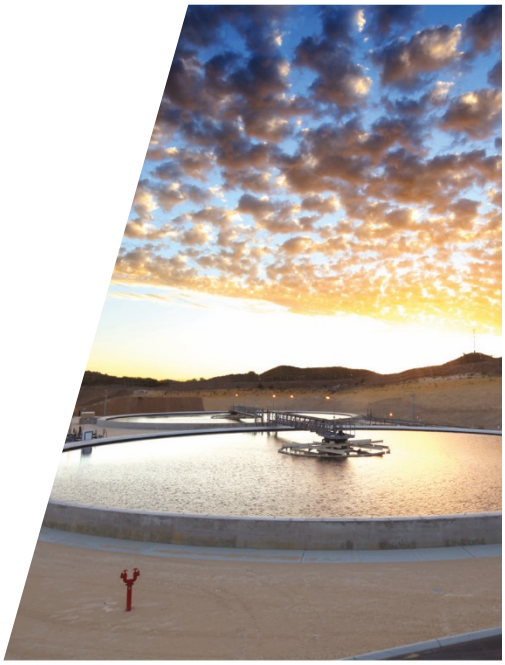
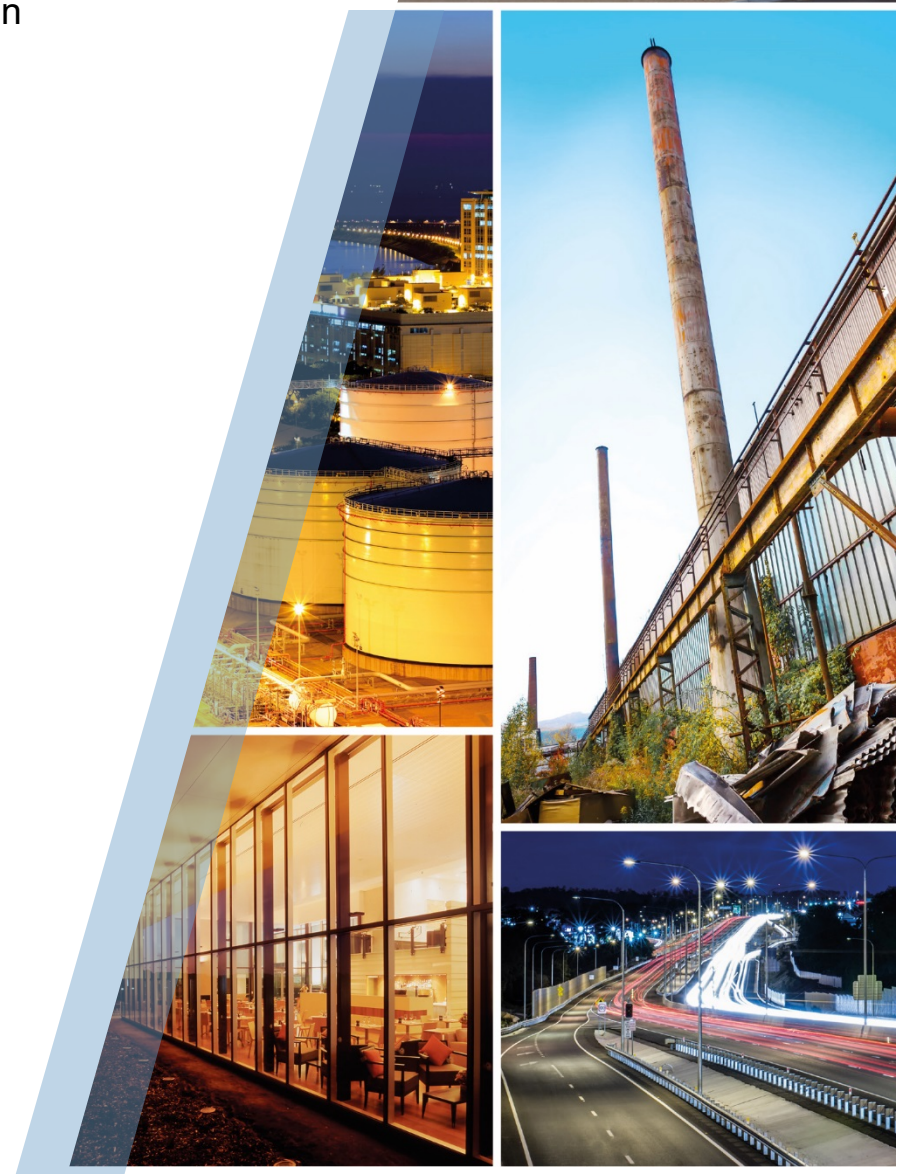
Exhibit 8
GM-OU-4 Public
Hearing April 9, 2020



OU-4 Supplemental VI Risk Evaluation

Former GM Wilmington
Assembly Plant
Wilmington, Delaware

RACER Trust



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List of Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below Ground Surface
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual Site Model
DNREC	Delaware Department of Natural Resources and Environmental Control
EPC	Exposure Point Concentration
ESA	Environmental Site Assessment
ft	Feet
GM	General Motors
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IRIS	Integrated Risk Information System
IRM	Interim Remedial Measure
ITRC	Interstate Technology Regulatory Counsel
kg	Kilogram
L	Liter
mg	Milligram
MLC	Motors Liquidation Company
Mod	Modular
NCEA	National Center for Environmental Assessment
OU-4	Operable Unit 4
PPRTV	Provisional Peer Reviewed Toxicity Values
PVI	Petroleum Vapor Intrusion
RACER	Revitalizing Auto Communities Environmental Response
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RI	Remedial Investigation

List of Acronyms

RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SIRS	Site Investigation and Restoration Section
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
µg/m^3	Microgram per Cubic Meter
URF	Unit Risk Factor
UST	Underground Storage Tank
USEPA	United States Environmental Protection Agency
VI	Vapor Intrusion
VOC	Volatile Organic Compound

1. Introduction

1.1 Purpose

GHD Services Inc. (GHD) on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER Trust), has prepared this Operable Unit 4 (OU-4) Supplemental Vapor Intrusion (VI) Risk Evaluation (Risk Evaluation) to support the ongoing evaluation activities for OU-4 of the former General Motors (GM) Corporation Wilmington Assembly Plant (Site or Facility) located in Wilmington, Delaware. The potential for significant VI exposures was previously evaluated during the Remedial Investigation (RI) and at the time it was concluded that there was a potential for significant VI if on-Site concentrations were to migrate off-Site. Therefore, RACER Trust implemented an interim remedial measure (IRM) in the form of a soil vapor extraction (SVE) system at the downgradient property boundary to eliminate the off-Site migration of on-Site concentrations of petroleum hydrocarbons in groundwater.

This Risk Evaluation assesses the potential for significant VI into on-Site and off-Site structures from the petroleum hydrocarbons from the former on-Site underground storage tanks (USTs) in OU-4 after the implementation of the IRM. This Risk Evaluation uses the on-Site and off-Site data from OU-4 that were presented in the 2015 RI Report (CRA, 2015) and additional data collected subsequent to the RI. This Risk Evaluation presents a multiple-lines of evidence evaluation relative to current VI guidance [i.e., Interstate Technology Regulatory Counsel (ITRC, 2014) and the United States Environmental Protection Agency (USEPA, 2015a)].

This Risk Evaluation summarizes relevant information from the RI Report dated July 2015, which presented the results of RI activities conducted at the Site between September 2011 and November 2014, BrightFields' Vapor Intrusion and Groundwater Delineation Investigation Report (BrightFields, 2014), BrightFields' Draft Supplemental Vapor Intrusion Off-Site Investigation (BrightFields, 2015), BrightFields' Draft OU-4 Feasibility Study Report (BrightFields, 2016), the groundwater sampling event conducted by GHD in October and November 2017, and the groundwater and soil gas sampling conducted by BrightFields in July, August, and December 2018, summarized in the Soil Vapor Extraction System Evaluation Report (BrightFields, 2019).

1.2 Approach

This Risk Evaluation assesses the significance of current and potential future VI exposures into on-Site and off-Site structures from the petroleum hydrocarbons from the former on-Site USTs in OU-4. The potential for significant VI from groundwater at and downgradient of OU-4 was evaluated in the 2015 RI Report. However, subsequent to initiating the evaluation of potentially significant VI exposures, ITRC and USEPA finalized guidance for evaluating the potential for significant VI from petroleum hydrocarbons. As recognized by ITRC and USEPA, petroleum hydrocarbons are unique from certain other volatile organic compounds (e.g., chlorinated hydrocarbons), because petroleum hydrocarbons biodegrade in the vadose zone as they migrate from a source to potential indoor receptors. Because of this natural ability to biodegrade, ITRC and USEPA both recommend approaches that account for this natural biodegradation. Specifically, lateral inclusion distances,

vertical separation distances, and attenuation factors that account for biodegradation are recommended.

This Risk Evaluation uses the current recommendations for the evaluation of potential petroleum VI, conservative estimates of exposure concentrations, and generic default exposure factors recommended by USEPA to evaluate the potential for significant VI exposure from OU-4. The results of this Risk Evaluation are intended to be used to evaluate corrective measures alternatives for OU-4.

1.3 Environmental Setting

1.3.1 Site Location and History

The Facility is located at 801 Boxwood Road, New Castle County, Wilmington, Delaware. The Facility currently consists of approximately 142 acres of land located on two tax parcels (07 042.10 055 and 07 042.20 010), including the approximately 3.2 million square foot Main Assembly Building, and several outlying buildings and structures (i.e., Waste Water Treatment Plant, Pump Houses, and Powerhouse). The Facility was developed in 1945 by GM Corporation for the purpose of automobile assembly. GM Corporation commenced operations at the Facility in 1946 and continued automobile assembly operations until July 2009 when the plant was idled. The Facility location is presented on Figure 1. The Facility layout is presented on Figure 2.

As a result of GM Corporation's 2009 bankruptcy, certain operating assets of GM Corporation were sold on July 10, 2009, to a newly formed company now known as GM LLC. Existing non-continuing assets, including the Site, remained the property of GM Corporation which was known as Motors Liquidation Company (MLC), in its capacity as debtor in possession in the bankruptcy case. The Site was sold by MLC to Fisker Automotive, Inc. (Fisker) in July 2010. However, MLC retained liability for the remediation of the Site. In October of 2010, the United States Government announced that MLC had agreed to resolve its liabilities at 89 sites relating to liabilities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Clean Air Act through an environmental response trust fund. On March 31, 2011, RACER Trust became effective and is conducting, managing, and funding cleanup at the 89 sites formerly owned by MLC, including the former Wilmington Assembly Plant.

Between July 2009 and April 2014, the plant remained idle with limited activities at the Site while Fisker evaluated opportunities to revive the assembly plant. Fisker filed for bankruptcy in November 2013 and the Site was purchased by Wanxiang Delaware Real Estate Holdings (Wanxiang) in April 2014 as part of a purchase by Wanxiang of Fisker's assets out of the bankruptcy. In October 2017 Boxwood Industrial Park, LLC purchased the Site from Wanxiang.

1.3.2 OU-4 Impacted Area

OU-4 is identified as the area at and around a former petroleum dispensing station and UST adjacent to the Anchor Motor Freight Building in the southeast corner of the Site where a release was identified in 1990. As discussed in the RI Report, the resulting dissolved volatile organic

compound (VOC) impacted groundwater plume migrated from the source area near the eastern property boundary downgradient and off-Site to the northeast.

1.3.2.1 On-Site and Off-Site Land Use

The land use on-Site is currently commercial/industrial and there are no currently occupied buildings in the on Site portion of OU 4. In addition, any other future use of the Site will be limited to commercial/industrial uses by deed restrictions that will prohibit residential development at the Site.

The off-Site land use directly east, downgradient, of OU-4 is a public road, Dodson Avenue, and a residential area. The residential neighborhood includes a combination of multi-family (i.e., duplexes) and single-family homes, some of which have basements. Future off-Site uses are expected to remain similar to the current uses.

1.3.2.2 Summary of Impacted Media

As discussed in the RI Report, the concentrations of VOCs in groundwater decline as the plume moves away from the source area and to the east. The RI Report identified concentrations of certain VOCs and semi-volatile organic compounds (SVOCs) in groundwater in OU-4 that exceeded the Delaware Department of Natural Resources and Environmental Control's (DNREC's) Site Investigation and Restoration Section (SIRS) Screening Levels. The RI Report evaluated the potential significance of VI to potential on-Site and off-Site receptors from OU-4 and concluded that there was a potential for significant VI if the on-Site concentrations were to migrate off-Site. Therefore, RACER Trust implemented an IRM in the form of an SVE system at the downgradient property boundary to eliminate the off-Site migration of on-Site concentrations of petroleum hydrocarbons in groundwater. As discussed in the First Quarter 2017 Quarterly Monitoring Report Prepared by BrightFields, Inc. (BrightFields, 2017), this IRM has been effective at reducing the off-Site migration of petroleum hydrocarbons in groundwater.

1.3.2.3 Lateral Inclusion Distance

Both ITRC and USEPA guidance on petroleum vapor intrusion (PVI) include evaluating the lateral distance from the perimeter of a PVI source in groundwater to potential receptors. ITRC recommends a conservative generic distance of 30 feet (ft) from a PVI source to potential receptors and USEPA recommends a dynamic distance that varies based on the spacing of existing groundwater monitoring wells. If the distance from the PVI source in groundwater to potential receptors is greater than these distances, ITRC and USEPA recommend no further evaluation of the potential PVI route of exposure, (i.e., the Site screens out).

In the RI Report the off-Site groundwater plume was defined to extend beneath the residential neighborhood. The current definition of the off-Site petroleum groundwater plume has a minimum lateral distance from the source to off-Site residences of no more than 10 ft, as shown on Figure 3. On-Site, the plume extends under the Anchor Building to within 50 ft of the Main Assembly Building, as shown on Figure 3. Therefore, using current PVI guidance there is a potential for significant PVI and additional evaluation would be performed.

1.3.2.4 Vertical Screening Distance

Both ITRC and USEPA guidance on PVI include evaluating the vertical distance between the PVI source in groundwater and the potential receptors (i.e., the bottom of the building). ITRC recommends a conservative generic distance of 5 ft from a dissolved phase PVI source to potential receptors and USEPA recommends a distance of 6 ft. If the vertical distance from the dissolved phase PVI source to potential receptors is greater than these distances, ITRC and USEPA recommend no further evaluation of the potential PVI route of exposure (i.e., the Site screens out).

The minimum vertical distance from the Site-related dissolved phase PVI source in groundwater to off-Site residential buildings is calculated as the difference between the typical high water elevation of 12-16 ft below ground surface (bgs) and the typical depth of a residential basement (i.e., 6 ft bgs). On-site the typical depth to water is 7-17 ft bgs. Therefore, the vertical screening distance recommended by both ITRC and USEPA is met in the off-Site portions of OU-4 for residential buildings with basements and on-Site for nonresidential slab-on-grade buildings. Both on- and off-Site buildings would screen out and no additional evaluation is necessary. However, because soil gas, sub-slab soil gas, and indoor and outdoor (background) air data have been collected and were previously evaluated, these data are further evaluated in this Risk Evaluation.

1.3.3 Site Physical Characteristics

1.3.3.1 Geology

A review of soil borings in the RI Report shows the soils at the Site to be fill-underlain by unconsolidated sediments consisting primarily of silty sands and clays, from below paved surface to a depth of approximately 8 to 10 ft bgs. Gravel lenses are seen ranging in thickness from 1 to 10 ft at varying depth across the Site. There appears to be a continuous sand layer ranging from 16 to 30 ft in thickness with starting depths ranging from approximately 7.8 ft bgs to 11.5 ft bgs and extending to depths ranging from approximately 23.8 ft bgs to 40 ft bgs. The historical boring logs also indicate the sand layer is underlain by reddish-brown clay of an undetermined thickness.

1.3.3.2 Hydrogeology

On-Site, groundwater was observed at an average depth of approximately 12 ft bgs during the RI Report. The assembly plant appears to create a groundwater divide at the Site with groundwater on the east side flowing to the east toward Little Mill Creek and groundwater on the west side flowing to the west towards Red Clay Creek.

Surface water flow across the Facility is directed to the Facility storm sewer system, which discharges to Little Mill Creek at Outfall 001. With the exception of Little Mill Creek, there are no surface water bodies or waterways (streams, rivers, lakes, etc.), including associated wetlands, floodplains, and riparian zones present on-Site or immediately adjacent to the Site.

According to Facility personnel interviewed during the 2009 Phase I Environmental Site Assessment (ESA), there was no historical use of Facility groundwater for potable or non-potable purposes. At the time of Facility inspections conducted in 2009, there was no visual evidence suggesting that potable water, production, or irrigation wells were located at the Facility. There are two groundwater sumps, one on the east side and one on the north side of the modular (Mod) Paint

Building that dewater the area in the vicinity of the Mod Paint Building. According to Facility personnel, the sumps are approximately 30 to 40 ft deep. Groundwater in the sumps is pumped and discharged to the storm sewer discharge system located on northeastern side of the Facility. The sumps are operated manually as needed.

As part of the VI and groundwater delineation investigation at AOI-16, BrightFields conducted an assessment to identify the residential and commercial addresses within proximity of the former UST area and to determine whether public water service or private wells were used. The evaluation focused on the properties located within a two-block area east of the Site (AOI-16). BrightFields contacted Artesian Resources Corporation (Artesian), the local water supplier, and based on the information provided to BrightFields, there were no private wells reported to currently be in use in the assessment area. There was a rumored historical well at 19 Read Ave. that was reportedly taken out of service approximately 30 years ago; however, municipal water is supplied to this location address.

2. Data Collection and Preparation

This Risk Evaluation incorporates data evaluated in the 2015 RI Report and data collected subsequent to the 2015 RI Report. These data that were subsequently collected by RACER Trust to assist in the evaluation of the IRM/SVE system performance at the downgradient property boundary and confirm that off-Site concentrations were not increasing. Sample locations are shown on Figure 3.

3. Exposure Assessment

This section discusses the potential exposures that are relevant under current and reasonably expected future land use at and around the Site. The exposure setting, potentially exposed populations, and exposure pathways are discussed below.

Exposure via inhalation is quantified as a time-weighted average concentration in air. The exposure concentration for evaluating cancer risk is averaged over a lifetime. For evaluating non-cancer effects, the exposure concentration is averaged over the period of exposure. The methods for estimating the concentration term are discussed below. The fate and transport models that are used to calculate the concentration of chemicals in the exposure medium (e.g., indoor air), are discussed below. The exposure factors that are used to quantify the magnitude, frequency, and duration of potential exposures are discussed below.

3.1 Potential Human Exposure

As discussed above, the Site is an industrial property located in an industrial and residential area where future land and groundwater use on-Site and off-Site are expected to remain unchanged. The potentially exposed populations at and around the Site based on current and expected future land and groundwater uses are summarized in the conceptual site model (CSM) in Table 3.1.

Table 3.1 Scenarios for Potential VI Exposure at OU-4

Source Media	Potential Route of Exposure	Routine Workers	Off-Site Residents
Groundwater	Vapor Intrusion	●	●

● = Potentially complete pathway

Notes:
· Secondary media, i.e., soil gas and sub-slab soil gas, were also measured to evaluate the potential for significant vapor intrusion. The Facility's current health & safety procedures ensure that maintenance worker and construction worker exposures are not significant.
· Outdoor and indoor air were also measured and evaluated.

As part of the corrective measures at the Site, a deed restriction for the Site will be put in place to maintain commercial/industrial land use. As such, workers comprise the main receptor population on-Site under both current and reasonably expected future land use.

The following summarizes the receptors and exposure pathways evaluation in this Risk Evaluation.

3.1.1 On-Site

Manufacturing operations on-Site ceased in 2009. Thus, under current conditions, there are no populations that would be expected to have significant exposure via assumed VI into the existing or future on-Site buildings in OU-4. Under reasonably expected future conditions, the only population with potentially significant on-Site exposure via VI are routine workers.

These workers could be exposed via inhalation of constituents from the groundwater if constituents were to volatilize and migrate through cracks in building foundations into indoor air.

3.1.2 Off-Site

The areas around the Site consist of a mixture of residential and industrial. As such, the largest potentially exposed populations via assumed VI from VOCs from the OU-4 groundwater plume are residents and workers.

Residents could be exposed via indoor inhalation of constituents from the off-Site groundwater if constituents were to volatilize and migrate through cracks in the building foundations into indoor air.

3.2 Exposure Concentrations

Appendix A presents the Exposure Point Concentrations (EPCs) used in this Risk Evaluation and their sample location IDs. This risk evaluation conservatively used maximum detected concentrations from the most recent sampling event(s) at each location in all media to evaluate the potential for significant VI both on-Site and off-Site. This approach of using maximum detected

concentrations as the EPCs is conservative because it overestimates the reasonable maximum exposures (RME) concentration, but is efficient for identifying potentially significant exposures.

3.2.1 Groundwater

To assess potential exposures to groundwater under current and potential future conditions on- and off-Site, the highest detected concentrations collected since 2012 for each constituent from all monitoring wells associated with OU-4 that are screened to monitor shallow groundwater were used to calculate upper-bound estimates of cumulative cancer and non-cancer risks representative of current conditions. As discussed above, the use of the most recent maximum detected concentrations introduces more conservatism than necessary for RME estimates.

3.2.2 Soil Gas

Deep and shallow soil gas samples were collected at on- and off-Site locations to provide an additional line of evidence in the evaluation of the potential for VI from groundwater into indoor air. To assess potential VI exposures to constituents in soil gas under current and potential future conditions, the highest detected concentration for each constituent from the most recent sampling of all soil gas monitoring points sampled since 2012 were used. During the December 2018 sampling event, one location (DA-SG-31) served as a surrogate for a previous temporary sample location (DA-SG-2) that was no longer able to be sampled yet previously had the highest detected concentration of benzene (BrightFields, 2019). As discussed above, the use of maximum detected concentrations introduces more conservatism than necessary for RME estimates.

3.2.3 Sub-slab Soil Gas

Sub-slab soil gas samples were collected at off-Site locations to provide an additional line of evidence in the evaluation of the potential for VI from groundwater into indoor air. To assess potential VI exposures to constituents in sub-slab soil gas under current and potential future conditions, the highest detected concentration for each constituent from all sub-slab soil gas monitoring points sampled since 2012 were used. As discussed above, the use of maximum detected concentrations introduces more conservatism than necessary for RME estimates.

3.2.4 Indoor and Background Outdoor Air

Indoor and background outdoor air samples were collected at off-Site locations to provide additional lines of evidence in the evaluation of the potential for VI from groundwater into indoor air. These data were evaluated to determine whether the concentrations detected in these media are associated with the groundwater conditions related to the Site.

3.3 Fate & Transport – Vapor Intrusion into Buildings

The following approach was used in this Risk Evaluation to estimate exposure concentrations in indoor air from assumed vapor intrusion from the subsurface for the exposure scenarios previously discussed. The use of an empirical attenuation factor model is used by USEPA and state regulatory agencies for screening level analysis; i.e., they tend to overestimate concentrations, and are consistent with the models used in the 2015 RI Human Health Risk Assessment (HHRA).

Indoor air concentrations resulting from migration of vapors from groundwater into a building are estimated using the empirical model described by ITRC and USEPA for evaluating potential VI from petroleum hydrocarbons. ITRC and USEPA evaluated data from numerous PVI sites to derive attenuation factors that account for the distance between the source and the potential receptor and the concentration (strength) of petroleum products, i.e., benzene, at the source. These calculations are summarized in graphical form in Figures 3-5 and 3-6, and Figure 9 from ITRC and USEPA, respectively. For the purpose of this Risk Evaluation the attenuation factors were selected from Figures 3-5 and 3-6, and Figure 9 from ITRC and USEPA, ignoring biodegradation and using a conservatively assumed benzene source concentration of 1 milligram per liter (mg/L). This assumed concentration of benzene is conservative when using these figures because actual concentrations of benzene in groundwater at OU-4 are lower and could have even lower attenuation factors. A distance from the groundwater source to potential off-Site residential receptors of 6-9 ft bgs, based on the difference between the typical high water table of 12-15 ft bgs and the depth of typical residential basements, i.e., approximately 6 ft bgs was also used when reading from these figures.

Using Figures 3-5 and 3-6, and Figure 9 from ITRC and USEPA, for groundwater and deep soil gas an attenuation factor of 0.0000001 (1E-7) was used following this approach. Similarly, an attenuation factor of 0.001 (1E-3), i.e., that did not account for biodegradation, was selected from Figures 3-5 and 3-6, and Figure 9 from ITRC and USEPA and used for shallow soil gas and sub-slab soil gas.

These attenuation factors are designed for screening data to determine whether there is a potential for significant VI exposure into residential buildings. These attenuation factors are conservative for sites with coarse-grained soil, but are conservatively used here even though the vadose zone consists primarily of silty sands and clays, as discussed in Section 1.3.3.1. These attenuation factors are also conservatively used in the evaluation of potential VI into non-residential buildings at the Site. The previously discussed attenuation factors are used in the risk calculations in Appendix B and also summarized in Table B.2 in Appendix B.

As a sensitivity analysis, the applicability of the attenuation factors from ITRC and USEPA were evaluated relative to empirical attenuation factors calculated using the data collected in the off-Site portion of OU-4. Specifically, these empirical attenuation factors were calculated using concentrations of constituents detected in indoor air, but not in outdoor air, and the detected concentrations in the subsurface from the same sampling event, except as follows. There were no constituents that were detected in both the indoor air and in deep soil gas; therefore, 2,2,4-trimethylpentane was used because it was not detected in outdoor air. Similarly, there were no constituents that were detected in the sub-slab and indoor air that were also not detected in the outdoor air; therefore, benzene and hexane were used. 1,2,4-Trimethylbenzene was used for the groundwater attenuation factor while 2,2,4-trimethylpentane and 1,2,4-trimethylbenzene were utilized for soil gas attenuation factor, assuming that all detected concentrations in the indoor air were from the subsurface.

The empirical attenuation factors are summarized in Table 3.2. As shown in Table 3.2, the empirical attenuation factors from groundwater and deep soil gas are somewhat higher, less conservative, than the generic values from ITRC and USEPA. However, the soil gas empirical attenuation factors are similar to two orders of magnitude lower, more conservative, than the generic values from ITRC and USEPA. The sub-slab empirical attenuation factors are within a factor of three (3) of the generic

values from ITRC and USEPA, which makes them effectively the same. Therefore, while there are some differences between the generic attenuation factors and empirical factors, the generic factors are similar to or more conservative than empirical values in the soil gas and sub-slab and slightly less conservative in groundwater. Therefore, use of generic attenuation factors that are based on data from numerous UST releases are appropriate.

Table 3.2 Calculated Site-Specific Attenuation Factors

Media	Calculated Alpha	Indoor Air Concentration ($\mu g/m^3$)	Subsurface Concentration ($\mu g/m^3$)	Chemical	Sample Date(s)
Sub-Slab	$3.2x10^{-3}$	8.3	2,600	Hexane	9/10/2013; 9/10/2013
	$1.1x10^{-3}$	4.2	3,700	Benzene	9/10/2013; 9/10/2013
Soil Gas	$1.0x10^{-5}$	0.67	67,000	2,2,4-Trimethylpentane	12/21/2012; 8/17/2012
	$7.0x10^{-4}$	5.0	7,100	1,2,4 Trimethylbenzene	9/10/2013; 9/12/2013
Deep Soil Gas	$1.5x10^{-6}$	0.67	450,000	2,2,4-Trimethylpentane	12/21/2012; 10/24/2012
Groundwater	$5.3x10^{-5}$	5.0	94,000	1,2,4 Trimethylbenzene	9/10/2013; 9/18/2013

3.4 Exposure Factors

The exposure factors for evaluating the exposure scenarios summarized in the CSM are discussed in this section. In this Risk Evaluation, standard default exposure factors recommended by USEPA for estimating RME are used where available and appropriate. According to USEPA, the standard default exposure factors are conservative assumptions about the magnitude, frequency, and duration of exposures, which in combination, are intended to provide estimates of exposures that are higher than actual exposures to a large portion (90 percent to 99 percent) of a potentially exposed population.

The exposure factors are the same as those used in the 2015 HHRA, except certain exposure factors such as adult body weight and skin surface area were updated to be consistent with USEPA's current recommendations (USEPA 2014).

3.4.1 Routine Workers

In the 2015 HHRA and this Risk Evaluation, potential exposure of on-Site routine workers is conservatively evaluated using the standard default exposure factors that USEPA (1991, 2014) recommends for estimating RME. Quantitative evaluation of off-Site routine workers is unnecessary because the exposure factors for the off-Site routine workers are lower than the off-Site residents.

3.4.1.1 Exposure Time

Routine workers are assumed to be at the Site and inhale vapors and particulates from Site-related sources for 8 hours per day, which is the USEPA recommended value for full time workers (USEPA 2009, 2014).

3.4.1.2 Exposure Frequency and Duration

Routine workers are assumed to be at the Site for 250 days per year for 25 years. This combination of exposure frequency and exposure duration is conservative for the time workers could be exposed indoors while at work. USEPA has recommended the use of these values for evaluating high end routine worker exposures (USEPA 1991, 2014).

3.4.1.3 Averaging Time

The averaging time for evaluating cancer risk is equal to a lifetime of 70 years, and the averaging time for evaluating non-cancer risk is equal to the exposure duration (USEPA 1989, 2014).

Although it is recognized that the use of the default exposure factors, rather than Site-specific factors (e.g., a Site-specific exposure frequency or a fraction contacted term <1), results in overestimation of RME risks at the Site, this approach streamlines this update of the HHRA.

3.4.2 Residents

The exposure factors used for evaluating potential exposure of off-site residents, which are consistent with those in the 2015 HHRA, except where USEPA has revised its recommendations, are as follows.

3.4.2.1 Exposure Time

Residents are assumed to be at home and inhale vapors and particulates from Site-related sources for 24 hours per day, the USEPA recommended value for residents (USEPA 2009, 2014).

3.4.2.2 Exposure Frequency and Duration

Residents are assumed to be at home for 350 days per year for 26 years (6 years as children and 20 years as adults). This combination of exposure frequency and exposure duration is expected to be conservative for the amount of time that residents could actually be exposed while at home. USEPA has recommended the use of these values for evaluating high end residential exposures (USEPA 2014).

3.4.2.3 Averaging Time

The averaging time for evaluating cancer risk is equal to a lifetime of 70 years, and the averaging time for evaluating non-cancer risk is equal to the exposure duration (USEPA 1989, 2014).

4. Toxicity Values

A toxicity assessment identifies potential adverse health effects that are associated with exposure to chemicals, and determines the dose response relationship between exposure and the occurrence of adverse effects. The toxicity values used in this Risk Evaluation were compiled from USEPA's hierarchy of sources are as follows:

1. Integrated Risk Information System (IRIS)
2. Provisional Peer Reviewed Toxicity Values (PPRTV)
3. Other Toxicity Values (e.g., historical HEAST [Health Effects Assessment Summary Tables], NCEA [EPA National Center for Environmental Assessment] provisional values and ATSDR [Agency for Toxic Substances and Disease Registry])

When a toxicity value was not available from the first two tiers of the hierarchy, other USEPA and non-USEPA sources (e.g., ATSDR) of toxicity values were consulted. The toxicity values used in this Risk Evaluation were taken directly from USEPA's Regional Screening Levels (RSL) Calculator, which preferentially selects the most conservative toxicity values when multiple Tier 3 sources are available, regardless of the strength of the assessment. Similarly, the RSLs select cancer toxicity values independent of the carcinogenic weight of evidence determination, e.g., for ethylbenzene. Therefore, the toxicity values from the RSL are conservative for risk evaluation. The toxicity values are current as of May 2017.

Estimation of the human intake received through the various exposure pathways is based upon Chronic Daily Intakes (CDIs) expressed in terms of the mass of the substance taken into the body per unit body weight per unit time [mg/kilogram (kg) - day]. For each constituent, two different estimates of the CDI, one for non-carcinogenic (systemic) effects and a second for carcinogens are calculated. The CDIs used in the assessment of non-carcinogenic effects is the average daily dose or exposure concentration an individual is likely to receive during the period of exposure. For carcinogens, the CDIs are estimated by averaging the total cumulative intake over a lifetime.

4.1 Cancer Toxicity Values

The potential carcinogenic health effect from exposure to a constituents was evaluated by multiplying the CDI by the inhalation unit risk factors (URFs). This product is termed the cancer risk, and is defined as the estimated upper bound on additional risk of cancer over a lifetime in an individual exposed to the carcinogen for a specified exposure period (unitless). The sum of the cancer risks from multiple carcinogens and multiple exposure routes is termed the cumulative cancer risk. The potential cumulative risks resulting from exposure to the constituents are compared to the DNREC's target cancer risk level of $1x10^{-5}$, which falls within the cumulative target risk range provided by USEPA of $1x10^{-6}$ or 1 in 1,000,000 to $1x10^{-4}$ or 1 in 10,000.

4.2 Non-Cancer Toxicity Values

The potential for non-cancer health effect from exposure to a constituent was evaluated by comparing the CDI to a reference concentration (RfC). This ratio is termed the hazard quotient (HQ). The Hazard Index (HI) for an exposure situation is the sum of the HQs estimated for the individual constituents. An HI less than 1 is considered health protective for a lifetime exposure and is therefore not an exposure of concern. If the HI is greater than 1, it may be appropriate to re-evaluate the toxicity of the individual constituents to determine if individual chemicals have the same or differing toxicological endpoints that would support conclusions that the HQs should or should not be added.

5. Risk Characterization

As discussed above, there are no currently occupied buildings in the on-Site portion of OU-4. The evaluation of potential off-Site would screen out based on the vertical distance from the off-Site dissolved PVI source in groundwater to potential off-Site receptors using current ITRC and USEPA guidance. However, as discussed with DNREC, because data have been collected from additional media, those data are also evaluated in this assessment.

The cumulative cancer risk and HI estimates for each receptor population were calculated and compared with DNREC's cancer risk limit of $1x10^{-5}$ and HI limit of 1, respectively, for determining whether corrective measures are warranted for a particular area of the Site (DNREC, 2007). The risk estimates and the evaluation of these results for multiple media (i.e., multiple lines of evidence), were evaluated for determining whether remedial activities are warranted and for determining what remedial alternatives should be considered.

For the evaluation of potential VI, the calculated risk estimates from groundwater, soil gas, sub-slab soil gas, indoor air, and background outdoor air were evaluated simultaneously to determine whether a potential for significant VI exposure from on-Site sources, which necessitates remedial activities exists.

5.1 Estimating Risks to Off-Site Residents

As discussed above, quantification of potential VI risks is not necessary per ITRC and USEPA guidance documents, i.e., because there are no currently occupied on-Site buildings and off-Site buildings screen out using vertical distances. However, in this evaluation off-Site residents are conservatively assumed to be exposed to constituents in off-Site groundwater that volatilize and are assumed to migrate into indoor air.

Soil gas and sub-slab soil gas samples were also collected to provide additional lines of evidence regarding the potential for significant VI from groundwater into off-Site residential buildings.

Background outdoor air samples and indoor air samples were collected at certain residential properties and were evaluated to determine whether the detected concentrations in these media are associated with the groundwater conditions related to the Site.

These risk estimates are summarized below in Table 5.1 and shown by chemical in Appendix B.

Table 5.1 OU-4 Off-Site Cumulative Cancer Risk and Non-Cancer HI Estimates

Media	Cancer Risk	Hazard Index	Appendix B Table
Shallow Groundwater	$1x10^{-8}$	0.0005	Appendix B.2
Deep Soil Gas	$6x10^{-8}$	0.003	Appendix B.3
Shallow Soil Gas	$7x10^{-7}$	0.1	Appendix B.4
Sub-slab	$1x10^{-5}$	0.1	Appendix B.5
Background Outdoor Air	$2x10^{-5}$	0.3	Appendix B.7
Indoor Air	$4x10^{-5}$	0.9	Appendix B.6

Table 5.1 shows that the upper-bound risks for off-Site residential exposures to off-Site groundwater via assumed VI meet DNREC's and USEPA's cancer risk and HI limits for RME risks.

Soil gas and sub-slab soil gas were evaluated to provide additional lines of evidence to confirm the conclusions regarding the potential significant VI from groundwater. As discussed above, the deep soil gas risk estimates were calculated using the groundwater attenuation factor. The shallow soil gas risk estimates were calculated using the sub-slab soil gas attenuation factor, which does not account for the 1-2 ft of silty sand and clay soil in the vadose zone between these samples and the bottom of the residential buildings. As shown in Table 5.1, the upper-bound risks for off-Site residential exposures to deep soil gas, shallow soil gas, and sub-slab soil gas via potential VI also meet DNREC's and USEPA's cancer risk and HI limits for RME risks and confirm the conclusions from groundwater. The risk estimates for potential VI from groundwater, deep soil gas, shallow soil gas, and sub-slab soil gas consistently show risks that follow the ITRC and USEPA petroleum vapor intrusion model.

Background outdoor air and indoor air data were also collected from certain residential buildings in the adjacent neighborhood downgradient of OU-4. As shown in Table 5.1, the background outdoor air and indoor air cancer risk estimates are slightly higher than DNREC's cancer risk limit of 1×10^{-5}, which are inconsistent with the risks calculated from the groundwater source and other subsurface media. As shown in Appendix B, the cancer risk estimates for both background outdoor air and indoor air are due to the detected concentrations of benzene and ethylbenzene.

The cancer risk estimate for both background outdoor air and indoor air exceed DNREC's risk limit, and both are the result of detected concentrations of the same two constituents. Therefore, it is likely that at least a significant portion of the indoor concentrations are from other sources, which could include background outdoor air. The detected concentrations in indoor air were also compared to the estimated indoor air concentrations from groundwater and other subsurface media collected during the same sampling events in 2012 and 2013 to determine whether the indoor air concentrations better correlate with background outdoor air or vapors from the subsurface.

Table 5.2 OU-4 Off-Site Indoor Air Concentrations

Chemical	Indoor Air	Bkg Outdoor Air	Indoor Air from Shallow Groundwater	Indoor Air from Deep Soil Gas	Indoor Air from Shallow Soil Gas	Indoor Air from Sub-Slab
	Measured		Calculated			
Benzene	10	2.5	0.000086	0.081	0.47	3.7
Ethylbenzene	19	13	0.025	0.063	3	0.0014

All concentrations in Table 5.2 are in $\mu g/m^3$ (microgram per cubic meter)

As shown in Table 5.2, the detected concentrations of benzene and ethylbenzene in indoor air do not correlate with the source concentrations in groundwater or the soil gas results. Similarly, the detected concentrations of benzene and ethylbenzene in background outdoor air do not correlate with the source concentrations in groundwater or the soil gas results, except for the calculated

concentration of benzene in the sub-slab soil gas, which does not agree with any of the other data points/lines of evidence, including results for ethylbenzene.

Additionally, the indoor air concentrations of benzene and ethylbenzene are in the range of typical residential indoor air (USEPA 2011) in the United States and they are also within the range of background outdoor air data measured in Wilmington, DE (USEPA 2015b). Background residential indoor air concentrations of benzene and ethylbenzene range from 4.7 – 29 µg/m^3 (mean to upper percentile) and 3.7-17 µg/m^3, respectively (USEPA 2011). Background outdoor air concentrations of benzene and ethyl benzene range from 4.8 – 11 µg/m^3 (mean to upper percentile) and 2.2-21 µg/m^3, respectively (USEPA 2015b). In addition, the locations with the highest indoor air concentrations do not correlate with the locations where the highest sub-slab concentrations were measured, which further supports that measured concentrations indoors are from background sources.

Using multiple lines of evidence, these results confirm that VI from groundwater does not pose an unacceptable risk via VI to off-Site residences.

5.2 Estimating Risks to On-Site Workers

As discussed above, there are currently no occupied buildings in OU-4. However, in this evaluation on-Site workers are conservatively assumed to be exposed to constituents in on-Site groundwater that volatilize and are assumed to migrate into indoor air.

Soil gas samples were also collected to provide an additional line of evidence regarding the potential for significant VI from groundwater into on-Site nonresidential buildings.

These risk estimates are summarized below in Table 5.3 and shown by chemical in Appendix B.

Table 5.3 OU-4 On-Site Cumulative Cancer Risk and Non-Cancer HI Estimates

Media	Cancer Risk	Hazard Index	Appendix B Table
Shallow Groundwater	$2x10^{-8}$	0.0008	Appendix B.8
Shallow Soil Gas	$8x10^{-6}$	0.2	Appendix B.9

Table 5.3 shows that the upper-bound risks for on-Site worker exposures to on-Site groundwater and soil gas via assumed VI meet DNREC's and USEPA's cancer risk and HI limits for RME risks.

As discussed above, the shallow soil gas risk estimates were calculated using the sub-slab soil gas attenuation factor, which does not account for the 1-2 ft of silty sand and clay soil in the vadose zone between these samples and the bottom of buildings. As shown in Table 5.3, the upper-bound risks for on-Site nonresidential exposures to shallow soil gas via assumed VI did not exceed DNREC's and USEPA's cancer risk and HI limits for RME risks. These risk estimates are conservatively calculated using a sub-slab attenuation factor for residential buildings and likely overestimate the risks.

Groundwater and soil gas results, along with the silty sand and clay soil, form the multiple lines of evidence that confirm that VI from groundwater does not pose an unacceptable risk via VI to potential on-site workers on OU-4.

6. Conclusions

GHD, on behalf of RACER Trust, has prepared this OU-4 Supplemental VI Risk Evaluation to support the ongoing evaluations for OU-4 of the former GM Corporation Wilmington Assembly Plant located in Wilmington, Delaware. This Risk Evaluation evaluates the potential for significant VI into on-Site and off-Site structures from the petroleum hydrocarbons from the former on-Site USTs in OU-4. This Risk Evaluation presents a multiple-lines of evidence evaluation relative to current VI guidance [i.e., Interstate Technology Regulatory Counsel (ITRC 2014) and the United States Environmental Protection Agency (USEPA 2015a)].

Off-Site residential buildings along Dodson Avenue are within the Lateral Inclusion Zone/Distance that ITRC and USEPA use to screen out the potential for significant VI. The off-Site residential buildings do however, screen out for further evaluation based on the Vertical Separation Distance between the dissolved-phase source (groundwater) and the depth of off-Site residential structures. Nevertheless, because soil gas, sub-slab soil gas, and indoor and background outdoor air data have been collected and were previously evaluated in a HHRA, these data are further evaluated in this Risk Evaluation.

The upper-bound risks for off-Site residential exposures to off-Site groundwater via assumed VI meet DNREC's and USEPA's cancer risk and HI limits for RME risks, as shown in Table 5.1. Soil gas and sub-slab soil gas were evaluated to provide additional lines of evidence to confirm the conclusions regarding the potential significant VI from groundwater. The upper-bound risks for off-Site residential exposures to deep soil gas, shallow soil gas, and sub-slab soil gas via assumed VI also meet DNREC's and USEPA's cancer risk and HI limits for RME risks and confirm the conclusions from groundwater, as shown in Table 5.1, i.e., the risks calculated from subsurface media are consistent with the ITRC and USEPA petroleum vapor intrusion model.

Background outdoor air and indoor air data were also collected from certain residential buildings in the adjacent neighborhood downgradient of OU-4. As shown in Table 5.1, the background outdoor air and indoor air cancer risk estimates are slightly higher than DNREC's cancer risk limit of 1×10^{-5}; however, the evaluation of all of the multiple lines of evidence shows that the indoor concentrations do not result from VI from the groundwater source. Therefore, using multiple lines of evidence, these results confirm that VI from groundwater does not pose an unacceptable risk via VI to off-Site residences.

There are no currently occupied buildings in the on-Site portion of OU-4 and according to site owners. However, in this evaluation on-Site workers are conservatively assumed to be exposed to constituents in on-Site groundwater that volatilize and are assumed to migrate into indoor air. Soil gas samples were also collected to provide an additional line of evidence regarding the potential for significant VI from groundwater into on-Site nonresidential buildings.

The upper-bound risks for on-Site worker exposures to on-Site groundwater and soil gas via assumed VI meet DNREC's and USEPA's cancer risk and HI limits for RME risks, as shown in Table 5.3.

Therefore, the on-Site and off-Site VI risks are acceptable for current and reasonably anticipated future scenarios and as such, no additional remedial activities are necessary.

7. References

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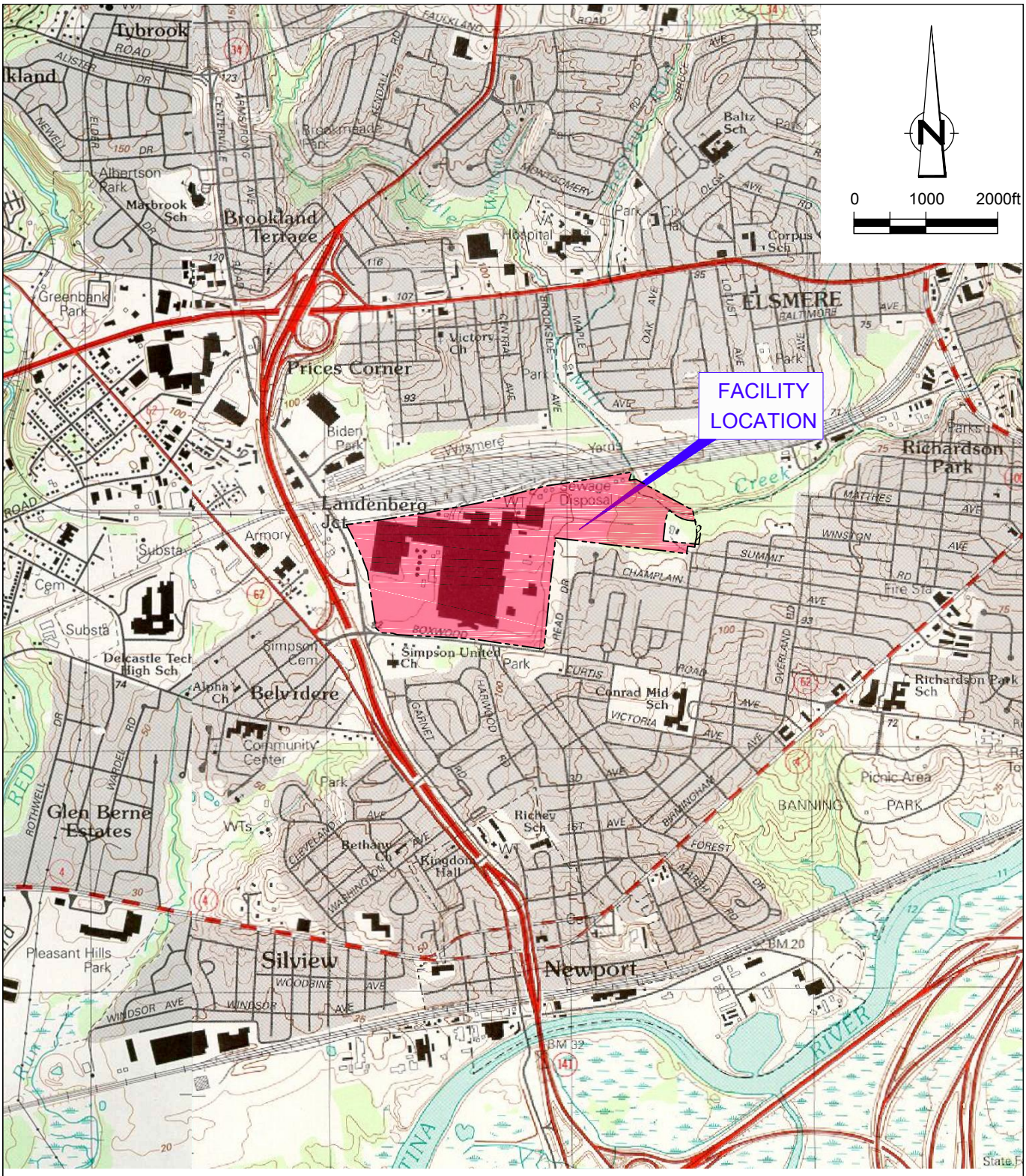


LEGEND

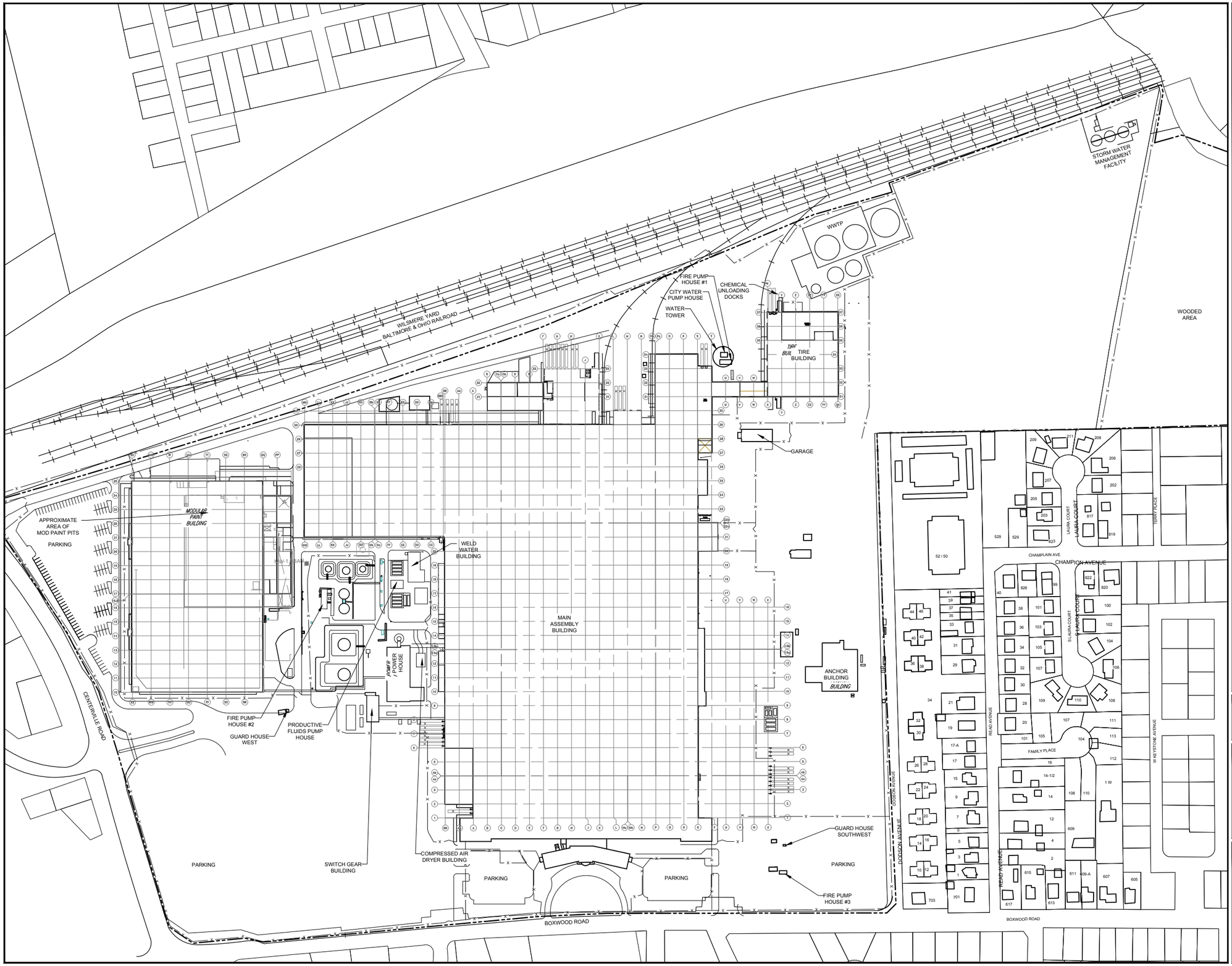
APPROXIMATE FACILITY BOUNDARY

figure 1

FACILITY LOCATION
OU-4 SUPPLEMENTAL VI RISK EVALUATION
FORMER GM WILMINGTON ASSEMBLY PLANT
Wilmington, Delaware

REFERENCE:
USGS WILMINGTON SOUTH QUADRANGLE, DEL TOPOGRAPHIC, 7.5 MINUTES SERIES 1997 SCALE: 1:24,000

17338-00(030)GN-NI001 JUN 27/2017



0 50 150ft

LEGEND

- APPROXIMATE FACILITY BOUNDARY
- FENCELINE
- RAILWAY

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

FORMER WILMINGTON ASSEMBLY PLANT

OU-4 SUPPLEMENTAL VI RISK EVALUATION

FACILITY LAYOUT

GHD

Source Reference:			
Project Manager: G. CARLI	Reviewed By: S. SASNOW	Date: JUNE 2017	
Scale: 1" = 150'	Project №: 17338-T05	Report №: 030	Drawing №: 2

17338-00(030)GN-NI002 JUL 05/2017

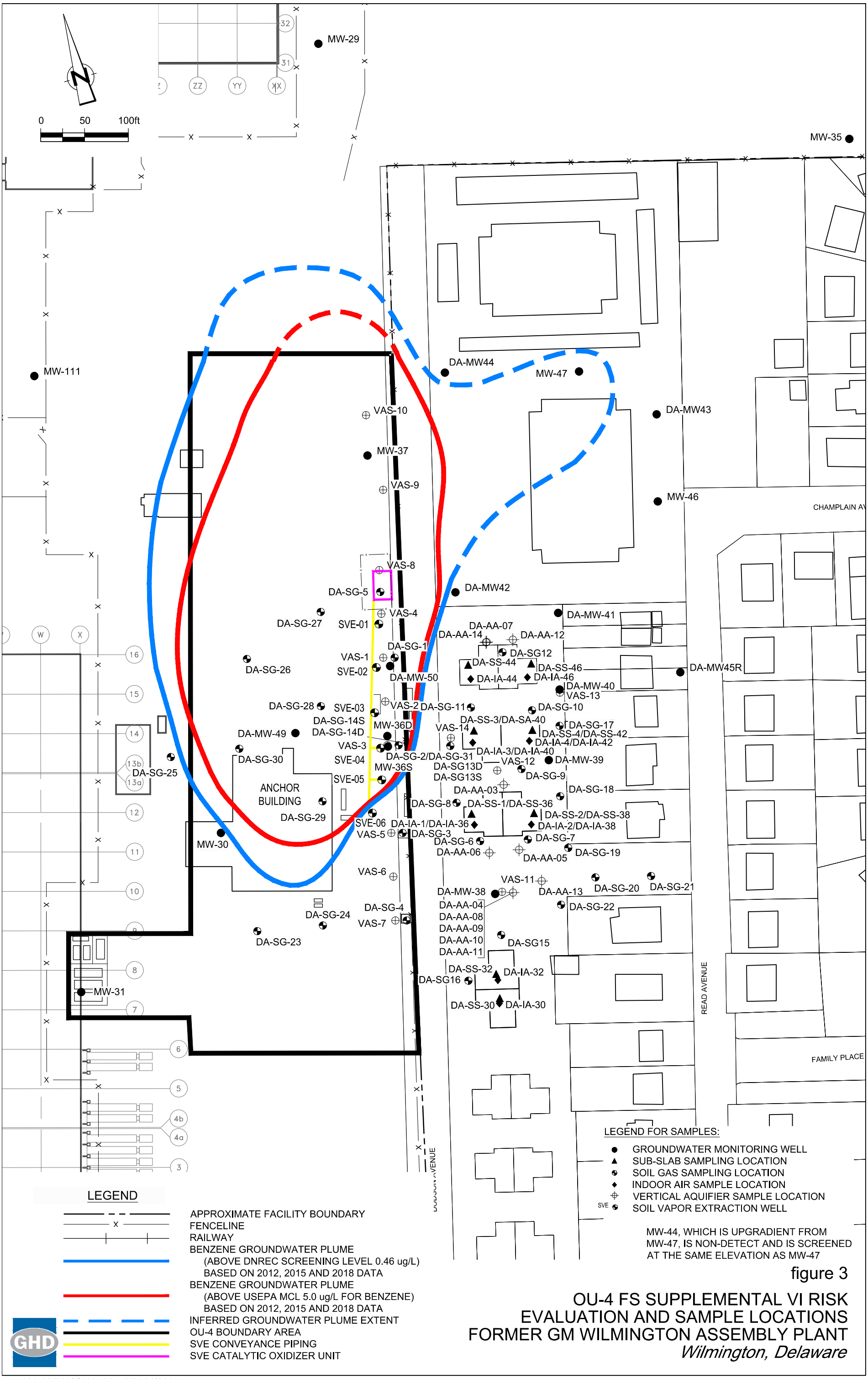


figure 3

OU-4 FS SUPPLEMENTAL VI RISK EVALUATION AND SAMPLE LOCATIONS FORMER GM WILMINGTON ASSEMBLY PLANT

Wilmington, Delaware

17338-00(030)GN-NI005 JUN 24/2019

Appendices

Appendix A
Samples Used in Risk Evaluation

Table A.1

OU-4 Supplemental VI Risk Evaluation
Sample ID and Exposure Point Concentrations
Former GM Wilmington Assembly Plant
Wilmington, Delaware

Sample ID	Sample Type	Location
Ambient	Ambient Air	Off-Site
AA-2	Ambient Air	Off-Site
AA-3	Ambient Air	Off-Site
AA-4	Ambient Air	Off-Site
DA-AA5	Ambient Air	Off-Site
DA-AA6	Ambient Air	Off-Site
DA-AA7	Ambient Air	Off-Site
DA-AA8	Ambient Air	Off-Site
DA-AA9	Ambient Air	Off-Site
DA-AA10	Ambient Air	Off-Site
DA-AA11	Ambient Air	Off-Site
DA-AA12	Ambient Air	Off-Site
DA-AA13	Ambient Air	Off-Site
DA-AA14	Ambient Air	Off-Site
DA-IA30	Indoor Air	Off-Site
DA-IA32	Indoor Air	Off-Site
DA-IA36	Indoor Air	Off-Site
DA-IA38	Indoor Air	Off-Site
DA-IA40	Indoor Air	Off-Site
DA-IA42	Indoor Air	Off-Site
DA-IA44	Indoor Air	Off-Site
DA-IA46	Indoor Air	Off-Site
IA-1	Indoor Air	Off-Site
IA-2	Indoor Air	Off-Site
IA-3	Indoor Air	Off-Site
IA-4	Indoor Air	Off-Site
MW-30	Groundwater	On-Site
MW-31	Groundwater	On-Site
MW-35	Groundwater	On-Site
MW-36D	Groundwater	On-Site
MW-36S	Groundwater	On-Site
MW-37	Groundwater	On-Site
DA-MW-38	Groundwater	Off-Site
DA-MW-39	Groundwater	Off-Site
DA-MW-40	Groundwater	Off-site

Table A.1

OU-4 Supplemental VI Risk Evaluation
Sample ID and Exposure Point Concentrations
Former GM Wilmington Assembly Plant
Wilmington, Delaware

Sample ID	Sample Type	Location
DA-MW-41	Groundwater	Off-Site
DA-MW-42	Groundwater	Off-Site
DA-MW-43	Groundwater	Off-Site
DA-MW-44	Groundwater	Off-Site
DA-MW-45R	Groundwater	Off-Site
DA-MW-46	Groundwater	Off-Site
DA-MW-47	Groundwater	Off-Site
DA-MW-49	Groundwater	On-Site
DA-MW-50	Groundwater	On-Site
VAS-1	Groundwater	On-Site
VAS-2	Groundwater	On-Site
VAS-3	Groundwater	On-Site
VAS-4	Groundwater	On-Site
VAS-5	Groundwater	On-Site
VAS-6	Groundwater	On-Site
VAS-7	Groundwater	On-Site
VAS-8	Groundwater	On-Site
VAS-9	Groundwater	On-Site
VAS-10	Groundwater	On-Site
VAS-11	Groundwater	Off-Site
VAS-12	Groundwater	Off-Site
VAS-13	Groundwater	Off-Site
VAS-14	Groundwater	Off-Site
DA-SG-1	Soil Gas	On-Site
DA-SG-2	Soil Gas	On-Site
DA-SG-3	Soil Gas	On-Site
DA-SG-4	Soil Gas	On-Site
DA-SG-5	Soil Gas	On-Site
DA-SG-6	Soil Gas	Off-Site
DA-SG-7	Soil Gas	Off-Site
DA-SG-8	Soil Gas	Off-Site
DA-SG-9	Soil Gas	Off-Site
DA-SG-10	Soil Gas	Off-Site
DA-SG-11	Soil Gas	Off-Site
DA-SG-12	Soil Gas	Off-Site

Table A.1

OU-4 Supplemental VI Risk Evaluation
Sample ID and Exposure Point Concentrations
Former GM Wilmington Assembly Plant
Wilmington, Delaware

Sample ID	Sample Type	Location
DA-SG-13D	Soil Gas	Off-Site
DA-SG-13S	Soil Gas	Off-Site
DA-SG-14D	Soil Gas	Off-Site
DA-SG-14S	Soil Gas	Off-Site
DA-SG-15	Soil Gas	Off-Site
DA-SG-16	Soil Gas	Off-Site
DA-SG-17	Soil Gas	Off-Site
DA-SG-18	Soil Gas	Off-Site
DA-SG-19	Soil Gas	Off-Site
DA-SG-20	Soil Gas	Off-Site
DA-SG-21	Soil Gas	Off-Site
DA-SG-22	Soil Gas	Off-Site
DA-SG-23	Soil Gas	On-Site
DA-SG-24	Soil Gas	On-Site
DA-SG-25	Soil Gas	On-Site
DA-SG-26	Soil Gas	On-Site
DA-SG-27	Soil Gas	On-Site
DA-SG-28	Soil Gas	On-Site
DA-SG-29	Soil Gas	On-Site
DA-SG-30	Soil Gas	On-Site
DA-SG-31	Soil Gas	On-Site
DA-SS-1	Sub-slab Soil Gas	Off-Site
DA-SS-2	Sub-slab Soil Gas	Off-Site
DA-SS-3	Sub-slab Soil Gas	Off-Site
DA-SS-4	Sub-slab Soil Gas	Off-Site
DA-SS-30	Sub-slab Soil Gas	Off-Site
DA-SS-32	Sub-slab Soil Gas	Off-Site
DA-SS-36	Sub-slab Soil Gas	Off-Site
DA-SS-38	Sub-slab Soil Gas	Off-Site
DA-SS-40	Sub-slab Soil Gas	Off-Site
DA-SS-42	Sub-slab Soil Gas	Off-Site
DA-SS-44	Sub-slab Soil Gas	Off-Site
DA-SS-46	Sub-slab Soil Gas	Off-Site

Appendix B
Supporting VI Risk Calculations

Toxicity Values
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

CAS	Chemical Name	Inhalation Unit Risk (IUR) (µg/m3)-1	IUR Source	Reference Concentration (RfC) (mg/m3)	RfC Source	Mutagenic Indicator i
67-64-1	Acetone	--	--	31	A	
83-32-9	Acenaphthene	--	--	--	--	
98-86-2	Acetophenone	--	--	--	--	
120-12-7	Anthracene	--	--	--	--	
71-43-2	Benzene	0.0000078	I	0.03	I	
75-27-4	Bromodichloromethane	0.000037	CA	--	--	
105-60-2	Caprolactam	--	--	--	--	
75-15-0	Carbon Disulfide	--	--	0.7	I	
56-23-5	Carbon Tetrachloride	0.000006	I	0.1	I	
86-74-8	Carbazole	--	--	--	--	
108-90-7	Chlorobenzene	--	--	0.05	P	
67-66-3	Chloroform	0.000023	I	0.098	A	
74-87-3	Chloromethane	--	--	0.09	I	
95-48-7	Cresol, M-	--	--	--	--	
106-44-5	Cresol, P-	--	--	--	--	
98-82-8	Cumene (Isopropyl benzene)	--	--	0.4	I	
110-82-7	Cyclohexane	--	--	6	I	
110-83-8	Cyclohexene	--	--	1	X	
132-64-9	Dibenzofuran	--	--	--	--	
106-93-4	Dibromoethane, 1,2-	0.0006	I	0.009	I	
95-50-1	Dichlorobenzene, 1,2-	--	--	0.2	H	
541-73-1	Dichlorobenzene, 1,3-	--	--	--	--	
106-46-7	Dichlorobenzene, 1,4-	0.000011	CA	0.8	I	
75-71-8	Dichlorodifluoromethane	--	--	0.1	X	
75-34-3	Dichloroethane, 1,1-	0.0000016	CA	--	--	
107-06-2	Dichloroethane, 1,2-	0.000026	I	0.007	P	
75-35-4	Dichloroethylene, 1,1-	--	--	0.2	I	
156-59-2	Dichloroethylene, 1,2-cis-	--	--	--	--	
78-87-5	Dichloropropane, 1,2-	0.00001	CA	0.004	I	
84-66-2	Diethyl phthalate	--	--	--	--	
105-67-9	Dimethylphenol, 2,4-	--	--	--	--	
75-00-3	Ethyl Chloride (Chloroethane)	--	--	10	I	
100-41-4	Ethylbenzene	0.0000025	CA	1	I	
86-73-7	Fluorene	--	--	--	--	
39635-31-9	Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB	0.0011	E	0.0013	E	
142-82-5	Heptane, N-	--	--	0.4	P	
110-54-3	Hexane, N-	--	--	0.7	I	
591-78-6	Hexanone, 2-	--	--	0.03	I	
67-63-0	Isopropanol	--	--	0.2	P	
108-87-2	Methyl Cyclohexane	--	--	--	--	
78-93-3	Methyl Ethyl Ketone (2-Butanone)	--	--	5	I	
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	--	--	3	I	
91-57-6	Methylnaphthalene, 2-	--	--	--	--	
1634-04-4	Methyl tert-Butyl Ether (MTBE)	0.00000026	CA	3	I	
75-09-2	Methylene Chloride	0.00000001	I	0.6	I	Mut
91-20-3	Naphthalene	0.000034	CA	0.003	I	
85-01-8	Phenanthrene	--	--	--	--	
108-95-2	Phenol	--	--	--	--	
103-65-1	Propyl benzene	--	--	1	X	
129-00-0	Pyrene	--	--	--	--	
100-42-5	Styrene	--	--	1	I	
127-18-4	Tetrachloroethylene	0.00000026	I	0.04	I	
108-88-3	Toluene	--	--	5	I	
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	--	--	30	H	
79-00-5	Trichloroethane, 1,1,2-	0.000016	I	0.0002	X	
79-01-6	Trichloroethylene	see note 4	I	0.002	I	TCE
75-69-4	Trichlorofluoromethane	--	--	--	--	
95-63-6	Trimethylbenzene, 1,2,4-	--	--	0.06	P	
108-67-8	Trimethylbenzene, 1,3,5-	0.00066	CA	--	--	
540-84-1	Trimethylpentane, 2,2,4-	--	--	--	--	
75-01-4	Vinyl Chloride	0.0000044	I	0.1	I	VC
1330-20-7	Xylenes	--	--	0.1	I	

Notes:
-- Not available
i = Symbol for mutagenic indicator
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see note (4) below).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see note (4) below).

Sources:
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs).
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments.
Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database.
Available online at: http://epa-heast.ornl.gov/heast.shtml
I = IRIS: EPA Integrated Risk Information System (IRIS).
Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs).
Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

Appendix B.2

Off-Site (Shallow) Cumulative Cancer and Non-Cancer Risk Estimates from Groundwater
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Groundwater to Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1
Average Groundwater Temperature (^{o}C)	Tgw	14

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
67-64-1	Acetone	8.8E+01	7.7E-06	No IUR	2.4E-10
98-86-2	Acetophenone	3.5E+01	5.8E-07	No IUR	No RfC
71-43-2	Benzene	4.5E+00	6.1E-05	1.7E-10	1.9E-06
117-81-7	Bis(2-ethylhexyl)phthalate	1.2E+01	1.3E-08	1.1E-14	No RfC
67-66-3	Chloroform	1.6E+00	1.5E-05	1.2E-10	1.4E-07
106-44-5	Cresol, P-	5.8E+00	2.4E-08	No IUR	3.8E-11
98-82-8	Cumene	4.5E+01	9.4E-04	No IUR	2.2E-06
110-82-7	Cyclohexane	3.0E+02	1.1E-01	No IUR	1.8E-05
84-66-2	Diethyl phthalate	1.4E+02	3.5E-07	No IUR	No RfC
105-67-9	Dimethylphenol, 2,4-	3.5E+01	1.4E-07	No IUR	No RfC
100-41-4	Ethylbenzene	5.7E+02	9.5E-03	8.5E-09	9.2E-06
591-78-6	Hexanone, 2-	2.6E+01	5.1E-06	No IUR	1.6E-07
108-87-2	Methyl cyclohexane	3.7E+02	6.5E-01	No IUR	No RfC
78-93-3	Methyl Ethyl Ketone (2-Butanone)	3.1E+01	4.2E-06	No IUR	8.0E-10
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	1.4E+00	4.2E-07	No IUR	1.3E-10
91-57-6	Methylnaphthalene, 2-	2.9E+01	2.2E-05	No IUR	No RfC
1634-04-4	Methyl tert-Butyl Ether (MTBE)	8.6E-01	1.3E-06	1.2E-13	4.1E-10
91-20-3	Naphthalene	2.6E+02	2.0E-04	2.5E-09	6.5E-05
100-42-5	Styrene	1.6E+01	9.2E-05	No IUR	8.8E-08
108-88-3	Toluene	2.4E+02	3.6E-03	No IUR	6.9E-07
95-63-6	Trimethylbenzene, 1,2,4-	7.9E+02	9.4E-03	No IUR	1.5E-04
108-67-8	Trimethylbenzene, 1,3,5-	2.3E+02	3.9E-03	No IUR	6.2E-05
1330-20-7	Xylenes	1.6E+03	2.2E-02	No IUR	2.1E-04
		Cumulative:		1E-08	5E-04

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.3

Off-Site (Deep) Cumulative Cancer and Non-Cancer Risk Estimates from Soil Gas
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1
Average Groundwater Temperature (^{o}C)	Tgw	14

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
71-43-2	Benzene	8.1E+02	8.1E-05	2.3E-10	2.6E-06
110-82-7	Cyclohexane	2.7E+06	2.7E-01	No IUR	4.3E-05
100-41-4	Ethylbenzene	6.3E+05	6.3E-02	5.6E-08	6.0E-05
142-82-5	Heptane, N-	4.3E+06	4.3E-01	No IUR	1.0E-03
110-54-3	Hexane, N-	1.1E+07	1.1E+00	No IUR	1.5E-03
108-88-3	Toluene	1.7E+06	1.7E-01	No IUR	3.3E-05
95-63-6	Trimethylbenzene, 1,2,4-	3.3E+05	3.3E-02	No IUR	5.3E-04
540-84-1	Trimethylpentane, 2,2,4-	4.5E+05	4.5E-02	No IUR	No RfC
			Cumulative:	6E-08	3E-03

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.4

Off-Site (Shallow) Cumulative Cancer and Non-Cancer Risk Estimates from Soil Gas
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1
Average Groundwater Temperature (^{o}C)	Tgw	14

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
67-64-1	Acetone	1.4E+01	1.40E-02	No IUR	4.3E-07
71-43-2	Benzene	1.4E+02	1.4E-01	3.9E-07	4.5E-03
75-15-0	Carbon Disulfide	2.8E+01	2.80E-02	No IUR	3.8E-05
67-66-3	Chloroform	7.0E-01	7.0E-04	5.7E-09	6.8E-06
98-82-8	Cumene	8.5E+01	8.50E-02	No IUR	2.0E-04
110-82-7	Cyclohexane	6.8E+03	6.8E+00	No IUR	1.1E-03
110-83-8	Cyclohexene	6.0E+00	6.00E-03	No IUR	5.8E-06
75-71-8	Dichlorodifluoromethane	2.0E+00	2.00E-03	No IUR	1.9E-05
75-34-3	Dichloroethane, 1,1-	1.3E+01	1.30E-02	7.4E-09	No RfC
100-41-4	Ethylbenzene	3.6E+02	3.6E-01	3.2E-07	3.5E-04
142-82-5	Heptane, N-	2.2E+04	2.2E+01	No IUR	5.3E-02
110-54-3	Hexane, N-	4.4E+04	4.4E+01	No IUR	6.0E-02
67-63-0	Isopropanol	6.0E+00	6.0E-03	No IUR	2.9E-05
78-93-3	Methyl Ethyl Ketone (2-Butanone)	1.0E+00	1.0E-03	No IUR	1.9E-07
103-65-1	Propyl benzene	9.7E+01	9.7E-02	No IUR	9.3E-05
127-18-4	Tetrachloroethylene	4.0E+00	4.0E-03	3.7E-10	9.6E-05
108-88-3	Toluene	1.1E+02	1.1E-01	No IUR	2.1E-05
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2	2.0E-01	2.00E-04	No IUR	6.4E-09
75-69-4	Trichlorofluoromethane	8.0E-01	8.0E-04	No IUR	No RfC
95-63-6	Trimethylbenzene, 1,2,4-	3.4E+02	3.4E-01	No IUR	5.4E-03
108-67-8	Trimethylbenzene, 1,3,5-	2.0E+02	2.0E-01	No IUR	3.2E-03
540-84-1	Trimethylpentane, 2,2,4-	5.7E+03	5.7E+00	No IUR	No RfC
1330-20-7	Xylenes	3.6E+02	3.6E-01	No IUR	3.5E-03
		Cumulative:		7E-07	1.3E-01

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.5

Off-Site Cumulative Cancer and Non-Cancer Risk Estimates from Sub-Slab
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1
Average Groundwater Temperature (^{o}C)	Tgw	14

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk[a] CR	VI Hazard[a] HQ
71-43-2	Benzene	3.7E+03	3.7E+00	1.0E-05	1.2E-01
110-82-7	Cyclohexane	2.4E+02	2.4E-01	No IUR	3.8E-05
100-41-4	Ethylbenzene	1.4E+00	1.4E-03	1.2E-09	1.3E-06
142-82-5	Heptane, N-	1.5E+02	1.5E-01	No IUR	3.6E-04
110-54-3	Hexane, N-	2.6E+03	2.6E+00	No IUR	3.6E-03
108-88-3	Toluene	7.5E+01	7.5E-02	No IUR	1.4E-05
95-63-6	Trimethylbenzene, 1,2,4-	3.1E+00	3.1E-03	No IUR	5.0E-05
540-84-1	Trimethylpentane, 2,2,4-	1.1E+00	1.1E-03	No IUR	No RfC
1330-20-7	Xylenes	3.1E+00	3.1E-03	No IUR	3.0E-05
		Cumulative:		1E-05	1E-01

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.6

Off-Site Cumulative Cancer and Non-Cancer Risk Estimates from Indoor Air
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
71-43-2	Benzene	1.0E+01	**2.8E-05**	3.2E-01
110-82-7	Cyclohexane	2.9E+00	No IUR	4.6E-04
100-41-4	Ethylbenzene	1.9E+01	**1.7E-05**	1.8E-02
142-82-5	Heptane, N-	1.3E+01	No IUR	3.1E-02
110-54-3	Hexane, N-	3.0E+01	No IUR	4.1E-02
108-88-3	Toluene	3.7E+01	No IUR	7.1E-03
95-63-6	Trimethylbenzene, 1,2,4-	1.3E+01	No IUR	2.1E-01
540-84-1	Trimethylpentane, 2,2,4-	1.9E+01	No IUR	No RfC
1330-20-7	Xylenes	3.0E+01	No IUR	2.9E-01
		Cumulative:	**4E-05**	9E-01

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.7

Off-Site Cumulative Cancer and Non-Cancer Risk Estimates from Outdoor Air
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Residential
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
71-43-2	Benzene	2.5E+00	6.9E-06	8.0E-02
110-82-7	Cyclohexane	1.6E+00	No IUR	2.6E-04
100-41-4	Ethylbenzene	1.3E+01	**1.2E-05**	1.2E-02
142-82-5	Heptane, N-	1.5E+01	No IUR	3.6E-02
110-54-3	Hexane, N-	2.8E+00	No IUR	3.8E-03
108-88-3	Toluene	1.2E+01	No IUR	2.3E-03
95-63-6	Trimethylbenzene, 1,2,4-	6.7E+00	No IUR	1.1E-01
540-84-1	Trimethylpentane, 2,2,4-	1.8E+00	No IUR	No RfC
1330-20-7	Xylenes	2.2E+00	No IUR	2.1E-02
		Cumulative:	**2E-05**	3E-01

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.8

On-Site (Shallow) Cumulative Cancer and Non-Cancer Risk Estimates from Groundwater
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

VISL Calculator Output:
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.5.1 (May 2016 RSLs)

Parameter	Symbol	Value
Exposure Scenario	Scenario	Commercial
Target Risk for Carcinogens	TCR	1.00E-05
Target Hazard Quotient for Non-Carcinogens	THQ	1
Average Groundwater Temperature (^{o}C)	Tgw	14

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
83-32-9	Acenaphthene	2.7E+00	7.15E-07	No IUR	No RfC
67-64-1	Acetone	2.8E+02	2.5E-05	No IUR	1.8E-10
98-86-2	Acetophenone	3.9E+01	6.4E-07	No IUR	No RfC
120-12-7	Anthracene	2.6E+00	1.8E-07	No IUR	No RfC
71-43-2	Benzene	1.4E+03	1.9E-02	1.2E-08	1.4E-04
92-52-4	Biphenyl, 1,1'-	1.1E+01	5.6E-06	No IUR	3.2E-06
117-81-7	bis(2-Ethylhexyl)phthalate	1.3E+01	1.4E-08	2.8E-15	No RfC
86-74-8	Carbazole	1.8E+00	1.1E-10	No IUR	No RfC
75-15-0	Carbon Disulfide	7.7E-01	2.9E-05	No IUR	9.6E-09
56-23-5	Carbon Tetrachloride	1.3E+01	8.8E-04	4.3E-10	2.0E-06
105-60-2	Caprolactam	1.2E+02	1.2E-08	No IUR	1.3E-09
108-90-7	Chlorobenzene	4.4E-01	3.0E-06	No IUR	1.4E-08
67-66-3	Chloroform	2.4E+01	2.2E-04	4.2E-10	5.2E-07
95-48-7	Cresol, M-	2.1E+01	7.4E-08	No IUR	2.8E-11
106-44-5	Cresol, P-	5.3E+01	2.2E-07	No IUR	8.2E-11
98-82-8	Cumene	1.3E+02	2.7E-03	No IUR	1.5E-06
110-82-7	Cyclohexane	7.0E+02	2.6E-01	No IUR	9.8E-06
132-64-9	Dibenzofuran	3.6E+00	1.1E-08	No IUR	No RfC
106-93-4	Dibromoethane, 1,2-	1.8E+00	2.5E-06	1.2E-10	6.3E-08
95-50-1	Dichlorobenzene, 1,2-	1.0E+01	3.7E-05	No IUR	4.2E-08
541-73-1	Dichlorobenzene, 1,3-	7.8E-01	9.9E-06	No IUR	No RfC
106-46-7	Dichlorobenzene, 1,4-	1.2E+00	5.7E-06	5.1E-12	1.6E-09
75-34-3	Dichloroethane, 1,1-	2.9E-01	4.1E-06	5.4E-13	No RfC
107-06-2	Dichloroethane, 1,2-	4.6E+01	1.3E-04	2.7E-10	4.2E-06
75-35-4	Dichloroethylene, 1,1-	1.4E-01	9.9E-06	No IUR	1.1E-08
156-59-2	Dichloroethylene, 1,2-cis-	1.3E+00	1.3E-05	No IUR	No RfC
78-87-5	Dichloropropane, 1,2-	1.9E-01	1.3E-06	1.0E-12	7.2E-08
105-67-9	Dimethylphenol, 2,4-	2.1E+01	8.2E-08	No IUR	No RfC
100-41-4	Ethylbenzene	2.4E+03	4.0E-02	8.2E-09	9.2E-06
86-73-7	Fluorene	6.2E+00	8.6E-07	No IUR	No RfC
591-78-6	Hexanone, 2-	2.3E+01	4.5E-06	No IUR	3.4E-08
108-87-2	Methyl cyclohexane	3.6E+02	6.3E-01	No IUR	No RfC
78-93-3	Methyl Ethyl Ketone (2-Butanone)	9.0E+01	1.2E-05	No IUR	5.6E-10
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	3.0E+01	9.0E-06	No IUR	6.8E-10
91-57-6	Methylnaphthalene, 2-	1.7E+02	1.3E-04	No IUR	No RfC
1634-04-4	Methyl tert-Butyl Ether (MTBE)	1.6E+00	2.4E-06	5.1E-14	1.8E-10
75-09-2	Methylene Chloride	9.1E+01	7.7E-04	6.3E-13	2.9E-07
91-20-3	Naphthalene	2.4E+02	1.9E-04	5.2E-10	1.4E-05
85-01-8	Phenanthrene	9.9E+00	9.4E-07	No IUR	No RfC
108-95-2	Phenol	7.3E+00	9.9E-09	No IUR	1.1E-11
129-00-0	Pyrene	2.4E+00	3.0E-08	No IUR	No RfC
100-42-5	Styrene	7.2E+01	4.1E-04	No IUR	9.4E-08
127-18-4	Tetrachloroethylene	1.3E+00	5.1E-05	1.1E-12	2.9E-07
108-88-3	Toluene	6.1E+03	9.2E-02	No IUR	4.2E-06
79-01-6	Trichloroethylene	9.5E+00	2.2E-04	7.4E-11	2.5E-05
95-63-6	Trimethylbenzene, 1,2,4-	2.8E+03	3.3E-02	No IUR	1.3E-04
108-67-8	Trimethylbenzene, 1,3,5-	2.3E+02	3.9E-03	No IUR	1.5E-05
75-01-4	Vinyl Chloride	2.3E+01	1.9E-03	6.8E-10	4.3E-06
1330-20-7	Xylenes	1.3E+04	1.8E-01	No IUR	4.2E-04
		Cumulative:		2E-08	8E-04

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion

Appendix B.9

On-Site (Shallow) Cumulative Cancer and Non-Cancer Risk Estimates from Soil Gas
RACER Trust
OU-4, Former GM Wilmington Assembly Plant, Wilmington, Delaware

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
67-64-1	Acetone	1.0E+01	1.00E-02	No IUR	7.4E-08
71-43-2	Benzene	1.0E+04	1.0E+01	6.4E-06	7.6E-02
75-27-4	Bromodichloromethane	3.6E+00	3.6E-03	1.1E-08	No RfC
75-15-0	Carbon Disulfide	1.3E+02	1.30E-01	No IUR	4.2E-05
56-23-5	Carbon Tetrachloride	2.9E-01	2.9E-04	1.4E-10	6.6E-07
108-90-7	Chlorobenzene	9.9E+02	9.9E-01	No IUR	4.5E-03
67-66-3	Chloroform	1.5E+01	1.5E-02	2.8E-08	3.5E-05
74-87-3	Chloromethane	3.0E+00	3.0E-03	No IUR	7.6E-06
98-82-8	Cumene	5.3E+02	5.30E-01	No IUR	3.0E-04
110-82-7	Cyclohexane	1.1E+05	1.1E+02	No IUR	4.2E-03
75-71-8	Dichlorodifluoromethane	2.0E+00	2.0E-03	No IUR	4.6E-06
75-34-3	Dichloroethane, 1,1-	1.3E+01	1.30E-02	1.7E-09	No RfC
107-06-2	Dichloroethane, 1,2-	2.2E+02	2.20E-01	4.7E-07	7.2E-03
75-00-3	Ethyl Chloride (Chloroethane)	4.5E-01	4.5E-04	No IUR	1.0E-08
100-41-4	Ethylbenzene	3.8E+03	3.8E+00	7.7E-07	8.7E-04
142-82-5	Heptane, N-	8.4E+04	8.4E+01	No IUR	4.8E-02
110-54-3	Hexane, N-	2.4E+05	2.4E+02	No IUR	7.8E-02
67-63-0	Isopropanol	9.0E+00	9.00E-03	No IUR	1.0E-05
78-93-3	Methyl Ethyl Ketone (2-Butanone)	1.6E+01	1.6E-02	No IUR	7.3E-07
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	3.1E+03	3.1E+00	No IUR	2.4E-04
75-09-2	Methylene Chloride	2.3E+00	2.3E-03	1.9E-12	8.8E-07
103-65-1	Propyl benzene	6.1E+02	6.10E-01	No IUR	1.4E-04
127-18-4	Tetrachloroethylene	1.2E+01	1.2E-02	2.5E-10	6.8E-05
108-88-3	Toluene	1.1E+03	1.1E+00	No IUR	5.0E-05
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	6.9E-01	6.9E-04	No IUR	5.3E-09
95-63-6	Trimethylbenzene, 1,2,4-	1.4E+03	1.4E+00	No IUR	5.3E-03
108-67-8	Trimethylbenzene, 1,3,5-	1.1E+00	1.1E-03	No IUR	4.2E-06
540-84-1	Trimethylpentane, 2,2,4-	2.7E+04	2.7E+01	No IUR	No RfC
75-01-4	Vinyl Chloride	3.6E-01	3.6E-04	1.3E-10	8.2E-07
1330-20-7	Xylenes	2.8E+03	2.8E+00	No IUR	6.4E-03
		Cumulative:		8E-06	2E-01

Notes:
Cia = Indoor Air Concentration
CR = Carcinogenic Risk
HQ = Hazard Quotient
IUR = Inhalation Unit Risk
VI = Vapor Intrusion