United States Environmental Protection Agency
Region V
POLLUTION REPORT

Date: Wednesday, August 26, 2009
From: Steven Renninger, On-Scene Coordinator

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Subject: POLREP #3 (FINAL)
Behr VOC Plume Site - Chrysler AOC
1600 Webster Street, Dayton, OH
Latitude: 39.7821400
Longitude: -84.1805500

POLREP No.:	3	**Site #:**	B5FH
Reporting Period:	March 19, 2007 through July 10, 2009	**D.O. #:**	
Start Date:	12/21/2006	**Response Authority:**	CERCLA
Mob Date:	12/21/2006	**Response Type:**	Time-Critical
Demob Date:	7/10/2009	**NPL Status:**	NPL
Completion Date:	7/10/2009	**Incident Category:**	Removal Action
CERCLIS ID #:		**Contract #**	PRP Oversight
RCRIS ID #:			

Site Description

The Behr Dayton Thermal Products Facility (Behr-Dayton facility) is located at 1600 Webster Street, Dayton, Montgomery County, Ohio. The Behr-Dayton facility manufactures vehicle air conditioning and engine cooling systems at the facility. DaimlerChrysler Corporation (DCC) owned and operated the Behr-Dayton facility from at least 1937 until April of 2002.

The groundwater beneath the Behr-Dayton facility is contaminated with volatile organic compounds, including trichloroethene (TCE). DCC contracted Earth Tech to design, install, and operate two systems for the remediation of soil and groundwater contamination under the Behr-Dayton facility, with TCE as the main contaminant of concern. Earth Tech installed a Soil Vapor Extraction (SVE) system on the Behr-Dayton facility property for soil remediation and began operation in October 2003.

The TCE-contaminated ground water has migrated to the south/southwest through residential, commercial and industrial areas. The “Site”, as defined in the Administrative Order by Consent (AOC), is defined as the area underlain by the groundwater contamination plume originating from the Behr-Dayton facility. The Site extends in a south-southwesterly direction towards State Route 4 and Interstate 75.

Earth Tech has conducted groundwater monitoring on a network of 75 on-site and off-site groundwater monitoring wells since 2001. In 2003, the following monitoring wells were sampled and contained elevated levels of TCE: MW010s (17,000 ppb), MW028s (9,600 ppb), and MW029s (16,000 ppb). These monitoring wells are located along the southern perimeter of the Behr-Dayton facility (MW010s) or in the adjacent neighborhood (MW028s and MW029s).

On September 28, 2006, Earth Tech submitted the most recent quarterly groundwater sampling results to Ohio EPA. In the report, Earth Tech stated that one shallow groundwater monitoring well, MW038s, which is located at the intersection of Daniel Street and Lamar Street (residential area south of Behr Dayton facility), contained a TCE concentration of 3,900 ppb. Groundwater in the area of the Behr-Dayton facility is located approximately 20 feet below ground surface.

On October 16, 2006, Ohio EPA installed a total of seven soil gas probes along Daniel Street, Lamar Street and Milburn Avenue to evaluate potential risk posed by vapor intrusion from a VOC groundwater plume. The depth of the soil gas probes were approximately one to two feet above the depth of groundwater, which was determined to be approximately 20 feet below ground surface. Once the soil probes were installed, an air sample was collected and analyzed for VOCs. Ohio EPA soil gas analytical results detected TCE concentrations as high as 160,000 ppb.

On November 6, 2006, Ohio EPA formally requested U.S. EPA to conduct a time-critical removal action to assess whether vapor intrusion was occurring at the site.

Vapor Intrusion is the migration of volatile organic compounds from contaminated shallow groundwater to soil gas to the indoor air of properties. ATSDR and the Ohio Department of Health (ODH) established TCE screening levels for residential and commercial sub-slab and indoor air. The ATSDR and ODH residential indoor air screening level is 0.4 parts per billion (ppb) and the residential sub-slab screening level is 4 ppb. The ATSDR and ODH commercial indoor air screening level is 1.7 ppb and the commercial sub-slab screening level is 17 ppb.

In November 2006, U.S. EPA conducted a site assessment at the site. U.S. EPA tasked WESTON START to collect sub-slab vapor probe and indoor air samples from eight residences. Analytical results indicated that eight sub-slab vapor probe air samples had TCE vapor levels greater than the ATSDR and ODH screening level of 4 ppb, and five sub-slab vapor probe air samples have a TCE vapor level greater than the ATSDR immediate action level of 1,000 ppb, with a maximum TCE concentration of 62,000 ppb.

Analytical results indicated all eight sampled residences having TCE vapor levels greater than the ATSDR screening level of 0.4 ppb, and three residences with an indoor air sample having a TCE vapor level greater than the ATSDR immediate action level of 100 ppb, with a maximum TCE vapor level of 260 ppb.

Based on analytical results and conditions during the 2006 Site Assessment, the Site met the criteria for a removal action as outlined in 40 CFR 300.415(b). The chemicals detected at the Site pose an imminent health threat and present a danger to individuals occupying the structures at the Site.

In December 2006, Chrysler signed an Administrative Order on Consent (AOC) to conduct a removal action at the site. The removal action included vapor intrusion sampling in buildings (residential, commercial, schools) and, if necessary, installation of a vapor abatement mitigation system. See POLREPs 1-2 for further detail on removal activities completed in 2006-2007. Phase 1 addressed the area immediately south of the Behr facility (1 block). Phase 2 addressed the area south and west of Lamar Street.

Current Activities

March 2007:

Chrysler continued to conduct vapor intrusion sampling in residential homes south of the Behr facility. EPA informed Chrysler that ODH recommended the indoor and sub-slab TCE screening levels for schools as the same TCE screening levels for residential homes because of the sensitive populations in the schools.

EPA conducted sub-slab sampling at both Kiser and VanCleve @ McGuffey Elementary Schools. The TCE results are as follows:

Kiser Elementary School – 30 parts per billion by volume (ppbv) TCE

VanCleve @ McGuffey Elementary School – 0.17 ppbv TCE. Due to the TCE sub-slab result at Kiser Elementary School, EPA will collect indoor air and sub-slab samples on a quarterly basis. Chrysler submitted a revised DRAFT Phase II Work Plan to EPA on March 23, 2007.

April 2007:

Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans. Chrysler upgraded the fan on one vapor abatement system located on Daniel Street.

PHDMC sent letters to residences and businesses in the Phase II area of investigation requesting them to sign Chrysler's access agreement to allow sampling.

EPA conducted indoor air and sub-slab sampling at VanCleve @ McGuffey Elementary school and showed a TCE concentration in the sub-slab at 110 ppbv, which is greater than the screening level of 4 ppbv, and a TCE concentration in the indoor air at 0.2 ppbv, which is less than the ODH screening level of 0.4 ppbv. EPA collected an indoor air sample at Kiser Elementary School which showed a TCE concentration less than 0.12 ppbv.

Chrysler submitted the Behr VOC Plume Report to EPA. The Behr VOC Plume Report explained Chrysler's position of where Chrysler "believes" its TCE plume is located. The report showed a TCE plume originating from the Behr-Dayton facility and traveling in a south-southwesterly direction and stopping at North Keowee Street.

EPA requested Chrysler to upgrade the vapor abatement system in residential homes which have not reduced the indoor and sub-slab TCE concentrations below the screening levels. The vapor abatement systems that are being installed in the homes are a basic radon abatement system, which includes one extraction point with an inline fan. EPA is requesting Chrysler to review each basic system and upgrade the basic system as necessary to provide more efficient VOC sub-slab gas removal.
Chrysler installed vapor abatement systems in 2 commercial business locations.

May 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans. Chrysler has installed, to date, vapor abatement systems in 14 residential homes and 2 commercial businesses.

EPA requested Chrysler to place both Kiser and VanCleve @ McGuffey Elementary Schools in the quarterly monitoring program. Chrysler stated that they would include VanCleve @ McGuffey Elementary School in the quarterly monitoring program but would not include Kiser Elementary School because Chrysler believes the school is outside (east) of where Chrysler believes the Behr facility TCE plume is located. EPA will conduct quarterly monitoring at Kiser Elementary School.

EPA requested Chrysler to conduct radius of influence testing in the homes which have a vapor abatement system. EPA requested Chrysler evaluate each vapor abatement system and upgrade as necessary.

EPA collected sub-slab and indoor air samples from eight homes in the McCook Field Neighborhood and determined that two indoor air samples had TCE concentrations greater than the screening level of 0.4 ppbv and four sub-slab air samples showed TCE concentrations greater than the screening level of 4 ppbv.

June 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans.

Chrysler is observing TCE concentrations in ambient air samples which are greater than the residential indoor air screening level. The ambient air samples are being collected just south of the Behr facility. ODH informed RAPCA of Chrysler's ambient air sample results. RAPCA is studying the situation and will provide a briefing or report to EPA when completed.

PHDMC requested additional residential air sampling south of Keowee Street. Chrysler informed PHDMC that the residents are located outside of where Chrysler believes the Behr facility TCE plume is located and will not sample those residents.

July 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans.

Chrysler to identify possible options for properties where a fan upgrade has not reduced indoor air levels to below the screening levels – Some options include: 1) Addition of a second fan; and 2) Increasing fan size. Building construction and available areas in the basement will be reviewed and Chrysler will present options.

Chrysler installed vapor abatement systems in one commercial business on Webster Street and installed a vapor abatement system at VanCleve @ McGuffey Elementary School.

August 2007:
Chrysler conducted extensive sub-slab and indoor air sampling at VanCleve @ McGuffey Elementary School on July 18 and 19 and showed sub-slab TCE concentrations ranging from 993 to 7660 ppbv, and

indoor air TCE concentrations ranging from 1.7 to 25.5 ppbv. EPA collected two indoor air samples and showed TCE concentrations ranging from 1.2 to 4.3 ppbv. The sub-slab and indoor air TCE screening levels are 4 ppbv and 0.4 ppbv, respectively. Dayton Public Schools hired an independent consultant to collect air samples within the school.

Dayton Public School was briefed on the indoor and sub-slab sample results by EPA and ODH, and decided to close VanCleve @ McGuffey Elementary School and move the students to another elementary school. EPA conducted a press conference to explain the sample results and to show the vapor abatement system that Chrysler installed at the school on August 6, 2007.

EPA collected the second round of sub-slab and an indoor air samples from Kiser Elementary School. Both samples did not show TCE levels above the residential screening levels.

On August 8, 2007, EPA OSC Renninger submitted a letter to Chrysler outlining 6 items to revise in the Draft Phase II Work Plan (a copy of this letter is in the documents section of the site website). Two of the 6 items included the following:

1) EPA requested that the revised Phase II Work Plan include vapor intrusion investigation sampling within the McCook Field Neighborhood (area bordered to the north by Protzman Street, to the east by Kiser Street and to the south by State Route 4), because EPA believes that the TCE plume originating from the Behr facility has traveled south of Keowee Street.

2) EPA requested that the Phase II Work Plan include quarterly sampling to be conducted by Chrysler at Kiser Elementary School.

Chrysler collected sub-slab and indoor proficiency air samples from VanCleve @ McGuffey Elementary School after 10 days of abatement system operation. Sub-slab results showed TCE concentrations ranging from 19.9 to 122 ppbv, and indoor air TCE concentrations ranging from 4.8 to 9.8 ppbv. EPA collected three indoor air samples and showed TCE concentrations ranging from 1.4 to 7 ppbv.

On August 15, 2007, Chrysler submitted a letter to EPA refusing to conduct vapor intrusion investigation sampling within the McCook Field Neighborhood (area south of VanCleve @ McGuffey Elementary School).

EPA requested Chrysler to have an engineer evaluate each vapor abatement system to ensure that the system was designed properly and to upgrade the system as necessary to reduce the sub-slab and indoor air TCE concentrations below the screening level.

September 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans.

On September 7, Chrysler conducted sub-slab and indoor air 30-day proficiency sampling at VanCleve @ McGuffey Elementary School. Sub-slab TCE concentrations ranged from 23.8 to 137 ppbv. Indoor air TCE concentrations ranged from non-detect to 4.9 ppbv.

Chrysler reviewed data from the six residential homes located south of the Behr-Dayton facility that contain a vapor abatement system which does not appear to lower the indoor air TCE concentrations less than the screening levels, such as, basement layouts, vacuum readings during sub-slab sampling, and changes in vacuum readings following system upgrades. Chrysler will provide scaled drawings of the basement layouts, vacuum readings, sub-slab and indoor air concentration changes, radius of influence of the SSDS, and proposed next step for each address. Chrysler is calling these six homes “Target Properties”.

Chrysler explained that the Behr VOC Plume is based on the TCE originating from the plant and is controlled by groundwater flow. Chrysler added that the entire McCook Field Neighborhood identified by EPA did not originate from the plant and therefore, is not Chrysler’s responsibility. EPA disagreed.

Chrysler provided scaled drawings of the basement layouts for the seven target properties including, vacuum readings, sub-slab and indoor air concentration changes, radius of influence of the SSDS, and proposed next step for each address.

October 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans. Chrysler installed a vapor abatement system at a commercial location on

Webster Street and Milburn Ave.

On October 1, Chrysler conducted indoor air proficiency sampling at VanCleve @ McGuffey Elementary School. Indoor air TCE concentrations ranged from 1.4 to 3.7 ppbv.

On October 26, 2007, Chrysler submitted a letter to EPA refusing to conduct vapor intrusion testing within the McCook Field Neighborhood and refusing to conduct quarterly sampling at Kiser Elementary School. Chrysler submitted a modified Phase II Work Plan that did not include dispute items.

November 2007:
Chrysler continued to conduct vapor intrusion sampling in homes and businesses as stated in the Phase I and Phase II work plans.

On November 8, 2007, EPA submitted a letter to Chrysler indicating that EPA would be initiating a fund-lead removal action within the McCook Field Neighborhood.

On November 13, EPA OSC Renninger submitted to Chrysler a modified and approved Phase II Work Plan indicating the area where Chrysler has agreed to continue conducting the vapor intrusion investigation, and identifying the area within the McCook Field Neighborhood that EPA will be conducting a vapor intrusion investigation and that EPA will be conducting quarterly sub-slab and indoor air sampling at Kiser Elementary School.

On November 15, a public meeting was conducted at Kiser Elementary School to update the community on vapor intrusion investigation sampling (conducted by EPA) within the McCook Field Neighborhood. Approximately 140 people attended the public meeting.

As of November 15, 2007, Chrysler had installed 22 vapor abatement systems and have sampled a total of 81 locations.

On November 20, Chrysler received a letter from EPA requesting Chrysler to participate in a remedial investigation for the site.

On November 29, EPA, Ohio EPA and Chrysler conducted a technical meeting to discuss removal activities at the Site. Chrysler stated it is installing at least 11 temporary wells and 6 permanent groundwater wells south of the Behr-Dayton facility.

December 2007:
EPA collected the third round of sampling at Kiser Elementary School. One sub-slab and one indoor air sample were collected. Both samples did not show TCE levels above the residential screening levels.

January 2008:
Chrysler has sampled 76 residential and commercial locations. Chrysler has installed and/or will be installing 35 vapor abatement mitigation systems in residential and commercial businesses.

EPA conducted meetings with seven residents south of the Behr facility where the vapor abatement systems are still attempting to reduce indoor air TCE levels. The meeting will explain that Chrysler is preparing a work plan to install a soil vapor extraction (SVE) system in the neighborhood to supplement TCE vapor removal.

February 2008:
Chrysler preparing residential area SVE work plan addendum. EPA requested Chrysler to sample all ground-level properties at apartment buildings currently under investigation. Chrysler agreed to sample all ground-level apartments where access has been granted.

March 2008:
EPA approved the Chrysler Phase II Work Plan Addendum Soil Vapor Extraction System Design. The soil vapor extraction system will enhance the TCE vapor mitigation as part of the indoor air removal action within the residential area between Leo Street, Milburn Ave, Daniel Street, and Lamar Street. The SVE system is designed to focus on properties where soil gas concentrations have not been reduced by sub-slab depressurization systems to levels recommended by ODH and ATSDR.

On March 26, 2008, U.S. EPA collected its 4th round of sampling at Kiser Elementary School. One sub-slab and one indoor air sample were collected. Both samples did not show TCE levels above the residential screening levels.

April 2008:
The SVE system as approved by EPA is currently being installed in the area bounded by Leo Street to the North, Milburn Street to the East, Daniel Street to the West and Lamar Street to the South. Status of the system installation is as follows:

• The extraction well installation is complete.
• The trenching and piping is complete.
• Waiting on weather to place asphalt over trenches.
• Treatment shed will be moved to the southwest corner of the AMVET property after asphalt has been placed.
• Shed configuration will take place during the week of April 14.
• Landscaping / reseeding residents yards will be conducted the end of April depending on the weather.
• System start-up and check will be conducted during the week of April 21, (with a generator).
• The best estimate from DP&L is that power will be available by early May.

PHDMC sent out certified letters to Best Effort addresses (47 locations). One additional round of letters will be sent out prior to EPA stating that Best Efforts have been achieved.

May 2008:
Chrysler has conducted vapor intrusion sampling at a total of 82 of 132 structures to date. Of those 82 locations which have been sampled, a total of 38 locations require a vapor abatement mitigation system; 9 are in the quarterly monitoring program; and 35 require "No Further Action".

June 2008:
PHDMC to send out one final letter to the “Best Effort” locations in both the EPA and the Chrysler areas of concern. The residential SVE system installation is complete. DP&L to hard wire SVE system beginning June 10th. Ohio EPA conducted soil gas sampling in the areas of Hillrose Avenue and Leo Street and identified additional areas for EPA to investigate during its removal action.

Chrysler has conducted vapor intrusion sampling at a total of 110 of 156 structures to date. Of those 110 locations which have been sampled, a total of 51 locations require a vapor abatement mitigation system; 11 are in the quarterly monitoring program; and 48 require "No Further Action". A total of 50 vapor abatement mitigation systems have been installed to date by Chrysler.

July 2008:
Chrysler began full operation of the SVE system. Chrysler estimates that the effective radius of influence for each SVE extraction well is greater than 100 feet.

August 2008:
Chrysler working to mitigate 14 properties which contain a vapor abatement system that continue to show indoor air TCE levels above the screening level.

Chrysler conducted noise testing around and south of the SVE system to determine if elevated levels were observed. Noise measurements were taken for 15 minutes with the system off and for 15 minutes with the system on. Noise results were as follows:

	System Off (dB)	System On (dB)
Minimum	48	52
Maximum	75	72
Average	58	60

October 2008:
EPA conducted a public meeting on October 8th to discuss the site’s NPL status and removal update. EPA requested Chrysler sample the Challenger School (adjacent to the Kiser Elementary School). Chrysler indicated that they would not sample the Challenger section of the school. EPA will conduct the sampling.

November 2008:
Chrysler continued to request the removal of the two carbon vessels connected to the residential SVE system.

December 2008:
EPA collected an indoor air and a sub-slab sample from the Challenger Center of Kiser Elementary School. Both samples did not show TCE levels above the residential screening levels.

January 2009:
Five new properties to be sampled, 13 properties currently above indoor air screening level and four properties have new vapor abatement mitigation systems installed.

February 2009:
Chrysler continued to address properties containing vapor abatement mitigation systems that continue to show indoor air TCE levels greater than 0.4 ppbv.

April 2009:
A total of 10 properties with mitigation systems continue to show indoor air TCE levels above the screening level. Chrysler sent EPA a workplan addendum to remove the two carbon vessels. The workplan addendum met RAPCA's requirements, including periodic testing of the SVE discharge.

May 2009:
Chrysler continued proficiency sampling, upgrading mitigation systems and operating the residential SVE system. EPA approved a work plan addendum allowing Chrysler to remove the two carbon vessels due to effluent TCE concentrations less than action levels established by the Regional Air Pollution Control Agency (RAPCA). The plan requires periodic testing of the SVE discharge air.

July 2009:
Chrysler has sampled a combination of 118 residential, commercial and industrial properties. Of those 118 properties, 56 properties received mitigation measures by Chrysler. A total of 55 properties required "No Further Action". A total of 38 properties were either unresponsive or Chrysler's access request for sampling was denied by the owner. Chrysler has only one remaining property (which has a vapor abatement system) that still has an indoor air TCE level slightly above the residential indoor air screening level of 0.4 ppbv.

July 9, 2009 Update: Chrysler's consultant, AECOM (formerly Earth Tech) issued a letter to EPA stating that on July 2, 2009, it received a letter from Chrysler that it was no longer authorized by Chrysler to continue operations at the Behr VOC Plume site. Effective on July 3, 2009, the following activities will be ceased or terminated:
•All rental services for the on-site (on the Behr facility) groundwater treatment system. This includes a trailer housing the main control computer for the system, and a storage unit containing miscellaneous tools, equipment, and parts owned by Chrysler.
•Operation of the Behr facility groundwater extraction system / reinjection system including wells and other mechanical sytems.
•Indoor air monitoring as required by the EPA AOC dated December 2006
•Weekly data updates to the EPA as required by the AOC
•Monthly conference calls with the EPA as required by the AOC
•Monthly and quarterly groundwater treatment system sampling
•Groundwater monitoring

Effective close of business on July 10, 2009, AECOM notified all utility service providers for the site (including all electricity and telephone services) to terminate services at the site. This termination of service affected the operation of the residential SVE sytem.

On July 10, 2009, EPA assumed Operation and Maintenance (including electric costs) for the residential SVE system.

Planned Removal Actions
On July 17, 2009, EPA issued a Unilateral Administrative Order (UAO) to Behr Dayton Thermal Products to complete the following removal activities:

-operate and maintain the residential SVE system along Daniel Street
-conduct annual performance monitoring at all (205) vapor abatement mitigation systems that were installed by EPA or Chrysler to date for vapor intrusion
-upgrade any residential vapor abatement mitigation system, if necessary
-sample additional locations for vapor intrusion, if identified by EPA
-conduct vapor intrusion sampling at the completed Salvation Army facility.

A new website has been generated to follow work being conducted by Behr Dayton Thermal Products. Please visit the following website for more information:

www.epaosc.org/behrdaytonthermalproductssite

Next Steps
EPA will provide oversight to the Behr Dayton Thermal Products removal activities associated with the July 17, 2009 UAO.

Key Issues
Chrysler sampled 118 out of 156 residential, commercial and industrial locations within the Chrysler area of concern. Of the 118 properties sampled, 56 properties received a vapor abatement system.

Disposition of Wastes
Vapor Intrusion Site - no disposal completed.

response.epa.gov/behrvocplume