; TPH-GRO – 934 ppb;

- December 27, 2005. MDE-OCP received a HCHD letter dated 02/15/05 requesting assistance in the evaluation of the Stark Farm property, which is being considered for re-development as residential subdivision.
- January 10, 2006. MDE received letter from the prospective purchaser's environmental consultant requesting a meeting between the OCP, HCHD, the current property owner, and Susquehanna Meadows LLC to discuss the results of the environmental reports prepared as part of the due diligence process.
- January 12, 2006. MDE-OCP issued directive letter to the property owner requiring the following:
  - Conduct semi-annual (every 6 months) sampling of all monitoring wells.
  - Conduct semi-annual sampling of all existing drinking water wells and tests wells earmarked for drinking water purposes located on-site;
  - Perform a half-mile well survey; and
  - Develop interim corrective actions to address the removal of oil-impacted soil in the vicinity of the former UST.
- January 13, 2006. MDE-OCP notified HCHD of this new petroleum impact pursuant to Section 4-411.2 of the Environmental Article, Annotated Code of Maryland, for an impacted property located in a high-risk groundwater use area.
- January 23, 2006. Notification letters mailed to 119 residents within half-mile radius of the property by HCHD.
- January 26, 2006. Press release issued by the Health Department.
- January 27, 2006. MDE-OCP received confirmatory letter and listing of residents within ½ radius of the property.
- February 23, 2006. MDE-OCP received a letter from attorney for the Elwood Stark Estate summarizing historic land use and requesting an extension to provide the required CAP.
- March 3, 2006. MDE-OCP site visit to mark monitoring well locations, domestic well locations, and proximity to adjacent properties.
- March 6, 2006. MDE-OCP faxed copy of *Report of Observations-03/803/06* to the attorney.
- March 7, 2006. MDE-Water Management Administration letter to Susquehanna Meadows, LLC, indicating that the application for well permit and subdivision will be suspended until required environmental work is completed.
- April 21, 2006. MDE-OCP grants an extension until June 2006 for an environmental report from the property owner, in response to the Department's directive letter.
- May 30, 2006. MDE-OCP received *Additional Phase II Environmental Assessment of the Stark Farm Property*. This report summarized the findings presented in the *Phase II Environmental Assessment - September 29, 2005* report.
- June 21, 2006. MDE-OCP met with prospective purchaser and their consultant to discuss the Department's requirements in the 01/12/06 directive letter.
- August 8, 2006. MDE-OCP letter to Susquehanna Meadows, requesting an update on the requested *Interim Corrective Action Plan*.

- October 13, 2006. MDE-OCP received *Draft Corrective Action Plan-October 13, 2006 (CAP)*.
  - The CAP proposes over-excavation of approximately 30,000 cubic yards of petroleum-impacted soil.
  - Impacted soil excavated will be field screened. Based on field screening results soil will either be: properly disposed off-site (soil >1000 units; estimated quantity 3000 cubic yards); land farmed on-site (soil <1000 - <100 units) or used as backfill material (soil <100 unit).
- October 12, 2006. Harford County Soil Conservation District letter to Frederick Ward Associates requesting MDE-OCP approval on all submitted projects for this site due to the removal of the underground storage tank and the presence of soil and groundwater contamination.
- October 20, 2006. MDE site visit to field verify the *Draft Corrective Action Plan-October 13, 2006 (CAP)*.
- January 24, 2007. MDE-OCP received *Draft Corrective Action Plan-Revised – January 24, 2007 (rCAP)*. The *rCAP* clarified selective points of the *Draft Corrective Action Plan – October 13, 2006* and provided copies of the *Additional Phase II Environmental Site Assessment-November 30, 2006*.
- February 5, 2007. MDE-OCP approved the *rCAP* with modifications.
- March 28, 2007. MDE-OCP participated in a pre-construction meeting and received a site map of the planned area for soil excavation.
- June 27, 2007. MDE was on-site to witness the excavation of petroleum impacted soils.
  - Soils are field screened with a PID for and separated into holding piles;
  - Excavated soils are stored on plastic;
  - Approx. 400 tons of soils have been selected for off-site disposal;
  - Approx. 12,000 tons of soil have been spread in pre-approved remediation cells;
  - Approx. 36,000 tons of soil have been set aside as clean;
  - Excavation continues.
- October 1, 2007. MDE-OCP reviewed and approved, via email, the locations six new monitoring wells required to replace those six lost during the soil excavation process.
- October 4 and 5, 2007. MDE-OCP site visits to observe the installation of the replacement monitoring wells.
- October 22, 2007. MDE-OCP letter to Susquehanna Meadows LLC, summarizing post-excavation monitoring requirements:
  - Conduct 4 quarters of post-remedial sampling of all nine monitoring wells.
  - All newly drilled drinking water wells must be sampled for full suite VOCs via EPA Method 524.2, prior to use and occupancy.
  - Submit a formal *Soil Excavation and Monitoring well Replacement and Sampling Report* to the Department for review.
- December 12, 2007. MDE-OCP received the *Soil Excavation and Monitoring Well Replacement and Sampling Report – Dec 11, 2007*.
  - Soil excavation occurred from June 25 to July 2, 2007. Approximately 20,000 cubic yards of soils were excavated. 260 tons of impacted soils were properly disposed of at soil recycling facility. 769 tons of impacted soils were segregated for land farming.
  - 10/03/07. Six monitoring wells were loss during excavation activities and replaced with newly drilled wells outside the area of excavation.
  - 10/31/07. All monitoring wells were sampled.
    - Elevated levels of benzene remain in several wells (MW4 – 905 ppb; MW7 –110 ppb).

- Elevated levels of MTBE remain several wells (MW4 -6,850 ppb; MW7 - 3,600 ppb.
- All other wells were below regulatory levels for petroleum constituents.
- January 7, 2008. MDE-OCP received *Landfarm Remediation of Impacted Soils – January 3, 2008*.
  - 11/28/07 twenty soil samples collected from landfarm area. All samples below regulatory levels for petroleum constituents.
  - Requested approval to seed and straw soils for temporary storage prior to conditional reuse.
- January 25, 2008. MDE-OCP directive letter to representative for Stark Farm, approving the proposed amendments to the *Corrective Action Plan* proposed in the *Soil Excavation and Monitoring Well Replacement and Sampling Report – December 11, 2007* and the *Landfarm Remediation on Impacted Soils – January 3, 2008* with modifications:
  - A one-time enhanced fluid recovery (EFR) event;
  - Four quarters of post-remedial monitoring of the monitoring well network;
  - Sampling of any newly drilled drinking water wells or test wells for full-suite VOCs prior to use and occupancy.
- April 2, 2008. MDE-OCP received *Revised Corrective Action Plan – February 25, 2008*, proposing a one-time injection of oxygen releasing compound (ORC) in fifteen locations around the area previously excavated, in lieu of a one-time EFR event.
- May 2, 2008. MDE-OCP directive letter to representative for Stark Farm approving the proposed *Revised Corrective Action Plan*.
- June 13, 2008. MDE-OCP received *ORC Injections Summary – June 11, 2008*.
  - Oxygen releasing compound (ORC) injected at fifteen (15) borings on the property between 06/02/08 and 06/03/08.
  - Approximately 600 lbs. of ORC product used during the injection event.
- July 31, 2008. MDE-OCP received *Monitoring Well Sampling Event – July 17, 2008*.
  - 01/09/08 groundwater sampling event:
    - MW1: Non-detect
    - MW2: Non-detect
    - MW3: Non-detect
    - MW4: benzene 655 ppb; MTBE 4,500 ppb; TPH/GRO 4.86 ppm; TPH/DRO 0.62 ppm
    - MW5: Non-detect
    - MW6: Non-detect
    - MW7: benzene 96 ppb; MTBE 3,700 ppb; TPH/GRO 3.02 ppm; TPH/DRO 0.26 ppm
    - MW8: TPH/DRO 0.24 ppm
    - MW9: Below regulatory levels
  - 07/01/08 groundwater sampling event:
    - MW1: Non-detect
    - MW2: Non-detect
    - MW3: Non-detect
    - MW4: benzene 461 ppb; MTBE 2,510 ppb; TPH/GRO 3.16 ppm; TPH/DRO 0.49 ppm
    - MW5: Non-detect
    - MW6: Non-detect
    - MW7: benzene 25 ppb (estimated); MTBE 1,470 ppb; TPH/GRO 10.3 ppm
    - MW8: TPH/DRO 0.59 ppm
    - MW9: Non-detect
- October 24, 2008. MDE-OCP received *Monitoring Well Sampling Event – October 22, 2008*.

- 10/16/08 groundwater sampling event:
  - MW1: Non-detect
  - MW2: Non-detect
  - MW3: Non-detect
  - MW4: benzene 587 ppb; MTBE 3,090 ppb; TPH/GRO 5.58 ppm; TPH/DRO 0.54 ppm
  - MW5: Non-detect
  - MW6: Non-detect
  - MW7: benzene 35 ppb (estimated); MTBE 1,610 ppb; TPH/GRO 1.71 ppb
  - MW8: Non-detect
  - MW9: Below regulatory levels

**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 (OCP): 410-537-3443
- Harford County Health Department (HCHD): 443-643-0322 and 443-643-0307

**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.