

Environmental Investigation
Baltimore Gas & Electric - Perryman Generating Station
(BGE- Constellation Power Source Generation)
900 Chelsea Road
Perryman, Harford County, Maryland
MDE Case No. 1993-1431-HA
Above Ground Storage Facility - Permit No. 2002-OPT-2086

The Maryland Department of the Environment (MDE), Oil Control Program (OCP), is overseeing the remediation of petroleum constituents at the BGE Perryman Generation Station located in Harford County. The Perryman Combustion Turbine facility consists of four oil-fired turbine units fed by four large aboveground storage tanks, each with a storage capacity of 2,500,000 gallons. A system of pipelines, originally below ground, but now visible for inspection, connects the fuel supply AST's to the turbine units. The Department regulates this facility under National Pollution Discharge Elimination System (NPDES) Permit No. 2003-OGR-2086 for the discharge of wastewater generated from the remediation system and under an Oil Operation Permit 2002-OPT-2086 for the above ground storage facility.

The BGE facility is an industrial property located in south central Harford County, approximately 3 miles southwest of Aberdeen. The site is very roughly rectangular with its shortest (north) side stretching about 1 kilometer from the railroad tracks on the west to a portion of Aberdeen Proving Ground to the east. Bush River and Sod Run bound the property on the southwest and southeast respectively. Other industrial properties lie north along Chelsea Road. The nearest residences are along Perryman Road approximately one mile to the west. The Perryman site is underlain by unconsolidated Coastal Plain sediments. Shallow regional groundwater flow is primarily to the west-southwest in the Patapsco sands and is recharged by precipitation. The facility and several properties in the area are served by private wells, with the facility permitted to withdraw a daily average of 100,000 gallons. The on-site supply well has been sampled periodically since 1992 and has been non-detect for petroleum constituents.

In March 1991, a #2 fuel oil return line failed a hydrostatic test. Subsequent retesting isolated the leak to the area west of Turbine #4. Soil borings confirmed the release and MDE was notified on November 6, 1991. The estimated quantity of the release is less than 300,000 gallons. Pumping and skimming of liquid phase hydrocarbons (LPH or product) has resulted in the recovery of almost 70,000 gallons. A small amount of petroleum-impacted soil was removed during construction activities in 1999. Continued monitoring of the established network of 30 monitoring and recovery wells has shown that the product plume has not traveled beyond the BG&E property.

Chronology:

- 1991:
 - November 6, 1991: MDE notified of a release of an unknown amount of petroleum product (#2 fuel oil).
 - November 7, 1991: MDE site visit in response to the reported spill. It was determined that there had been a leak of indeterminate duration from a 6" underground pipeline.
 - November 21, 1991: MDE received written notification attributing the pipeline leak to corrosion.
- 1992:
 - January 31, 1992: MDE received a scope of work to conduct a subsurface investigation.
 - Analytical results of 19,700 ppm TPH in soils.
 - Delineate the horizontal extent of contamination with 24 soil borings
 - Delineate vertical extent with four monitoring wells.

- May 22, 1992: MDE received *Report of Soil and Groundwater Investigation at the Baltimore Gas and Electric Company Perryman Combustion Turbine Facility - May 1992*.
 - 24 soil borings to define the extent of the product plume (215,000 ft.²) within BGE property.
 - Four monitoring wells all recorded some thickness of product.
- June 26, 1992: MDE required a work plan for the remediation of all soil and groundwater contamination at the site.
- July 7, 1992: MDE received response detailing measures taken by BGE.
 - Construction to replace subsurface fuel piping with above ground pipes.
 - Preparation of a well survey report: nearest wells approximately ½ mile upgradient.
 - Sampling onsite production well (not impacted).
- July 10, 1992: MDE required immediate free-product removal with monthly remedial progress reports.
- July 29, 1992: MDE on site to inspect the new recovery system
 - Initial estimated product loss 100,000 - 600,000 gallons.
- July 31, 1992: MDE received *Project Plan for Site Characterization and Oil Recovery System Design Baltimore Gas and Electric Company Perryman Station Site - July 30, 1992*.
 - Interim phase-separate fuel skimmer recovery systems in four monitoring wells.
 - Six 4-inch monitoring wells establish baseline water quality
 - Product baildown tests in four monitoring wells.
 - Shallow water table pumping test.
- September 4, 1992: MDE responded to BGE site characterization plan.
 - Additional 8 monitoring wells.
 - All monitoring wells must be sampled.
 - Product pump available for recovery during pumping test.
- September 11, 1992: MDE received BGE status report.
 - Six monitoring wells, 1 pumping well, and 2 observation wells installed. 4 monitoring wells sampled.
 - Two product baildown tests.
 - 52-hour shallow water pumping test.
 - Revised estimate of product loss to less than 300,000 gallons.
 - Preliminary indication that plume has not migrated further.
- September 21, 1992: MDE received BGE modifications to Site Characterization Plan.
 - Two additional monitoring wells installed.
 - Five monitoring wells sampled.
 - Water level & product thickness gauging for flow contour map.
- October 9, 1992: MDE received BGE status report.
 - Two product baildown tests.
 - Revised estimate of product loss between 56,000 & 112,000 gallons.
 - Approximately 3,000 gallons petroleum recovered to date.
- November 6, 1992: MDE received BGE status report.
 - Approximately 4,300 gallons petroleum recovered to date.
- November 20, 1992: MDE received *Site Characterization and Oil Recovery System Design Baltimore Gas and Electric Company Perryman Station Facility Chelsea Road, Perryman, Maryland - November 20, 1992*.
 - LPH recovered to be stored in existing 2,500,000 gallon AST.
 - LPH plume estimated as a 400ft by 600ft elliptical shape (250,000 ft.²).
 - Surface discharge of treated water.
- December 4, 1992: MDE received BGE status report.
 - Approximately 5,200 gallons petroleum recovered to date.

■ 1993:

- January 14, 1993: MDE received BGE status report.
 - Approximately 7,200 gallons recovered to date.
 - 4 well pairs consisting of 1 pumping well matched with 1 product recovery well.
- January 20, 1993: MDE on site for installation of new recovery wells.

- Construction of new recovery well pairs.
- April 12, 1993: MDE received BGE quarterly status report.
 - Approximately 10,000 gallons petroleum recovered to date by interim systems.
 - Construction of oil recovery system.
- May 4, 1993: MDE site visit to observe progress of recovery system construction.
- July 26, 1993: MDE received BGE quarterly status report.
 - 5,423 gallons petroleum recovered this quarter.
 - 1,007,028 gallons water pumped.
- October 28, 1993: MDE received BGE quarterly status report.
 - 5,588 gallons petroleum recovered this quarter.
 - 620,873 gallons water pumped.
- 1994:
 - MDE received BGE quarterly status reports.
 - 13,357 gallons petroleum recovered in 1994
 - 1,486,257 gallons water pumped.
 - August 12, 1994: MDE approved concrete containment of BGE drain lines.
- 1995:
 - MDE received BGE quarterly status reports.
 - 13,969 gallons petroleum recovered in 1995
 - 2,090,500 gallons water pumped.
 - A total of 51,525 gallons of petroleum recovered to date
 - May 24, 1995: MDE received *Groundwater Monitoring Plan- March 1994*.
 - Monitor potential for brackish water intrusion due to enhanced pumping.
 - September 7, 1995: MDE-Water Appropriations responded to *Groundwater Monitoring Plan- March 1994*.
- 1996:
 - MDE received BGE quarterly status reports.
 - 8,570 gallons petroleum recovered in 1996
 - 1,540,833 gallons water pumped.
 - At total of 60,095 gallons of petroleum recovered to date
- 1997:
 - May 2, 1997. MDE letter to HCHD advising them of remediation cases in Perryman.
 - MDE received BGE quarterly status reports.
 - 1,343 gallons petroleum recovered this year
 - 4,370,049 gallons water pumped.
 - A total of 61,438 gallons of petroleum recovered to date
- 1998:
 - January 22, 1998: MDE received notice of 150 gallon #2 fuel oil spill.
 - August 31, 1998: MDE received *Fuel Oil Delineation Work Plan BGE Perryman Gas Turbine Plant Perryman, Maryland*.
 - Proposed cone penetrometer to determine the extent of liquid hydrocarbon.
 - Successive lines of direct-push points until the down-gradient edge of the fuel plume is reached
 - MDE received BGE quarterly status reports.
 - 3,115 gallons petroleum recovered this year.
 - 6,090,769 gallons water pumped.
 - Project total equals 64,553 gallons petroleum to date

- 1999:
 - March 29, 1999: MDE received *Cone Penetrometer Testing Assessment Report BGE Perryman Gas Turbine Plant Perryman, Maryland-March 4, 1998*.
 - Provided updated plume contour for the extent of liquid hydrocarbon product.
 - Most soil materials in subsurface are sand although a lower bounding layer of clay was found in 3 borings.
 - July 29, 1999: MDE on site for installation of new sewer line.
 - No reported evidence of local soil contamination.
 - August 10, 1999: MDE on site for removal of 2 truckloads of contaminated soils.
 - MDE received BGE quarterly status reports.
 - 3,039 gallons petroleum recovered this year.
 - 3,142,660 gallons water pumped.
 - Project total equals 66,400 gallons petroleum to date

- 2000:
 - MDE received BGE quarterly status reports.
 - 752 gallons petroleum recovered this year.
 - 1,488,554 gallons water pumped.
 - A total of 67,152 gallons of petroleum recovered to date
 - October 20, 2000: MDE witnessed gauging and sampling of the groundwater monitoring wells.
 - Product/water recovery pumps converted to product only skimming

- 2001:
 - April 6, 2001: MDE received BGE well gauging data for 1999-2000.
 - MDE received BGE quarterly status reports.
 - 264 gallons petroleum recovered this year.
 - A total of 67,416 gallons of petroleum recovered to date

- 2002:
 - January 15, 2002: MDE received BGE quarterly status report.
 - 547 gallons petroleum recovered this quarter.
 - Project total equals 67,810 gallons petroleum to date
 - April 25, 2002: MDE received BGE quarterly status report.
 - 476 gallons petroleum recovered this quarter.
 - Project total equals 68,461 gallons petroleum to date
 - July 23, 2002: MDE received BGE quarterly status report.
 - 403 gallons petroleum recovered this quarter.
 - October 24, 2002: MDE received BGE quarterly status report.
 - 105 gallons petroleum recovered this quarter.
 - A total of 69,204 gallons of petroleum recovered to date

- 2003:
 - January 27, 2003: MDE received BGE quarterly status report.
 - 228 gallons petroleum recovered during this quarter.
 - April 23, 2003: MDE received BGE quarterly status report.
 - System out of service this quarter.
 - July 22, 2003: MDE received BGE quarterly status report.
 - 8.5 gallons of petroleum recovered this quarter.
 - Project total equals 69,435 gallons petroleum to date
 - October 30, 2003: MDE received BGE quarterly status report.
 - Keck skimmers shut down this quarter.
 - Adsorbents in use.

- 2004:
 - February 4, 2004: MDE received BGE quarterly status report.
 - Keck skimmers shut down this quarter. Adsorbents in use.
 - April 27, 2004: MDE received BGE quarterly status report.
 - Keck skimmers shut down this quarter. Adsorbents in use
 - July 19, 2004: MDE received BGE quarterly status report.
 - Keck skimmers shut down this quarter.
 - 1 gallon of petroleum recovered this quarter.
 - A total of 69,436 gallons of petroleum recovered to date
 - October 18, 2004: MDE received BGE quarterly status report.
 - Keck skimmers shut down this quarter. Adsorbents in use
 - December 16, 2004: MDE on site to verify groundwater monitoring wells.

- 2005:
 - January 28, 2005: MDE received BGE quarterly status report.
 - Total fluids recovery and skimmer systems inoperable.
 - Project total equals 69,438 gallons petroleum to date.
 - May 19, 2005. MDE received BGE quarterly status report.
 - 3 Keck skimmers operable this quarter.
 - Groundwater flow reportedly more west-northwest.
 - June 9, 2005: MDE on site for familiarization.

- 2006:
 - May 24, 2006: MDE received BGE quarterly status report.
 - 3 Keck skimmers operable this quarter.
 - Appears that greatest thickness of product is not intercepted by current wells.

 - March 20, 2007. MDE-OCP met with representatives of Constellation energy to discuss the current and future remediation status of the facility.

- 2007:
 - May 8, 2007. MDE-OCP received *First Quarter 2007 Status Report – May 1, 2007*.
 - 3 Keck skimmers operated this quarter;
 - 18 gallons of product were recovered; 69,456 gallons petroleum recovered to date.

- July 21, 2008. MDE-OCP directive letter to Constellation Energy Group, requiring:
 - Redevelopment of monitoring wells containing LPH;
 - Quarterly gauging and sampling of monitoring wells;
 - Continued LPH recovery;
 - Annual sampling of the on-site drinking water supply well;
 - A half-mile well survey;
 - Submittal of a Quarterly Groundwater Monitoring Update Report;
 - A Site Conceptual Model.

- 2008:
 - September 29, 2008. MDE-OCP received *Fourth Quarter 2007 Status Report – January 25, 2008*.
 - 3 Keck skimmers operated this quarter;
 - 8 gallons of product were recovered; 69,464 gallons petroleum recovered to date.
 - LPH identified in several monitoring wells during the Oct, Nov. and Dec. 2007 gauging events

MW1 - 0.45 to 0.68 ft;	MW2 - 0.34 to 1.2ft;	MW5 - 0.17to 0.65 ft;	MW8 - 0.6 to 0.4ft;
MW13 - 0.78 to 0.86 ft	MW14 - 2.15 to 2.02 ;	OW-01 - 0.12 to 0.3 ft;	OW-02 - 1.44 to 1.46 ft;
PW2 - 0.21ft;	PW05 - 0.17 to 0.42 ft	RW05 - 0.1 to 0.15ft	
 - Skimmers placed in wells yielded little product.

- Product is handbailed.
- 16 monitoring wells were analyzed during this quarter.
- Low dissolved phase petroleum concentrations (benzene 9.3 ppb; TPH-DRO 6860 ppb);
- September 29, 2008. MDE-OCP received *First Quarter 2008 Status Report –April 25, 2008*.
 - 3 Keck skimmers operated this quarter;
 - 12 gallons of product were recovered; 69,472 gallons petroleum recovered to date.
 - Shallower water table. Possibly trapped product.
 - LPH identified in several monitoring wells during the Jan, Feb. and Mar. 2008 gauging events
 MW1 - 0.46 ft; MW2 – 0.95ft; MW5 - 0.64 to 0.18 ft; MW8 - 0.49 to 0.2ft;
 MW13 – 0.75 to 0.02 ft MW14 - 2.09 to 1.42ft OW-01 – 0.38 ft; OW-02 - 1.06 to 0.15 ft;
 PW2 – 0.6 to 0.06 ft; PW03 – 0.25 to 0.1 ft PW05 - 0.44 ft RW5 – 0.06 to 0.1 ft
 - Skimmers placed in wells yielded little product.
 - Product is handbailed.
 - 16 monitoring wells were analyzed during this quarter.
 - Low dissolved phase petroleum concentrations (TPH-DRO 8720 ppb);
- September 29, 2008. MDE-OCP received *Second Quarter 2008 Status Report –July 25, 2008*.
 - 3 Keck skimmers operated this quarter;
 - Unclear if product was recovered for the month of April 2008.
 - Shallower water table. Possibly trapped product.
 - LPH identified in several monitoring wells during only the month of April 2008 gauging events
 MW5 - 0.09 ft; PW03 – 0.1 ft RW5 – 0.02ft
 - Skimmers placed in wells yielded little product.
 - Product is handbailed.
 - No groundwater samples collected from the monitoring well network.
- October 3, 2008. MDE-OCP received *Groundwater Analytical Reports and September 2008 Data Tables and Figures – October 2, 2008*.
 - Second Quarter 2007: Fifteen monitoring wells sampled, detecting benzene at 20.2 ppb; TPH/DRO at 35.7 ppm
 - Third Quarter 2007: Sixteen monitoring wells sampled, detecting benzene at 19.3 ppb; TPH/DRO at 8.34 ppm
 - Fourth Quarter 2007: Thirteen monitoring wells sampled, detecting benzene at 9.7 ppb; TPH/DRO at 6.86 ppm
 - First Quarter 2008: Sixteen monitoring wells sampled, detecting benzene at 5.2 ppb; TPH/DRO at 8.72 ppm
 - Third Quarter 2008: Fourteen monitoring wells sampled, detecting benzene at 5.2 ppb; naphthalene at 82.9 ppb; and TPH/DRO at 5.06 ppm
 - LPH identified in several monitoring wells during the month of September 2008 gauging events:
 MW-1 – 0.31 ft; MW-2 – 0.82 ft; MW-5 – 0.09 ft; MW-8 – 0.05 ft; MW-13 – 0.39 ft;
 MW-14 – 1.22 ft; OW-02 – 0.52 ft; PW-02 – 0.05 ft; PW-03 – 0.1 ft; RW-05 – 0.05 ft
- October 14, 2008. MDE-OCP received *Second Quarter 2008 Status Report – October 10, 2008*.
 - Enhanced fluid recovery (EFR) event conducted on eighteen (18) wells in September 2008.
 - Handbailing and sorbent socks used for product removal.
 - Approximately 22.5 gallons of product were recovered; 69,494.5 gallons petroleum recovered to date.
 - LPH identified in ten (10) wells during September 2008 gauging (see above).
 - Fourteen wells were sampled, detecting benzene at 5.2 and TPH/DRO at 5.06 ppm
- October 15, 2008. MDE-OCP on-site to observe monitoring well gauging and bailing event.
 - Thirteen (13) wells with product were bailed. Product ranged from a sheen to 1.58 ft. in MW-14.
 - Currently three wells with active skimmers: MW-2, MW-8, and MW-14. Two additional wells contain inactive skimmers (MW-5 and MW-6)

- November 14, 2008. MDE-OCP site visit to observe monitoring well gauging and sampling event. Sampling of the on-site production well to be conducted.
- March 4, 2009. MDE-OCP received *4th Quarter 2008 Status Report – March 3, 2009*.
 - Gauging events conducted October, November and December 2008. LPH identified in:

MW1 – 0.9.2 to 1.1 ft;	MW-2 – 1.48 to 1.57 ft;	MW-5 – 0.9 to 1.02 ft;	MW-6 – 0.02 ft;
MW-8 – 0.02 ft;	MW-14 – 1.06 to 1.58 ft;	OW-1 – 0.91 to 1.24 ft;	OW-2 – 0.96 to 1.57 ft;
PW-4 – sheen;	PW-5 – 0.76 ft;	RW-1 – sheen;	RW-2 – 1.31 – 1.5 ft;
RW-3 – 0.62 ft;	RW-5 – 1.14 – 1.25 ft		
 - December 2008 EFR event conducted on MW-1, MW-2, MW-5, MW-8, MW-14, OW-1, OW-2, PW-5, RW-2, RW-3, and RW-5.
 - November 2008 groundwater sampling event: Fifteen monitoring wells sampled, detecting benzene at 24 ppb and TPH/DRO at 52.7 ppm
 - The production well (depth 207 ft) was also sampled. No petroleum constituents detected above regulatory levels.
 - Groundwater flow west/northwesterly.
 - Approximately 98.5 gallons LPH recovered via EFR and handbailing; 69,593 gallons petroleum recovered to date.
 - A half-mile well survey completed; three supply wells located within a half-mile of the property boundary lines.
- March 6, 2009. MDE-OCP received *Site Conceptual Model – March 6, 2009*.
 - Release due to underground pipeline leak in early 1990s in the area of Turbine No. 4.
 - Subsurface geology mainly silts and sand with a discontinuous clay layer.
 - Groundwater between fourteen (14) and twenty-six (26) feet.
 - Groundwater flow south/southwesterly.
 - Additional subsurface investigations downgradient from MW-14 to be proposed.

Estimated Cumulative Recovery to date: Approximately 69,593 gallons LPH.

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 (MDE): 410-537-3443 (Oil Control Program)

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.