FINAL DECISION
And
RESPONSE TO COMMENTS

Chevron Gasoline Release

At Chillum, Maryland

April 2008

Volume 1 of 2

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I. INTRODUCTION

The United States Environmental Protection Agency (EPA) is issuing this Final Decision and Response to Comments (Final Decision) under the authority of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 to 6992k, for the gas station formerly owned by Chevron U.S.A. Inc. (Chevron) which is located at 5801 Riggs Road in Chillum, Prince George's County, Maryland (the Facility).

The purpose of this Final Decision is to describe the Final Remedy selected by EPA to address releases of hazardous waste and/or hazardous constituents at and/or from the Facility.

II. PUBLIC PARTICIPATION PROCESS

On August 30, 2007, EPA issued a Statement of Basis (SB) which described the Proposed Remedy for the Facility and provided the public with an opportunity to comment on the Proposed Remedy. In the SB, EPA proposed as the remedy for the Facility the expansion of the existing groundwater remediation system through angle wells, the installation of vapor mitigation systems in homes impacted by subsurface vapor intrusion, and the implementation of institutional controls. The SB is hereby incorporated into this Final Decision by reference as Attachment C, and modified as specified in Sections III. B and C (Final Remedy), below.

Consistent with public participation provisions under RCRA, EPA requested comments from the public on the Proposed Remedy. The 60-day public comment period began on August 30, 2007 and ended on October 29, 2007. The public comment period was announced in the Washington Times and Washington Post on August 30, 2007. On September 6, 2007, EPA held a public meeting and open house at the Jessica LaSalle Elementary School to explain the Proposed Remedy, the public comment process, future actions, and to answer questions from the public.

Based on comments received during the public comment period and evaluation of the remedy selection criteria, EPA has modified the Proposed Remedy as set forth in the SB to include the installation of an independent remediation system on the District of Columbia (District) side of Eastern Avenue and the installation of an oxygen injection curtain in the alley above MW-33 to accelerate degradation of the dissolved phase plume. EPA views these modifications to the SB as enhancements to the Proposed Remedy and, as such, will not be seeking additional public comments on these modifications, but will be describing them in this Final Decision.

This Final Decision presents the concerns and issues raised during the public comment period that followed EPA's issuance of SB for the Facility, and responds to

comments received by EPA regarding the Proposed Remedy. As noted in the Response to Comments, some of the comments received were directed to the Health Consultation prepared by the Agency for Toxic Substances and Disease Registry (ATSDR). Therefore, EPA referred those comments to ATSDR for response and has included ATSDR's responses in Attachment B.

III. FINAL REMEDY

The Final Remedy for the Facility is the continuation of the groundwater remediation system in Area A; expansion of the existing groundwater remediation system through angle wells; the installation of an independent remediation system in Area B; the installation of an oxygen injection curtain in Area C; the installation of vapor mitigation systems in homes impacted by subsurface vapor intrusion, and the implementation of institutional controls.

A. Continuation of Groundwater Remediation System in Area A and Expansion of Existing Groundwater Remediation System by Angle Wells

This component of the Final Remedy is the same as proposed in the SB. Chevron is required to continue operation of the existing groundwater remediation system in Area A, and to expand the system into Area B by installing angle recovery wells under Eastern Avenue up to private property boundary. All new recovery wells will be connected to the existing groundwater treatment unit. The final design and the number of angle wells needed will be determined in the design phase. Chevron is required to obtain all necessary permits from the District to install the angle wells (Figures 1 and 2).

B. Independent Remediation System to Area B

Based on comments received during the public comment period and evaluation of the remedy selection criteria set forth in Section VIII of the SB, EPA has decided to add this component to the Final Remedy. EPA is requiring Chevron to install an Independent Remediation System (IRS) in the alley behind Eastern Avenue in Area B. The IRS uses an innovative recovery well design by combining multiple treatments (soil vapor extraction, recirculation groundwater pumping, and air sparging) inside a large diameter well, thereby reducing space needed to place equipment above ground. Additionally, EPA will require Chevron to design an underground vault to house most of the above-ground equipment. There will be short-term construction disruptions, but long-term disruptions due to noise, traffic and aesthetic interferences will be minimized by fitting most equipment below grade. The IRS has no net groundwater discharge because dissolved phase contaminants are vaporized inside the well and will be removed by a soil vapor extraction pump. Unlike the existing dual phase extraction system, the IRS will not depress groundwater, and, therefore, will not draw the plume further into the residential area. There will be stack emission from the IRS, which will be treated by activated carbon or catalytic oxidizer to meet District emission standards. The final

design and the number of IRS wells will be determined in the design phase. Chevron is required to obtain all necessary permits from the District to install and operate the IRS (Figure 3).

C. Oxygen Curtain to Area C

Based on comments received during the public comment period and evaluation of the remedy selection criteria, EPA has decided to add this component to the Final Remedy. EPA is requiring Chevron to install an Oxygen Curtain (OC) in the alley above Nicholson Street to enhance natural biodegradation of the dissolved phase plume in Area C.

Petroleum constituents in groundwater or soil moisture degrade rapidly under aerobic condition. In 2004 and 2005, Chevron conducted a site-wide groundwater oxygen survey to identify low oxygen areas. The survey confirmed EPA's assessment that the dissolved phase plume is largely aerobic and will degrade rapidly once the liquid gasoline source can be eliminated. The one exception is Area C which has a low oxygen level. Area C is located upgradient of the groundwater upwelling zone surrounding MW-33 on Nicholson Street.

Injection of oxygen will accelerate natural degradation of the dissolved phase petroleum constituents. An OC operates by injecting bottled oxygen through a curtain of injection wells to supersaturate groundwater with oxygen. The groundwater will carry elevated oxygen some distance down gradient to continue the enhancement effect. The OC is a non-mechanical system operated by pressure. The OC equipment takes up little space and will not generate noise, so it will not be disruptive to the community except for short-term construction disruptions. The final design and the number of OC wells will be determined in the design phase. Chevron is required to obtain all necessary permits from the District to install and operate the oxygen curtain (Figure 4).

D. Installation of Vapor Mitigation System

This component of the Final Remedy is the same as proposed in the SB. Chevron is required to install subslab vapor mitigation systems in homes above the plume where EPA has identified petroleum vapor concentrations that exceed EPA's indoor air standards.

E. Institutional Controls

This component of the Final Remedy is the same as proposed in the SB.

IV. REMEDIATION STANDARDS

The contaminants of concern (COC) relating to the Facility are benzene, toluene, ethylbenzene, xylenes (BTEX) and MTBE. The proposed clean-up standards for these COCs set forth in the SB are made final in this Final Decision, as described below.

A. Groundwater Standards

The groundwater remediation standards in the Final Remedy are the same as those proposed in the SB. Chevron is required to restore groundwater to drinking water standards as established by the Maximum Contaminant Levels (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1, except for MTBE. MTBE does not have a MCL. EPA's remediation standard for MTBE is based on taste and odor thresholds adopted by the District and Maryland. EPA's groundwater remediation standards are as follows:

Benzene	5 micrograms per liter (ug/l)
Toluene	1,000 ug/l
Ethylbenzne	700 ug/l
Xylenes	10,000 ug/l
MTBE	20 ug/l

B. Indoor Air Standards

The indoor air standards in the Final Remedy are the same as those proposed in the SB. In the SB, EPA referred to the indoor air standards as vapor remediation standards. While EPA has not modified the vapor remediation standards as presented in the SB, those standards are referred to as indoor air standards in the Final Remedy to avoid confusing those standards with the soil vapor action levels.

Benzene	8 micrograms per cubic meter (ug/m^3)
Toluene	5,000 ug/m^3
Ethylbenzene	1,000 ug/m^3
Xylenes	100 ug/m^3
MTBE	17 ug/m^3

V. FUTURE ACTIONS

Pursuant to the 2002 unilateral Administrative Order (2002 Order), RCRA-03-2003-0006th, issued by EPA to Chevron pursuant to Section 7003 of RCRA, 42 U.S.C. § 6973, EPA has ordered Chevron to install residential vapor mitigation systems in selected homes and to conduct additional indoor air sampling of certain homes so that EPA can determine whether it is necessary to have additional vapor mitigation systems installed at these residences.

EPA anticipates that the Final Remedy will be implemented using available legal authorities including, but not necessarily limited to, RCRA Section 7003, 42 U.S.C. 6973. The installation of the Independent Remediation System and Oxygen Injection Curtain will be contingent upon Chevron receiving permit approval from the District.

VI. DECLARATION

Based on the on the Administrative Record compiled for this Facility, I have determined that the Final Remedy as set forth in this Final Decision and Response to Comments is appropriate and will be protective of human health and/or the environment.

Abraham Ferdas, Director
Waste and Chemicals Management Division

4/3/08
Date

VII. EPA RESPONSE TO PUBLIC COMMENTS

Response to Andrew Robertson Jr. Comments, dated 9/5/07

EPA is sorry to hear of the illness and loss in Mr. Robertson's family. EPA assures Mr. Robertson and the community that the Facility is receiving EPA's full attention and that EPA's response to the conditions posed by the contamination is consistent with our response to similar situations throughout the country.

On April 12, 2002, Chevron sampled soil vapor concentrations at Mr. Robertson's property. The sample results below show that the concentrations of benzene and methyl tertiary butyl ether (MTBE) are substantially below EPA's soil vapor action levels, and, therefore, do not warrant further testing by indoor air sampling:

ug/m^3*	Measured Soil Vapor Levels	EPA Soil Vapor Action Levels
Benzene	9 to 14	220
MTBE	Not detected**	1,600

* "ug/m^3" stands for micrograms per cubic meter of air
** Not detected at 28.8 ug/m^3 laboratory detection limit

In his letter, Mr. Robertson compares the soil vapor sample results taken from his property with EPA's indoor air standards. Soil vapor sample results cannot be compared directly to indoor air standards. The soil vapor action levels are higher than the indoor air standards because only a tiny fraction of the air inside the home originates from the soil. Once the soil vapor disperses into a home, it mixes with other air in the home resulting in diluted concentrations of soil vapor in the indoor air.

EPA collects soil vapor data because soil vapor intrusion can be falsely identified when looking solely at indoor air quality data, as indoor vapor sources, such as cleaners, paints, glues and cigarette smoke, may also contribute to indoor air contaminants.

In the case of Mr. Robertson's property, EPA determined that soil vapor concentrations do not pose a threat to human health because the soil vapor concentrations are far below EPA's soil vapor action levels. In June 2006, the District of Columbia Department of Health (DOH) conducted indoor air sampling of Mr. Robertson's home. The DOH sample results show that the concentrations of benzene and MTBE in the indoor air of Mr. Robertson's home are below EPA's indoor air standards as shown below:

	Measured Indoor Air Levels (DOH 2006)	EPA Indoor Air Remediation Standards
Benzene	1.4 ug/m^3 (0.44 ppb)	8 ug/m^3
MTBE	0.87 ug/m^3 (0.24 ppb)*	17 ug/m^3

- ppb stands for parts per billion of indoor air

Given that soil vapor data and indoor air data show that soil vapor is not migrating into Mr. Robertson's home in concentrations that pose a threat to human health, EPA does not plan to conduct further testing of Mr. Robertson's property.

"Response Action" shall mean those activities undertaken by the Settling Defendants in accordance with the Administrative Settlement and Order on Consent (2006 Settlement Agreement), Docket No. CERC-03-2007-0006DC, entered into on November 29, 2006 by PPL, UGI and EPA.

Response to Delores Ford Comments, dated 10/29/07

(1) As required by EPA, in 2002 Chevron sampled soil vapor concentrations in properties surrounding Ms. Ford's property, including the adjoining house which shares the same building slab; the next-door neighbors on either side, and three properties directly across the street. All sampling results showed that the soil vapor concentrations at these properties were far below the EPA's soil vapor action levels that do not warrant further testing by indoor air sampling.

In addition, in 2006 DOH collected one indoor air sample in Ms. Ford's home. The sample results, as shown below, confirm the indoor air concentrations in Ms. Ford's home are far below EPA's indoor air standards.

	Measured Indoor Air Levels (DOH 2006)	EPA Indoor Air Standards
Benzene	1.02 ug/m^3 (0.32 ppb)	8 ug/m^3
MTBE	0.36 ug/m^3 (0.1 ppb)	17 ug/m^3

Given that soil vapor data and indoor air data from Ms. Ford's property show that soil vapor is not migrating into Ms. Ford's home in concentrations that pose a threat to human health, EPA does not plan to conduct further sampling of Ms. Ford's property.

(2) The Geoprobe located closest to Ms. Ford's property is GP-19E. Data from GP-19E show that groundwater is encountered at 22 feet below grade. Contaminated groundwater was detected at 26 feet below grade. Therefore, the contaminated groundwater is capped with 4 feet of clean groundwater. The cap acts as a barrier preventing soil vapor from migrating to the soil above. In addition, if the petroleum vapor were to migrate through the 4-foot cap of clean groundwater due to changing climatic conditions, the vapor would then have to migrate through another 15 to 22 feet of soil before reaching the basement. The bacteria in that soil would degrade soil vapor to harmless levels before it could migrate into Ms. Ford's home.

(3) EPA appreciates Ms. Ford's efforts to maintain her child care business while EPA, DOH and Chevron have been conducting environmental investigations in the area. As previously stated in EPA's response to Ms. Ford's first comment above, EPA and DOH data show that soil vapor is not migrating into Ms. Ford's home in concentrations that would pose a threat to human health.

(4) As stated above, EPA and DOH data show that soil vapor is not migrating into Ms. Ford's home in concentrations that would pose a threat to human health.

(5) In conducting its investigation, EPA has considered the "chimney effect" involved with the active use of heating, in that EPA conducted most of its vapor sampling in the cooler months to maximize the chimney effect when the furnace was operating.

Response to Frank Harris Comments, dated 9/6/07

(1) and (2) EPA purposefully placed wells 38 and 39 in the clay zone in order to fully delineate the plume of contaminated groundwater. Monitoring wells must be placed in areas of contaminated groundwater as well as areas of clean groundwater. Doing so allows EPA to better understand the size and scope of the plume of contaminated groundwater. The data obtained from Wells 38 and 39 helped EPA verify that the groundwater in the clay zone is clean, thereby allowing EPA to better define the boundary between clean and contaminated groundwater.

(3) EPA has developed an Agency-wide program of quality control and quality assurance for environmental data and that program has been fully implemented with regard to data obtained during the investigation. EPA requires data to be verified and validated to determine the analytical quality of the data and to ensure that data are complete, correct, and in conformance with the method, procedural, and contractual requirements.

Response to CRW Comments, dated 9/6/07

EPA examines data from groundwater, soil vapor, and indoor air sampling to determine if there is a current or future threat to human health from soil vapor intrusion. Groundwater sampling is relevant because, in general, soil vapor can migrate into homes located on top of or in proximity to a contaminated groundwater plume. As part of its investigation , EPA determined that all homes located above the contaminated groundwater plume emanating from the Facility would be further evaluated for soil vapor intrusion. EPA limited its investigation to those homes directly over the contaminated groundwater plume because EPA determined that there are no man-made or natural preferential pathways along which soil vapor could migrate laterally beyond the plume boundary.

EPA examines soil vapor data to characterize the nature and extent of soil vapor contamination in the soil and to determine the potential for human exposure. Soil vapor samples are generally collected before indoor air samples because soil vapor intrusion can be falsely identified when looking solely at indoor air quality data, as indoor vapor sources, such as cleaners, paints, glues and cigarette smoke, may also contribute to indoor air contaminants.

EPA examines indoor air data to characterize the nature and extent of soil vapor contamination within a building and to determine if there is current human exposure to soil vapor. Because of possible indoor vapor sources, EPA conducts a household chemical screening of a home prior to collecting indoor air samples. During the household chemical screening EPA indentifies and removes to the extent practicable indoor vapor sources. Without such a screening, soil vapor intrusion can be falsely identified.

For Riggs Park, EPA has examined extensive data to identify those homes which require soil vapor mitigation systems. EPA has examined 250 soil vapor samples collected from 90 properties by Chevron; indoor air data from 20 homes collected by Chevron; indoor air and soil vapor data from 32 homes collected by EPA, and indoor air data from 97 homes collected by DOH.

Out of all indoor air samples collected by Chevron, EPA and DOH, the results from five homes showed soil vapor in concentrations greater than EPA's indoor air standards. The data from three of those homes were collected by EPA, the data from the other two by DOH. EPA has required Chevron to install a vapor mitigation system in each home for which EPA's indoor air data showed concentrations of soil vapor in excess of EPA's indoor air standards. This work will be conducted under the 2002 Order and an EPA-approved work plan. EPA is treating the data collected under EPA's oversight differently from those collected by DOH because EPA is uncertain of the thoroughness of the household chemical screening. A thorough household chemical screening is essential because it is the only way EPA can, with higher degree of confidence, identify those homes where the indoor air contamination is due to the Chevron release.

For the two homes for which DOH's indoor air data showed concentrations in excess of EPA's indoor air standards, EPA has required Chevron to conduct additional indoor air sampling, including a thorough household chemical screening. If the data from that sampling shows indoor air concentrations above EPA's indoor air standards, EPA will require Chevron to install vapor mitigation systems in those homes. In addition, EPA has required Chevron to conduct indoor air sampling at the co-slab neighbors of the three homes in which EPA has required Chevron to install vapor mitigation systems.

Response to Kerry Waller Comments, dated 10/5/07

1) Significant time was needed to collect the data necessary to create the 3-D conceptual plume pictures. EPA presented those pictures to the public on December 6, 2007 at the Riggs Park monthly meeting and electronic copies were sent to Councilmember Bowser for distribution.

2) It is important to clarify that EPA, not Chevron, prepared the Statement of Basis (SB) and decided what data to include in it. Further, the SB was first made available to Chevron on August 30, 2007, the same time it was made available to the general public.

EPA included only the shallow zone plume maps in the SB because the shallow plumes have the greatest impact on soil vapor intrusion. Shallow zone plumes depict contamination at the water table. Only contamination at the water table can significantly off gas to the soil above the water table and potentially migrate to basement. Deeper zone plumes depict contamination submerged beneath the water table and cannot readily off gas to the soil above the water table.

Shallow and deeper zone plume maps are updated semi-annually by Chevron and submitted to EPA in quarterly progress reports. The progress reports are available for public review in the Administrative Record for the Facility located at the Lamond Riggs Library. The 2004 shallow zone plume maps included in the SB were the first plume maps constructed for the Facility. EPA used those maps to direct Chevron to collect indoor air samples on Nicholson Street. EPA has been reviewing the newer plume maps constructed by Chevron and did not find that they would alter EPA's decision.

Response to Frances Reeder Comments, dated 10/23/07

(1) EPA followed, as it must, Agency-wide guidelines to establish action levels for the Chevron Site. EPA's action levels are based on highly conservative assumptions, in that the assumptions are biased towards worst-case conditions and are overly protective.

DC has independent enforcement authority and can take independent action to impose more stringent standards and/or action levels.

(2) Mr. Forest Arnold of the Maryland Department of the Environment (MDE) informed EPA by phone conversation of March 11, 2008 that the current and previous owners of the gas station located at 5801 Riggs Road, Chillum, Maryland are in full compliance with Maryland's Underground Storage Tank (UST) regulations. In 1992, EPA approved Maryland's UST Program to operate in lieu of the federal UST Program. Maryland's UST regulations require the installation and maintenance of leak detection, corrosion protection and other safeguards, such as spill and overfill protection, to prevent and detect any new releases. In addition, the existing groundwater remediation system provides additional safeguards because that system includes multiple recovery and monitoring wells installed at and around the gas station. Those wells can detect and contain any new releases from the gas station.

(3) The groundwater remediation system must be shutdown for routine maintenance and repair. Since the January 2005 upgrade, the groundwater pumping unit has been in operation 83 percent of the time and the vapor extraction unit has been in operation 75 percent of the time. These shutdown times are within the normal range for such a groundwater remediation system.

(4) The groundwater remediation strategy is to remove the liquid phase hydrocarbons (liquid gasoline), the source of the dissolved phase hydrocarbon plume. Once the source is removed, the dissolved phase plume will dissipate due to rapid natural biodegradation. Therefore, it is not necessary to place recovery wells throughout the 1,400- foot long dissolved phase plume but to focus on the removal of the liquid gasoline source present in Areas A and B.

The angle wells will be connected to the existing treatment system which has enough capacity to handle the additional flow. The angle wells will be designed to draw only a few gallons per minute, and will not be strong enough to overload the electrical system, shift house foundations, or draw the plume towards the District side. There will be a slight increase in vapor emission on the Maryland side from the treatment unit, but the increase will fall within the permitted limits.

The 60-day public comment period and public meeting which was held on September 6, 2007 provided the opportunity for the property owners to voice their support for or objection to the proposed remedy. Based on overwhelming requests received from the public, EPA has made its final decision to modify the proposed remedy as set forth in the SB by adding two remediation components, both located on the District side. A

description and diagrams of the two new components (Independent Remediation System and Oxygen Curtain) are included in Section III of this document.

(5) The 400 homes cited in the July 2003 newsletter referred to the total number of homes in the community bounded by Eastern Avenue, Riggs Road, Madison Street and Kennedy Street. Not all of the 400 homes in that community are located above the contaminated groundwater plume. In 2004, EPA, in order to be overly protective, overestimated the number of homes actually located above the plume by including all homes within Zones 1, 2 and 5 as seen on Figure 4 of the SB. EPA later determined that fewer than 120 out of the 400 homes are located above the plume. Because EPA determined that there are no man-made or natural preferential pathways in the source area (Areas A and B) that can lead to lateral migration of the vapor outside the plume boundary, EPA focused its sampling efforts to homes located directly above the plume boundary.

Based on 250 soil vapor samples collected from 90 properties by Chevron; indoor air data from 20 homes collected by Chevron; indoor air and soil vapor data from 32 homes collected by EPA, and indoor air data from 97 homes collected by DOH, under the 2002 Order, EPA has required Chevron to (1) install a vapor mitigation system in three homes for which EPA's indoor air data showed concentrations of soil vapor in excess of EPA's indoor air standards; (2) conduct indoor air sampling at the co-slab neighbors of the three homes; and (3) conduct additional indoor air sampling at two homes for which DOH's indoor air data showed concentrations of soil vapor in excess of EPA's indoor air standards. EPA has also required Chevron to resample the two homes sampled by DOH because those data were not collected under EPA's oversight and EPA is uncertain if adequate household chemical screening had been conducted prior to sampling. If the new data show soil vapor concentrations above EPA's indoor air standards, EPA will require the installation of vapor mitigation systems in those two homes.

EPA's response to the contamination caused by Chevron has been thorough and complete, and consistent with the Agency's mandate to protect human health and the environment. EPA believes that its commitment to the interest of the citizens of Riggs Park has been reflected in numerous public meetings and that it has been as responsive as it could be given that facts and circumstances presented.

Response to Walter Reeder comments, dated 10/28/2007

(1) The District submitted its comments on EPA's SB by submitting to EPA a document entitled "District of Columbia Remedial Action Strategy Statement of Basis" (District SB). EPA's response to the District SB is provided in this document.

(2) As described in Section III. B and C of this document, EPA has decided to add two new components to the remedy, both located on the District side. These new components are designed to be compact, less disruptive to the community, and will not draw the plume further into the District side.

(3) In 2001, EPA designed a program to sample groundwater, soil vapor, and indoor air. Indoor air testing, without testing the underlying groundwater or soil vapor, can lead to misinterpretation of the results due to indoor sources of petroleum vapor.

In 2002, EPA required Chevron to conduct soil vapor sampling at properties located on Eastern Avenue. The results of those samples showed that the soil vapor concentrations at those properties were far below EPA's soil vapor action levels. Therefore, EPA determined that the soil vapor concentrations at those properties did not pose a current or future threat to human health. DOH's 2006 indoor air sampling results confirmed EPA's determination.

In 2006, the DOH conducted indoor air sampling of 97 homes in Riggs Park, 45 of which are located above the plume and 52 of which are located outside the plume. The average indoor air vapor concentrations are shown below. Only two of the 45 homes above the plume have measured indoor air concentrations exceeding EPA's standards. EPA has required Chevron to resample these two homes.

	Average Indoor Air Levels		EPA Indoor
ug/m^3	Above Plume	Outside Plume	Air Standards
Benzene	3	2.7	8
MTBE	3.5	2.8	17

(4) Due to slightly different assumptions, EPA and DOH's one-in-a-million cancer risk calculations for benzene and MTBE are different. Both of those calculations along with DOH's measured average indoor air concentrations are listed below. Under those calculations, nearly all homes in Riggs Park and in the District would be above one-in-a-million cancer risk calculations.

	Average Indoor Air*		Average Outdoor**	One-in-a-million Risk	
ug/m^3	Above Plume	Outside Plume	Air in District	EPA	DOH
Benzene	3	2.7	4.6	0.23	0.8
MTBE	3.5	2.8	2.5	1.6	1.7

* Based on DOH indoor air data collected from 97 homes in Riggs Park in 2006

** Based on 2006 DOH data collected at Monitoring Station #1, McMillan Reservoir, located about 5 miles from Riggs Park

(5) As discussed in EPA's response to the third comment in Mr. Reeder's 10/28/2007 submission, above, testing indoor air without testing the underlying groundwater and/or or soil vapor can lead to misinterpretation of the results due to indoor sources of petroleum vapor. In 2002, EPA required Chevron to conduct soil vapor sampling at properties located on Eastern Avenue. The results of those samples showed that the soil vapor concentrations at those properties were far below EPA's soil vapor action levels. Therefore, EPA determined that the vapor concentrations at those properties did not pose a current threat to human health. EPA's determination was confirmed by DOH's 2006 indoor air sampling.

(6) Homes on Nicholson Street and portions of Olglehtopre and 8th Street are located above a high water table and are, therefore, different from homes on Eastern Avenue. Collecting soil vapor samples from homes with water table reaching the slab is neither possible nor meaningful. Therefore, EPA required Chevron to collect indoor air samples directly from those homes.

(7) EPA has long recognized that soil vapor intrusion is a potential risk and began its assessment of this pathway at the very beginning of the investigation. In 2001, EPA designed a sampling program to sample groundwater, soil vapor, and indoor air. EPA did not begin its assessment with indoor air sampling because soil vapor intrusion can be falsely identified when looking solely at indoor air quality data, because indoor vapor sources, such as cleaners, paints, glues and cigarette smoke, may also contribute to indoor air contaminants.

(8) Individual home vapor mitigation systems are not designed to clean up soil or groundwater. A vapor mitigation system is designed to protect human health by venting the vapor from beneath a building slab to prevent it from entering a building. Clean up of the gasoline-contaminated soil and groundwater is accomplished by operation of the dual phase extraction system in Area A, angle well and independent remediation system in Area B, and the oxygen curtain in Area C as described in Section III of this document.

(9) See EPA response to Frances Reeder Comment #2.

(10) EPA has acknowledged that the groundwater remediation system has been periodically shut down. However, the shutdown times have been for routine operation and maintenance and repair and are within the normal range for such a groundwater remediation system.

(11) Groundwater data from the Facility investigation shows that the dissolved phase plume is not continuing to migrate deeper into Riggs Park. The dissolved phase contamination in some wells, such as MW-33, is sensitive to rainfall and water table fluctuation. A temporary fluctuation of dissolved phase contamination does not indicate that there is a long-term trend in increasing or decreasing concentrations of contaminants. Moreover, a source for increased liquid phase hydrocarbons no longer exists at the

Facility. The leak from the gas station was stopped over 17 years ago and since that time, Chevron has removed 4,800 gallons of liquid phase hydrocarbons from the groundwater.

The groundwater remediation system is designed to remove the liquid phase hydrocarbons, the source of the dissolved phase contamination in groundwater. It was not designed to prevent migration of dissolved phase contamination to downstream areas. In order for the system to prevent the migration of the dissolved phase plume, it would have to pump groundwater at rates which would compromise the removal of the liquid phase hydrocarbons and potentially pull the plume toward the District border.

(12) The angle recovery wells will be connected to the existing groundwater remediation system. The existing remediation system has enough capacity to handle the additional flow created by the angle recovery wells. In addition, those wells will be designed to draw only a few gallons per minute and will not be strong enough to overload the electrical system, shift the house foundations, or draw the plume towards the District.

With the addition of the angle recovery wells, there will be a slight increase in vapor emission from the remediation system. EPA will require that the total emissions of volatile organic compounds from the remediation system be less than 20 pounds per day and the total emissions of benzene be less than 0.02 pounds per hour. The existing treatment unit is located in Maryland. EPA's emission standards will fall within MDE's permitted limits.

(13) Since the new components of the remedy are located on the District side, all design and construction must meet safety and fire codes that will be reviewed and permitted by the District.

(14) See EPA's response to comment #11, above.

(15) EPA's mandate is to protect human health and the environment. EPA's experience has shown that in many cases several different remedial alternatives will offer equivalent protection of human health and the environment, but may vary widely in cost. Therefore, Agency-wide guidance requires EPA to consider cost as one of seven balancing criteria that the Agency must consider in evaluating remedial alternatives.

Response to Cleo Holmes comments, dated 10/29/2007

(1) It is not uncommon for locations of EPA-approved borings and/or wells to be changed, eliminated, or added due to unforeseen site conditions encountered during actual installation. On June 18, 2002, EPA approved the location for and installation of 232 Geoprobes. Based on field conditions which arose during the installation of those Geoprobes, EPA allowed Chevron to change the location of or to eliminate 5 of the 232 Geoprobes. EPA determined those changes did not impact the investigation or remediation of the Facility and the surrounding area.

The EPA RCRA Program has the lead for the Chevron gasoline investigation and remediation. The EPA Superfund Removal Program has the lead for the dry cleaner fluid perchloroethylene (PERC) investigation.

(2) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(3) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(4) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

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(7) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(8) The angle wells will be designed to capture all liquid phase hydrocarbons in Area B, which includes the property located between MW 18 and 24A and, generally, the area between 5882 and 5884 Eastern Avenue.

(9) and (23) The design objective of the final remediation systems is to extract the liquid phase hydrocarbons. Once the liquid phase hydrocarbons are extracted, the dissolved phase plume will dissipate due to rapid natural biodegradation.

Based on requests from the District and residents, and evaluation of the remedy selection criteria, EPA will require the installation of an independent remediation system on the District side in the alley between Eastern Avenue and Olglethorpe Street, and an oxygen curtain in the alley between Olglethorpe Street and Nicholson Avenue. A description of these new components is provided in Section III of this document.

(10) and (11) Chevron can always request that EPA waive a requirement based on technical impracticability. Chevron would have to demonstrate that active remediation is not more effective than natural attenuation. EPA anticipates that Chevron will have to operate the expanded groundwater remediation system for an extended period of time before it will be able to receive a technical impracticability waiver.

EPA will require the installation of an independent remediation system and an oxygen curtain on the District side as described in Section III of this document.

(12) Free product was detected once in MW-18 on August 21, 2002. Free product was not detected in MW-24a. MW-24a is a permanent well which replaced temporary Geoprobe well GP-5. Free product was never detected in GP-5. Please note that non-detection of free product does not necessarily mean that free product is absent. Much of the free product left in the smear zone is the non-mobile form that will not enter a well in a detectable quantity.

(13) EPA followed Agency-wide guidelines to select the remediation standards within the 10^{-4} to 10^{-6} cancer risk range by factoring in background concentrations for implementation consideration. EPA's selected standards are protective and implementable. The District has independent enforcement authority and can take independent action to impose more stringent standards and/or action levels.

(14) The EPA-approved protocol for recording water level calls for recording the water level before purging, and not after purging. It takes time for the groundwater to return to equilibrium after purging, and, therefore, recording the water level after purging may lead to misrepresentation of the true groundwater level.

(15) Under the EPA-approved protocol for recording water level, Chevron is required to record the water level at each well to be sampled before the sample is taken.

(16) EPA has investigated the geology and location of the utilities in Riggs Park and determined that there are no man-made or natural preferential pathways along which soil vapor can migrate laterally beyond the plume boundary. The water table in the vicinity of the gas station and Eastern Avenue ranges between 30 to 40 feet deep. Utilities are buried in shallow depth between 1 to 5 feet, separated vertically and horizontally away from the smear zone.

(17) Yes, the dissolved phase plume is being transported by groundwater to down gradient areas on Oglethorope and Nicholson Streets.

(18) The angle wells, in conjunction with the independent remediation system in the alley of Eastern Avenue, will be designed to capture the liquid phase hydrocarbons in Area B.

(19) No product has ever been detected in monitoring well 33B. The various components of the final remedy are designed to capture product that is present only in Areas A and B.

(20) See EPA response to Kerry Waller Comment #1.

(21) A vapor mitigation system essentially prevents vapors beneath a slab from entering a building. The system applies a low amount of suction below the building foundation and vents the vapors to the outside, ambient air. The vapor mitigation systems to be installed will not treat the vapor emissions before they are released into the outside, ambient air because the emission levels will be very low and will not pose a threat to human health or the environment.

(22) The residential vapor mitigation systems will not pose a risk of explosion. The residential vapor mitigation systems are similar to radon mitigation systems which have been in use and are proven safe and effective in millions installations nationwide. The vapor emissions from the vapor mitigation systems will be orders of magnitude below explosion limits. Therefore, the installation of explosion proof fan is not necessary to protect human health and the environment.

(23) See EPA's response to Cleo Holmes' Comment #9, above.

(24) Both the shallow and deep zone wells collect water from the same water body in the same aquifer.

(25) and (26) If a home is located directly over the contaminated groundwater plume is a factor EPA examines in assessing whether a home requires a vapor mitigation system. The fact that a home is located directly over the contaminated groundwater plume does not necessarily mean that that home is impacted by soil vapor intrusion.

For those homes located over the contaminated groundwater plume emanating from the Facility, EPA examined soil vapor and indoor air data to characterize the nature and extent of soil vapor contamination and to determine if there is human exposure to soil vapor. EPA examined 250 soil vapor samples collected from 90 properties by Chevron; indoor air data from 20 homes collected by Chevron; indoor air and soil vapor data from 32 homes collected by EPA, and indoor air data from 97 homes collected by DOH.

Out of all indoor air samples collected by Chevron, EPA and DOH, the results from five homes showed soil vapor in concentrations greater than EPA's indoor air standards. The data from three of those homes were collected by EPA, and the remaining two by DOH. Under the 2002 Order, EPA has required Chevron to install a vapor mitigation system in each home for which EPA's indoor air data showed concentrations of soil vapor in excess of EPA's indoor air standards. EPA is treating the data collected under EPA oversight

differently from those collected by other parties because EPA is uncertain of the sampling protocol such as how thorough the homes have been screened prior to taking the indoor air samples. For the two homes for which DOH's indoor air data showed concentrations of soil vapor in excess of EPA's indoor air standards, EPA has required Chevron to conduct additional indoor air sampling, including a household chemical screening. If the data from that sampling shows soil vapor concentrations above EPA's indoor air standards, EPA will require Chevron to install vapor mitigation systems in those homes.

Response to Betty Tate Comments, dated October 27, 2007

(1) In 2001, Chevron discovered that the contaminated groundwater plume had migrated from the former Chevron gas station into the District affecting Riggs Park. At the request of District Councilmember Adrian Fenty, who was later elected as Mayor of the District, EPA assumed the lead investigatory role for the Facility. In December 2002, EPA issued a unilateral Administrative Order (Order), RCRA-03-2003-0006th, pursuant to Section 7003 of RCRA, 42 U.S.C. § 6973, to Chevron.

As required by the Order, between 2002 and 2007, Chevron installed over 80 new groundwater monitoring wells, four soil vapor monitoring wells, 16 product recovery wells, and 232 temporary Geoprobe wells. Cumulatively, as of June 2007, Chevron has collected over 2300 groundwater samples, 14 basement sump samples, 300 soil samples, over 260 soil vapor samples from 90 properties, and over 50 indoor and ambient air samples from 20 properties. EPA has reviewed the data collected by Chevron along with indoor air and soil vapor data collected by EPA from 32 homes and indoor air data from 97 homes collected by DOH.

(2) The remediation system has been working effectively. Since upgrade of the system in 2005, a drastic reduction in groundwater concentrations in Zone B monitoring wells was observed. The new angled wells and independent remediation system on the District side will further enhance the effectiveness and efficiency of the remediation.

(3) EPA considered the LaSalle School in its investigation and determined that the LaSalle School is not impacted by the contaminated groundwater plume because it is located outside the Chevron plume boundary. In fact, the LaSalle School is located on the other side of a natural groundwater divide which creates a barrier to groundwater moving from the Facility to the school.

(4) The dual phase extraction system is not experimental. Dual phase extraction systems have been successfully implemented at many sites and according to MDE, up to 95 percent of the systems installed in gasoline-contaminated sites in Maryland are dual phase extraction.

(5) See EPA's response to Walter Reeder's Comment #12.

(6) See EPA's response to Cleo Holmes' Comments #25 and #26.

(7) The residential vapor mitigation systems are similar to radon mitigation systems which have been in use and are proven safe and effective in millions installations nationwide. The effective use of vapor mitigation systems to mitigate homes with elevated soil vapor levels is well established as cited below from USEPA publication, 1993b Radon Reduction Techniques for Existing Detached Houses, Technical Guidance for Active Soil Depressurization Systems (SSD) (EPA/625/R-93/011):

Active SSD systems are the most reliable, cost effective, and efficient technique for controlling vapor intrusion in the majority of cases, with concentration reductions in the 90%–99% range (USEPA 1993b) and 99.5% or greater in carefully designed and installed systems (Folkes 2002). Subslab depressurization in the range of 0.025–0.035 inches H_2O is generally sufficient to maintain downward pressure gradients (USEPA 1993b).

(8) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(9) See EPA's response to Cleo Holmes' Comments #13 on remediation standards.

The contaminated groundwater plume is not expanding. A source for increased liquid phase hydrocarbons no longer exists at the Facility. The leak from the gas station was stopped over 18 years ago. In addition, the remediation system has been working; Chevron has removed 4,800 equivalent gallons of liquid phase hydrocarbons from the groundwater.

Response to Betty Tate Comments dated 10/2/07

(1) See EPA's response to Cleo Holmes' Comment #13.

(2) See EPA's response to Betty Tate's 10/27/07 Comment #9 regarding plume expansion.

EPA will require , subject to physical restrictions, local and state laws, and public acceptance, the installation of an independent remediation system and an oxygen curtain on the District side of Eastern Avenue. A description of these new components to the system is provided in Section III of this document.

(3) See EPA's response to Cleo Holmes' Comments #25 and #26.

Response to William and Judith Mills Comments, dated 9/6/07

This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

Response to Diane Carpenter Comments, dated October 27, 2007

(1) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(2) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(3) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(4) Liquid gasoline can permeate through a water line that is made of plastic, polyvinyl chloride (PVC) or high-density polyethylene (HDPE). EPA has ruled out the possibility of gasoline permeation of water line in Riggs Park because: (1) the water main in Riggs Park is made of cast iron which is resistant to gasoline permeation; (2) the water main is under pressure, so it can only leak water out, not water in; and (3) the water main is located laterally and vertically away from the smear zone, so it is not in contact with liquid gasoline.

(5) DOH did not identify any homes outside the plume that are affected by the Chevron release. The apparent difference in plume configurations presented by DOH and EPA is because EPA presented only the shallow zone plume maps in the SB which have the greatest impact on soil vapor intrusion. Shallow zone plumes depict contamination at the water table. Only contamination at the water table can significantly off gas to the soil above the water table and potentially migrate to basement. Deeper zone plumes depict contamination submerged beneath the water table and cannot readily off gas to the soil above the water table. Shallow and deeper zone plume maps are updated semi-annually by Chevron in the quarterly progress reports submitted to EPA, which are placed and available in the Lamond Riggs Library for public review.

(6) Soil vapor intrusion poses a potential threat to human health when chemical vapors migrate from the subsurface to indoor environment. As soil vapor migrates to the outside and mixes with ambient air, the concentrations will be reduced by dilution and photo degradation. DOH currently maintains two outdoor air monitors at the McMillan Reservoir at Howard University about 5 miles from Riggs Park. In 2006, the average concentration of benzene in outdoor ambient air as measured by DOH monitors ranged between 4.6 to 6.2 ug/m^3, respectively.

(7) The first and subsequent rounds of data collected by Chevron and EPA followed an Agency-wide program of quality control and quality assurance for environmental data. EPA requires data to be verified and validated to determine that analytical quality of the data and to ensure that data is complete, correct, and in conformance with the method, procedural, and contractual requirements.

(8) The dissolved phase petroleum plume at its maximum length has reached the corner of Nicholson and 8th Streets which is approximately 1,400 feet from the gas station.

(9) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(10) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(11) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(12) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(13) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(14) The angle wells will be designed to capture liquid phase hydrocarbons in residential Area B, not the entire 1,400-foot long dissolved phase hydrocarbon plume. Liquid phase hydrocarbons are present only in the smear zone of Areas A and B, extending approximately 150 feet down slope from Eastern Avenue.

EPA will require, subject to physical restrictions, local and state laws, and public acceptance, the installation of an independent remediation system and an oxygen curtain on the District side as described in Section III of this document.

(15) The design objective of the angle wells is to capture liquid phase hydrocarbons present in residential Area B. Please note that the number of wells has not been finalized. EPA will determine the number of wells needed during the design phase.

(16) EPA has no plan to increase the number of homes requiring vapor mitigation, unless new data show that the levels exceed EPA's standards. EPA understands that DOH will continue to collect data and welcomes the opportunity to review the data.

(17) This comment is related to ATSDR's Health Consultation. Therefore, EPA referred this comment to ATSDR for response and has included ATSDR's response to this comment in Attachment B.

(18) EPA does not support injecting an oxidizing chemical agent through temporary wells in Area B because the effectiveness this technology to treat liquid gasoline is uncertain, and it will be highly disruptive to the affected properties owners. However, EPA is requiring the installation of an oxygen curtain in public space of Area C to treat the dissolved phase plume as described in Section III of this document.

Response to ATSDR comments, dated 10/16/2007

(1) Yes, EPA was incorrect in stating that ATSDR is a division of the Centers for Disease Control and Prevention. Rather, ATSDR is a sister agency to the Centers for Disease Control and Prevention.

(2) EPA limited its investigation to those homes directly over the contaminated groundwater plume emanating from the Facility, because EPA determined that there are no man-made or natural preferential pathways along which soil vapor can migrate laterally beyond the plume boundary. Please refer to EPA's response to Cleo Holmes' Comment #16.

Response to Chevron Comments, dated October 29, 2007

General Comments:

(1) See EPA's response to Cleo Holmes' Comment #16.

(2) EPA is aware that MDE is currently investigating sources of petroleum hydrocarbons upgradient from the Facility. However, without additional information, EPA cannot determine that the contamination in MW-50 and MW-51 is not related to the Facility. While EPA has not, at this time, determined the source of the contamination in MW-50 and MW-51, EPA has determined that the contamination in MW-50 and MW-51 has no impact on Riggs Park. Based on extensive Geoprobe sampling in 2002, EPA determined that the residential groundwater southeast of the 8th Street and Eastern Avenue junction is free of petroleum contamination.

Specific Comments:

(1) Based on Agency-wide guidance, Region III requires that a household chemical screening be conducted in every home before conducting indoor air sampling. The purpose of the screening is to document and remove to the extent practicable, potential sources of vapor emissions. If a household chemical screening is not conducted, the results from indoor air sampling can be misleading because consumer products, such as cleaners, paints, and glues, can be sources of indoor vapor emissions and can contribute to increased indoor air concentrations of some chemicals.

EPA is uncertain whether the DOH contractor conducted a thorough household chemical screening of each home before it conducted the indoor air sampling. Therefore, EPA cannot use the DOH data to confirm exceedances of EPA's indoor air standards. However, the DOH data are valid for statistical comparison purposes because throughout the sampling event, DOH used consistent contractor, laboratory, and sampling procedures. In the SB, EPA cited the DOH data to show that statistically there is an elevation in benzene and MTBE vapor concentrations in homes located above the gasoline plume as compared to homes located outside of the plume boundaries.

(2) Chevron is correct in stating that 4,800 gallons of gasoline are equivalent gallons obtained by calculating the total recovery from groundwater and soil vapor extraction.

(3) EPA has determined that it is not necessary for Chevron to conduct verification (baseline) sampling prior to the installation of the residential vapor mitigation systems. Based on existing sampling data, EPA has determined that the installation of individual vapor mitigation systems at those addresses is necessary to protect human health.

EPA will provide Chevron with the opportunity to resample residences at which existing data was not collected under EPA's oversight.

(4) The objective of the remediation system is to eliminate all liquid phase hydrocarbons (LPH) to the extent practicable. Much of the LPH left in the smear zone is the non-mobile form that cannot be measured by gauging, but is still present in sufficient quantity to contaminate groundwater. Since non-mobile LPH cannot be measured, the remediation endpoints can only be implied from the dissolved phased concentration trends. Chevron must continue to operate the remediation system until EPA determines that the system performance has reached diminishing return limits and further operation will not clean up the groundwater faster than natural attenuation.

(5) EPA has clarified in Section IV of this document that the vapor mitigation standards are for indoor air concentrations. Also, as stated in the SB, for the purpose of remediation, EPA Region III has conservatively treated MTBE as a carcinogen based on provisional data.

(6) EPA has checked the statistical distribution of the data and determined that the data do not fit normal distribution at 3 percent significance. Although normal distribution is not the best fit, it will not affect the 95 percentile values determination outcome. A back calculation using frequency distribution analysis of the actual data shows that the benzene and MTBE vapor standards selected are equivalent to the 94 and 96 percentile of the actual data, respectively. EPA has already provided Chevron with the raw data.

(7) EPA requires institutional controls be implemented at sites where remediation is ongoing and at sites where residual contamination remains onsite at a level that does not allow for unrestricted use and unlimited exposure during or after cleanup. Institutional controls will be a required component of the final remedy for the Facility.

(8) The number of wells that show detectable free product can fluctuate with time. It is correct at the time of writing the SB that free product was detected in four monitoring wells.

Response to Papdopulos & Associates comments, dated 10/29/07

(1) The target capture zone for the angle recovery wells is the liquid gasoline in Area B. As shown in Figure 4 of the SB, Area B encompasses approximately the width of two duplex lots and the length between Eastern Avenue and the adjoining alley.

(2) While it is impossible to provide a precise time for how long it will take to clean up the source contamination, EPA projects that it will take extended time, up to a decade, to completely eliminate the liquid gasoline source. EPA anticipates that once the liquid gasoline source is eliminated, the dissolved phase plume will degrade rapidly to attain drinking water standards within a few years.

(3) The existing and new angle dual phase extraction wells are designed to pump a small amount of groundwater to minimize water level depression in the smear zone. The new independent remediation system is designed to extract soil vapor with no net withdrawal of groundwater that would otherwise depress the water level beneath the smear zone or draw the plume further into the residential area. The existing dual phase extraction system is currently recovering 85 percent of the product by soil vapor extraction, and only 15 percent by groundwater recovery. EPA recognizes that the rebound effect after the system is shut-down is a relevant consideration. EPA will evaluate any such rebound effect prior to final system shut-down.

(4) The design objective of the existing and final remediation system is source removal, not hydraulic containment of the dissolved phase plume. Therefore, the capture zone does not encompass the entire 1,400-foot long dissolved phase plume. Hydraulic containment will require over pumping of groundwater below the smear zone which is counter productive and will reduce the remediation effectiveness.

Based on public comments received and evaluation of the remedy selection criteria, EPA has included in its final remedy an independent remediation system in the alley of Area B to remove liquid gasoline, and an oxygen injection curtain in the alley of Area C to accelerate degradation of the dissolved phase plume where oxygen is limited.

(5) The data base EPA used to identify homes for vapor mitigation is extensive: 250 soil vapor samples collected from 90 properties by Chevron, indoor air data from 20 homes collected by Chevron, indoor air and soil vapor data from 32 homes collected by EPA, and indoor air data from 97 homes collected by DOH. EPA has no plan to require additional site-wide indoor air or soil vapor sampling. However, EPA will evaluate new data generated by DOH to determine if additional sampling at specific homes is warranted.

Response to DOH comments / Statement of Basis, dated September 7, 2007

General Comments:

- DOH recommends installation of an independent dual phase groundwater remediation system on the District residential side.

See EPA's response to Councilmember Bowser's Comment #1.

- DOH recommends installing individual vapor mitigation systems in 53 homes.

See EPA's response to Councilmember Bowser's Comment #2.

Specific Comments

(1) DOH's assertion that the groundwater plume is expanding is not substantiated. The dissolved phase contamination in some wells is sensitive to rainfall and water table fluctuation. A temporary fluctuation of dissolved phase contamination does not indicate that there is a long-term trend in increasing or decreasing concentrations. While some monitoring data from March 2006, September 2006 and March 2007 showed an increase in benzene concentrations, more recent monitoring data from some of those wells showed a decrease in benzene concentrations.

EPA believes DOH has misinterpreted the information by comparing the larger deep zone plume maps with the smaller shallow zone plume maps as an indicator of plume expansion. In response to Kerry Waller's Comment #2, EPA explained the rationale for including only the shallow zone plume maps in the SB. In categorizing homes above the plume, EPA overestimated the number of homes actually located above the plume by including all homes bounded by Zones 1, 2 and 5 in Figure 4 of the SB. As a result, both shallow zone and deep zone plume maps are included in the categorization even though only the shallow zone plume maps have significant impact on vapor intrusion.

(2) It is incorrect to assume that higher indoor air concentrations than outdoor air is an indicator of subsurface vapor intrusion. Benzene concentrations in indoor air are typically higher than benzene concentrations in outdoor air due to many indoor chemical sources, such as cleaners, paints, glues and cigarette smoke. In 2006, DOH sampled indoor air in 52 homes which are located outside the boundary of the plume. The average indoor air concentration for benzene inside those 52 homes was 2.7 ug/m^3, versus 1.9 ug/m^3 measured by DOH in outdoor ambient air during the same period.

(3) EPA has a different interpretation of the information contained in Figure 1 (Performance chart of the groundwater recovery system) of the First Quarter 2007 Progress Report. As of early 2005, the groundwater recovery system at the Facility had recovered 4,500 gallons of product. Since the system was upgraded in 2005, it has recovered an additional 300 gallons.

(4) See EPA's response to Papdopulos & Associates Comment #4.

(5) EPA does not agree that additional indoor air and soil vapor sampling is warranted given the extensive amount of data that have already been collected to date. EPA understands that DOH has contracted Papdopulos & Associates to collect additional data and welcomes the opportunity to review new data.

(6) The soil cleanup levels presented by DOH are from the District's Risk-Based Corrective Action (RBCA) Plan for management of underground storage tanks. DOH soil cleanup levels are applicable to the removal of petroleum-contaminated soils in a tank pit during tank removal.

The smear zone soil in Areas A and B is over thirty feet below grade. It is impractical to remove it by excavation. EPA has selected in-situ remediation for the smear zone. Therefore, EPA has not established soil remediation standards because the smear zone soil is to be treated by in-situ remediation. The remediation performance will be measured indirectly by groundwater concentrations, and therefore no soil remediation standards are needed. Since the remediation goal of groundwater is drinking water standards, the remediation will achieve greater clean up levels than DOH soil remediation standards.

(7) See EPA's response to Cleo Holmes' Comment #13 regarding EPA's selection of the indoor air standards.

(8) EPA established the site-specific indoor air standards by following the National Contingency Plan (NCP) guideline, which was promulgated in the Federal Register, Volume 55, No. 46, in 1990. The NCP does not establish numerical remediation standards, but rather describes a two-step approach to establish site-specific remediation standards. First, the individual 10^{-6} excess cancer risk level is used as a point of departure, and expresses EPA's preference for cleanup levels at the more protective end of the risk range. While the 10^{-6} risk level is the starting point, it is not a presumption that the final cleanup will attain that risk level, even for the presence of multiple contaminants at a site. The final cleanup goals may be revised to a different risk level within the acceptable range of 10^{-4} to 10^{-6} based on the consideration of appropriate site-specific or remedy-specific factors including exposure, uncertainty and technical factors. In setting cleanup goals for the Riggs Park community, EPA considered background concentrations of benzene and MTBE in indoor air. Background concentrations are relevant factors because cleaning up contaminants to levels below their background concentrations is impracticable because the area intended to be remediated will be re-contaminated by background and surrounding air.

(9) As stated in EPA's response to DOH's Comment #6, EPA has not proposed soil remediation standards. EPA's remediation standards for groundwater are based on the Maximum Contaminant Levels (MCLs) in the federal Clean Water Act. MCLs are not strictly risk-based concentrations and do not necessarily provide a 10^{-6} cancer risk

protection. Other factors used in identifying the MCLs are the same as those factors EPA used to indentify the indoor air standards for the Riggs Park site, such as technical practicability and background concentrations. For example, the MCL for benzene is 5 ppb, which is equivalent to 10^{-5} cancer risk concentration, versus 0.36 ppb at 10^{-6} cancer risk concentration.

Response to Councilmember Muriel Bowser comments, Dated October 27, 2007

(1) DOH recommends installation of an independent dual phase groundwater remediation system on the District residential side.

EPA has modified the remedy proposed in the SB and, in the Final Decision, has required, subject to physical restrictions, local and state laws, the installation of an Independent Remediation System and an Oxygen Curtain on the District side as described in Section III of this document.

(2) DOH recommends installing individual vapor mitigation systems in 53 homes.

EPA followed federal guidelines to establish indoor air standards as described in detail in Section VI(B) of the SB. EPA's indoor air standards were derived from highly conservative assumptions, in that the assumptions are biased towards worst-case conditions and are overly protective. Please also see EPA's response to Cleo Holmes' Comment #13, and ATSDR health consultation on EPA's indoor air standards in Attachment B.

Only homes with measured indoor air concentrations exceeding EPA's indoor air standards are qualified for installation of individual vapor mitigation systems. Currently, only five homes above the plume have measured indoor air concentrations exceeding EPA's standards. EPA understands that DOH will continue to collect data from the community. EPA will review the new data generated by DOH to evaluate the necessity of installing additional vapor mitigation systems based on comparison with EPA's indoor air standards.

(3) EPA presented the 3-D maps to the public on December 6, 2007 at the Riggs Park community meeting, and an electronic version was furnished to you for distribution to interested members of the community.

LIST OF FIGURES

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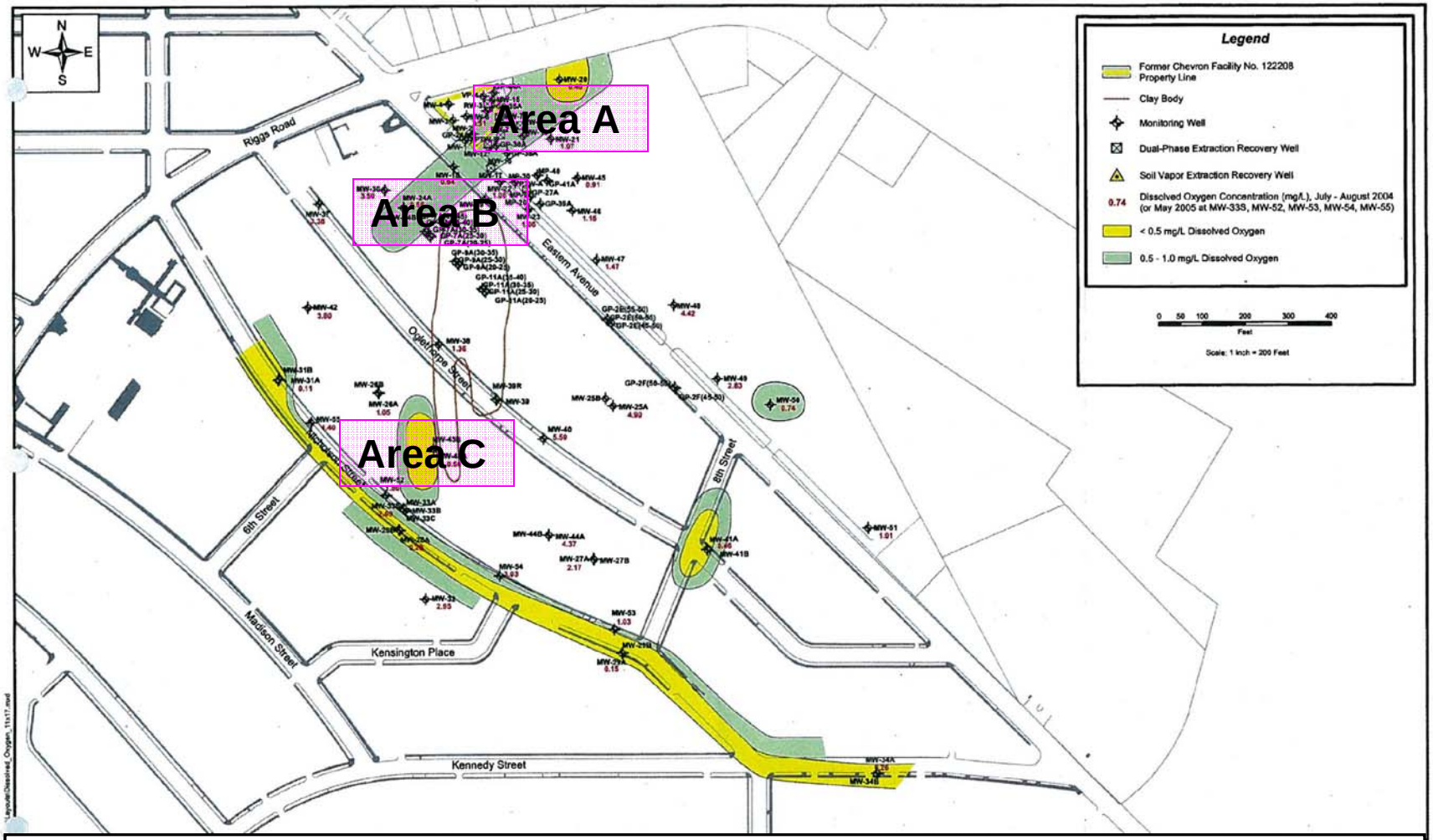
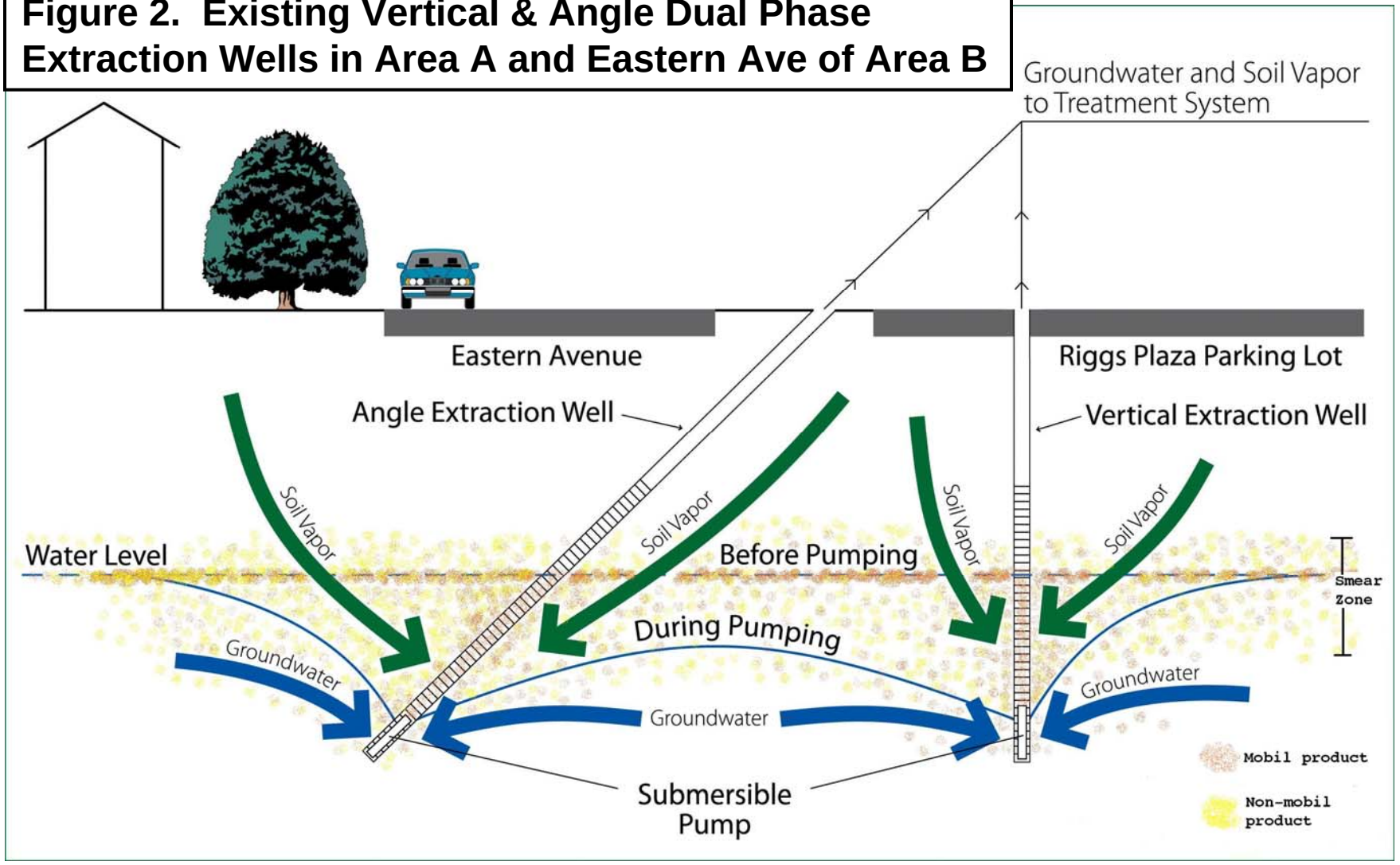


Figure 1. Remediation Areas / Dissolved Oxygen Concentrations in Shallow Wells, 2004-2005

Figure 2. Existing Vertical & Angle Dual Phase Extraction Wells in Area A and Eastern Ave of Area B



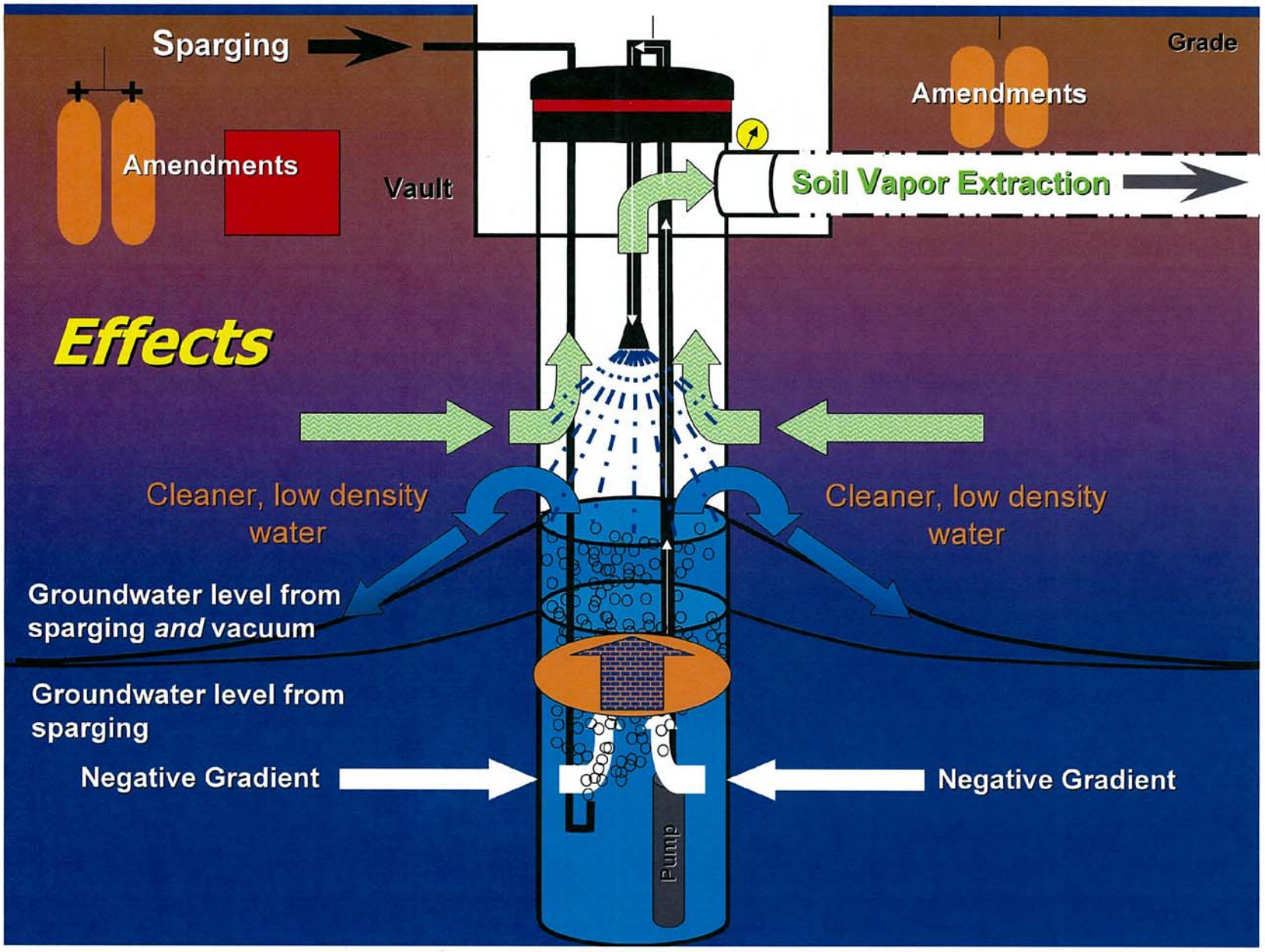


Figure 3 Independent Remediation System in alley of Area B

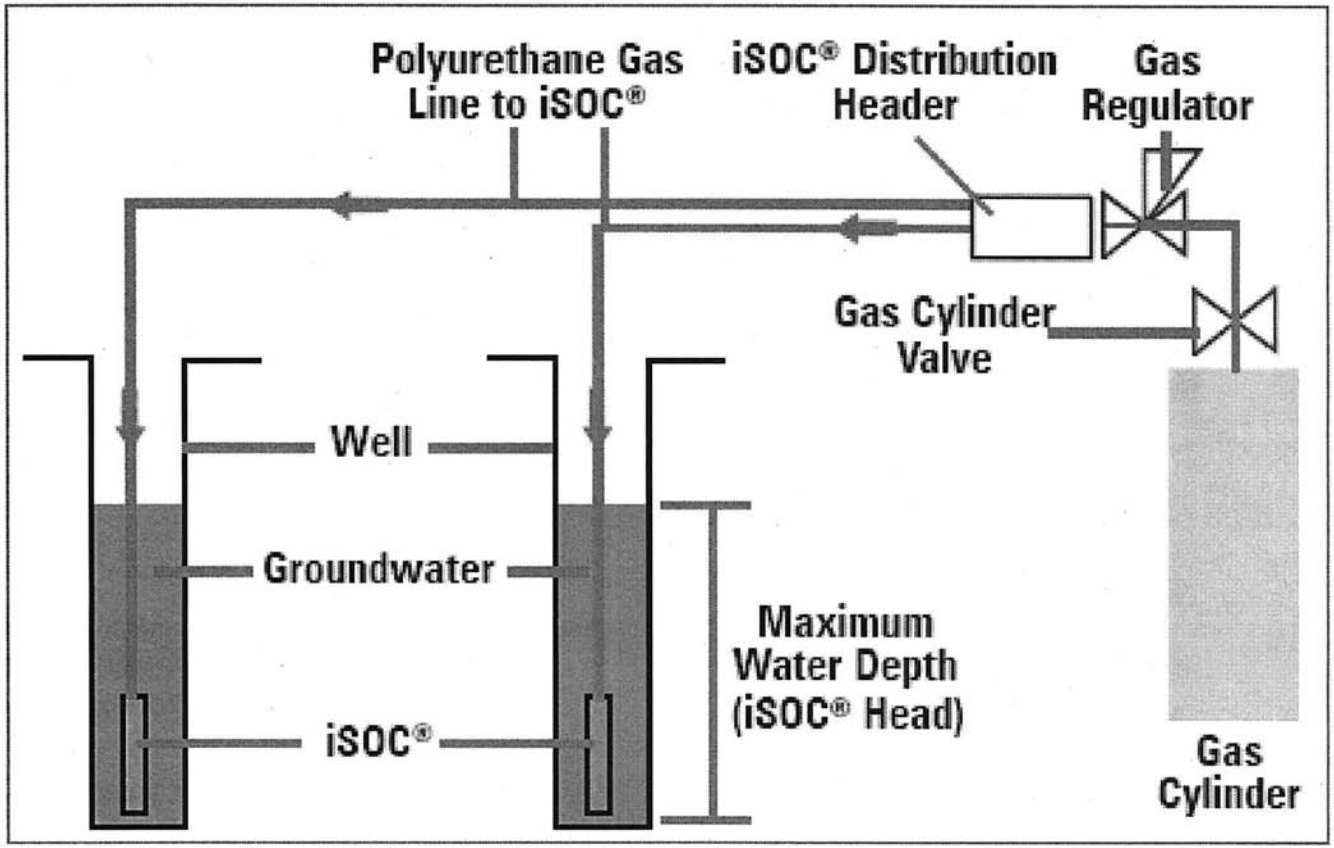


Figure 4 Oxygen Curtain in Area C