

GOVERNMENT OF THE DISTRICT OF COLUMBIA



DISTRICT DEPARTMENT OF THE ENVIRONMENT

**FINAL REMEDY SELECTION
AND RESPONSE TO COMMENTS**

FOR

RIGGS PARK COMMUNITY, WASHINGTON, D.C.

May 3, 2010

TABLE OF CONTENTS

GLOSSARY.....	Page 3
I. DECISION.....	Page 5
II. INTRODUCTION.....	Page 7
III. BACKGROUND.....	Page 7
IV. REGULATORY FRAMEWORK & ACCEPTABLE RISK LEVELS	Page 10
V. RISK ASSESSMENT APPROACH & RESULTS.....	Page 12
VI. REMEDIATION DECISION CRITERIA & OUTCOME.....	Page 16
VII. IDENTIFICATION OF REMEDIATION ALTERNATIVES.....	Page 17
VIII. EVALUATION OF CRITERIA FOR REMEDY SELECTION	Page 18
IX. FINAL REMEDY.....	Page 20

APPENDIX A: Comments received on the proposed Remedy Selection, issued February 20, 2009

APPENDIX B: Response to Comments

APPENDIX C: DOH Riggs Park Health Survey Results, dated April 12, 2010

GLOSSARY AND ABBREVIATIONS

ATSDR	The Agency for Toxic Substances and Disease Registry
BTEX	Benzene, toluene, ethylbenzene, and xylenes
COC	Contaminants of Concern
District	District of Columbia
DDOE	District Department of the Environment
DOH	District of Columbia Department of Health
EPA Region 3	The Regional Branch of the U.S. Environmental Protection Agency which includes the District of Columbia, Delaware, Maryland, Pennsylvania, Virginia, and West Virginia
Facility	5801 Riggs Road in Chillum, Prince George's County, Maryland
GMP	Geoprobe Monitoring Port – used to collect soil vapor samples
2009 HHRA	Human Health Risk Assessment supporting the proposed Remedy Selection, issued on February 20, 2009.
2010 HHRA	The revised Human Health Risk Assessment, supporting this Final Remedy Selection document, completed April 2010.
HI	Hazard Index. A summation of the hazard quotients for all chemicals to which an individual is exposed.
HQ	Hazard Quotient. A comparison of an estimated chemical intake (dose) with a reference dose level below which adverse health effects are unlikely. The hazard quotient is expressed as the ratio of the estimated intake to the reference dose. The value is used to evaluate the potential for non-carcinogenic health effects, such as organ damage, from chemical exposures.
MCL	Maximum Contaminant Levels
MTBE	Methyl tertiarybutyl ether
Non-carcinogenic risk	The term used to describe risks associated with non-carcinogenic or non-cancer causing materials. These materials can cause damage to the respiratory system, central nervous system, reproductive system and other internal organs.
PCE	Perchloroethene, also known as Perchloroethylene, Tetrachloroethene or Tetrachloroethylene. An alternate abbreviation for Perchloroethene is PERC.
ppb	Parts per Billion
ppbv	Parts per Billion by Volume
ppm	Parts per Million
RAGS	Risk Assessment Guidance for Superfund
RME	Reasonable Maximum Exposure
Soil vapor	Vapor in soil. This can either be subslab soil vapor or subsurface soil vapor.
SSP&A	S. S. Papadopulos and Associates.
Subslab soil vapor	Soil vapor collected from immediately below the basement slab of a building, usually 0 to 5 feet below the slab
Subsurface soil vapor	Soil vapor collected from below the soil surface.
TMB	Trimethyl benzene

ug/l	Micrograms per liter
U.S. EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile organic compounds
VMP	Vapor Monitoring Port – used to collect sub slab vapor samples
VMS	Vapor Mitigation System

I. DECISION

On February 20, 2009, the District of Columbia (the “District”) issued its proposed Remedy Selection for the Riggs Park community, addressing potential human health risks posed by the release of hazardous materials, including the release of gasoline from underground storage tanks located at a gas station formerly owned by Chevron U.S.A., Inc. (“Chevron”), at 5801 Riggs Road in Chillum, Prince George’s County, MD. The District, through the Department of the Environment (“DDOE”) and the Department of Health (“DOH”), issued the proposed Remedy Selection pursuant to its authority to protect human health and the environment under the District of Columbia Hazardous Waste Management Act of 1997 (D.C. Official Code §§ 8-1301, 8-1305(a)(9)), the Underground Storage Tank Management Act of 1990 (D.C. Official Code §§ 8-113, 8-113.08(d)), and under the Brownfield Revitalization Amendment Act of 2000 (D.C. Official Code §§ 8-632.01(b), 8-634.02(a)(b)).

The District’s proposed “Remedy Selection” (dated February 20, 2009) for the Riggs Park community originally called for the installation and operation of vapor mitigation systems (VMSs) in 45 residences that, according to the 2009 HHRA, exhibited potentially unacceptable risks due to potential vapor intrusion attributable to contaminated groundwater and associated soils.

During the 45-day comment period¹ for the proposed “Remedy Selection” dated February 20, 2009, the District received numerous of comments from the public. The District has considered all comments received and is hereby revising its proposed Remedy Selection pursuant to the comments received as well as a more comprehensive evaluation of the available data (as reflected in the 2010 HHRA). All comments received have been added to the Administrative Record in support of this Final Remedy. This document sets forth the District’s “Final Remedy Selection and Response to Comments” (“Final Remedy”) for the Riggs Park community, as well as the Department of Health’s Health Survey results (Appendix C). Please note that the DOH health survey results are inconclusive due to a low responsiveness level from the community on the health survey. Accordingly, DOH has provided raw data results, but no conclusions have been drawn.

Based on a review and comprehensive evaluation of the various sampling data, as well as the site characterization and the 2010 HHRA generated for the Riggs Park community, the District finds that 22 residences have measured subslab soil vapor concentrations at levels that pose unacceptable potential human health risks; 1 residence has measured soil vapor or groundwater concentrations at levels that pose an unacceptable potential human health risks; and 20 residences have no directly measured data but were evaluated using statistical data extrapolations, and subsequently projected to possibly pose unacceptable potential human health risks. In the final analysis, it was determined that a total of 43 homes qualify for VMS installation.

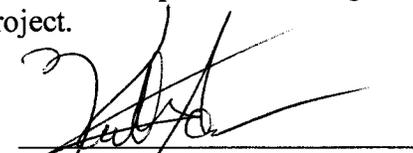
In arriving at the above-stated conclusions, the District has comprehensively evaluated information obtained from subslab soil vapor samples, geoprobe soil vapor samples, groundwater data, and statistical data interpolation analysis. In general, the soil

vapor results are indicative of contaminants potentially emanating from groundwater and that represent a source of potential indoor vapor intrusion. Within the limits of technical validity, the soil vapor results have also been correlated with the available groundwater data, and only those contaminants of concern which could be reasonably attributed to groundwater contamination were used for the 2010 HHRA (which forms the basis for this Final Remedy Selection).

Finally, as part of the overall remedial action plan for the installation and operation of vapor mitigation systems in 43 residences (that have been identified as meeting the requirements for remedial action), the District's selected remedy includes the following elements or tasks:

- Hazardous Substance Easements, also called Environmental Covenants, at residences or inhabited buildings receiving a VMS, to allow continuous access to DDOE and/or its agents to monitor performance and effectiveness of the VMS's installed.
- Evaluations to determine the most appropriate VMS system to install at each home requiring one.
- Development of a program to monitor and perform maintenance for each VMS installed pursuant to the District's Remedy, while the VMS is in operation.
- Development of a program to determine when there is no further need to operate the VMS installed at the direction of the District.
- The District will determine in conjunction with EPA Region 3 when shutting down the VMS whose installation was required by EPA Region 3 is appropriate.
- Development of a Plan to close all remaining open wells installed by SSP&A, in accordance with D.C. Official Code § 8-103.13(a).
- Response to comments received on the proposed Remedy Selection (Appendix A, and B).

Details on the types of vapor mitigation systems to be installed at the qualifying residences will be provided during the remedial design and installation/operation phase of this project.



Keith Anderson
Interim Director

5/03/10
Date

II. INTRODUCTION

The purpose of this document is to inform the public of the District's 'Final Remedy Selection' which addresses potential vapor intrusion caused by the release of hazardous materials, including gasoline, from underground storage tanks located at a gas station formerly owned by Chevron U.S.A., Inc. ("Chevron"), at 5801 Riggs Road in Chillum, Prince George's County, MD, and to respond to comments received on the District's proposed Remedy Selection during a prior 45-day comment period. During the comment period for the proposed "Remedy Selection" dated February 20, 2009, the District received a number of comments from the public. The District has considered all comments received and is hereby revising its proposed Remedy Selection pursuant to the comments received as well as a comprehensive evaluation of the available data (as reflected in the 2010 HHRA).

The District's proposed Remedy Selection for the Riggs Park community originally called for the installation and operation of vapor mitigation systems (VMSs) in up to 45 residences that, according to the 2009 HHRA, exhibited potentially unacceptable risks due to potential vapor intrusion attributable to contaminated groundwater and associated soils. Subsequently, the District undertook an even more comprehensive evaluation of available information and data in order to produce a final remedial action plan for the Riggs Park community. Based on a review and comprehensive evaluation of the various sampling data, as well as the site characterization, response to comments, and the 2010 HHRA generated for the Riggs Park community, the District hereby presents a final remedial action plan that recommends the installation of VMSs in 43 homes.

The findings presented in this Final Remedy are based primarily on data gathered by SSP&A as well as a comprehensive evaluation of the available data (as presented in the 2010 HHRA). The District has also evaluated the information comprising the Administrative Record for this decision. To gain a more complete understanding of the data and other information upon which the District's remedy decision is based, the District encourages the public to review the documents in the Administrative Record.

This 'Final Remedy' (which also includes the response to comments for the proposed Remedy Selection – dated February 20, 2009), the Administrative Record, and the Administrative Record Index are all available for public review on DDOE's website: <http://ddoe.dc.gov/RiggsPark>. Copies of all these documents will also be available at the document repository established for this site at the Lamond Riggs Branch Library located on 5401 South Dakota Avenue, N.E., Washington, D.C., and on a data DVD which is available by written request from Sharon Cooke at District Department of the Environment, 1200 1st St NE, 5th Floor, Washington, DC 20002.

III. BACKGROUND: SUMMARY OF SITE HISTORY AND INVESTIGATION ACTIVITIES

According to Chevron, after a vehicle accident caused damage to one of Chevron's fuel dispensers in October 1989, Chevron conducted an UST tightness test on its underground storage tanks at a gas station formerly owned by Chevron, located at

5801 Riggs Road, in Chillum, Prince George's County, Maryland, abutting the District. This investigation as well as subsequent investigations confirmed the release of gasoline products from the gas station, and the presence of gasoline-related products in the groundwater. Since 1990, Chevron has been recovering gasoline product from the groundwater by operating a groundwater remediation system at the facility.

In 2001, Chevron discovered that gasoline-contaminated groundwater had migrated into the District, underneath a residential neighborhood known as Riggs Park, in Northeast D.C., Ward 4. Because the gasoline plume impacted two separate political jurisdictions (the State of Maryland and the District), at the request of then-Councilmember Fenty, EPA Region 3 assumed the lead investigatory role for the Facility.

During the summer of 2002, as a result of a site investigation carried out by EPA Region 3 at the impacted areas, perchloroethene (PCE) contamination was detected within part of the groundwater contaminant plume². In an August 2008 'Fact Sheet', EPA Region 3 announced that it had completed its PCE investigation, and concluded that no further action was required relative to PCE at that time³. (For a history of EPA Region 3's PCE investigation, please see EPA's website at http://www.epaos.org/site_profile.asp?site_id=A3Q3%20.)

In December 2002, EPA Region 3 ordered Chevron to perform interim measures to mitigate threats to human health and the environment, to perform a site investigation to determine the nature and extent of petroleum-related contaminants in the groundwater, and to perform a Corrective Measure Study to evaluate alternatives for corrective action necessary to protect human health and the environment. Under the interim measures provision of EPA Region 3's 2002 Unilateral Order, Chevron was required to upgrade the groundwater remediation system to recover additional gasoline product in an impacted parking lot area^{4, 5}. Chevron completed the system upgrade in early 2005. In 2007, EPA Region 3 informed Chevron that an additional expansion of the existing remediation system was required⁶. To date, none of the additional groundwater remediation has been installed, as permit approval for installation is still pending. However, Chevron continues to perform routine testing and monitoring as required by EPA Region 3's order.

In April of 2008, EPA Region 3 issued its 'Final Decision and Response to Comments. This required Chevron to install an additional ground water treatment system within the District, as well as the installation of an oxygen curtain, installation of Vapor Mitigation Systems (VMSs) at 3 homes, and additional testing to be conducted at up to 5 additional homes⁷. As one home-owner elected not to be tested, Chevron tested only 4 additional homes and presented the data to EPA for review. On March 5, 2009, EPA Region 3 informed Chevron it had completed reviewing the data and that installation of VMS in those additional homes was not needed.⁸ As of December 9, 2008, Chevron had completed installing the VMSs in 3 homes.⁹

A February 2009 Indoor Air, Sub-slab Vapor, Soil and Groundwater Sampling and Analysis Report prepared by SSP&A, on behalf of the District, revealed soil vapor

contaminated with PCE, 1,4-dichlorobenzene, chloroform, naphthalene, carbon tetrachloride, and methylene chloride. The EPA Region 3 Administrative Order on Consent states that EPA Region 3 will review and consider the results from the SSP&A study^{10, 11, 12}. EPA has concluded this review (see Response to Comment #125 in Appendix B). The SSP&A report is available for review at the Lamond Riggs Branch Library and on DDOE's Riggs Park website <http://ddoe.dc.gov/RiggsPark>, as well as on DVD upon written request from Sharon Cooke as specified in section I.

The Agency for Toxic Substances and Disease Registry (ATSDR) has concurrently carried out health surveys/evaluations for the impacted areas under investigation. ATSDR's goal has been to help the community affected by the Riggs Park/Chillum site understand the public health implications of the groundwater contamination associated with this site and vicinity. A summary of ATSDR's key findings/conclusions is as follows: "*All of the environmental sampling data sets reviewed to date support ATSDR's overall conclusion that all indoor and outdoor air VOC concentrations detected at this site are at levels below those expected to harm people's health*" (ATSDR "Health Consultation" dated December 30, 2008; ATSDR "Letter Health Consultation" dated November 3, 2009; ATSDR "Environmental Health Newsletter, Issue 3" dated February 2010). Throughout its public health evaluations for this site, ATSDR relied on actual indoor and outdoor air sampling results as the basis for the conclusions about the potential health effects.

Other relevant site investigations and related activities of interest include the following:

- In the summer of 2006, the residents of Riggs Park retained a contractor to obtain independent samples, in order to evaluate the implications of the contaminant plume impacting their neighborhood.
- In 2006, the District's Department of Health ("DOH") initiated an independent indoor air sampling effort based on voluntary participation by the Riggs Park residents. Sampling was conducted by the District's contractor, Building Sciences and Engineering Associates (BSEA). BSEA collected indoor air data from 97 homes in Riggs Park, bounded geographically by four streets: Kennedy Street, Madison Street, Eastern Avenue, and Riggs Road. The results of this sampling were presented in the BSEA Riggs Park Air Quality Study, September 2006¹³.
- In response to concerns expressed by residents, the District retained a second contractor, SSP&A, to conduct additional sampling intended to verify the BSEA results noted above. Over the course of three quarters, in 2008, SSP&A collected samples from a total of 118 homes. Indoor air samples were collected from a total of 115 homes; subsurface soil vapor samples were taken at 106 homes. Outdoor subsurface soil vapor samples were taken at 66 homes. Ambient air samples were taken concurrently with indoor, subsurface, and subsurface samples. Subslab vapor samples were taken from below the concrete slab of the residence, outdoor subsurface vapor samples were taken from the soil in the vicinity of the home. Ambient air or background samples were taken outside the home. The results of

this sampling were presented in the S.S. Papadopoulos & Associates, Inc.'s 2009 'Riggs Park Indoor Air, Sub-slab Soil Vapor, Soil, and Groundwater Sampling and Analysis Report' (dated February 2009).¹⁴

- In response to a request by Riggs Park residents, the District of Columbia Department of Health conducted a health survey from April 2009 - May 2009.
- Over a period of several months, EPA Region 3 reviewed available indoor air and related data for 151 homes sampled at the Riggs Park community, and in March 2010, concluded that some of the homes may require further sampling in order to arrive at definitive conclusions about potential risks to residents.¹⁵

Further information, including the findings and conclusions on the above, can be found in the administrative record and related supporting documents for this project.

Overall, some areas within the Riggs Park community have been impacted by various organic chemicals present in the contaminated groundwater associated with the Chevron release. The primary chemicals of concern are PCE and its degradation products, as well as gasoline-related contaminants. It should be noted here, however, that the initial site investigations focused mostly on the source and location of petroleum products in groundwater, and their impacts. For a full history of the petroleum investigation, please see DDOE's Riggs Park website at <http://ddoe.dc.gov/RiggsPark>. Subsequently, the investigations were expanded to include other non-petroleum constituents, in order that cumulative health risks could be determined, ensuring the protection of Riggs Park residents' health.

IV. REGULATORY FRAMEWORK AND ACCEPTABLE RISK LEVELS

Pursuant to the District Department of the Environment Establishment Act (D.C. Code §§ 8-151.01, 8-151.07(11)), the Mayor has charged the Director of DDOE with the task of executing and enforcing the provisions of this chapter and the rules and regulations adopted pursuant to this chapter. Accordingly, the Director is hereby selecting corrective action for the Riggs Park site pursuant to three different District of Columbia statutes: (i) the Brownfield Revitalization Amendment Act of 2000 (D.C. Code §§ 8-634.02(a),(b); 8-635.01); (ii) the District of Columbia Hazardous Waste Management Act of 1997 (D.C. Code §§ 8-1301, 8-1311(a)(1); and (iii) the Underground Storage Tank Management Act of 1990 (D.C. Code §§ 8-113, 8-113.09(a)). These statutes all contain provisions which allow the District to require and secure corrective action at this site. In addition, the District's Brownfield Revitalization Act provides the District with the authority to impose the necessary institutional controls at this site, as discussed below in Section IX.A.1 of this Remedy (D.C. Code § 8-635.01).

Pursuant to its authority to secure corrective action, the District is using the National Oil & Hazardous Substances Contingency Plan ("NCP") promulgated by U.S. EPA pursuant to the Comprehensive Environmental Response, Compensation and Liability of 1980, 42 U.S.C. §§ 9601, *et seq.*, and used by U.S. EPA in formulating cleanups under CERCLA, as well as corrective actions under the Resource Conservation

and Recovery Act, 42 U.S.C. §§ 6901, *et seq.* U.S. EPA intended to publish an implementation framework for the RCRA(C) corrective action provision, which was titled RCRA(S), but prior to finalizing it, withdrew RCRA(S) (FR Vol. 64, No. 194 / Thursday, October 7, 1999 / Proposed Rules). Instead, U.S. EPA urged coordination between the RCRA and CERCLA corrective action programs, by implementing guidance and policy which both should follow (RAGS and NCP) (U.S. EPA memorandum from Elliott P. Laws and Steven A. Herman to RCRA/CERCLA Senior Policy Managers, *Use of the Corrective Action Advance Notice of Proposed Rulemaking as Guidance*, January 17, 1997, *see also* FR Vol. 64, No. 194). In addition, RAGS, Part D, encourages the use of RAGS for RCRA corrective action sites (RAGS, Part D, Frequently Asked Questions, Fact Sheet).

The NCP specifies that “*for systematic toxicants, the acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety.*” 40 C.F.R. § 300.430(e)(2)(i)(A)(1). A U.S. EPA Memorandum, dated April 21, 1991, from Don R. Clay (Assistant Administrator), which provides guidance on the above-cited Section, at page 1 of the Memorandum, quantifies the acceptable non-carcinogenic Hazard Quotient as no greater than 1.

In addition, the NCP specifies that “*for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound life-time cancer risk to an individual of between 1×10^{-4} and 1×10^{-6} ...*” 40 C.F.R. § 300.430(e)(2)(i)(A)(2). The Don Clay Memo provides that U.S. EPA remedial action is generally not warranted where cancer risk is found to be below 1×10^{-4} unless there are adverse environmental impacts (Page 2). The District has selected a 1×10^{-5} cancer risk level, which is within the range permitted by the NCP.

Consistent with the Federal CERCLA (or Superfund) statute, the NCP (40 CFR §300.430), and the D.C. UST regulations at 20 DCMR § 6206.4, the District determines risk based on a cumulative evaluation of chemicals. Under these authorities, the District would consider appropriate remedies for homes where site-specific soil vapor chemicals of concern have been detected at concentrations that pose an unacceptable potential cumulative cancer and/or non-cancer risk.

Acceptable Risk Levels:

Consistent with the regulatory framework presented above, the District has selected a cumulative hazard index of 1.0 for non-cancer health effects, and a cumulative cancer risk level of 1×10^{-5} (which is within the range permitted under the NCP, i.e., 1×10^{-4} to 1×10^{-6}) to be protective of the current and future residents of Riggs Park.

In addition, the District’s selection of the 1×10^{-5} cancer risk level, which is within the range permitted by the NCP (i.e., 1×10^{-4} to 1×10^{-6}), is also consistent with the level selected by EPA Region 3 in reviewing this same project.

V. RISK ASSESSMENT APPROACH AND RESULTS

In February of 2009, an abbreviated human health risk assessment (HHRA) was completed for homes with sub-slab vapor monitoring data at the Riggs Park community. This 2009 HHRA resulted in a recommendation for the installation and operation of vapor mitigation systems (VMSs) in up to 45 residences that exhibited potentially unacceptable risks due to potential vapor intrusion attributable to contaminated groundwater and associated soils. This then formed the basis for the District's original proposed Remedy Selection, dated February 20, 2009.

Subsequently, a more comprehensive HHRA and risk management evaluation for the Riggs Park community was completed in April 2010 to evaluate current and potential cancer risks and noncancer health hazards associated with potential vapor intrusion into 106 homes located in the Riggs Park neighborhood. The primary goal of the 2010 HHRA was to determine whether detected sub-slab contaminant vapor concentrations associated with contaminated groundwater pose unacceptable non-cancer health hazards or cancer risks based on long-term inhalation exposures. Additional evaluations were also carried out for homes where no sub slab data was collected in the SSP&A study. Ultimately, homes in which health risks are found to be unacceptable are to be targeted for remediation by installation of a VMS.

The methods used in the risk assessment for Riggs Park conform to all key U.S. EPA risk assessment/management guidance and policy. Among other things, U.S. EPA risk assessment guidance and policies require that individual chemical risks be calculated for each detected chemical and that those risks be summed when an individual is exposed simultaneously to multiple chemicals in order to derive the cumulative risk. Health risks must also be calculated for the "reasonable maximum exposure" (RME) individual, which then forms a key basis for making risk management decisions in accordance with U.S. EPA's risk management framework.

DDOE's 2010 HHRA for the Riggs Park community presents, in more detail the following health risk estimates:

- Non-carcinogenic hazard quotient (HQ) for each detected chemical and the cumulative hazard index (HI) for all chemicals detected in the subslab sample based on EPA Region 3 toxicity values; and
- Carcinogenic risk for each chemical and the cumulative carcinogenic risk for all chemicals detected in the subslab sample risk based on EPA Region 3 toxicity values.

These potential health risks were generally calculated on the basis of the vapor concentrations measured in sub-slab samples that were collected in 2008 by the District Department of the Environment's contractor, S. S. Papadopoulos and Associates (SSP&A 2008). Where such data were missing, alternate data sets were utilized in arriving at justifiable risk conclusions for the study areas. By solely focusing on the sub-slab samples, it can be concluded that the detected chemicals are arising from a source under

the home and that there are no ambient household chemicals confounding the sub-slab samples.

A total of 357 vapor monitoring port (VMP) samples were collected in 2008 from 106 Riggs Park homes, and the health hazard and cancer risk were calculated for each of those samples – as detailed in the Human Health Risk Assessment report (DDOE, 2010).

Summary of the 2010 Human Health Risk Assessment Results:

In 2009-2010, the District undertook a more comprehensive evaluation of available information and data in order to produce a definitive remedial action plan for the Riggs Park community. Among other things, a groundwater co-relational assessment was conducted for homes which participated in the SSP&A study, but for which VMP data were not available. Ultimately, a comprehensive HHRA for all the homes which participated in the SSP&A study was completed in April of 2010.

Based on the analytical results described in the 2010 HHRA and other related documents, it was concluded that installation of a VMS system is warranted for a total of 43 Riggs Park homes, as follows:

1. Twenty-two (22) homes qualify for remediation based on the presence of COC's in VMP samples at unacceptable levels and a link to groundwater.
2. Seven (7) homes qualify for remediation under the duplex evaluation.
3. Eight (8) homes qualify for remediation under the kriging evaluation.
4. Five (5) homes qualify for remediation under the duplex evaluation and kriging evaluation.
5. One (1) out of the twelve homes that participated in the study, but had no VMP samples, qualifies for remediation based on GMP data and groundwater.

Specifically, sampling and analysis results show that 22 homes warrant remediation due to contaminant levels measured directly in the sub-slab vapor space under the home (category 1, above). However, not all Riggs Park homes were sampled for this investigation. Although many homeowners were unable to participate in this study, important site-specific results gathered as part of this study must be applied to all homes at Riggs Park that are in the vicinity of the plume to ensure protection of public health for all residents. For this reason, the following two additional analyses were conducted, extending the findings in this study to neighboring or surrounding homes:

- I. The first analysis was conducted to determine whether the adjoining duplexes of each of the 22 homes that are being targeted for remediation were included in the study. This is important since the adjoining duplex (not sampled) would be located over the same contaminated groundwater as the home identified as needing remediation. Since they share the same basement concrete slab, it is reasonable to assume the sub-slab vapor contaminant conditions would be very similar. In this analysis, all available information on the adjoining duplex was

evaluated and, if the VMP samples were collected and the cancer risk for that home was calculated to be acceptable, it was not included in the list of homes requiring remediation. Where the adjacent duplex home was sampled and found to have unacceptable VMP risks, it was simply included as another home requiring VMP installation. Under this analysis, of those adjacent duplex homes that did not participate in this study and were therefore not sampled, seven (7) homes qualify for remediation, as a prudent public health measure (category 2, above).

- II. In the second analysis, the modeling procedure of 'kriging' (which involves statistical interpolation of available data) was performed to determine if remediation was warranted for any other surrounding homes in the area (in addition to the physically attached duplex home previously discussed). As with the "duplex" analysis, this type of analysis was conducted as a prudent measure to fill existing data and information gaps. If the kriging results showed other surrounding homes should be included as a "cluster" of homes, these were also included. Under this analysis, eight (8) homes qualify for remediation, as a prudent public health measure (category 3, above).
- III. Five (5) homes qualify for remediation, as a prudent public health measure, under both, the "duplex" analysis and the 'kriging' analysis (category 4, above).

Finally, for the 12 homes without subslab soil VMP samples that have basements very close to the groundwater table, a critical analysis was conducted using Geoprobe Monitoring Port (GMP) data and data from the nearest groundwater well (where the site-specific subslab chemicals of concern have the potential to pose a cumulative health risk from subslab soil vapor to exceed the DDOE acceptable cancer risk level of 1×10^{-5} or non-cancer hazard index of 1); on that basis, it was determined that one (1) home warrants remediation due to petroleum and chloroform contamination in groundwater above acceptable levels (category 5, above).

In the final analysis, it was determined that a total of 43 homes should be considered for remediation. These homes are listed in Exhibit A below, along with the rationale for taking remedial action. For each home it was assumed that a resident would stay home and breathe the vapors 24 hours a day, 7 days a week, 350 days a year, for 30 years even though most residents will not be in their homes for such extended periods¹⁶.

EXHIBIT A: Summary Table of Riggs Park Homes Recommended for Remediation
(Source: 2010 HHRA Report – DDOE)

Home ID	Rationale
S13	PCE VMP Risk
S30	PCE VMP Risk
S33	PCE VMP Risk
S36	PCE VMP Risk
S37	PCE VMP Risk
S88	PCE VMP Risk

Home ID	Rationale
S96	PCE VMP Risk
S107	PCE VMP Risk
S121	PCE VMP Risk
S143	PCE VMP Risk
S194	PCE VMP Risk
S199	PCE VMP Risk
S239	PCE VMP Risk
S257	PCE VMP Risk
S258	PCE VMP Risk
S322	PCE VMP Risk
S362	PCE VMP Risk
S416	PCE VMP Risk
S419	PCE VMP Risk
S32	Home in Area of Extrapolated PCE Risk
S195	Home in Area of Extrapolated PCE Risk
S196	Home in Area of Extrapolated PCE Risk
S260	Home in Area of Extrapolated PCE Risk
S310	Home in Area of Extrapolated PCE Risk
S363	Home in Area of Extrapolated PCE Risk
S366	Home in Area of Extrapolated PCE Risk
S418	Home in Area of Extrapolated PCE Risk
S11	Duplex of Home S13
S20	Duplex of Home S121
S89	Duplex of Home S362
S100	Duplex of Home S287
S106	Duplex of Home S107
S157	Duplex of Home S96
S324	Duplex of Home S322
S35	Duplex Home of S33 & Home in Area of Extrapolated PCE Risk
S162	Duplex Home of S239 & Home in Area of Extrapolated PCE Risk
S309	Duplex of Home S143 & Home in Area of Extrapolated PCE Risk
S369	Duplex Home of S199 & Home in Area of Extrapolated PCE Risk
S420	Duplex Home of S37 & Home in Area of Extrapolated PCE Risk
S296	Chloroform VMP Risk
S287	Chloroform VMP Risk
S354	Chloroform VMP Risk
S167	Home With No VMP Samples, based on GMP and groundwater results. Petroleum, Chloroform

VI. REMEDIATION DECISION CRITERIA AND OUTCOME

The District's remedy decision consists of installation of a subslab vapor mitigation system, similar to a radon system, in all residences or inhabited buildings in Riggs Park which meet the criteria that follow. To be considered for a VMS, the levels of the contaminants of concern in the subslab soil vapor samples or its surrogate must meet one or more of the following key criteria:

- 1) Exceed a Hazard Index of 1 for cumulative non-cancer risk posed by gasoline constituents, PCE and/or other contaminants detected in the subslab vapor samples. A Hazard Index of 1 is specified in Title 20 of the District of Columbia Municipal Regulations, Section 6206.4(c), (20 DCMR § 6206.4(c)), and U.S. EPA Memorandum, dated April 21, 1991, from Don R. Clay (Assistant Administrator). The Hazard Index is the sum (or cumulative) of the Hazard Quotients for all the chemicals of concern. The Hazard Quotient is a comparison of an estimated chemical intake (dose) with a reference dose level below which adverse health effects are unlikely.
- 2) Exceed a 1×10^{-5} cumulative cancer risk posed by gasoline constituents, PCE and/or other contaminants detected in the subslab vapor samples. The District has selected a 1×10^{-5} cancer risk level, which is mid-way within the range permitted by the NCP.

Furthermore, to receive a VMS, the chemicals of concern in subslab soil vapor or its surrogate must reasonably be attributable to the groundwater contamination of interest. As such, the chemicals of concern in soil vapor must also be attributable to groundwater contamination to demonstrate that the most probable source of the chemical is the groundwater. Homes where soil vapor contamination or its surrogate cannot be attributed to contaminated groundwater will generally not be remediated at the direction of the District.

As more thoroughly presented above, based primarily on the SSP&A data and the corresponding risk assessment, as well as other documents referenced in the Administrative Record, the District finds that 22 residences have measured subslab soil vapor concentrations at levels that pose unacceptable potential human health risks, 20 homes were selected for remediation due to duplex evaluation or statistical data interpolation, and 1 residence has measured soil vapor or groundwater concentrations at levels that pose an unacceptable potential human health risks. Accordingly, a total of 43 homes are recommended for VMS installation.

For most homes, the risk management decision to install a vapor mitigation system (VMS) was straightforward and based on just two criteria. The first criterion required that at least one COC was detected (in at least one subslab sample at a concentration that posed a cancer risk $\geq 1 \times 10^{-5}$ or a hazard index ≥ 1.0). The second was that there must be a demonstrated link between the COC detected in the subslab sample

and groundwater contamination near the home. The rationale underlying the risk management decision to install a VMS only in homes satisfying these two criteria is based on the concept of effective “risk mitigation.” That is, one of the basic assumptions of the risk assessment is that residents must be exposed to chemicals for a lengthy period of time (years) for the risks to be applicable. Without a groundwater source providing a “reservoir” or continuous source, the calculated risks are not truly representative of cancer risk.

VII. IDENTIFICATION OF REMEDIATION ALTERNATIVES

Buildings located above contaminated groundwater are vulnerable to subsurface vapor intrusion coming from the contaminated groundwater and entering basements through cracks, joints and utility openings. This effect is referred to as subsurface vapor intrusion. The scope of remediation in this document is limited to addressing potential vapor intrusion arising from contaminated groundwater and associated soils only.

The following were identified as potentially feasible remedies to adopt in the remediation decisions for the potential vapor intrusion situations identified for the Riggs Park homes investigated here:

- 1) *Basement Sealant* – Sealant products are available on the open market which can be applied to walls and floors which are in contact with soil. The products are intended to seal small cracks and prevent vapor intrusion. The products must be applied to the structural walls and floor, and are therefore not suitable for use in a basement which is already finished. Some of the products are clear, therefore the integrity of the seal cannot be easily monitored in the future. The effectiveness of these products is unknown at this time; therefore the District does not consider this to be protective.
- 2) *Pressurization of Basement* – A system can be installed to increase the overall air pressure in the basement which is intended to decrease vapor intrusion. In order to maintain the pressure, the basement cannot be accessed after the system is installed, rendering the basement non-usable by the homeowner. The results of installations of these systems are inconsistent; therefore the District does not consider this to be protective.
- 3) *Natural Ventilation* – The basement area can be vented using windows and fans. This renders the basement inaccessible to the homeowner except when the weather is pleasing to their taste. The heating and cooling costs for the home will increase significantly unless the basement is insulated from the house. The results are from this method are inconsistent; therefore the District does not consider this to be protective.
- 4) *Subslab Vapor Mitigation System* – A subslab vapor mitigation system, similar to a radon system, can be installed in all residences or inhabited buildings. The effectiveness of this type of system is well known; therefore the District does

consider this to be protective upon proper installation, operation, and maintenance.

VIII. EVALUATION CRITERIA USED FOR REMEDY SELECTION

This section provides a brief description of the criteria used by the DDOE to evaluate and select the appropriate remedy, in accordance with DDOE and federal guidance documents. The criteria were applied in two phases. In the first phase, DDOE evaluated remedy 'threshold criteria' as general goals. In the second phase, DDOE evaluated 'balancing criteria' to confirm that the selected remedy alternative provided the best relative combination of attributes.

A. Threshold Criteria

The District's evaluation of the threshold criteria was as follows:

1. Protect human health and the environment

The primary health concern under current conditions is vapor intrusion into basements. An appropriate and effective remedy requires the installation of a vapor mitigation system in each residence where the criteria specified in Section V are met.

2. Achieve media cleanup objectives

The vapor mitigation systems will achieve the media (indoor air) cleanup objective by preventing subsurface vapor intrusion into homes potentially affected by the groundwater contaminants. This will ensure that contaminants in the contaminated groundwater do not contribute to indoor air levels that will result in an unacceptable cancer or non-cancer risk.

3. Control the source(s)

The District's Remedy does not control the source of the groundwater contaminants. EPA's remedy addresses groundwater. Rather, the District's Remedy (VMS) is intended to limit the hazardous effects at residences or inhabited buildings impacted by the contaminated groundwater until such time as the groundwater is remediated.

B. Balancing Criteria

After satisfying the threshold criteria, DDOE evaluated the following balancing criteria to demonstrate the suitability of the Remedy:

1. Long-term Reliability and Effectiveness

The vapor mitigation systems to be installed in those occupied buildings affected by vapor intrusion, evidenced by results where the criteria specified in Section V are met, are a proven technology which has been adopted from the radon mitigation industry. Similar systems have been installed in millions of homes throughout the nation to mitigate radon intrusion. The systems are expected to be equally reliable and effective because the mechanism to prevent vapor and radon intrusion is identical.

During the design phase of the Remedy, the District will require the development of a monitoring protocol to evaluate individual home vapor mitigation systems.

2. Reduction of Waste Toxicity, Mobility or Volume

The Remedy does not reduce toxicity, mobility, or volume of the contaminants, but limits residents' exposure to vapors emanating from the contaminated groundwater.

3. Short Term Effectiveness

The short term effectiveness criterion is intended to address hazards posed during construction of the Remedy. Short term effectiveness is designed to take into consideration the impact on site workers and nearby residents such as potential for volatilization of contaminants, the spread of contamination through dust generation, and disposal and/or transportation of the wastes.

Workers will be required to comply with the Occupational, Safety and Health Administration rules and to follow the Health and Safety Plans submitted to DDOE.

No short term hazards to the residents were identified for the Remedy.

4. Implementability

The implementability criterion addresses various constraints, such as regulatory constraints, ability to obtain access agreements, technological and practicability limitations, and intrusiveness to residents due to noise, traffic and aesthetic disruptions.

The vapor mitigation system is a proven technology with no significant implementation constraints except obtaining access agreements from homeowners to install, maintain and test the systems. The District will require that all District and EPA Region 3 required permits be acquired before installation.

Installation of the systems in private properties is contingent upon consent from homeowners. At this time, it is unknown if any homeowners will refuse to allow installation of VMS.

5. Cost

The Remedy is cost-effective in meeting the remediation objectives. According to published information, the estimated capital cost to install each vapor mitigation system

ranges from \$800 to \$10,000^{17, 18} with homes near the water table being the most expensive. Homes with finished basements may incur additional cost.

Maintenance is minimal, but may include replacing the fan, which can be performed from outside the home.

The fan draws approximately the same amount of electricity as a 75 watt light bulb. Alternative energy sources (solar panels or wind turbines) may be available.

IX. FINAL REMEDY

A subslab vapor mitigation system, similar to a radon system, will be installed in all residences selected for mitigative action. The effectiveness of this type of system is well known, and therefore the District considers this remedy selection to be protective, upon proper installation, operation, and maintenance.

The VMS will consist of the following key components: one or more slab penetrations, ductwork guiding subslab vapors to the exterior of the building, a fan to actively draw vapors from below the slab, and ductwork to guide the vapors to the proper exhaust height. Actual design specifications may vary from this list and will be determined during the design phase.

In addition to selecting installation and operation of VMSs in up to 43 residences, the District's selected remedy includes the following tasks:

- Hazardous Substance Easements, also called Environmental Covenants, at residences or inhabited buildings receiving VMS, to allow continuous access to DDOE and/or its agents to monitor the VMS operation in each home.
- Evaluations to determine the most appropriate VMS systems to install.
- Development of a program to monitor each VMS installed pursuant to the District's Remedy, while the VMS is in operation.
- Development of a program to determine when there is no further need to operate the VMS installed at the direction of the District.
- The District will determine in conjunction with EPA Region 3 when shutting down the VMS whose installation was required by the EPA Region 3 is appropriate.
- Development of a Plan to close all remaining open wells installed by SSP&A.
- Response to comments received for the Selected Remedy (see Appendix A and B).

A. Installation of Vapor Mitigation System

The District's Final Remedy Selection calls for the installation of a subslab vapor mitigation system, similar to a radon system, in all residences or inhabited buildings

which meet the criteria described in Section V. All installation and testing will be subject to homeowners' consent. The installation of the VMS will be contingent upon acquisition of all necessary permits from the District and/or EPA Region 3 to install and operate the VMS.

B. Additional Tasks Required to Support Selected Remedy

In the course of implementing this Remedy, the following additional evaluations, determinations, and developments will be made:

1) Determine the most appropriate VMS system to install. In particular, the overall impact on background air results due to the operation of 43VMSs within a limited area must be determined; if the impact will be significant, systems which capture and/or treat the emitted vapors will be required. Also, homes which are in contact with the water table may require a modification of the VMS system to ensure effective functionality. The final design of the VMS will be determined in the design phase.

2) Develop a program to monitor each VMS installed pursuant to the District's Remedy, while the system is in operation. Monitoring protocols will be determined during the design phase.

3) Development of a program to determine when there is no further need to operate the VMS at the direction of the District.

4) The District will determine in conjunction with EPA Region 3 when shutting down the VMS whose installation was required by the EPA Region 3 is appropriate.

5) Develop a plan to close all wells which were opened by the District's contractors to take samples, according to the District's water quality regulatory requirements (D.C. Official Code § 8-103.13(a)).

C. Institutional Controls

DDOE's remedy requires the following institutional controls be implemented to ensure the protection of human health in the future.

Pursuant to D.C. Code § 8-635.01(b)(3), require the recording of Hazardous Substance Easements, also known as Environmental Covenants, with the D.C. Recorder of Deeds for each home with a VMS, to allow continuous access to DDOE and/or its agent to monitor and ensure the continuity of VMS operation in each home.

The District of Columbia's Brownfield Revitalization Amendment Act of 2000 allows the District to place these institutional controls, and to register the documents with the D.C. Recorder of Deeds (D.C. Code § 8-635.01). Other jurisdictions also routinely use these types of institutional controls in hazardous waste sites.

Endnotes

- ¹ The 30-day comment period began on March 6, 2009, and was originally scheduled to end on April 6, 2009, but was then extended to April 20, 2009, pursuant to a request for extension from the public, making it a 45-day comment period.
- ² Chillum PERC Site Fact Sheet #1, July 2003. <http://www.epaosc.org/sites/A3Q3/files/chillum%20fact%20sheet%20-%207-28-03%20final2.pdf>
- ³ Chillum Site Gasoline and PERC Release Administrative Order Issued to Chevron USA: Update on PERC Investigation, August 2008. <http://www.epa.gov/reg3wcmd/pdf/ChillumIOrderFactSheet.pdf>
- ⁴ EPA letter to Chevron. September 30, 2002. Page 1. <http://www.epa.gov/reg3wcmd/pdf/chev9.pdf>
- ⁵ EPA Unilateral Order. USEPA Docket Number: RCRA-03-2003-0006TH. November 26, 2002. Page 8. <http://www.epa.gov/reg3wcmd/pdf/chevfinal.pdf>
- ⁶ EPA Statement of Basis Chevron Gasoline Release at Chillum Maryland. August 30, 2007. Pages 10 and 11. <http://www.epaosc.net/sites/abc/files/chillumsb.pdf>
- ⁷ EPA Final Decision and Response to Comments, April 2008. Page 6. <http://www.epaosc.org/sites/abc/files/finaldecisionvolume1.pdf>
- ⁸ March 5, 2009 letter from EPA to Chevron re: Interim Measures Report for Indoor Air sampling at Residences, Former Chevron Facility at Chillum, Maryland. <http://ddoe.dc.gov/RiggsPark>
- ⁹ Interim Measures Construction Completion Report for Vapor Mitigation Systems, Gannet Fleming, April 28, 2009. page 2. <http://ddoe.dc.gov/RiggsPark>
- ¹⁰ EPA Administrative Order on Consent. July 10, 2008. USEPA Docket Number: RCRA-03-2008-0355TH. Page 13. <http://www.epaosc.net/sites/abc/files/iporder.pdf>
- ¹¹ EPA Response to Chevron Comments on Administrative Order on Consent – Transmittal, response to comments and fact sheet for the Chillum/Riggs Park Community. January 16, 2009. Page 7. <http://www.epaosc.net/sites/abc/files/finalorderresponsetocomments.pdf>
- ¹² EPA Final Decision and Response to Comments, April 2008. Page 7. <http://www.epaosc.org/sites/abc/files/finaldecisionvolume1.pdf>
- ¹³ BSEA Riggs Park Air Quality Study, September 2006
- ¹⁴ S.S. Papadopoulos & Associates, Inc.'s 2009 'Riggs Park Indoor Air, Sub-slab Soil Vapor, Soil, and Groundwater Sampling and Analysis Report' (dated February 2009). http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/information2/public.notices/Riggs_Park_Sampling_Analysis_Report.pdf
- ¹⁵ Comment submitted by EPA on (March 2, 2010). See Appendix B of this document for a copy.
- ¹⁶ EPA Region 3-Risk Based Concentration Table. <http://www.epa.gov/reg3hwmd/risk/human/>
- ¹⁷ Estimates for VMS installation were obtained via web search, document search, and personal communication.
- ¹⁸ Detailed Field Investigation of Vapor Intrusion Processes ESTCP Project ER-0423. September 2008.

Appendix A
Submitted Comments

Cleo Holmes Response to DC Remedy Selection

April 5, 2009

Administrative Order of Consent (AOC)

Chemicals of Concern (COC)

District of Columbia Remedy Selection (DCRS)

Riggs Park, Indoor Air, Sub Slab Vapor, Soil and Groundwater, Sampling and Analysis Rpt. (RPISS&GR)

Risk Based Corrective Action (DC RBCA)

Tetrachloroethene (PERC)

Questions and concerns

RPISS&GR, pg. [REDACTED] Table 8 states soil sample was collected was taken from my property.

Question 1: Why when on Feb 23, 2009 the DC DOE received a FOIA to provide copies of test results of all samples taken at this property, no soil sample results were delivered?

Question 2: Does the District believe this public comment period a fair opportunity for residents to comment when the residents were not allowed to see or review results of soil and groundwater samples taken on their property?

Question 3: Why doe the DCRS not explain the relationship to the depth of the groundwater and the rate of soil vapor movement in different times of the year, as well as what conditions could cause soil vapor to migrate at a faster rate towards the slab of resident homes?

Question 4: Why does the DCRS not mention how many years it would be before the soil would be considered clean of human carcinogenic chemical compounds?

Appendix O: Table 3 Compounds detected indoor Air Samples PERC Maximum Detection is [REDACTED] ppbv, my result for PERC reported at [REDACTED] ppbv.

Question 5: Why are DOE and its contractor only quoting results in ppbv and not in ug/m3, is this being done so that when an unformed read looks at this report they will think these numbers to be small?
Example: 6.24 ppbv is equal to 42.3 ug/m3

Question 6: With the DCRS pg. 14 listing 17 COC as "Human Carcinogens", why does the District feel cumulative cancer risk is not important issue to be evaluated?

The DCRS refer to there being a toxicologist being an expert, the definition of "expert" is , a person with a high degree of skill in or knowledge of a certain subject of field.

Question 7: Did the Districts "expert toxicologist" agree with or advise the District not to address or evaluate the cumulative cancer risk in Riggs Park study?

First quarter VMP 1 PERC result of [REDACTED] ppbv-[REDACTED] ug/m3, increased to a 2nd quarter VMP 1 result of [REDACTED] ppbv - [REDACTED] ug/m3) and my 3rd quarter VMP 1 went to [REDACTED] ppbv to [REDACTED] ug/m3.

Question 8 : Does this increase in numbers warrant the installation of a Vapor Mitigation System at this property?

Question 9: Why hasn't the District applied any indoor air, sub- slab, or soil vapor action levels for this survey?

DCRS Pg, 6 references the District DOH development and administration of a health survey of Riggs Park residents who reside over the plume footprint caused by the leakage of gasoline from the Chevron gas station.

Question 10; Will DCRS direct DOH to correct its development and administration of the RP health survey to include plumes related to PERC and its breakdown products as well?

The Riggs Park Sampling & Analysis Report, Feb. 2009 makes reference to "Ambient air concentrations of Benzene and toluene, and PCE are within ranges observed both at Washington DC's McMillan Reservoir, and within ranges reported in the literature for other urban environments"

Question 11: Why is the District using McMillan ambient numbers in this report and not ambient air samples taken from Riggs Park as the more representative sample collected?

Table two: " Selected information from home surveys" state at my home:

- a "[REDACTED]", the fact is a [REDACTED] installed at least 12 months prior to the SSP&A testing period.

*This report says "[REDACTED]", inaccurate statement placed in the record.

*This report says [REDACTED] done within two weeks prior to testing, inaccurate statement Placed in the record.

Question 12: Are these inaccurate statements being placed in the record to disqualify this property from having a Vapor Mitigation System installed at this property?

Question 13: Why, when in our FOIA request to the DOE for copies of all contractor field note, none were provide in response to the FIAO we submitted?

Page 3 Cleo Holmes response to the District Remedy Selection

Question 14: Since it has been stated in the February 09 public meeting by DOE Director Hawkins, the problem with locating the PERC plume is that the plume is moving from place to place. Would not it be prudent, as a protection to the community, to install Vapor mitigation Systems under each home in Riggs Park that request a system be installed?

Question 15: What date exactly did the District of Columbia repeal its" Risked Based Corrective Action guidance?

Question 16: why, when the SSP&A took groundwater samples from various locations in Riggs Park, did the District decide not to reveal laboratory results and the process DOE used to evaluate these results?

Question 17: Why does the District feel that by testing only 20% of the homes in is sufficient to protect all residents within the boundaries of the gasoline and PERC contaminated areas?

Page 5 Installations and operation of vapor mitigation systems in up to 45 residences with elevated sub-slab soil vapor levels attributable to contaminated groundwater.

Question 18: is the District decision to perform evaluations to confirm that contaminants observed in subslab vapor samples are attributable to groundwater contamination, being done as the result of a prior agreement with chevron?

Question 19: Is the cost of any re evaluation of any property results being paid for by chevron?

Question 20: Has the District agreed to supply Chevron results of any test performed in the design or installation phase of the Papadopoulos study?

Question 21: Has DOE agreed to collaborate with Chevron or EPA prior to installations of VMS at any property?

Question 22: What exactly is the agreed to Consent order between DOE and Chevron?

Question 23: In February 09 public meeting Director Hawkins explained on PECC contamination is hard to follow because the way this chemical moves in the subsurface, since the DCRS is based of protective solutions why not install VMS devices under all properties in Riggs Park that which this system?

Many of the Riggs Park site related guidance documents since 2001 noted " District of Columbia's Risk Based Corrective Action as "The" guidance document of choice for this site.

Question 24: Why has DC DOE abandon the District's Risk Based Corrective Action Guidance when evaluating the Riggs Park community?

Question 25: Why does the "Regulatory Framework" listed in the DCRS not mention of DC RBCA?

Question 26: Is the DC Risk Based Corrective Action no longer recognized by the District of Columbia?

Page 4 Cleo Holmes response to the District Remedy Selection

Question 27: Does the District of Columbia DOE view the DC RBCA as not being adequate protection for the residents of the District?

Question 28: Is DC DOE decision not to follow its own RBCA at this site as a result on a signed AOC between the District and Chevron?

The residents from day one have asserted its concerns to EPA and D C DOE repeatedly around the issue of having the cancer risk evaluated on a cumulative bases?

Question 29: Since the issue of cumulative risk not being addressed as a part of a pre-existing agreement between Doe and Chevron?

Question 30: How can the DOE consider its remedy to be protective of the health of the Riggs Park resident's without a proper evaluation of any cancer, diseases or other illnesses that could occur as a result of the accumulative exposure to multiple toxic chemicals on the resident population of Riggs Park?

Director Hawkins in a Feb. 2009 public meeting stated the intention of DCDOE intention is to make the Riggs Park web page documents available for public review. As you know this community has repeatedly been asking for this web page to be accessible for sometime now.

Question 31: Is the AOC between the District and Chevron the reason why the community has since October 2008, not been able to properly access and view documents on the DOE web page?

In the Feb. 2009 public meeting Director Hawkins stated the District would be open and transparent with the Riggs Park community?

Question 32: Why, in this public meeting, didn't Director Hawkins announce that DDOE and Chevron in January 2008 entered into an AOC?

Question 33: Please explain the parameters of the AOC and how this AOC affects the relationship between DC DOE and the residents of Riggs Park?

Question 34: Has the gasoline plume seem to be diminished because Chevron has been permitted to inject cloaking chemicals (hydrogen proxide) into the Sub- surface?

The DCRS mentions DOH development and Administration of a health survey in Riggs Park for those who reside in the plume footprint caused by the leakage of gasoline from the gasoline station.

Question 35: Does this footprint include carcinogens MTBE and PERC and in breakdown product as well?

Question 36: Is Chevron collaborating through DOE or directly with DOH on the District health survey and its "specific questions" to be asked to the residents of Riggs Park?

Page 5 Cleo Holmes response to the District Remedy Selection

Nowhere in the District Remedy Selection does it mention the continuing oversight of and distribution of chevron regulatory monthly and semi annual groundwater sampling results to and on behalf of the residents of Riggs Park.

Question 37: Will the resident be guaranteed to receive copies of all future test results complete with executive summaries for as long as testing regulatory testing of the groundwater is ordered?

To: Sharon Cooke, Director
Community Outreach Office, District Department of the Environment

From: Mary L. Wilkins
Owner, 672 Nicholson Street, N.E., Washington, D.C. 20011

Date: April 5, 2009

Re: Riggs Park Remedy – 4 Questions

In reference to your e-mail dated March 11, 2009, the following is my response to the District Department of the Environment/Department of Health, Remedy Selection For Riggs Park Community, Washington, D.C. report dated February 20, 2009.

PERC results April, June, and August 2008:

[Below results are in ppbv]

April 2008:

VMP== [REDACTED]

June 2008:

VMP== [REDACTED]

Aug 2008:

VMP== [REDACTED]

Indoor air result April 2008:

April, 2008== [REDACTED]

Question #1:

When the June 2008 VMP increased from [REDACTED] to [REDACTED] why didn't the contractor sample in August 2008 to see if indoor air had increased as well? In fact, the August 2008 VMP went to [REDACTED] ppbv, proving that the contractor erred in his/her responsibility.

Question #2:

Do you intend to put Vapor Mitigation systems on Nicholson Street, N.E.? I'm concerned because the residents on Nicholson Street are so close to the water table. If you are not putting in the vapor remedial systems, how are you guaranteeing the protection of the residents from 500 Nicholson to 808 Nicholson Street, N.E.?

Wilkins' Questions (continued)
Riggs Park Remedy – 4 Questions
Page 2

Question #3:

If my next door neighbor has a crack in her slab, how will this affect the selected remedial system for my property? If there is an alternative remedial system, how will this address the needs of two homes on one slab?

Question #4:

My final question addresses the oversight of the Vapor Mitigation system. Will the District be responsible for the oversight, sampling and operation of this system?

I am requesting that your answers to my questions be made a permanent part of the public record for the Riggs Park Remedy Selection.

Thank you.

Mary L. Wilkins


Washington, D.C. 20011

April 5, 2009

Ms. Hazel Lawson

[REDACTED]
Washington, DC 20011

Comments to District Final Remedy

I am requesting my questions and DOE answers to my questions be published as a part of the DC Remedy Selection.

Here are my SSP&A readings for this chemical.

	Tetrachloroethene	
Feb 08 VMP	[REDACTED] ppbv	[REDACTED] ug/m3
April 08 VMP	[REDACTED] ppbv	[REDACTED] ug/m3
July 08 VMP	[REDACTED] ppbv	[REDACTED] ug/m3

Question: Why is it there are no published numbers that tell the residents what number, i.e. ppbv or ug/m3, is used to qualify their home to receive a vapor mitigation system.

Question: How can your remedy selection be consider adequate if there are no numbers published to tell the residents at what chemical level (reading) this home must receive protection?

Your Remedy mentions to receive a Vapor Mitigation System the chemical of concern must be attributable to groundwater contamination.

Question: In the interest of full disclosure, why hasn't the district released the groundwater test results for the residents to see?

Question: I do not see results for a groundwater sample taken at this property, so given the fact Tetrachloroethene is present in groundwater behind doesn't my hoe being so close to the groundwater qualify my home for the installation of a vapor mitigation system?

Question: With the depth to contaminated groundwater being within feet from my basement and slab, has the District or Papadopulas taken groundwater samples directly under my slab to ascertain the length of time it would take for this contaminated water turned to vapor would take to come in contact with the slab of my home?

Question: Why didn't the Papadopulas measure and report on, the depth to the groundwater under my slab as it is a relevant factor when considering if vapor intrusion is more apt to affect my home?

Question: Why did Papadopulas, after evaluating my Feb. and April results, not take another indoor air sample to find out how much my indoor air was being affected by the increasing tetrachloroethene?

Page 2: Lawson comments to the DC Remedy Selection

Question: Did the District order Papadopoulos not to do a July 08 verifying evaluation of indoor air as part of a pre-existing agreement with Chevron not to take 3rd quarter indoor air samples at any resident?

Question: Does the District consider not performing a third quarter indoor air sample in my home as being protective of health concerns for my home and family?

Question: Why doesn't the District Remedy Selection explain how tetrachloroethene can move from my property to my co slab owner and, under what conditions can the amount of chemical be made to increase to cause harm to my co slab neighbor and her family?

Question: My co slab neighbor has a newborn baby, since our slab has increasing tetrachloroethene VMP readings, what are the possible negative health affects can this chemical cause this child?

Question: With the groundwater being so close to the homes on Oglethrope Street, how will vapor mitigation systems be installed on Nicholson Street given most of the homes are on the water table?

Question: How many inches or feet off the water table does the contaminant tetrachloroethene begin to turn into contaminated vapor?

Question: Why does the District not mention soil contamination at slab, does this District feel there remedy is complete and validated without a proper evaluation of how many feet of the soil under and around my home is contaminated?

Question: Since the VMP is installed flush with the slab under my home, and the VMP results reveal the presence of contaminate tetrachloroethene, does this mean the soil directly under my home is contaminated as well?

Hazel Lawson



Ethel Archie Comments District Remedy Selection

April 5, 2009

In the Papadopulos results there is evidence of Tetrachlorethene, Chloroform, Benzene and 1,4 Dichlorobenzene have increased to levels to cause me to have concerns about the possible health affects these chemicals either individually or collectively could have on me and members of my family as well.

I request the questions and answers be published as a part of the Riggs Park District Final Remedy Selection

Question: Can the District explain the decision not to evaluate the cumulative affects these chemicals could have on my family?

Question: I have a new born living in my home; does the District feel the lack of a proper investigation of the cumulative affects is the proper kind of investigation to protect the health of my grand daughter's child living in my home?

Question: Can the District assure me without the protection of a vapor mitigation system the health of my family members will not deteriorate, in the future, as a result of these chemicals toxic chemicals in the sub surface under and around my home?

Question: Did Papadopulos perform soil and groundwater sampling on my property? If so why weren't the results released to our family for review prior to commencement of the comment period?

Question: I have been a member of the DOE canceled Riggs Park Advisory Committee. Why in monthly meetings RPAC during the past year, after being asked repeatedly, did DOE, a member of RPAC, choose to hide the fact DOE had been in talks with Chevron prior to the start of the District funded Papadopulos study?

Question: What effect did the agreed to District/Chevron Admin. Consent Order have on the resident not being able to see certain documents that were generated by the testing done by Padadouplos paid for by District taxpayer money?

Thank you

Ethel Archie
Ethel Archie

Washington, DC 20011

April 6, 2009

TO: Victoria North, District Dept. of the Environment
FROM: Tamiko Lofty, Homeowner
SUBJECT: Response to the District's Selected Remedy for the Riggs Park/Chillum Site

I, Tamiko Lofty, reside in Riggs Park at the following address:

[REDACTED]
Washington, D.C. 20011

I am requesting that my house be considered for a vapor mitigation system for the following reasons:

In the March 2008, first quarter results from the Papadopulos test, Tetrachloroethene, which is a known carcinogen, was detected in high numbers in both the indoor air and subslab test results (See Attachment A). In the July 2008, second quarter results the same carcinogen appeared at a high rate (See Attachment B). In the September 2008, third quarter results, which was also the final testing; the same carcinogen appeared, again, at a high rate (See Attachment C).

Because of the high the numbers which have appeared in each of the tests conducted at my home, I would like DDOE to answer the following questions:

1. Why did DDOE not order additional "indoor air" testing after receiving the high results which appeared in the 1st quarter?
2. What numbers have been set by the District of Columbia to determine action levels?
3. Do high test results of known carcinogens warrant vapor mitigation systems?

It is extremely important that my concerns be addressed and remedied, and I would appreciate immediate attention. Thank you.

Tamiko Lofty

[REDACTED]
Washington, D.C. 20011

Home [REDACTED]

Cell [REDACTED]

Work [REDACTED]

ATTACHMENT A

PAPADOPULOS DATA FIRST QUARTER RESULTS

Collection Date
28-Mar-08

Received
31-Mar-08

(FOLLOWING THIS PAGE)

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Health



April 23, 2008

Dear Riggs Park Resident:

Attached is the data from the first quarter sample collected in your home by S. S. Papadopoulos. The attached data, along with data that will be collected in the second and third quarter of this year, will be analyzed and the findings presented to you in the form of an "Individual Home Test Report" (IHTR) sent to you in the fall 2008. The IHTR will include test results (data) and basic information on testing, including preliminary interpretation of data.

If you have any questions, you can contact Judith Johnson at (202) 442-9335 or Ronald King at (202) 442-8983. DOH will continue to meet you at the Riggs Park Community meeting held on the first Thursday of each month at 6:30 pm at the LaSalle Elementary School.

Sincerely,

A handwritten signature in black ink, appearing to read "V. Sreenivas".

V. Sreenivas, Ph.D., CPM
Chief of Environmental Health Affairs

Enclosure

Selected Material
Redacted for Privacy

ATTACHMENT B

**PAPADOPULOS DATA
FIRST QUARTER RESULTS**

Collection Date
25-Jul-08

Received
28-Jul-08

(FOLLOWING THIS PAGE)

Selected Material
Redacted for Privacy

ATTACHMENT C

**PAPADOPULOS DATA
FIRST QUARTER RESULTS**

Collection Date
12-Sep-08

Received
15-Sep-08

(FOLLOWING THIS PAGE)

Selected Material
Redacted for Privacy

April 4, 2009

Gertrude Johnson S.S. Papadopoulos Home ID # [REDACTED]
[REDACTED]
Washington, DC 20011

RE: DC Remedy Selection

Response to District Remedy Selection for Riggs Park Due April 6, 2009

Let me state for the record I find the manner in which DC Department of the Environment handled their part of the Papadopoulos testing was and continues to be deplorable. I feel this department of the District government should be investigated for violations of the public trust. In the case of my home this department provided no solutions only controversy to this already frustrating situation. I demand my opening statement be published and made apart of the formal record of this contract investigation.

If as quoted in DC Remedy Selection, "the district has based the decision on sub-slab soil vapor samples" and " sub-slab soil vapor results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor air vapor intrusion".

Is "Chemical of Concern "Perchloroethene " mentioned of page 5 of DC Remedy another way word for Tetrachloroethene?

Why is the District and its contractor SSPA decide not to do 2nd or 3rd round of Indoor air sampling at my home?

- A.) The February 08 indoor air sample result for chemical compound Tetrachoroethene was [REDACTED] ppbv.
- B.) Tetrachloroethene readings in my VMP went from negative in February 08 to [REDACTED] ppbv in June 08, to [REDACTED] ppbv in August 08?
- C.) Tetrachloroethene readings in PVMP 1 went from [REDACTED] ppbv in February to [REDACTED] ppbv in June and [REDACTED] ppbv in August
- D.) Tetracholoethene readings in PMVP2 went from [REDACTED] ppbv in Februray to [REDACTED] ppbv in June08.

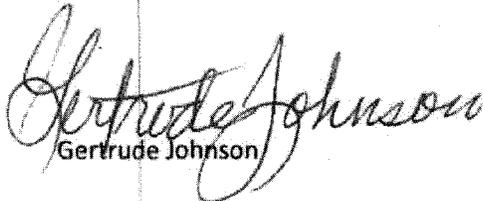
A, B,C, and D. is evidence tetrachloroethene is increasing. Why did the District not perform additional indoor air testing in Q3 to address this obvious concern?

Since EPA and Chevron are not going to clean up the groundwater under my home, why doesn't the District Remedy address the issue of the fact not potentially that Tetrachloroethene, is increasing, in the sub-surface under my home. What does the District plan to do to prevent my home from future exposure?

In the Riggs Park Indoor Air, Sub-Slab, Soil and Groundwater Analysis Report, Table 3- states in Q1 "[REDACTED]" I have on memory of this ever happening. Table 8- reveals on 4-3-08 a soil sample was taken at the depth of [REDACTED] feet. No Lab results were provided me by the date of this my response to the DC Remedy.

In February 09 I sent and the District DOE received my FIOA request, my request asked for results from all indoor air, soil, soil vapor, and groundwater test taken in or on my property. This request also asked for copies of all field notes, log books and any other documents generated by S.S. Papadopoulos or its contractors during this sampling event. To date DOE my FOIA has not satisfied my request.

In the District Administrative Record File, why is SSPA Final Report Appendix B, C, R,S, T, considered to be "Confidential" When DC DOE Director Hawkins has come before this community and said this investigation and results are completely transparent and above board. Why is DOE keeping the aforementioned files "confidential" ?


Gertrude Johnson

From: Barbara Davis [candie077077@yahoo.com]

Sent: Tuesday, April 07, 2009 11:14 PM

To: Cooke, Sharon (DDOE)

Cc: fenty@dc.gov; Delores Ford; Frank Harris; Cleo Holmes; Darrel Johnson; ANDREW Robertson JR; eddie_Judy; King, Ronald (DOH); Mary L.; Deborah Lehner; Andrew Robinson; Bettye Tate; Bernard Tinner; Janice Wade; juanita waller; Carol Warren; Barbara Davis

Subject: "A Formal Request"

04/07/2009

Ms. Cooks,

I hope this e-mail find you in good health.

Ms. Cooke the subject of this matter is a **'Formal Request for a 'Vapor Mitigation System'** to be install at my address. Which is stated in the "District of Columbia Remedy Selection".

Even thou **I wasn't allow to participate in the 2008 S. S. Papadopolous Study, I'm Formally Requesting, again a 'Vapor Mitigation System' at my address.**

Ms. Cooke, I'm also **requesting that my question (request), and your answer to my request (question) be made apart of the official record for this study. "I will await your Speedy Decision".**

'Thanking You In Advance' & "God Bless"

Ms. Barbara J. Davis

12/08/08

Dear Ms. Cooke,

I am requesting a **"Full Data Pack"** from Spectrum Laboratory of all tests performed by S.S. Papadopoulos at my property: [REDACTED]. Also I'm requesting the **"Tentative Identified Compounds"** I shall look forward to receiving this information **within 7 to 14 business days** from the **date of this e-mail message.**

In addition, I would like to request a **"Vapor Mitigation System"** to be installed on my property, as soon as possible.

'Thanking You in Advance' on these matters.

"God Bless", MS. Barbara J. Davis

candie077077@yahoo.com

Glenda Theodore

[REDACTED]
Washington, DC 20011

April 5, 5009

RE: S- [REDACTED] Comments District Remedy Selection

I notice the Naphtalene in April VMP 1 was [REDACTED] ppbv- [REDACTED] ug/m3 and June [REDACTED] ppbv- [REDACTED] ug/m3 indoor sample o8 reveal increase of almost a 3 times is this be proof that this chemical has entered into my home?

Why did the District and Papadouplas elect not to retest the indoor air in the 3 quarter to validate in increasing and intrusion of this deadly chemical into my home?

For what reason can District defend this type negligent testing behavior as the proper way to evaluate how and if toxic chemicals are coming into my home?

Please explain why the residents were told about the dangers of Naphtalene and its being a human carcinogen?

When I come to meeting why does DOE give the impression as though they are not working in the best interest of the Riggs Park residents?

No matter what I the District should install a vapor mitigation system installed at my property to insure my family safety, does the District agree with me?

I need my comments and the Districts response to my comments to become a part of the official record of the District of Columbia Remedy Selection.

Glenda Theodore

Betty Tate District Remedy Comments April 5, 2009 please publish as part of record

In selecting this Remedy, The District has evaluated the risk for healthy adults.

Question: Why didn't the Dc Remedy mention, adults that may already have health problems, their conditions can be aggravated by exposure to gasoline and PERC vapors coming into their homes?

DDOE has not evaluate the indoor air results in any building in this study and the Actual Cumulative Risk Levels, therefore the Cumulative Risk Level in the Remedy is not known..

Question: Is the DOE decision not to evaluate the Cumulative Risk Levels in Riggs Park a condition of the agreed to DC and Chevron Administrative Consent Order ?

September 11, 2008, Mr. Andrew Fan stated that the upwelling of the contaminated deeper water rising up into shallow water and clean water appears in the Oglethrope Street area-this has something to do with El Nino year off the Coast of Peru, the Contaminated groundwater is still there.

Question: Can this be true?

Question: Is the DOE decision not to challenge EPA decision not to clean up the groundwater a part of the Administrative Consent Order between DOE and Chevron?

Question: Why is the District not establishing toxicity value for the Chemicals in Table 2 that were detected in Riggs Park sub-slabs soil vapor samples?

Question: Does the District feel the District Remedy Selection is flawed because of the lack of a Cumulative Risk of evaluation?

In Jan. 08 a Indoor Air sample was taken at my home, Napthelene was [REDACTED] ppbv-[REDACTED] ug/m3

Question: Why didn't Papadopoulos not come back to my home and do another indoor air test to see if these numbers were increasing or decreasing?

Question: Why is the District asking for the residents to comment on a District Remedy Selection, without the community being able to read the District promised individual report we were promised at the prior to the start of the Papadopoulos contract?

Question: Why, when DOE, came into the picture, did the contract deliverables change to non existent?

Question: How much of the \$ 500,000.00 DOE paid to fund the Papadopoulos contract did Chevron refund to the District as a condition of the District and Chevron Administrative Consent Order?

Cancer is not the only health concerns that are affecting this community. We have residents with Respiratory, Kidney, Liver, and others.

Question: Will the District Remedy Selection give a strong recommendation that a gasoline and PERC related chemical(s) health study/survey be performed in Riggs Park?

Darrell Johnson Comments

DC Remedy Selection

April 5, 2009

Please receive and publish all my questions, attachment and all the District response to my questions in a public format.

Here is a part of my

Tetrachloroethene

	VMP 1	VMP 2
Feb 08.	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3
April 08	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3
Sept 08	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3

Why did Papadopulos and the District decide not to resample the indoor air of my home to see how much this chemical is increasing in our indoor air?

How can the District call this study-evaluation complete and accurate without properly evaluating all factors involved with publishing whether or not vapor intrusion is a happening at my home?

What factors in the attached "District and Chevron Administrative Order" on Consent altered the manner in which the District's contractor Papadopulos performed the duties and responsibilities of the contract the District taxpayer funds paid to receive?

Why didn't the District notify the Riggs Park residents of the DC and Chevron Order of Consent was been negotiated and agreed to?

Why did the District Remedy Selection publish the amounts of chemical contamination that would trigger the installation of a vapor mitigation System?

Since this chemical is on the increase, what is the possible accumulative health affects of this chemical and could this increasing chemical increase the carcinogenic effect of other chemicals and collectively increase the potential for illness at my property and my neighbors as well?

I am Darrell Johnson and I approve this message

Delores Ford

It is documented in either the December 2008 or the January 2009 public meetings where this community repeatedly pleaded and begged our District government's ' Councilwoman Bowser, Department of Health, Department of Environment, ATSDR, and EPA to install additional monitoring wells between 643 through 736 Oglethorpe Street because in the reports that placed in Lamond/Riggs Library shows that no data is being produced out of Monitoring Well #39 because it is in a clay area. We were told by EPA that monitoring wells can not produce data if they are in monitoring wells. I strongly believe it is this type of behavior from our District and Federal government officials and agency representatives that are responsible for countless members of this community question the motives and actions of those in authority!

Director Hawkins told us in the February 5, 2009 meeting that the District of Columbia could have Chevron install or etc... in this community and they would do it!

1. When are you going to ask Chevron to install additional monitoring wells in this particular area;
2. Why hasn't the District government and DDOE follow up with a health survey that addresses the cancer conditions between this locations since it was reported to you;
3. When the RPAC members conducted their own health survey on Oglethorpe Street, it was found that alarming numbers of cancer has been and still is rampant between that section of homes;
4. Data proves that there is liquid gasoline present on Oglethorpe Street.. Where are additional monitoring wells going to be installed between 651 through 736 on Oglethorpe Street. Because there are not data producing wells in or around these addresses?
5. How clean is the ground water on Oglethorpe Street?

Marion Drummond S- [REDACTED]

[REDACTED]
Washington, DC 20011

April 5, 2009

RE: Comments related to the District Remedy Selection

I asked the District for 2 months and finally received one Papadopulas identification number, I went to the library and researched I found there are two ID #s for my home. Why did the District not disclose I had a second identification number?

How many other homeowners who participated in this study have been two ID numbers without their knowledge?

Since the District did not disclose the 2nd number, this number revealed there was a soil sample taken at my home but did not give me the results of these test taken on my property. How can the District initiate a public comment period without allowing the residents the ability to view then comment on the soil and groundwater results of samples taken from their homes?

Has the District shared the soil, soil vapor, groundwater, and indoor air results with chevron prior to this resident public comment period?

I am very concerned about the depth to the groundwater under my property and the ability of the toxic chemical to come into my home now and in the future. How can the District protect me from these chemicals coming into my home?

Is the District or Chevron going to clean up this contaminated groundwater under my home?

S [REDACTED] Riggs Park Indoor Air, Sub slab vapor, soil and groundwater report makes reference to my basement [REDACTED] and resident refused removal of [REDACTED] from the basement. This statement is not correct, I never made this kind of statement and my basement was not [REDACTED].

Please publish my questions and the District response to my questions as a part of the administrative record for this DC Remedy Selection and the Riggs Park Administrative Record.

Marion Drummond.

From: John Dunston [johndunston923@yahoo.com]

Sent: Wednesday, April 08, 2009 11:11 PM

To: Cooke, Sharon (DDOE)

Cc: cleo holmes; darrel johnson; delores Ford; Carew, Christopher (DDOE); Corman, Bicky (DDOE); Delgadillo, Gabriela (DDOE); North, Victoria (DDOE); Kauffman, Nick (DDOE); Graham, Robin (DDOE); Etwaroo, Larissa (DDOE); b.tate33@yahoo.com; darrel johnson; Carol Warren

Subject: Re: dc remedy coments

Attachments: chain of custody.pdf

Ms. Cooke, I need someone to explain this chain of custody to me. I was looking through the SSA file and I found this about my sample. My ID number is [REDACTED]. The chain of custody looks like the sample was taken from my house on [REDACTED] at [REDACTED] pm. On [REDACTED] at [REDACTED] am the samples left this location and arrived at the final destination, assume the laboratory. I need the district to explain what appears to be two other persons doing something with the canisters on [REDACTED]. It shows these persons leaving this location at [REDACTED] pm. This causes me to wonder were these canisters tampered with in this time period, what was going on. I would like a detailed description for the actions of everyone who came in contact with my canister for the entire time this chain of custody describes.

Can this email questions and answers be made an official part of the DC Remedy selection and the official record for the Riggs Park Chillum investigation.

Ms. Cooke please confirm you received this email.

John Dunston

From: "Cooke, Sharon (DDOE)" <sharon.cooke@dc.gov>

To: John Dunston <johndunston923@yahoo.com>

Cc: cleo holmes <cholm7777@yahoo.com>; darrel johnson <d.johnson14@yahoo.com>; delores Ford <delores.ford@yahoo.com>; "Carew, Christopher (DDOE)" <christopher.carew@dc.gov>; "Corman, Bicky (DDOE)" <bicky.corman@dc.gov>; "Delgadillo, Gabriela (DDOE)" <gabriela.delgadillo@dc.gov>; "North, Victoria (DDOE)" <victoria.north@dc.gov>; "Kauffman, Nick (DDOE)" <Nick.Kauffman@dc.gov>; "Graham, Robin (DDOE)" <robin.graham@dc.gov>; "Etwaroo, Larissa (DDOE)" <larissa.etwaroo@dc.gov>

Sent: Monday, April 6, 2009 10:23:17 AM

Subject: RE: dc remedy coments

Mr. Dunston,

I received your comments on the District's Proposed Remedy for Riggs Park.

Regards,

Sharon Cooke
Director
Community Outreach Office
District Department of the Environment



From: John Dunston [mailto:johndunston923@yahoo.com]

Sent: Sunday, April 05, 2009 6:25 PM

To: Cooke, Sharon (DDOE)

Cc: cleo holmes; darrel johnson; delores Ford

john dunston

[REDACTED]
washington, dc 20011

ref. response to dc remedy selection

april 5, 2009

let me first state I want my questions and the district answers to my question to be made apart of the official district administrative record of the riggs park contamination investigation

i have not received a copy of the results of a soil sample taken [REDACTED] at a depth of [REDACTED]. does the district think it is fair for them not to allow me the ability to view and comment on the soil sample as a part of this comment period?

what is acetone and why is it so high in gmpr 1 ([REDACTED] ppbv-[REDACTED] ug/m3 and gmpr 2 ([REDACTED] ppbv-[REDACTED] ug/m3)?

an indoor air test was taken from my property in february 2008. the laboratory results from this sample showed 1,4 dichlorobenzene in my indoor air as [REDACTED] ppbv - [REDACTED] ug/m3. why did the district not do another indoor air sample in april or august to investigate this high february number?

why does DOE feel by not disclosing results of all tests the residents will have a fair opportunity comment on issues related to the indoor air, soil, soil vapor and groundwater samples taken from their properties?

in the feb. public meeting doe director george hawkins stated the district would be transparent with the documents for the riggs park community. what documents are in appendix a, b,r,s, t, the districts administrative record file for the riggs park remedy selection that cause these files to be treated as confidential.

through agreement with chevron, did the district share these confidential files with chevron when these files came available from papdaopulas?

in the January 08 administrative order of consent between chevron and doe the chevron agreed to pay \$10,000.00 of the cost for the district expert toxicologist. did the district reveal the name of its expert toxicologist when negotiating this consent order with chevron?

how much money did chevron pay the doe prior to and while the papadoupas study was being done?

as part of the aoc did chevron have access to resident results before the resident did?

councilwoman bowser's office held 10 to 12 monthly ward 4 public meetings, with representatives of DOE in attendance. why did doe choose not disclose the terms of the administrative order of consent at the request of chevron?

page 2 john Dunston comments to the district remedy

when exactly did doe inform the mayor office and councilwoman bower that doe had agreed to enter into an administrative order of consent with chevron?

since chevron paid for the services of victoria north, did the district agree to limit the monitoring of chevrons site activities and/or not continue monitoring chevron site activities on behalf of the residents of riggs park?

when the residents asked questions by email and public meeting did the doe agree limit answers to the residents questions as a result of an agreement with chevron?

as a result of the aoc between chevron and the district did chevron have access to the districts experts toxicologist prior to the release?

what percentage of the district remedy selection was negotiated and modified with chevron prior to its release to residents of riggs park?

why when the district knew the mistrust the residents have of chevron, why did doe enter into secret activities with chevron without the knowledge of and against the will of the district very residents chevrons caused harm?

i am truly concerned and upset that the very department, dc department of the environment, with the mission to protect the residents of the district from environmental harm, entered into an agreement against the very residents this agency was created to protect. this action by doe has cause me to wonder why the residents of the district are not being treated in a honest and fair manner. i am asking the mayor of the district of columbia to have a public hearing to investigate the activities the district department of the environment. this hearing must be open and transparent as to allow the residents of riggs park and the district of columbia full disclosure.

Again I state I want all my questions and doe answers to my questions published and made apart to the official record for the riggs park contamination investigation.

john dunston

Chillum Resampling Locations

1. HSCD has reviewed all of the Indoor Air data for the 151 homes sampled, and identified the following 7 homes as locations where the Contaminant of Concern (COC) in basement readings exceed EPA's 10-4 cancer Risk Screening Levels (RSLs) or result in a non-cancer hazard index (HI) > 1 (using standard residential exposure assumptions). HSCD further reviewed the historical sampling results, and provides the following house specific recommendations:

██████████ - COC is Naphthalene, which is not related to either the suspect gas station or dry cleaner releases. DDOE performed the one sampling event in 2008. DDOE should advise the residents of the risk value exceedance, and consider further identification of an indoor source. Relative to investigation of the Chillum Site gasoline or dry cleaner releases, no additional sampling is recommended.

██████████ - COC is 1,4 Dichlorobenzene; it is unclear whether this is related to the suspect gas station leak but it is not known to be a dry cleaning chemical. Only one indoor air and subslab sampling event was performed by DDOE. Subslab concentrations were significantly less than the indoor air results. Therefore, it is recommended that an additional round of contemporaneous sampling be performed to more fully characterize subslab and indoor air at this residence.

██████████ - COCs are Carbon Tetrachloride and Chloroform, which may be related to the suspect dry cleaner release. These COCs were detected by EPA above the 10-4 cancer risk level in the July 2003 sampling event. The data from the April 2005 EPA and the DDOE 2008 sampling events are within acceptable risk levels. Subslab levels were either comparable to or less than the Indoor Air levels. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.

██████████ - COCs are 1,2,4 Trimethylbenzene and 1,3,5 Trimethylbenzene; it is unclear whether the results are related to the suspect gas station leak but they are not known to be dry cleaning chemicals. Only one indoor air and subslab sampling event was performed (by DDOE). The COCs were detected in only one of the 6 Subslab samples, and this one sample concentration was significantly less than the indoor air. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ - COC is Chloroform, which may be related to the suspect dry cleaner release. Only one indoor air and subslab sampling event was performed by DDOE. The three subslab concentrations for Chloroform were significantly less than the indoor air. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ – Vapor Mitigation System has been installed. Therefore, no further evaluation of historical data was conducted.

██████████ – COC is 1,2,4 Trimethylbenzene; it is unclear whether this is related to the suspect gas station leak but it is not known to be a dry cleaning chemical. This COC was detected above the RSL in an April 2004 EPA sampling event. The data from the April 2003, July 2003, June 2005, and April 2006 EPA sampling events and the DDOE 2008 sampling event were non-detect for this COC. Subslab levels for this compound also were non-detect. This residence will be discussed further under the Subslab data review, and it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.

2. HSCD has reviewed all of the subslab data for the 151 homes sampled, and identified the following 3 homes as locations where the Contaminant of Concern (COC) exceeds EPA's 10-3 cancer Risk Screening Levels (RSLs) or results in a non-cancer hazard index (HI) > 10. By applying this screening level, we are using the conservative Attenuation Factor of 0.1 for vapors migrating from subslab to indoor air. HSCD further reviewed the historical sampling results, and provides the following house specific recommendations:

██████████ - COC is Naphthalene detected by DDOE, which is not related to either the suspect gas station or dry cleaner releases. It should be noted that Naphthalene was not detected in any of the 4 Indoor Air samples collected by EPA in July 2003, April 2004, February 2005 or DDOE in 2008, nor in 5 of the 6 Subslab samples collected in 2008 by DDOE. DDOE should advise the residents that a public health threat exists. No additional sampling relative to the Chillum Site groundwater releases is recommended.

██████████ – COC is Chloroform, detected by DDOE in 2008, which may be related to the suspect dry cleaner release. Only one indoor air sampling event was performed by DDOE, which was non-detect. It should be noted that Chloroform levels exceeded the RSL in five out of the 6 DDOE subslab samples in 2008. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ – COC is Tetrachloroethene; which is likely related to the suspect dry cleaner release. This COC had significant levels detected in all of the Subslab samples collected in EPA's July 2003 and DDOE 2008 sampling events. It should be noted that the COC was not detected in indoor air in EPA's April 2003, July 2003, April 2004, June 2005, April 2006 sampling events and the DDOE 2008 sampling events. It is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.



**Chevron Environmental
Management Company
Marketing Business Unit
2300 Windy Ridge Parkway
Suite 575 South
Atlanta, GA 30339
Tel 770-984-3104**

April 20, 2009

District of Columbia Department of the Environment
Attn: Victoria North
51 N Street NE, 6th Floor
Washington, DC 20002

RE: Comments on Remedy Selection, Risk Assessment and S.S. Papadopoulos Report
Former Chevron Facility
5801 Riggs Road
Chillum, MD

Dear Ms. North:

Enclosed are Chevron's interim comments related to the following documents:

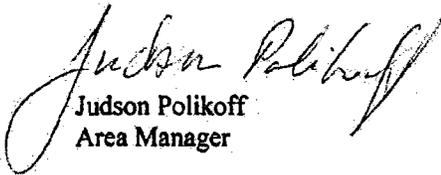
Remedy Selection for Riggs Park Community, Washington, D.C.

*Methods: Riggs Park Comprehensive Human Health Risk Assessment Long Version, and Summary Tables
Supplied by Expert Toxicologist 2/13/09*

Riggs Park Indoor Air, Sub-slab Vapor, and Groundwater Sampling and Analysis Report

If you have any questions, please call me at 770-984-3104.

Sincerely


Judson Polikoff
Area Manager

cc: Bicky Corman
Andrew Fan
Herb Meade



GANNETT FLEMING, INC.
Seton Business Park
4701 Mount Hope Drive
Suite A
Baltimore, MD 21215
Office: (410) 585-1460
Fax: (410) 585-1470
www.gannettfleming.com

April 17, 2009

Mr. Judson Polikoff
Area Manager and Assistant Secretary
Chevron Environmental Management Company
2300 Windy Ridge Parkway, Suite 575
Atlanta, Georgia 30339

**RE: Review of Remedy Selection for Riggs Park Community, Washington, D.C.
Former Chevron Facility 122208, Chillum, Maryland**

Dear Mr. Polikoff:

As requested, Gannett Fleming, Inc. (GF) has reviewed the *Remedy Selection for Riggs Park Community, Washington, D.C.*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland, dated February 20, 2009. The report was prepared by the Government of the District of Columbia Department of the Environment (DDOE) and Department of Health (DOH).

The following references were used in the review of the report:

Agency for Toxic Substances and Disease Registry (ATSDR), 2008. Health Consultation, Indoor and Outdoor Air Data Evaluation for Chillum Perc Site. Dated April 2008.

Gannett Fleming, 2003. Description of Current Conditions Report. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2003.

Gannett Fleming, 2006. Site Investigation Report. Former Chevron Facility 122208. Dated July 2006.

Gannett Fleming, 2007a. Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2007.

Gannett Fleming, 2007b. Baseline Risk Assessment. Former Chevron Facility 122208, Chillum, Maryland. Dated January 2007.

Interstate Technology & Regulatory Council (ITRC), 2007. Vapor Intrusion Pathway: A Practical Guide. Dated January 2007.

McHugh, T., P. DeBlanc, and R. Pokluda, 2006. Indoor Air as a Source of VOC Contamination in Shallow Soils Below Buildings. Soil and Sediment Contamination, Vol. 15, pages 103-122.

S.S. Papadopoulos & Associates, Inc., 2009. Riggs Park Indoor Air, Sub-slab Soil Vapor, Soil, and Groundwater Sampling and Analysis Report. Dated February 2009.

Mr. Judson Polikoff
Chevron EMC
April 17, 2009
Page 2 of 6

U.S. Environmental Protection Agency (EPA), 1989. Risk Assessment Guidance for Superfund, Volume 1, Part A.

EPA, 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. EPA 530-D-02-004.

EPA, 2007. Letter to Ms. Denise Dixon of Chevron, re: Comments on Corrective Measures Study. Dated June 2007.

EPA, 2008. Final Decision and Response to Comments, Chevron Gasoline Release at Chillum, Maryland. Dated April 2008.

GF reviewed the report for technical content, data gaps, validity, accuracy, completeness, and compliance with regulations and guidance.

GENERAL COMMENTS

1. The District of Columbia's (the District's) remedy for the Riggs Park community was selected after reviewing data collected by S.S. Papadopoulos & Associates (SSP&A) (2009), additional documents contained in the administrative record, and conducting an extensive human health risk assessment. The selected remedy described in this document is the "installation and operation of vapor mitigation systems in up to 45 residences with elevated sub-slab soil vapor levels attributable to contaminated groundwater." However, groundwater was not evaluated as part of the remedy selection. Rather, the District states the sub-slab soil vapor "results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor vapor intrusion." However, a review of the September 2008 groundwater analytical results for shallow wells screened across the water table indicated only 17 compounds were detected above laboratory reporting limits and only 13 of these compounds were detected by DDOE in sub-slab soil vapor (Attachment 1). Thus, of the 36 compounds identified in sub-slab soil vapor and assumed by the District to be potentially emanating from groundwater, only 13 were actually detected in shallow groundwater in September 2008. As a result, the DDOE HHRA likely overestimated the risk to residents by including 36 compounds in the assessment instead of the 13 present in shallow groundwater.

The likely source of the compounds detected in sub-slab soil vapor that are not present in groundwater is indoor air (McHugh, et al., 2006). As noted in the SSP&A data set for indoor air, ambient air, sub-slab soil vapor, and outdoor soil vapor, this phenomenon is observed in Riggs Park (SSP&A, 2009). To summarize the SSP&A data, Freon 11 and 12 are observed in ambient air, indoor air, and sub-slab soil vapor, but not in the outdoor vapor monitoring ports. Freon compounds are commonly detected in ambient and indoor air, but are not likely attributable to subsurface contamination (SSP&A, 2009). Therefore, the Freon compounds are present in the sub-slab soil vapor as a result of infiltration of ambient and/or indoor air through the basement slab. Benzene and other hydrocarbons are also present in ambient and indoor air and it is reasonable to assume that some portion of the concentration of hydrocarbons in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment as well.

Previous investigations conducted by Chevron have demonstrated that contaminants present in indoor air have been detected in sub-slab soil vapor samples (GF, 2007a).

2. The District conducted a "home-by-home" risk assessment (the DDOE HHRA) whereby the individual risk for each residence within the study was calculated. More than 1,700 separate risk assessments were conducted. Chevron has several concerns regarding this approach. First, it greatly compartmentalizes the site into small microcosms and neglects larger trends in sampling data that are observed site-wide. Each home may have a very small data set, perhaps one set of indoor, ambient, and sub-slab data taken at one or a few points in time. Soil vapor concentrations can vary over a wide range both spatially and temporally (SSP&A, 2009). In contrast, the Baseline Risk Assessment for the site (GF, 2007b) took into account thousands of samples from multiple media collected over nearly a decade. Second, this approach introduces a large amount of uncertainty into the risk assessment for each home. The list of factors that influence indoor air concentrations is long and includes personal habits such as smoking, dry cleaning, use of cleaning products, building materials, among many others (SSP&A, 2009). Each of these factors contributes additional uncertainty to a very small data set that already has considerable inherent uncertainty. It is Chevron's position that the home-by-home risk assessment does not provide much value for determining risk to the residents from vapor intrusion.

SPECIFIC COMMENTS

1. **Section I, page 5, bullets 1 and 4.** The first bullet states "No residences have gasoline-related contaminants such as benzene in the SSP&A study in the sub-slab soil vapor at concentrations that exceed the 1×10^{-5} cancer risk level after the application of an attenuation factor of 10%." The last bullet in this section, as well as text in Section III, states "that out of 106 homes, additional residences require vapor mitigation systems (VMS) where gasoline-related contaminants are still present in sub-slab soil vapor." These two statements are contradictory. It is unclear why vapor mitigation systems would be required for residences where the concentrations of gasoline-related compounds in soil vapor are considered to be acceptable.
2. **Section I, page 5, bullet 3.** According to the third bullet in this section, the homes requiring VMS are those where site specific chemicals of concern (perchloroethene [PCE] and its degradation products, 1,4-dichlorobenzene, chloroform, naphthalene, carbon tetrachloride, and methylene chloride) "have the potential to pose a cumulative health risk from sub-slab soil vapor to exceed the 1×10^{-5} cancer risk level after the application of an attenuation factor of 10%." It should be made clear that these compounds are not related to the petroleum release at the former Chevron Facility (SSP&A, 2009).
3. **Section I, page 6, bullet 4.** The District's remedy includes a health survey of Riggs Park residents who reside in the plume footprint caused by the release of hydrocarbons at the former Chevron Facility. It should be noted that the Agency for Toxic Substances and Disease Registry (ATSDR) has issued three health consultations for the site to evaluate the public health implications through the vapor intrusion pathway. ATSDR has concluded that all indoor and outdoor volatile organic compound (VOC) concentrations detected at the site are at levels not expected to cause adverse cancer or non-cancer

health effects and has categorized the site as No Apparent Public Health Hazard for exposures to reported VOC levels (ATSDR, 2008). The goals and purpose of additional health surveys administered by DOH are unclear.

4. **Section II.A, page 7, paragraph 2.** This section states that in October 1989, the release of gasoline into the subsurface was confirmed after Chevron conducted a tightness test on its underground storage tanks. Although this statement is true, it should be noted that vehicle accident damage to a fuel dispenser caused the product line to fail the tightness test (GF, 2003).
5. **Section II.A, page 7, paragraphs 3 and 4.** The first sentence in the fourth paragraph should be replaced with "Final Decision and Response to Comments", which was issued in April 2008 and outlined the corrective measures to be implemented (EPA, 2008).
6. **Section III, page 9, paragraph 3.** This section describes the regulatory framework allowing the District to require and secure corrective actions at the site. Paragraph 3 describes corrective actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Corrective actions undertaken under CERCLA use the risk management tool to select appropriate corrective actions. A human health risk assessment is used by risk managers to determine if corrective actions are warranted for a site. Without the full text and tables of the DDOE HHRA, it is not feasible for risk managers to evaluate the need for, or appropriateness of, corrective action. All text and tables used in the DDOE HHRA are required to adequately determine the appropriateness of the selected remedy. The complete DDOE HHRA was not available for review, therefore the District's conclusions concerning the appropriateness of the selected remedy can not be fully evaluated, and the District's conclusions are not supported by other available information, as described in other comments and documents referenced by the comments.
7. **Section III, page 10, paragraph 6.** This paragraph states that "The Don Clay Memo provides that US EPA remedial action is generally not warranted where cancer risk is found to be below 1×10^{-4} ." The word "below" (less than) should be replaced with the word "above" (greater than).
8. **Section IV, page 10, paragraph 3.** An attenuation factor of 0.1 (10%) was selected, based on Draft EPA Vapor Intrusion Guidance, to represent the amount of sub-slab soil vapors that may be entering the home or that might enter the home in the future (EPA, 2002). Attenuation factors for the migration of sub-slab soil vapor to indoor air are generally based on empirical data and range from 0.01 to 0.1 (ITRC, 2007). The recommended criterion established by EPA in the Draft Vapor Intrusion Guidance is a conservative estimate that assumes the chemicals do not degrade as they migrate upward through the vadose zone; however petroleum hydrocarbon vapors are known to biodegrade in the presence of oxygen (EPA, 2002). Site investigation data collected at the site from 2002 to 2004 suggested that biodegradation of hydrocarbons in soil vapor was occurring in the vadose zone (GF, 2006). In addition, Chevron has calculated a site specific attenuation factor for one residence of 0.0026 based on sub-slab soil vapor and indoor air sampling results conducted in 2007 (GF, 2007a). Since its publication of the Draft Vapor Intrusion Guidance in 2002, EPA has determined that its recommended sub-slab to indoor air attenuation factor of 0.1 may be overly conservative (ITRC, 2007). It is

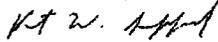
Chevron's position that using an attenuation factor of 0.1 is a very conservative estimate which leads to an overestimation of risk from vapor intrusion of petroleum hydrocarbons.

9. **Section IV, page 10, paragraph 4.** This paragraph makes the statement that Hazard Indices were calculated using toxicity values for both healthy adults and children. Toxicity values are selected on a chemical-specific basis and do not vary based on the age of the receptor. "Exposure parameters" are adjusted to reflect the specific age of the receptor. It appears that the District meant exposure parameters rather than toxicity values.
10. **Section V, page 11, paragraph 4.** This paragraph details the methods for calculating risk based on sub-slab soil vapor samples. According to the Draft EPA Vapor Intrusion Guidance, the sampling of sub-slab air provides a direct measure of the potential for exposures from vapor intrusion (EPA, 2002). It is noted that "for homes with multiple sub-slab soil vapor sample results, the basis of the cancer risk was the sample posing the maximum calculated cancer risk." Text in the SSP&A report indicates that several of the sub-slab soil vapor samples from homes with multiple samples were obtained from several feet below the bottom of the basement slab. The depth ranges of the sub-slab soil vapor samples should be specified, because EPA considers sub-slab air to be soil vapor samples obtained from directly below the foundation or from depths less than 5 feet below the foundation level (EPA, 2002). Deeper soil vapor samples are a more direct measurement of the source vapor concentration and will likely result in higher concentrations than shallow soil vapor samples. The EPA recommended attenuation factor for deep (greater than 5 feet below the foundation level) soil vapor samples to indoor air is 0.01 (EPA, 2002).
11. **Section V, page 12, paragraph 5.** This paragraph states that indoor air samples were not evaluated as part of the DDOE HHRA because of the numerous "background" sources of indoor air (discussed in General Comment #1). It should be noted, however, that all of the indoor air samples collected during the SSP&A investigation were reported to be below EPA's Indoor Air Standards for the site (EPA, 2007).
12. **Section V, page 12, paragraph 6.** The District has evaluated the cumulative risk posed to healthy adults by 66 compounds reported in the samples collected by SSP&A. Of those 66 compounds, 36 compounds detected in sub-slab soil vapor samples (SSP&A, 2009) have been identified as compounds of interest, and were included in the DDOE HHRA. As stated in General Comment #1, of the 36 compounds of interest shown on Table 1 on page 14, only 13 of those compounds have been detected in shallow groundwater (Attachment 1). The compounds evaluated in the DDOE HHRA should only include those compounds that are attributable to groundwater.
13. **Section V, page 12, Exhibit 1.** This table presents exposure assumptions used to calculate the chronic daily dose for the adult receptor. No exposure parameters have been provided for the child receptor. Exhibit 1 should be modified to include exposure parameters for the child receptor. Also, the Risk Assessment Guidance for Superfund (RAGS), which provided the basis for health risk calculations for this risk assessment, requires that references be provided for all exposure parameters (EPA, 1989). Per RAGS, Exhibit 1 should be modified to include the assumptions for the child receptor.

Mr. Judson Polikoff
Chevron EMC
April 17, 2009
Page 6 of 6

If you have any questions or require additional information, please contact the undersigned at (410) 585-1460.

Sincerely,
GANNETT FLEMING, INC.



Robert Scrafford, P.E.
Project Manger

Attachment 1 – Shallow Groundwater Analytical Detections- September 2008

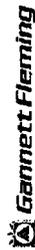
Location	Sample Date	1,2,4- Trinitrobenzene (µg/L)	RL (µg/L)	1,3,5- Trinitrobenzene (µg/L)	RL (µg/L)	Acetone ¹ (µg/L)	RL (µg/L)	Benzene (µg/L)	RL (µg/L)	Chloro form (µg/L)	RL (µg/L)	cis-1,2- Dichloro ethene (µg/L)	RL (µg/L)	Ethyl benzene (µg/L)	RL (µg/L)	Isopropyl benzene ² (µg/L)	RL (µg/L)
GP-11A(20-25)	9/24/08	ND	1	ND	1	5,000	25	ND	1	ND	1	ND	1	ND	1	ND	1
GP-2E(45-50)	9/25/08	ND	2	ND	2	24	10	ND	2	ND	2	ND	2	ND	2	ND	2
GP-2F(45-50)	9/25/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
GP-7A(20-25)	9/24/08	ND	1	ND	1	610	5	ND	1	ND	1	ND	1	ND	1	ND	1
GP-9A(20-25)	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-16 ²	9/25/08	1,700	100	460	100	ND	500	4,700	100	ND	100	ND	100	1,400	100	ND	100
MW-17 ²	10/1/08	1,100	50	320	50	ND	250	5,700	50	ND	50	ND	50	1,100	50	ND	50
MW-18	9/25/08	3,400	20	1,400	20	ND	100	6.1	20	ND	20	ND	20	270	20	27	20
MW-19	9/25/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-22 ²	9/25/08	61	5	16	5	280	25	1,100	5	ND	5	ND	5	95	5	ND	5
MW-23 ²	9/25/08	ND	1	ND	1	19	5	6.5	1	1.6	1	ND	1	ND	1	ND	1
MW-24A	9/24/08	3,100	20	920	20	650	100	ND	20	ND	20	ND	20	640	20	39	20
MW-25A	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-26A	9/23/08	ND	1	ND	1	83	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-27A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-28A	9/22/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-28A	9/22/08	ND	1	ND	1	ND	5	ND	1	1	1	ND	1	ND	1	ND	1
MW-30	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-33S	9/23/08	ND	1	ND	1	63	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-38	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-39F	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-40	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-41A	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-42	9/23/08	ND	1	ND	1	ND	5	ND	1	1.1	1	ND	1	ND	1	ND	1
MW-43A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-44A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-53	9/22/08	ND	1	ND	1	ND	5	23	1	ND	1	11	1	ND	1	ND	1
MW-54	9/22/08	ND	1	ND	1	180	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-55	9/23/08	ND	1	ND	1	23	5	ND	1	ND	1	ND	1	ND	1	ND	1
Number of Detections		5/29		5/29		10/29		6/29		3/29		1/29		5/29		2/29	
Maximum Detection (µg/L)		3,400		1,400		5,000		5,700		1.6		11		1,400		39	

Abbreviations:

- ND - Not Detected
- RL - Reporting Limit
- µg/L - Micrograms per Liter
- TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics

Notes:

- ¹ Acetone is a common laboratory contaminant.
- ² Wells MW-16, MW-17, MW-22, and MW-23 are located within the active remediation area and not in the residential neighborhood.
- ³ These compounds were not detected in sub-slab soil vapor samples collected by SSP&A.



Attachment 1. Shallow Groundwater Analytical Detections - September 2008
 Former Chevron Facility No. 122208
 5801 Riggs Road, Chillum, Maryland

Location	Sample Date	m,p-Xylene (µg/L)	RL (µg/L)	MTBE (µg/L)	RL (µg/L)	n-Propyl benzene (µg/L)	RL (µg/L)	Naphthalene (µg/L)	RL (µg/L)	o-Xylene (µg/L)	RL (µg/L)	Tetra chloro ethene (µg/L)	RL (µg/L)	Toluene (µg/L)	RL (µg/L)	TPH-GRO (µg/L)	RL (µg/L)	Tri chloro ethene (µg/L)	RL (µg/L)
GP-11A(20-25)	9/24/08	ND	4	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
GP-2E(45-50)	9/25/08	ND	2	370	2	ND	2	ND	2	ND	2	10	2	ND	2	320	100	ND	2
GP-2F(45-50)	9/25/08	ND	2	270	1	ND	1	ND	1	ND	1	16	1	ND	1	350	100	ND	1
GP-7A(20-25)	9/24/08	ND	2	1	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
GP-9A(20-25)	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-16	9/25/08	6,500	200	560	100	160	100	810	100	3,300	100	ND	100	13,000	100	38,000	2,000	ND	100
MW-17	10/1/08	4,200	100	6,500	50	94	50	470	50	2,100	50	ND	50	10,000	50	43,000	2,000	ND	50
MW-18	9/25/08	4,400	40	ND	20	47	20	150	20	2,500	20	ND	20	670	20	27,000	10,000	ND	20
MW-19	9/25/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-22	9/25/08	340	10	1,100	5	ND	5	48	5	290	5	ND	5	730	5	4,400	100	ND	5
MW-23	9/25/08	ND	2	16	1	ND	1	ND	1	ND	1	1.3	1	ND	1	ND	100	ND	1
MW-24A	9/24/08	4,600	40	ND	20	110	20	770	20	340	20	ND	20	160	20	26,000	1,000	ND	20
MW-25A	9/24/08	ND	2	4.6	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-26A	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-27A	9/23/08	ND	2	23	1	ND	1	ND	1	ND	1	5.9	1	ND	1	ND	100	ND	1
MW-28A	9/22/08	ND	2	1.8	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-29A	9/22/08	ND	2	9.4	1	ND	1	ND	1	ND	1	1.3	1	ND	1	ND	100	ND	1
MW-30	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-33S	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-38	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-39R	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-40	9/24/08	ND	2	1.3	1	ND	1	ND	1	ND	1	1.4	1	ND	1	ND	100	ND	1
MW-41A	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-42	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	1.1	1	ND	1	ND	100	ND	1
MW-43A	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-44A	9/23/08	ND	2	42	1	ND	1	ND	1	ND	1	6.2	1	ND	1	ND	100	ND	1
MW-53	9/22/08	ND	2	160	1	ND	1	ND	1	ND	1	ND	1	ND	1	330	100	3	1
MW-54	9/22/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-55	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
Number of Detections		5/29		14/29		4/29		5/29		5/29		8/29		5/29		8/29		17/29	
Maximum Detection (µg/L)		6,500		6,500		160		810		3,300		16		13,000		43,000		179	
																			3

April 3, 2009

Mr. Judson Polikoff
Area Manager and Assistant Secretary
Chevron Environmental Management Company
2300 Windy Ridge Parkway, Suite 575
Atlanta, Georgia 30339

**RE: Review of Methods: Riggs Park Comprehensive Human Health Risk
Assessment Long Version, and Summary Tables Supplied by Expert
Toxicologist 2/13/09
Former Chevron Facility 122208, Chillum, Maryland**

Dear Mr. Polikoff:

As requested, RAM Group of Gannett Fleming, Inc. (RAM Group) has reviewed the *Methods: Riggs Park Comprehensive Human Health Risk Assessment Long Version, and Summary Tables Supplied by Expert Toxicologist 2/13/09*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland.

The Human Health Risk Assessment (HHRA) report was found to be missing several key sections necessary for proper review of the estimate of risk. In addition, it does not follow typical USEPA guidance or the practice of risk assessment. Therefore, any remedy proposed as a result of these data and conclusions cannot be properly substantiated. The missing data and sections should be provided so that the HHRA can be adequately reviewed.

GENERAL COMMENTS

1. In page 1, paragraph 1, the report states "The goal of the HHRA was to determine whether any unacceptable adverse health effects associated with vapor intrusion originating from ground water contamination are present in any of the 106 homes, based on current and future exposures." The report makes no attempt to relate the sub-slab vapor (SSV) concentrations to the groundwater concentrations. Rather, the report states the SSV "results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor vapor intrusion." No evidence is presented that the 36 chemicals detected in the various SSV samples are due to volatilization of these COCs from the groundwater. Our review of the September 2008 groundwater analytical results for shallow wells screened across the water table indicated that only 17 compounds were detected above laboratory reporting limits and only 13 of these compounds were detected in SSV. Thus, of the 36 compounds identified in SSV and assumed by the report to be potentially emanating from groundwater, only 13 were actually detected in shallow groundwater in September 2008. As a result, the report likely overestimated the risk to residents by including 36 compounds in the HHRA instead of the 13 present in shallow groundwater.

2. The source of chemicals measured in the SSV samples may be indoor air that has advected downward through the slab and into the vadose zone. This phenomenon has been reported in peer reviewed literature. McHugh et al. (2006) indicates that the likely source of the compounds detected in sub-slab soil vapor that are not present in groundwater is indoor air. Previous investigations conducted by Chevron have demonstrated that airborne contaminants can be transported both downward and upward through the basement slab (GF, 2007). For ease of reference, Figure 1 from this report is attached which shows that during an entire week in June 2007, the pressure gradient in one residence at the site was downward through the slab. When this occurs, the airborne contaminants in indoor air are advected downward through the slab and into shallow soil vapor. Therefore, it is reasonable to assume that some portion of the concentration of hydrocarbons (and other airborne contaminants) in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment. This should be taken into account in the HHRA.

3. Page 4, paragraph 3 indicates that "The results of this HHRA were based on 357 vapor monitoring port SSV samples collected from 106 Riggs Park homes. In total, 1,785 separate cumulative health risk analyses were performed on each of the 357 SSV samples." This is not consistent with the practice of risk assessment as described in the various USEPA guidance documents referred to in the report (although the report did not include a reference list).

For a detailed site-specific HHRA, it may be reasonable to perform exposure and risk calculations for each home to account for the variability in the inputs for each home. However, no home-specific information has been used in the calculations.

4. The report does not present the data for the 357 sub-slab vapor (SSV) samples. A comprehensive HHRA must present all the data, evaluate the data, and comment on the variability in the data. The report does not include any discussion about the quality of the data or whether sufficient representative data has been collected to support a realistic estimate of risk.

5. RAGS Part A (USEPA, 1989), Sections 5.8 and 5.9 describe the process for the selection of chemicals of concern (COCs). It suggests that the following criteria be used to determine the COCs:

- Positively detected in a medium;
- Detected at levels above the concentration in blank samples;
- Detected at levels above naturally occurring levels;
- Only tentatively identified but associated with the site or confirmed by special analytical services;
- Transformation products;
- Not detected chemicals but present at the site if an evaluation of the risks at the detection limit is desired; and
- Further criteria:
 - Chemicals by class;
 - Frequency of detection;
 - Essential nutrients; and

o Concentration-toxicity screen.

All of the chemicals analyzed for or detected in a sampling program are not considered COCs for the purposes of a HHRA. For example, the frequency of detection has not been discussed in the report and as presented in Specific Comment 6, not detected chemicals were eliminated without proper review. Therefore, this HHRA is deficient in that it does not follow the methodology described in RAGS. Thus, the statement on page 2, paragraph 2 "HHRA was conducted strictly according to RAGS" is misleading.

6. RAGS Part A (USEPA, 1989) requires a section devoted to uncertainty analysis to discuss the impact of various assumptions and variability in the data used. The report does not include such a section. Therefore, again it does not follow USEPA guidance. A discussion of the uncertainty, especially the large amount of uncertainty inherent in the home-by-home risk assessment methodology described, should be clearly discussed in detail in the HHRA.
7. Review of the calculated risks indicates that the majority of the calculated risk is from chloroform. This compound is a common disinfectant byproduct present in drinking water. In addition, a review of the September 2008 groundwater sampling results for shallow (water table) monitoring wells indicates that chloroform was present in only 3 of 29 wells at a maximum concentration of 1.6 µg/L. Based on Henry's Law, this concentration is not elevated enough to cause diffusion into soil vapor at the concentrations observed in shallow soil vapor. The chloroform concentrations in soil vapor likely were advected through the basement slab as described in general comment 2 above. Thus, for residences where chloroform was the major risk driver, the risk is likely overestimated.
8. It is interesting to note that the measured sub-slab benzene concentrations presented in the various tables in Exhibit 7 are all below or within the range of benzene indoor air background concentrations and for most of the samples cause a very small percentage of the risk. This HHRA indicates that petroleum hydrocarbons are not a major risk driver at the site.

SPECIFIC COMMENTS

1. **Section 1.0, page 1, paragraph 2.** The cumulative noncarcinogenic health hazard index (HI) was calculated based on four different toxicity values from four different sources. The rationale for using various toxicity values is not provided and the values used could not be verified. The toxicity values and their source should be provided in the HHRA.
2. **Section 1.0, page 2, line 6.** The cumulative cancer risk is referred to as "Incremental Lifetime Cancer Risk (ILCR)", but it is referred to as "ELCR" several times. This difference should be clarified and consistent terminology used throughout the HHRA to prevent confusion.
3. **Section 1.1, page 3, paragraph 1.** This section refers to the draft vapor intrusion (VI) guidance (EPA, 2002). This is a draft guidance that has not been

updated by USEPA to date due to considerable controversy about the contents of the document, and overly conservative assumptions, such as conservative attenuation factors.

In addition, this draft guidance is not applicable to underground storage tank (UST) sites. Page 2 of the draft EPA VI guidance states that:

"The draft guidance is suggested for use at RCRA Corrective Action, CERCLA (National Priorities List and Superfund Alternative Sites), and Brownfields sites, but is not recommended for use at Subtitle I Underground Storage Tank (UST) sites at this time. The draft guidance recommends certain conservative assumptions that may not be appropriate at a majority of the current 145,000 petroleum releases from USTs."

As such, the draft guidance is unlikely to provide an appropriate mechanism for screening the vapor pathway at UST sites.

4. **Section 1.1, page 3, paragraph 2.** The text states that "According to EPA VI guidance (EPA 2002), the recommended attenuation factor for sub-slab soil gas samples is 0.1." The recommended criterion established by EPA in the Draft Vapor Intrusion Guidance is a conservative estimate that assumes the chemicals do not degrade as they migrate upward through the vadose zone; however petroleum hydrocarbon vapors are known to biodegrade in the presence of oxygen (EPA, 2002). Site investigation data collected at the site from 2002 to 2004 suggested that biodegradation of hydrocarbons in soil vapor was occurring in the vadose zone (GF, 2006). In addition, Chevron has calculated a site specific attenuation factor for one residence of 0.0026 based on sub-slab soil vapor and indoor air sampling results conducted in 2007 (GF, 2007). Since its publication of the Draft Vapor Intrusion Guidance in 2002, EPA has determined that its recommended sub-slab to indoor air attenuation factor of 0.1 may be overly conservative (ITRC, 2007). It is Chevron's position, as well as that of most experts in this field, that using an attenuation factor of 0.1 is a very conservative estimate which leads to an overestimation of risk from vapor intrusion of petroleum hydrocarbons.
5. **Section 1.1, page 4, paragraph 1.** The statement "This assumption has become so integral to the U.S. EPA risk management frame work that a site is automatically remediated when chemicals contaminate soil, water, or air above acceptable risk levels" is not accurate. There are many sites where the USEPA, state regulators, and the responsible party have agreed to implement institutional controls or used mechanisms other than remediation to reduce the risk to an acceptable level. This statement should be revised or removed from the text.
6. **Section 1.1, page 4, paragraph 4.** Text in this section states that chemicals not detected in any home were not considered to be chemicals of concern. It is not reasonable to eliminate chemicals that were not detected without a proper review of detection limits.

Mr. Judson Palikoff
Chevron EMC
April 3, 2009
Page 5 of 5

7. **Section 1.2, page 6, exhibit 2.** Exhibit 2 presents the dose equation for both carcinogenic and noncarcinogenic effects. However, the chronic daily dose (CDD) equation presented in Exhibit 2 is applicable for noncarcinogenic exposure only. The parameter "BW" included in the exhibit should be deleted. The unit for averaging time should be hours instead of days, and values should be 262,800 and 613,200 for noncarcinogenic and carcinogenic, respectively.

As per the recent EPA's document (USEPA, 2009), CDD is referred as exposure concentrations (EC). The EC for carcinogenic effects should be as below:

$$EC = \frac{C \times ET \times EF \times ED}{AT}$$

It was confirmed that cancer risks presented in Exhibit 7 were calculated based on the equation above using an averaging time of 613,200 hours, not the equation presented in Exhibit 2 of the report. The revised equations and the resulting calculations should be provided.

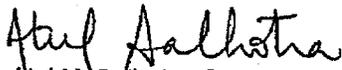
In addition, the calculation of the noncarcinogenic hazard quotient could not be verified. Supporting information for this calculation should be provided in the HHRA.

8. **Section 1.3, page 9.** The unit for CDD is presented as mg/kg-day, however, it should be mg/m³ for inhalation.
9. **Section 1.3, page 10, paragraph 1.** This section states that the Hazard Index (HI) is calculated for the sample. Please note that the HI is calculated for a receptor not a sample.

The references used in the review of the report are attached.

If you have any questions, please do not hesitate to contact me. We will welcome the opportunity to discuss our comments in more detail with DC official as well as the authors of the HHRA report as appropriate.

Sincerely,


Atul M. Salhotra, Ph.D.
Vice President

- Attachments: 1. References
2. Shallow Groundwater Analytical Detections - September 2008
3. Figure: Mean Soil-Building Pressure Differential

ATTACHMENT 1: REFERENCES

Gannett Fleming, 2006. Site Investigation Report. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2006.

Gannett Fleming, 2007. Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2007.

Interstate Technology & Regulatory Council (ITRC), 2007. Vapor Intrusion Pathway: A Practical Guide. Dated January 2007.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A).

USEPA, 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).

USEPA, 2009. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance For Inhalation Risk Assessment).

McHugh, T., P. DeBlanc, and R. Pokluda, 2006. Indoor Air as a Source of VOC Contamination in Shallow Soils Below Buildings. Soil and Sediment Contamination, Vol. 15, pages 103-122.

Location	Sample Date	1,2,4-Trimethyl benzene (µg/L)	RL (µg/L)	1,3,5-Trimethyl benzene (µg/L)	RL (µg/L)	Acetone ¹ (µg/L)	RL (µg/L)	Benzene (µg/L)	RL (µg/L)	Chloro form (µg/L)	RL (µg/L)	cis-1,2-Dichloro ethene (µg/L)	RL (µg/L)	Ethyl benzene (µg/L)	RL (µg/L)	Isopropyl benzene ³ (µg/L)	RL (µg/L)
GP-11A(20-25)	9/24/08	ND	1	ND	1	5,000	25	ND	1	ND	1	ND	1	ND	1	ND	1
GP-2E(45-50)	9/25/08	ND	2	ND	2	24	10	ND	2	ND	2	ND	2	ND	2	ND	2
GP-2F(45-50)	9/25/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
GP-7A(20-25)	9/24/08	ND	1	ND	1	610	5	ND	1	ND	1	ND	1	ND	1	ND	1
GP-9A(20-25)	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-16 ²	9/25/08	1,700	100	460	100	ND	500	4,700	100	ND	100	ND	100	1,400	100	ND	100
MW-17 ²	10/1/08	1,100	50	320	50	ND	250	5,700	50	ND	50	ND	50	1,100	50	ND	50
MW-18	9/25/08	3,400	20	1,400	20	ND	100	6.1	20	ND	20	ND	20	270	20	27	20
MW-19	9/25/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-22 ²	9/25/08	61	5	16	5	280	25	1,100	5	ND	5	ND	5	95	5	ND	5
MW-23 ²	9/25/08	ND	1	ND	1	19	5	6.5	1	1.6	1	ND	1	ND	1	ND	1
MW-24A	9/24/08	3,100	20	920	20	650	100	ND	20	ND	20	ND	20	640	20	39	20
MW-25A	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-26A	9/23/08	ND	1	ND	1	83	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-27A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-28A	9/22/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-29A	9/22/08	ND	1	ND	1	ND	5	ND	1	1	1	ND	1	ND	1	ND	1
MW-30	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-33S	9/23/08	ND	1	ND	1	63	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-38	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-39R	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-40	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-41A	9/24/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-42	9/23/08	ND	1	ND	1	ND	5	ND	1	1.1	1	ND	1	ND	1	ND	1
MW-43A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-44A	9/23/08	ND	1	ND	1	ND	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-53	9/22/08	ND	1	ND	1	ND	5	23	1	ND	1	11	1	ND	1	ND	1
MW-54	9/22/08	ND	1	ND	1	180	5	ND	1	ND	1	ND	1	ND	1	ND	1
MW-55	9/23/08	ND	1	ND	1	23	5	ND	1	ND	1	ND	1	ND	1	ND	1
Number of Detections		5/29		5/29		10/29		6/29		3/29		1/29		5/29		2/29	
Maximum Detection (µg/L)		3,400		1,400		5000		5,700		1.5		11		1,400		39	

Abbreviations:

- ND - Not Detected
- RL - Reporting Limit
- µg/L - Micrograms per Liter
- TPH-GRO - Total Petroleum Hydrocarbons - Gasoline Range Organics

Notes:

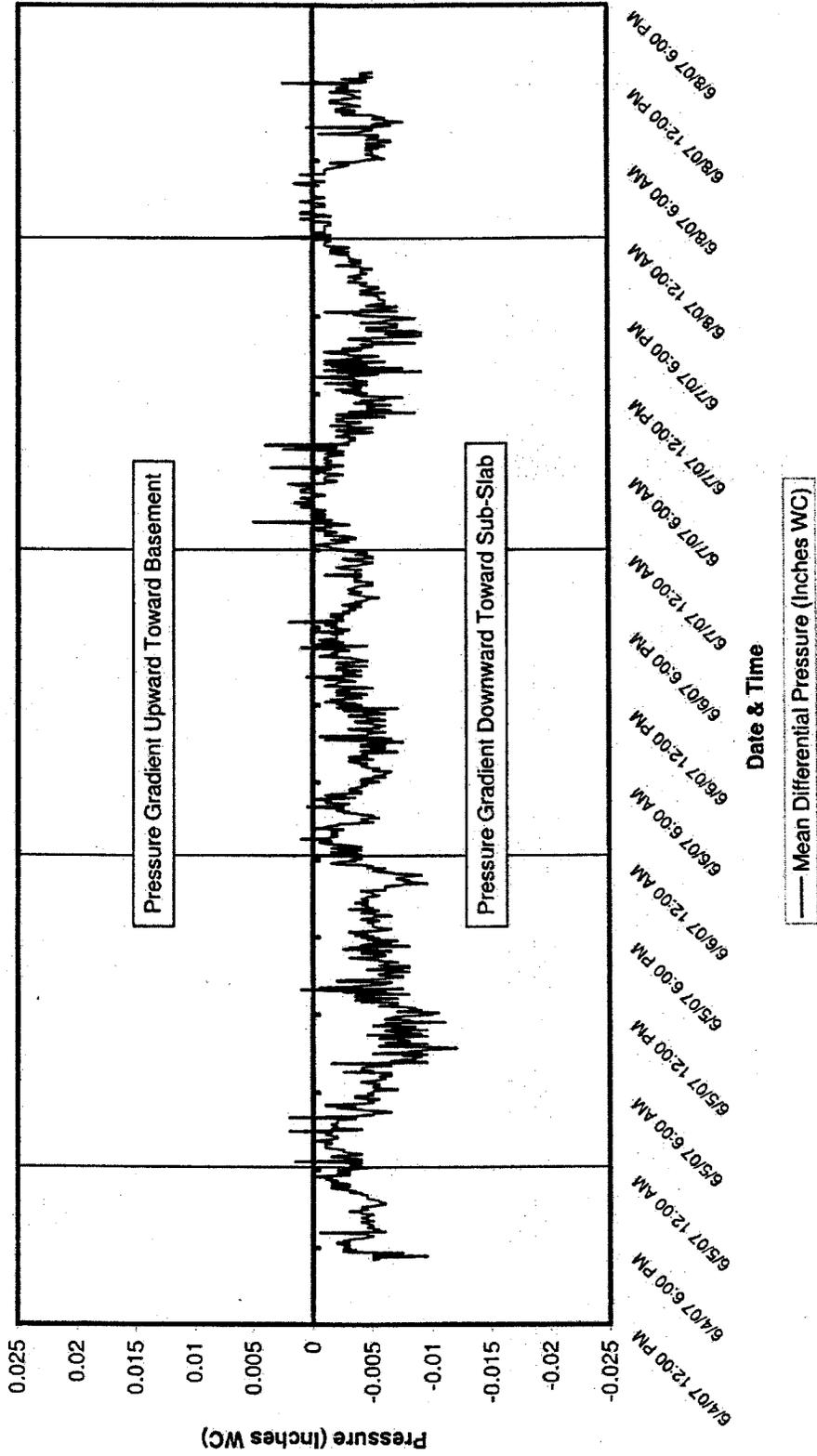
- ¹ Acetone is a common laboratory contaminant.
- ² Wells MW-16, MW-17, MW-22, and MW-23 are located within the active remediation area and not in the residential neighborhood.
- ³ These compounds were not detected in sub-slab soil vapor samples collected by SSP&A.



Attachment 2. Shallow Groundwater Analytical Detections - September 2008
 Former Chevron Facility No. 122208
 5801 Riggs Road, Chillum, Maryland

Location	Sample Date	m,p-Xylene (ug/L)	RL (ug/L)	MTBE (ug/L)	RL (ug/L)	n-Propyl benzene ² (ug/L)	RL (ug/L)	Naphthalene (ug/L)	RL (ug/L)	o-Xylene (ug/L)	RL (ug/L)	Tetra chloro ethene (ug/L)	RL (ug/L)	Toluene (ug/L)	RL (ug/L)	TPH - GRO ³ (ug/L)	RL (ug/L)	Tri chloro ethene ³ (ug/L)	RL (ug/L)
GP-11A(20-25)	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
GP-2E(45-50)	9/25/08	ND	4	370	2	ND	2	ND	2	ND	2	10	2	ND	2	320	100	ND	2
GP-2E(45-50)	9/25/08	ND	2	270	1	ND	1	ND	1	ND	1	16	1	ND	1	390	100	ND	1
GP-7A(20-25)	9/24/08	ND	2	1	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
GP-9A(20-25)	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-16 ²	9/25/08	6,500	200	560	100	160	100	610	100	3,300	100	ND	100	13,000	100	38,000	2,000	ND	100
MW-17 ²	10/1/08	4,200	100	6,500	50	94	50	470	50	2,100	50	ND	50	10,000	50	43,000	2,000	ND	50
MW-18	9/25/08	4,400	40	ND	20	47	20	150	20	2,500	20	ND	20	670	20	27,000	10,000	ND	20
MW-19	9/25/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-22 ²	9/25/08	340	10	1,100	5	ND	5	48	5	290	5	ND	5	730	5	4,400	100	ND	5
MW-23 ²	9/25/08	ND	2	16	1	ND	1	ND	1	ND	1	1.3	1	ND	1	ND	100	ND	1
MW-24A	9/24/08	4,600	40	ND	20	110	20	770	20	340	20	ND	20	160	20	26,000	1,000	ND	20
MW-25A	9/24/08	ND	2	4.6	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-26A	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-27A	9/23/08	ND	2	23	1	ND	1	ND	1	ND	1	5.9	1	ND	1	ND	100	ND	1
MW-28A	9/22/08	ND	2	1.8	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-29A	9/22/08	ND	2	9.4	1	ND	1	ND	1	ND	1	1.3	1	ND	1	ND	100	ND	1
MW-30	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-33S	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-38	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-39R	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-40	9/24/08	ND	2	1.3	1	ND	1	ND	1	ND	1	1.4	1	ND	1	ND	100	ND	1
MW-41A	9/24/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-42	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	1.1	1	ND	1	ND	100	ND	1
MW-43A	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-44A	9/23/08	ND	2	42	1	ND	1	ND	1	ND	1	6.2	1	ND	1	ND	100	ND	1
MW-53	9/22/08	ND	2	160	1	ND	1	ND	1	ND	1	ND	1	ND	1	330	100	3	1
MW-54	9/22/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
MW-55	9/23/08	ND	2	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	100	ND	1
Number of Detections		5/29	14/29	6,500	4/29	160	5/29	8/10	5/29	5/28	3,300	8/29	16	5/29	13,000	8/29	43,000	1/29	3
Maximum Detection (ug/L)		6,500	6,500	6,500	160	160	810	810	810	3,300	3,300	8/29	16	13,000	13,000	43,000	43,000	1/29	3

Attachment 3
Mean Soil-Building Pressure Differential
From: Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue
Former Chevron Facility 122208, Chillum, Maryland





GANNETT FLEMING, INC.
Seton Business Park
4701 Mount Hope Drive
Suite A
Baltimore, MD 21215
Office: (410) 585-1460
Fax: (410) 585-1470
www.gannettfleming.com

April 17, 2009

Mr. Judson Polikoff
Area Manager and Assistant Secretary
Chevron Environmental Management Company
2300 Windy Ridge Parkway, Suite 575
Atlanta, Georgia 30339

**RE: Review of Riggs Park Indoor Air, Sub-Slab Vapor, and Groundwater Sampling and Analysis Report
Former Chevron Facility 122208, Chillum, Maryland**

Dear Mr. Polikoff:

As requested, Gannett Fleming, Inc. (GF) has reviewed the *Riggs Park Indoor Air, Sub-slab Vapor, and Groundwater Sampling and Analysis Report*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland, dated February 2009. The report was prepared by S.S. Papadopoulos and Associates, Inc. for the District of Columbia Department of Health and Department of Environment (DDOE).

The following references were used in the review of the report:

Gannett Fleming, 2007. Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2007.

McHugh, T., P. DeBlanc, and R. Pokluda, 2006. Indoor Air as a Source of VOC Contamination in Shallow Soils Below Buildings. *Soil and Sediment Contamination*, Vol. 15, pages 103-122.

McHugh, T., D. Hammond, T. Nickels, and B. Hartman, 2008. Use of Radon Measurements for Evaluation of VOC Vapor Intrusion. *Environmental Forensics*, Vol. 9, March 2008.

U.S. Environmental Protection Agency (EPA), 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. EPA 530-D-02-004.

EPA, 2008. Final Decision and Response to Comments, Chevron Gasoline Release at Chillum, Maryland. Dated April 2008.

GF reviewed the report for technical content, data gaps, validity, accuracy, completeness, and compliance with regulations and guidance. Several of the appendices were labeled as confidential and not provided in the public version of the report, thus they could not be reviewed.

GENERAL COMMENTS

1. Several figures and appendices of this report were considered confidential and were not provided in the public version of this report. This included maps showing the distribution of contaminants in various media and appendices documenting home surveys of chemicals removed from residences prior to sampling. These are critical pieces of information that are required to fully evaluate the conclusions of this report.
2. An immense amount of data were collected as a part of this study. Tables for many of the media sampled were prepared to summarize the data using percentages and other summary statistics. However, broad conclusions regarding the validity of the site conceptual model were made based on specific sample data. No data tables with individual sample results were provided for any of the media sampled. Figures with few or vague reference points were prepared to summarize some of the data (e.g., Figure 23). Some of the conclusions and assertions made in this report cannot be substantiated without the specific sample data.

SPECIFIC COMMENTS

1. Section 2, page 4, paragraph 5. This section states that perchloroethene (PCE), a halogenated compound, was detected in groundwater during the summer of 2002. The first detection of halogenated compounds at the site by Chevron was during the September 2001 investigation along the south side of Eastern Avenue summarized in the following document:

Gannett Fleming, 2001. Geoprobe and Membrane Interface Probe (MIP) Investigation Results. Former Chevron Facility 122208, Chillum, Maryland. Dated October 2001.

The text should be revised.

2. Section 5, page 16, paragraph 4. This paragraph describes the pre-indoor air sampling survey. Careful detection and removal of potential indoor air sources of chemicals is critical to obtaining quality samples. This section does not provide enough detail to determine whether quality samples were collected during the sampling event. Clarification of the following items should be provided in the text:
 - It is unlikely that the ppbRAE photoionization detector (PID) was calibrated prior to surveying activities at each residence. Calibration sheets from Appendices D, E, and F indicated the PID calibration was checked daily and calibrated when required, which was once every 3 days on average. These instruments tend to drift with use, particularly after detecting a high concentration source, such as moth balls or perfume.
 - It is unclear if the sampling protocol prohibited the fueling of vehicles by the sampling team prior to collecting samples. This prevents cross contamination of samples.
 - Based on the observations noted in Table 3 and Appendix D, various chemicals were inadvertently not removed during the survey for several residences (e.g.,

refer to line 185 of the table that states "additional can of paint found during sample setup, removed"). It is unclear whether the residence was allowed to ventilate for 24 hours after these items were removed as is stated in the text.

- Table 3 also indicates that items potentially containing petroleum products such as gas cans and lawn mowers, were removed from several residences. It is unclear whether the residence was allowed to adequately ventilate prior to sampling.
 - Several observations from Table 3 and Appendices D and E state that the basement air had an odor during sampling. For example, on line 184 of the table, the observation for indoor air sample Q1-S289-INA is "smell of mothballs in home". This suggests that either all sources of indoor air contaminants were not removed or the residence may not have had adequate time to ventilate.
 - The text states there were several homes with attached garages that were sampled. It is unclear whether residents were requested not to park or run vehicles within the garage before or during sampling.
 - Observations from Table 11 indicate that numerous residents that smoke were encountered during the study. It is unclear whether they were discouraged from smoking indoors during the ventilation and sampling period. It is also unclear whether an exit interview was conducted to determine whether smoking occurred indoors during the sampling period.
3. **Section 5, page 18, paragraph 2.** This section provides information on the outdoor vapor monitoring ports. The text states that some of the ports were replaced and were installed at depths of 1 to 2 feet. Analytical results from outdoor ports installed to a final depth of less than 5 feet are considered unreliable (EPA, 2002; Appendix E) due to the high potential for short-circuiting of ambient (outdoor) air into the sample. EPA recommended that these samples be excluded from evaluation in their 2002 Draft Vapor Intrusion Guidance. There are some areas of the site, however, where groundwater is found at depths shallower than 5 feet. In this case, shallow soil vapor sample collection with quantitative leak detection is the only available option. If this situation was encountered, it should be clarified in the text. To aid in clarification, the text should include a construction table for all vapor monitoring ports along with corresponding depth to groundwater or perched water (if known). A map of the ports should also be released to better evaluate spatial trends.
4. **Section 5, page 20, paragraph 1.** This section provides information on sampling of the sub-slab and outdoor vapor monitoring ports.
- The text does not mention if leak detection was conducted during the sampling. Based on the field notes in Appendices D, E, and F, leak detection was not conducted for any of the soil vapor samples collected. If leak detection was not conducted, then the soil vapor samples could have been diluted by ambient air intrusion into the sample collection apparatus or through the port itself. This is of particular concern for shallow outdoor and sub-slab vapor monitoring ports. This should be clarified in the text.

- The text does not mention if the vapor monitoring ports were purged and what the general purge volume target was (e.g., 3 well volumes, etc.). Appendices D, E, and F indicated purging was completed prior to sampling. This information is critical to evaluate sample quality and should be added to the text. In addition, there were many samples in Appendices D, E, and F (as summarized in Table 3) that appeared to have excessive purge volumes. For example, line 162 of Table 3 indicates that for sub-slab vapor monitoring port sample Q1-S293-VMP2 purging of two liters of soil vapor was attempted. According to Appendices D, E, and F, all the sub-slab soil vapor ports were purged of at least one liter of vapor prior to sampling. This volume seems excessive given the typical sub-slab vapor monitoring port contains less than 10 milliliters of air. This issue and its affect on sample quality for sub-slab ports as well as outdoor vapor wells should be discussed in the text.
 - The text does not mention what size canister was used. Typically, one-liter canisters are used for soil vapor sampling to minimize the volume of vapor removed from the subsurface. This information should be provided in the text.
 - The industry standard for collecting soil vapor samples from implants, probes and ports is generally to use grab sampling techniques while maintaining a low (e.g., less than 200 milliliters per minute) soil vapor flow rate. The 24 or 20 hour composite samples collected for this study are not considered grab samples. Although the soil vapor flow rate was sufficiently low, the text should provide justification why the samples were collected in this manner.
 - The text states that a PID was used to screen each of the ports on the initial visit. Although good for the general screening for presence or absence of volatile organic compounds (VOCs), a PID does not provide data that is of sufficient accuracy or reliability to make definitive conclusions, particularly if the PID was not calibrated regularly. The data quality objectives and use of these data should be provided in the text. Furthermore, the PID readings were collected prior to collecting the summa canister sample, effectively purging the vapor port. It is unclear whether the port was purged a second time with the sampling apparatus attached to the port. If this was the case, a discussion of the effect on sample quality should be added to the text.
5. **Section 7, page 31, paragraph 1.** This paragraph raises concerns over false negative results from outdoor vapor monitoring ports and infers that sub-slab samples are of higher quality for use in determining vapor intrusion problems. Although this statement is true to some extent, it should also be noted that the indoor air inside the residence can also serve as a source of contaminants to sub-slab soil vapor (McHugh, et al., 2006). This phenomenon is observed in the lists of detected compounds for indoor air, ambient air, sub-slab soil vapor, and outdoor soil vapor on pages 22 through 24. Both Freon 11 and 12 are detected in ambient air, indoor air, and sub-slab air, but not in the outdoor vapor monitoring ports. Text on page 31 indicates that the Freon compounds are commonly detected in ambient and indoor air, but not likely attributable to subsurface contamination. Therefore, the Freon compounds are present in the sub-slab soil vapor as a result of infiltration of ambient and/or indoor air through the basement

slab. Benzene and other hydrocarbons are also present in ambient and indoor air and it is reasonable to assume that some portion of the concentration of hydrocarbons in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment as well. The inference that sub-slab soil vapor samples are of higher quality when compared to results from outdoor vapor monitoring ports should be qualified.

6. **Section 6, page 25, paragraph 0.** This section indicates that liquid-phase hydrocarbons (LPH) or gasoline from the release at the service station migrated into the alley south of Eastern Avenue in the vicinity of monitoring well MW-24A. This assertion was based on soil concentrations from the groundwater interface provided on page 24. Xylenes were detected at approximately 6 parts per million (ppm) and naphthalene at 3 ppm. A reference with representative concentrations of these compounds in soil indicative of LPH should be provided in the text.

In addition, these soil results are but one line of evidence. Other lines of evidence include groundwater concentrations, total petroleum hydrocarbons (TPH) analysis, product fingerprinting (if the LPH is mobile), observation in soil cores, occurrence in monitoring wells, and others. LPH has never been detected in well MW-24A since it was installed in 2004. The assertion that LPH migrated to the vicinity of monitoring well MW-24A is not founded based on the information provided in the text.

7. **Section 7, page 34, paragraph 3.** This paragraph compares the results obtained during this study to others, including previous indoor air sampling conducted by Building Sciences and Engineering Associates (BSEA) on behalf of DDOE. Specifically, the maximum concentration of benzene in indoor air from the BSEA study was used for comparison purposes. It should be noted that Chevron sampled this residence after BSEA and found numerous indoor air contaminant sources in an attached shed, including an open gasoline can. After removal and ventilation, the residence had a benzene concentration in indoor air of $2.9 \mu\text{g}/\text{m}^3$, which was much lower than the BSEA study maximum of $26.8 \mu\text{g}/\text{m}^3$ used for comparison in the text. The BSEA results should be qualified in the text or omitted.
8. **Section 7, page 35, paragraph 2.** A thorough discussion of potential sources of contaminants for indoor air is provided in this paragraph. Table 3 indicates that moth balls were found in a fair number of residences during the building survey. Naphthalene is one of the primary ingredients in moth balls, however, this is not mentioned in this paragraph. Text on page 29 indicates that naphthalene was detected in 21 percent of indoor air samples but only 2 percent of sub-slab samples. The presence of moth balls in residences likely explains the prevalence of naphthalene in indoor air. The text should include a brief discussion of this issue.
9. **Section 7, page 36, paragraph 1.** This paragraph provides the conclusion that the currently accepted conceptual site model that the sewer line along Nicholson Street is the groundwater discharge point may be flawed. This assertion cannot be supported with the data provided in the public version of the report. Neither individual sample results nor figures showing sample points were provided. Chevron will review the data collected for this study in conjunction with its extensive data set for this area to determine the validity of this claim when the data are released to Chevron.

10. **Section 9, page 38, paragraph 1.** This section provides a formula for the observed ratio of contaminant concentrations between the subsurface and indoor air and indicates that it is one measure for the potential occurrence of vapor intrusion. There are several issues with this equation and its usage with respect to vapor intrusion:
- Most of the compounds of interest in the study are not conservative tracers. That is, they have documented indoor or ambient air sources that are not related to vapor intrusion.
 - The equation was not corrected for indoor air. EPA (2002) indicates that the average building exchanges a full volume of air over 6 times per day. Therefore, ambient air has a large effect on the concentrations of contaminants in indoor air. By subtracting the ambient air concentration out of the denominator as suggested in McHugh, et al. (2008) this effect is reduced.
 - As noted in comment 5, indoor air contaminants can migrate downward through the basement slab and into the subsurface. The concentrations of some contaminants detected in sub-slab air in this study are attributable to indoor air infiltration into the subsurface.

Based on the points above, the inverted attenuation factor equation presented in the text is not a good indicator of the potential for vapor intrusion. Any conclusions based on this equation should be qualified accordingly. To determine an accurate attenuation factor, a conservative tracer must be used such as radon (McHugh, et al, 2008, Gannett Fleming, 2007).

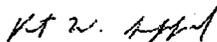
11. **Section 10, page 42, paragraph 2.** This paragraph presents the recommendations of the study. A "home-by-home" risk assessment was recommended whereby individual risk for each individual residence within the study would be calculated. This is not a small undertaking and should be evaluated carefully. Chevron has several concerns regarding this approach. First, this approach greatly compartmentalizes the site into small microcosms and neglects larger trends in sampling data that are observed site-wide. Each home may have a very small data set, perhaps one set of indoor, ambient, and sub-slab data taken at one or a few points in time. As stated in the report, soil vapor concentrations can vary over a wide range spatially and temporally. Contrast this to the Baseline Risk Assessment prepared for the site, which took into account thousands of samples from multiple media collected over nearly a decade. Secondly, this approach introduces a large amount of uncertainty into the risk assessment for each home. As stated in the report, the list of factors that influence indoor air concentrations is long and includes personal habits such as smoking, use of dry cleaning, use of cleaning products, building materials, the building exchange rate, ambient air concentrations, and attached garages, among many others. All of these factors contribute additional uncertainty to a very small data set with considerable inherent uncertainty. It is Chevron's opinion that a home-by-home risk assessment would not provide much value for determining risk to residents from vapor intrusion.
12. **Appendices D, E, and F.** These appendices provide field documentation sheets for each of the samples collected during the investigation. According to the field sheets,

there was no vacuum at the conclusion of the 24-hour sampling period for 27 out of 128 indoor air samples (21 percent) and 10 out of 39 ambient air samples (26 percent). The true sampling period cannot be known for these samples, but it was less than 24 hours. Therefore, these samples may not be truly representative of indoor and ambient air concentrations. This issue should be discussed in the text.

13. **Appendix O, Memorandum from H. Cohen of SSPA to Dr. V. Sreenivas (DCDOH) dated July 22, 2008.** This memorandum provides a summary of activities related to the outdoor vapor port sampling. The memo states that "some of the PVC casings and Teflon sample tubing contained unacceptable levels of tetrahydrofuran, acetone, and 2-butanone (methyl ethyl ketone)." These chemicals are the main ingredients in PVC primer and glue. As a result, all existing outdoor vapor ports were abandoned and reinstalled. This is a significant event that was not discussed in the text. A thorough discussion of the well abandonment should be provided in the text along with how the construction of the vapor wells may have affected sample quality. For instance, if the concentrations of these compounds decreased after replacing the wells, then it is clear that leaks were present in the well during sampling.

If you have any questions or require additional information, please contact the undersigned at (410) 585-1460.

Sincerely,
GANNETT FLEMING, INC.



Robert Scrafford, P.E.
Project Manger

April 20, 2009

Mr. Judson Polikoff
Area Manager and Assistant Secretary
Chevron Environmental Management Company
2300 Windy Ridge Parkway, Suite 575
Atlanta, Georgia 30339

**RE: Review of Riggs Park Comprehensive Human Health Risk Assessment
Toxicologist Work Product Data Tables
Former Chevron Facility 122208, Chillum, Maryland**

Dear Mr. Polikoff:

As requested, RAM Group of Gannett Fleming, Inc. (RAM Group) has reviewed the *Riggs Park Comprehensive Human Health Risk Assessment Toxicologist Work Product Data Tables*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland.

This review was conducted on an expedited basis and should not be considered a comprehensive review of the data provided. However, unless additional documentation and information is provided, a comprehensive review would not add value. Representative calculations and input values to the risk assessment were spot checked for consistency with applicable U.S. Environmental Protection Agency (EPA) risk assessment guidance. The comments provided are general in nature and represent general issues and discrepancies in the data files provided.

SUMMARY OF DATA REVIEWED

The data were provided on CD with no associated key to the files or supporting information. The following narrative describes our presumption of the data and calculations based on the S.S. Papadopoulos and Associates Report and inferences made from the calculations provided in the files. As shown in the attached figure, the data consist of five folders labeled:

1. Data-Each Home Q1
2. Data-Each Home Q2
3. Data-Each Home Q3
4. VMP
5. Combined Data Sets

Folders 1 to 3 presumably contain analytical data for three quarters. Folder 4 contains raw data, calculated risks, and hazard indices for each sample. Folder 5 contains compiled raw data for each sampling location or home and comparison of calculated risks and hazard indices using U.S. Environmental Protection Agency (EPA) Region 3 toxicity values. The data and associated calculated risk values are not clear because most of the files are missing column headings and other necessary information (e.g., references). The contents of each folder are discussed in detail below.

Folder 1: Data-Each Home Q1

Folder 1 contains data from sampling conducted during quarter 1; 104 excel workbooks named "number".xls where the number varies from 8 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. In addition, the folder contains 5 workbooks named 4-663 Oglethorpe.xls, 7-5902 8th.xls, 8-5908 8th.xls, 107-643 Kensington.xls, and 120-5618 Eastern.xls. Each workbook contains one excel sheet with the following column headings:

Sample Name, Week, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$.

The sample names in each workbook start with "S" followed by sampling location number and presumably the type of sample (AOA, INA, VMP, GMPP, VMP&, GMPP&, and PVMP, where the symbol "&" is 1, 2 or 3). All excel workbooks do not contain all sample types mentioned above. For the sample types included, concentrations in parts per billion (ppb) and micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) are presented for over 60 chemicals.

Folder 2: Data-Each Home Q2

Folder 2 contains data from sampling conducted during quarter 2; 107 excel workbooks also named "number".xls where the number varies from 4 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. Each workbook has one excel sheet with the following column headings (although not indicated in each worksheet):

Sample Name, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$ although not labeled as such.

The sample names in each workbook start with "S" followed by sampling location number and presumably type of sample (AOA, INA, and VMP). All excel workbooks do not contain all sample types mentioned above. For the sample types included concentrations in ppb and $\mu\text{g}/\text{m}^3$ are presented for over 60 chemicals.

Folder 3: Data-Each Home Q3

Folder 3 contains data from sampling conducted during quarter 3; 109 excel workbooks also named "number".xls where the number varies from 4 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. Each workbook has one excel sheet with the following column headings (although not indicated in each worksheet):

Sample Name, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$ although not labeled as such.

The sample names in each workbook start with "S" followed by sampling location number and presumably type of sample (AOA, INA, VMP, GMPP, VMP&, GMPP&, and PVMP, where the symbol "&" is 1, 2 or 3). All excel workbooks do not contain all sample types mentioned above. For the sample types included concentrations in ppb and $\mu\text{g}/\text{m}^3$ are presented for over 60 chemicals.

Mr. Judson Polikoff
Chevron EMC
April 20, 2009
Page 3 of 7

Folder 4: VMP

This folder contains 112 excel workbooks named *No. of Homes.xls* and *Risk Summary.xls* in addition to "S#".xls where the "#" varies from 4 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. Each of these is described below.

No. of Homes.xls: This file includes presumably 103 homes and for each home the VMP (sub-slab soil vapor) samples are identified. For example home No. 5 is associated with Q3-S21-VMP2, Q3-S21-VMP1, Q2-S21-VMP2, Q2-S21-VMP1, Q1-S21-VMP2, and Q1-S21-VMP1; whereas home No. 37 is associated with only one sample number Q1-S144-VMP.

Risk Summary.xls: This file contains five sheets. First sheet named "Number Homes" contain the following column headings:

Sample No., Week, HI, "Unlabeled", Risk, Risk;

The first two columns have number of homes and sample number information in the same fashion as *No. of Homes.xls*. The Hazard Index (HI) is assumed to be a cumulative hazard coefficient (HQ) for non carcinogenic chemicals and risk is cumulative for carcinogenic chemicals. The HI and risk are calculated for each sample. An unlabeled column presents the ratio of carcinogenic risk to the 1×10^{-6} risk level (acceptable risk). A second sheet named "Original" presumably contains the same information as the first sheet. The rest of the three sheets Sheet 5, Sheet 4, and Risk > 1E-5 do not have any column headings.

S#.xls: These excel workbooks contain three work sheets named VMP, INA, and Tox V. No column headings are presented in these sheets.

Folder 5: Combined Data Sets

This folder contains 128 excel workbooks named "number".xls (except for nine files named *Book2.xls*, *Combined Data.xls*, *Dosimetric Child PERC.xls*, *HI for Carcinogens.xls*, *List of COCs.xls*, *New Tox Values.xls*, *RISK SUMMARY.xls*, *VMP SUMMARY.xls*, and *VMP-New Region 3 Values.xls*) where the number varies from 4 to 426. All the numbers in this range are not used and presumably represent different measurement locations or homes. Each of these is described below.

Book2.xls: This file contains HI and risk for different samples collected in the three quarters.

Combined Data.xls: This file presents the concentration data for chemicals analyzed for different samples. This file presumably contains all of the raw data except nondetects and non toxic chemicals, which are excluded.

Dosimetric Child PERC.xls: This file contains one sheet with average ventilation rate information.

HI for Carcinogens.xls: This file contains reference concentration (RFCi) values for carcinogenic chemicals. These sheets also contain other columns with sample numbers and analytes but the values provided here are not labeled.

List of COCs.xls: This file contains EPA Region 3 toxicity values.

New Tox Values.xls: This file does not have any column headings, but presumably contains toxicity values.

Risk Summary.xls: This file contains eight sheets presumably presenting calculated HI and risk values for each sample using EPA Region 3 and Integrated Risk Information System (IRIS) toxicity values.

VMP Summary.xls: This file contains one sheet, but there are no column headings.

VMP-New Region 3 Values.xls: This file contains three sheets presumably presenting EPA Region 3 toxicity values in the first sheet. There are no column headings in the second and third sheets.

Number.xls: These files have a variable number of sheets in each file, each containing raw data for different sampling types.

SPECIFIC COMMENTS

1. **Files:** *Combined Data Sets/8.xls/data, Data Each Home Q1/8.xls/sheet1, and Data Each Home Q2/8-2.xls/sheet1*

Comment: Data listed as Q1 for samples S8-AOA and S8-INA in Combined Data Sets/8.xls/data do not match with that for the same samples in Data Each Home Q1/8.xls/sheet1. Instead, they match with Data Each Home Q2/8-2.xls/sheet1. This discrepancy should be corrected.

2. **Files:** *Combined Data Sets/8.xls/data and Data Each Home Q1/8.xls/sheet1*

Comment: Data for the chemicals 1,3-dichlorobenzene, 2-butanone (MEK), 2-hexanone (MBK), benzene, and toluene in sample Q1 S8-VMP in Combined Data Sets/8.xls/data do not match with that for the same sample in Data Each Home Q1/8.xls/sheet1. This discrepancy should be corrected.

3. **Files:** *Combined Data Sets/8.xls/data and Data Each Home Q1/8.xls/sheet1*

Comment: Data for the chemicals 2-butanone (MEK), 2-hexanone (MBK), acetone, and benzene for sample Q2 S8-VMP in Combined Data Sets/8.xls/data do not match with that in Data Each Home Q1/8.xls/sheet1. This discrepancy should be corrected.

4. **Files:** *Combined Data Sets/402.xls/Raw and Data-Each Home Q2/402.xls*

Comment: Q2 sample data from individual tables from Folder 1, Folder 2, and Folder 3 do not match with the data in Folder 5. Conversions from ppb to $\mu\text{g}/\text{m}^3$ are not verifiable with the following formula:

$$\mu\text{g}/\text{m}^3 = (\text{ppb} * P * \text{MW}) / (R * T)$$

where: ppb: Value from raw data table in parts per billion
P: Atmospheric pressure; 760 mmHg
MW: Molecular weight of chemical obtained from EPA Regional Tables (12Sep2008);
R: Ideal gas constant; 62.4 L·mmHg / (mol·°K)
T: Temperature; 298 °K

The above formula can be used to match the conversion from ppb to $\mu\text{g}/\text{m}^3$ for data in the Q1 and Q3 folders. Therefore, it is evident that there is a discrepancy in conversions that should be corrected.

5. **Files:** *Combined Data Sets/402.xls/VMP and /RAW*

Comment: As per the Riggs Park Comprehensive Human Health Risk Assessment document Exhibit 2, chronic daily dose (CDD) is calculated using the following equation:

$$\text{CDD} = (C * E * T * E_f * E_d) / (A * C_f)$$

This equation is not correct. Refer to specific comment 7 in the Riggs Park Comprehensive Human Health Risk Assessment Document review for the correct equation.

The hazard index calculations were made using the actual concentration with an attenuation factor of 10 instead of using the CDD. For example, in worksheet VMP cell "E2", which is the concentration used in HQ calculation (with an attenuation factor of 10) for acetone in Q3-s402-VMP matches with the corresponding value in worksheet RAW. The CDD should be used in this calculation.

6. **Files:** *Combined Data Sets/107-643 Kensington.xls/Raw, Data-Each Home Q1/107-643 Kensington.xls/sheet1, and Data-Each Home Q2/107.xls/sheet1*

Comment: There is no data for sample Q2 S107-GMPR in Data-Each Home Q2/107.xls/sheet1, however, the data are presented in Combined Data Sets/107-643 Kensington.xls/Raw. In addition, conversion to $\mu\text{g}/\text{m}^3$ is not consistent. These discrepancies should be corrected.

In addition, sample Q2 S107-INA data presented in Data-Each Home Q2/107.xls/sheet1 is not included in Combined Data Sets/107-643 Kensington.xls/Raw. This discrepancy should be corrected.

7. **Files:** *Combined Data Sets/VMP-New Region3 Values.xls/Region3 Tox*

Comment: There are no column headings for this file and there are no units to identify the reference and check the toxicity values. This information should be provided.

8. **Files:** *Combined Data Sets/30.xls/Raw and Data-Each Home Q2/30.xls/sheet1*

Comment: Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q2-S30-VMP do not match with the corresponding values in Data-Each Home Q2/30.xls/sheet1 and Combined Data Sets/30.xls/Raw. However, they match with the concentrations in Combined Data Sets/30.xls/Raw, if the conversions from ppb to $\mu\text{g}/\text{m}^3$ were made according to the formula in comment 4 above. This discrepancy should be corrected.

9. **Files:** *Combined Data Sets/13.xls/Raw and Data-Each Home Q1/13.xls/sheet1*

Comment: Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-S13-VMP do not match with the corresponding values in Data-Each Home Q1/13.xls/sheet1. However, they match with Combined Data Sets/13.xls/Raw. It is not clear if the correct concentrations were used in risk calculations.

10. **Files:** *Combined Data Sets/23.xls/Raw and Data-Each Home Q2/23.xls/sheet1*

Comment: Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q2-S23-VMP do not match with the corresponding values in Data-Each Home Q2/23.xls/sheet1 and Combined Data Sets/23.xls/Raw. This discrepancy should be corrected.

11. **Files:** *Combined Data Sets/258.xls/Raw and Data-Each Home Q1/258.xls/sheet1*

Comment: The tetrachloroethane concentration provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-S258-VMP does not match with the corresponding concentration in Data-Each Home Q1/258.xls/sheet1. There are two different values for tetrachloroethane concentration in Combined Data Sets/23.xls/Raw, and the value in Exhibit 7 matches with one of these. This should be corrected.

12. **Files:** *Combined Data Sets/37.xls/Raw and Data-Each Home Q1/37.xls/sheet1*

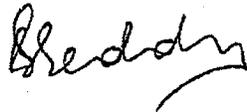
Comment: Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-S37-VMP do not match with the corresponding values in Data-Each Home Q1/37.xls/sheet1. However, they match with Combined Data Sets/73.xls/Raw. It is not clear if correct concentrations were used in risk calculations.

Mr. Judson Polikoff
Chevron EMC
April 20, 2009
Page 7 of 7

The above evaluation leads us to believe that there are significant discrepancies and errors in the calculations and the risk assessment presented. Because no documentation is available for the spreadsheets, the only way to confirm the calculations and assumptions is to either (i) request detailed documentation of the data and calculations included in the spreadsheets, or (ii) have a face to face meeting with the authors of these spreadsheets to discuss the methodology, assumptions, and calculations.

If you have any questions, please do not hesitate to contact me. We will welcome the opportunity to discuss our comments in more detail with DC officials as well as the authors of the HHRA report as appropriate.

Sincerely,

For 

Atul M. Salhotra, Ph.D.
Vice President

Attachments: 1. Figure: Toxicologist Work Product: Data Received

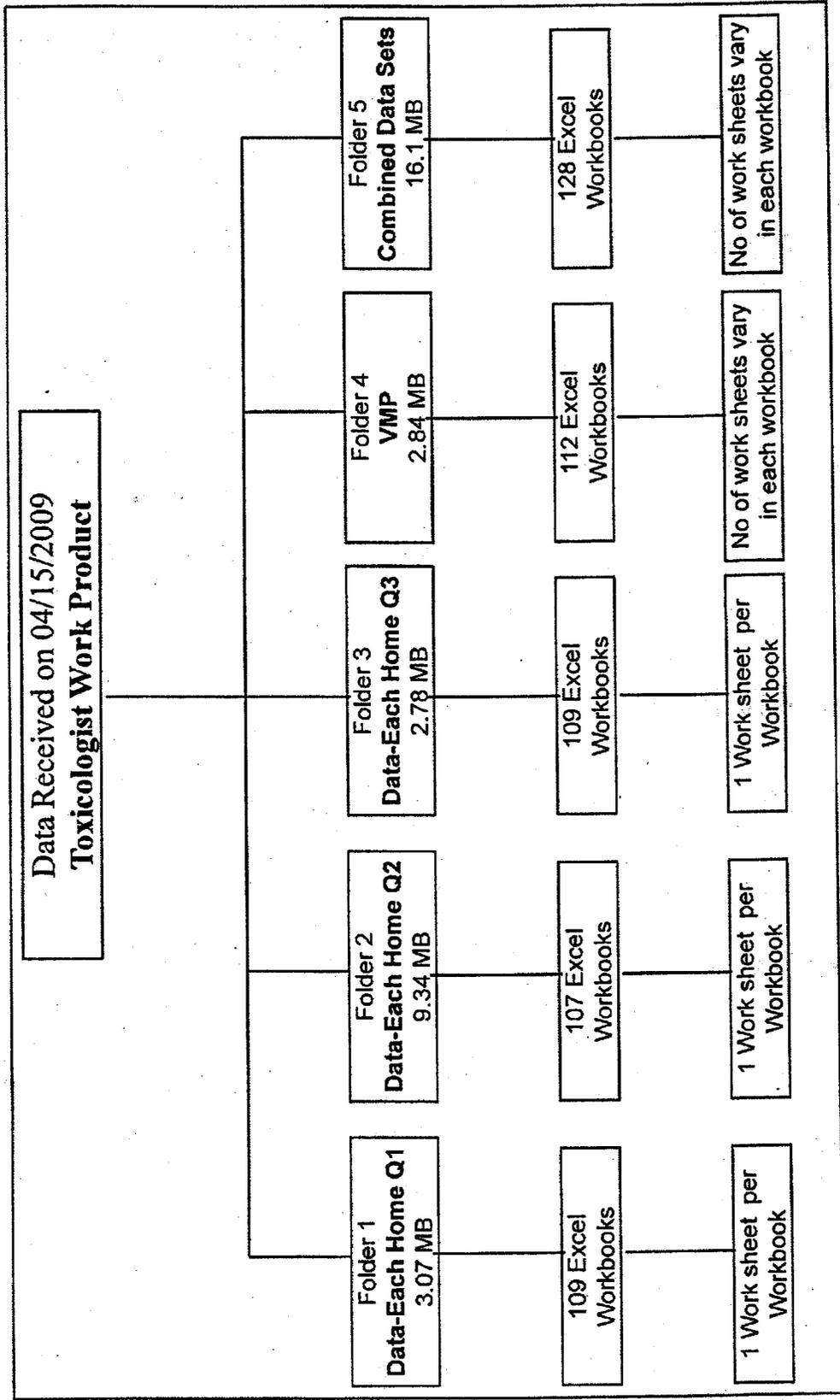


Figure 1: Data Received on 04/15/2009
Former Chevron Facility No. 122208, Chillum Maryland

Appendix B

Response to Comments

Index

Introduction	page B2
Responses to comments submitted by Cleo Holmes	pages B3 to B13
Responses to comments submitted by Mary Wilkins	pages B14 to B15
Responses to comments submitted by Hazel Lawson	pages B16 to B21
Responses to comments submitted by Ethel Archie	pages B22 to B23
Responses to comments submitted by Tamiko Lofty	pages B24 to B25
Responses to comments submitted by Gertrude Johnson	page B26 to B28
Responses to comments submitted by Mrs. Barbara Davis	page B29
Responses to comments submitted by Glenda Theodore	pages B30 to B31
Responses to comments submitted by Bettye Tate	pages B32 to B36
Responses to comments submitted by Darrel Johnson	pages B37 to B39
Responses to comments submitted by Delores Ford	page B40
Responses to comments submitted by Marion Drummond	pages B41 to B42
Responses to comments submitted by John Dunston	pages B43 to B47
Response to comment submitted by EPA	page B48 to B50
Responses to comments submitted by Chevron	
Subset 1	pages B51 to B68
Subset 2	pages B69 to B79
Subset 3	pages B80 to B88
Subset 4	pages B89 to B97

INTRODUCTION

The following comments were received in response to DDOE's Request for Public Comment on the proposed Remedy Selection issued in February 2009 for Riggs Park.

The submitted comments have been reproduced here, as Appendix B of the Final Remedy Selection, in the exact format in which they were received, including grammatical and spelling errors, and/or typos.

DDOE has placed its response below each comment. For ease of reading, the comments are in bold type font, and the responses are in regular black font.

The actual comments that were submitted are attached as Appendix A of the Final Remedy Selection.

Comments 1-37 (Cleo Holmes)

Comment 1:

RPISS&GR, pg. [REDACTED], Table 8 states soil sample was collected was taken from my property.

Why, when on Feb 23, 2009 the DC DOE received a FOIA to provide copies of test results of all samples taken at this property, no soil sample results were delivered?

Response:

All of this information is included in the SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> , and on DVD by request.

Please also see the FOIA response to Ms. Freedman-Holmes's request provided by Mr. Bullo on February 27, 2009, which states:

"The SSP&A data is not currently in the home-by-home format you have requested. A home-by-home report is being prepared, and will be made available to each resident when it is ready. The complete SSP&A report, with *all* of its non-confidential attachments, will be available at the Lamond-Riggs library, and the complete SSP&A report, with *most* of its non-confidential attachments, will also be available online on the DDOE website. Due to the voluminous size (over 20,000 pages, total) of the SSP&A report, we are unable to upload all of its attachments onto our website."

Comment 2:

Does the District believe this public comment period a fair opportunity for residents to comment when the residents were not allowed to see or review results of soil and groundwater samples taken on their property?

Response:

The complete data were included in the Final Report completed by SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Park Library, online at <http://ddoe.dc.gov/RiggsPark> , and on DVD upon request.

Comment 3:

Why doe the DCRS not explain the relationship to the depth of the groundwater and the rate of soil vapor movement in different times of the year, as well as what conditions could cause soil vapor to migrate at a faster rate towards the slab of resident homes?

Response:

The February 2009 Remedy Selection addresses vapor migration at all times of the year by taking 3 seasonal samples, a conservative approach to its technical evaluation, and using maximum detected values. In general, a variety of soil, groundwater, and

physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building; this is why multiple/seasonal samples have been taken, in order to capture a fuller spectrum of potential releases and migration. Also, please note that several other important factors are taken into account in the overall risk evaluation – to ensure that residents would be adequately protected.

Please note that the District contractor did consider the depth to groundwater under each home in its investigation. A figure illustrating the depth to groundwater is provided in the SSP&A Riggs Park Sampling & Analysis Report (2009).

Comment 4:

Why does the DCRS not mention how many years it would be before the soil would be considered clean of human carcinogenic chemical compounds?

Response:

Remediation of the soil and groundwater is under US EPA's oversight.

Comment 5:

Appendix O: Table 3 Compounds detected indoor Air Samples PERC Maximum Detection is [REDACTED] ppbv, my result for PERC reported at [REDACTED] ppbv.

Why are DOE and its contractor only quoting results in ppbv and not in ug/m3, is this being done so that when an unformed reader looks at this report they will think these numbers to be small?

Example: 6.24 ppbv is equal to 42.3 ug/m3

Response:

All results in SSP&A Riggs Park Sampling & Analysis Report (2009) were cited in units of ug/m³. Appendix O of that report contains preliminary reports that were provided to DDOE during the investigation. The final results are included in the main report in units of ug/m³. The District will provide both values and units in the final remedy decision document when appropriate.

Comment 6:

With the DCRS pg. 14 listing 17 COC as "Human Carcinogens", why does the District feel cumulative cancer risk is not important issue to be evaluated?

Response:

The District has utilized cumulative risk assessment and has incorporated it into its February 2009 Remedy Selection. Please see the first paragraph of section IV of the remedy document which states:

"The District selects a cumulative hazard index of 1.0 for non-cancer risk, and a cumulative 1×10^{-5} level for cancer risk to be protective for the current and future residents of Riggs Park."

Comment 7:

The DCRS refer to there toxicologist being an expert, the definition of “expert” is, a person with a high degree of skill in or knowledge of a certain subject of field.

Did the Districts “expert toxicologist” agree with or advise the District not to address or evaluate the cumulative cancer risk in Riggs Park study?

Response:

The District has retained the services of a Toxicologist whose credentials clearly meet those required of “expert” status. The District’s Toxicologist has taken cumulative risk into account.

Comment 8:

First quarter VMP 1 PERC result of [REDACTED] ppbv-[REDACTED] ug/m3, increased to a 2nd quarter VMP 1 result of [REDACTED] ppbv – [REDACTED] ug/m3) and my 3rd quarter VMP 1 went to [REDACTED] ppbv to [REDACTED] ug/m3.

Does this increase in numbers warrant the installation of a Vapor Mitigation System at this property?

Response:

In the 2009 Remedy Selection, determination of the potential need for a Vapor Mitigation System was based on sub-slab vapor samples, as such, if the estimated risks based on the sampling results indicate unacceptable risks, then a VMS is generally recommended for the subject property. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

In the 2010 HHRA and Remedy Selection, homes without sub-slab vapor samples were also evaluated. Homes in direct contact with contaminated ground water or that fell within kriged boundaries delineating clusters of homes with unacceptable sub-slab vapor concentrations were identified as homes requiring remediation. Additionally, any duplex home from which no data was collected and which shared a common concrete slab with a home already targeted for remediation (based on a high sub-slab sample vapor concentration), was automatically identified as requiring remediation.

Comment 9:

Why hasn’t the District applied any indoor air, sub- slab, or soil vapor action levels for this survey?

Response:

The District made the decision to base its 2009 Remedy Selection on an actual risk assessment, rather than on pre-selected action levels, or “published numbers”. Ultimately, if an unacceptable health risk is found to be present, then a decision is made to qualify the affected home for VMS installation.

Comment 10:

DCRS Pg, 6 references the District DOH development and administration of a health survey of Riggs Park residents who reside over the plume footprint caused by the leakage of gasoline from the Chevron gas station.

Will DCRS direct DOH to correct its development and administration of the RP health survey to include plumes related to PERC and its breakdown products as well?

Response:

The survey that was conducted by DOH was a health status update of residents who reside in Riggs Park. The survey was available online and was also mailed over a 60 day period.

DOH has provided a summary of the results of their health survey (please see Appendix C of the Final Remedy Selection).

Comment 11:

The Riggs Park Sampling & Analysis Report, Feb. 2009 makes reference to "Ambient air concentrations of Benzene and toluene, and PCE are within ranges observed both at Washington DC's McMillan Reservoir, and within ranges reported in the literature for other urban environments"

Why is the District using McMillan ambient numbers in this report and not ambient air samples taken from Riggs Park as the more representative sample collected?

Response:

As is stated in the quote from the SSP&A Riggs Park Sampling & Analysis Report (2009), DDOE did consider ambient air concentrations from the Riggs Park neighborhood, and these were similar in concentration to the other locations cited. McMillan Reservoir and other urban environments were referenced to provide context for the Riggs Park results.

Comment 12:

Table two:" Selected information from home surveys" state at my home:

- a "[REDACTED]", the fact is a [REDACTED] installed at least 12 months prior to the SSP&A testing period.

* This report says "[REDACTED]", inaccurate statement placed in the record.

* This report says [REDACTED] done within two weeks prior to testing, inaccurate statement Placed in the record.

Are these inaccurate statements being placed in the record to disqualify this property from having a Vapor Mitigation System installed at this property?

Response:

The District has never knowingly placed inaccurate statements in the Record for any reason. Items in this table are reported as transcribed during the home surveys. The remedy selection is based on subslab vapor results, not indoor or ambient air results, therefore this information can neither qualify nor disqualify a home from receiving a VMS. The information was used to provide a complete picture of the home.

Comment 13:

Why, when in our FOIA request to the DOE for copies of all contractor field note, none were provide in response to the FOIA we submitted?

Response:

All SSP&A field notes are provided in the appendices to the SSP&A Riggs Park Sampling & Analysis Report (2009).

Comment 14:

Since it has been stated in the February 09 public meeting by DOE Director Hawkins, the problem with locating the PERC plume is that the plume is moving from place to place. Would not it be prudent, as a protection to the community, to install Vapor mitigation Systems under each home in Riggs Park that request a system be installed?

Response:

Director Hawkins did not make this statement at the February 09 public meeting. Vapor mitigation systems will be installed on the basis of data illustrating potential risk.

Comment 15:

What date exactly did the District of Columbia repeal its" Risked Based Corrective Action guidance?

Response:

DDOE has not repealed the DC RBCA guidance. Although the District Department of the Environment continues to rely on DC RBCA for guidance in making risk-based decisions for clean-ups taking place in the District of Columbia, DC RBCA was intended to be used as a guidance document only, and, as such, it is not binding. Whether and to what extent it is used is determined on a case-by-case basis by DDOE's Director and staff. Also, recognize that other site-specific conditions and factors may necessitate the utilization of different but more appropriate technical evaluation protocols not necessarily found in the DC RBCA document – in order for public health to be adequately protected.

Comment 16:

why, when the SSP&A took groundwater samples from various locations in Riggs Park, did the District decide not to reveal laboratory results and the process DOE used to evaluate these results?

Response:

Although the results of all samples, including the soil and groundwater samples were presented in the SSP&A Riggs Park Sampling & Analysis Report (2009), the groundwater results were not evaluated for the February 2009 Remedy Selection.

The preliminary evaluation process was described in the February 2009 Remedy Selection document. The 2010 HHRA evaluation, including the evaluation of groundwater results, has now been completed, and is described in the Final Remedy Document.

Comment 17:

Why does the District feel that by testing only 20% of the homes is sufficient to protect all residents within the boundaries of the gasoline and PERC contaminated areas?

Response:

It is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the tested homes to make projections for all the homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 18:

Page 5 Installations and operation of vapor mitigation systems in up to 45 residences with elevated sub-slab soil vapor levels attributable to contaminated groundwater.

is the District decision to perform evaluations to confirm that contaminants observed in sub-slab vapor samples are attributable to groundwater contamination, being done as the result of a prior agreement with chevron?

Response:

There are no prior agreements with Chevron related to Riggs Park.

DDOE recognizes the importance of correlating sub-slab contamination to groundwater to ensure a sound methodology.

Comment 19:

Is the cost of any re evaluation of any property results being paid for by chevron?

Response:

Chevron has borne the costs of compliance with EPA's orders respecting the gasoline release clean-up at Riggs Park, but the District of Columbia has paid for the costs of DDOE's and DOH's investigations.

Comment 20:

Has the District agreed to supply Chevron results of any test performed in the design or installation phase of the Papadopoulos study?

Response:

There is no agreement for the District to provide Chevron with the above referenced information. Like any other member of the public, Chevron has access to all of the public documents.

Comment 21:

Has DOE agreed to collaborate with Chevron or EPA prior to installations of VMS at any property?

Response:

As stated in other comments, DDOE currently has no agreement(s) with Chevron.

Comment 22:

What exactly is the agreed to Consent order between DOE and Chevron?

Response:

There is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaossc.org/sites/abc/files/iporder.pdf>

Comment 23:

In February 09 public meeting Director Hawkins explained on PERC contamination is hard to follow because the way this chemical moves in the subsurface, since the DCRS is based of protective solutions why not install VMS devices under all properties in Riggs Park that which this system?

Response:

As previously stated in response to Comment #14, vapor mitigation systems will be installed on the basis of data illustrating potential risk.

Comment 24:

Many of the Riggs Park site related guidance documents since 2001 noted "District of Columbia's Risk Based Corrective Action as "The" guidance document of choice for this site.

Why has DC DOE abandoned the District's Risk Based Corrective Action Guidance when evaluating the Riggs Park community?

Response:

The District has opted to pursue a case-specific health assessment of the Riggs Park homes using updated toxicological methods and values – to ensure that residents are adequately protected.

Please also see the responses to Comments #15 and 27.

Comment 25:

Why does the “Regulatory Framework” listed in the DCRS not mention of DC RBCA?

Response:

As previously stated in the answer to Comment # 24, the District has opted to pursue a case-specific health assessment of the Riggs Park homes using updated toxicological methods and values – to ensure that residents are adequately protected.

Please also see the responses to Comments #15 and 27.

Comment 26:

Is the DC Risk Based Corrective Action no longer recognized by the District of Columbia?

Response:

As previously seen in the response to Comment # 15, DDOE has not repealed the DC RBCA guidance. Although the District Department of the Environment continues to rely on DC RBCA for guidance in making risk-based decisions for clean-ups taking place in the District of Columbia, DC RBCA was intended to be used as a guidance document only, and, as such, it is not binding. Whether and to what extent it is used is determined on a case-by-case basis by DDOE’s Director and staff. Also, recognize that other site-specific conditions and factors may necessitate the utilization of different but more appropriate technical evaluation protocols not necessarily found in the DC RBCA document – in order for public health to be adequately protected.

Please also see the responses to Comment #27.

Comment 27:

Does the District of Columbia DOE view the DC RBCA as not being adequate protection for the residents of the District?

Response:

As previously stated in the answer to Comment #15, DC RBCA is only a guidance document, and does not, in and of itself, provide protection to the residents of the District. Rather, DC RBCA is used by DDOE, together with other guidance tools available, to determine how to best protect the health of the residents of the District of Columbia from potential environmental hazards. New scientific data pertaining to DC RBCA’s propositions has come into existence since 2002, when DC RBCA was published. DDOE will be revising and updating DC RBCA in 2010 to reflect these latest scientific developments.

Comment 28:

Is DC DOE's decision not to follow its own RBCA at this site as a result on a signed AOC between the District and Chevron?

Response:

As previously stated in the answer to Comments # 22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaossc.org/sites/abc/files/iporder.pdf>

Comment 29:

The residents from day one have its asserted concerns to EPA and DC DOE repeatedly around the issue of having the cancer risk evaluated on a cumulative bases?

Since the issue of cumulative risk not being addressed as a part of a pre-existing agreement between DOE and Chevron?

Response:

Cumulative risk was addressed by DDOE in its selected remedy. As previously stated in the answer to Comment #22, there is no pre-existing agreement between DDOE and Chevron.

Comment 30:

How can the DOE consider its remedy to be protective of the health of the Riggs Park resident's without a proper evaluation of any cancer, diseases or other illnesses that could occur as a result of the accumulative exposure to multiple toxic chemicals on the resident population of Riggs Park?

Response:

The remedy does address health risks that may occur as a result of cumulative exposure to multiple chemicals.

Comment 31:

Director Hawkins in a Feb. 2009 public meeting stated the intention of DC DOE intention is to make the Riggs Park web page documents available for public review. As you know this community has repeatedly been asking for this web page to be accessible for sometime now.

Is the AOC between the District and Chevron the reason why the community has since October 2008, not been able to properly access and view documents on the DOE web page?

Response:

As previously stated in the answer to Comment #22, there is no AOC between the District and Chevron.

DDOE has made extensive efforts to employ the internet to provide information to Riggs Park residents; however, there are limitations placed on the size of documents which our system can support. DC also has no control over the quality of the internet service each resident receives from their providers. The documents are also available at the Lamond Riggs Park Library and on DVD upon request.

Comment 32:

In the Feb. 2009 public meeting Director Hawkins stated the District would be open and transparent with the Riggs Park community?

Why, in this public meeting, didn't Director Hawkins announce that DDOE and Chevron in January 2008 entered into an AOC?

Response:

As previously stated in the answer to Comment #22, there is no AOC between DDOE and Chevron. DDOE has made every attempt to be open and transparent with the Riggs Park community in accordance with Director Hawkins' decision.

Comment 33:

Please explain the parameters of the AOC and how this AOC affects the relationship between DC DOE and the residents of Riggs Park?

Response:

As previously stated in the answer to Comment #22, there is no AOC between the District (DDOE) and Chevron.

Comment 34:

Has the gasoline plume seem to be diminished because Chevron has been permitted to inject cloaking chemicals (hydrogen peroxide) into the Sub- surface?

Response:

There is no such thing as "cloaking chemicals." The plume of gasoline-related contaminants has changed over time in response to natural processes in the subsurface, and Chevron's remedial efforts.

Comment 35:

The DCRS mentions DOH development and Administration of a health survey in Riggs Park for those who reside in the plume footprint caused by the leakage of gasoline from the gasoline station.

Does this footprint include carcinogens MTBE and PERC and in breakdown product as well?

Response:

A health survey was developed for the Riggs Park residents who reside within the boundaries of the plume. The health survey did not include information about carcinogens MTBE or PERC.

DOH has provided a summary of the results of their health survey (please see Appendix C of the Final Remedy Selection).

Comment 36:

Is Chevron collaborating through DOE or directly with DOH on the District health survey and its “specific questions” to be asked to the residents of Riggs Park?

Response:

Chevron did not collaborate with the DOH in developing the survey. The survey administered was an adaptation of the National Health Interview Survey through the National Center for Health Statistics within the Centers for Disease Control.

Comment 37:

Nowhere in the District Remedy Selection does it mention the continuing oversight of and distribution of Chevron regulatory monthly and semi annual groundwater sampling results to and on behalf of the residents of Riggs Park.

Will the resident be guaranteed to receive copies of all future test results complete with executive summaries for as long as testing regulatory testing of the groundwater is ordered?

Response:

EPA has lead on groundwater remediation, which includes groundwater monitoring and sampling. Groundwater remediation was not addressed in the February 2009 Remedy Selection.

At this time, DDOE continues to audit ground water monitoring and sampling activities.

EPA has issued requirements for reporting the groundwater monitoring and sampling results. Chevron places copies of the results in the Lamond Riggs Library. At this time, DDOE does not plan to issue additional requirements for reporting on the groundwater activities.

Comments 38 through 41 (Mary Wilkins)

Comment 38:

PERC results April, June, and August 2008: [Below results are in ppbv]

April 2008: VMP==[REDACTED] June 2008: VMP==[REDACTED] Aug 2008: VMP==[REDACTED]

Indoor air result April 2008:

April, 2008==[REDACTED]

When the June 2008 VMP increased from [REDACTED] to [REDACTED] why didn't the contractor sample in August 2008 to see if indoor air had increased as well? In fact, the August 2008 VMP went to [REDACTED] ppbv, proving that the contractor erred in his/her responsibility.

Response:

The study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 39:

Do you intend to put Vapor Mitigation systems on Nicholson Street, N.E.? I'm concerned because the residents on Nicholson Street are so close to the water table. If you are not putting in the vapor remedial systems, how are you guaranteeing the protection of the residents from 500 Nicholson to 808 Nicholson Street, N.E.?

Response:

DDOE has determined that the use of a VMS is a suitable remedy for homes requiring remediation, regardless of the home's proximity to the water table. DDOE has determined the need for VMS installation using a risk-based determination for each home. Determination of the need for a Vapor Mitigation System has generally been based on sub-slab vapor samples except where none were available. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Once DDOE has identified the homes that qualify for VMS installation, each of those home-owners will be notified in writing.

Please see also the response to Comment #44.

Comment 40:

If my next door neighbor has a crack in her slab, how will this affect the selected remedial system for my property? If there is an alternative remedial system, how will this address the needs of two homes on one slab?

Response:

Each home was evaluated independently using the data associated with each home. If no data was collected from a home, an alternative evaluation strategy was utilized.

The decision was based on risk posed by potential vapor intrusion, not actual vapor intrusion. This method is meant to be preventive, as it is used to select homes for remediation which are potentially at risk, regardless of the current conditions of the home's sub-slab. Please also see page 5 of the Remedy Selection Document which states:

“Subslab soil vapor results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor vapor intrusion. [...] Using subslab soil vapor results to make determinations protects against possible current and future exposures.”

Comment 41:

My final question addresses the oversight of the Vapor Mitigation system. Will the District be responsible for the oversight of the VMS, sampling and operation of the system?

Response:

The District will be responsible for oversight of VMS systems installed pursuant to District directives; EPA will exercise oversight for VMS systems installed pursuant to EPA orders.

Comments 42 to 55 (Hazel Lawson)

Comment 42:

Here are my SSP&A readings for this chemical.

Tetrachloroethene

Feb 08 VMP	█ ppbv	█ ug/m3
April 08 VMP	█ ppbv	█ ug/m3
July 08 VMP	█ ppbv	█ ug/m3

Why is it there are no published numbers that tell the residents what number, i.e. ppbv or ug/m3, is used to qualify their home to receive a vapor mitigation system. How can your remedy selection be consider adequate if there are no numbers published to tell the residents at what chemical level (reading) this home must receive protection?

Response:

As previously stated in the answer to Comment #9, the District has made the decision to base its 2009 Remedy Selection on an actual risk assessment, rather than on pre-selected action levels, or "published numbers".

DDOE used the numbers cited in the comment above to carry out a comprehensive and site-specific human health risk assessment. Ultimately, if an unacceptable health risk is found to be present, based on the risk calculations that utilize the numbers you have cited, then a decision is made to qualify the affected home for VMS installation.

Comment 43:

Your Remedy mentions to receive a Vapor Mitigation System the chemical of concern must be attributable to groundwater contamination.

In the interest of full disclosure, why hasn't the district released the groundwater test results for the residents to see?

Response:

All groundwater results from samples collected by SSP&A were included in the SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> and on DVD upon request. Groundwater results from samples collected by other contractors are also available at the Lamond Riggs Library.

Comment 44:

I do not see results for a groundwater sample taken at this property, so given the fact Tertrachloroethene is present in groundwater behind , doesn't my hoe being so close to the groundwater qualify my home for the installation of a vapor mitigation system?

Response:

In general, a variety of soil, groundwater, and physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, possible cracks in building foundations, and plume behavior) may affect the likelihood of vapor releases from the subsurface into a building. Data from the nearest groundwater well was evaluated and taken into consideration during the risk determination, as well as in the decision-making process for VMS installations.

As previously stated in the answer to Comment #14, vapor mitigation systems will be installed on the basis of data illustrating potential risk.

Each of those home-owners whose home has been identified as qualifying for VMS installation will be notified in writing.

Please also see the response to Comment # 43.

Comment 45:

With the depth to contaminated groundwater being within feet from my basement and slab, has the District or Papadopulas taken groundwater samples directly under my slab to ascertain the length of time it would take for this contaminated water turned to vapor would take to come in contact with the slab of my home?

Response:

In general, a variety of soil, groundwater, and physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building. As such, several important factors (including the groundwater depth) are taken into account in the overall sampling design and risk determination – to ensure that residents would be adequately protected.

Comment 46:

Why didn't the Papadopulas, measure and report on, the depth to the groundwater under my slab as it is a relevant factor when considering if vapor intrusion is more apt to affect my home?

Response:

The District contractor did consider the depth to groundwater under each home in its investigation. A figure illustrating the depth to groundwater is provided in the SSP&A Riggs Park Sampling & Analysis Report (2009).

Comment 47:

Why didn't Papadopulas, after evaluating my Feb. and April results, not take another indoor air sample to find out how much my indoor air was being affected by the increasing tetrachloroethene?

Response:

As previously stated in the answer to Comment # 38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008.

The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 48:

Did the District order the Papadopulas not to do a July 08 verifying evaluation of indoor air as part of a pre-existing agreement with Chevron not to take 3rd quarter indoor air samples at any resident?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

Please also see the response to Comment # 38.

Comment 49:

Does the District consider not performing a third quarter indoor air sample in my home as being protective of health concerns for my home and family?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts

for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 50:

Why doesn't the District Remedy Selection explain how tetrachlorethene can move from my property to my co-slab owner and, under what conditions can the amount of chemical be made to increase to cause harm to my co-slab neighbor and her family?

Response:

In general, a variety of soil, groundwater, and physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building; this is why multiple/seasonal samples have been taken, in order to capture a fuller spectrum of potential releases and migration patterns. Also, please note that several other important factors are taken into account in the overall risk evaluation – to ensure that all residents would be adequately protected.

Comment 51:

My co slab neighbor has a newborn baby, since our slab has increasing tetrachloroethene VMP readings, what are the possible negative health affect can this chemical cause this child?

Response:

DDOE used the measured and estimated concentrations to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive receptors, such as children. As such, no negative health effects would be anticipated for any resident in your or your neighbor's home. This conclusion is also supported by ATSDR's independent study carried out for the Riggs Park community. Note that ATSDR is tasked with investigating chemical effects on residents nationally.

Please note that if an unacceptable health risk is found to be present (i.e., based on the risk calculations), then a decision is made to qualify the affected home for VMS installation. Please also see the 2010 HHRA and Final Remedy Selection, which provide that, if one home of a co-slab pair is selected for remediation and if no data was collected from its pair, the un-sampled home is automatically selected for remediation.

Comment 52:

With the groundwater being so close to the homes on Oglethorpe Street, how will vapor mitigation systems be installed on Nicholson Street given that most of the homes are on the water table?

Response:

Consultation with VMS contractors indicates that Vapor Mitigation Systems can be installed in homes which are at or near the water table. The specific details will be determined during the design phase. Please see section VI B.1 of the Remedy Selection document.

Please note that only those homes identified by DDOE as meeting the requirements for VMS installation will be offered Vapor Mitigation Systems. Each of those homeowners will be notified in writing.

Comment 53:

How many inches or feet off the water table does the contaminant tetrachloroethene begin to turn into contaminated vapor?

Response:

Tetrachloroethene (PCE) is a volatile organic compound. When in contact with air (even air in soil pores), some portion of it transfers to the air. Dissolved PCE can potentially lead to vapors immediately above the saturated zone (water table).

Comment 54:

Why does the District not mention soil contamination at slab, does the District feel there remedy is complete and validated without a proper evaluation of how many feet of the soil under and around my home is contaminated?

Response:

DDOE has carefully evaluated the potential transport of groundwater contaminants via soil media which includes the soil columns under and around all homes which have been investigated. Therefore, any soil contamination under and around your home has been properly taken into consideration as part of the overall evaluation. In general, a variety of soil, groundwater, and physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building. As such, several important factors (including the soil conditions, areas of contamination, groundwater depth, etc.) have been taken into account in the overall sampling design and risk determination – to ensure that residents would be adequately protected.

Comment 55:

Since the VMP is installed flush with the slab under my home, and the VMP results reveal the presence of contaminant tetrachloroethene, does this mean the soil directly under my home is contaminated as well?

Response:

PCE (tetrachloroethene) detected in the vapor samples is most likely associated with contaminants in groundwater, not soil. PCE has been seen in groundwater in Riggs Park. The scope of the investigation did not include identification of the source of the PCE. In any event, a variety of soil, groundwater, and physical or ambient conditions

(such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building. As such, several important factors (including the soil conditions, groundwater depth, etc.) have been taken into account in the overall sampling design and risk determination – to ensure that residents would be adequately protected.

Comments 56 to 61 (Ethel Archie)

Comment 56:

Can the District explain the decision not to evaluate the cumulative affects these chemical could have on my family?

Response:

As previously stated in the answer to Comment #6, the District has consistently supported cumulative risk assessment and has incorporated it into its February 2009 Remedy Selection. Please see the first paragraph of section IV of the remedy document which states:

“The District selects a cumulative hazard index of 1.0 for non-cancer risk, and a cummulative 1×10^{-5} level for cancer risk to be protective for the current and future residents of Riggs Park.”

Comment 57:

I have a new born living in my home; does the District feel the lack of a proper investigation of the cumulative affects is the proper kind of investigation to protect the health of my grand daughter's child living in my home?

Response:

As previously stated in the answer to Comment #6, the District has consistently supported cumulative risk assessment and has incorporated it into its February 2009 Remedy Selection. Please see the first paragraph of section IV of the remedy document which states:

“The District selects a cumulative hazard index of 1.0 for non-cancer risk, and a cummulative 1×10^{-5} level for cancer risk to be protective for the current and future residents of Riggs Park.”

Comment 58:

Can the District assure me without the protection of a vapor monitoring system the health of my family members will not deteriorate, in the future, as a result of these toxic chemicals in the sub surface under and around my home?

Response:

DDOE used the measured and estimated concentrations to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive receptors, such as children. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home.

Comment 59:

Did Papadopulos perform soil and groundwater sampling on my property? If so, why weren't the results released to our family for review prior to commencement of the comment period?

Response:

DDOE cannot provide information regarding sampling at your home in a public forum. All homes which participated in the SSP&A study will receive a home-by-home report which includes the results from samples taken at their residence.

The results are also in the SSP&A Sampling & Analysis Report (February 2009) which is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> and on DVD upon request.

Comment 60:

I have been a member of the DDOE canceled Riggs Park Advisory Committee. Why in monthly meetings RPAC during the past year, after being asked repeatedly, did DOE, a member of RPAC, choose to hide the fact DOE had been in talks with Chevron prior to the start of the District funded Papadopulos study?

Response:

DDOE has been engaged in communications with EPA and with Chevron, as the responsible party, from the time the District became involved in Riggs Park. DDOE has never hidden this fact.

Comment 61:

What effect did the agreed to District/Chevron Admin. Consent Order have on the resident not being able to see certain documents that were generated by the testing done by Papadopoulos paid for by District taxpayer money?

Response:

As previously stated in the answer to Comment #22, there is no AOC between the District and Chevron.

Aside from information that was identified as confidential (to protect the residents' identities), residents have not been restricted from seeing information developed by SSP&A. The results are in the SSP&A Sampling & Analysis Report (February 2009) which is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> and on DVD upon request.

Comments 62 to 64 (Tamiko Lofty)

Comment 62:

Why did DDOE not order additional “indoor air” testing after receiving the high results which appeared in the 1st quarter?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 63:

What numbers have been set by the District of Columbia to determine action levels?

Response:

As previously stated in the answer to Comment #9, the District made the decision to base its 2009 Remedy Selection on an actual risk assessment, rather than on pre-selected action levels, or “published numbers”.

Ultimately, if an unacceptable health risk is found to be present, then a decision is made to qualify the affected home for VMS installation.

Comment 64:

Do high test results of known carcinogens warrant vapor mitigation systems?

Response:

As previously stated in the answer to Comment #9, the District made the decision to base its 2009 Remedy Selection on an actual risk assessment, rather than on pre-selected action levels, or “published numbers”.

DDOE used the measured and estimated concentrations of all contaminants (including known carcinogens) to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all

residents – including sensitive receptors, such as children. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home. Note that if an unacceptable health risk is found to be present (i.e., based on the risk calculations), then a decision is made to qualify the affected home for VMS.

Ultimately, if an unacceptable health risk is found to be present, then a decision is made to qualify the affected home for VMS installation.

Comments 65 to 70 (Gertrude Johnson)

Comment 65:

If as quoted in the DC Remedy Selection, “the district has based the decision on sub-slab soil vapor samples” and “sub-slab soil vapor results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor air vapor intrusion”

Is “Chemical of Concern “Perchloroethene” mentioned of page 5 of DC Remedy another way word for Tetrachloroethene?

Response:

Yes. Please see the glossary section of the remedy document, pages 3 and 4.

Comment 66:

Why is the District and its contractor SSPA decide not to do 2nd or 3rd round of indoor air sampling at my home?

A.) The February 08 indoor air sample result for chemical compound Tetrachloroethene was [REDACTED] ppbv;

B.) Tetrachloroethene readings in my VMP went from negative in February 08 to [REDACTED] ppbv in June 08, to [REDACTED] ppbv in August 08?

C.) Tetrachloroethene readings in PVMP 1 went from [REDACTED] ppbv in February to [REDACTED] ppbv in June and [REDACTED] in August

D.) Tetrachloroethene readings in PMVP2 went from [REDACTED] ppbv in Feb. to [REDACTED] ppbv in June 08.

A,B,C, and D. is evidence tetrachloroethene is increasing. Why did the District not perform additional indoor air testing in Q3 to address this obvious concern?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 67:

Since EPA and Chevron are not going to clean up the groundwater under my home, why doesn't the District Remedy address the issue of the fact not potentially that Tetrachloroethene, is increasing, in the sub-surface under my home. What does the District plan to do to prevent my home from future exposure?

Response:

If a home is determined to qualify for VMS installation, pursuant to the District's risk-based analysis, a VMS will be installed and operated until such time that all contaminant sources contributing to the potential indoor air problems have been removed.

Comment 68:

In the Riggs Park Indoor Air, Sub-Slab, Soil and Groundwater Analysis Report, Table 3- states in Q1 " [REDACTED]" I have no memory of this ever happening. Table 8- reveals on 4-3-08 a soil sample was taken at the depth of [REDACTED] feet. No lab results were provided to me by the date of this my response to the DC Remedy.

Response:

As previously stated in the answer to Comment #12, the District has never knowingly placed inaccurate statements in the Record for any reason. Items in this table are reported as transcribed during the home surveys.

As previously stated in the answer to Comment #2, the complete data were included in the Final Report completed by SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Park Library, online at <http://ddoe.dc.gov/RiggsPark> , and on DVD upon request.

Comment 69:

In February 2009 I sent, and the District DOE received my FOIA request, my request asked for results from all indoor air, soil, soil vapor, and groundwater tests taken in or on my property. This request also asked for copies of all field notes, log books and any other documents generated by S. S. Papadopoulos or its contractors during this sampling event. To-date DOE my FOIA has not satisfied my request.

Response:

All this information is included in the SSP&A Sampling & Analysis Report (2009) which is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> and on DVD upon request.

Please also see the FOIA response provided by Mr. Bullo on 2/27/09 which states "The SSP&A data is not currently in the home-by-home format you have requested. A home-by-home report is being prepared, and will be made available to each resident when it is ready. The complete SSP&A report, with *all* of its non-confidential attachments, will be available at the Lamond-Riggs

library, and the complete SSP&A report, with *most* of its non-confidential attachments, will also be available online on the DDOE website. Due to the voluminous size (over 20,000 pages, total) of the SSP&A report, we are unable to upload all of its attachments onto our website.”

Comment 70:

In the District Administrative Record File, why is SSPA Final Report Appendix B,C,R, S, T considered to be “Confidential” when DC DOE Director Hawkins has come before this community and said this investigation and results are completely transparent and above board? Why is DOE keeping the aforementioned files “confidential”?

Response:

Sections of the report are marked “confidential” to preserve homeowner privacy. By limiting distribution of these sections of the report, DDOE intended to prevent anyone but individual homeowners from identifying specific sampling results with their home address. In addition, the home survey forms were marked “confidential” because these contained descriptive information about the interiors of residents’ homes, and the District wished to preserve the privacy of individual homeowners.

Individual home owners may request a copy of the portions of these confidential appendices, and DDOE shall provide them in a redacted form, so as to preserve other homeowner’s privacy. To request a redacted copy, please submit the request in writing to Sharon Cooke at 1200 First St NE, 5th Floor, Washington DC 20002.

Comment 71 (Mrs. Barbara Davis)

Comment #71:

Ms. Cooke the subject of this matter is a 'Formal Request for a 'Vapor Mitigation System' to be install at my address. Which is stated in the "District of Columbia Remedy Selection". Even thou I wasn't allow to participate in the 2008 S. S. Papadopolous Study, I'm Formally Requesting, again a 'Vapor Mitigation System' at my address.

Response:

The DDOE selection process is based on data collected by SSP&A, a human health risk assessment, and site specific risk management framework. Please see the 2010 HHRA for additional information. You will be notified via letter if your home meets the criteria.

Comments 72 through 77 (Glenda Theodore)

Comment 72:

RE: S-█ Comments District Remedy Selection

I notice the Naphtalene in April VMP 1 was █ ppbv- █ ug/m3 and June █ ppbv- █ ug/m3 indoor sample o8 reveal increase of almost a 3 times is this be proof that this chemical has entered into my home?

Response:

Although the results may suggest the presence of this chemical in your home, it does not point to the source. More importantly, it does not necessarily suggest there would be risk to residents. In any event, please note that DDOE used the measured and estimated concentrations to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive receptors, such as children. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home from contaminants in groundwater.

Comment 73:

Why did the District and Papadouplas elect not to retest the indoor air in the 3 quarter to validate in increasing and intrusion of this deadly chemical into my home?

Response:

See the response to comment #38. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 74:

For what reason can District defend this type negligent testing behavior as the proper way to evaluate how and if toxic chemicals are coming into my home?

Response:

It is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other

important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 75:

Please explain why the residents were told about the dangers of Naphtalene and its being a human carcinogen?

Response:

We assume Ms. Theodore intended to ask why the residents were not informed.

The residents were informed. Please see the SSP&A Riggs Park Sampling & Analysis Report (2009) and the remedy selection.

Comment 76:

When I come to meeting why does DOE give the impression as though they are not working in the best interest of the Riggs Park residents?

Response:

The District became involved with Riggs Park at the request of the Riggs Park community. Since then, the District has worked arduously to ensure the health and best interests of that community are protected. The District hired its own contractor(s) to corroborate the sampling results obtained by Chevron pursuant to EPA's orders.

Comment 77:

No matter what I the District should install a vapor mitigation system installed at my property to insure my family safety, does the District agree with me?

Response:

The DDOE used the measured and estimated concentrations to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive receptors, such as children. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home. If indeed an unacceptable health risk is found to be present (i.e., based on the risk calculations), then a decision is made to qualify the affected home for VMS.

Comments 78 to 89 (Bettye Tate)

Comment 78:

In selecting this Remedy, The District has evaluated the risk for healthy adults.

Question: Why didn't the Dc Remedy mention, adults that may already have health problems, their conditions can be aggravated by exposure to gasoline and PERC vapors coming into their homes?

Response:

DDOE used the measured and estimated concentrations of all contaminants to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive/vulnerable receptors, such as children, the sick, and the elderly. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home. Note that if an unacceptable health risk is found to be present (i.e., based on the risk calculations), then a decision is made to qualify the affected home for VMS.

Please also see the response to Comment # 25

Comment 79:

DDOE has not evaluate the indoor air results in any building in this study and the Actual Cumulative Risk Levels, therefore the Cumulative Risk Level in the Remedy is not known.

Response:

As previously stated in the answer to Comment #6, the District has consistently supported cumulative risk assessment and has incorporated it into its February 2009 Remedy Selection. Please see the first paragraph of section IV of the remedy document which states:

“The District selects a cumulative hazard index of 1.0 for non-cancer risk, and a cumulative 1×10^{-5} level for cancer risk to be protective for the current and future residents of Riggs Park.”

Comment 80:

Question: Is the DOE decision not to evaluate the Cumulative Risk Levels in Riggs Park a condition of the agreed to DC and Chevron Administrative Consent Order?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaossc.org/sites/abc/files/iporder.pdf>

Comment 81:

September 11, 2008, Mr. Andrew Fan stated that the upwelling of the contaminated deeper water rising up into shallow water and clean water appears in the Oglethrope Street area-this has something to do with El Nino year off the Coast of Peru, the Contaminated groundwater is still there.

Question: Can this be true?

Response:

DDOE is unable to confirm the exact nature, content and context of Mr. Fan's statement. Accordingly, DDOE is unable to say whether El Nino is a possible cause for "upwelling" in Riggs Park.

However, regardless of the causes of the "upwelling", it does not affect DDOE's evaluation of the potential vapor intrusion issues, which are the focus of DDOE's study.

Comment 82:

Question; Is the DOE decision not to challenge EPA decision not to clean up the groundwater a part of the Administrative Consent Order between DOE and Chevron?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaossc.org/sites/abc/files/iporder.pdf>

Comment 83:

Question: Why is the District not establishing toxicity value for the Chemicals in Table 2 that were detected in Riggs Park sub-slabs soil vapor samples?

Response:

The process of establishing toxicity values for chemicals found in various sectors of society and/or in the environment is generally a very involved and expensive undertaking; as such, it has become standard scientific practice to focus the development of toxicity parameters on the more dangerous and highly toxic chemicals that have significant potential to cause harm to human health and the environment. For this reason, both the federal EPA and the District (DDOE) have not established toxicity values for the chemicals in Table 2. However, the evaluation results for the more toxic chemicals (that have toxicity values) generally provide a good indicator of the relative risks presented by the type of chemicals in Table 2 as well. This information is taken into consideration in the overall decision-making process. Please note that the type of chemicals in Table 2 will generally present relatively insignificant

risk to human health in comparison to the other family of chemicals that were the focus of the overall risk characterization.

Comment 84:

Question: Does the District feel the District Remedy Selection is flawed because of the lack of a Cumulative Risk of evaluation?

Response:

The remedy selection does include a cumulative risk evaluation. See the first paragraph of section IV of the remedy document which states:

“The District selects a cumulative hazard index of 1.0 for non-cancer risk, and a cumulative 1×10^{-5} level for cancer risk to be protective for the current and future residents of Riggs Park.”

Comment 85:

In Jan. 08 a Indoor Air sample was taken at my home, Napthelene was [redacted] ppbv- [redacted] ug/m3

Question: Why didn't Papadopoulos not come back to my home and do another indoor air test to see if these numbers were increasing or decreasing?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 86:

Question: Why is the District asking for the residents to comment on a District Remedy Selection, without the community being able to read the District promised individual report we were promised at the prior to the start of the Papadopoulos contract?

Response:

The comment period initiation is tied to when the remedy document is issued.

All the indoor and subslab data was mailed to each home owner as it was generated. The individual home owner reports were not ready when the remedy document was issued. However, as was stated in the answer to Comment #21, all the data is available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark>, and on DVD on request.

Comment 87:

Question: Why, when DOE, came into the picture, did the contract deliverables change to non existent?

Response:

The S. S. Papadopoulos and Associates contract did contain deliverables.

Comment 88:

Question: How much of the \$ 500,000.00 DOE paid to fund the Papadopoulos contract did Chevron refund to the District as a condition of the District and Chevron Administrative Consent Order?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Comment 89:

Cancer is not the only health concerns that are affecting this community. We have residents with Respiratory, Kidney, Liver, and others.

Question: Will the District Remedy Selection give a strong recommendation that a gasoline and PERC related chemical(s) health study/survey be performed in Riggs Park?

Response:

The remedy selection stated that DOH would conduct a health survey (including both cancer and non-cancer issues). Please see section VII.B.3 of the remedy selection document.

DOH conducted a survey for residents who reside in Riggs Park. The health survey did not consist of questions about PERC related chemicals. However, it included various questions about access to primary care and chronic diseases, in addition to cancer.

DOH has provided a summary of the results of their health survey (please see Appendix C of the Final Remedy Selection).

Also, please note that DDOE used the measured and estimated concentrations of all contaminants (including both carcinogens and non-carcinogens) to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including sensitive receptors, such as children. Ultimately, the determination of an acceptable health risk also means that no significant/negative health effects would be anticipated for any resident in this home. Note that if an unacceptable health risk is found to be present (i.e., based on the risk calculations), then a decision is made to qualify the affected home for VMS.

Comments 90 to 95 by (Darrel Johnson)

Here is a part of my

Tetrachloroethene

	VMP 1	VMP 2
Feb 08.	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3
April 08	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3
Sept 08	█ ppbv-█ ug/m3	█ ppbv-█ ug/m3

Comment 90:

Why did Papadopoulos and the District decide not to resample the indoor air of my home to see how much this chemical is increasing in our indoor air?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 91:

How can the District call this study-evaluation complete and accurate without properly evaluating all factors involved with publishing whether or not vapor intrusion is a happening at my home?

Response:

DDOE has evaluated all the factors to determine the risks associated with potential vapor intrusion at each home that participated in the study.

Comment 92:

What factors in the attached “District and Chevron Administrative Order” on Consent altered the manner in which the District’s contractor Papadopoulos performed the duties and responsibilities of the contract the District taxpayer funds paid to receive?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time. The document submitted with this question was a draft prepared by Chevron that was never agreed upon or executed by the District or Chevron.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaos.org/sites/abc/files/iporder.pdf>

Comment 93:

Why didn't the District notify the Riggs Park residents of the DC and Chevron Order of Consent was been negotiated and agreed to?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

Comment 94:

Why did the District Remedy Selection publish the amounts of chemical contamination that would trigger the installation of a vapor mitigation System?

Response:

We assume Mr. Johnson intended to ask why the District did **not** publish the levels of subslab vapor contamination that would trigger the installation of a VMS.

As previously stated in the answer to Comment #9, the District made the decision to base its 2009 Remedy Selection on an actual risk assessment, rather than on pre-selected action levels, or "published numbers".

Ultimately, if an unacceptable health risk is found to be present, then a decision is made to qualify the affected home for VMS installation.

Comment 95:

Since this chemical is on the increase, what is the possible accumulative health affects of this chemical and could this increasing chemical increase the carcinogenic effect of other chemicals and collectively increase the potential for illness at my property and my neighbors as well?

Response:

DDOE used measured and projected concentrations of all contaminants (including both carcinogens and non-carcinogens) to carry out a comprehensive and site-specific human health risk assessment; such approach inherently accounts for the safe levels appropriate for all residents – including people residing at your property and at your neighbors'. Also, please note that current scientific data indicates that the chemicals of concern found in your neighborhood do **not** exhibit 'synergistic' effects (i.e. the "possible accumulative health effects" you mention); in other words, the chemicals of

Comments # 96 to # 101 (Delores Ford)

Comment 96:

When are you going to ask Chevron to install additional monitoring wells in this particular area;

Response:

EPA has lead for groundwater monitoring and sampling.

Comment 97:

Why hasn't the District government and DDOE follow up with a health survey that addresses the cancer conditions between this locations since it was reported to you;

Response:

The District of Columbia Department of Health conducted a health survey from April 2009 to May 2009 through an online component as well as by mail. Over that period 64 residents responded to the 37 question survey primarily by mail. The purpose of the survey was to conduct a health status update of the residents of Riggs Park.

DOH has provided a summary of the results of their health survey (please see Appendix C of the Final Remedy Selection).

Comment 98:

When the RPAC members conducted their own health survey on Oglethorpe Street, it was found that alarming numbers of cancer has been and still is ramped between that section of homes;

Response:

DOH conducted a health survey for those who reside in Riggs Park. The survey was an attempt to collect data on the health status of the aforementioned residents.

DOH has provided a summary of the results of their health survey (please see Appendix C of the Final Remedy Selection).

Comment 99:

Data proves that there is liquid gasoline present on Oglethorpe Street. Where are additional monitoring wells going to be installed between 651 through 736 on Oglethorpe Street. Because there are not data producing wells in or around these addresses?

Response:

As previously stated in the answer to Comment #97, EPA has lead for groundwater monitoring and sampling.

Comment 100:

How clean is the ground water on Oglethorpe Street?

Response:

Please review the data available at the Lamond Riggs Library, online at <http://ddoe.dc.gov/RiggsPark> , or on DVD on request.

Comments # 101 to # 107 (Marion Drummond)

Comment 101:

I asked the District for 2 months and finally received one Papadopoulos identification number, I went to the library and researched I found there are two ID #s for my home. Why did the District not disclose I had a second identification number?

Response:

Please see the email response dated 4/6/09 from Ms. Cooke which states in part: [Please note, in the quote below the code # was replaced with ### to protect the resident's confidentiality.]

"[...] each home has an ID number Sxxx tied to its address. That code remained fixed through the entire sampling period.

Samples for the first, second and third quarter are designated with a Q1, Q2, or Q3 as appropriate. Samples from VMPs are designated VMP, samples from pre-existing VMPs are designated PVMP, samples from outdoor vapor ports are designated GMP, indoor air samples are designated INA, and outdoor air samples are designated AOA.

Putting it all together, a second quarter VMP sample from home S###, for example, would be labeled as: Q2-S###-VMP."

Comment 102:

How many other homeowners who participated in this study have been two ID numbers without their knowledge?

Response:

None, no homeowners have two ID numbers in the SSP&A study.

Comment 103:

Since the District did not disclose the 2nd number, this number revealed there was a soil sample taken at my home but did not give me the results of these test taken on my property. How can the District initiate a public comment period without allowing the residents the ability to view then comment on the soil and groundwater results of samples taken from their homes?

Response:

As previously stated in the answer to Comment #2, the complete data were included in the Final Report completed by SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Park Library, online at <http://ddoe.dc.gov/RiggsPark> , and on DVD upon request.

Please also see the response to Comment #102.

Comment 104:

Has the District shared the soil, soil vapor, groundwater, and indoor air results with chevron prior to this resident public comment period?

Response:

The information is available to the public and is therefore accessible by Chevron. The information was made available to all of the public (including Chevron), in coded form, at the same time.

Comment 105:

I am very concerned about the depth to the groundwater under my property and the ability of the toxic chemical to come into my home now and in the future. How can the District protect me from these chemicals coming into my home?

Response:

In general, a variety of soil, groundwater, and physical or ambient conditions (such as contaminant concentrations in groundwater, soil moisture conditions, temperature, and possible cracks in building foundations) may affect the rate of vapor releases from the subsurface into a building. As such, several important factors (including the soil conditions, groundwater depth, etc.) have been taken into account in the overall sampling design and risk determination – to ensure that residents would be adequately protected into the future.

Comment 106:

Is the District or Chevron going to clean up this contaminated groundwater under my home?

Response:

Remediation of soil and groundwater is under US EPA's oversight, not DDOE's.

Comment 107:

S [REDACTED] Riggs Park Indoor Air, Sub slab vapor, soil and groundwater report makes reference to my basement [REDACTED] and resident refused removal of [REDACTED] [REDACTED] from the basement. This statement is not correct, I never made this kind of statement and my basement was not [REDACTED].

Response:

As stated in the response to Comment #12, the District has never knowingly placed inaccurate statements in the Record for any reason. Items are reported as transcribed during the home surveys.

Comments # 108 to # 124 (John Dunston)

Comment 108:

I need someone to explain this chain of custody to me. I was looking through sspa file h and I found this. About my sample. My ID number is [REDACTED]. The chain of custody looks like the sample was taken from my house on [REDACTED], at [REDACTED] pm. On [REDACTED] at [REDACTED] am the samples left this location and arrived at the final destination, I assume the laboratory. I need the district to explain what appears to be two other persons doing something with the canisters on [REDACTED] it shows these persons leaving this location at [REDACTED] pm. This causes me to wonder were these canisters tampered with in this time period, what was going on. I would like a detailed description for the actions of everyone who came in contact with my canister [REDACTED] for the entire time this chain of custody describes. I ask that these email questions and answers be made an official part of the DC Remedy Selection and the official record for the Riggs Park Chillum investigation.

Response:

Because of the large number of samples collected each week, the canisters were picked up by representatives of the laboratory and driven from Maryland to the laboratory in Massachusetts (as opposed to being shipped via a shipping company). The additional signatures represent tracking of the samples from Maryland via personnel employed by DDOE's consultants or the laboratory.

Comment 109:

I have not received a copy of the results of a soil sample taken [REDACTED] at a depth of [REDACTED]. Does the district think it is fair for them not to allow me the ability to view and comment on the soil sample as a part of this comment period?

Response:

As previously stated in the answer to Comment #2, the complete data were included in the Final Report completed by SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Park Library, online at <http://ddoe.dc.gov/RiggsPark>, and on DVD upon request.

Comment 110:

What is acetone and why is it so high in gmpr 1 ([REDACTED] ppbv-[REDACTED] ug/m3 and gmpr 2 ([REDACTED] ppbv-[REDACTED] ug/m3)?

Response:

Acetone is a commonly used solvent. It is found in common consumer and household products – such as nail polish remover and paint thinner. The results in your indoor air may be a combination from several sources – including the household use of products containing acetone, and ambient air. Most importantly, the contaminant levels associated with groundwater contamination were not found to pose unacceptable risks.

Comment 111:

an indoor air test was taken from my property in february 2008. the laboratory results from this sample showed 1,4 dichlorobenzene in my indoor air as [REDACTED] ppbv - [REDACTED] ug/m3. why did the district not do another indoor air sample in april or august to investigate this high february number?

Response:

As previously stated in the answer to Comment #38, the study was designed to include one set of indoor air sampling per participating address. See the home owner information packets distributed in January of 2008. The quarterly vapor samples collected from beneath homes are a better measure of possible contamination from the subsurface, and thus a better indicator of where vapor mitigation may be required. The contractor followed proper designs and procedures – and overall, the sets of data collected were adequate to support the necessary decisions at these locations. In general, it is standard scientific practice to sample a statistically representative portion of the whole; as such, it is not necessary to sample all the homes at all times. In making this determination, a good conceptual representation of the site (that accounts for the contaminant behavior, as well as the site-specific conditions) was developed to support the sampling design – in order that there would be an acceptable degree of confidence in using the results from the sampling periods and/or homes to make projections for all the other sampling periods and/or homes. In addition, other important lines of evidence (related to the fate and behavior of the contaminant) are utilized in the final decision-making process – to ensure that residents are adequately protected.

Comment 112:

why does DOE feel by not disclosing results of all tests the residents will have a fair opportunity comment on issues related to the indoor air, soil, soil vapor and groundwater samples taken from their properties?

Response:

As previously stated in the answer to Comment #2, the complete data were included in the Final Report completed by SSP&A Riggs Park Sampling & Analysis Report (2009) which is available at the Lamond Riggs Park Library, online at <http://ddoe.dc.gov/RiggsPark> , and on DVD upon request.

Comment 113:

in the feb. public meeting doe director george hawkins stated the district would be transparent with the documents for the riggs park community. what documents are in appendix a, b,r,s, t, the districts administrative record file for the riggs park remedy selection that cause these files to be treated as confidential.

Response:

As previously stated in the answer to Comment # 70, sections of the report are marked “confidential” to preserve homeowner privacy. By limiting distribution of these sections of the report, DDOE intended to prevent anyone but individual homeowners from identifying specific sampling results with their home address. In addition, the

home survey forms were marked "confidential" because these contained descriptive information about the interiors of resident's homes, and the District wished to preserve the privacy of individual homeowners.

Comment 114:

through agreement with chevron, did the district share these confidential files with chevron when these files came available from papdaopulas?

Response:

As previously stated in the answer to Comments # 20 and 105, there is no agreement for the District to provide Chevron with the above referenced information. The information is available to the public and is therefore accessible by Chevron. The information was made available to all of the public (including Chevron), in coded form, at the same time.

Comment 115:

in the January 08 administrative order of consent between chevron and doe the chevron agreed to pay \$10,000.00 of the cost for the district expert toxicologist. did the district reveal the name of its expert toxicologist when negotiating this consent order with chevron?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time. The January 2008 document referenced by Mr. Dunston was a draft prepared by Chevron that was never agreed upon or executed by the District or Chevron.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Chevron has not paid for any of the activities directed by DDOE.

Comment 116:

how much money did chevron pay the doe prior to and while the papadoulas study was being done?

Response:

As previously stated in the answer to Comment #115, Chevron has not paid for any of the activities directed by DDOE.

Comment #117

as part of the aoc did chevron have access to resident results before the resident did?

Response:

As previously stated in the answer to Comment #114, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are

no agreements between the District and Chevron related to the Riggs Park site at this time. The January 2008 document referenced by Mr. Dunston was a draft prepared by Chevron that was never agreed upon or executed by the District or Chevron.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

As previously stated in the answer to Comment #105, the information is available to the public and is therefore accessible by Chevron. The information was made available to all of the public (including Chevron), in coded form, at the same time.

Comment 118:

councilwoman bowsers office held 10 to 12 monthly ward 4 public meetings, with representatives of dOE in attendance. why did doe choose not disclose the terms of the administrative order of consent at the request of chevron?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Comment 119:

when exactly did doe inform the mayor office and councilwoman bower that doe had agreed to enter into an administrative order of consent with chevron?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Comment 120:

since chevron paid for the services of victoria north, did the district agree to limit the monitoring of chevrons site activities and/or not continue monitoring chevron site activities on behalf of the residents of riggs park?

Response:

Chevron has not paid for the services of any of the DDOE staff.

Comment 121:

when the residents asked questions by email and public meeting did the doe agree limit answers to the residents questions as a result of an agreement with chevron?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Comment 122:

as a result of the aoc between chevron and the district did chevron have access to the districts experts toxicologist prior to the release?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Chevron has not had access to DDOE's expert toxicologist.

Comment 123:

what percentage of the district remedy selection was negotiated and modified with chevron prior to its release to residents of riggs park?

Response:

Chevron had no input in the preparation of the District's remedy selection.

Comment 124:

why when the district knew the mistrust the residents have of chevron, why did doe enter into secret activities with chevron without the knowledge of and against the will of the district very residents chevrons caused harm?

Response:

As previously stated in the answer to Comment #22, there is no Consent Order between the District and Chevron related to the Riggs Park site at this time. There are no agreements between the District and Chevron related to the Riggs Park site at this time.

There is an Administrative Order on Consent between EPA and Chevron, it is available on EPA's website. <http://www.epaosc.org/sites/abc/files/iporder.pdf>

Comment # 125 (EPA)

[addresses have been redacted to protect the residents' identity]

Chillum Resampling Locations

HSCD has reviewed all of the Indoor Air data for the 151 homes sampled, and identified the following 7 homes as locations where the Contaminant of Concern (COC) in basement readings exceed EPA's 10-4 cancer Risk Screening Levels (RSLs) or result in a non-cancer hazard index (HI) > 1 (using standard residential exposure assumptions). HSCD further reviewed the historical sampling results, and provides the following house specific recommendations:

██████████ - COC is Naphthalene, which is not related to either the suspect gas station or dry cleaner releases. DDOE performed the one sampling event in 2008. DDOE should advise the residents of the risk value exceedance, and consider further identification of an indoor source. Relative to investigation of the Chillum Site gasoline or dry cleaner releases, no additional sampling is recommended.

██████████ - COC is 1,4 Dichlorobenzene; it is unclear whether this is related to the suspect gas station leak but it is not known to be a dry cleaning chemical. Only one indoor air and subslab sampling event was performed by DDOE. Subslab concentrations were significantly less than the indoor air results. Therefore, it is recommended that an additional round of contemporaneous sampling be performed to more fully characterize subslab and indoor air at this residence.

██████████ – COCs are Carbon Tetrachloride and Chloroform, which may be related to the suspect dry cleaner release. These COCs were detected by EPA above the 10-4 cancer risk level in the July 2003 sampling event. The data from the April 2005 EPA and the DDOE 2008 sampling events are within acceptable risk levels. Subslab levels were either comparable to or less than the Indoor Air levels. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.

██████████ Avenue – COCs are 1,2,4 Trimethylbenzene and 1,3,5 Trimethylbenzene; it is unclear whether the results are related to the suspect gas station leak but they are not known to be dry cleaning chemicals. Only one indoor air and subslab sampling event was performed (by DDOE). The COCs were detected in only one of the 6 Subslab samples, and this one sample concentration was significantly less than the indoor air. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ – COC is Chloroform, which may be related to the suspect dry cleaner release. Only one indoor air and subslab sampling event was performed by DDOE. The three subslab concentrations for Chloroform were significantly less than the indoor air. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ – Vapor Mitigation System has been installed. Therefore, no further evaluation of historical data was conducted.

██████████ – COC is 1,2,4 Trimethylbenzene; it is unclear whether this is related to the suspect gas station leak but it is not known to be a dry cleaning chemical. This COC was detected above the RSL in an April 2004 EPA sampling event. The data from the April 2003, July 2003, June 2005, and April 2006 EPA sampling events and the DDOE 2008 sampling event were non-detect for this COC. Subslab levels for this compound also were non-detect. This residence will be discussed further under the Subslab data review, and it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.

HSCD has reviewed all of the subslab data for the 151 homes sampled, and identified the following 3 homes as locations where the Contaminant of Concern (COC) exceeds EPA's 10-3 cancer Risk Screening Levels (RSLs) or results in a non-cancer hazard index (HI) > 10. By applying this screening level, we are using the conservative Attenuation Factor of 0.1 for vapors migrating from subslab to indoor air. HSCD further reviewed the historical sampling results, and provides the following house specific recommendations:

██████████ - COC is Naphthalene detected by DDOE, which is not related to either the suspect gas station or dry cleaner releases. It should be noted that Naphthalene was not detected in any of the 4 Indoor Air samples collected by EPA in July 2003, April 2004, February 2005 or DDOE in 2008, nor in 5 of the 6 Subslab samples collected in 2008 by DDOE. DDOE should advise the residents that a public health threat exists. No additional sampling relative to the Chillum Site groundwater releases is recommended.

██████████ – COC is Chloroform, detected by DDOE in 2008, which may be related to the suspect dry cleaner release. Only one indoor air sampling event was performed by DDOE, which was non-detect. It should be noted that Chloroform levels exceeded the RSL in five out of the 6 DDOE subslab samples in 2008. Therefore, it is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to more fully characterize this residence.

██████████ – COC is Tetrachloroethene; which is likely related to the suspect dry cleaner release. This COC had significant levels detected in all of the Subslab samples collected in EPA’s July 2003 and DDOE 2008 sampling events. It should be noted that the COC was not detected in indoor air in EPA’s April 2003, July 2003, April 2004, June 2005, April 2006 sampling events and the DDOE 2008 sampling events. It is recommended that an additional round of contemporaneous indoor air and subslab sampling be performed to confirm that no further work is required.

Response:

Pursuant to its commitment in EPA Region 3’s Administrative Order on Consent dated Jan 16, 2009, EPA Region 3 reviewed the SSP&A data and provided recommendations to DDOE. EPA Region 3 is currently evaluating its findings.

DDOE is in discussion with EPA Region 3 regarding the nature of the public health threat about which EPA has suggested DDOE advise the residents. DDOE will notify the residents of the addresses referenced by EPA where additional investigation, if any, will be performed after the decision has been made.

DDOE notes that ATSDR indicated that there is no public health threat at homes in Riggs Park related to the petroleum fuel spill.

“ATSDR categorizes this site as No Apparent Public Health Hazard for exposures to reported VOC levels. This means human exposure to contaminated indoor air could be occurring, could have occurred in the past, or could occur in the future to the reported VOC levels, but such exposure is not expected to cause any adverse health effects.” (Page ii of ATSDR’s April 9, 2008 Public Health Consultation.)

RESPONSE TO CHEVRON'S COMMENTS

On April 20, 2009 Chevron Corp. submitted comments on DDOE's Remedy Selection for Riggs Park Community, Washington, D.C., pursuant to a Notice of Opportunity for Public Comment, published in the *D.C. Register* on March 6, 2009. Chevron's comments were composed of 4 sub-sets as follows:

- (1) Review of Remedy Selection for Riggs Park Community, Washington, DC – Former Chevron Facility 122208, Chillum, Maryland.,
- (2) Review of Riggs Park Indoor Air, Sub-Slab Vapor, and Groundwater Sampling and Analysis Report.
- (3) Review of Methods: Riggs Park Comprehensive Human Health Assessment Long Version, and Summary Tables Supplied by Expert Toxicologist 2/13/09.
- (4) Review of Riggs Park Comprehensive Human Health Risk Assessment – Toxicologist Work Product Data Tables.

#####

SUBSET #1

- (1) Review of Remedy Selection for Riggs Park Community, Washington, DC – Former Chevron Facility 122208, Chillum, Maryland

Gannett Fleming, Inc. (GF) has reviewed the *Remedy Selection for Riggs Park Community, Washington, D.C.*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland, dated February 20, 2009. The report was prepared by the Government of the District of Columbia Department of the Environment (DDOE) and Department of Health (DOH).

The following references were used in the review of the report:

Agency for Toxic Substances and Disease Registry (ATSDR), 2008. Health Consultation, Indoor and Outdoor Air Data Evaluation for Chillum Perc Site. Dated April 2008.

Gannett Fleming, 2003. Description of Current Conditions Report. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2003.

Gannett Fleming, 2006. Site Investigation Report. Former Chevron Facility 122208. Dated July 2006.

Gannett Fleming, 2007a. Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2007.

Gannett Fleming, 2007b. Baseline Risk Assessment. Former Chevron Facility 122208, Chillum, Maryland. Dated January 2007.

Interstate Technology & Regulatory Council (ITRC), 2007. Vapor Intrusion Pathway: A Practical Guide. Dated January 2007.

McHugh, T., P. DeBlanc, and R. Pokluda, 2006. Indoor Air as a Source of VOC Contamination in Shallow Soils Below Buildings. Soil and Sediment Contamination, Vol. 15, pages 103-122.

S.S. Papadopoulos & Associates, Inc., 2009. Riggs Park Indoor Air, Sub-slab Soil Vapor, Soil, and Groundwater Sampling and Analysis Report. Dated February 2009.

U.S. Environmental Protection Agency (EPA), 1989. Risk Assessment Guidance for Superfund, Volume 1, Part A. EPA, 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. EPA 530-D-02-004.

EPA, 2007. Letter to Ms. Denise Dixon of Chevron, re: Comments on Corrective Measures Study. Dated June 2007.

EPA, 2008. Final Decision and Response to Comments, Chevron Gasoline Release at Chillum, Maryland. Dated April 2008.

GF reviewed the report for technical content, data gaps, validity, accuracy, completeness, and compliance with regulations and guidance.

General Comment 1(a):

The District of Columbia's (the District's) remedy for the Riggs Park community was selected after reviewing data collected by S.S. Papadopoulos & Associates (SSP&A) (2009), additional documents contained in the administrative record, and conducting an extensive human health risk assessment. The selected remedy described in this document is the "installation and operation of vapor mitigation systems in up to 45 residences with elevated sub-slab soil vapor levels attributable to contaminated groundwater." However, groundwater was not evaluated as part of the remedy selection. Rather, the District states the sub-slab soil vapor "results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor vapor intrusion." However, a review of the September 2008 groundwater analytical results for shallow wells screened across the water table indicated only 17 compounds were detected above laboratory reporting limits and only 13 of these compounds were detected by DDOE in sub-slab soil vapor (Attachment 1). Thus, of the 36 compounds identified in sub-slab soil vapor and assumed by the District to be potentially emanating from groundwater, only 13 were actually detected in shallow groundwater in September 2008. As a result, the DDOE HHRA likely overestimated the risk to residents by including 36 compounds in the assessment instead of the 13 present in shallow groundwater.

Response:

Identifying all contaminants detected in sub-slab vapor (VMP) samples represents only the first step of the human health risk assessment (HHRA). According to U.S. EPA's Risk Assessment Guidance for Superfund (RAGS; EPA 1989) and generally accepted risk assessment practice, all detected chemicals should be defined as chemicals of interest. Therefore, DDOE did not eliminate any chemicals detected in (VMP) samples. Once detected, they became chemicals of interest and were evaluated in the 2009 HHRA. Seventeen compounds were initially identified as chemicals of interest. Subsequent to the 2009 HHRA, a further detailed evaluation revealed that only 6 were detected at elevated levels. Based on the frequency of detection and the elevated concentration the following 6 chemicals are identified as chemicals of concern (COCs):

- Tetrachloroethene (PCE)
- Chloroform
- 1,4-Dichlorobenzene
- Naphthalene
- Carbon tetrachloride
- Methylene chloride

The remaining 11 compounds (of the initial 17) were eliminated from further consideration because they were detected only sporadically at low concentrations and thus did not pose unacceptable levels of human health risks.

It is contrary to U.S. EPA risk assessment guidance to eliminate chemicals based on an *a priori* presumption of what the chemical "source" should be. That approach could lead to the unintended result of ignoring a chemical source that simply had not been heretofore considered or identified. Accordingly, the first step taken by DDOE was to identify *all* potential health threats from vapor intrusion, regardless of the contaminant source(s) and to report all chemicals detected in the sub-slab soil vapor space below the homes.

The second step of the process is to determine whether the chemicals found in the sub-slab soil vapor are linked to the underlying groundwater, potentially resulting in long-term vapor intrusion. While there was insufficient time to conduct a ground water analysis in the 2009 HHRA, DDOE has since finished such an analysis as part of the 2010 HHRA. Based on the analysis in the 2010 HHRA, DDOE has determined that of the 6 previously identified COCs, only two chemicals detected in VMP samples—namely tetrachloroethene, (perchloroethene or PCE) and chloroform—can be definitively linked to groundwater contamination in the Riggs Park community. It should be emphasized that although other chemicals (including those associated with petroleum releases) have been detected in sub slab samples at high concentrations, the groundwater dataset is not sufficiently complete to conclude those chemicals are also present in ground water.

Chevron correctly points out that some contaminants detected in VMP samples have not historically been detected in groundwater. However, it should also be noted that the historic groundwater dataset has many data gaps and uncertainties due to high

detection limits and limited analyte lists. That is, since the focus of the groundwater monitoring effort has, for the most part, been limited to a relatively small number of contaminants, the historical dataset may not be sufficient for identifying all groundwater sources of contamination. Moreover, since the detection limits for many target analytes were significantly elevated, the historical groundwater dataset is unreliable for conducting a forensic source analysis for numerous contaminants identified in the VMP samples. If contaminants were actually present but just below the elevated detection limits, they could pose unacceptable risk via vapor intrusion. Furthermore, in many instances the groundwater monitoring wells are not co-localized with the home undergoing sampling, so any inferred relationship would be tenuous. In some instances, it was necessary to extrapolate groundwater data from monitoring wells that were located a significant distance from a home undergoing sub-slab vapor sampling. To DDOE's knowledge, no detailed analysis of groundwater contamination by the six COCs identified in the VMP samples had yet been conducted so it was necessary to conduct such an analysis in order to ensure that no part of the investigation was ignored or overlooked.

Overall, Chevron seems to have provided a selective view of the groundwater data collected in late 2008. First, the data provided by Chevron (122208_GW_Data_12-08-08.xls) indicate that during groundwater sampling between 9/22/08 and 10/1/08, twenty (20) compounds were reported in groundwater, 18 of which were also detected in sub-slab monitoring ports. Secondly, Chevron confuses reporting limits with detection limits. Laboratory reporting limits exceed the instrument detection limits and method detection limits, and do not indicate the presence or absence of a compound except with respect to that reporting limit. We note that the frequency of "detections" is also dependent upon the analytical methods used, and dilution of individual samples. Thus, simply stating whether a compound was reported to be present in groundwater is not an adequate evaluation of whether that compound may actually be present in groundwater at concentrations sufficient to cause the observed vapor concentrations.

Please see the final sentence in section IV of the remedy document which states:

"The District will evaluate contaminant levels detected in subslab soil vapor in comparison to contaminant levels attributable to groundwater to confirm that the levels detected in soil vapors, that the District will require be remediated, result from contaminated groundwater."

The District has now completed this task. Please see the 2010 HHRA.

General Comment 1(b):

The likely source of the compounds detected in sub-slab soil vapor that are not present in groundwater is indoor air (McHugh, et al., 2006). As noted in the SSP&A data set for indoor air, ambient air, sub-slab soil vapor, and outdoor soil vapor, this phenomenon is observed in Riggs Park (SSP&A, 2009). To summarize the SSP&A data, Freon 11 and 12 are observed in ambient air, indoor air, and sub-slab soil vapor, but not in the outdoor vapor monitoring ports. Freon compounds are commonly detected in ambient and indoor air, but are not likely attributable to subsurface contamination (SSP&A, 2009). Therefore, the Freon

compounds are present in the sub-slab soil vapor as a result of infiltration of ambient and/or indoor air through the basement slab. Benzene and other hydrocarbons are also present in ambient and indoor air and it is reasonable to assume that some portion of the concentration of hydrocarbons in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment as well. Previous investigations conducted by Chevron have demonstrated that contaminants present in indoor air have been detected in sub-slab soil vapor samples (GF, 2007a).

Response:

DDOE has conducted a detailed and thorough analysis of any possible downward migration of indoor air contaminants into the sub-slab soils. All evidence was conclusive and shows downward migration was not occurring in any of the 106 homes that were sampled.

It is noteworthy that Chevron's comment on downward migration is directly contradicted by the findings and conclusions presented in an early Chevron study in which Chevron determined the attenuation factor (AF) for one home to be approximately 0.0026. That is, it is contradictory to conclude that vapor intrusion is presently negligible (based on the very low calculated AF value) but also conclude that indoor air vapors are migrating downward to contaminate the sub-slab soil vapor space. The number and size of cracks and openings in the concrete slab govern vapor intrusion in both upward and downward directions. If the AF is indeed negligible, as suggested by Chevron's own calculations), vapors are apparently migrating in any direction.

All evidence indicates that net vapor migration is only occurring in one direction: upward from the sub-slab soils into Riggs Park homes. It should be stressed that a single AF cannot be equally applied to all homes sampled because the number and size of cracks and openings in the concrete slab are specific and unique for each home depending on the physical state of the concrete slab. For this reason, DDOE calculated the AF for each chemical detected in either indoor air or VMP samples for each home.

It should be noted that when vapor migration through the concrete slab occurs, the exact same chemicals detected on one side of the slab must be detected on the other side. This is because the concrete slab cannot act as a "semi-permeable membrane" in which it selectively blocks some chemicals from migrating while permitting others to migrate through. Furthermore, in the case of downward migration the concentration detected in indoor air needs to be significantly higher than the concentration detected in VMP samples because the AF factor applies to migration in both directions. In DDOE's detailed analysis of paired indoor and VMP samples for each of the 106 homes, neither of these two conditions were satisfied. For example, the specific chemicals detected in indoor air was not matched by those detected in VMP samples for any home. Additionally, the PCE level in VMP samples was significantly higher than that detected in indoor air samples. Indeed, in many homes, the PCE concentration in the VMP sample was far greater than in the paired indoor air sample

(in which it was frequently non-detect). These 2 findings provide compelling evidence downward migration is not occurring.

It is noteworthy that, for those compounds detected in groundwater and in VMP samples, a simple examination of the maximum groundwater concentrations and the Henry's Law constants indicates that these groundwater concentrations are sufficient to produce the observed sub-slab vapor concentrations, warranting concern over transport from the subsurface.

Chevron cites the paper by McHugh et al (2006) as support for the downward migration theory. This paper does not support the argument Chevron is making.

As noted by McHugh et al. (2006):

"newer residences are more likely than older residences to operate with positive building pressures. In addition, larger buildings with central Heating, Ventilation, and Air-Conditioning (HVAC) systems are typically designed to operate under positive pressure."

The Riggs Park residences were built in the 1950s and do not meet the current residential design standards cited. Nor do the single-family residences meet the criteria of "larger building" mentioned. The pressure transducer data provided by McHugh et al. (2006) clearly illustrate that while some positive pressure excursions did occur over a 24-hour period, so did negative pressures. (Note the contrast with the large commercial warehouse data set also included.)

Finally, it must be noted that the McHugh et al. article is largely devoted to development of a theoretical model of vapor transport from indoor air to the subsurface, and that the only data provided to support this theory are circumstantial, no empirical data are presented. It is also noteworthy that the model of contaminant transport described by McHugh (2006) is bi-directional; very specific circumstances are required under which indoor contaminants may cause subsurface contaminants at higher concentrations than observed indoors. 1) a transient source of indoor air contamination (<1 day as illustrated by McHugh 2006 in Figure 4), and 2) a continuous pressure gradient from indoor air to the subsurface. Residential home pressure transducer data presented in that article make such circumstances unlikely for the Riggs Park neighborhood (see above).

Chevron notes the presence of Freon in the sub-slab samples and suggests that "the Freon compounds are present in the sub-slab soil vapor as a result of infiltration of ambient and/or indoor air through the basement slab." In reality, the basement slab is the least likely route for Freon migration, as it provides far more resistance to flow and attenuation than infiltration of ambient air through the soil. The presence of Freon in the sub-slab merely reflects the ubiquitous nature of these compounds in ambient air, and the mixing of that air with the subsurface vapors.

General Comment 2:

The District conducted a "home-by-home" risk assessment (the DDOE HHRA) whereby the individual risk for each residence within the study was calculated. More than 1,700 separate risk assessments were conducted. Chevron has several concerns regarding this approach. First, it greatly compartmentalizes the site into small microcosms and neglects larger trends in sampling data that are observed site-wide. Each home may have a very small data set, perhaps one set of indoor, ambient, and sub-slab data taken at one or a few points in time. Soil vapor concentrations can vary over a wide range both spatially and temporally (SSP&A, 2009). In contrast, the Baseline Risk Assessment for the site (GF, 2007b) took into account thousands of samples from multiple media collected over nearly a decade. Second, this approach introduces a large amount of uncertainty into the risk assessment for each home. The list of factors that influence indoor air concentrations is long and includes personal habits such as smoking, dry cleaning, use of cleaning products, building materials, among many others (SSP&A, 2009). Each of these factors contributes additional uncertainty to a very small data set that already has considerable inherent uncertainty. It is Chevron's position that the home-by-home risk assessment does not provide much value for determining risk to the residents from vapor intrusion.

Response:

The approach used here was so chosen to provide a more cost-effective way of determining if an individual Riggs Park home requires a vapor mitigation system and that is to determine whether vapor intrusion poses a current or future risk to the residents who live in the home. What is more, the approach used is not inconsistent with what Chevron used in an earlier evaluation. In fact, Chevron's objection to the evaluation of potential risk at individual homes is puzzling since this is precisely the approach that Chevron has taken in response to USEPA oversight; we note that in response to increased risk, Chevron has agreed to install vapor mitigation systems in individual homes identified by EPA, rather than in an entire block or neighborhood, as suggested by their comments here.

In any case, it should be noted that DDOE followed all pertinent U.S. EPA risk assessment guidance, based on estimating human health risks for the "reasonable maximum exposed" (RME) individual. Moreover, EPA's risk management framework is solely based on protecting the RME receptor. For the Riggs Park residents, this corresponds to the RME individual who actually lives in each home. Under the most realistic set of exposure scenarios for the project site, it seems most appropriate to estimate the RME risk for each of the participating Riggs Park homes based on current and future vapor concentrations for that particular home. The purpose of both the 2009 and 2010 DDOE HHRA is to determine whether the health risks estimated for an individual's chemical exposure to contaminants inside his or her home is unacceptable based on the risk calculated based on the VMP concentration. If the calculated risk exceeds an acceptable level, then a source analysis is necessary to determine if a link to groundwater contamination exists. As previously discussed this second step has now been completed and is presented in the 2010 HHRA.

It is not clear how DDOE has neglected sampling "trends" for the larger population since each individual indoor, VMP, geoprobe, and groundwater samples were carefully evaluated for each of the homes. Lastly, if the population risks were to be calculated based on the entire population of Riggs Park homes (rather than on a house-specific basis), that information could not be used to make cost-effective risk management decisions about mitigating risks for any particular home. It also should be noted here that, the sampling data used in the risk determinations do indeed consist of a more current and representative data set; as such, the HHRA results should provide more value to the risk management decisions than could otherwise be obtained from other alternative evaluation approaches.

The DDOE 2009 Remedy Selection document was based solely on sub-slab vapor concentration data, and is entirely independent of resident habits such as smoking, pesticide use, etc. that impact indoor air concentrations.

The homes were carefully inventoried prior to any sample, and all potential confounding sources of household chemicals were removed. However, DDOE agrees that chemicals used in the home by Riggs Park residents can influence indoor air measurements. That is why DDOE based the 2009 HHRA and the subsequent risk management decisions on VMP measurements, which we have demonstrated are not confounded by chemicals used inside or outside the home. Chemicals used inside or outside the home do not impact VMP samples - EPA guidance states this clearly. The analysis of indoor air samples was strictly limited to an evaluation of the attenuation factor. Time did not permit a thorough evaluation of the AF in the 2009 HHRA. However, the AF was analyzed in detail in the 2010 HHRA where the AF was calculated for each chemical detected in VMP samples on a home by home basis.

SPECIFIC COMMENTS:

Specific Comment 1. Section I, page 5, bullets 1 and 4.

The first bullet states "No residences have gasoline related contaminants such as benzene in the SSP&A study in the sub-slab soil vapor at concentrations that exceed the 1×10^{-5} cancer risk level after the application of an attenuation factor of 10%." The last bullet in this section, as well as text in Section III states "that out of 106 homes, additional residences require vapor mitigation systems (VMS) where gasoline-related contaminants are still present in sub-slab soil vapor." These two statements are contradictory. It is unclear why vapor mitigation systems would be required for residences where the concentrations of gasoline-related compounds in soil vapor are considered to be acceptable.

Response:

The two statements are not contradictory - DDOE has determined that no VMP sample concentration of the gasoline components Chevron has routinely measured as part of routine groundwater and vapor sampling—namely benzene, toluene, ethylbenzene, and xylene (BTEX) and MTBE—posed unacceptable risks. However, naphthalene concentrations measured in VMP samples from 6 homes did exceed a cancer risk of 1×10^{-5} . It was important to note this finding in the decision document for purposes of

full disclosure to the Riggs Park residents since naphthalene is a component of gasoline. Indeed, DDOE has conducted a statistical regression analysis of the groundwater monitoring data that clearly shows naphthalene is present in groundwater as a component of the Chevron gasoline release. This analysis revealed that naphthalene in groundwater is associated with the entire group of BTEX compounds and is highly correlated with individual gasoline constituents. For example, the correlation coefficient between naphthalene and each of the individual gasoline constituents—toluene and ethylbenzene—was 0.7.

Even based on the most recent 2008 and 2009 groundwater monitoring data, the evidence is compelling; where naphthalene is detected in groundwater, it is present as a gasoline constituent. Since the highest naphthalene detections were observed in monitoring wells on or near the Chevron facility, there is little doubt the naphthalene detected in groundwater is present as part of the Chevron gasoline release. However, there are large gaps in the existing groundwater data, which makes it difficult to determine the areal extent of naphthalene contamination in groundwater under Riggs Park homes. Lacking a more extensive and complete groundwater dataset for naphthalene, DDOE cannot definitively conclude that there is not a link between the 6 homes with unacceptable naphthalene risks (based on the VMP samples) and naphthalene in groundwater under those homes. Simply put, because naphthalene has not been analyzed in monitoring wells near those homes, there is at least the possibility that naphthalene is present but has gone undetected. Nevertheless, based on the limited groundwater data that is available, it does not appear as though there is a current naphthalene groundwater source under those homes.

With regard to gasoline contaminants in soil vapors that could pose unacceptable risk, it should be stressed that the DDOE decision document only addresses human health risks associated with conditions that existed in 2008 based on the samples that were collected in that year. It is clear from earlier groundwater and vapor sampling conducted by Chevron that gasoline contaminants did pose unacceptable human health risks under the current DDOE risk management framework. For example, in 2002, Chevron collected soil vapor samples from under basements in 12 Riggs Park homes. To determine whether the concentrations in those samples posed an unacceptable risk, Chevron compared these sampling results with calculated "acceptable" vapor levels. It has long been assumed that, based on this Chevron study, the gasoline components did not pose unacceptable risks. This conclusion was in error. As part of the 2010 HHRA, DDOE reviewed this document to determine whether contaminant conditions had changed in the intervening 6 years. Our review and recalculation of human health risks based on the 2002 Chevron soil vapor data revealed that the gasoline constituents measured at that time did pose unacceptable risks.

Specific Comment 2. Section I, page 5, bullet 3.

According to the third bullet in this section, the homes requiring VMS are those where site specific chemicals of concern: perchloroethene [PCE] and its degradation products, 1,4-dichlorobenzene, chloroform, naphthalene, carbon tetrachloride, and methylene chloride) "have the potential to pose a cumulative health risk from sub-slab soil vapor to exceed the 1×10^{-5} cancer risk level after the application of an attenuation factor of 10%." It should be made clear that

these compounds are not related to the petroleum release at the former Chevron Facility (SSP&A, 2009).

Response:

DDOE has been unable to determine if each of the above mentioned chemicals are or are not associated with the Chevron spill. DDOE issued 2 information demands to Chevron to determine the historic use of chemicals at the site, and the responses provided by Chevron were insufficient to make this determination.

The historical source of the uncontrolled release of PCE into groundwater has not yet been identified. However, DDOE's initial review of historical PCE sampling maps prepared by EPA Region 3 and Chevron for the years 2002-2004 show the highest concentrations were detected in the Northernmost portion of Riggs Park just across the street from the former Chevron station. What the maps do not show is that some of the highest PCE concentrations detected during that period were collected from groundwater under the Chevron Station itself. Further analysis of the more recent 2008 and 2009 data continues to show the highest concentrations are detected in groundwater on the property of the former Chevron facility. Unfortunately, no groundwater samples have been collected up-gradient from the facility, so no definitive proof exists to point to one or more potentially responsible parties for the PCE release.

In reviewing businesses that routinely use PCE in manufacturing operations, dry cleaning services most often come to mind. However, it is well known that PCE has been widely used in automotive repair services to clean metal parts such as brakes. In fact, PCE is still used in brake cleaning formulations. Accordingly, without further delineation of the PCE groundwater contamination around the former Chevron facility, and based on data from groundwater under the Chevron facility, it is reasonable to conclude the facility could be the source of the PCE.

Specific Comment 3. Section I. page 6. bullet 4.

The District's remedy includes a health survey of Riggs Park residents who reside in the plume footprint caused by the release of hydrocarbons at the former Chevron Facility. It should be noted that the Agency for Toxic Substances and Disease Registry (ATSDR) has issued three health consultations for the site to evaluate the public health implications through the vapor intrusion pathway. ATSDR has concluded that all indoor and outdoor volatile organic compound (VOC) concentrations detected at the site are at levels not expected to cause adverse cancer or non-cancer health effects and has categorized the site as No Apparent Public Health Hazard for exposures to reported VOC levels (ATSDR, 2008). The goals and purpose of additional health surveys administered by DOH are unclear.

Response:

Chevron is correct that ATSDR has concluded that the vapors measured indoors at Riggs Park are not expected to cause adverse health effects. However, ATSDR's health evaluation was incomplete for several reasons. First, ATSDR did not quantitatively evaluate the actual site subslab data to identify site-specific COCs and

estimate cancer and non-cancer risk, although they did evaluate the indoor air data. Additionally, the Agency did not calculate the actual cancer risk or health hazard according to EPA risk assessment guidance, and there is considerable difference between the type of analysis of human health risks conducted by EPA and ATSDR. Recently, EPA Region 3 explained the difference between the two approaches in *Vapor Intrusion Framework* (June 2009) in the following statement:

At times there may be confusion over how a “risk assessment” (EPA determination) compares to a “public health assessment” (ATSDR determination), and which of these measures should be used in making decisions about Remedial or Removal actions. Although it may seem counter-intuitive, a “no apparent public health hazard” determination by ATSDR may not necessarily imply that no mitigative action is warranted at a site. EPA risk assessors/toxicologists calculate numerical risks in order to provide risk managers with information to determine the need for Removal or Remedial action at a contaminated site. ATSDR performs a health assessment or consultation, using both quantitative and qualitative data, in order to provide information to community members and inform regulatory partners about the likelihood of actual public health effects.

The 2010 HHRA DDOE shows that PCE concentrations in VMP samples far exceed acceptable concentrations. ATSDR did not evaluate these samples nor did it calculate current and future risks, as ATSDR primarily focused on indoor air samples. As Chevron has correctly noted in its comments, any HHRA based on indoor air samples is, for the most part, unreliable due to the numerous confounding contributions of source (vapor intrusion) and non-source contaminants.

It is also important to stress that the methodology used by ATSDR and U.S. EPA to identify potential health threats is very different. While U.S. EPA requires that the cumulative cancer risk and non-cancer health threat be calculated—and represented by a numerical estimate of total risk—ATSDR’s methodology does not permit cumulative risks to be calculated. Rather, the Agency makes a chemical-by-chemical comparison in which the detected concentration for a single contaminant is compared with a tabulated acceptable concentration for that chemical.

At the time of the publication of the 2009 selected remedy document, DOH had not established goals for the survey. Please see DOH’s summarized health survey results in Appendix C of the Final Remedy Selection for additional information

Specific Comment 4. Section II.A, page 7, paragraph 2.

This section states that in October 1989, the release of gasoline into the subsurface was confirmed after Chevron conducted a tightness test on its underground storage tanks. Although this statement is true, it should be noted that vehicle accident damage to a fuel dispenser caused the product line to fail the tightness test (GF, 2003).

Response:

This section was intended to be a brief, not a comprehensive summary of the history of the site. DDOE will revise the Remedy Document to reflect this detail.

Specific Comment 5. Section II.A, page 7, paragraphs 3 and 4.

The first sentence in the fourth paragraph should be replaced with "Final Decision and Response to Comments", which was issued in April 2008 and outlined the corrective measures to be implemented (EPA, 2008).

Response:

DDOE will so note.

Specific Comment 6. Section III, page 9, paragraph 3.

This section describes the regulatory framework allowing the District to require and secure corrective actions at the site. Paragraph 3 describes corrective actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Corrective actions undertaken under CERCLA use the risk management tool to select appropriate corrective actions. A human health risk assessment is used by risk managers to determine if corrective actions are warranted for a site. Without the full text and tables of the DDOE HHRA, it is not feasible for risk managers to evaluate the need for, or appropriateness of, corrective action. All text and tables used in the DDOE HHRA are required to adequately determine the appropriateness of the selected remedy. The complete DDOE HHRA was not available for review, therefore the District's conclusions concerning the appropriateness of the selected remedy can not be fully evaluated, and the District's conclusions are not supported by other available information, as described in other comments and documents referenced by the comments.

Response:

DDOE's threshold responsibility in relation to this site is to ensure that the health of Riggs Park residents is protected. The residents urged the Department to develop a Remedy as soon as the results of the 2009 HHRA were known. While the preliminary risk analysis served that purpose, DDOE has now completed a more detailed HHRA that presents the risk results as well as a groundwater analysis. It also presents a risk management approach that was applied to homes where VMP samples were not available.

Specific Comment 7. Section III, page 10, paragraph 6.

This paragraph states that "The Don Clay Memo provides that US EPA remedial action is generally not warranted where cancer risk is found to be below 1×10^{-4} ." The word "below" (less than) should be replaced with the word "above" (greater than).

Response:

The DDOE statement is correct as written. According to the Don Clay memo, risks below (less than) 1×10^{-4} do not need remediation. For example, a home with a risk of 1×10^{-6} (which is less than 1×10^{-4}) would not need remediation according to the Don Clay Memo. 1×10^{-4} is scientific short hand for 1 out of 1,000, 1×10^{-6} is scientific short hand for 1 out of 1,000,000. 1 out of 1,000,000 is less than 1 out of 1,000.

Specific Comment 8. Section IV, page 10. paragraph 3.

An attenuation factor of 0.1 (10%) was selected, based on Draft EPA Vapor Intrusion Guidance, to represent the amount of sub-slab soil vapors that may be entering the home or that might enter the home in the future (EPA, 2002). Attenuation factors for the migration of sub-slab soil vapor to indoor air are generally based on empirical data and range from 0.01 to 0.1 (ITRC, 2007). The recommended criterion established by EPA in the Draft Vapor Intrusion Guidance is a conservative estimate that assumes the chemicals do not degrade as they migrate upward through the vadose zone; however petroleum hydrocarbon vapors are known to biodegrade in the presence of oxygen (EPA, 2002). Site investigation data collected at the site from 2002 to 2004 suggested that biodegradation of hydrocarbons in soil vapor was occurring in the vadose zone (GF, 2006). In addition, Chevron has calculated a site specific attenuation factor for one residence of 0.0026 based on sub-slab soil vapor and indoor air sampling results conducted in 2007 (GF, 2007a). Since its publication of the Draft Vapor Intrusion Guidance in 2002, EPA has determined that its recommended sub-slab to indoor air attenuation factor of 0.1 may be overly conservative (ITRC, 2007). It is Chevron's position that using an attenuation factor of 0.1 is a very conservative estimate which leads to an overestimation of risk from vapor intrusion of petroleum hydrocarbons.

Response:

This comment has several contradictory statements. The comment seems to present (and support) the ITRC-recommended AF range of 0.01 to 0.1 (0.1 is the value DDOE selected for its Remedy), while at the same time indicating that 0.1 may be too conservative.

An AF value of 0.1 was the default AF value recommended in the EPA Vapor Intrusion Guidance (EPA 2002). More recently, EPA Region 3 (EPA 2009) reaffirmed this is the appropriate default AF value in its June 2009 guidance, stating:

“Appendix F of the 2002 HQ Guidance presents a review of groundwater, soil gas, sub-slab and indoor air data from fifteen vapor intrusion sites nationwide and, based on an evaluation of the data, makes recommendations for “default” generic attenuation factors (except under certain conditions as noted in the Guidance). For example, Appendix F recommends a default attenuation factor of 0.1 (i.e., 1/10) be used to predict indoor air concentrations from vapors migrating from the sub-slab. This value is for the upper bound statistical measure, the 95th percentile. In general terms, the attenuation factor of 0.1 indicates that a specific sub-slab vapor concentration would result in an indoor air concentration that was ten times lower (e.g., if the sub-slab value is 25 ppb, the indoor air value would be 2.5 ppb).

Since 2002, in an effort to calculate empirically-derived attenuation factors and compile a robust database from vapor intrusion sites nationwide, EPA HQ and Helen Dawson, EPA Region 8 Hydrogeologist, have been formulating the national “Vapor Intrusion Database”. The database currently contains approximately 2,989

paired data sets (e.g., sub-slab/indoor air sample results, groundwater/indoor air results) from over 41 vapor intrusion sites nationwide. The database is expanding as data from new sites is added. As the data is input and evaluated, recommended generic default attenuations factors may well change.

Currently, using the larger database with the added feature of accounting for background indoor air concentrations, the Vapor Intrusion Database suggests that the default values appearing in the 2002 Guidance generally do not change when using the upper bound statistical measure. That is, 0.1 is identified as an interim default value for sub-slab to indoor air (95% percentile) and 0.001 as an interim default value (95% percentile) for groundwater to indoor air.”

The factors governing the AF were discussed previously and it was noted that, in practice, each home has a different actual AF depending on the condition of the concrete slab in the home. It must be stressed that the AF is not a constant for a particular home but will change as the home ages and the concrete slabs deteriorate or they are compromised by home renovation, construction, or remodeling activities.

Chevron is correct to note DDOE did not calculate the AF in the 2009 HHRA for any Riggs Park home based on empirical evidence. However, this was not a necessary step in order for the Department to formulate a health-protective Remedy because the threshold requirement for a DDOE risk management decision is to ensure human health is protected based on not only current, but *future* site conditions as well. Calculating the site-specific AF value based on empirical data would address the issue of current conditions but may not be adequately protective of future conditions.

It should be noted that this regulatory approach is precisely the approach that U.S. EPA uses to determine the appropriate remedy for the vast majority of contaminated sites where soil or water is contaminated. That is, for most sites (particularly abandoned CERCLA sites), there are no current complete exposure routes because there are no currently exposed individuals. Nevertheless, a risk assessment is conducted for a “hypothetical” receptor. If the risks are determined to be unacceptable for the hypothetical receptor (typically, a hypothetical future residential receptor), the site is remediated even though no one is currently exposed. In fact, the District’s and U.S. EPA policy is always proactive, and it is unacceptable to wait to take remedial steps until exposure actually occurs. For example, according to “The Don Clay memo,” the site *must* be remediated based on current and *future* conditions. Since the District cannot predict the future condition of the concrete slab in each of the Riggs Park homes, it was prudent to select an AF of 0.1 (10%) to ensure the health of *all* Riggs Park residents is protective.

Chevron states that it calculated an AF of 0.0026 for one home, however that value was not based on an actual paired analysis of all chemicals detected in indoor air and VMP samples. As noted in recent EPA Region 3 guidance, the Agency has conducted such an analysis on nearly 3,000 datasets. Likewise, in the 2010 HHRA DDOE has conducted paired analysis indoor and VMP samples since and the AF analysis is presented in the compendium risk assessment document. However, DDOE still believes it is prudent to apply an AF of 0.1 because DDOE cannot *predict* with

certainty what the appropriate AF value will be for each of the Riggs Park homes in the future.

Chevron also notes that biodegradation is likely in the petroleum fraction of vapors in the vadose zone. DDOE concurs this is a likely scenario. However, it is irrelevant to the DDOE CHSA and Remedy since the majority of VMP samples were collected in the shallow soils approximately 3 inches below the slab. Any biodegradation would have occurred prior to the vapors migrating to this point and, therefore, the VMP samples would have biodegradation already incorporated into the result.

Specific Comment 9. Section IV, page 10, paragraph 4.

This paragraph makes the statement that Hazard Indices were calculated using toxicity values for both healthy adults and children. Toxicity values are selected on a chemical-specific basis and do not vary based on the age of the receptor. "Exposure parameters" are adjusted to reflect the specific age of the receptor. It appears that the District meant exposure parameters rather than toxicity values.

Response:

DDOE did evaluate all toxicity values and determined that modifying toxicity values (which were based on adult exposure) to reflect the increased sensitivity for children did not ultimately change the results or conclusions of the 2009 HHRA. This evaluation was consistent with U.S. EPA's A Review Of The Reference Dose And Reference Concentration Processes (EPA/630/P-02/002F December 2002 Final Report) and Exploration Of Perinatal Pharmacokinetic Issues (EPA/630/R-01/004 May 2001).

It is important to note that children are not just "small adults." Children are more susceptible than adults based not only on behavioral (exposure) factors but also on physiological differences. Children are more vulnerable to toxic chemicals because their organs are immature and are at a susceptible stage, predisposing them to effects from some toxic compounds. For example, the metabolic pathways and detoxification systems of infants and children have reduced capacity for neutralizing and eliminating toxins from the body as compared with adults. Children's major excretory organs—namely, the liver and kidney—are not nearly as efficient as adult organs. This results in the body burden of many toxic chemicals remaining higher in children compared with adults for longer periods of time, thereby resulting in more damage. A child's brain (and peripheral nervous system) is also more vulnerable because of the immaturity of the blood-brain-barrier, which is designed to protect it from toxins. These factors (among others) were taken into account developing child-specific toxicity values for noncarcinogenic effects based on U.S. EPA guidance and generally accepted toxicological practice.

Non-carcinogenic toxicity values are based on 2 factors—namely, the dose-response endpoint (such as the no-adverse-effect-level [NOAEL]) and the necessary safety factor (SF), which is the product of the uncertainty factor [UF] and modifying factor [MF]. Since most toxicity studies are based on adult animals or human responses, DDOE did investigate the appropriateness of introducing an additional safety factor when the toxic effect observed in adults is potentially more severe in infants and

children based on physiological factors. This evaluation revealed that even when child-specific toxicity values were used (for just a very few chemicals), the cumulative HI did not exceed 1.0. Based on the preliminary analysis, introducing new child-specific toxicity values would not likely change the DDOE Remedy.

DDOE also evaluated the appropriateness of developing child-specific cancer slope factors to calculate the cumulative cancer risk according to U.S. EPA's 2005 guidance *Assessing Susceptibility from Early-life Exposure to Carcinogen*. It is well recognized that children are more sensitive to carcinogens when they are exposed during earlier life stages. When the carcinogen's mode of action (MOA) is mutagenic (i.e., it binds to or alters DNA or the genetic material in cells), an additional safety factor is used to modify the cancer slope factor. Among other things, it should be noted that PCE degradation products are thought to be mutagenic, and the presence of PCE may warrant developing a child-specific carcinogenic slope factor.

In addition to the evaluations of child-specific toxicity values, DDOE also made the dosimetric adjustment noted by Chevron (as "exposure assumptions") to account for children's greater breathing volume per body weight (which is approximately 4 fold), etc.

Specific Comment 10. Section V, page 11, paragraph 4.

This paragraph details the methods for calculating risk based on sub-slab soil vapor samples. According to the Draft EPA Vapor Intrusion Guidance, the sampling of sub-slab air provides a direct measure of the potential for exposures from vapor intrusion (EPA, 2002). It is noted that "for homes with multiple sub-slab soil vapor sample results, the basis of the cancer risk was the sample posing the maximum calculated cancer risk." Text in the SSP&A report indicates that several of the sub-slab soil vapor samples from homes with multiple samples were obtained from several feet below the bottom of the basement slab. The depth ranges of the sub-slab soil vapor samples should be specified, because EPA considers sub-slab air to be soil vapor samples obtained from directly below the foundation or from depths less than 5 feet below the foundation level (EPA, 2002). Deeper soil vapor samples are a more direct measurement of the source vapor concentration and will likely result in higher concentrations than shallow soil vapor samples. The EPA recommended attenuation factor for deep (greater than 5 feet below the foundation level) soil vapor samples to indoor air is 0.01 (EPA, 2002).

Response:

DDOE concurs that VMP samples provide a direct measure of potential vapor intrusion and that is why the 2009 HHRA and Remedy were based on those sampling results. All the VMP samples were collected at intervals of less than 5 feet below the slab, the majority were collected at less than 2 feet below the slab. This data was presented in the SSP&A report.

Specific Comment 11. Section V, page 12, paragraph 5.

This paragraph states that indoor air samples were not evaluated as part of the DDOE HHRA because of the numerous "background" sources of indoor air

(discussed in General Comment #1). It should be noted, however, that all of the indoor air samples collected during the SSP&A investigation were reported to be below EPA's Indoor Air Standards for the site (EPA, 2007).

Response:

Chevron notes that DDOE did not evaluate indoor air samples due to numerous background sources of indoor air vapors. Chevron would like DDOE to note that contaminant levels in all of the indoor air samples were below EPA's Indoor Air Standards for the site (EPA 2007).

This is unnecessary for two reasons. First, EPA's "Standards" were incorrectly calculated because they were developed by incorporating the wrong background concentration into the "Standard." Secondly, EPA did not follow any past or current EPA risk assessment guidance in developing those standards because they do not represent or take into account cumulative risk, which is a standard requirement in all risk assessments. This requirement was reaffirmed in the June 2009 EPA Region 3 guidance, which states:

"For sites with multiple contaminants, CERCLA and the NCP indicate that cumulative risks and hazards need to be within or below the acceptable cancer risk range or HI. Thus, sites that have vapor intrusion problems associated with multiple contaminants need careful evaluation to ensure that the mitigation decision meets the requirement of protecting human health and the environment at a cumulative level."

Therefore, the EPA "standard" is not relevant to the DDOE decision.

Lastly, DDOE will not make the Chevron-suggested note in the decision document because it is not accurate. DDOE has calculated the actual cumulative risk based on the indoor air sampling results for all detected chemicals. For some homes, the risks associated with breathing indoor air vapors are so high that they exceed the maximum risks that can even be quantified with EPA methodology. The results of this analysis are presented in the 2010 HHRA.

Specific Comment 12. Section V, page 12, paragraph 6.

The District has evaluated the cumulative risk posed to healthy adults by 66 compounds reported in the samples collected by SSP&A. Of those 66 compounds, 36 compounds detected in sub-slab soil vapor samples (SSP&A, 2009) have been identified as compounds of interest, and were included in the DDOE HHRA. As stated in General Comment #1, of the 36 compounds of interest shown on Table 1 on page 14, only 13 of those compounds have been detected in shallow groundwater (Attachment 1). The compounds evaluated in the DDOE HHRA should only include those compounds that are attributable to groundwater.

Response:

Please see the response to subset #1, general comment # 1a.

Specific Comment 13. Section V, page 12, Exhibit 1.

This table presents exposure assumptions used to calculate the chronic daily dose for the adult receptor. No exposure parameters have been provided for the child receptor. Exhibit 1 should be modified to include exposure parameters for the child receptor. Also, the Risk Assessment Guidance for Superfund (RAGS), which provided the basis for health risk calculations for this risk assessment, requires that references be provided for all exposure parameters (EPA, 1989). Per RAGS, Exhibit 1 should be modified to include the assumptions for the child receptor.

Response:

To be consistent with EPA Region 3, DDOE used the same exposure parameters to calculate cumulative risk.

DDOE has evaluated child exposure for Hazard Index separately from adult exposure and found it does not pose a non-cancer health threat. When calculating carcinogenic risk it is not necessary to differentiate between adult and children, because a traditional risk-assessment method averages over a 30-year continuous exposure period. Please see the responses to Comments # 9 and 79.

SUBSET #2

Review of Riggs Park Indoor Air, Sub-Slab Vapor, and Groundwater Sampling and Analysis Report

Gannett Fleming, Inc. (GF) has reviewed the *Riggs Park Indoor Air, Sub-slab Vapor, and Groundwater Sampling and Analysis Report*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland, dated February 2009. The report was prepared by S.S. Papadopulos and Associates, Inc. for the District of Columbia Department of Health and Department of Environment (DDOE).

The following references were used in the review of the report:

Gannett Fleming, 2007. Interim Measures Report for Indoor Air Sampling at 5846 Eastern Avenue. Former Chevron Facility 122208, Chillum, Maryland. Dated July 2007.

McHugh, T., P. DeBlanc, and R. Pokluda, 2006. Indoor Air as a Source of VOC Contamination in Shallow Soils Below Buildings. *Soil and Sediment Contamination*, Vol. 15, pages 103-122.

McHugh, T., D. Hammond, T. Nickels, and B. Hartman, 2008. Use of Radon Measurements for Evaluation of VOC Vapor Intrusion. *Environmental Forensics*, Vol. 9, March 2008.

U.S. Environmental Protection Agency (EPA), 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. EPA 530-D-02-004.

EPA, 2008. Final Decision and Response to Comments, Chevron Gasoline Release at Chillum, Maryland. Dated April 2008.

GF reviewed the report for technical content, data gaps, validity, accuracy, completeness, and compliance with regulations and guidance. Several of the appendices were labeled as confidential and not provided in the public version of the report, thus they could not be reviewed.

General Comment 1

Several figures and appendices of this report were considered confidential and were not provided in the public version of this report. This included maps showing the distribution of contaminants in various media and appendices documenting home surveys of chemicals removed from residences prior to sampling. These are critical pieces of information that are required to fully evaluate the conclusions of this report.

Response:

Some information was retained by DDOE as confidential to maintain the privacy of Riggs Park residents. This information included addresses of specific homes sampled,

and information about the interior of the homes, as noted on home survey forms. However, redacted versions of the confidential documents which were retained were made public, where possible.

General Comment 2

An immense amount of data were collected as a part of this study. Tables for many of the media sampled were prepared to summarize the data using percentages and other summary statistics. However, broad conclusions regarding the validity of the site conceptual model were made based on specific sample data. No data tables with individual sample results were provided for any of the media sampled. Figures with few or vague reference points were prepared to summarize some of the data (e.g., Figure 23). Some of the conclusions and assertions made in this report cannot be substantiated without the specific sample data.

Response:

All of the relevant data are reproduced in appendices to the Sampling & Analysis Report. Data specific to a home is considered confidential and is not made available (except as coded or redacted) to the public.

SPECIFIC COMMENTS

Specific Comment 1. Section 2, page 4, paragraph 5.

This section states that perchloroethene (PCE), a halogenated compound, was detected in groundwater during the summer of 2002. The first detection of halogenated compounds at the site by Chevron was during the September 2001 investigation along the south side of Eastern Avenue summarized in the following document:

Gannett Fleming, 2001. Geoprobe and Membrane Interface Probe (MIP) Investigation http://www.epaos.org/site_profile.asp?site_id=A3Q3%20. Results. Former Chevron Facility 122208, Chillum, Maryland. Dated October 2001.
The text should be revised.

Response:

Comment noted. The date referenced was based on EPA's PCE investigation, which began in the summer of 2002. EPA's first reported PCE detection was that summer.

Specific Comment 2. Section 5. Page 16. paragraph 4.

This paragraph describes the pre-indoor air sampling survey. Careful detection and removal of potential indoor air sources of chemicals is critical to obtaining quality samples. This section does not provide enough detail to determine whether quality samples were collected during the sampling event. Clarification of the following items should be provided in the text:

a. It is unlikely that the ppbRAE photoionization detector (PID) was calibrated prior to surveying activities at each residence. Calibration sheets from Appendices D, E, and F indicated the PID calibration was checked daily and

calibrated when required, which was once every 3 days on average. These instruments tend to drift with use, particularly after detecting a high concentration source, such as moth balls or perfume.

b. It is unclear if the sampling protocol prohibited the fueling of vehicles by the sampling team prior to collecting samples. This prevents cross contamination of samples.

c. Based on the observations noted in Table 3 and Appendix D, various chemicals were inadvertently not removed during the survey for several residences (e.g., refer to line 185 of the table that states "additional can of paint found during sample setup, removed"). It is unclear whether the residence was allowed to ventilate for 24 hours after these items were removed as is stated in the text.

d. Table 3 also indicates that items potentially containing petroleum products such as gas cans and lawn mowers, were removed from several residences. It is unclear whether the residence was allowed to adequately ventilate prior to sampling.

e. Several observations from Table 3 and Appendices D and E state that the basement air had an odor during sampling. For example, on line 184 of the table, the observation for indoor air sample Q1-S289-INA is "smell of mothballs in home". This suggests that either all sources of indoor air contaminants were not removed or the residence may not have had adequate time to ventilate.

f. The text states there were several homes with attached garages that were sampled. It is unclear whether residents were requested not to park or run vehicles within the garage before or during sampling.

g. Observations from Table 11 indicate that numerous residents that smoke were encountered during the study. It is unclear whether they were discouraged from smoking indoors during the ventilation and sampling period. It is also unclear whether an exit interview was conducted to determine whether smoking occurred indoors during the sampling period.

Response:

- a. re ppb RAE PID: Comment noted. PID instruments, however, were used solely for qualitative evaluations prior to sampling. Results of the PID readings were not used in the remedy selection or risk assessment.
- b. re: Sampling Protocol: DDOE notes the comment, but notes that the remedy selection, based upon the 2009 HHRA, is not influenced by the chemicals most strongly associated with gasoline vapors.
- c. re: Removal of additional items from home: details on the sampling times for specific samples are contained on the sampling records in Appendices D through F
- d. re: Table 3: observations under the heading "Sampling Observation" were made during both the pre-sampling home surveys and sample collection events; the context of each comment can be ascertained from those forms in their respective appendices.

- e. re: Odors: observations under the heading "Sampling Observation" were made during both the pre-sampling home surveys and sample collection events; the context of each comment can be ascertained from those forms in their respective appendices.
- f. re: attached garages: Residents were requested to remove cars from garages prior to sampling
- g. re: Smoking residents: No exit interviews of the type suggested were undertaken.

Specific Comment 3. Section 5, page 18, paragraph 2.

This section provides information on the outdoor vapor monitoring ports. The text states that some of the ports were replaced and were installed at depths of 1 to 2 feet. Analytical results from outdoor ports installed to a final depth of less than 5 feet are considered unreliable (EPA, 2002; Appendix E) due to the high potential for short-circuiting of ambient (outdoor) air into the sample. EPA recommended that these samples be excluded from evaluation in their 2002 Draft Vapor Intrusion Guidance. There are some areas of the site, however, where groundwater is found at depths shallower than 5 feet. In this case, shallow soil vapor sample collection with quantitative leak detection is the only available option. If this situation was encountered, it should be clarified in the text. To aid in clarification, the text should include a construction table for all vapor monitoring ports along with corresponding depth to groundwater or perched water (if known). A map of the ports should also be released to better evaluate spatial trends.

Response:

As noted by Chevron, at some locations, the shallow depth to groundwater prevented installation of outdoor VMPs at depths greater than 2 feet. In these types and similar situations, alternative protocols were used to generate appropriate sets of data to evaluate the potential risks, and subsequently to determine the need for vapor mitigation systems at individual homes covered under this project.

Specific Comment 4. Section 5, page 20, paragraph 1.

This section provides information on sampling of the sub-slab and outdoor vapor monitoring ports.

a. The text does not mention if leak detection was conducted during the sampling. Based on the field notes in Appendices D, E, and F, leak detection was not conducted for any of the soil vapor samples collected. If leak detection was not conducted, then the soil vapor samples could have been diluted by ambient air intrusion into the sample collection apparatus or through the port itself. This is of particular concern for shallow outdoor and sub-slab vapor monitoring ports. This should be clarified in the text.

b. The text does not mention if the vapor monitoring ports were purged and what the general purge volume target was (e.g., 3 well volumes, etc.). Appendices D, E, and F indicated purging was completed prior to sampling. This information is critical to evaluate sample quality and should be added to the text. In addition, there were many samples in Appendices D, E, and F (as summarized in Table 3)

that appeared to have excessive purge volumes. For example, line 162 of Table 3 indicates that for sub-slab vapor monitoring port sample Q1-S293-VMP2 purging of two liters of soil vapor was attempted. According to Appendices D, E, and F, all the sub-slab soil vapor ports were purged of at least one liter of vapor prior to sampling. This volume seems excessive given the typical sub-slab vapor monitoring port contains less than 10 milliliters of air. This issue and its affect on sample quality for sub-slab ports as well as outdoor vapor wells should be discussed in the text.

c. The text does not mention what size canister was used. Typically, one-liter canisters are used for soil vapor sampling to minimize the volume of vapor removed from the subsurface. This information should be provided in the text.

d. The industry standard for collecting soil vapor samples from implants, probes and ports is generally to use grab sampling techniques while maintaining a low (e.g., less than 200 milliliters per minute) soil vapor flow rate. The 24 or 20 hour composite samples collected for this study are not considered grab samples. Although the soil vapor flow rate was sufficiently low, the text should provide justification why the samples were collected in this manner.

e. The text states that a PID was used to screen each of the ports on the initial visit. Although good for the general screening for presence or absence of volatile organic compounds (VOCs), a PID does not provide data that is of sufficient accuracy or reliability to make definitive conclusions, particularly if the PID was not calibrated regularly. The data quality objectives and use of these data should be provided in the text. Furthermore, the PID readings were collected prior to collecting the summa canister sample, effectively purging the vapor port. It is unclear whether the port was purged a second time with the sampling apparatus attached to the port. If this was the case, a discussion of the effect on sample quality should be added to the text.

Response:

- a. Although leak detection was not part of the sampling protocol, review of the data collected at the Riggs Park site indicates that the sample results were not compromised by leaks.
- b. All vapor ports were purged prior to sampling, with a target purge volume of 1 liter; when conditions prevented a 1 liter purge, a lower purge volume was used. The volume of air in the VMP is insignificant compared to the volume of air in the attached tubing that must be purged prior to sampling.
- c. 6 liter canisters were used for all samples
- d. The comment regarding grab sampling is noted. We point out, however, that by using 20-hour integrated samples rather than grab samples, sample results indicating the type of transient reversal of concentration gradient described by McHugh (2006) can be minimized.
- e. As noted above, the PID was not used for any quantitative analysis, and purging was required not only for the VMP, but also for the attached tubing.

Specific Comment 5. Section 7, page 31, paragraph 1.

This paragraph raises concerns over false negative results from outdoor vapor monitoring ports and infers that sub-slab samples are of higher quality for use in determining vapor intrusion problems. Although this statement is true to some extent, it should also be noted that the indoor air inside the residence can also serve as a source of contaminants to sub-slab soil vapor (McHugh, et al., 2006). This phenomenon is observed in the lists of detected compounds for indoor air, ambient air, sub-slab soil vapor, and outdoor soil vapor on pages 22 through 24. Both Freon 11 and 12 are detected in ambient air, indoor air, and sub-slab air, but not in the outdoor vapor monitoring ports. Text on page 31 indicates that the Freon compounds are commonly detected in ambient and indoor air, but not likely attributable to subsurface contamination. Therefore, the Freon compounds are present in the sub-slab soil vapor as a result of infiltration of ambient and/or indoor air through the basement slab. Benzene and other hydrocarbons are also present in ambient and indoor air and it is reasonable to assume that some portion of the concentration of hydrocarbons in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment as well. The inference that sub-slab soil vapor samples are of higher quality when compared to results from outdoor vapor monitoring ports should be qualified.

Response:

Chevron again cites McHugh et al. (2006) as support for the theory of indoor air percolation to the subsurface. The limitations of this argument are noted above in Subset 1, General Comment 1(b). Chevron is factually wrong when they assert that some Freon compounds are not observed in the outdoor vapor monitoring ports. Freon 11 and 12 were detected in the outdoor vapor monitoring ports (GMPs) with a frequency of 25% and 43% of the samples. Chevron's argument that the freons are strong evidence for downward infiltration of vapors through the slab is not supported by the evidence. The freons are notable components of atmospheric air in part because they are persistent in the environment. Freon 11 and 12 were detected in 92% and 100% of the ambient air samples, respectively. The ambient atmosphere is in contact with, and mixes with air in the subsurface. It is also the source for some observed contaminants in the subsurface, particularly those that do not degrade under subsurface conditions.

This argument is particularly difficult to reconcile with a physical model of vapor movement, as there are demonstrably contaminants, such as PCE that are present under many homes in concentrations one to two orders of magnitude higher than observed either in the home, or in ambient air.

Specific Comment 6. Section 6, page 25, paragraph O.

This section indicates that liquid-phase hydrocarbons (LPH) or gasoline from the release at the service station migrated into the alley south of Eastern Avenue in the vicinity of monitoring well MW-24A. This assertion was based on soil concentrations from the groundwater interface provided on page 24. Xylenes were detected at approximately 6 parts per million (ppm) and naphthalene at 3 ppm. A reference with representative concentrations of these compounds in soil indicative of LPH should be provided in the text. In addition, these soil results are but one line of evidence. Other lines of evidence include groundwater

concentrations, total petroleum hydrocarbons (TPH) analysis, product fingerprinting (if the LPH is mobile), observation in soil cores, occurrence in monitoring wells, and others. LPH has never been detected in well MW-24A since it was installed in 2004. The assertion that LPH migrated to the vicinity of monitoring well MW-24A is not founded based on the information provided in the text.

Response:

The text states clearly that the soil sample collected from near MW-24A is consistent with the presence of *residual gasoline* in soil. It does not imply that any LPH is currently mobile as a free phase in the alley behind Oglethorpe Street. Residual gasoline may persist in soil long after all mobile free-phase product has dissipated or been trapped as an immobile phase. Releases of gasoline from the Chevron station in Chillum Road are understood to have occurred before and during 1989, fifteen years before the installation of well MW-24A, thus the absence of LPH observations in that well is irrelevant.

Multiple lines of evidence do support the inference that free product was present in the alley:

- This location is situated approximately 180 feet downgradient of another well (MW-18) in which liquid hydrocarbons were detected in 2002; LPH will travel down-gradient at the top of the saturated zone while mobile,
- The contaminated soil is present at the top of the water-bearing zone, precisely where it would be expected to be found if it represented residual gasoline contamination
- The compounds detected at ppm levels (and those not detected) are consistent with weathered, residual gasoline. The absence of benzene and toluene at the detection limits in these samples are consistent with their higher solubility and weathering potential of these compounds compared to xylenes and naphthalene
- These soil concentration data can be converted to equivalent groundwater concentrations using reasonable assumptions regarding soil porosity and soil density. These calculations indicate that 3,000 ug/kg of naphthalene, and >6,000 ug/kg of xylenes are equivalent to aqueous concentrations that exceed the effective solubility of those compounds in gasoline. They even constitute a substantial percentage of the total solubility of those compounds in water; these factors are clearly indicative of groundwater in contact with residual product.
- Finally, we note that EPA's remedy for the site (USEPA, 2007 and 2008) explicitly considers Area B (the area in which this sample was collected) as part of the "Source Area", and a zone where liquid phase hydrocarbons are present.

The only implication of these new soil data is to indicate that residual product is present approximately 180 feet further down-gradient than previously recognized in Well MW-18.

Specific Comment 7. Section 7, page 34, paragraph 3.

This paragraph compares the results obtained during this study to others, including previous indoor air sampling conducted by Building Sciences and Engineering Associates (BSEA) on behalf of DDOE. Specifically, the maximum concentration of benzene in indoor air from the BSEA study was used for comparison purposes. It should be noted that Chevron sampled this residence after BSEA and found numerous indoor air contaminant sources in an attached shed, including an open gasoline can. After removal and ventilation, the residence had a benzene concentration in indoor air of 2.9 $\mu\text{g}/\text{m}^3$, which was much lower than the BSEA study maximum of 26.8 $\mu\text{g}/\text{m}^3$ used for comparison in the text. The BSEA results should be qualified in the text or omitted.

Response:

Comment noted.

Specific Comment 8. Section 7, page 35, paragraph 2.

A thorough discussion of potential sources of contaminants for indoor air is provided in this paragraph. Table 3 indicates that moth balls were found in a fair number of residences during the building survey. Naphthalene is one of the primary ingredients in moth balls, however, this is not mentioned in this paragraph. Text on page 29 indicates that naphthalene was detected in 21 percent of indoor air samples but only 2 percent of sub-slab samples. The presence of moth balls in residences likely explains the prevalence of naphthalene in indoor air. The text should include a brief discussion of this issue.

Response:

Comment noted. DDOE is making its determination based on potential exposure, as has been previously discussed. For this task, VMP data is used. The indoor air data shows current exposure, not future exposure and is not relevant to the determination process.

Specific Comment 9. Section 7, page 36, paragraph 1.

This paragraph provides the conclusion that the currently accepted conceptual site model that the sewer line along Nicholson Street is the groundwater discharge point may be flawed. This assertion cannot be supported with the data provided in the public version of the report. Neither individual sample results nor figures showing sample points were provided. Chevron will review the data collected for this study in conjunction with its extensive data set for this area to determine the validity of this claim when the data are released to Chevron.

Response:

The comment misrepresents the text of the SSP&A report. The SSP&A report does not "assert" a specific conclusion, but instead presents two alternative hypotheses (a flawed conceptual model for groundwater flow, or an additional source of contamination), that may apply if the relevant data are confirmed. DDOE welcomes Chevron's evaluation of these hypotheses in light of all the available data.

Specific Comment 10. Section 9, page 38, paragraph 1.

This section provides a formula for the observed ratio of contaminant concentrations between the subsurface and indoor air and indicates that it is one measure for the potential occurrence of vapor intrusion. There are several issues with this equation and its usage with respect to vapor intrusion:

- Most of the compounds of interest in the study are not conservative tracers. That is, they have documented indoor or ambient air sources that are not related to vapor intrusion.**
- The equation was not corrected for indoor air. EPA (2002) indicates that the average building exchanges a full volume of air over 6 times per day. Therefore, ambient air has a large effect on the concentrations of contaminants in indoor air. By subtracting the ambient air concentration out of the denominator as suggested in McHugh, et al. (2008) this effect is reduced.**
- As noted in comment 5, indoor air contaminants can migrate downward through the basement slab and into the subsurface. The concentrations of some contaminants detected in sub-slab air in this study are attributable to indoor air infiltration into the subsurface. Based on the points above, the inverted attenuation factor equation presented in the text is not a good indicator of the potential for vapor intrusion. Any conclusions based on this equation should be qualified accordingly. To determine an accurate attenuation factor, a conservative tracer must be used such as radon (McHugh, et al, 2008, Gannett Fleming, 2007).**

Response:

- No claim is made in the SSP&A report that the compounds discussed are conservative tracers; in fact the degradation of compounds is discussed; the presence of non-conservative compounds such as PCE under the homes, at concentrations greater than observed indoors highlights the need for a continuing source of these compounds, and their potential for indoor intrusion.**
- DDOE accepts the fact that air exchange may impact indoor air concentrations. We note, however, that the evaluation procedure presented is reasonably appropriate for its intended use (as a screening process, and as a supplementary line of evidence in the overall evaluation).**

Specific Comment 11. Section 10, page 42, paragraph 2.

This paragraph presents the recommendations of the study. A "home-by-home" risk assessment was recommended whereby individual risk for each individual residence within the study would be calculated. This is not a small undertaking and should be evaluated carefully. Chevron has several concerns regarding this approach. First, this approach greatly compartmentalizes the site into small microcosms and neglects larger trends in sampling data that are observed site-wide. Each home may have a very small data set, perhaps one set of indoor, ambient, and sub-slab data taken at one or a few points in time. As stated in the report, soil vapor concentrations can vary over a wide range spatially and temporally. Contrast this to the Baseline Risk Assessment prepared for the site, which took into account thousands of samples from multiple media collected over

nearly a decade. Secondly, this approach introduces a large amount of uncertainty into the risk assessment for each home. As stated in the report, the list of factors that influence indoor air concentrations is long and includes personal habits such as smoking, use of dry cleaning, use of cleaning products, building materials, the building exchange rate, ambient air concentrations, and attached garages, among many others. All of these factors contribute additional uncertainty to a very small data set with considerable inherent uncertainty. It is Chevron's opinion that a home-by-home risk assessment would not provide much value for determining risk to residents from vapor intrusion.

Response:

It is not realistic to expect that every home in the Riggs Park neighborhood will have the same potential risk due to vapor intrusion of contaminants. As illustrated in the SSP&A report, the contaminants are not uniformly distributed over the neighborhood. In addition, the depth to groundwater varies across the site – a significant variable in mass transfer from the groundwater to subsurface vapor. Consequently, a home-by-home assessment is warranted. See also the previous discussion for Subset 1, general comment 2 on pages 56 to 57.

Specific Comment 12. Appendices 0, E, and F.

These appendices provide field documentation sheets for each of the samples collected during the investigation. According to the field sheets, there was no vacuum at the conclusion of the 24-hour sampling period for 27 out of 128 indoor air samples (21 percent) and 10 out of 39 ambient air samples (26 percent). The true sampling period cannot be known for these samples, but it was less than 24 hours. Therefore, these samples may not be truly representative of indoor and ambient air concentrations. This issue should be discussed in the text.

Response:

The concern presented by this comment directly contradicts Chevron's comment # 4, suggesting the preference for grab samples over integrated samples. Nonetheless, all regulators on the sampling canisters were calibrated by the laboratory for 24 hours prior to shipment. Prior to leaving each canister, the sampling crew observed it for 10 minutes to ensure that the flow rate was sufficient to collect an air sample over a full day. While it is true that the residual pressure difference read "0" on some canisters at collection, we note that 1) the regulators are designed to stop collecting vapor prior to a true pressure equilibrium, so that the vapor flow is one-way, into the canister, and 2) in some cases because of accessibility to the homes, it was not possible to retrieve canisters precisely after 24 hours. DDOE is confident that the samples represent true integrated samples representing most of a full day, if not a complete 24 hour cycle in all cases.

Specific Comment 13. Appendix 0, Memorandum from H. Cohen of SSPA to Dr. V. Sreenivas (CCCOH) dated July 22, 2008.

This memorandum provides a summary of activities related to the outdoor vapor port sampling. The memo states that "some of the PVC casings and Teflon sample tubing contained unacceptable levels of tetrahydrofuran, acetone, and 2-butanone (methyl ethyl ketone)." These chemicals are the main ingredients in

PVC primer and glue, As a result, all existing outdoor vapor ports were abandoned and reinstalled, This is a significant event that was not discussed in the text. A thorough discussion of the well abandonment should be provided in the text along with how the construction of the vapor wells may have affected sample quality, For instance, if the concentrations of these compounds decreased after replacing the wells, then it is clear that leaks were present in the well during sampling.

Response:

The replacement of GMPs is discussed in Appendix O. The construction of the GMP sampling locations is discussed on page 17 of the report.

SUBSET #3

Review of Methods: Riggs Park Comprehensive Human Health Risk Assessment Long Version, and Summary Tables Supplied by Expert Toxicologist 2/13/09

RAM Group of Gannett Fleming, Inc. (RAM Group) has reviewed the *Methods: Riggs Park Comprehensive Human Health Risk Assessment Long Version, and Summary Tables Supplied by Expert Toxicologist 2/13/09*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland. The Human Health Risk Assessment (HHRA) report was found to be missing several key sections necessary for proper review of the estimate of risk. In addition, it does not follow typical USEPA guidance or the practice of risk assessment. Therefore, any remedy proposed as a result of these data and conclusions cannot be properly substantiated. The missing data and sections should be provided so that the HHRA can be adequately reviewed.

Attachments:

- 1. References**
- 2. Shallow Groundwater Analytical Detections - September 2008**
- 3. Figure: Mean Soil-Building Pressure Differential**

General Comments

General Comment 1.

In page 1, paragraph 1, the report states "The goal of the HHRA was to determine whether any unacceptable adverse health effects associated with vapor intrusion originating from ground water contamination are present in any of the 106 homes, based on current and future exposures." The report makes no attempt to relate the sub-slab vapor (SSV) concentrations to the groundwater concentrations. Rather, the report states the SSV "results are indicative of contaminants potentially emanating from groundwater and represent a source of potential indoor vapor intrusion." No evidence is presented that the 36 chemicals detected in the various SSV samples are due to volatilization of these COCs from the groundwater. Our review of the September 2008 groundwater analytical results for shallow wells screened across the water table indicated that only 17 compounds were detected above laboratory reporting limits and only 13 of these compounds were detected in SSV. Thus, of the 36 compounds identified in SSV and assumed by the report to be potentially emanating from groundwater, only 13 were actually detected in shallow groundwater in September 2008. As a result, the report likely overestimated the risk to residents by including 36 compounds in the HHRA instead of the 13 present in shallow groundwater.

Response:

This comment was addressed in the response to Subset 1, general comment # 1 (a). Risks were not overestimated and only 6 COCs contributed to the cumulative risk assessment.

Please also see the final sentence in section IV of the remedy document which states:
"The District will evaluate contaminant levels detected in subslab soil vapor in comparison to contaminant levels attributable to groundwater to confirm that the levels detected in soil vapors, that the District will require be remediated, result from contaminated groundwater."

The District has now completed this task. Please see the 2010 HHRA.

General Comment 2.

The source of chemicals measured in the SSV samples may be indoor air that has advected downward through the slab and into the vadose zone, This phenomenon has been reported in peer reviewed literature, McHugh et al. (2006) indicates that the likely source of the compounds detected in sub-slab soil vapor that are not present in groundwater is indoor air, Previous investigations conducted by Chevron have demonstrated that airborne contaminants can be transported both downward and upward through the basement slab (GF, 2007), For ease of reference, Figure 1 from this report is attached which shows that during an entire week in June 2007, the pressure gradient in one residence at the site was downward through the slab, When this occurs, the airborne contaminants in indoor air are advected downward through the slab and into shallow soil vapor. Therefore, it is reasonable to assume that some portion of the concentration of hydrocarbons (and other airborne contaminants) in sub-slab soil vapor is attributable to ambient and indoor air infiltration into the sub-slab environment. This should be taken into account in the HHRA.

Response:

This comment was previously addressed [see response to comments above regarding McHugh article, at Subset 1, General Comment 1(b) and at Subset 2, Comment 5.

General Comment 3.

Page 4, paragraph 3 indicates that "The results of this HHRA were based on 357 vapor monitoring port SSV samples collected from 106 Riggs Park homes. In total, 1,785 separate cumulative health risk analyses were performed on each of the 357 SSV samples." This is not consistent with the practice of risk assessment as described in the various USEPA guidance documents referred to in the report (although the report did not include a reference list). For a detailed site-specific HHRA, it may be reasonable to perform exposure and risk calculations for each home to account for the variability in the inputs for each home. However, no home-specific information has been used in the calculations.

Response:

It is correct that DDOE did not collect home-specific information to conduct a site-specific risk assessment because that is unnecessary and would not provide the type of risk management information necessary to make a decision regarding remediation. DDOE used site-specific sampling data and default exposure assumptions as is suggested by EPA risk assessment guidance. Risk management decisions are based on

current and future conditions; for future conditions, the current exposure conditions are irrelevant. See also, response to 'General Comments' #2 [Subset #1]; and see p.21 – 22 of the 'Remedy Selection' document, as well as the AR for reference list.

General Comment 4.

The report does not present the data for the 357 sub-slab vapor (SSV) samples. A comprehensive HHRA must present all the data, evaluate the data, and comment on the variability in the data. The report does not include any discussion about the quality of the data or whether sufficient representative data has been collected to support a realistic estimate of risk.

Response:

VMP samples were reviewed by a third-party to evaluate the data quality and were judged to be of sufficient quality to conduct the 2009 HHRA and make risk management decisions.

General Comment 5.

RAGS Part A (USEPA, 1989), Sections 5.8 and 5.9 describe the process for the selection of chemicals of concern (COCs). It suggests that the following criteria be used to determine the COCs:

- **Positively detected in a medium;**
- **Detected at levels above the concentration in blank samples;**
- **Detected at levels above naturally occurring levels;**
- **Only tentatively identified but associated with the site or confirmed by special analytical services;**
- **Transformation products;**
- **Not detected chemicals but present at the site if an evaluation of the risks at the detection limit is desired; and**
- **Further criteria:**
 - o **Chemicals by class;**
 - o **Frequency of detection;**
 - o **Essential nutrients; and**
 - o **Concentration-toxicity screen,**

All of the chemicals analyzed for or detected in a sampling program are not considered COCs for the purposes of a HHRA. For example, the frequency of detection has not been discussed in the report and as presented in Specific Comment 6, not detected chemicals were eliminated without proper review.

Therefore, this HHRA is deficient in that it does not follow the methodology described in RAGS. Thus, the statement on page 2, paragraph 2 "HHRA was conducted strictly according to RAGS" is misleading.

Response:

The guidance that Chevron cites is generally applicable to soil and groundwater where multiple samples are collected to characterize a large area. Those sampling designs are not relevant and are not appropriate for vapor intrusion studies. For example, it is difficult to see how relevant applying the essential nutrient criteria would be for

vapors migrating through basement slabs since essential nutrients are not volatile. Likewise, it is not clear how the frequency of detection would apply for a single home since the elimination criteria states that a chemical can be eliminated when the frequency of detection is 5 percent or less. The minimum number of samples that must be collected for each home for that particular criterion to apply is 20 (i.e., $1/20=0.05$). It is neither technically feasible nor necessary to collect 20 samples for each home in a vapor intrusion study. Lastly, EPA's sole purpose of applying those criteria to large soil and groundwater datasets is to reduce the number of COCs to a manageable size so that the risk assessment does not become overwhelming. DDOE did not consider it overwhelming to evaluate 6 carcinogens.

General Comment 6.

RAGS Part A (USEPA, 1989) requires a section devoted to uncertainty analysis to discuss the impact of various assumptions and variability in the data used. The report does not include such a section. Therefore, again it does not follow USEPA guidance. A discussion of the uncertainty, especially the large amount of uncertainty inherent in the home-by-home risk assessment methodology described, should be clearly discussed in detail in the HHRA.

Response:

It is correct that an uncertainty analysis was not presented in the 2009 HHRA. The 2010 HHRA prepared in support of DDOE's Revised Remedy Decision issued with this Response to Comments addresses uncertainty.

General Comment 7.

Review of the calculated risks indicates that the majority of the calculated risk is from chloroform. This compound is a common disinfectant byproduct present in drinking water. In addition, a review of the September 2008 groundwater sampling results for shallow (water table) monitoring wells indicates that chloroform was present in only 3 of 29 wells at a maximum concentration of 1.6 µg/L. Based on Henry's Law, this concentration is not elevated enough to cause diffusion into soil vapor at the concentrations observed in shallow soil vapor. The chloroform concentrations in soil vapor likely were advected through the basement slab as described in general comment 2 above. Thus, for residences where chloroform was the major risk driver, the risk is likely overestimated.

Response:

While chloroform was identified as a COC, PCE poses the majority of risk at Riggs Park. To identify the source of chloroform, DDOE conducted a detailed statistical regression analysis of both drinking water and VMP samples. Briefly summarizing, chloroform is highly correlated to bromodichloromethane (BrDCIM; another disinfectant trihalomethane) in tap water. Therefore, if the source of chloroform in VMP samples was the result of vaporization from tap water (as suggested by Chevron), both BrDCIM and chloroform would be detected in the same sample, whether it is an indoor air or VMP sample. Furthermore, paired sampling analysis should reveal that they are detected in each sample as a constant ratio. DDOE's analysis reveals they are not. Not only were the 2 chemicals not detected in the same ratio, but BrDCIM was only detected in 11 homes out of the 106 sampled.

It is possible that tap water is the source of chloroform at homes where it was detected at very low concentrations where it posed insignificant risk. However, in those homes where the chloroform concentration and corresponding risk was high, tap water was not a source. Although the evidence clearly points to a source other than tap water, the definitive source of chloroform in the high-risk homes has not yet been identified.

General Comment 8.

It is interesting to note that the measured sub-slab benzene concentrations presented in the various tables in Exhibit 7 are all below or within the range of benzene indoor air background concentrations and for most of the samples cause a very small percentage of the risk. This HHRA indicates that petroleum hydrocarbons are not a major risk driver at the site.

Response:

While benzene does not pose unacceptable risk on its own based on the levels detected in VMP samples, it is not the only carcinogenic petroleum constituent. As discussed previously, naphthalene has been detected in a few homes at levels posing unacceptable risk. However, in DDOE's more recent groundwater evaluation a link between VMP samples and ground water could not be unequivocally confirmed.

SPECIFIC COMMENTS:

Specific Comment 1. Section 1.0, page 1, paragraph 2.

The cumulative non-carcinogenic health hazard index (HI) was calculated based on four different toxicity values from four different sources. The rationale for using various toxicity values is not provided and the values used could not be verified. The toxicity values and their source should be provided in the HHRA.

Response:

The toxicity values and their sources are presented in the Riggs Park Comprehensive Human Health Risk Assessment Long Version, and Summary Tables Supplied by Expert Toxicologist 2/13/09.

To clarify: cancer risk was calculated using toxicity values adopted by EPA Region 3 in September 2008. HI were calculated using 2 different sources and a modification for children. The highest calculated risk was used for decision making.

Specific Comment 2. Section 1.0, page 2, line 6.

The cumulative cancer risk is referred to as "Incremental Lifetime Cancer Risk (ILeR)", but it is referred as "ELCR" several times. This difference should be clarified and consistent terminology used throughout the HHRA to prevent confusion.

Response:

Both terms are correct. In the 2010 HHRA one term will be used in the interest of consistency.

Specific Comment 3. Section 1.1, page 3, paragraph 1.

This section refers to the draft vapor intrusion (VI) guidance (EPA, 2002). This is a draft guidance that has not been updated by USEPA to date due to considerable controversy about the contents of the document, and overly conservative assumptions, such as conservative attenuation factors.

In addition, this draft guidance is not applicable to underground storage tank (UST) sites. Page 2 of the draft EPA VI guidance states that: "*The draft guidance is suggested for use at RCRA Corrective Action, CERCLA (National Priorities List and Superfund Alternative Sites), and Brownfields sites, but is not recommended for use at Subtitle I Underground Storage Tank (UST) sites at this time. The draft guidance recommends certain conservative assumptions that may not be appropriate at a majority of the current 145,000 petroleum releases from USTs.*"

As such, the draft guidance is unlikely to provide an appropriate mechanism for screening the vapor pathway at UST sites.

Response:

EPA's recommendation stated in the above quote pertains to investigations at petroleum sites. It is intended as cautionary note to not place too much emphasis on ground water data in evaluating vapor intrusion. Relying on groundwater data to predict vapor intrusion could produce conservative results because it ignores the process of degradation of gasoline components as they migrate through the vadose zone up to the concrete slab. DDOE recognized this complicating issue and consequently did not rely on groundwater data to predict vapor intrusion and calculate risks. DDOE relied on VMP samples because the measured concentration represents the level directly under the concrete slab after the process of degradation has already occurred.

As previously discussed, based on DDOE's analysis of VMP and ground water data the Riggs Park site should be considered a multiple chemical release site. Although Chevron's gasoline release triggered the numerous investigations that were conducted historically in which toxic gasoline components were the central focus, DDOE's more comprehensive investigations reveals that investigation and remediation efforts be all inclusive to target all chemicals detected in VMP samples that can be linked to groundwater.

Chevron's opinion that the AF is overly conservative is inconsistent with the most recent EPA Region 3 reevaluation of the most appropriate AF value. In their reevaluation of the AF value that should be used in vapor intrusion studies (which is presented in *EPA Region 3 Vapor Intrusion Framework. June 2009*) Region 3 concludes an AF of 0.1 remains the most representative and scientifically tenable assumption based on actual empirical data collected from numerous sites.

As previously discussed, based on the current conditions, the Riggs Park site should be considered a multiple chemical release site and not a petroleum site. Please also see the previous discussion of petroleum degradation (Subset 1, specific comment #2).

Although Chevron considers the AF to be overly conservative, this is inconsistent with the opinion of EPA Region 3. The region has reevaluated the AF value of 0.1 based on empirical data collected from numerous sites and they have concluded it is still the correct and appropriate default assumption for vapor intrusion sites. The choice of AF has been previously discussed, please see (Subset 1, general comment 1(b), general comment 2 and specific comment #8).

Specific Comment 4. Section 1.1, page 3, paragraph 2.

The text states that "According to EPA VI guidance (EPA 2002), the recommended attenuation factor for sub-slab soil gas samples is 0.1." The recommended criterion established by EPA in the Draft *Vapor Intrusion Guidance* is a conservative estimate that assumes the chemicals do not degrade as they migrate upward through the vadose zone; however petroleum hydrocarbon vapors are known to biodegrade in the presence of oxygen (EPA, 2002). Site investigation data collected at the site from 2002 to 2004 suggested that biodegradation of hydrocarbons in soil vapor was occurring in the vadose zone (GF, 2006). In addition, Chevron has calculated a site specific attenuation factor for one residence of 0.0026 based on sub-slab soil vapor and indoor air sampling results conducted in 2007 (GF, 2007). Since its publication of the Draft *Vapor Intrusion Guidance* in 2002, EPA has determined that its recommended sub-slab to indoor air attenuation factor of 0.1 may be overly conservative (ITRC, 2007). It is Chevron's position, as well as that of most experts in this field, that using an attenuation factor of 0.1 is a very conservative estimate which leads to an overestimation of risk from vapor intrusion of petroleum hydrocarbons.

Response:

The AF factor of 0.1 is appropriate to evaluate current and future conditions and is the value recommended by EPA Region 3. Please see the previous discussion of the selection of the AF factor at response to Subset 1, specific Comment 8, pages 63 to 65.

Specific Comment 5. Section 1.1, page 4, paragraph 1.

The statement "This assumption has become so integral to the U.S. EPA risk management frame work that a site is automatically remediated when chemicals contaminate soil, water, or air above acceptable risk levels" is not accurate. There are many sites where the USEPA, state regulators, and the responsible party have agreed to implement institutional controls or used mechanisms other than remediation to reduce the risk to an acceptable level. This statement should be revised or removed from the text.

Response:

Chevron incorrectly interpreted the point of DDOE's statement. The point was not what type of remedial response is warranted, but that a remedial action is automatically triggered simply based on the potential for future exposures. That is, the

Agency does not wait for actual exposures to occur before taking action. Likewise, DDOE is responsible for preventing exposure before it occurs and does not wait for the vapors to actually penetrate the Riggs Parks homes and inhalation to occur before taking action.

Furthermore, use of the term "remediation" did not imply actual removal of contamination. Implementing institutional controls is, by definition, a remedial option intended to prevent exposures from occurring, which is identical to the risk management decision made by DDOE at the Riggs Park site. This is far different from a no-further-action decision because there are no current exposures and human health risks.

Specific Comment 6. Section 1.1, page 4, paragraph 4.

Text in this section states that chemicals not detected in any home were not considered to be chemicals of concern. It is not reasonable to eliminate chemicals that were not detected without a proper review of detection limits.

Response:

The text will be rewritten for added clarity in the 2010 HHRA. In general, chemicals were not arbitrarily eliminated from the chemicals of concern (COCs) list simply because they were not detected in VMP samples; rather, among other things, a thorough/deliberate evaluation of the detection limits vis-à-vis the risk-based or acceptable concentrations of the target chemicals becomes part of the overall data evaluation and screening process used in the selection of the COCs.

Specific Comment 7. Section 1.2, page 6, exhibit 2.

Exhibit 2 presents the dose equation for both carcinogenic and noncarcinogenic effects. However, the chronic daily dose (CDD) equation presented in Exhibit 2 is applicable for noncarcinogenic exposure only. The parameter "BW" included in the exhibit should be deleted. The unit for averaging time should be hours instead of days, and values should be 262,800 and 613,200 for noncarcinogenic and carcinogenic, respectively. As per the recent EPA's document (USEPA, 2009), CDD is referred as exposure concentrations (EC). The EC for carcinogenic effects should be as below:

$$EC = \frac{CxET \times EF \times ED}{AT}$$

It was confirmed that cancer risks presented in Exhibit 7 were calculated based on the equation above using an averaging time of 613,200 hours, not the equation presented in Exhibit 2 of the report. The revised equations and the resulting calculations should be provided. In addition, the calculation of the noncarcinogenic hazard quotient could not be verified. Supporting information for this calculation should be provided in the HHRA.

Response:

All exposure assumptions will be presented in the 2010 HHRA. DDOE used the same exposure assumptions that are recommended and used by EPA Region 3.

Specific Comment 8. Section 1.3, page 9.

The unit for CDD is presented as mg/kg-day, however, it should be mg/m³ for inhalation.

Response:

The units used in the 2009 HHRA are presented in the 2010 HHRA and are the same units used and recommended by EPA Region 3.

Specific Comment 9. Section 1.3, page 10, paragraph 1.

This section states that the Hazard Index (HI) is calculated for the sample. Please note that the HI is calculated for a receptor not a sample.

Response:

Text will be rewritten for added clarity.

SUBSET #4

**RE: Review of Riggs Park Comprehensive Human Health Risk Assessment
Toxicologist Work Product Data Tables
Former Chevron Facility 122208, Chillum, Maryland**

As requested, RAM Group of Gannett Fleming, Inc. (RAM Group) has reviewed the *Riggs Park Comprehensive Human Health Risk Assessment Toxicologist Work Product Data Tables*, prepared for the residential area surrounding Former Chevron Facility 122208, Chillum, Maryland.

This review was conducted on an expedited basis and should not be considered a comprehensive review of the data provided. However, unless additional documentation and information is provided, a comprehensive review would not add value.

Representative calculations and input values to the risk assessment were spot checked for consistency with applicable U.S. Environmental Protection Agency (EPA) risk assessment guidance. The comments provided are general in nature and represent general issues and discrepancies in the data files provided.

SUMMARY OF DATA REVIEWED

The data were provided on CD with no associated key to the files or supporting information. The following narrative describes our presumption of the data and calculations based on the S.S. Papadopoulos and Associates Report and inferences made from the calculations provided in the files. As shown in the attached figure, the data consist of five folders labeled:

1. Data-Each Home Q1
2. Data-Each Home Q2
3. Data-Each Home Q3
4. VMP
5. Combined Data Sets

Folders 1 to 3 presumably contain analytical data for three quarters. Folder 4 contains raw data, calculated risks, and hazard indices for each sample. Folder 5 contains compiled raw data for each sampling location or home and comparison of calculated risks and hazard indices using U.S. Environmental Protection Agency (EPA) Region 3 toxicity values. The data and associated calculated risk values are not clear because most of the files are missing column headings and other necessary information (e.g., references). The contents of each folder are discussed in detail below.

Folder 1: Data-Each Home Q1

Folder 1 contains data from sampling conducted during quarter 1; 104 excel workbooks named "number".xls where the number varies from 8 to 426. All of the numbers in this range are not used and presumably represent different

measurement locations or homes. In addition, the folder contains 5 workbooks named 4-663 Oglethorpe.xls, 7-5902 8th.xls, 8-5908 8th.xls, 107-643 Kensington.xls, and 120-5618 Eastern.xls. Each workbook contains one excel sheet with the following column headings:

Sample Name, Week, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$

The sample names in each workbook start with "S" followed by sampling location number and presumably the type of sample (AOA, INA, VMP, GMPR, VMP&, GMPR&, and PVMP, where the symbol "&" is 1, 2 or 3). All excel workbooks do not contain all sample types mentioned above. For the sample types included, concentrations in parts per billion (ppb) and micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) are presented for over 60 chemicals.

Folder 2: Data-Each Home Q2

Folder 2 contains data from sampling conducted during quarter 2; 107 excel workbooks also named "number".xls where the number varies from 4 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. Each workbook has one excel sheet with the following column headings (although not indicated in each worksheet):

Sample Name, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$ although not labeled as such. The sample names in each workbook start with "S" followed by sampling location number and presumably type of sample (AOA, INA, and VMP). All excel workbooks do not contain all sample types mentioned above. For the sample types included concentrations in ppb and $\mu\text{g}/\text{m}^3$ are presented for over 60 chemicals.

Folder 3: Data-Each Home Q3

Folder 3 contains data from sampling conducted during quarter 3; 109 excel workbooks also named "number".xls where the number varies from 4 to 426. All of the numbers in this range are not used and presumably represent different measurement locations or homes. Each workbook has one excel sheet with the following column headings (although not indicated in each worksheet):

Sample Name, Analyte, ppb, Detect Flag, $\mu\text{g}/\text{m}^3$ although not labeled as such.

The sample names in each workbook start with "S" followed by sampling location number and presumably type of sample (AOA, INA, VMP, GMPR, VMP&, GMPR&, and PVMP, where the symbol "&" is 1, 2 or 3). All excel workbooks do not contain all sample types mentioned above. For the sample types included concentrations in ppb and $\mu\text{g}/\text{m}^3$ are presented for over 60 chemicals.

Folder 4: VMP

This folder contains 112 excel workbooks named *No. of Homes.xls* and *RiskSummary.xls* in addition to "S#".xls where the "#" varies from 4 to 426. All

of the numbers in this range are not used and presumably represent different measurement locations or homes. Each of these is described below.

No. of Homes.xls: This file includes presumably 103 homes and for each home the VMP (sub-slab soil vapor) samples are identified. For example home NO.5 is associated with Q3-S21-VMP2, Q3-S21-VMP1, Q2-S21-VMP2, Q2-S21-VMP1, Q1-S21-VMP2, and Q1-S21-VMP1; whereas home No. 37 is associated with only one sample number Q1-S144-VMP.

Risk Summary.xls: This file contains five sheets. First sheet named "Number Homes" contain the following column headings:

Sample No., Week, HI, "Unlabeled", Risk, Risk;

The first two columns have number of homes and sample number information in the same fashion as *No. of Homes.xls*. The Hazard Index (HI) is assumed to be a cumulative hazard coefficient (HQ) for non carcinogenic chemicals and risk is cumulative for carcinogenic chemicals. The HI and risk are calculated for each sample. An unlabeled column presents the ratio of carcinogenic risk to the 1×10^{-6} risk level (acceptable risk). A second sheet named "Original" presumably contains the same information as the first sheet. The rest of the three sheets Sheet 5, Sheet 4, and Risk > 1 E-5 do not have any column headings.

S#.xls: These excel workbooks contain three work sheets named VMP, INA, and Tox V.

No column headings are presented in these sheets.

Folder 5: Combined Data Sets

This folder contains 128 excel workbooks named "number".xls (except for nine files named Book2.xls, Combined Data.xls, Dosimetric Child PERC.xls, HI for Carcinogens.xls, List of COCs.xls, New Tox Values.xls, RISK SUMMARY.xls, VMP SUMMARY.xls, and VMP-New Region 3 Values.xls) where the number varies from 4 to 426. All the numbers in this range are not used and presumably represent different measurement locations or homes. Each of these is described below.

Book2.xls: This file contains HI and risk for different samples collected in the three quarters.

Combined Data.xls: This file presents the concentration data for chemicals analyzed for different samples. This file presumably contains all of the raw data except nondetects and non toxic chemicals, which are excluded.

Dosimetric Child PERC.xls: This file contains one sheet with average ventilation rate information.

HI for Carcinogens.xls: This file contains reference concentration (RFCi) values for carcinogenic chemicals. These sheets also contain other columns with sample numbers and analytes but the values provided here are not labeled.

List of COCs.xls: This file contains EPA Region 3 toxicity values.

New Tax Values.xls: This file does not have any column headings, but presumably contains toxicity values.

Risk Summary.xls: This file contains eight sheets presumably presenting calculated HI and risk values for each sample using EPA Region 3 and Integrated Risk Information System (IRIS) toxicity values.

VMP Summary.xls: This file contains one sheet, but there are no column headings.

VMP-New Region 3 Values.xls: This file contains three sheets presumably presenting EPA Region 3 toxicity values in the first sheet. There are no column headings in the second and third sheets.

Number.xls: These files have a variable number of sheets in each file, each containing raw data for different sampling types.

General Response:

The EXCEL Files referenced above were provided to Chevron in response to Chevron's request in a letter dated April 6, 2009, and no attempt was made to apply any quality control measures to ensure "consistency." Indeed, the spreadsheets were produced independently as interim internal and iterative calculations for different purposes and accordingly should not be interpreted as originating from a single dataset. Not all of the spreadsheets were used to quantify risks and many were interim spreadsheets intended to provide information unrelated to the HHRA. In other words, they are not final work products that can or should be carefully reviewed as they are irrelevant to the DDOE Decision document, which is the subject of the request for comments.

As a consequence, the specific comments below are irrelevant to the DDOE decision document and the discrepancies noted.

Specific Comments:

Specific Comment 1.

Files: *Combined Data Sets/8.xls/data, Data Each Home Q1/8.xls/sheet1, and Data Each Home Q2/8-2.xls/sheet1*

Comment: Data listed as Q1 for samples S8-AOA and S8-INA in Combined Data Sets/8.xls/data do not match with that for the same samples in Data Each Home Q1/8.xls/sheet1. Instead, they match with Data Each Home Q2/8-2.xls/sheet1. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 2.

Files: *Combined Data Sets/8.xls/data and Data Each Home Q1/8.xls/sheet1*

Data for the chemicals 1,3-dichlorobenzene, 2-butanone (MEK), 2-hexanone (MBK), benzene, and toluene in sample Q1 S8-VMP in Combined Data Sets/8.xls/data do not match with that for the same sample in Data Each Home Q1/8.xls/sheet1. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 3.

Files: *Combined Data Sets/8.xls/data and Data Each Home Q1/8.xls/sheet1*

Data for the chemicals 2-butanone (MEK), 2-hexanone (MBK), acetone, and benzene for sample 02 S8-VMP in Combined Data Sets/8.xls/data do not match with that in Data Each Home Q1/8.xls/sheet1. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 4.

Files: *Combined Data Sets/402.xls/Raw and Data-Each Home Q2/402.xls*

Q2 sample data from individual tables from Folder 1, Folder 2, and Folder 3 do not match with the data in Folder 5. Conversions from ppb to $\mu\text{g}/\text{m}^3$ are not verifiable with the following formula:

$$\mu\text{g}/\text{m}^3 = (\text{ppb} * \text{P} * \text{MW}) / (\text{R} * \text{T})$$

where: ppb: Value from raw data table in parts per billion
P: Atmospheric pressure; 760 mmHg
MW: Molecular weight of chemical obtained from EPA Regional Tables (12Sep2008) ;
R: Ideal gas constant; 62.4 L·mmHg / (mol·°K)
T: Temperature; 298 °K

The above formula can be used to match the conversion from ppb to $\mu\text{g}/\text{m}^3$ for data in the Q1 and Q3 folders. Therefore, it is evident that there is a discrepancy in conversions that should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to "match" as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 5.

Files: *Combined Data Sets/402.xls/VMP and /RAW*

As per the Riggs Park Comprehensive Human Health Risk Assessment document Exhibit 2, chronic daily dose (CDD) is calculated using the following equation:

$$\text{CDD} = (\text{C} \cdot \text{ET} \cdot \text{EF} \cdot \text{ED}) / (\text{AT} \cdot \text{CF})$$

This equation is not correct. Refer to specific comment 7 in the Riggs Park Comprehensive Human Health Risk Assessment Document review for the correct equation.

The hazard index calculations were made using the actual concentration with an attenuation factor of 10 instead of using the CDD. For example, in worksheet VMP cell "E2", which is the concentration used in HQ calculation (with an attenuation factor of 10) for acetone in Q3-s402-VMP matches with the corresponding value in worksheet RAW. The CDD should be used in this calculation.

Response:

As the above General Response indicates, the spreadsheets were not intended to "match" as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Please also see the response to Subset #3, comment #7, page (insert page # 89).

Specific Comment 6.

Files: *Combined Data Sets/107-643 Kensington.xls/Raw, Data-Each Home Q1/107-643 Kensington.xls/sheet1, and Data-Each Home Q2/107.xls/sheet1*

There is no data for sample Q2 S107-GMPR in Data-Each Home Q2/107.xls/sheet1, however, the data are presented in Combined Data Sets/107-643

Kensington.xls/Raw. In addition, conversion to $\mu\text{g}/\text{m}^3$ is not consistent. These discrepancies should be corrected.

In addition, sample Q2 S107-INA data presented in Data-Each Home Q2/107.xls/sheet1 is not included in Combined Data Sets/107-643 Kensington.xls/Raw. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 7.

Files: *Combined Data Sets/VMP-New Region3 Values.xls/Region3 Tox*

There are no column headings for this file and there are no units to identify the reference and check the toxicity values. This information should be provided.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 8.

Files: *Combined Data Sets/30.xls/Raw and Data-Each Home Q2/30.xls/sheet1*

Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample 02-S30-VMP do not match with the corresponding values in Data-Each Home Q2/30.xls/sheet1 and Combined Data Sets/30.xls/Raw. However, they match with the concentrations in Combined Data Sets/30.xls/Raw, if the conversions from ppb to $\mu\text{g}/\text{m}^3$ were made according to the formula in comment 4 above. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 9.

Files: *Combined Data Sets/13.xls/Raw and Data-Each Home Q1/13.xls/sheet1*

Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-S13-VMP do not match with the corresponding values in Data-Each Home Q1/13.xls/sheet1. However, they match with Combined Data Sets/13.xls/Raw. It is not clear if the correct concentrations were used in risk calculations.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 10.

Files: *Combined Data Sets/23.x/s/Raw and Data-Each Home Q2/23.xls/sheet1*

Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q2-823-VMP do not match with the corresponding values in Data-Each Home Q2/23.xls/sheet1 and Combined Data Sets/23.xls/Raw. This discrepancy should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 11.

Files: *Combined Data Sets/258.x/s/Raw and Data-Each Home Q1/258.xls/sheet1*

The tetrachloroethane concentration provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-S258-VMP does not match with the corresponding concentration in Data-Each Home Q1/258.xls/sheet1. There are two different values for tetrachloroethane concentration in Combined Data Sets/23.xls/Raw, and the value in Exhibit 7 matches with one of these. This should be corrected.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

Specific Comment 12.

Files: *Combined Data Sets/37.xls/Raw and Data-Each Home Q1/37.xls/sheet1*

Concentration values provided in Exhibit 7 of the Riggs Park Comprehensive Human Health Risk Assessment Document for sample Q1-837-VMP do not match with the corresponding values in Data-Each Home Q1/37.xls/sheet1. However, they match with Combined Data Sets/73.xls/Raw. It is not clear if correct concentrations were used in risk calculations.

The above evaluation leads us to believe that there are significant discrepancies and errors in the calculations and the risk assessment presented. Because no documentation is available for the spreadsheets, the only way to confirm the calculations and assumptions is to either (i) request detailed documentation of the data and calculations included in the spreadsheets, or (ii) have a face to face

meeting with the authors of these spreadsheets to discuss the methodology, assumptions, and calculations.

Response:

As the above General Response indicates, the spreadsheets were not intended to “match” as they are interim spreadsheets. Therefore, there it is not necessary to correct any discrepancy.

APPENDIX C

to DDOE Final Remedy Selection and Response to Comments

DEPARTMENT OF HEALTH HEALTH SURVEY SUMMARY OF RESULTS

**GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF HEALTH**



Office of the Director

April 12, 2010

In March 2009 DOH convened a team of DOH staff from the Office of the Director to respond to a request for a health survey by the residents of Riggs Park. The purpose of this survey was for DOH to determine a health profile of the Riggs Park community through the voice of its residents. The survey sought to gain knowledge of resident's perceptions of current health status, insurance status, access to healthcare and relevant demographic information. Summarily, the results of this survey could be utilized to address the subsequent unmet healthcare needs of the residents of Riggs Park.

Upon the commencement of an open Riggs Park community meeting (March 2009), the survey was vetted by the group and revised to reflect their concerns. The survey was loaded online and also mailed with an initial deadline of April 15th, 2009. Due to slow response, the survey deadline was extended to May 30, 2009. The majority of residents responded to the survey by mail and all data was manually entered into the database by June 2009.

The results were as follows:

Sixty four participants completed the Riggs Park health survey during the allotted timeframe. Participants' consisted of 45.3% male and 54.7% female responses. Over 90% of participants were African Americans, with a median age of 70.7, and living alone. Of the 64 respondents, 8.5% reported asthma compared to 11%, nationally, in a similar age related cohort. Other health related issues included high blood pressure of which 72.6% of respondents were clinically diagnosed compared to the national average of 57.9% for the respective age cohort. Further, 29.6% of African Americans over 60 years of age are likely to develop cancer in various sites which is slightly above the 22.2% of residents who had been diagnosed with some form of cancer. Prostate cancer was the cancer most reported in the survey at 7.2% and the national data suggests that it accounts for 34% of reported cancer in African American men over the age of 60.