Appendix G

Human Health Risk Evaluation Supporting Information and Calculations

APPENDIX G

HUMAN HEALTH RISK ASSESSMENT
SUPPORTING INFORMATION AND CALCULATIONS

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G1 INTRODUCTION

This appendix to the RFI Phase II Report for the General Motors Corporation's (GM's) North American Operations (NAO) Flint Operations Site located at 902 East Leith Street in Flint, Michigan (revised, BBL June 2006) provides information and calculations that support the discussion of the human health risk assessment in Section 6 of the Revised RFI Phase II Report. The information in this appendix is organized in Sections G2 through G7 which correspond to the exposure scenarios for the following potentially exposed populations evaluated in the risk assessment:

- Routine Workers
- Maintenance Workers
- Trespassers
- Redevelopment Construction Workers
- Recreational Users
- Residents

The references cited in this appendix are included in Section 9 of the Revised RFI Phase II Report. Physical and chemical information and toxicity values are provided in Attachment G0. Detailed calculation sheets supporting the discussion in Sections G2 through G7 are provided in the Attachments to this Appendix.

G2 ROUTINE WORKERS

As discussed in Section 6.3 of the Revised RFI Phase II Report, the risk assessment evaluated potential exposure of on-site routine workers via contact with outdoor soil and via vapor intrusion from soil, groundwater, and light non-aqueous phase liquid (LNAPL) below buildings. The computation of risk estimates associated with exposure via contact with outdoor soil is discussed in Section G2.1, and the computation of risk estimates associated with exposure via vapor intrusion is discussed in Section G2.2.

G2.1 Contact with Outdoor Soil

For the ingestion and dermal exposure routes, estimates of cancer risk and noncancer hazard quotients (HQ) are calculated as discussed in Section 6.5.1 of the Revised RFI Phase II Report:

$$Risk = LADD \cdot SF$$

$$HQ = \frac{ADD}{RfD}$$

where *LADD* is the lifetime average daily dose, *SF* is the cancer slope factor, *ADD* is the average daily dose, and *RfD* is the reference dose.

For the inhalation route, the inhalation cancer risk and noncancer HQ are calculated using the chemical concentration in air (C_{air}), as follows:

$$Risk = C_{air} \cdot URF \cdot \frac{EF \cdot ED}{AT}$$

$$HQ = \frac{C_{air}}{RfC} \cdot \frac{EF \cdot ED}{AT}$$

where URF is the inhalation unit risk factor for a carcinogenic chemical, RfC is the reference concentration for a non-carcinogenic chemical, EF is the exposure frequency, ED is the exposure duration, and AT is the averaging time.

In this risk assessment, estimates of cancer risk and HQ were calculated using the following equivalent forms of these equations, which made use of risk-based criteria (RBC) that were calculated separately in advance of the risk calculations. For example, the risk equations for the ingestion and dermal routes can be re-written as follows:

$$Risk = \frac{C \cdot LADD^* \cdot SF}{TR} \cdot TR = \frac{C}{RBC} \cdot TR$$

$$HQ = \frac{C \cdot ADD}{RfD \cdot THQ} \cdot THQ = \frac{C}{RBC} \cdot THQ$$

where C is the exposure concentration, LADD* and ADD* are doses that are normalized to unit concentration (e.g., 1 mg/kg), and TR and THQ are the target cancer risk and target HQ used in calculating the RBCs.

For the soil ingestion and dermal routes of exposure, soil RBCs can then be expressed as follows:

$$Cancer\ RBC = \frac{TR}{LADD^* \cdot SF}$$

$$Noncancer\ RBC = \frac{THQ \cdot RfD}{ADD^*}$$

In this risk assessment, RBCs were calculated by setting TR and THQ equal to 10^{-5} and 1 for single chemical, respectively. The LADD* and ADD* were calculated using the exposure factors discussed in Section 6.3.5 of the Revised RFI Phase II Report.

Similarly for the inhalation route, soil RBCs were calculated as follows:

$$Cancer\ RBC = \frac{TR \cdot AT_c}{URF \cdot ET \cdot EF \cdot ED}\left(J \cdot C / Q\right)^{-1}$$

$$Noncancer\ RBC = \frac{THQ \cdot RfC \cdot AT_{nc}}{ET \cdot EF \cdot ED}\left(J \cdot C / Q\right)^{-1}$$

where the product $J \cdot C/Q$ is an air concentration that is normalized to unit concentration in soil. The J term is the normalized average vapor or particulate flux, and the C/Q term is a normalized air concentration.

The normalized average vapor flux J_v of a chemical from unsaturated soil is conservatively estimated using an unsteady-state model derived by Jury et al. (1983) that USEPA has adapted for screening-level analysis (USEPA 1996). This model conservatively assumes that volatile chemicals are present in the soil to an infinite depth. The equation for J_v is given by:

$$J_v = 2\, C_{s,0}\, \rho_b \sqrt{\frac{D_E}{\pi\, T}}$$

$$D_E = \frac{D_G\, H + D_L}{\rho_b K_d + \theta_w + \theta_a\, H}$$

$$D_G = D_{air} \cdot \frac{\theta_a^{10/3}}{n^2}$$

$$D_L = D_{water} \cdot \frac{\theta_w^{10/3}}{n^2}$$

Derivation of this equation and definition of the equation parameters can be found in the Jury et al. 1983 journal article and in USEPA guidance (1996), and therefore, is not repeated here. The values for chemical-specific parameters and default soil parameters for "loamy sand" recommended in the USEPA guidance (2004a) are used in calculating J_v.

The normalized, average particulate flux $J_{10,w}$ of a chemical from surface soil is conservatively estimated using the "unlimited reservoir" model that USEPA has adapted for screening-level analysis of particulate emissions from soil (USEPA 1996). This model assumes that particulate emissions are created by wind erosion. The details of this model can be found in USEPA guidance (1996), and therefore, are not repeated here.

The C/Q term for routine worker inhalation exposures is USEPA's default value for a generic 0.5 acre square source (USEPA 2002b).

The RBCs for each route of exposure (ingestion, dermal contact, and inhalation) were then conservatively combined to give cancer and noncancer criteria that are based on the combination of all three exposure routes, as follows:

$$RBC = \left(\sum_i RBC_i^{-1} \right)^{-1}$$

The combined RBCs based on cancer risk and those based on noncancer effects for exposures of routine workers to outdoor soil are summarized in Attachment G1.

In the human health risk assessment, the cancer risk and HQ for each chemical was estimated using its concentration in soil C_s and RBC, as follows:

$$Risk = \frac{C_s}{RBC} \cdot TR$$

$$HQ = \frac{C_s}{RBC} \cdot THQ$$

The cumulative cancer risk and noncancer HI for exposure to a combination of constituents were conservatively estimated according to USEPA guidance (1989), as follows:

$$Cumulative\ Risk = \sum_i Risk_i$$

$$Hazard\ Index = \sum_i HQ_i$$

In this risk assessment, bounding estimates of cumulative cancer risk and HI were calculated using the highest detected concentration of each constituent at each AOI (Table 6-2). The computation of the incremental risk and HQ estimates which were summed to determine the cumulative cancer risk and HI estimates is shown in Attachment G12.

To evaluate the need for remedial actions in the Southend of the Site, which is expected to be available for future redevelopment, bounding estimates of cumulative cancer risk and HI were calculated using the highest detected concentration of each constituent in soil at each of the 184 boring locations in Parcels 1, 2, and 3 where the bounding risk estimates for one or more of the areas are greater than USEPA's cumulative cancer risk of 10^{-4} or HI limit of 1 (Table 6-2). The procedure for ensuring conservative estimation of the highest concentrations in soil at each boring location, and the association of each location with a sub-area of the Site using Thiessen polygons is described in Attachment G13. The results of risk calculations for each of the 184 soil boring locations are shown Attachment G13 along with the details of the risk calculations for boring locations RFI-84-12 and RFI-09-48 as an example of the risk calculations.

For locations with unacceptable bounding risk estimates, area-weighted estimates of cumulative cancer risk and/or HI for a half-acre area around these locations were calculated to provide more realistic but still highly conservative risk estimates. The area-weighted estimates were based on a hypothetical square ½ acre lot centered on the polygon or polygons with

unacceptable bounding risk (adjusted if necessary to ensure the lot is within the site boundaries). The area-weighted cumulative cancer risk and HI estimates for the ½ acre lot were calculated using the following equations:

$$area-weighted\ risk = \frac{\sum_i Risk_i \cdot A_i}{\sum_i A_i}$$

$$area-weighted\ HI = \frac{\sum_i HI_i \cdot A_i}{\sum_i A_i}$$

where $Risk_i$ and HI_i are the cumulative cancer risk and HI of polygon i, and A_i is the area of polygon i that falls within the hypothetical ½ acre lot (Table 6-4). The details of the area-weighted risk calculations around these locations are shown in Attachment G14.

G2.2 Vapor Intrusion

G2.2.1 Current On-Site Workers

Currently, on-site routine workers perform daily activities in buildings that are governed by Occupational Safety and Health Administration (OSHA) regulations. The conservative screening criteria for indoor air inhalation in industrial buildings are calculated based on occupational inhalation exposure limits. The occupational inhalation exposure limits are exposure limits for air contaminants as established in the Michigan Occupational Health Standards (MICIS 2001), permissible exposure limits (PELs) established by OSHA (NIOSH 1997), and threshold limit values (TLVs) recommended by the American Conference of Government Industrial Hygienists (ACGIH 2005) for chemicals without Michigan exposure limits or OSHA PELs. These inhalation benchmarks for constituents detected in soil, groundwater, and LNAPL are shown in Attachment G2.

The indoor air concentrations are estimated using the following relationships described by Johnson and Ettinger (1991):

$$C_{building} = \alpha\ C_{source}$$

where $C_{building}$ is the indoor air concentration, C_{source} is the source vapor concentration, and α is an attenuation coefficient that is given by the following equation:

$$\alpha = \frac{\left[\frac{D_T^{eff} A_B}{Q_{building} L_T}\right] \exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right)}{\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right) + \left[\frac{D_T^{eff} A_B}{Q_{building} L_T}\right] + \left[\frac{D_T^{eff} A_B}{Q_{soil} L_T}\right]\left[\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right) - 1\right]}$$

Derivation of this equation and definition of the equation parameters can be found in Johnson and Ettinger's 1991 journal article, and therefore, are not repeated here.

The effective diffusion coefficient term D_T^{eff} in the equation for the attenuation coefficient α is calculated based on "loamy sand" soil type, which is representative of the vadose zone soil at the Site. The soil-water profile in the vadose zone is estimated using the van Genuchten soil-water retention equation curve with, and default water retention parameters appropriate for, loamy sand (USEPA 2004a). These parameters are shown in Attachment G2.

The distance between contaminated soil and a building foundation L_T is assumed to be only 0.15 m, which is a default value used by the Michigan Department of Environmental Quality (MDEQ 2002) in deriving the Michigan Part 201 generic vapor intrusion criteria for soil. The distance between on-site groundwater and a building foundation is estimated to be approximately 1.8 m, which is a conservative estimate of the average depth to groundwater at the Site and is less than the MDEQ default value of 3 m.

The remaining parameters in the equation for the attenuation coefficient α, which relate to building characteristics, are based on default values that MDEQ (2002) used in deriving the Michigan Part 201 generic vapor intrusion criteria for commercial/industrial sites. These values are shown in Attachment G2; their bases are discussed in MDEQ guidance (1998).

Site-specific volatilization to indoor air criteria for soil and groundwater are derived using the following equation:

$$Vapor\ Intrusion\ Criteria = \frac{Occupational\ Air\ Standards}{C_{bldg}}$$

where the occupation inhalation standards are the MICIS criteria, OSHA PEL, or ACGIH TLVs as discussed above, and C_{bldg} is the model-predicted indoor air concentration per unit concentration in soil or in groundwater.

The source vapor concentration C_{source} for a constituent in soil is calculated from the constituent's concentration in soil C_{soil}, as follows:

$$C_{source} = C_{soil}\left(\frac{K_d}{H} + \frac{\theta_w}{\rho_b H} + \frac{\theta_a}{\rho_b}\right)^{-1}\left(\frac{10^3 L}{m^3}\right)$$

where K_d is the equilibrium-partitioning coefficient, H is the Henry's law constant, θ_w is the water-filled soil porosity, ρ_b is the soil bulk density, and θ_a is the air-filled soil porosity.

The source vapor concentration for a constituent in groundwater is calculated from the constituent's concentration in groundwater C_{gw}, as follows:

$$C_{source} = H \cdot C_{gw}\left(\frac{10^3 L}{m^3}\right)$$

Attachment G2 shows the site-specific volatilization to indoor air criteria that are based on occupational air standards for soil and groundwater and the ratios of soil and groundwater concentrations to the respective criteria. To ensure that estimated indoor air concentrations from assumed vapor intrusion do not contribute materially to total indoor air concentrations in existing buildings at the Site (which would include contributions from indoor occupational sources), the ratios of soil and groundwater concentrations to the site-specific vapor intrusion criteria were summed for each AOI (Table 6-7). In this evaluation, the ratios are used as equivalent ratios of indoor air concentrations from assumed vapor intrusion to the inhalation exposure limits. These results are presented in Attachment G2 and discussed in Section 6.5.2.1.

At AOIs where LNAPL was sampled, conservative estimates of indoor air concentrations resulting from potential volatilization and migration of LNAPL constituents through cracks in building foundations is calculated using the mathematical modeling approach discussed below.

The source vapor concentrations C_{source} for constituents in LNAPL are calculated using Raoult's law, as follows:

$$\mathrm{C}_{\mathrm{source}} = \frac{\mathrm{VP} \cdot \mathrm{MW}_{\mathrm{LNAPL}}}{\mathrm{R} \cdot \mathrm{T}}\,\mathrm{C}_{\mathrm{LNAPL}}$$

where C_{source} is the vapor concentration of the constituent, VP is its vapor pressure, MW_{LNAPL} is the molecular weight of LNAPL, R is the gas constant (0.062361 mm Hg m^3/mole/K), T is the absolute temperature, and C_{LNAPL} is the constituent's concentration in LNAPL.

The estimated indoor air concentrations resulting from potential volatilization and migration of LNAPL constituents through cracks in building foundations are compared to the same occupational inhalation limits discussed above for constituents in soil and groundwater (Table 6-8). The estimated indoor air concentrations and the ratios of these concentrations to the occupational inhalation limits are shown in Attachment G12.

G2.2.2 Off-Site Workers and Future On-Site Workers

As noted in Section 6.5, site-specific vapor intrusion criteria are used in calculating estimates of cumulative cancer risk and HI for hypothetical exposure of routine workers via assumed vapor intrusion from soil, groundwater, and LNAPL at the Site, and from groundwater off-site. The cancer risk and HQ estimates for vapor intrusion from soil in this scenario are calculated using equivalent forms of the inhalation risk equations that make use of site-specific risk-based criteria (RBC) for soil, in the same way as discussed in Section G2.1:

$$Risk = C_{building} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT \cdot TR} \cdot TR = \frac{C_{soil}}{RBC} \cdot TR$$

$$HQ = \frac{C_{building}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT \cdot THQ} \cdot THQ = \frac{C_{soil}}{RBC} \cdot THQ$$

where $C_{building}$ is concentration in indoor air, C_{soil} is concentration in soil, *URF* is unit risk factor, *RfC* is reference concentration, *ET* is a normalized exposure time, *EF* is exposure frequency, and *ED* is exposure duration. The equations for vapor intrusion from constituents in groundwater are the same as the above equations except C_{soil} is replaced with the concentration in groundwater C_{gw}. The risk-based criteria (*RBC*) for soil and groundwater in the above equations are based on the same modeling approach and input parameter values discussed in Section G2.2.1.

Similarly, conservative estimates of indoor air concentrations resulting from potential volatilization and migration of LNAPL constituents through cracks in building foundations are calculated using the mathematical modeling approach discussed in Section G2.2.1.

The estimates of cumulative cancer risk and HI for potential volatilization and migration through cracks in building foundations were calculated for soil, groundwater, and LNAPL at the Site and for groundwater off-site by AOI (Tables 6-7 and 6-9). The computation of the incremental risk and HQ estimates which were summed to determine the cumulative cancer risk and HI estimates for potential indoor air exposures for soil, groundwater, and LNAPL are included in Attachment G12.

G3 MAINTENANCE WORKERS

As discussed in Section 6.3 of the Revised RFI Phase II Report, risk estimates for maintenance workers are calculated for potential exposures to soil, groundwater, and LNAPL (including smear zone soil). The computation of these risk estimates are discussed in Sections G3.1, G3.2, and G3.3 respectively.

G3.1 Contact with Soil

The computation of risk estimates for worker exposure to soil via incidental ingestion, dermal contact, and inhalation of vapors and particulates during small-scale maintenance excavations is analogous to the computations discussed in Section G2.1, except for the soil exposure factors for maintenance workers discussed in Section 6.3.5.2 and the estimation of air and airborne dust concentrations discussed in Section 6.3.4.1.

The soil RBCs for maintenance workers are summarized in Attachment G3. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for exposure to the highest concentrations in soil at each AOI (Table 6-2). The computation of incremental risk and HQ estimates which were summed to determine these cumulative cancer risk and HI estimates is shown in Attachment G12.

G3.2 Contact with Groundwater

As discussed in Section 6.3 of the Revised RFI Phase II Report, maintenance workers could be exposed to groundwater via incidental ingestion, dermal contact, and inhalation of vapors during excavations that extend to the water table or maintenance work in the flooded basement, tunnel areas, and in storm water sewers. The cancer risk and HQ estimates for these exposure routes are calculated using risk-based criteria in a manner analogous to the method discussed in Section G2.1, except for the groundwater exposure factors for maintenance workers discussed in Section 6.3.5.2 and the estimation of air concentrations discussed in Section 6.3.4.1. In addition, the risk-based criteria for the inhalation route are calculated analogous to those discussed for maintenance worker exposure to soil via vapor inhalation in Section G3.1 with the exception of the normalized vapor flux.

The normalized vapor flux J of a chemical is estimated using an overall mass transfer coefficient that is recommended by USEPA (1995c):

$$K_L = \left(\frac{1}{k_l} + \frac{1}{H\,k_g} \right)^{-1} \left(\frac{m}{10^2\,cm} \right) \left(\frac{10^3\,L}{m^3} \right)$$

where H is the Henry's law constant, and k_l and k_g are the liquid-phase and gas-phase mass transfer coefficients (in cm/s) given by the following:

$$k_l = \left(\frac{MW_o}{MW} \right)^{0.5} \left(\frac{T}{298K} \right) k_{l,o}$$

$$k_g = \left(\frac{MW_w}{MW} \right)^{0.335} \left(\frac{T}{298K} \right)^{1.005} k_{g,w}$$

where MW, MW_o, and MW_w are the molecular weights of the chemical, oxygen, and water, T is the water's absolute temperature, $k_{l,o}$ is the liquid-phase mass transfer coefficient for oxygen (0.002 cm/s), and $k_{g,w}$ is the gas-phase mass transfer coefficient for water vapor (0.833 cm/s).

The groundwater RBCs for maintenance workers are summarized in Attachment G4. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for exposure to the highest concentrations in groundwater at each AOI (Tables 6-10 and 6-12). The computation of incremental risk and HQ estimates which were summed to determine these cumulative cancer risk and HI estimates is shown in Attachment G12.

G3.3 Contact with LNAPL and Smear Zone Soil

As discussed in Section 6.3 of the Revised RFI Phase II Report, maintenance workers conducting excavations that extend to the smear zone at AOIs containing LNAPL, as well as maintenance activities at storm sewers and Outfall 004, could be exposed to LNAPL and/or smear zone soil. Their most potentially significant exposure to LNAPL would be via dermal contact and inhalation of vapors. Potential routes of exposure to smear zone soil could include incidental ingestion, dermal contact, and inhalation of vapors. The cancer risk and HQ estimates for these potential exposures are calculated using the typical risk equations discussed in Section 6.5.1 of the Revised RFI Phase II Report.

The LNAPL constituent concentrations used in the computations are the maximum concentrations measured in LNAPL at each AOI. Smear zone soil samples are difficult to collect and were not collected during the RFI. However, the concentrations of LNAPL constituents in the smear zone are conservatively estimated in the risk assessment by assuming that the 20% of the pore volume in the smear zone soil is filled with LNAPL.

The concentration of a LNAPL constituent in the smear zone soil is estimated as follows:

$$C_{soil} = C_{NAPL} \cdot \rho_{NAPL} \cdot S \cdot \frac{n}{\rho_{soil}}$$

where C_{NAPL} is the concentration of the chemical in LNAPL, ρ_{NAPL} is the density of the LNAPL (approximately 0.88 kg/L), S is the pore saturation of LNAPL (20%), n is the total porosity of the soil (assumed to be 0.43), and ρ_{soil} is the dry bulk density of the soil (assumed to be 1.5 kg/L). The assumed soil porosity and bulk density are the default values USEPA recommended in the Soil Screening Guidance (USEPA 1996) and MDEQ used in derivation of the Act 451, Part 201 generic soil cleanup criteria, and are considered representative of the typical soil types found at the Site. The assumption of 20% LNAPL saturation is reasonably conservative since typical LNAPL residual saturation does not typically exceed 10% to 20% in unsaturated soil (Mercer and Cohen 1990), depending on the type of LNAPL and soil.

The LNAPL concentrations and the estimated smear zone soil concentrations are shown in Attachment G5. The estimated smear zone soil concentration is used to calculate dermal contact and ingestion exposures analogous to other soil exposures, as discussed in Section G2.1. Inhalation exposure from smear zone soil is calculated using the air dispersion factors discussed in Section 6.3.4.1 and the Jury model discussed in Section G2.1 for concentrations below the soil saturation limit. The soil saturation limit is the concentration above which the constituent may be present in free phase. For constituent concentrations above the soil saturation limit, the desaturation-front model is used since the Jury model ignores the saturation limit and would over-predict the vapor flux for soil concentrations above the saturation limit. This extension to the Jury model is based on diffusion of the constituent through an unsaturated zone that expands downward over time as the excess mass in the saturated zone is depleted. The vapor flux for the desaturation-front model is calculated as follows:

$$J_{av} = \rho_b \sqrt{\frac{2 D_E \cdot C_{sat} \cdot \left(C_i - \frac{1}{2} C_{sat}\right)}{T}}$$

where J_{av} is the average vapor flux over the averaging time, C_i is the initial concentration in soil that is assumed to be the same down to an infinite depth, and C_{sat} is the concentration in soil at the saturation limit, and the definition of the other equation parameters are the same as those in the Jury model.

The vapor concentration of LNAPL constituents in the air as a result of emission from LNAPL that is exposed in an open excavation pit is estimated using the "oil film surface emission model" (USEPA 1987), which is given by:

$$C_{air} = C_{NAPL} \cdot K\, e^{-K\,t/L} \cdot (C/Q)$$

where K is the chemical's overall mass transfer coefficient given by the following equation, L is thickness of the LNAPL film, and C/Q is a normalized air concentration as discussed in Section 6.3.4.1:

$$K = k_g \cdot K_{eq}$$

In this expression for K, k_g is the gas-phase mass transfer coefficient and K_{eq} is the equilibrium coefficient between a chemical's concentrations in air and in the LNAPL. These coefficients are defined as follows:

$$k_g = 0.00482\, u^{0.78} Sc_g^{\;-0.67} d_e^{\;-0.11}$$

$$K_{eq} = \frac{p\ \rho_{air}\ MW_{NAPL}}{p_O\ \rho_{NAPL}\ MW_{air}}$$

where u is wind speed (m/s), Sc_g is the chemical's gas-phase Schmidt number, d_e is effective diameter of the LNAPL film surface area (m), p is the chemical's vapor pressure, p_o is total pressure, ρ_{air} and ρ_{NAPL} are densities of air and LNAPL, and MW_{air} and MW_{NAPL} are molecular weights of air and LNAPL.

As shown in the above equation for C_{air}, the model can account for depletion of constituents in the LNAPL over time as they volatilize. However, this risk assessment conservatively assumes that the constituent in the exposed LNAPL layer do not deplete. This assumption is conservatively used to account for the possibility that exposed LNAPL in the pit could be

refreshed by “fresh” LNAPL that drains into the pit, such as when workers attempt to “dewater” the pit.

The computation of the incremental risk and HQ estimates which were summed to determine the cumulative cancer risk and HI estimates for this scenario (Table 6-11) are shown in Attachment G12.

G4 TRESPASSERS

As discussed in Section 6.3.3 of the Revised RFI Phase II Report, potential exposures of trespassers to soil are evaluated indirectly in the risk assessment by using risk estimates for exposures of routine workers to soil (Table 6-2). These estimates are discussed in Section G2.1.

G5 REDEVELOPMENT CONSTRUCTION WORKERS

As discussed in Section 6.3 of the Revised RFI Phase II Report, risk estimates for redevelopment construction workers are calculated for potential exposures to soil, groundwater, and LNAPL (including smear zone soil). The computation of these risk estimates are discussed in Sections G5.1, G5.2, and G5.3 respectively.

G5.1 Contact with Soil

The computation of risk estimates for worker exposure to soil via incidental ingestion, dermal contact, and inhalation of vapors and particulates during large-scale redevelopment excavations is analogous to the computations discussed in Section G2.1, except for the soil exposure factors for redevelopment construction workers discussed in Section 6.3.5.2 and the estimation of air and airborne dust concentrations discussed in Section 6.3.4.1.

The soil RBCs for redevelopment construction workers are summarized in Attachment G6. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for the Southend of the Site by area and by location (Tables 6-13 and 6-14). The computation of these cumulative cancer risk and HI estimates is shown in Attachments G12 and G13. For locations where upper-bound point estimates of cumulative cancer risk or HI exceeded USEPA limits, area-weighted cancer risk and HI estimates were calculated similar to the calculations discussed in section G2.1. For redevelopment construction workers, the area-weighting exposure area is defined as the Thiessen polygon (or adjacent polygons) with unacceptable bounding risk, together with all adjacent polygons because redevelopment activities are likely to extend over a larger area of the site than a half-acre area used for routine workers. This

exposure area extends up to 2.5 acres, which is still conservative for large-scale redevelopment construction work. All area-weighted calculations are shown in Attachment G14.

G5.2 Contact with Groundwater

As discussed in Section 6.3 of the Revised RFI Phase II Report, redevelopment construction workers could be exposed to groundwater via incidental ingestion, dermal contact, and inhalation of vapors during excavations that extend to the water table. Risk estimates for redevelopment construction worker exposure to groundwater are calculated analogous to those for maintenance workers as discussed above in Section G3.2, except for the groundwater exposure factors for redevelopment construction workers discussed in Section 6.3.5.2.

The groundwater RBCs for redevelopment construction workers are summarized in Attachment G7. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for the Southend of the Site (Table 6-15). The computation of incremental risk and HQ estimates which were summed to determine these cumulative cancer risk and HI estimates is shown in Attachment G12.

G5.3 Contact with LNAPL and Smear Zone Soil

As discussed in Section 6.3 of the Revised RFI Phase II Report, redevelopment construction workers conducting excavations that extend to the smear zone at AOIs containing LNAPL could be exposed to LNAPL and/or smear zone soil. Risk estimates for redevelopment construction worker exposure to LNAPL and/or smear zone soil are calculated analogous to those for maintenance workers as discussed above in Section G2.3, except for the exposure factors for redevelopment construction workers discussed in Section 6.3.5.2.

The computation of the incremental risk and HQ estimates which were summed to determine the cumulative cancer risk and HI estimates for this scenario (Table 6-16) is shown in Attachment G12.

G6 RESIDENTS

As discussed in Section 6.3 of the Revised RFI Phase II Report, the risk assessment evaluated potential exposure of residents via contact with outdoor soil and via vapor intrusion from soil, groundwater, and light non-aqueous phase liquid (LNAPL) below future buildings. The computation of risk estimates associated with exposure via contact with outdoor soil is discussed in Section G6.1, and the computation of risk estimates associated with exposure via vapor intrusion is discussed in Section G6.2.

G6.1 Contact with Soil

The computation of risk estimates for residential exposure to soil via incidental ingestion, dermal contact, and inhalation of vapors and particulates is analogous to the computations discussed in Section G2.1, except for the exposure factors for residents discussed in Section 6.3.5.2.

The RBCs for residential soil contact are summarized in Attachment G9. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for the Southend of the Site by area and by location (Tables 6-13 and 6-17). The computation of these cumulative cancer risk and HI estimates is shown in Attachments G12 and G13. For locations where upper-bound point estimates of cumulative cancer risk or HI exceeded USEPA limits, area-weighted cancer risk and HI estimates were calculated using a hypothetical ½ acre lot similar to the calculation discussed in section G2.1.

Additionally, the area-weighted lead concentration was estimated in one location (RFI-40-09) with lead above the residential screening limit of 400 mg/kg using the following equation:

$$area - weighted\ C_{lead} = \frac{\sum_i C_{lead,i} \cdot A_i}{\sum_i A_i}$$

where $C_{lead,i}$ is the lead concentration in polygon i, and A_i is the area of polygon i that falls within the hypothetical ½ acre lot.

All area-weighted calculations are shown in Attachment G14.

G6.2 Vapor Intrusion

Residents could be exposed to vapors from soil, groundwater, and LNAPL via volatilization and vapor intrusion through building foundations. The computation of risk estimates for residential exposure to vapors that could migrate into indoor air are analogous to the computations for routine workers discussed in Section G2.2, except for the exposure factors for residents discussed in Section 6.3.5.2 and the use of MDEQ default parameters for residential buildings with basements (MDEQ 2002), rather than those for industrial buildings.

The soil and groundwater RBCs for the residential vapor intrusion pathway are summarized in Attachment G10. These RBCs were used to calculate upper-bound estimates of cumulative cancer risk and HI for the Southend of the Site (Tables 6-19 and 6-20). The estimates of incremental risk and HQ estimates which were summed to determine the cumulative cancer

risk and HI for potential residential indoor air exposures for soil, groundwater, and LNAPL are included in Attachment G12.

G7 RECREATIONAL USERS

As discussed in Section 6.3 of the Revised RFI Phase II Report, potential off-site recreational users could be exposed to constituents in groundwater and/or storm sewer water via contact with nearby downgradient surface water in the Flint River. Surface water concentrations are estimated using the mass balance approach discussed below.

The concentration of a constituent in the surface water that results from groundwater entering the Flint River is calculated as follows:

$$C_{sw,1} = \frac{C_{gw} \cdot Q_{gw}}{Q_{gw} + (Q_{sw} \cdot Mixing\ Zone\ Factor)}$$

The flow rate of surface water in the Flint River, Q_{sw}, used in the calculations, 3.09 x 10^7 ft^3/day, is measured at the USGS Station 04148500 Flint River near Flint, MI. The mixing zone factor, 0.25, is from MDEQ Water Quality Standards (Part 4 R 323.1082(2)). The highest detected constituent concentrations among the monitoring wells nearest the Flint River (i.e., those selected for Groundwater Surface Water Interface (GSI) evaluation) are conservatively used as the concentrations in groundwater (C_{gw}) in the mass loading calculation.

The flow rate of groundwater into the river is calculated as follows:

$$Q_{gw} = K(h) \cdot i \cdot A$$

where the horizontal hydraulic conductivity, *K(h)*, is 6 ft/day based on specific-capacity tests for shallow monitoring wells installed during the RFI in the sandy fill and silty sand soil units, and the hydraulic gradient, *i*, is 0.02 based on the high end value of historical groundwater level measurements for areas near the Flint River. The area of discharge into the Flint River, *A*, is calculated as:

$$A = (\text{Distance Along River}) \cdot (\text{d}_{\text{GW/SW}})$$

The distance along river, 2900 ft, is measured as the linear distance between the northernmost and southernmost monitoring wells selected for comparison against the GSI criteria and is

conservatively used for all constituents even though most constituents were not detected in all the monitoring wells. The height of the groundwater/surface water interface, $d_{gw/sw}$, is conservatively assumed to be 9 ft, as depths of the Flint River at USGS gauging stations in the Flint area typically range from 4 to 9 ft.

The surface water concentration resulting from storm sewer outfall discharging to the Flint River is calculated as follows:

$$C_{sw,2} = \frac{M_{outfall}}{Q_{sw} \cdot \text{Mixing Zone Factor}}$$

The $M_{outfall}$ term (mass of constituents in storm sewer effluent) is estimated using data collected for the Site's NPDES permits and at various locations along the sewer networks during summer 2002 for PCBs and VOCs, respectively. The data collected as part of the NPDES permits are summarized in Table 1 of Appendix F.

The estimated surface water concentration resulting from groundwater and storm sewer discharging to the Flint River, C_{sw}, is calculated as follows:

$$C_{sw} = C_{sw,1} + C_{sw,2}$$

Attachment G11 presents the estimates of surface water concentrations in the above equations shown on Table 6-22.

Attachment G0
Chemical Properties and Toxicity Information

Attachment G0: Toxicity Values
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	Carc Class			SF_{oral} (mg/kg/d)$^{-1}$			RfD_{oral} (mg/kg/d)				SF_{derm} (mg/kg/d)$^{-1}$			RfD_{derm} (mg/kg/d)				$SRfD_{derm}$ (mg/kg/d)				SRfC (mg/m^3)			
			Class	Ref	Notes	Value	Ref	Notes	Value	UF	Ref	Note	Value	Ref	Note	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes
VOC	Acetone	67-64-1	ID	1					9.00E-01	1000	1					9.00E-01	1000	125	104	1.00E+00	100	125	104	3.50E+00	100	2	4, 44
VOC	Benzene	71-43-2	A	1		5.50E-02	1	68	4.00E-03	300	1		5.50E-02	125	104	4.00E-03	300	125	104	4.00E-03	300	125	104	6.00E-02	100	94	50,69
VOC	Bromodichloromethane	75-27-4	B2	1		6.20E-02	1		2.00E-02	1000	1		6.20E-02	125	104	2.00E-02	1000	125	104	2.00E-02	1000	125	104	7.00E-02	1000	2	2, 4, 44
VOC	Bromoform	75-25-2	B2	1		7.90E-03	1		2.00E-02	1000	1		7.90E-03	125	104	2.00E-02	1000	125	104	2.00E-01	100	125	104			2	90, 62
VOC	Bromomethane	74-83-9	D	1					1.40E-03	1000	1					1.40E-03	1000	125	104	5.00E-03	300	125	104	2.00E-01	30	24	
VOC	2-Butanone	78-93-3	ID	1					6.00E-01	1000	1					6.00E-01	1000	125	104	2.00E+00	1000	125	104	5.00E+00	300	1	62
VOC	Carbon Disulfide	75-15-0							1.00E-01	100	1					1.00E-01	100	125	104	1.00E-01	100	125	104	7.00E-01	30	2	2
VOC	Carbon Tetrachloride	56-23-5	B2	1		1.30E-01	1		7.00E-04	1000	1		1.30E-01	125	104	7.00E-04	1000	125	104	7.00E-03	100	125	104				
VOC	Chlorobenzene	108-90-7	D	1					2.00E-02	1000	1					2.00E-02	1000	125	104	2.00E-02	1000	125	104	6.00E-02	1000	103	62
VOC	Chloroethane	75-00-3				2.90E-03	3		4.00E-01		3		2.90E-03	125	104	4.00E-01		125	104	4.00E-01		125	104	1.00E+01	300	2	2
VOC	Chloroform	67-66-3	B2	1					1.00E-02	1000	1					1.00E-02	1000	125	104	1.00E-02	1000	125	104	5.00E-02	100	117	
VOC	Chloromethane	74-87-3	D	1																				9.00E-02	1000	1	62
VOC	Cumene	98-82-8	D	1					1.00E-01	1000	1					1.00E-01	1000	125	104	4.00E-01	300	125	104	4.00E-01	1000	1	62
VOC	Cyclohexane	110-82-7	ID	1																				6.00E+00	300	1	62
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	2		1.40E+00	2						1.40E+00	125	104									2.00E-04	1000	1	62
VOC	Dibromochloromethane	124-48-1	C	1		8.40E-02	1		2.00E-02	1000	1		8.40E-02	125	104	2.00E-02	1000	125	104	2.00E-01	100	125	104	7.00E-01	100	2	4, 44
VOC	1,2-Dibromoethane	106-93-4	LC	1		2.00E+00	1		9.00E-03	3000	1		2.00E+00	125	104	9.00E-03	3000	125	104	9.00E-03	3000	125	104	9.00E-03	300	1	62
VOC	1,2-Dichlorobenzene	95-50-1	D	1					9.00E-02	1000	1					9.00E-02	1000	125	104	9.00E-02	1000	125	104	2.00E+00	100	2	3
VOC	1,3-Dichlorobenzene	541-73-1	D	1					9.00E-02	1000	1	10				9.00E-02	1000	125	104	9.00E-02	1000	125	104	1.40E-01	1000	2	3, 10, 44, 62
VOC	1,4-Dichlorobenzene	106-46-7	C	2		2.40E-02	2	6	3.00E-02		3		2.40E-02	125	104	3.00E-02		125	104	3.00E-02		125	104	2.50E+00	30	2	
VOC	Dichlorodifluoromethane	75-71-8							2.00E-01	100	1					2.00E-01	100	125	104	9.00E-01	100	125	104	2.00E+00	1000	2	
VOC	1,1-Dichloroethane	75-34-3	C	1					1.00E-01	1000	2	26,6				1.00E-01	1000	125	104	1.00E+00	100	125	104	5.00E+00	100	2	3
VOC	1,2-Dichloroethane	107-06-2	B2	1		9.10E-02	1		2.00E-02		3		9.10E-02	125	104	2.00E-02		125	104	2.00E-02		125	104	5.00E-03	3000	102	92, 62
VOC	1,1-Dichloroethene	75-35-4	C	1					5.00E-02	100	1					5.00E-02	100	125	104	5.00E-02	100	125	104	2.00E-01	30	1	62
VOC	1,2-Dichloroethene (total)	540-59-0							9.00E-03	1000	2					9.00E-03	1000	125	104	9.00E-03	1000	125	104	3.15E-02	1000	2	4, 44
VOC	cis-1,2-Dichloroethene	156-59-2	D	1					1.00E-02	3000	126					1.00E-02	3000	125	104	1.00E-01	300	125	104	3.50E-01	300	126	4, 44
VOC	trans-1,2-Dichloroethene	156-60-5							2.00E-02	1000	1					2.00E-02	1000	125	104	2.00E-01	100	125	104	5.95E-02		3	44, 62
VOC	1,2-Dichloropropane	78-87-5	B2	2		6.80E-02	2	6					6.80E-02	125	104									1.30E-02	100	2	
VOC	1,3-Dichloropropene (total)	542-75-6	B2	1		1.00E-01	1	77	3.00E-02	100	1		1.00E-01	125	104	3.00E-02	100	125	104	3.00E-02	100	125	104	2.00E-02	30	2	2
VOC	cis-1,3-Dichloropropene	10061-01-5				1.00E-01	1	77, 11	3.00E-02	100	1	11	1.00E-01	125	104	3.00E-02	100	125	104	3.00E-02	100	125	104	2.00E-02	30	2	2, 11
VOC	trans-1,3-Dichloropropene	10061-02-6																									
VOC	Ethyl Benzene	100-41-4	D	1					1.00E-01	1000	1					1.00E-01	1000	125	104	1.00E-01	1000	125	104	1.00E+00	300	126	
VOC	2-Hexanone	591-78-6							4.00E-02	10000	40					4.00E-02	10000	125	104	4.00E-02	10000	125	104	5.00E-03	10000	108	62
VOC	Methyl Acetate	79-20-9							1.00E+00	1000	2					1.00E+00	1000	125	104	1.00E+01	100	125	104	3.50E+01	100	2	4, 44
VOC	Methyl tert-butyl ether	1634-04-4																						3.00E+00	100	1	62
VOC	4-Methyl-2-pentanone	108-10-1	ID	1							1	90						125	104			125	104	3.00E+00	300	1	62
VOC	Methylcyclohexane	108-87-2																						3.00E+00	100	2	
VOC	Methylene Chloride	75-09-2	B2	1		7.50E-03	1		6.00E-02	100	1		7.50E-03	125	104	6.00E-02	100	125	104	6.00E-02	100	125	104	3.00E+00	100	2	
VOC	Styrene	100-42-5							2.00E-01	1000	1	6				2.00E-01	1000	125	104	2.00E-01	1000	125	104	3.00E+00	10	2	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1		2.00E-01	1		6.00E-02	300	101		2.00E-01	125	104	6.00E-02	300	125	104	6.00E-02	300	125	104			88	90, 62
VOC	Tetrachloroethene	127-18-4	C-B2	77		5.20E-02	77		1.00E-02	1000	1		5.20E-02	125	104	1.00E-02	1000	125	104	1.00E-01	100	125	104	4.00E-01	300	109	94, 62
VOC	Toluene	108-88-3	D	1					8.00E-02	3000	1					8.00E-02	3000	125	104	8.00E-01	300	125	104	5.00E+00	10	1	
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1					1.00E-02	1000	1					1.00E-02	1000	125	104	1.00E-02	1000	125	104	2.00E+00	100	2	
VOC	1,1,1-Trichloroethane	71-55-6	D	1					2.80E-01		3					2.80E-01		125	104	2.80E-01		125	104	2.20E+01	90	126	
VOC	1,1,2-Trichloroethane	79-00-5	C	1		5.70E-02	1		4.00E-03	1000	1		5.70E-02	125	104	4.00E-03	1000	125	104	4.00E-02	100	125	104				
VOC	Trichloroethene	79-01-6	C-B2	49	18	1.10E-02	49		6.00E-03	3000	46	6, 97	1.10E-02	125	104	6.00E-03	3000	125	104	6.00E-03	3000	125	104				
VOC	Trichlorofluoromethane	75-69-4							3.00E-01	1000	1					3.00E-01	1000	125	104	7.00E-01	1000	125	104	7.00E+00	1000	2	3
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1							3.00E+01	10	1					3.00E+01	10	125	104	3.00E+01	10	125	104	3.00E+01	100	2	

Attachment G0: Toxicity Values
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	Carc Class			SF_{oral} $(mg/kg/d)^{-1}$			RfD_{oral} (mg/kg/d)				SF_{derm} $(mg/kg/d)^{-1}$			RfD_{derm} (mg/kg/d)				$SRfD_{derm}$ (mg/kg/d)				SRfC (mg/m^3)			
			Class	Ref	Notes	Value	Ref	Notes	Value	UF	Ref	Note	Value	Ref	Note	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	126					5.00E-02	3000	126					5.00E-02	3000	125	104	5.00E-01	300	125	104	6.00E-02	300	126	109
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	126					5.00E-02	3000	126					5.00E-02	3000	125	104	5.00E-01	300	125	104	6.00E-02	300	126	
VOC	Vinyl Chloride	75-01-4	A	1		1.40E+00	1	78	3.00E-03	30	1		1.40E+00	125	104	3.00E-03	30	125	104	3.00E-03	30	125	104	1.00E-01	30	1	62
VOC	Xylenes (total)	1330-20-7	ID	1					2.00E-01	1000	1					2.00E-01	1000	125	104	4.00E-01	1000	125	104	1.00E-01	300	1	62
SVOC	Acenaphthene	83-32-9							6.00E-02	3000	1					6.00E-02	3000	125	104	6.00E-01	300	125	104	2.10E+00	300	2	4, 44
SVOC	Acenaphthylene	208-96-8	D	1					3.00E-02	3000	1	20				3.00E-02	3000	125	104	3.00E-01	300	125	104	1.05E+00	300	2	20, 4, 44
SVOC	Acetophenone	98-86-2	D	1					1.00E-01	3000	1					1.00E-01	3000	125	104	1.00E+00	300	125	104	3.50E+00	300	2	4, 44
SVOC	Anthracene	120-12-7	D	1					3.00E-01	3000	1					3.00E-01	3000	125	104	3.00E+00	300	125	104			2	90, 62
SVOC	Atrazine	1912-24-9	C	2		2.22E-01	2		3.50E-02	100	1		2.22E-01	125	104	3.50E-02	100	125	104	3.50E-02	100	125	104	1.23E-01	100	1	62, 4, 44
SVOC	Benzaldehyde	100-52-7							1.00E-01	1000	1					1.00E-01	1000	125	104	1.00E-01	1000	125	104	3.50E-01	1000	1	62, 4, 44
SVOC	Benzo(a)anthracene	56-55-3	B2	1		7.30E-01	10	5					7.30E-01	125	104												
SVOC	Benzo(a)pyrene	50-32-8	B2	1		7.30E+00	1						7.30E+00	125	104												
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1		7.30E-01	10	5					7.30E-01	125	104												
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1					3.00E-02	3000	1	20				3.00E-02	3000	125	104	3.00E-01	300	125	104	1.05E+00	300	2	20, 4, 44
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1		7.30E-02	10	5					7.30E-02	125	104												
SVOC	Biphenyl	92-52-4	D	1					5.00E-02	1000	1					5.00E-02	1000	125	104	5.00E-02	1000	125	104	1.75E-01	1000	1	62, 4, 44
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1																							
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1		1.10E+00	1						1.10E+00	125	104												
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1		1.40E-02	1		2.00E-02	1000	1		1.40E-02	125	104	2.00E-02	1000	125	104	2.00E-02	1000	125	104	2.00E-01	100	16	
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1																							
SVOC	Butylbenzylphthalate	85-68-7	C	1		1.90E-03	3		2.00E-01	1000	1		1.90E-03	125	104	2.00E-01	1000	125	104	2.00E+00	100	125	104	7.00E+00	100	2	4, 44
SVOC	Caprolactam	105-60-2							5.00E-01	100	1					5.00E-01	100	125	104	5.00E-01	100	125	104	1.75E+00	100	2	4, 44
SVOC	Carbazole	86-74-8	B2	2		2.00E-02	2						2.00E-02	125	104												
SVOC	4-Chloro-3-methylphenol	59-50-7																		2.00E+00	100	125	104	7.00E+00	100	2	4, 44
SVOC	4-Chloroaniline	106-47-8				5.40E-02	3		4.00E-03	3000	1		5.40E-02	125	104	4.00E-03	3000	125	104	4.00E-03	3000	125	104	1.40E-02	3000	2	2, 4, 44
SVOC	2-Chloronaphthalene	91-58-7							8.00E-02	3000	1					8.00E-02	3000	125	104	8.00E-02	3000	125	104	2.80E-01	3000	1	62, 4, 44
SVOC	2-Chlorophenol	95-57-8							5.00E-03	1000	1					5.00E-03	1000	125	104	5.00E-02	100	125	104	1.75E-01	100	2	4, 44
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3																									
SVOC	Chrysene	218-01-9	B2	1		7.30E-03	10	5					7.30E-03	125	104												
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1		7.30E+00	10	5					7.30E+00	125	104												
SVOC	Dibenzofuran	132-64-9	D	1					2.00E-03		3					2.00E-03		125	104	2.00E-03		125	104	7.00E-03		3	62, 4, 44
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1		4.50E-01	1						4.50E-01	125	104												
SVOC	2,4-Dichlorophenol	120-83-2							3.00E-03	100	1					3.00E-03	100	125	104	3.00E-03	100	125	104	1.05E-02	100	2	2, 4, 44
SVOC	Diethylphthalate	84-66-2	D	1					8.00E-01	1000	1					8.00E-01	1000	125	104	8.00E+00	100	125	104	2.80E+01	100	2	4, 44
SVOC	2,4-Dimethylphenol	105-67-9							2.00E-02	3000	1					2.00E-02	3000	125	104	2.00E-01	300	125	104	7.00E-01	300	2	4, 44
SVOC	Dimethylphthalate	131-11-3	D	1						100	2	90					100	125	104	1.00E+01	100	125	104			2	90, 62
SVOC	Di-n-butylphthalate	84-74-2	D	1					1.00E-01	1000	1	6				1.00E-01	1000	125	104	1.00E+00	100	125	104			1	90, 62
SVOC	4,6-Dinitro-2-methylphenol	534-52-1							1.00E-04		3					1.00E-04		125	104	1.00E-04		125	104	3.50E-04		3	62, 4, 44
SVOC	2,4-Dinitrophenol	51-28-5							2.00E-03	1000	1					2.00E-03	1000	125	104	2.00E-03	1000	125	104			2	90, 62
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1	28	6.80E-01	1	28	2.00E-03	100	1		6.80E-01	125	104	2.00E-03	100	125	104	2.00E-03	100	125	104			2	90, 62
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1	28	6.80E-01	1	28	1.00E-03	3000	2	6	6.80E-01	125	104	1.00E-03	3000	125	104	1.00E-02	300	125	104	3.50E-02	300	2	4, 44
SVOC	Di-n-octylphthalate	117-84-0							4.00E-02	1000	126					4.00E-02	1000	125	104	4.00E-01	100	125	104			126	90
SVOC	Fluoranthene	206-44-0	D	1					4.00E-02	3000	1					4.00E-02	3000	125	104	4.00E-01	300	125	104	1.40E+00	300	2	4, 44
SVOC	Fluorene	86-73-7	D	1					4.00E-02	3000	1					4.00E-02	3000	125	104	4.00E-01	300	125	104	1.40E+00	300	2	4, 44
SVOC	Formaldehyde	50-00-0	B1	1					2.00E-01	100	1					2.00E-01	100	125	104	2.00E-01	100	125	104				
SVOC	Hexachlorobenzene	118-74-1	B2	1		1.60E+00	1		8.00E-04	100	1		1.60E+00	125	104	8.00E-04	100	125	104	8.00E-04	100	125	104			1	90, 62
SVOC	Hexachlorobutadiene	87-68-3	C	1		7.80E-02	1		2.00E-04	1000	2	6	7.80E-02	125	104	2.00E-04	1000	125	104	7.00E-04	300	125	104				
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1					6.00E-03	1000	1					6.00E-03	1000	125	104	7.00E-02	100	125	104	7.00E-04	100	2	

Attachment G0: Toxicity Values
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	Carc Class			SF_{oral} $(mg/kg/d)^{-1}$			RfD_{oral} (mg/kg/d)				SF_{derm} $(mg/kg/d)^{-1}$			RfD_{derm} (mg/kg/d)				$SRfD_{derm}$ (mg/kg/d)				SRfC (mg/m^3)			
			Class	Ref	Notes	Value	Ref	Notes	Value	UF	Ref	Note	Value	Ref	Note	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes
SVOC	Hexachloroethane	67-72-1	C	1		1.40E-02	1		1.00E-03	1000	1		1.40E-02	125	104	1.00E-03	1000	125	104	1.00E-02	100	125	104				
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1		7.30E-01	10	5					7.30E-01	125	104												
SVOC	Isophorone	78-59-1	C	1		9.50E-04	1		2.00E-01	1000	1		9.50E-04	125	104	2.00E-01	1000	125	104	2.00E+00	100	125	104			2	90, 62
SVOC	2-Methylnaphthalene	91-57-6	ID	1					4.00E-03	1000	1					4.00E-03	1000	125	104	4.00E-03	1000	125	104	3.00E-03	3000	1	61, 62
SVOC	Methylphenol (total)	1319-77-3							5.00E-02		1	99				5.00E-02		125	104	5.00E-01		125	104			1	90, 99
SVOC	2-Methylphenol	95-48-7	C	1					5.00E-02	1000	1					5.00E-02	1000	125	104	5.00E-01	100	125	104			1	90, 62
SVOC	4-Methylphenol	106-44-5	C	1					5.00E-03	1000	2	6				5.00E-03	1000	125	104	5.00E-03	1000	125	104			42	90,92, 62
SVOC	Naphthalene	91-20-3	C	1					2.00E-02	3000	1					2.00E-02	3000	125	104	2.00E-01	300	125	104	3.00E-03	3000	1	62
SVOC	2-Nitroaniline	88-74-4							3.00E-03		3					3.00E-03		125	104	3.00E-03		125	104	2.00E-03	1000	2	
SVOC	3-Nitroaniline	99-09-2	C	112		2.10E-02	112		3.00E-04	1000	110		2.10E-02	125	104	3.00E-04	1000	125	104	3.00E-04	1000	125	104	1.00E-03	3000	111	62
SVOC	4-Nitroaniline	100-01-6	C	115		2.10E-02	115		3.00E-03	100	113		2.10E-02	125	104	3.00E-03	100	125	104	3.00E-03	100	125	104	4.00E-03	1000	114	62
SVOC	Nitrobenzene	98-95-3	D	1					5.00E-04	10000	1	6				5.00E-04	10000	125	104	5.00E-03	1000	125	104	2.00E-02	1000	2	3
SVOC	2-Nitrophenol	88-75-5																									
SVOC	4-Nitrophenol	100-02-7																									
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1		4.90E-03	1		2.00E-02	3000	126		4.90E-03	125	104	2.00E-02	3000	125	104	2.00E-02	3000	125	104			126	90,98
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1		7.00E+00	1						7.00E+00	125	104												
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2		7.00E-02	2		4.00E-02		1		7.00E-02	125	104	4.00E-02		125	104	4.00E-02		125	104				
SVOC	Pentachlorophenol	87-86-5	B2	1		1.20E-01	1		3.00E-02	100	1		1.20E-01	125	104	3.00E-02	100	125	104	3.00E-02	100	125	104	1.05E-01	100	2	4, 44
SVOC	Phenanthrene	85-01-8	D	1					3.00E-02	3000	1	20				3.00E-02	3000	125	104	3.00E-01	300	125	104	1.05E+00	300	2	20, 4, 44
SVOC	Phenol	108-95-2	ID	1					3.00E-01	300	1					3.00E-01	300	125	104	3.00E-01	300	125	104			1	90,98, 62
SVOC	Pyrene	129-00-0	D	1					3.00E-02	3000	1					3.00E-02	3000	125	104	3.00E-01	300	125	104	1.05E+00	300	2	4, 44
SVOC	2,4,5-Trichlorophenol	95-95-4							1.00E-01	1000	1					1.00E-01	1000	125	104	1.00E+00	100	125	104			2	90, 62
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1		1.10E-02	1		1.00E-04		4		1.10E-02	125	104	1.00E-04		125	104	1.00E-04		125	104			2	90, 62
PCB	PCBs (total)	1336-36-3	B2	1		2.00E+00	1	30,32	2.00E-05	300	1	72	2.00E+00	125	104	2.00E-05	300	125	104	5.00E-05	100	125	104				
INORG	Antimony	7440-36-0							4.00E-04	1000	1					6.00E-05	1000	125	104	6.00E-05	1000	125	104	1.40E-03	1000	1	62, 4, 44
INORG	Arsenic	7440-38-2	A	1		1.50E+00	1		3.00E-04	3	1		1.50E+00	125	104	3.00E-04	3	125	104	5.00E-03	10	125	104				
INORG	Barium	7440-39-3	D	1					7.00E-02	3	1					4.90E-03	3	125	104	4.90E-03	3	125	104			1	90, 62
INORG	Beryllium	7440-41-7	B1	1					2.00E-03	300	1					1.40E-05	300	125	104	1.40E-05	300	125	104	2.00E-05	10	1	62
INORG	Cadmium	7440-43-9	B1	1					1.00E-03	10	1	95				2.50E-05	10	125	104	2.50E-05	10	125	104	9.00E-04		122	102
INORG	Chromium (total)	7440-47-3							3.00E-03	900	1	8				7.50E-05	900	125	104	5.00E-04	100	125	104	1.00E-04	300	1	59, 8, 62
INORG	Chromium III	16065-83-1	D	1					1.50E+00	1000	1					1.95E-02	1000	125	104	1.95E-02	1000	125	104	5.25E+00	1000	1	62, 4, 44
INORG	Chromium VI	18540-29-9	A	1					3.00E-03	900	1					7.50E-05	900	125	104	5.00E-04	100	125	104	1.00E-04	300	1	59, 62
INORG	Cobalt	7440-48-4	B1	126					2.00E-02	10	126					2.00E-02	10	125	104	2.00E-02	10	125	104	2.00E-05	100	126	62
INORG	Copper	7440-50-8	D	1					4.00E-02	2	50	49				4.00E-02	2	125	104	4.00E-02	2	125	104	1.40E-01	2	50	49, 62, 4, 44
INORG	Cyanide (total)	57-12-5	D	1					2.00E-02	500	1					2.00E-02	500	125	104	2.00E-02	500	125	104	7.00E-02	500	2	2, 4, 44
INORG	Fluoride	16984-48-8																									
INORG	Lead	7439-92-1	B2	1																							
INORG	Manganese	7439-96-5	D	1					1.40E-01	1	1					8.40E-03	1	125	104	8.40E-03	1	125	104	5.00E-05	1000	1	62
INORG	Mercury	7439-97-6	D	1					3.00E-04	1000	1	51				3.00E-04	1000	125	104	3.00E-04	1000	125	104	3.00E-04	30	2	
INORG	Nickel	7440-02-0	A	1					2.00E-02	300	1					8.00E-04	300	125	104	8.00E-04	300	125	104				
INORG	Selenium	7782-49-2	D	1					5.00E-03	3	1					5.00E-03	3	125	104	5.00E-03	3	125	104	1.75E-02	3	2	2, 4, 44
INORG	Silver	7440-22-4	D	1					5.00E-03	3	1					2.00E-04	3	125	104	2.00E-04	3	125	104	1.00E-05	1000	83	62
INORG	Thallium	7440-28-0							7.00E-05	3000	52	49				7.00E-05	3000	125	104	7.00E-05	3000	125	104	2.45E-04	3000	52	49, 62, 4, 44
INORG	Vanadium	7440-62-2							7.00E-03	100	2	6				1.82E-04	100	125	104	1.82E-04	100	125	104	2.45E-02	100	2	4, 44
INORG	Zinc	7440-66-6	D	1					3.00E-01	3	1					3.00E-01	3	125	104	3.00E-01	3	125	104	1.05E+00	3	2	2, 4, 44

Attachment G0: Toxicity Values Notes and References
GMC: NAO Flint Operations Site, Flint, Michigan

Notes:	
2	USEPA adopted chronic value as subchronic value.
3	HEAST Alternate Method.
4	ENVIRON obtained value by route-to-route extrapolation.
6	Under review, according to IRIS.
8	ENVIRON used Chromium VI [CASRN 18540-29-9] value from IRIS (reference 1) as a surrogate.
10	ENVIRON used 1,2-Dichlorobenzene [CASRN 95-50-1] value from the indicated reference as a surrogate.
11	ENVIRON used 1,3-Dichloropropene (total) [CASRN 542-75-6] value from the indicated reference as a surrogate.
18	Not verifiable, according to IRIS.
20	ENVIRON used Pyrene [CASRN 129-00-0] value from IRIS (reference 1) as a surrogate.
26	USEPA obtained value by route-to-route extrapolation.
28	USEPA used 2,4-,2,6-Dinitrotolunene mixture value from IRIS (reference 1) as a surrogate.
30	Upper-bound slope factor.
32	High risk & persistence tier for: food chain exposure; sediment/soil ingestion; dust/aerosol inhalation; dermal exposure, if an absorption factor is applied; presence of dioxin-like, tumor-promoting/persistent congeners; and all early life exposures.
34	Lowest risk & persistence tier. Criteria for use: congener or isomer analyses verify that congeners with more than 4 chlorines comprise less than 1/2 % of total PCBs.
44	ENVIRON derived inhalation RfC from inhalation RfD value presented in the indicated reference, using standard USEPA methodology presented in HEAST.
45	ENVIRON derived inhalation URF from Inhalation Slope Factor value presented in the indicated reference, using standard USEPA methodology presented in HEAST.
49	ENVIRON derived oral RfD from adverse health effect level value presented in the indicated reference.
50	Personal communication with NCEA indicated the supporting paper had been retired.
51	ENVIRON used Mercuric Chloride [CASRN 7487-94-7] value from the indicated reference as a surrogate.
52	ENVIRON derived inhalation Slope Factor from inhalation URF value presented in the indicated reference, using standard USEPA methodology presented in HEAST.
59	This RfD is for particulates. The RfD for chromic acid mists and dissolved Chromium VI aerosols is 0.000008 mg/m3.
60	IRIS provides a range of 2.2E-6 to 7.8E-6 (ug/m3)-1 as the inhalation URF for Benzene.
61	ENVIRON used Naphthalene [CASRN 91-20-3] value from indicated reference as a surrogate.
62	ENVIRON used chronic value as a surrogate for the subchronic value.
63	ENVIRON derived inhalation RfD from inhalation RfC published in the indicated reference, using standard USEPA methodology presented in HEAST.
64	ENVIRON removed uncertainty factor used by USEPA to convert from subchronic to chronic exposure.
68	IRIS provides a range of 1.5E-2 to 5.5E-2 (mg/kg/d)-1 as the oral Slope Factor for Benzene.
69	Personal communication with NCEA indicated the retired paper should be used until a new value is published in IRIS.
72	ENVIRON used Aroclor 1254 [CASRN 11097-69-1] value from the indicated reference as a surrogate for PCBs [CASRN 1336-36-3].
77	IRIS provides an alternate slope factor of 5E-2; however, EPA does not recommend its use, due to the higher uncertainty in the delivered dose in the supporting study.
78	IRIS recommends an oral Slope Factor for Vinyl Chloride of 7.2E-1 (mg/kg/d)-1 to account for continuous lifetime exposure during adulthood; a twofold increase to 1.4 (mg/kg/d)-1 is recommended to account for continuous exposure from birth.
79	IRIS recommends an inhalation URF for Vinyl Chloride of 4.4E-6 (ug/m3)-1 to account for continuous lifetime exposure during adulthood; a twofold increase to 8.8E-6 (ug/m3)-1 is recommended to account for continuous exposure from birth.
83	ENVIRON used PCBs (total) [CASRN 1336-36-3] value as a surrogate.
90	Inadequate data exist to derive a toxicity value, according to the indicated reference.
92	NCEA directed ENVIRON to use outdated value.

Attachment G0: Toxicity Values Notes and References
GMC: NAO Flint Operations Site, Flint, Michigan

93	Personal communication with NCEA indicated the HEAST LOAEL of 1000 mg and the subchronic RfD of 7E-1mg/kg-day both appear to be incorrect and recommended using the IRIS RfD of 3E-1 as the subchronic RfD.
94	Two provisional RfC values are presented in the indicated reference (4E-1 and 6E-1 mg/m3). Personal communication with NCEA indicated that either RfC is acceptable and the RfC should be chosen on a case-by-case basis.
95	This RfD is for dietary exposure. The RfD for drinking water exposure is 0.0005 mg/kg/day.
97	ENVIRON used withdrawn source.
98	Route-to-route extrapolation is not appropriate, according to the indicated reference.
99	ENVIRON used 3-Methylphenol [CASRN 108-39-4] values from the indicated reference as a surrogate.
102	A dose equivalency factor of 4.5 was applied to the chronic RfC to derive the subchronic RfC.
104	Dermal toxicity value is extrapolated from oral toxicity value in accordance with the referenced EPA guidance.
105	Adjustment for gastrointestinal absorption efficiencies should not be applied according to the indicated reference.
106	This ABSGI is for dietary exposure. The ABSGI for drinking water exposure is 0.050.
107	Per Exhibit 4-1 in the indicated reference, the ABSGI value ranges from 30 to 80 percent.
109	ENVIRON used 1,3,5-Trimethylbenzene [CASRN 108-67-8] values from the indicated reference as a surrogate.
References:	
1	USEPA. Integrated Risk Information System (IRIS). On-line database.
2	USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). FY-1997 Update. EPA 540/R-97-036. July.
3	USEPA. Region III. 2005. Risk-Based Concentration Table. April.
4	USEPA. Region IX. 2004. Preliminary Remediation Goal Table. December.
10	USEPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. EPA/600/2-93/089. July.
16	USEPA. NCEA. 1993. Provisional Subchronic RfC for Di(2-ethylhexyl)phthalate [CASRN 117-81-7]. August 25.
24	USEPA. NCEA. 1992. Derivation of a Provisional Subchronic Inhalation RfC for Bromomethane [CASRN 74-83-9]. October 22.
25	USEPA. NCEA. 1994. Derivation of a Provisional Subchronic Oral RfD for Bromomethane [CASRN 74-83-9]. May 9.
26	USEPA. NCEA. 1994. Derivation of a Provisional Subchronic Oral RfD for Hexachlorobutadiene [CASRN 87-68-3]. January 24.
27	USEPA. NCEA. 1994. Derivation of a Provisional Subchronic Inhalation RfC for Toluene [CASRN 108-88-3]. May 25.
40	USEPA. NCEA. 1993. Risk Assessment Issue paper for: Derivation of a Provisional RfD for 2-Hexanone (Methyl-n-butyl ketone) [CASRN 591-78-6]. June 24.
42	USEPA. NCEA. 1994. Risk Assessment Issue paper for: Evaluation of Systemic Toxicity after Inhalation Exposure to 4-Methylphenol (p-cresol) [CASRN 106-44-5]. May 5.
46	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Provisional oral RfD for Trichloroethylene [CASRN 79-01-6].
49	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Carcinogenicity Information for Trichloroethylene (TCE) [CASRN 79-01-6]. September 6.
50	USEPA. 56 FR 26460, June 7, 1991. Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper. Final Rule.
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64	USEPA. NCEA. 1994. Risk Assessment Issue Paper for: Derivation of the Subchronic Oral Reference Dose for Mixed Xylenes [CASRN 1330-20-7]. September 30.
77	USEPA. NCEA. 2001. Risk Assessment Issue Paper for Carcinogenicity Information for Tetrachloroethylene (perchloroethylene, PERC) [CASRN 127-18-4]. December 20.
78	USEPA. NCEA. 1999. Risk Assessment Paper for: The Derivation of a Provisional Oral Subchronic RfD for Carbon Tetrachloride [CASRN 56-23-5]. June 14.

Attachment G0: Toxicity Values Notes and References GMC: NAO Flint Operations Site, Flint, Michigan	
79	USEPA. NCEA. 1999. Risk Assessment Paper for: The Derivation of a Provisional Oral Subchronic RfC for Carbon Tetrachloride [CASRN 56-23-5]. June 14.
83	USEPA. NCEA. 1994. Risk Assessment Issue Paper for: Derivation of a Provisional RfC for Silver [CASRN 7440-22-4]. June 30.
88	USEPA. NCEA. 2002. Risk Assessment Issue paper for: Derivation of a Provisional RfC for 1,1,2,2-Tetrachloroethane[CASRN 79-34-5]. January 15.
94	USEPA. NCEA. 1996. Risk Assessment Issue paper for: Derivation of a Provisional Subchronic Inhalation RfC for Benzene [CASRN 71-43-2]. July 2.
100	USEPA. Region 8. 2002. Derivation of Acute and Subchronic Oral Reference Doses for Inorganic Arsenic. August.
101	USEPA. NCEA. 2002. Risk Assessment Issue paper for: Derivation of a Provisional RfD for 1,1,2,2-Tetrachloroethane[CASRN 79-34-5]. January 14.
102	USEPA. NCEA. 1993. Risk Assessment Issue paper for: Derivation of a Provisional Inhalation RfC for 1,2-Dichloroethane [CASRN 107-06-2]. April 5.
103	USEPA. NCEA. 1998. Risk Assessment Issue Paper for: Derivation of a Provisional Chronic RfC for Chlorobenzene [CASRN 108-90-7]. September 18.
108	USEPA. NCEA. 1993. Risk Assessment Issue paper for: Derivation of a Provisional RfC for 2-Hexanone (Methyl-n-butyl ketone) [CASRN 591-78-6]. June 24.
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117	USEPA. NCEA. 2003. Risk Assessment Issue Paper for: Derivation of Provisional Subchronic and Chronic RfCs for Chloroform [CASRN 67-66-3]. January 23.
122	USEPA. NCEA. 1998. Risk Assessment Issue Paper for: Derivation of Provisional Subchronic RfC for Cadmium [CASRN 7440-43-9]. June 14.
125	USEPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. July.
126	Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) Database
128	USEPA. Region 6. 2004. Human Health Medium-Specific Screening Levels. December.

Attachment G0: Physical and Chemical Information
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)			Log Kow (unitless)			Koc (L/kg)			Kd (L/kg)			H (unitless)			s (mg/L)			VP (mm Hg)			Dair (m^2/d)			Dwater (m^2/d)		
			Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes				Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes
VOC	Acetone	67-64-1	5.81E+01	50		-2.40E-01	44		5.81E-01	44	82				1.59E-03	44		1.00E+06	44		2.30E+02	50	92	1.07E+00	44		9.85E-05	44	
VOC	Benzene	71-43-2	7.81E+01	50		2.13E+00	44		5.82E+01	44	111				2.28E-01	44		1.75E+03	44		9.50E+01	50	92	7.60E-01	44		8.47E-05	44	
VOC	Bromodichloromethane	75-27-4	1.64E+02	50		2.10E+00	44		5.51E+01	44	111				6.56E-02	44		6.74E+03	44		5.00E+01	50	92	2.57E-01	44		9.16E-05	44	
VOC	Bromoform	75-25-2	2.53E+02	50		2.35E+00	44		8.70E+01	44	111				2.19E-02	44		3.10E+03	44		5.51E+00	50	92	1.29E-01	44		8.90E-05	44	
VOC	Bromomethane	74-83-9	9.49E+01	50		1.19E+00	44		1.05E+01	44	111				2.56E-01	44		1.52E+04	44		1.62E+03	50	92	6.29E-01	44		1.05E-04	44	
VOC	2-Butanone	78-93-3	7.21E+01	50		2.80E-01	69		2.00E+00	69	111				2.28E-03	50	92	2.75E+05	69		9.53E+01	50	92	6.98E-01	69		8.47E-05	69	
VOC	Carbon Disulfide	75-15-0	7.61E+01	50		2.00E+00	44		4.59E+01	44	111				1.24E+00	44		1.19E+03	44		3.59E+02	50	92	8.99E-01	44		8.64E-05	44	
VOC	Carbon Tetrachloride	56-23-5	1.54E+02	50		2.73E+00	44		1.74E+02	44	111				1.25E+00	44		7.93E+02	44		1.15E+02	50	92	6.74E-01	44		7.60E-05	44	
VOC	Chlorobenzene	108-90-7	1.13E+02	50		2.86E+00	44		2.20E+02	44	111				1.52E-01	44		4.72E+02	44		1.20E+01	50	92	6.31E-01	44		7.52E-05	44	
VOC	Chloroethane	75-00-3	6.45E+01	50		1.43E+00	69		1.62E+01	69	111				3.60E-01	50	92	5.68E+03	50	92	1.01E+03	50	92	2.34E+00	69		9.94E-05	69	
VOC	Chloroform	67-66-3	1.19E+02	50		1.92E+00	44		3.97E+01	44	111				1.50E-01	44		7.92E+03	44		1.97E+02	50	92	8.99E-01	44		8.64E-05	44	
VOC	Chloromethane	74-87-3	5.05E+01	50		1.92E+00	69		3.97E+01	69	111				3.60E-01	50	92	5.33E+03	50	92	4.30E+03	50	92	1.09E+00	69		5.62E-05	69	
VOC	Cumene	98-82-8	1.20E+02	50		3.50E+00	69		7.05E+02	69	111				5.32E-01	69		6.13E+01	50	92	4.50E+00	50	92	5.62E-01	69		6.13E-05	69	
VOC	Cyclohexane	110-82-7	8.42E+01	50		3.44E+00	39		6.35E+02	39	111				7.97E+00	50	92	5.50E+01	50	92	9.69E+01	50	92	7.25E-01	69		7.86E-05	69	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	2.36E+02	50		2.63E+00	1		1.45E+02	1	111				6.01E-03	50	92	1.23E+03	50	92	5.80E-01	50	92	6.91E-01	40		6.91E-05	40	
VOC	Dibromochloromethane	124-48-1	2.08E+02	50		2.17E+00	44		6.26E+01	44	111				3.21E-02	44		2.60E+03	44		4.90E+00	50	92	1.69E-01	44		9.07E-05	44	
VOC	1,2-Dibromoethane	106-93-4	1.88E+02	50		1.60E+00	1		2.22E+01	1	111				3.04E-02	50	92	4.18E+03	50	92	1.33E+01	50	92	6.91E-01	40		6.91E-05	40	
VOC	1,2-Dichlorobenzene	95-50-1	1.47E+02	50		3.43E+00	44		6.23E+02	44	111				7.79E-02	44		1.56E+02	44		1.36E+00	50	92	5.96E-01	44		6.83E-05	44	
VOC	1,3-Dichlorobenzene	541-73-1	1.47E+02	50		3.38E+00	69		5.69E+02	69	111				1.27E-01	50	92	1.33E+02	50	93	2.15E+00	50	92	5.98E-01	69		6.79E-05	69	
VOC	1,4-Dichlorobenzene	106-46-7	1.47E+02	50		3.42E+00	44		6.12E+02	44	111				9.96E-02	44		7.38E+01	44		1.00E+00	50	92	5.96E-01	44		6.83E-05	44	
VOC	Dichlorodifluoromethane	75-71-8	1.21E+02	50		2.16E+00	1		6.15E+01	1	111				1.40E+01	50	92	2.80E+02	50	92	4.85E+03	50	92	6.91E-01	40		6.91E-05	40	
VOC	1,1-Dichloroethane	75-34-3	9.90E+01	50		1.79E+00	44		3.13E+01	44	111				2.30E-01	44		5.06E+03	44		2.27E+02	50	92	6.41E-01	44		9.07E-05	44	
VOC	1,2-Dichloroethane	107-06-2	9.90E+01	50		1.47E+00	44		1.75E+01	44	111				4.01E-02	44		8.52E+03	44		7.89E+01	50	92	8.99E-01	44		8.55E-05	44	
VOC	1,1-Dichloroethene	75-35-4	9.69E+01	50		2.13E+00	44		5.82E+01	44	111				1.07E+00	44		2.25E+03	44		6.00E+02	50	92	7.78E-01	44		8.99E-05	44	
VOC	1,2-Dichloroethene (total)	540-59-0	9.69E+01	50	81	1.86E+00	62		3.56E+01	62	111				3.85E-01	44	81	6.30E+03	44	81	3.33E+02	50	92, 81	6.11E-01	44	81	1.03E-04	44	81
VOC	cis-1,2-Dichloroethene	156-59-2	9.69E+01	50		1.86E+00	44		3.56E+01	44	111				1.67E-01	44		3.50E+03	44		2.03E+02	50	92	6.36E-01	44		9.76E-05	44	
VOC	trans-1,2-Dichloroethene	156-60-5	9.69E+01	50		2.07E+00	44		5.22E+01	44	111				3.85E-01	44		6.30E+03	44		3.33E+02	50	92	6.11E-01	44		1.03E-04	44	
VOC	1,2-Dichloropropane	78-87-5	1.13E+02	50		1.97E+00	44		4.35E+01	44	111				1.15E-01	44		2.80E+03	44		5.20E+01	50	92	6.76E-01	44		7.54E-05	44	
VOC	1,3-Dichloropropene (total)	542-75-6	1.11E+02	50		2.00E+00	44		4.59E+01	44	111				7.26E-01	44		2.80E+03	44		3.40E+01	50	92	5.41E-01	44		8.64E-05	44	
VOC	cis-1,3-Dichloropropene	10061-01-5	1.11E+02	50		1.41E+00	1		1.57E+01	1	111				1.45E-01	1	55	2.72E+03	50	90	3.28E+01	50	90	6.91E-01	40		6.91E-05	40	
VOC	trans-1,3-Dichloropropene	10061-02-6	1.11E+02	50		1.98E+00	69		4.43E+01	69	111				6.54E-02	40		2.72E+03	50	90	2.33E+01	50	90	5.41E-01	69		8.64E-05	69	
VOC	Ethyl Benzene	100-41-4	1.06E+02	50		3.14E+00	44		3.67E+02	44	111				3.23E-01	44		1.69E+02	44		9.60E+00	50	92	6.48E-01	44		6.74E-05	44	
VOC	2-Hexanone	591-78-6	1.00E+02	50		1.38E+00	39		1.48E+01	39	111				7.15E-02	1		1.75E+04	39		1.16E+01	50	92						
VOC	Methyl Acetate	79-20-9	7.41E+01	55		1.80E-01	39		1.66E+00	39	111				3.71E-03	69		2.44E+05	39		2.16E+02	39		8.27E-01	69		9.50E-05	69	
VOC	Methyl tert-butyl ether	1634-04-4	8.82E+01	1		1.24E+00	39		1.15E+01	39	111				2.40E-02	69		5.10E+04	69		2.50E+02	69		7.42E-01	69		8.73E-05	69	
VOC	4-Methyl-2-pentanone	108-10-1	1.00E+02	50		1.19E+00	62		1.05E+01	62	111				5.64E-03	50	92	1.90E+04	39		1.99E+01	50	92	6.48E-01	40		6.74E-05	40	
VOC	Methylcyclohexane	108-87-2	9.82E+01	55		2.96E+00	69		2.66E+02	69	111				1.76E+01	69		1.40E+01	69		4.30E+01	69		6.35E-01	69		7.36E-05	69	
VOC	Methylene Chloride	75-09-2	8.49E+01	50		1.25E+00	44		1.17E+01	44	111				8.98E-02	44		1.30E+04	44		4.33E+02	50	92	8.73E-01	44		1.01E-04	44	
VOC	Styrene	100-42-5	1.04E+02	50		2.94E+00	44		7.77E+02	44	82				1.13E-01	44		3.10E+02	44		6.12E+00	50	92	6.13E-01	44		6.91E-05	44	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	1.68E+02	50		2.39E+00	44		9.35E+01	44	111				1.41E-02	44		2.97E+03	44		4.62E+00	50	92	6.13E-01	44		6.83E-05	44	
VOC	Tetrachloroethene	127-18-4	1.66E+02	50		2.67E+00	44		1.56E+02	44	111				7.54E-01	44		2.00E+02	44		1.86E+01	50	92	6.22E-01	44		7.08E-05	44	
VOC	Toluene	108-88-3	9.21E+01	50		2.75E+00	44		1.80E+02	44	111				2.72E-01	44		5.26E+02	44		2.84E+01	50	92	7.52E-01	44		7.43E-05	44	
VOC	1,2,4-Trichlorobenzene	120-82-1	1.81E+02	50		4.01E+00	44		1.79E+03	44	111				5.82E-02	44		3.00E+02	44		4.31E-01	50	92	2.59E-01	44		7.11E-05	44	
VOC	1,1,1-Trichloroethane	71-55-6	1.33E+02	50		2.48E+00	44		1.10E+02	44	111				7.05E-01	44		1.33E+03	44		1.24E+02	50	92	6.74E-01	44		7.60E-05	44	
VOC	1,1,2-Trichloroethane	79-00-5	1.33E+02	50		2.05E+00	44		5.03E+01	44	111				3.74E-02	44		4.42E+03	44		2.33E+01	50	92	6.74E-01	44		7.60E-05	44	
VOC	Trichloroethene	79-01-6	1.31E+02	50		2.71E+00	44		1.68E+02	44	111				4.22E-01	44		1.10E+03	44		7.35E+01	50	92	6.83E-01	44		7.86E-05	44	
VOC	Trichlorofluoromethane	75-69-4	1.37E+02	50		2.53E+00	69		1.21E+02	69	111				3.96E+00	50	92	1.10E+03	50	92	8.03E+02	50	92	7.52E-01	69		8.38E-05	69	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.87E+02	50		3.16E+00	38		3.81E+02	38	111				1.97E+01	50	92	1.70E+02	50	92	3.32E+02	50	92	6.74E-01	40		7.08E-05	40	
VOC	1,2,4-Trimethylbenzene	95-63-6	1.20E+02	55		3.63E+00	1		8.97E+02	1	111				2.52E-01	69		5.70E+01	1		1.00E+00	1		5.24E-01	69		6.84E-05	69	
VOC	1,3,5-Trimethylbenzene	108-67-8	1.20E+02	39		4.00E+00	69		1.76E+03	69	111				2.40E-01	69		4.82E+01	68		2.48E+00	68		5.20E-01	69		7.49E-05	69	
VOC	Vinyl Chloride	75-01-4	6.25E+01	50		1.50E+00	44		1.85E+01	44	111				1.11E+00	44		2.76E+03	44		2.98E+03	50	92	9.16E-01	44		1.06E-04	44	113
VOC	Xylenes (total)	1330-20-7	1.06E+02	50		3.17E+00	44		3.86E+02	44	111				2.76E-01	44		1.75E+02	44		7.99E+00	50	92	6.74E-01	44		7.56E-05	44	
SVOC	Acenaphthene	83-32-9	1.54E+02	1		3.92E+00	44		7.14E+03	44	82				6.36E-03	44		4.24E+00	44		2.50E-03	50	92	3.64E-01	44		6.64E-05	44	
SVOC	Acenaphthylene	208-96-8	1.52E+02	50		3.94E+00	69		7.47E+03	69	82				4.62E-03	50	92	1.61E+01	50	92	9.12E-04	50	92	3.88E-01	69		6.03E-05	69	
SVOC	Acetophenone	98-86-2	1.20E+02	50		1.58E+00	1		3.58E+01	1	82				4.37E-04	50	92	6.13E+03	50	92	3.97E-01	50	92	6.91E-01	40		6.91E-05	40	
SVOC	Anthracene	120-12-7	1.78E+02	50		4.55E+00	44		2.97E+04	44	82				2.67E-03	44		4.34E-02	44		2.67E-06	50	92	2.80E-01	44		6.69E-05	44	
SVOC	Atrazine	1912-24-9	2.16E+02	50		2.61E+00	69		3.68E+02	69	82				2.50E-07	69		7.00E+01	50	92	3.00E-07	50	92	2.24E-01	69		5.76E-05	69	
SVOC	Benzaldehyde	100-52-7	1.06E+02	39		1.48E+00	39		2.85E+01	39	82				9.73E-04	69		3.00E+03	39		9.00E-01	69		6.23E-01	69		7.84E-05	69	
SVOC	Benzo(a)anthracene	56-55-3	2.28E+02	50		5.70E+00	44		4.01E+05	44	82				1.37E-04	44		9.40E-03	44		1.05E-07	50	92	4.41E-01	44		7.78E-05	44	
SVOC	Benzo(a)pyrene	50-32-8	2.52E+02	50		6.11E+00	44		1.01E+06	44	82				4.63E-05	44		1.62E-03	44		5.49E-09	50	92	3.72E-01	44		7.78E-05	44	
SVOC	Benzo(b)fluoranthene	205-99-2	2.52E+02	50		6.20E+00	44		1.24E+06	44	82				4.55E-03	44		1.50E-03	44		5.00E-07	50	92	1.95E-01	44		4.80E-05	44	
SVOC	Benzo(g,h,i)perylene	191-24-2	2.76E+02	50		7.23E+00	69		1.28E+07	69	82				5.76E-06	50	92	2.60E-04	50	92	1.01E-10	50	92	1.88E-01	69		4.54E-05	69	
SVOC	Benzo(k)fluoranthene	207-08-9	2.52E+02	50		6.20E+00	44		1.24E+06	44	82				3.40E-05	44		8.00E-04	44		2.00E-09	50	92	1.95E-01	44		4.80E-05	44	
SVOC	Biphenyl	92-52-4	1.54E+02	50		4.09E+00	39		1.05E+04	39	82				1.23E-02	50	92	6.03E+00	50	93	9.64E-03	50	92	3.49E-01	69		7.04E-05	69	

Attachment G0: Physical and Chemical Information
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)			Log Kow (unitless)			Koc (L/kg)			Kd (L/kg)			H (unitless)			s (mg/L)			VP (mm Hg)			Dair (m^2/d)			Dwater (m^2/d)		
			Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes				Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+02	50		1.26E+00	69		1.73E+01	69	82				6.95E-06	50	92	1.21E+05	50	92	1.40E-04	50	92	3.77E-01	69		7.31E-05	69	
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.43E+02	50		1.21E+00	44		1.55E+01	44	82				7.38E-04	44		1.72E+04	44		1.55E+00	50	92	5.98E-01	44		6.51E-05	44	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.91E+02	50		7.30E+00	44		1.50E+07	44	82				4.18E-06	44		3.40E-01	44		6.45E-06	50	94	3.03E-01	44		3.16E-05	44	
SVOC	4-Bromophenyl-phenyl ether	101-55-3	2.49E+02	50		4.28E+00	1		1.61E+04	1	82				4.78E-03	50	92	4.60E+00	50	92	1.50E-03	50	92	2.26E-01	69		5.88E-05	69	
SVOC	Butylbenzylphthalate	85-68-7	3.12E+02	50		4.84E+00	44		5.73E+04	44	82				5.17E-05	44		2.69E+00	44		8.25E-06	50	92	1.50E-01	44		4.17E-05	44	
SVOC	Caprolactam	105-60-2	1.13E+02	39		-1.90E-01	39		6.51E-01	39	82				2.06E-07	69		7.72E+05	68		1.60E-03	39		5.98E-01	69		7.77E-05	69	
SVOC	Carbazole	86-74-8	1.67E+02	50		3.59E+00	44		3.38E+03	44	82				6.26E-07	44		7.48E+00	44		5.19E-07	50	90	3.37E-01	44		6.07E-05	44	
SVOC	4-Chloro-3-methylphenol	59-50-7	1.43E+02	50		3.10E+00	1		1.12E+03	1	82				1.63E-05	50	91	3.85E+03	50	94	8.17E-03	50	91	5.24E-01	69		8.22E-05	69	
SVOC	4-Chloroaniline	106-47-8	1.28E+02	50		1.85E+00	44		6.61E+01	44					1.36E-05	44		5.30E+03	44		1.23E-02	50	92	4.17E-01	44		8.73E-05	44	
SVOC	2-Chloronaphthalene	91-58-7	1.63E+02	50		4.12E+00	1		1.12E+04	1	82				1.28E-02	50	92	1.17E+01	50	92	7.98E-03	50	92	4.25E-01	69		7.59E-05	69	
SVOC	2-Chlorophenol	95-57-8	1.29E+02	50		2.15E+00	44		3.88E+02	44	43				1.60E-02	44		2.20E+04	44		2.34E+00	50	92	4.33E-01	44		8.17E-05	44	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	2.05E+02	50		4.08E+00	1		1.03E+04	1	82				8.99E-03	1	55	1.42E+00	50	90	2.70E-03	1		2.45E-01	69		6.61E-05	69	
SVOC	Chrysene	218-01-9	2.28E+02	50		5.70E+00	44		4.01E+05	44	82				3.88E-03	44		1.60E-03	44		6.23E-09	50	92	2.14E-01	44		5.37E-05	44	
SVOC	Dibenz(a,h)anthracene	53-70-3	2.78E+02	50		6.69E+00	44		3.77E+06	44	82				6.03E-07	44		2.49E-03	44		1.00E-10	50	92	1.75E-01	44		4.48E-05	44	
SVOC	Dibenzofuran	132-64-9	1.68E+02	50		4.39E+00	69		2.07E+04	69	82				5.15E-04	50	92	1.00E+01	50	93	1.80E-04	50	92	2.06E-01	69		5.18E-05	69	
SVOC	3,3'-Dichlorobenzidine	91-94-1	2.53E+02	50		3.51E+00	44		7.21E+02	44	111				1.64E-07	44		3.11E+00	44		3.71E-08	50	92	1.68E-01	44		5.82E-05	44	
SVOC	2,4-Dichlorophenol	120-83-2	1.63E+02	50		3.08E+00	44		1.47E+02	44	43				1.30E-04	44		4.50E+03	44		6.70E-02	50	92	2.99E-01	44		7.58E-05	44	
SVOC	Diethylphthalate	84-66-2	2.22E+02	50		2.50E+00	44		2.87E+02	44	82				1.85E-05	44		1.08E+03	44		1.65E-03	50	92	2.21E-01	44		5.49E-05	44	
SVOC	2,4-Dimethylphenol	105-67-9	1.22E+02	50		2.36E+00	44		2.09E+02	44					8.20E-05	44		7.87E+03	44		9.80E-02	50	92	5.05E-01	44		7.51E-05	44	
SVOC	Dimethylphthalate	131-11-3	1.94E+02	50		1.87E+00	69		6.89E+01	69	82				4.29E-06	50	92	4.00E+03	50	92	1.65E-03	50	92	4.91E-01	69		5.43E-05	69	
SVOC	Di-n-butylphthalate	84-74-2	2.78E+02	50		4.61E+00	44		3.40E+04	44	82				3.85E-08	44		1.12E+01	44		7.30E-05	50	92	3.78E-01	44		6.79E-05	44	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	1.98E+02	50		2.12E+00	69		1.21E+02	69	82				1.75E-05	50	92	1.98E+02	50	92	3.24E-04	50	92	2.38E-01	69		5.97E-05	69	
SVOC	2,4-Dinitrophenol	51-28-5	1.84E+02	50		1.55E+00	44		1.00E-02	44	43				1.82E-05	44		2.79E+03	44		5.10E-03	50	92	2.36E-01	44		7.83E-05	44	
SVOC	2,4-Dinitrotoluene	121-14-2	1.82E+02	50		2.01E+00	44		9.46E+01	44	82				3.80E-06	44		2.70E+02	44		1.47E-04	50	92	1.75E+00	44		6.10E-05	44	
SVOC	2,6-Dinitrotoluene	606-20-2	1.82E+02	50		1.87E+00	44		6.89E+01	44	82				3.06E-05	44		1.82E+02	44		5.67E-04	50	92	2.83E-01	44		6.27E-05	44	
SVOC	Di-n-octylphthalate	117-84-0	3.91E+02	50		8.06E+00	44		8.38E+07	44	82				2.74E-03	44		2.00E-02	44		2.60E-06	50	92	1.30E-01	44		3.09E-05	44	
SVOC	Fluoranthene	206-44-0	2.02E+02	50		5.12E+00	44		1.08E+05	44	82				6.60E-04	44		2.06E-01	44		7.80E-06	50	94	2.61E-01	44		5.49E-05	44	
SVOC	Fluorene	86-73-7	1.66E+02	50		4.21E+00	44		1.38E+04	44	82				2.61E-03	44		1.98E+00	44		6.33E-04	50	92	3.14E-01	44		6.81E-05	44	
SVOC	Formaldehyde	50-00-0	3.00E+01	50		3.50E-01	62								1.39E-05	50	92	5.50E+05	50	92	5.24E+03	50	92	1.56E+00	40		1.73E-04	40	
SVOC	Hexachlorobenzene	118-74-1	2.85E+02	50		5.89E+00	44		5.53E+04	44	111				5.41E-02	44		6.20E+00	44		1.80E-05	50	92	4.68E-01	44		5.11E-05	44	
SVOC	Hexachlorobutadiene	87-68-3	2.61E+02	50		4.81E+00	44		5.35E+04	44	82				3.34E-01	44		3.23E+00	44		2.21E-01	50	92	4.85E-01	44		5.32E-05	44	
SVOC	Hexachlorocyclopentadiene	77-47-4	2.73E+02	50		5.39E+00	44		1.99E+05	44	82				1.11E+00	44		1.80E+00	44		5.96E-02	50	94	1.39E-01	44		6.23E-05	44	
SVOC	Hexachloroethane	67-72-1	2.37E+02	50		4.00E+00	44		1.76E+03	44	111				1.59E-01	44		5.00E+01	44		2.10E-01	50	92	2.16E-02	44		5.88E-05	44	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.76E+02	50		6.65E+00	44		3.45E+06	44	82				6.56E-05	44		2.20E-05	44		1.00E-10	50	92	1.64E-01	44		4.89E-05	44	
SVOC	Isophorone	78-59-1	1.38E+02	50		1.70E+00	44		4.69E+01	44	82				2.72E-04	44		1.20E+04	44		4.38E-01	50	92	5.38E-01	44		5.84E-05	44	
SVOC	2-Methylnaphthalene	91-57-6	1.42E+02	50		3.86E+00	1		6.23E+03	1	82				2.12E-02	50	92	2.46E+01	50	92	5.50E-02	50	92	4.18E-01	52		6.70E-05	52	
SVOC	Methylphenol (total)	1319-77-3	1.08E+02	50	99	1.96E+00	1	99	8.45E+01	1	99, 82				3.54E-05	50	92, 99	2.27E+04	50	92, 99	1.38E-01	50	92, 99	6.39E-01	40	99	8.64E-05	40	99
SVOC	2-Methylphenol	95-48-7	1.08E+02	50		1.99E+00	44		9.12E+01	44					4.92E-05	44		2.60E+04	44		2.99E-01	50	92	6.39E-01	44		7.17E-05	44	
SVOC	4-Methylphenol	106-44-5	1.08E+02	50		1.92E+00	1		7.72E+01	1	82				3.24E-05	50	92	2.15E+04	50	92	1.10E-01	50	92	6.39E-01	40		8.64E-05	40	
SVOC	Naphthalene	91-20-3	1.28E+02	50		3.36E+00	44		2.01E+03	44	82				1.98E-02	44		3.10E+01	44		8.50E-02	50	92	5.10E-01	44		6.48E-05	44	
SVOC	2-Nitroaniline	88-74-4	1.38E+02	50		1.85E+00	69		6.59E+01	69	82				6.53E-06	69		2.94E+02	50	90	1.42E-04	50	90	6.31E-01	69		6.91E-05	69	
SVOC	3-Nitroaniline	99-09-2	1.38E+02	50		1.37E+00	1		2.22E+01	1	82				5.89E-06	50	92	1.21E+03	50	92	9.56E-05	50	92						
SVOC	4-Nitroaniline	100-01-6	1.38E+02	50		1.39E+00	1		2.33E+01	1	82				8.46E-08	50	92	7.28E+02	50	92	8.28E-06	50	92	5.00E-01	69		7.41E-05	69	
SVOC	Nitrobenzene	98-95-3	1.23E+02	50		1.84E+00	44		6.44E+01	44	82				9.84E-04	44		2.09E+03	44		2.45E-01	50	92	6.57E-01	44		7.43E-05	44	
SVOC	2-Nitrophenol	88-75-5	1.39E+02	50		1.79E+00	1		5.75E+01	1	82				3.87E-04	50	92	2.19E+03	50	92	1.13E-01	50	92	4.66E-01	69		6.78E-05	69	
SVOC	4-Nitrophenol	100-02-7	1.39E+02	50		1.91E+00	69		7.55E+01	69	82				1.70E-08	50	92	1.16E+04	50	92	4.10E-05	50	92	5.40E-01	69		8.30E-05	69	
SVOC	N-Nitrosodiphenylamine	86-30-6	1.98E+02	50		3.16E+00	44		1.29E+03	44					2.05E-04	44		3.51E+01	44		6.69E-04	50	92	2.70E-01	44		5.49E-05	44	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	1.30E+02	50		1.40E+00	44		2.40E+01	44					9.23E-05	44		9.89E+03	44		1.30E-01	50	92	4.71E-01	44		7.06E-05	44	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	1.71E+02	50		2.45E+00	69		2.56E+02	69	82				4.78E-03	50	92	1.70E+03	50	92	8.80E-01	50	92	5.20E-01	69		5.54E-05	69	
SVOC	Pentachlorophenol	87-86-5	2.66E+02	50		5.09E+00	44		5.92E+02	44	43				1.00E-06	44		1.95E+03	44		3.17E-05	50	92	4.84E-01	44		5.27E-05	44	
SVOC	Phenanthrene	85-01-8	1.78E+02	50		4.46E+00	69		2.42E+04	69	82				9.52E-04	50	92	1.15E+00	50	92	1.12E-04	50	92	3.24E-01	69		6.45E-05	69	
SVOC	Phenol	108-95-2	9.41E+01	50		1.48E+00	44		2.88E+01	44					1.63E-05	44		8.28E+04	44		2.76E-01	50	92	7.08E-01	44		7.86E-05	44	
SVOC	Pyrene	129-00-0	2.02E+02	50		5.11E+00	44		1.06E+05	44	82				4.51E-04	44		1.35E-01	44		4.59E-06	50	92	2.35E-01	44		6.26E-05	44	
SVOC	2,4,5-Trichlorophenol	95-95-4	1.97E+02	50		3.90E+00	44		1.60E+03	44	43				1.78E-04	44		1.20E+03	44		2.00E-02	50	92	2.51E-01	44		6.07E-05	44	
SVOC	2,4,6-Trichlorophenol	88-06-2	1.97E+02	50		3.70E+00	44		3.81E+02	44	43				3.19E-04	44		8.00E+02	44		2.40E-02	50	92	2.75E-01	44		5.40E-05	44	
PCB	PCBs (total)	1336-36-3	3.28E+02	64	116	6.50E+00	64	116	2.45E+06	64	116, 82				8.17E-02	64	116	1.20E-02	64	116	7.71E-05	64	116	1.75E-01	69	116	4.32E-05	69	116
INORG	Antimony	7440-36-0	1.22E+02	50			1	48				4.50E+01	44	43					1	61					40	48		40	48
INORG	Arsenic	7440-38-2	7.49E+01	50			1	48				2.90E+01	44	43					1	61					40	48		40	48
INORG	Barium	7440-39-3	1.37E+02	50			1	48				4.10E+01	44	43					1	60					40	48		40	48
INORG	Beryllium	7440-41-7	9.01E+00	50			1	48				7.90E+02	44	43					1	61					40	48		40	48
INORG	Cadmium	7440-43-9	1.12E+02	50			1	48				7.50E+01	44	43					1	61		40	48		40	48		40	48
INORG	Chromium (total)	7440-47-3	5.20E+01	50			1	48				1.90E+01	44	43, 45					1	61					40	48		40	48
INORG	Chromium III	16065-83-1	5.20E+01	50								1.80E+06	44	43															
INORG	Chromium VI	18540-29-9	5.20E+01	50								1.90E+01	44	43								40	48		40	48		40	48

Attachment G0: Physical and Chemical Information
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)			Log Kow (unitless)			Koc (L/kg)			Kd (L/kg)			H (unitless)			s (mg/L)			VP (mm Hg)			Dair (m^2/d)			Dwater (m^2/d)		
			Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes				Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes
INORG	Cobalt	7440-48-4	5.89E+01	50			1	48				4.50E+01	35						1	61									
INORG	Copper	7440-50-8	6.35E+01	50			1	48				3.50E+01	35						1	61					40	48		40	48
INORG	Cyanide (total)	57-12-5	2.60E+01	1			1	48				9.90E+00	44	43															
INORG	Fluoride	16984-48-8																											
INORG	Lead	7439-92-1	2.07E+02	50			1	48				9.00E+02	35						1	61					40	48		40	48
INORG	Manganese	7439-96-5	5.49E+01	50								6.50E+01	35																
INORG	Mercury	7439-97-6	2.01E+02	67			1	48				1.00E+03	67		2.90E-01	67		5.60E-02	1		1.96E-03	50	92	2.65E-01	44		5.44E-05	44	
INORG	Nickel	7440-02-0	5.87E+01	50			1	48				6.50E+01	44	43					1	61					40	48		40	48
INORG	Selenium	7782-49-2	7.90E+01	50			1	48				5.00E+00	44	43					40	48		40	48		40	48		40	48
INORG	Silver	7440-22-4	1.08E+02	50			1	48				8.30E+00	44	43					1	61					40	48		40	48
INORG	Thallium	7440-28-0	2.04E+02	50			1	48				7.10E+01	44	43					1	61					40	48		40	48
INORG	Vanadium	7440-62-2	5.09E+01	50			1	48				1.00E+03	44	43					1	61		40	48		40	48		40	48
INORG	Zinc	7440-66-6	6.54E+01	50			1	48				6.20E+01	44	43					1	61					40	48		40	48

Attachment G0: Physical and Chemical Information Notes and References
GMC: NAO Flint Operations Site, Flint, Michigan

Notes:	
43	pH associated with value is 6.8.
45	ENVIRON used the value for Chromium VI [CASRN 18540-29-9] presented in indicated reference as a surrogate.
48	Not Available or Not Applicable
55	Reference temperature is unspecified.
60	Hydrolyzes
61	Insoluble
81	ENVIRON used the value for trans-1,2-Dichloroethene [CASRN 156-60-5] as a surrogate.
82	ENVIRON used Equation (70) from Reference 44 to calculate Koc value using Log Kow value from indicated reference.
90	Indicated source cites CHEMCALC.
91	Indicated source cites CHEMEST.
92	Indicated source cites CHEMFATE.
93	Indicated source cites FATE.
94	Indicated source cites LIVECHEM.
99	ENVIRON used the value for 3-Methylphenol [CASRN 108-39-4] value as a surrogate.
110	ENVIRON used the value for 4-Chlorobiphenyl [CASRN 2051-62-9] from the indicated reference as a surrogate.
111	ENVIRON used Equation (71) from Reference 44 to calculate Koc value using Log Kow value from indicated reference.
113	Personal communication with RCRA, Superfund & EPCRA Hotline on 9/15/2000; indicated reference presents the value which is off by an order of magnitude (1.23E-06 cm2/s). The database has the correct value of 1.23E-05 cm2/s.
114	A value of 1 is conservatively used because EPA guidance does not provide a default value.
115	ENVIRON calculated Kp value using equation 3.8 (p.3-8) in reference 62 with log Kow from the indicated reference and the MW presented in table.
116	ENVIRON used the value for Aroclor-1254 [CASRN 11097-69-1] from the indicated reference as a surrogate.
117	ENVIRON derived the FA based on Exhibit A-4 in the indicated reference.
References:	
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Attachment G0: High End Exposure Factors for all Receptors
GMC: NAO Flint Operations Site, Flint, Michigan

				Routine Worker		Maintenance Worker		Redevelopment Construction Worker		Resident Age 1-6	Resident Age 7-31	
Soil Ingestion												
Ingestion Rate	mg-soil/day	**IR**		50	b	200		200		200	100	b
Conversion Factor	kg/mg	**CF**		1E-06		1E-06		1E-06		1E-06	1E-06	
Fraction Contaminated	unitless	**FC**		1.0		1.0		1.0		1.0	1.0	
Exposure Frequency	days/year	**EF**		250	b	5	e	250	e	350	350	b
Exposure Duration	years	**ED**		25	b	10	e	1	e	6	24	b
Body Weight	kg	**BW**		70	a	70	a	70	a	15	70	a
Averaging Time, cancer	days	**AT_c**		25,550	a	25,550	a	25,550	a	25,550	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**		9,125	a	3,650	a	365	a	10,950	10,950	a
Soil Dermal Contact												
Adherence Factor	mg-soil/cm^2	**AF**		0.2	d	0.2	d	0.2	d	0.2	0.07	d
Skin Surface Area	cm^2/day	**SA**		3,300	d	3,300	d	3,300	d	2,800	5,700	d
Conversion Factor	kg/mg	**CF**		1E-06		1E-06		1E-06		1E-06	1E-06	
Fraction Contaminated	unitless	**FC**		1.0		1.0		1.0		1.0	1.0	
Exposure Frequency	days/year	**EF**		250	b	5	e	250	e	350	350	b
Exposure Duration	years	**ED**		25	b	10	e	1	e	6	24	b
Body Weight	kg	**BW**		70	a	70	a	70	a	15	70	b
Averaging Time, cancer	days	**AT_c**		25,550	a	25,550	a	25,550	a	25,550	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**		9,125	a	3,650	a	365	a	10,950	10,950	a
Ambient/Indoor Air Inhalation												
Fraction Contacted	unitless	**FC**		1		1		1		1	1	
Exposure Frequency	days/year	**EF**		250	b	5	e	5		350	350	b
Exposure Duration	years	**ED**		25	b	10	e	1		6	24	b
Averaging Time, cancer	days	**AT_c**		25550	a	25,550	a	25,550	a	25,550	25,550	a
Averaging Time, noncancer	days	**AT_{nc}**		9125	a	3,650	a	365	a	10,950	10,950	a

Attachment G0: High End Exposure Factors for all Receptors
GMC: NAO Flint Operations Site, Flint, Michigan

				Routine Worker		Maintenance Worker		Redevelopment Construction Worker		Resident Age 1-6	Resident Age 7-31	
Ground Water Incidental Ingestion												
Drinking Rate	L-water/hr	**DR**		NA		0.005	e	0.005	e	NA	NA	
Exposure Time	hours	**ET**		NA		2	e	2	e	NA	NA	
Exposure Frequency	days/year	**EF**		NA		5	e	5		NA	NA	
Exposure Duration	years	**ED**		NA		10	e	1		NA	NA	
Body Weight	kg	**BW**		NA		70	a	70	a	NA	NA	
Averaging Time, cancer	days	$\mathbf{AT_c}$		NA		25,550	a	25,550	a	NA	NA	
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$		NA		3,650	a	365	a	NA	NA	
Dermal Contact with Ground Water												
Event Time	hr	**t**		NA		2	e	2	e	NA	NA	
Skin Surface Area	cm^2	**SA**		NA		3,300	d	3,300	d	NA	NA	
Events per Day	1/d	**EV**		NA		1		1		NA	NA	
Exposure Frequency	days/year	**EF**		NA		5	e	5		NA	NA	
Exposure Duration	years	**ED**		NA		10	e	1		NA	NA	
Body Weight	kg	**BW**		NA		70	a	70	a	NA	NA	
Averaging Time, cancer	days	$\mathbf{AT_c}$		NA		25550	a	25550	a	NA	NA	
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$		NA		3650	a	365	a	NA	NA	
LNAPL Dermal Contact												
Event Time	hr	**t**		NA		2		2		NA	NA	
Skin Surface Area	cm^2	**SA**		NA		3,300	d	3,300	d	NA	NA	
Events per Day	1/day	**EV**		NA		1		1		NA	NA	
Exposure Frequency	days/year	**EF**		NA		5	e	5	e	NA	NA	
Exposure Duration	years	**ED**		NA		10	e	1	e	NA	NA	
Body Weight	kg	**BW**		NA		70	a	70	a	NA	NA	
Averaging Time, cancer	days	$\mathbf{AT_c}$		NA		25,550	a	25,550	a	NA	NA	
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$		NA		3,650	a	3,650	a	NA	NA	

Attachment G0: High End Exposure Factors for all Receptors
GMC: NAO Flint Operations Site, Flint, Michigan

				Routine Worker		Maintenance Worker		Redevelopment Construction Worker		Resident Age 1-6	Resident Age 7-31	
Smear Zone Soil Ingestion												
Ingestion Rate	mg-soil/day	**IR**		NA		200		200		NA	NA	
Conversion Factor	kg/mg	**CF**		NA		1E-06		1E-06		NA	NA	
Fraction Contaminated	unitless	**FC**		NA		1.0		1.0		NA	NA	
Exposure Frequency	days/year	**EF**		NA		5	e	5	e	NA	NA	
Exposure Duration	years	**ED**		NA		10	e	1	e	NA	NA	
Body Weight	kg	**BW**		NA		70	a	70	a	NA	NA	
Averaging Time, cancer	days	$\mathbf{AT_c}$		NA		25,550	a	25,550	a	NA	NA	
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$		NA		3,650	a	365	a	NA	NA	
Smear Zone Soil Dermal Contact												
Adherence Factor	mg-soil/cm^2	**AF**		NA		0.2	d	0.2	d	NA	NA	
Skin Surface Area	cm^2/day	**SA**		NA		3,300	d	3,300	d	NA	NA	
Conversion Factor	kg/mg	**CF**		NA		1E-06		1E-06		NA	NA	
Fraction Contaminated	unitless	**FC**		NA		1.0		1.0		NA	NA	
Exposure Frequency	days/year	**EF**		NA		5	e	5	e	NA	NA	
Exposure Duration	years	**ED**		NA		10	e	1	e	NA	NA	
Body Weight	kg	**BW**		NA		70	a	70	a	NA	NA	
Averaging Time, cancer	days	$\mathbf{AT_c}$		NA		25,550	a	25,550	a	NA	NA	
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$		NA		3,650	a	365	a	NA	NA	
References:												

a. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A) Interim Final (EPA 1989)

b. Human Health Evaluation Manual, Supplemental Guidance: "Standard default exposure factors." OSWER Directive 9285.6-03 (EPA 1991)

d. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual: Part E, Supplemental Guidance for Dermal Risk Assessment, Interim Final (EPA 2001)

e. Based on professional judgement and site-specific considerations as follows:

- Maintenance workers: The exposure time and frequency is based on anticipated excavation time for minor underground repairs by a worker, assumed to take 5 days per year. The exposure duration for a worker at a given site is assumed to be 10 years.

- Redevelopment workers: The exposure time and frequency is based on assumed excavation time for site redevelopment by a worker. The exposure duration for a redevelopment worker at a given site is assumed to be 1 year. The worker is assumed to spend no more than 5 days in excavations.

Attachment G1
Exposure of Routine Workers to Outdoor Soil

Attachment G1: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.07E+00	9.85E-05	7.81E-02	1.47E-01	1.21E-07	1.50E-03	8.57E-06
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	7.60E-01	8.47E-05	3.00E-01	1.04E-01	1.04E-07	3.96E-02	4.41E-05
VOC	Bromodichloromethane	75-27-4	5.51E+01		3.28E-02	2.57E-01	9.16E-05	2.65E-01	3.54E-02	1.13E-07	4.38E-03	1.47E-05
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	6.98E-01	8.47E-05	8.28E-02	9.59E-02	1.04E-07	1.32E-03	8.06E-06
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	8.99E-01	8.64E-05	4.19E-01	1.23E-01	1.06E-07	1.83E-01	9.47E-05
VOC	Carbon Tetrachloride	56-23-5	1.74E+02		6.25E-01	6.74E-01	7.60E-05	8.35E-01	9.26E-02	9.36E-08	6.93E-02	5.83E-05
VOC	Chlorobenzene	108-90-7	2.20E+02		7.60E-02	6.31E-01	7.52E-05	8.14E-01	8.66E-02	9.25E-08	8.09E-03	1.99E-05
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.34E+00	9.94E-05	1.85E-01	3.22E-01	1.22E-07	3.13E-01	1.24E-04
VOC	Chloroform	67-66-3	3.97E+01		7.50E-02	8.99E-01	8.64E-05	2.28E-01	1.23E-01	1.06E-07	4.06E-02	4.46E-05
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.09E+00	5.62E-05	2.61E-01	1.50E-01	6.91E-08	1.03E-01	7.12E-05
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	5.62E-01	6.13E-05	2.44E+00	7.71E-02	7.55E-08	8.39E-03	2.03E-05
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	7.25E-01	7.86E-05	3.38E+00	9.96E-02	9.68E-08	1.17E-01	7.59E-05
VOC	Dibromochloromethane	124-48-1	6.26E+01		1.61E-02	1.69E-01	9.07E-05	2.84E-01	2.33E-02	1.12E-07	1.32E-03	8.03E-06
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	5.96E-01	6.83E-05	2.11E+00	8.19E-02	8.40E-08	1.51E-03	8.62E-06
VOC	1,3-Dichlorobenzene	541-73-1	5.69E+02		6.33E-02	5.98E-01	6.79E-05	1.94E+00	8.21E-02	8.36E-08	2.68E-03	1.15E-05
VOC	1,4-Dichlorobenzene	106-46-7	6.12E+02		4.98E-02	5.96E-01	6.83E-05	2.07E+00	8.19E-02	8.40E-08	1.97E-03	9.82E-06
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	6.91E-01	6.91E-05	2.47E+00	9.49E-02	8.51E-08	2.70E-01	1.15E-04
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	6.41E-01	9.07E-05	2.13E-01	8.81E-02	1.12E-07	4.74E-02	4.82E-05
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.01E-02	8.99E-01	8.55E-05	1.39E-01	1.23E-01	1.05E-07	1.78E-02	2.96E-05
VOC	1,1-Dichloroethene	75-35-4	5.82E+01		5.35E-01	7.78E-01	8.99E-05	4.32E-01	1.07E-01	1.11E-07	1.32E-01	8.06E-05
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	6.36E-01	9.76E-05	2.17E-01	8.73E-02	1.20E-07	3.35E-02	4.06E-05
VOC	trans-1,2-Dichloroethene	156-60-5	5.22E+01		1.93E-01	6.11E-01	1.03E-04	3.05E-01	8.39E-02	1.27E-07	5.29E-02	5.09E-05
VOC	1,2-Dichloropropane	78-87-5	4.35E+01		5.75E-02	6.76E-01	7.54E-05	2.35E-01	9.28E-02	9.28E-08	2.27E-02	3.34E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	6.48E-01	6.74E-05	1.32E+00	8.90E-02	8.29E-08	1.09E-02	2.31E-05
VOC	2-Hexanone	591-78-6	1.48E+01		3.58E-02							
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	8.27E-01	9.50E-05	8.20E-02	1.14E-01	1.17E-07	2.57E-03	1.12E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.20E-02	7.42E-01	8.73E-05	1.17E-01	1.02E-01	1.07E-07	1.05E-02	2.26E-05
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	6.48E-01	6.74E-05	1.11E-01	8.90E-02	8.29E-08	2.26E-03	1.05E-05
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	6.35E-01	7.36E-05	3.68E+00	8.72E-02	9.06E-08	2.08E-01	1.01E-04

Attachment G1: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	8.73E-01	1.01E-04	1.28E-01	1.20E-01	1.24E-07	4.21E-02	4.54E-05
VOC	Styrene	100-42-5	7.77E+02		5.65E-02	6.13E-01	6.91E-05	2.61E+00	8.43E-02	8.51E-08	1.82E-03	9.46E-06
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	6.22E-01	7.08E-05	6.99E-01	8.54E-02	8.72E-08	4.61E-02	4.75E-05
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	7.52E-01	7.43E-05	7.03E-01	1.03E-01	9.15E-08	2.00E-02	3.13E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	2.59E-01	7.11E-05	5.90E+00	3.56E-02	8.75E-08	1.76E-04	2.94E-06
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	6.74E-01	7.60E-05	5.43E-01	9.26E-02	9.36E-08	6.00E-02	5.43E-05
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	6.74E-01	7.60E-05	2.45E-01	9.26E-02	9.36E-08	7.07E-03	1.86E-05
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	6.83E-01	7.86E-05	6.85E-01	9.37E-02	9.68E-08	2.89E-02	3.76E-05
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	7.52E-01	8.38E-05	1.09E+00	1.03E-01	1.03E-07	1.88E-01	9.61E-05
VOC	1,1,2-Trichloro-1,2,2-trifluoroe	76-13-1	3.81E+02		9.83E+00	6.74E-01	7.08E-05	4.38E+00	9.26E-02	8.72E-08	2.08E-01	1.01E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.26E-01	5.24E-01	6.84E-05	3.02E+00	7.19E-02	8.42E-08	2.99E-03	1.21E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.20E-01	5.20E-01	7.49E-05	5.82E+00	7.14E-02	9.22E-08	1.48E-03	8.51E-06
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	9.16E-01	1.06E-04	3.09E-01	1.26E-01	1.31E-07	2.26E-01	1.05E-04
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	6.74E-01	7.56E-05	1.37E+00	9.25E-02	9.30E-08	9.33E-03	2.14E-05
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	3.64E-01	6.64E-05	2.32E+01	5.00E-02	8.18E-08	6.85E-06	5.80E-07
SVOC	Acenaphthylene	208-96-8	7.47E+03		2.31E-03	3.88E-01	6.03E-05	2.43E+01	5.33E-02	7.42E-08	5.07E-06	4.99E-07
SVOC	Acetophenone	98-86-2	3.58E+01		2.19E-04	6.91E-01	6.91E-05	1.92E-01	9.49E-02	8.51E-08	1.09E-04	2.31E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.34E-03	2.80E-01	6.69E-05	9.63E+01	3.84E-02	8.23E-08	5.34E-07	1.62E-07
SVOC	Atrazine	1912-24-9	3.68E+02		1.25E-07	2.24E-01	5.76E-05	1.27E+00	3.07E-02	7.09E-08	5.89E-08	5.38E-08
SVOC	Benzaldehyde	100-52-7	2.85E+01		4.86E-04	6.23E-01	7.84E-05	1.69E-01	8.56E-02	9.65E-08	2.47E-04	3.48E-06
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	4.41E-01	7.78E-05	1.30E+03	6.05E-02	9.57E-08	3.26E-09	1.27E-08
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	3.72E-01	7.78E-05	3.29E+03	5.10E-02	9.57E-08	3.88E-10	4.36E-09
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.51E-08	2.73E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		2.88E-06	1.88E-01	4.54E-05	4.15E+04	2.58E-02	5.59E-08	3.14E-12	3.92E-10
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.28E-10	2.50E-09
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	3.49E-01	7.04E-05	3.41E+01	4.79E-02	8.67E-08	8.63E-06	6.51E-07
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	3.77E-01	7.31E-05	1.32E-01	5.17E-02	9.00E-08	2.04E-06	3.16E-07
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.55E+01		3.69E-04	5.98E-01	6.51E-05	1.26E-01	8.21E-02	8.01E-08	2.41E-04	3.44E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.03E-01	3.16E-05	4.86E+04	4.17E-02	3.89E-08	2.59E-12	3.57E-10

Attachment G1: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.50E-01	4.17E-05	1.86E+02	2.06E-02	5.14E-08	3.15E-09	1.24E-08
SVOC	Caprolactam	105-60-2	6.51E-01		1.03E-07	5.98E-01	7.77E-05	7.81E-02	8.21E-02	9.56E-08	1.33E-06	2.56E-07
SVOC	Carbazole	86-74-8	3.38E+03		3.13E-07	3.37E-01	6.07E-05	1.10E+01	4.63E-02	7.48E-08	8.09E-09	1.99E-08
SVOC	4-Chloro-3-methylphenol	59-50-7	1.12E+03		8.15E-06	5.24E-01	8.22E-05	3.69E+00	7.19E-02	1.01E-07	1.86E-07	9.56E-08
SVOC	2-Chloronaphthalene	91-58-7	1.12E+04		6.42E-03	4.25E-01	7.59E-05	3.65E+01	5.84E-02	9.35E-08	1.03E-05	7.10E-07
SVOC	2-Chlorophenol	95-57-8	3.88E+02		8.00E-03	4.33E-01	8.17E-05	1.34E+00	5.95E-02	1.01E-07	3.56E-04	4.18E-06
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.14E-01	5.37E-05	1.30E+03	2.94E-02	6.60E-08	4.40E-08	4.64E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		3.02E-07	1.75E-01	4.48E-05	1.22E+04	2.40E-02	5.51E-08	5.10E-12	5.00E-10
SVOC	Dibenzofuran	132-64-9	2.07E+04		2.57E-04	2.06E-01	5.18E-05	6.71E+01	2.82E-02	6.38E-08	1.09E-07	7.32E-08
SVOC	2,4-Dichlorophenol	120-83-2	1.47E+02		6.50E-05	2.99E-01	7.58E-05	5.52E-01	4.11E-02	9.33E-08	5.00E-06	4.95E-07
SVOC	Diethylphthalate	84-66-2	2.87E+02		9.25E-06	2.21E-01	5.49E-05	1.01E+00	3.04E-02	6.75E-08	3.47E-07	1.30E-07
SVOC	2,4-Dimethylphenol	105-67-9	2.09E+02		4.10E-05	5.05E-01	7.51E-05	7.53E-01	6.93E-02	9.24E-08	3.90E-06	4.37E-07
SVOC	Dimethylphthalate	131-11-3	6.89E+01		2.15E-06	4.91E-01	5.43E-05	2.99E-01	6.74E-02	6.69E-08	7.07E-07	1.86E-07
SVOC	Di-n-butylphthalate	84-74-2	3.40E+04		1.93E-08	3.78E-01	6.79E-05	1.10E+02	5.20E-02	8.36E-08	7.67E-10	6.13E-09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	1.21E+02		8.73E-06	2.38E-01	5.97E-05	4.69E-01	3.28E-02	7.35E-08	7.65E-07	1.94E-07
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	1.75E+00	6.10E-05	3.83E-01	2.41E-01	7.51E-08	1.39E-06	2.61E-07
SVOC	2,6-Dinitrotoluene	606-20-2	6.89E+01		1.53E-05	2.83E-01	6.27E-05	2.99E-01	3.88E-02	7.72E-08	2.24E-06	3.32E-07
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.30E-01	3.09E-05	2.72E+05	1.79E-02	3.81E-08	9.06E-11	2.11E-09
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	2.61E-01	5.49E-05	3.50E+02	3.58E-02	6.75E-08	3.40E-08	4.08E-08
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.14E-01	6.81E-05	4.47E+01	4.31E-02	8.38E-08	1.26E-06	2.49E-07
SVOC	Formaldehyde	50-00-0			6.95E-06	1.56E+00	1.73E-04					
SVOC	Hexachlorobutadiene	87-68-3	5.35E+04		1.67E-01	4.85E-01	5.32E-05	1.74E+02	6.66E-02	6.55E-08	6.41E-05	1.77E-06
SVOC	Hexachlorocyclopentadiene	77-47-4	1.99E+05		5.55E-01	1.39E-01	6.23E-05	6.45E+02	1.91E-02	7.67E-08	1.64E-05	8.98E-07
SVOC	Hexachloroethane	67-72-1	1.76E+03		7.95E-02	2.16E-02	5.88E-05	5.81E+00	2.97E-03	7.23E-08	4.06E-05	1.41E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		3.28E-05	1.64E-01	4.89E-05	1.12E+04	2.25E-02	6.02E-08	7.16E-11	1.87E-09
SVOC	Isophorone	78-59-1	4.69E+01		1.36E-04	5.38E-01	5.84E-05	2.28E-01	7.39E-02	7.19E-08	4.44E-05	1.48E-06
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.18E-01	6.70E-05	2.03E+01	5.74E-02	8.24E-08	3.00E-05	1.21E-06
SVOC	Methylphenol (total)	1319-77-3	8.45E+01		1.77E-05	6.39E-01	8.64E-05	3.50E-01	8.78E-02	1.06E-07	4.74E-06	4.82E-07
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.10E-01	6.48E-05	6.59E+00	7.00E-02	7.98E-08	1.05E-04	2.27E-06

Attachment G1: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	2-Nitroaniline	88-74-4	6.59E+01		3.27E-06	6.31E-01	6.91E-05	2.89E-01	8.66E-02	8.51E-08	1.27E-06	2.50E-07
SVOC	Nitrobenzene	98-95-3	6.44E+01		4.92E-04	6.57E-01	7.43E-05	2.85E-01	9.02E-02	9.15E-08	1.56E-04	2.77E-06
SVOC	2-Nitrophenol	88-75-5	5.75E+01		1.94E-04	4.66E-01	6.78E-05	2.62E-01	6.40E-02	8.35E-08	4.75E-05	1.53E-06
SVOC	4-Nitrophenol	100-02-7	7.55E+01		8.48E-09	5.40E-01	8.30E-05	3.21E-01	7.42E-02	1.02E-07	3.21E-07	1.25E-07
SVOC	N-Nitrosodiphenylamine	86-30-6	1.29E+03		1.03E-04	2.70E-01	5.49E-05	4.26E+00	3.70E-02	6.75E-08	9.08E-07	2.11E-07
SVOC	N-Nitroso-di-n-propylamine	621-64-7	2.40E+01		4.62E-05	4.71E-01	7.06E-05	1.54E-01	6.47E-02	8.69E-08	2.00E-05	9.90E-07
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.56E+02		2.39E-03	5.20E-01	5.54E-05	9.07E-01	7.14E-02	6.82E-08	1.88E-04	3.04E-06
SVOC	Pentachlorophenol	87-86-5	5.92E+02		5.00E-07	4.84E-01	5.27E-05	1.99E+00	6.65E-02	6.49E-08	4.92E-08	4.91E-08
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.24E-01	6.45E-05	7.86E+01	4.45E-02	7.94E-08	2.71E-07	1.15E-07
SVOC	Phenol	108-95-2	2.88E+01		8.15E-06	7.08E-01	7.86E-05	1.69E-01	9.73E-02	9.68E-08	5.26E-06	5.08E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.35E-01	6.26E-05	3.42E+02	3.23E-02	7.70E-08	2.15E-08	3.25E-08
SVOC	2,4,5-Trichlorophenol	95-95-4	1.60E+03		8.90E-05	2.51E-01	6.07E-05	5.25E+00	3.45E-02	7.48E-08	6.00E-07	1.72E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	3.81E+02		1.60E-04	2.75E-01	5.40E-05	1.31E+00	3.77E-02	6.65E-08	4.64E-06	4.77E-07
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	1.75E-01	4.32E-05	7.95E+03	2.40E-02	5.32E-08	1.23E-07	7.78E-08
INORG	Antimony	7440-36-0		4.50E+01								
INORG	Arsenic	7440-38-2		2.90E+01								
INORG	Barium	7440-39-3		4.10E+01								
INORG	Beryllium	7440-41-7		7.90E+02								
INORG	Cadmium	7440-43-9		7.50E+01								
INORG	Chromium (total)	7440-47-3		1.90E+01								
INORG	Chromium III	16065-83-1		1.80E+06								
INORG	Chromium VI	18540-29-9		1.90E+01								
INORG	Cobalt	7440-48-4		4.50E+01								
INORG	Copper	7440-50-8		3.50E+01								
INORG	Cyanide (total)	57-12-5		9.90E+00								
INORG	Fluoride	16984-48-8										
INORG	Lead	7439-92-1		9.00E+02								
INORG	Manganese	7439-96-5		6.50E+01								
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	2.65E-01	5.44E-05	1.62E+03	3.64E-02	6.70E-08	3.26E-06	4.00E-07

Attachment G1: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
INORG	Nickel	7440-02-0		6.50E+01								
INORG	Selenium	7782-49-2		5.00E+00								
INORG	Silver	7440-22-4		8.30E+00								
INORG	Thallium	7440-28-0		7.10E+01								
INORG	Vanadium	7440-62-2		1.00E+03								
INORG	Zinc	7440-66-6		6.20E+01								
Notes:	Soil bulk density	kg/L	ρ_b	1.62	*Loamy Sand*							
	Soil particle density	kg/L	ρ_s	2.65	*EPA default/MDEQ 1998*							
	Soil porosity	L/L-soil	θ	0.39	*1-(pb/ps)*							
	Soil water content	L/L-soil	θ_w	0.076	*Loamy Sand*							
	Soil air-filled porosity	L/L-soil	θ_a	0.31	*porosity-water content*							
	Soil organic carbon fraction	unitless	f_{oc}	0.002								
	Averaging period	year	**ED**	25								
		s	**ED**	7.9E+08								
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411								
	Temperature	^oC	**T**	12								
		K	**T**	285								

Attachment G1: Risk-Based Cancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	1.75E-07							1.25E-04	3.05E-05			7.59E-10	1.86E-10			
VOC	Benzene	71-43-2	A	1.75E-07	5.5E-02	1.0E+03			5.5E-02		6.41E-04	1.57E-04	7.8E-03	8.2E+00	7.59E-10	1.86E-10	7.8E-03	6.9E+06	8.1E+00
VOC	Bromodichloromethane	75-27-4	B2	1.75E-07	6.2E-02	9.2E+02			6.2E-02		2.13E-04	5.21E-05	1.8E-02	1.1E+01	7.59E-10	1.86E-10	1.8E-02	3.0E+06	1.1E+01
VOC	2-Butanone	78-93-3	ID	1.75E-07							1.17E-04	2.86E-05			7.59E-10	1.86E-10			
VOC	Carbon Disulfide	75-15-0		1.75E-07							1.38E-03	3.37E-04			7.59E-10	1.86E-10			
VOC	Carbon Tetrachloride	56-23-5	B2	1.75E-07	1.3E-01	4.4E+02			1.3E-01		8.47E-04	2.07E-04	1.5E-02	3.2E+00	7.59E-10	1.86E-10	1.5E-02	3.6E+06	3.2E+00
VOC	Chlorobenzene	108-90-7	D	1.75E-07							2.89E-04	7.08E-05			7.59E-10	1.86E-10			
VOC	Chloroethane	75-00-3		1.75E-07	2.9E-03	2.0E+04			2.9E-03		1.80E-03	4.41E-04			7.59E-10	1.86E-10			
VOC	Chloroform	67-66-3	B2	1.75E-07							6.48E-04	1.59E-04	2.3E-02	2.7E+00	7.59E-10	1.86E-10	2.3E-02	2.3E+06	2.7E+00
VOC	Chloromethane	74-87-3	D	1.75E-07							1.03E-03	2.53E-04			7.59E-10	1.86E-10			
VOC	Cumene	98-82-8	D	1.75E-07							2.95E-04	7.21E-05			7.59E-10	1.86E-10			
VOC	Cyclohexane	110-82-7	ID	1.75E-07							1.10E-03	2.70E-04			7.59E-10	1.86E-10			
VOC	Dibromochloromethane	124-48-1	C	1.75E-07	8.4E-02	6.8E+02			8.4E-02		1.17E-04	2.86E-05	2.4E-02	1.5E+01	7.59E-10	1.86E-10	2.4E-02	2.2E+06	1.4E+01
VOC	1,2-Dichlorobenzene	95-50-1	D	1.75E-07							1.25E-04	3.06E-05			7.59E-10	1.86E-10			
VOC	1,3-Dichlorobenzene	541-73-1	D	1.75E-07							1.67E-04	4.08E-05			7.59E-10	1.86E-10			
VOC	1,4-Dichlorobenzene	106-46-7	C	1.75E-07	2.4E-02	2.4E+03			2.4E-02		1.43E-04	3.49E-05	6.3E-03	4.6E+01	7.59E-10	1.86E-10	6.3E-03	8.6E+06	4.5E+01
VOC	Dichlorodifluoromethane	75-71-8		1.75E-07							1.67E-03	4.09E-04			7.59E-10	1.86E-10			
VOC	1,1-Dichloroethane	75-34-3	C	1.75E-07							7.01E-04	1.71E-04			7.59E-10	1.86E-10			
VOC	1,2-Dichloroethane	107-06-2	B2	1.75E-07	9.1E-02	6.3E+02			9.1E-02		4.30E-04	1.05E-04	2.6E-02	3.7E+00	7.59E-10	1.86E-10	2.6E-02	2.1E+06	3.6E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.75E-07							1.17E-03	2.86E-04			7.59E-10	1.86E-10			
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.75E-07							5.90E-04	1.44E-04			7.59E-10	1.86E-10			
VOC	trans-1,2-Dichloroethene	156-60-5		1.75E-07							7.40E-04	1.81E-04			7.59E-10	1.86E-10			
VOC	1,2-Dichloropropane	78-87-5	B2	1.75E-07	6.8E-02	8.4E+02			6.8E-02		4.85E-04	1.19E-04			7.59E-10	1.86E-10			
VOC	Ethyl Benzene	100-41-4	D	1.75E-07							3.36E-04	8.23E-05			7.59E-10	1.86E-10			
VOC	2-Hexanone	591-78-6		1.75E-07											7.59E-10	1.86E-10			
VOC	Methyl Acetate	79-20-9		1.75E-07							1.63E-04	3.99E-05			7.59E-10	1.86E-10			
VOC	Methyl tert-butyl ether	1634-04-4		1.75E-07							3.29E-04	8.05E-05			7.59E-10	1.86E-10			
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.75E-07							1.53E-04	3.75E-05			7.59E-10	1.86E-10			
VOC	Methylcyclohexane	108-87-2		1.75E-07							1.47E-03	3.59E-04			7.59E-10	1.86E-10			
VOC	Methylene Chloride	75-09-2	B2	1.75E-07	7.5E-03	7.6E+03			7.5E-03		6.60E-04	1.61E-04	4.7E-04	1.3E+02	7.59E-10	1.86E-10	4.7E-04	1.1E+08	1.3E+02
VOC	Styrene	100-42-5		1.75E-07							1.37E-04	3.36E-05			7.59E-10	1.86E-10			
VOC	Tetrachloroethene	127-18-4	C-B2	1.75E-07	5.2E-02	1.1E+03			5.2E-02		6.91E-04	1.69E-04	3.1E-03	1.9E+01	7.59E-10	1.86E-10	3.1E-03	1.8E+07	1.9E+01
VOC	Toluene	108-88-3	D	1.75E-07							4.55E-04	1.11E-04			7.59E-10	1.86E-10			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.75E-07							4.27E-05	1.04E-05			7.59E-10	1.86E-10			
VOC	1,1,1-Trichloroethane	71-55-6	D	1.75E-07							7.89E-04	1.93E-04			7.59E-10	1.86E-10			
VOC	1,1,2-Trichloroethane	79-00-5	C	1.75E-07	5.7E-02	1.0E+03			5.7E-02		2.71E-04	6.62E-05	1.6E-02	9.4E+00	7.59E-10	1.86E-10	1.6E-02	3.4E+06	9.4E+00
VOC	Trichloroethene	79-01-6	C-B2	1.75E-07	1.1E-02	5.2E+03			1.1E-02		5.47E-04	1.34E-04	1.7E-03	4.4E+01	7.59E-10	1.86E-10	1.7E-03	3.2E+07	4.4E+01
VOC	Trichlorofluoromethane	75-69-4		1.75E-07							1.40E-03	3.42E-04			7.59E-10	1.86E-10			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.75E-07							1.47E-03	3.59E-04			7.59E-10	1.86E-10			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.75E-07							1.76E-04	4.31E-05			7.59E-10	1.86E-10			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.75E-07							1.24E-04	3.02E-05			7.59E-10	1.86E-10			
VOC	Vinyl Chloride	75-01-4	A	1.75E-07	1.4E+00	4.1E+01			1.4E+00		1.53E-03	3.74E-04	8.8E-03	3.0E+00	7.59E-10	1.86E-10	8.8E-03	6.1E+06	2.8E+00
VOC	Xylenes (total)	1330-20-7	ID	1.75E-07							3.11E-04	7.61E-05			7.59E-10	1.86E-10			
SVOC	Acenaphthene	83-32-9		1.75E-07			1.30E-01	3.00E-07			8.42E-06	2.06E-06			7.59E-10	1.86E-10			
SVOC	Acenaphthylene	208-96-8	D	1.75E-07			1.30E-01	3.00E-07			7.25E-06	1.77E-06			7.59E-10	1.86E-10			
SVOC	Acetophenone	98-86-2	D	1.75E-07			1.00E-01	2.31E-07			3.35E-05	8.20E-06			7.59E-10	1.86E-10			
SVOC	Anthracene	120-12-7	D	1.75E-07			1.30E-01	3.00E-07			2.35E-06	5.75E-07			7.59E-10	1.86E-10			
SVOC	Atrazine	1912-24-9	C	1.75E-07	2.2E-01	2.6E+02	1.00E-01	2.31E-07	2.2E-01	2.0E+02	7.81E-07	1.91E-07	6.3E-02	8.2E+02	7.59E-10	1.86E-10	6.3E-02	8.5E+05	9.8E+01
SVOC	Benzaldehyde	100-52-7		1.75E-07			1.00E-01	2.31E-07			5.06E-05	1.24E-05			7.59E-10	1.86E-10			

Attachment G1: Risk-Based Cancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	1.75E-07	7.3E-01	7.8E+01	1.30E-01	3.00E-07	7.3E-01	4.6E+01	1.84E-07	4.50E-08	8.9E-02	2.5E+03	7.59E-10	1.86E-10	8.9E-02	6.1E+05	2.9E+01
SVOC	Benzo(a)pyrene	50-32-8	B2	1.75E-07	7.3E+00	7.8E+00	1.30E-01	3.00E-07	7.3E+00	4.6E+00	6.34E-08	1.55E-08	8.9E-01	7.3E+02	7.59E-10	1.86E-10	8.9E-01	6.1E+04	2.9E+00
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.75E-07	7.3E-01	7.8E+01	1.30E-01	3.00E-07	7.3E-01	4.6E+01	3.96E-07	9.69E-08	8.9E-02	1.2E+03	7.59E-10	1.86E-10	8.9E-02	6.1E+05	2.8E+01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.75E-07			1.30E-01	3.00E-07			5.70E-09	1.39E-09			7.59E-10	1.86E-10			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.75E-07	7.3E-02	7.8E+02	1.30E-01	3.00E-07	7.3E-02	4.6E+02	3.64E-08	8.90E-09	8.9E-03	1.3E+05	7.59E-10	1.86E-10	8.9E-03	6.1E+06	2.9E+02
SVOC	Biphenyl	92-52-4	D	1.75E-07			1.00E-01	2.31E-07			9.46E-06	2.31E-06			7.59E-10	1.86E-10			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.75E-07			1.00E-01	2.31E-07			4.60E-06	1.12E-06			7.59E-10	1.86E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.75E-07	1.1E+00	5.2E+01	1.00E-01	2.31E-07	1.1E+00	3.9E+01	4.99E-05	1.22E-05	3.3E-01	2.5E+00	7.59E-10	1.86E-10	3.3E-01	1.6E+05	2.2E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.75E-07	1.4E-02	4.1E+03	1.00E-01	2.31E-07	1.4E-02	3.1E+03	5.18E-09	1.27E-09	4.0E-03	2.0E+06	7.59E-10	1.86E-10	4.0E-03	1.3E+07	1.8E+03
SVOC	Butylbenzylphthalate	85-68-7	C	1.75E-07	1.9E-03	3.0E+04	1.00E-01	2.31E-07	1.9E-03	2.3E+04	1.81E-07	4.42E-08	5.4E-04	4.2E+05	7.59E-10	1.86E-10	5.4E-04	9.9E+07	1.3E+04
SVOC	Caprolactam	105-60-2		1.75E-07			1.00E-01	2.31E-07			3.72E-06	9.09E-07			7.59E-10	1.86E-10			
SVOC	Carbazole	86-74-8	B2	1.75E-07	2.0E-02	2.9E+03	1.00E-01	2.31E-07	2.0E-02	2.2E+03	2.89E-07	7.08E-08	5.7E-03	2.5E+04	7.59E-10	1.86E-10	5.7E-03	9.4E+06	1.2E+03
SVOC	4-Chloro-3-methylphenol	59-50-7		1.75E-07			1.00E-01	2.31E-07			1.39E-06	3.40E-07			7.59E-10	1.86E-10			
SVOC	2-Chloronaphthalene	91-58-7		1.75E-07			1.00E-01	2.31E-07			1.03E-05	2.52E-06			7.59E-10	1.86E-10			
SVOC	2-Chlorophenol	95-57-8		1.75E-07			1.00E-01	2.31E-07			6.07E-05	1.49E-05			7.59E-10	1.86E-10			
SVOC	Chrysene	218-01-9	B2	1.75E-07	7.3E-03	7.8E+03	1.30E-01	3.00E-07	7.3E-03	4.6E+03	6.75E-07	1.65E-07	8.9E-04	6.8E+04	7.59E-10	1.86E-10	8.9E-04	6.1E+07	2.8E+03
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.75E-07	7.3E+00	7.8E+00	1.30E-01	3.00E-07	7.3E+00	4.6E+00	7.27E-09	1.78E-09	8.9E-01	6.4E+03	7.59E-10	1.86E-10	8.9E-01	6.1E+04	2.9E+00
SVOC	Dibenzofuran	132-64-9	D	1.75E-07			1.00E-01	2.31E-07			1.06E-06	2.60E-07			7.59E-10	1.86E-10			
SVOC	2,4-Dichlorophenol	120-83-2		1.75E-07			1.00E-01	2.31E-07			7.20E-06	1.76E-06			7.59E-10	1.86E-10			
SVOC	Diethylphthalate	84-66-2	D	1.75E-07			1.00E-01	2.31E-07			1.89E-06	4.64E-07			7.59E-10	1.86E-10			
SVOC	2,4-Dimethylphenol	105-67-9		1.75E-07			1.00E-01	2.31E-07			6.35E-06	1.55E-06			7.59E-10	1.86E-10			
SVOC	Dimethylphthalate	131-11-3	D	1.75E-07			1.00E-01	2.31E-07			2.71E-06	6.62E-07			7.59E-10	1.86E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	1.75E-07			1.00E-01	2.31E-07			8.91E-08	2.18E-08			7.59E-10	1.86E-10			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.75E-07			1.00E-01	2.31E-07			2.82E-06	6.89E-07			7.59E-10	1.86E-10			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.75E-07	6.8E-01	8.4E+01	1.00E-01	2.31E-07	6.8E-01	6.4E+01	3.80E-06	9.29E-07			7.59E-10	1.86E-10			3.6E+01
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.75E-07	6.8E-01	8.4E+01	1.00E-01	2.31E-07	6.8E-01	6.4E+01	4.82E-06	1.18E-06	1.9E-01	4.4E+01	7.59E-10	1.86E-10	1.9E-01	2.8E+05	2.0E+01
SVOC	Di-n-octylphthalate	117-84-0		1.75E-07			1.00E-01	2.31E-07			3.06E-08	7.49E-09			7.59E-10	1.86E-10			
SVOC	Fluoranthene	206-44-0	D	1.75E-07			1.30E-01	3.00E-07			5.93E-07	1.45E-07			7.59E-10	1.86E-10			
SVOC	Fluorene	86-73-7	D	1.75E-07			1.30E-01	3.00E-07			3.61E-06	8.84E-07			7.59E-10	1.86E-10			
SVOC	Formaldehyde	50-00-0	B1	1.75E-07									1.3E-02		7.59E-10	1.86E-10	1.3E-02	4.1E+06	4.1E+06
SVOC	Hexachlorobutadiene	87-68-3	C	1.75E-07	7.8E-02	7.3E+02	1.00E-01	2.31E-07	7.8E-02	5.6E+02	2.58E-05	6.30E-06	2.2E-02	7.2E+01	7.59E-10	1.86E-10	2.2E-02	2.4E+06	5.9E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.75E-07			1.00E-01	2.31E-07			1.31E-05	3.19E-06			7.59E-10	1.86E-10			
SVOC	Hexachloroethane	67-72-1	C	1.75E-07	1.4E-02	4.1E+03	1.00E-01	2.31E-07	1.4E-02	3.1E+03	2.05E-05	5.02E-06	4.0E-03	5.0E+02	7.59E-10	1.86E-10	4.0E-03	1.3E+07	3.9E+02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.75E-08	7.3E-01	7.8E+01	1.30E-01	3.00E-08	7.3E-01	4.6E+01	2.72E-09	6.66E-10	8.9E-02	1.7E+04	7.59E-11	1.86E-11	8.9E-02	6.1E+05	2.9E+01
SVOC	Isophorone	78-59-1	C	1.75E-07	9.5E-04	6.0E+04	1.00E-01	2.31E-07	9.5E-04	4.6E+04	2.14E-05	5.25E-06			7.59E-10	1.86E-10			2.6E+04
SVOC	2-Methylnaphthalene	91-57-6	ID	1.75E-07			1.00E-01	2.31E-07			1.76E-05	4.31E-06			7.59E-10	1.86E-10			
SVOC	Methylphenol (total)	1319-77-3		1.75E-07			1.00E-01	2.31E-07			7.01E-06	1.71E-06			7.59E-10	1.86E-10			
SVOC	Naphthalene	91-20-3	C	1.75E-07			1.30E-01	3.00E-07			3.30E-05	8.07E-06			7.59E-10	1.86E-10			
SVOC	2-Nitroaniline	88-74-4		1.75E-07			1.00E-01	2.31E-07			3.63E-06	8.88E-07			7.59E-10	1.86E-10			
SVOC	Nitrobenzene	98-95-3	D	1.75E-07			1.00E-01	2.31E-07			4.02E-05	9.84E-06			7.59E-10	1.86E-10			
SVOC	2-Nitrophenol	88-75-5		1.75E-07			1.00E-01	2.31E-07			2.22E-05	5.43E-06			7.59E-10	1.86E-10			
SVOC	4-Nitrophenol	100-02-7		1.75E-07			1.00E-01	2.31E-07			1.82E-06	4.46E-07			7.59E-10	1.86E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.75E-07	4.9E-03	1.2E+04	1.00E-01	2.31E-07	4.9E-03	8.8E+03	3.07E-06	7.50E-07			7.59E-10	1.86E-10			5.0E+03
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.75E-07	7.0E+00	8.2E+00	1.00E-01	2.31E-07	7.0E+00	6.2E+00	1.44E-05	3.52E-06	2.0E+00	1.4E+00	7.59E-10	1.86E-10	2.0E+00	2.7E+04	1.0E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.75E-07	7.0E-02	8.2E+02	1.00E-01	2.31E-07	7.0E-02	6.2E+02	4.42E-05	1.08E-05	1.0E-02	9.3E+01	7.59E-10	1.86E-10	1.0E-02	5.4E+06	7.3E+01
SVOC	Pentachlorophenol	87-86-5	B2	1.75E-07	1.2E-01	4.8E+02	2.50E-01	5.77E-07	1.2E-01	1.4E+02	7.14E-07	1.75E-07	3.4E-02	1.7E+03	7.59E-10	1.86E-10	3.4E-02	1.6E+06	1.0E+02
SVOC	Phenanthrene	85-01-8	D	1.75E-07			1.30E-01	3.00E-07			1.67E-06	4.10E-07			7.59E-10	1.86E-10			
SVOC	Phenol	108-95-2	ID	1.75E-07			1.00E-01	2.31E-07			7.38E-06	1.81E-06			7.59E-10	1.86E-10			
SVOC	Pyrene	129-00-0	D	1.75E-07			1.30E-01	3.00E-07			4.72E-07	1.15E-07			7.59E-10	1.86E-10			

Attachment G1: Risk-Based Cancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	**Chemical**	**CASRN**	**Cancer Class**	**LADD** (mg/kg/d)	**SF_{oral}** $(mg/kg/d)^{-1}$	**RBC** (mg/kg)	**ABS_{derm}**	**LADD** (mg/kg/d)	**SF_{derm}** $(mg/kg/d)^{-1}$	**RBC** (mg/kg)	**C_{air}** (mg/m^3)	**Dose** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)	**C_{air}** (mg/m^3)	**Dose** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)	**Cancer RBC** (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		1.75E-07			1.00E-01	2.31E-07			2.49E-06	6.10E-07			7.59E-10	1.86E-10			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.75E-07	1.1E-02	5.2E+03	1.00E-01	2.31E-07	1.1E-02	3.9E+03	6.94E-06	1.70E-06	3.1E-03	1.9E+03	7.59E-10	1.86E-10	3.1E-03	1.7E+07	1.0E+03
PCB	PCBs (total)	1336-36-3	B2	1.75E-07	2.0E+00	2.9E+01	1.40E-01	3.23E-07	2.0E+00	1.5E+01	1.13E-06	2.76E-07	5.7E-01	6.3E+01	7.59E-10	1.86E-10	5.7E-01	9.4E+04	8.7E+00
INORG	Antimony	7440-36-0		1.75E-07											7.59E-10	1.86E-10			
INORG	Arsenic	7440-38-2	A	1.75E-07	1.5E+00	3.8E+01	3.00E-02	6.92E-08	1.5E+00	9.6E+01			4.3E+00		7.59E-10	1.86E-10	4.3E+00	1.3E+04	2.7E+01
INORG	Barium	7440-39-3	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Beryllium	7440-41-7	B1	1.75E-07									2.4E+00		7.59E-10	1.86E-10	2.4E+00	2.2E+04	2.2E+04
INORG	Cadmium	7440-43-9	B1	1.75E-07			1.00E-03	2.31E-09					1.8E+00		7.59E-10	1.86E-10	1.8E+00	3.0E+04	3.0E+04
INORG	Chromium (total)	7440-47-3		1.75E-07									1.2E+01		7.59E-10	1.86E-10	1.2E+01	4.5E+03	4.5E+03
INORG	Chromium III	16065-83-1	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Chromium VI	18540-29-9	A	1.75E-07									1.2E+01		7.59E-10	1.86E-10	1.2E+01	4.5E+03	4.5E+03
INORG	Cobalt	7440-48-4	B1	1.75E-07									2.8E+00		7.59E-10	1.86E-10	2.8E+00	1.9E+04	1.9E+04
INORG	Copper	7440-50-8	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Cyanide (total)	57-12-5	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Fluoride	16984-48-8		1.75E-07											7.59E-10	1.86E-10			
INORG	Lead	7439-92-1	B2	1.75E-07											7.59E-10	1.86E-10			
INORG	Manganese	7439-96-5	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Mercury	7439-97-6	D	1.75E-07							5.81E-06	1.42E-06			7.59E-10	1.86E-10			
INORG	Nickel	7440-02-0	A	1.75E-07									2.4E-01		7.59E-10	1.86E-10	2.4E-01	2.2E+05	2.24E+05
INORG	Selenium	7782-49-2	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Silver	7440-22-4	D	1.75E-07											7.59E-10	1.86E-10			
INORG	Thallium	7440-28-0		1.75E-07											7.59E-10	1.86E-10			
INORG	Vanadium	7440-62-2		1.75E-07											7.59E-10	1.86E-10			
INORG	Zinc	7440-66-6	D	1.75E-07											7.59E-10	1.86E-10			

Notes:

Target cancer risk of 1E-05

C/Q based on the annual maximum exposure for a 1/2 acre source area = 14.53 kg/m3 per (kg/m2-s)

PM10 flux modeled based on average wind speed in Flint

Attachment G1: Risk-Based Noncancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	4.89E-07	9.0E-01	1.8E+06			9.0E-01		1.25E-04	8.54E-05	3.2E+00	3.7E+04	7.59E-10	5.20E-10	3.2E+00	6.1E+09	3.6E+04
VOC	Benzene	71-43-2	A	4.89E-07	4.0E-03	8.2E+03			4.0E-03		6.41E-04	4.39E-04	3.0E-02	6.8E+01	7.59E-10	5.20E-10	3.0E-02	5.8E+07	6.8E+01
VOC	Bromodichloromethane	75-27-4	B2	4.89E-07	2.0E-02	4.1E+04			2.0E-02		2.13E-04	1.46E-04	7.0E-02	4.8E+02	7.59E-10	5.20E-10	7.0E-02	1.3E+08	4.7E+02
VOC	2-Butanone	78-93-3	ID	4.89E-07	6.0E-01	1.2E+06			6.0E-01		1.17E-04	8.02E-05	5.0E+00	6.2E+04	7.59E-10	5.20E-10	5.0E+00	9.6E+09	5.9E+04
VOC	Carbon Disulfide	75-15-0		4.89E-07	1.0E-01	2.0E+05			1.0E-01		1.38E-03	9.42E-04	7.0E-01	7.4E+02	7.59E-10	5.20E-10	7.0E-01	1.3E+09	7.4E+02
VOC	Carbon Tetrachloride	56-23-5	B2	4.89E-07	7.0E-04	1.4E+03			7.0E-04		8.47E-04	5.80E-04			7.59E-10	5.20E-10			
VOC	Chlorobenzene	108-90-7	D	4.89E-07	2.0E-02	4.1E+04			2.0E-02		2.89E-04	1.98E-04	6.0E-02	3.0E+02	7.59E-10	5.20E-10	6.0E-02	1.2E+08	3.0E+02
VOC	Chloroethane	75-00-3		4.89E-07	4.0E-01	8.2E+05			4.0E-01		1.80E-03	1.23E-03	1.0E+01	8.1E+03	7.59E-10	5.20E-10	1.0E+01	1.9E+10	8.0E+03
VOC	Chloroform	67-66-3	B2	4.89E-07	1.0E-02	2.0E+04			1.0E-02		6.48E-04	4.44E-04	5.0E-02	1.1E+02	7.59E-10	5.20E-10	5.0E-02	9.6E+07	1.1E+02
VOC	Chloromethane	74-87-3	D	4.89E-07							1.03E-03	7.08E-04	9.0E-02	1.3E+02	7.59E-10	5.20E-10	9.0E-02	1.7E+08	1.3E+02
VOC	Cumene	98-82-8	D	4.89E-07	1.0E-01	2.0E+05			1.0E-01		2.95E-04	2.02E-04	4.0E-01	2.0E+03	7.59E-10	5.20E-10	4.0E-01	7.7E+08	2.0E+03
VOC	Cyclohexane	110-82-7	ID	4.89E-07							1.10E-03	7.56E-04	6.0E+00	7.9E+03	7.59E-10	5.20E-10	6.0E+00	1.2E+10	7.9E+03
VOC	Dibromochloromethane	124-48-1	C	4.89E-07	2.0E-02	4.1E+04			2.0E-02		1.17E-04	7.99E-05	7.0E-02	8.8E+02	7.59E-10	5.20E-10	7.0E-02	1.3E+08	8.6E+02
VOC	1,2-Dichlorobenzene	95-50-1	D	4.89E-07	9.0E-02	1.8E+05			9.0E-02		1.25E-04	8.58E-05	2.0E-01	2.3E+03	7.59E-10	5.20E-10	2.0E-01	3.8E+08	2.3E+03
VOC	1,3-Dichlorobenzene	541-73-1	D	4.89E-07	9.0E-02	1.8E+05			9.0E-02		1.67E-04	1.14E-04	1.4E-01	1.2E+03	7.59E-10	5.20E-10	1.4E-01	2.7E+08	1.2E+03
VOC	1,4-Dichlorobenzene	106-46-7	C	4.89E-07	3.0E-02	6.1E+04			3.0E-02		1.43E-04	9.78E-05	8.0E-01	8.2E+03	7.59E-10	5.20E-10	8.0E-01	1.5E+09	7.2E+03
VOC	Dichlorodifluoromethane	75-71-8		4.89E-07	2.0E-01	4.1E+05			2.0E-01		1.67E-03	1.14E-03	2.0E-01	1.7E+02	7.59E-10	5.20E-10	2.0E-01	3.8E+08	1.7E+02
VOC	1,1-Dichloroethane	75-34-3	C	4.89E-07	1.0E-01	2.0E+05			1.0E-01		7.01E-04	4.80E-04	5.0E-01	1.0E+03	7.59E-10	5.20E-10	5.0E-01	9.6E+08	1.0E+03
VOC	1,2-Dichloroethane	107-06-2	B2	4.89E-07	2.0E-02	4.1E+04			2.0E-02		4.30E-04	2.94E-04	5.0E-03	1.7E+01	7.59E-10	5.20E-10	5.0E-03	9.6E+06	1.7E+01
VOC	1,1-Dichloroethene	75-35-4	C	4.89E-07	5.0E-02	1.0E+05			5.0E-02		1.17E-03	8.02E-04	2.0E-01	2.5E+02	7.59E-10	5.20E-10	2.0E-01	3.8E+08	2.5E+02
VOC	cis-1,2-Dichloroethene	156-59-2	D	4.89E-07	1.0E-02	2.0E+04			1.0E-02		5.90E-04	4.04E-04	3.5E-02	8.7E+01	7.59E-10	5.20E-10	3.5E-02	6.7E+07	8.6E+01
VOC	trans-1,2-Dichloroethene	156-60-5		4.89E-07	2.0E-02	4.1E+04			2.0E-02		7.40E-04	5.07E-04	6.0E-02	1.2E+02	7.59E-10	5.20E-10	6.0E-02	1.1E+08	1.2E+02
VOC	1,2-Dichloropropane	78-87-5	B2	4.89E-07							4.85E-04	3.32E-04	4.0E-03	1.2E+01	7.59E-10	5.20E-10	4.0E-03	7.7E+06	1.2E+01
VOC	Ethyl Benzene	100-41-4	D	4.89E-07	1.0E-01	2.0E+05			1.0E-01		3.36E-04	2.30E-04	1.0E+00	4.3E+03	7.59E-10	5.20E-10	1.0E+00	1.9E+09	4.3E+03
VOC	2-Hexanone	591-78-6		4.89E-07	4.0E-02	8.2E+04			4.0E-02				5.0E-03		7.59E-10	5.20E-10	5.0E-03	9.6E+06	8.1E+04
VOC	Methyl Acetate	79-20-9		4.89E-07	1.0E+00	2.0E+06			1.0E+00		1.63E-04	1.12E-04	3.5E+00	3.1E+04	7.59E-10	5.20E-10	3.5E+00	6.7E+09	3.1E+04
VOC	Methyl tert-butyl ether	1634-04-4		4.89E-07							3.29E-04	2.25E-04	3.0E+00	1.3E+04	7.59E-10	5.20E-10	3.0E+00	5.8E+09	1.3E+04
VOC	4-Methyl-2-pentanone	108-10-1	ID	4.89E-07							1.53E-04	1.05E-04	3.0E+00	2.9E+04	7.59E-10	5.20E-10	3.0E+00	5.8E+09	2.9E+04
VOC	Methylcyclohexane	108-87-2		4.89E-07							1.47E-03	1.01E-03	3.0E+00	3.0E+03	7.59E-10	5.20E-10	3.0E+00	5.8E+09	3.0E+03
VOC	Methylene Chloride	75-09-2	B2	4.89E-07	6.0E-02	1.2E+05			6.0E-02		6.60E-04	4.52E-04	3.0E+00	6.6E+03	7.59E-10	5.20E-10	3.0E+00	5.8E+09	6.3E+03
VOC	Styrene	100-42-5		4.89E-07	2.0E-01	4.1E+05			2.0E-01		1.37E-04	9.41E-05	1.0E+00	1.1E+04	7.59E-10	5.20E-10	1.0E+00	1.9E+09	1.0E+04
VOC	Tetrachloroethene	127-18-4	C-B2	4.89E-07	1.0E-02	2.0E+04			1.0E-02		6.91E-04	4.73E-04	4.0E-01	8.5E+02	7.59E-10	5.20E-10	4.0E-01	7.7E+08	8.1E+02
VOC	Toluene	108-88-3	D	4.89E-07	8.0E-02	1.6E+05			8.0E-02		4.55E-04	3.12E-04	5.0E+00	1.6E+04	7.59E-10	5.20E-10	5.0E+00	9.6E+09	1.5E+04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	4.89E-07	1.0E-02	2.0E+04			1.0E-02		4.27E-05	2.92E-05	2.0E-01	6.8E+03	7.59E-10	5.20E-10	2.0E-01	3.8E+08	5.1E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	4.89E-07	2.8E-01	5.7E+05			2.8E-01		7.89E-04	5.40E-04	2.2E+00	4.1E+03	7.59E-10	5.20E-10	2.2E+00	4.2E+09	4.0E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	4.89E-07	4.0E-03	8.2E+03			4.0E-03		2.71E-04	1.85E-04			7.59E-10	5.20E-10			
VOC	Trichloroethene	79-01-6	C-B2	4.89E-07	6.0E-03	1.2E+04			6.0E-03		5.47E-04	3.75E-04			7.59E-10	5.20E-10			
VOC	Trichlorofluoromethane	75-69-4		4.89E-07	3.0E-01	6.1E+05			3.0E-01		1.40E-03	9.57E-04	7.0E-01	7.3E+02	7.59E-10	5.20E-10	7.0E-01	1.3E+09	7.3E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		4.89E-07	3.0E+01	6.1E+07			3.0E+01		1.47E-03	1.00E-03	3.0E+01	3.0E+04	7.59E-10	5.20E-10	3.0E+01	5.8E+10	3.0E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	4.89E-07	5.0E-02	1.0E+05			5.0E-02		1.76E-04	1.21E-04	6.0E-03	5.0E+01	7.59E-10	5.20E-10	6.0E-03	1.2E+07	5.0E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	4.89E-07	5.0E-02	1.0E+05			5.0E-02		1.24E-04	8.47E-05	6.0E-03	7.1E+01	7.59E-10	5.20E-10	6.0E-03	1.2E+07	7.1E+01
VOC	Vinyl Chloride	75-01-4	A	4.89E-07	3.0E-03	6.1E+03			3.0E-03		1.53E-03	1.05E-03	1.0E-01	9.5E+01	7.59E-10	5.20E-10	1.0E-01	1.9E+08	9.4E+01
VOC	Xylenes (total)	1330-20-7	ID	4.89E-07	2.0E-01	4.1E+05			2.0E-01		3.11E-04	2.13E-04	1.0E-01	4.7E+02	7.59E-10	5.20E-10	1.0E-01	1.9E+08	4.7E+02
SVOC	Acenaphthene	83-32-9		4.89E-07	6.0E-02	1.2E+05	1.30E-01	8.40E-07	6.0E-02	7.1E+04	8.42E-06	5.77E-06	2.1E-01	3.6E+04	7.59E-10	5.20E-10	2.1E-01	4.0E+08	2.0E+04
SVOC	Acenaphthylene	208-96-8	D	4.89E-07	3.0E-02	6.1E+04	1.30E-01	8.40E-07	3.0E-02	3.6E+04	7.25E-06	4.96E-06	1.1E-01	2.1E+04	7.59E-10	5.20E-10	1.1E-01	2.0E+08	1.1E+04
SVOC	Acetophenone	98-86-2	D	4.89E-07	1.0E-01	2.0E+05	1.00E-01	6.46E-07	1.0E-01	1.5E+05	3.35E-05	2.30E-05	3.5E-01	1.5E+04	7.59E-10	5.20E-10	3.5E-01	6.7E+08	1.3E+04
SVOC	Anthracene	120-12-7	D	4.89E-07	3.0E-01	6.1E+05	1.30E-01	8.40E-07	3.0E-01	3.6E+05	2.35E-06	1.61E-06			7.59E-10	5.20E-10			2.3E+05
SVOC	Atrazine	1912-24-9	C	4.89E-07	3.5E-02	7.2E+04	1.00E-01	6.46E-07	3.5E-02	5.4E+04	7.81E-07	5.35E-07	1.2E-01	2.3E+05	7.59E-10	5.20E-10	1.2E-01	2.4E+08	2.7E+04
SVOC	Benzaldehyde	100-52-7		4.89E-07	1.0E-01	2.0E+05	1.00E-01	6.46E-07	1.0E-01	1.5E+05	5.06E-05	3.47E-05	3.5E-01	1.0E+04	7.59E-10	5.20E-10	3.5E-01	6.7E+08	9.1E+03

Attachment G1: Risk-Based Noncancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	4.89E-07			1.30E-01	8.40E-07			1.84E-07	1.26E-07			7.59E-10	5.20E-10			
SVOC	Benzo(a)pyrene	50-32-8	B2	4.89E-07			1.30E-01	8.40E-07			6.34E-08	4.34E-08			7.59E-10	5.20E-10			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	4.89E-07			1.30E-01	8.40E-07			3.96E-07	2.71E-07			7.59E-10	5.20E-10			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	4.89E-07	3.0E-02	6.1E+04	1.30E-01	8.40E-07	3.0E-02	3.6E+04	5.70E-09	3.90E-09	1.1E-01	2.7E+07	7.59E-10	5.20E-10	1.1E-01	2.0E+08	2.3E+04
SVOC	Benzo(k)fluoranthene	207-08-9	B2	4.89E-07			1.30E-01	8.40E-07			3.64E-08	2.49E-08			7.59E-10	5.20E-10			
SVOC	Biphenyl	92-52-4	D	4.89E-07	5.0E-02	1.0E+05	1.00E-01	6.46E-07	5.0E-02	7.7E+04	9.46E-06	6.48E-06	1.8E-01	2.7E+04	7.59E-10	5.20E-10	1.8E-01	3.4E+08	1.7E+04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	4.89E-07			1.00E-01	6.46E-07			4.60E-06	3.15E-06			7.59E-10	5.20E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	4.89E-07			1.00E-01	6.46E-07			4.99E-05	3.42E-05			7.59E-10	5.20E-10			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	4.89E-07	2.0E-02	4.1E+04	1.00E-01	6.46E-07	2.0E-02	3.1E+04	5.18E-09	3.55E-09	7.0E-02	2.0E+07	7.59E-10	5.20E-10	7.0E-02	1.3E+08	1.8E+04
SVOC	Butylbenzylphthalate	85-68-7	C	4.89E-07	2.0E-01	4.1E+05	1.00E-01	6.46E-07	2.0E-01	3.1E+05	1.81E-07	1.24E-07	7.0E-01	5.7E+06	7.59E-10	5.20E-10	7.0E-01	1.3E+09	1.7E+05
SVOC	Caprolactam	105-60-2		4.89E-07	5.0E-01	1.0E+06	1.00E-01	6.46E-07	5.0E-01	7.7E+05	3.72E-06	2.54E-06	1.8E+00	6.9E+05	7.59E-10	5.20E-10	1.8E+00	3.4E+09	2.7E+05
SVOC	Carbazole	86-74-8	B2	4.89E-07			1.00E-01	6.46E-07			2.89E-07	1.98E-07			7.59E-10	5.20E-10			
SVOC	4-Chloro-3-methylphenol	59-50-7		4.89E-07			1.00E-01	6.46E-07			1.39E-06	9.51E-07			7.59E-10	5.20E-10			
SVOC	2-Chloronaphthalene	91-58-7		4.89E-07	8.0E-02	1.6E+05	1.00E-01	6.46E-07	8.0E-02	1.2E+05	1.03E-05	7.07E-06	2.8E-01	4.0E+04	7.59E-10	5.20E-10	2.8E-01	5.4E+08	2.5E+04
SVOC	2-Chlorophenol	95-57-8		4.89E-07	5.0E-03	1.0E+04	1.00E-01	6.46E-07	5.0E-03	7.7E+03	6.07E-05	4.16E-05	1.8E-02	4.2E+02	7.59E-10	5.20E-10	1.8E-02	3.4E+07	3.8E+02
SVOC	Chrysene	218-01-9	B2	4.89E-07			1.30E-01	8.40E-07			6.75E-07	4.62E-07			7.59E-10	5.20E-10			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	4.89E-07			1.30E-01	8.40E-07			7.27E-09	4.98E-09			7.59E-10	5.20E-10			
SVOC	Dibenzofuran	132-64-9	D	4.89E-07	2.0E-03	4.1E+03	1.00E-01	6.46E-07	2.0E-03	3.1E+03	1.06E-06	7.29E-07	7.0E-03	9.6E+03	7.59E-10	5.20E-10	7.0E-03	1.3E+07	1.5E+03
SVOC	2,4-Dichlorophenol	120-83-2		4.89E-07	3.0E-03	6.1E+03	1.00E-01	6.46E-07	3.0E-03	4.6E+03	7.20E-06	4.93E-06	1.1E-02	2.1E+03	7.59E-10	5.20E-10	1.1E-02	2.0E+07	1.2E+03
SVOC	Diethylphthalate	84-66-2	D	4.89E-07	8.0E-01	1.6E+06	1.00E-01	6.46E-07	8.0E-01	1.2E+06	1.89E-06	1.30E-06	2.8E+00	2.2E+06	7.59E-10	5.20E-10	2.8E+00	5.4E+09	5.3E+05
SVOC	2,4-Dimethylphenol	105-67-9		4.89E-07	2.0E-02	4.1E+04	1.00E-01	6.46E-07	2.0E-02	3.1E+04	6.35E-06	4.35E-06	7.0E-02	1.6E+04	7.59E-10	5.20E-10	7.0E-02	1.3E+08	8.4E+03
SVOC	Dimethylphthalate	131-11-3	D	4.89E-07			1.00E-01	6.46E-07			2.71E-06	1.85E-06			7.59E-10	5.20E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	4.89E-07	1.0E-01	2.0E+05	1.00E-01	6.46E-07	1.0E-01	1.5E+05	8.91E-08	6.10E-08			7.59E-10	5.20E-10			8.8E+04
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		4.89E-07	1.0E-04	2.0E+02	1.00E-01	6.46E-07	1.0E-04	1.5E+02	2.82E-06	1.93E-06	3.5E-04	1.8E+02	7.59E-10	5.20E-10	3.5E-04	6.7E+05	5.9E+01
SVOC	2,4-Dinitrotoluene	121-14-2	B2	4.89E-07	2.0E-03	4.1E+03	1.00E-01	6.46E-07	2.0E-03	3.1E+03	3.80E-06	2.60E-06			7.59E-10	5.20E-10			1.8E+03
SVOC	2,6-Dinitrotoluene	606-20-2	B2	4.89E-07	1.0E-03	2.0E+03	1.00E-01	6.46E-07	1.0E-03	1.5E+03	4.82E-06	3.30E-06	3.5E-03	1.1E+03	7.59E-10	5.20E-10	3.5E-03	6.7E+06	4.8E+02
SVOC	Di-n-octylphthalate	117-84-0		4.89E-07	4.0E-02	8.2E+04	1.00E-01	6.46E-07	4.0E-02	6.2E+04	3.06E-08	2.10E-08			7.59E-10	5.20E-10			3.5E+04
SVOC	Fluoranthene	206-44-0	D	4.89E-07	4.0E-02	8.2E+04	1.30E-01	8.40E-07	4.0E-02	4.8E+04	5.93E-07	4.06E-07	1.4E-01	3.4E+05	7.59E-10	5.20E-10	1.4E-01	2.7E+08	2.8E+04
SVOC	Fluorene	86-73-7	D	4.89E-07	4.0E-02	8.2E+04	1.30E-01	8.40E-07	4.0E-02	4.8E+04	3.61E-06	2.48E-06	1.4E-01	5.7E+04	7.59E-10	5.20E-10	1.4E-01	2.7E+08	2.0E+04
SVOC	Formaldehyde	50-00-0	B1	4.89E-07	2.0E-01	4.1E+05			2.0E-01						7.59E-10	5.20E-10			
SVOC	Hexachlorobutadiene	87-68-3	C	4.89E-07	2.0E-04	4.1E+02	1.00E-01	6.46E-07	2.0E-04	3.1E+02	2.58E-05	1.76E-05			7.59E-10	5.20E-10			1.8E+02
SVOC	Hexachlorocyclopentadiene	77-47-4	E	4.89E-07	6.0E-03	1.2E+04	1.00E-01	6.46E-07	6.0E-03	9.3E+03	1.31E-05	8.94E-06	2.0E-04	2.2E+01	7.59E-10	5.20E-10	2.0E-04	3.8E+05	2.2E+01
SVOC	Hexachloroethane	67-72-1	C	4.89E-07	1.0E-03	2.0E+03	1.00E-01	6.46E-07	1.0E-03	1.5E+03	2.05E-05	1.40E-05			7.59E-10	5.20E-10			8.8E+02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	4.89E-08			1.30E-01	8.40E-08			2.72E-09	1.87E-09			7.59E-11	5.20E-11			
SVOC	Isophorone	78-59-1	C	4.89E-07	2.0E-01	4.1E+05	1.00E-01	6.46E-07	2.0E-01	3.1E+05	2.14E-05	1.47E-05			7.59E-10	5.20E-10			1.8E+05
SVOC	2-Methylnaphthalene	91-57-6	ID	4.89E-07	4.0E-03	8.2E+03	1.00E-01	6.46E-07	4.0E-03	6.2E+03	1.76E-05	1.21E-05	3.0E-03	2.5E+02	7.59E-10	5.20E-10	3.0E-03	5.8E+06	2.3E+02
SVOC	Methylphenol (total)	1319-77-3		4.89E-07	5.0E-02	1.0E+05	1.00E-01	6.46E-07	5.0E-02	7.7E+04	7.01E-06	4.80E-06			7.59E-10	5.20E-10			4.4E+04
SVOC	Naphthalene	91-20-3	C	4.89E-07	2.0E-02	4.1E+04	1.30E-01	8.40E-07	2.0E-02	2.4E+04	3.30E-05	2.26E-05	3.0E-03	1.3E+02	7.59E-10	5.20E-10	3.0E-03	5.8E+06	1.3E+02
SVOC	2-Nitroaniline	88-74-4		4.89E-07	3.0E-03	6.1E+03	1.00E-01	6.46E-07	3.0E-03	4.6E+03	3.63E-06	2.49E-06	2.0E-04	8.0E+01	7.59E-10	5.20E-10	2.0E-04	3.8E+05	7.8E+01
SVOC	Nitrobenzene	98-95-3	D	4.89E-07	5.0E-04	1.0E+03	1.00E-01	6.46E-07	5.0E-04	7.7E+02	4.02E-05	2.75E-05	2.0E-03	7.3E+01	7.59E-10	5.20E-10	2.0E-03	3.8E+06	6.2E+01
SVOC	2-Nitrophenol	88-75-5		4.89E-07			1.00E-01	6.46E-07			2.22E-05	1.52E-05			7.59E-10	5.20E-10			
SVOC	4-Nitrophenol	100-02-7		4.89E-07			1.00E-01	6.46E-07			1.82E-06	1.25E-06			7.59E-10	5.20E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	4.89E-07	2.0E-02	4.1E+04	1.00E-01	6.46E-07	2.0E-02	3.1E+04	3.07E-06	2.10E-06			7.59E-10	5.20E-10			1.8E+04
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	4.89E-07			1.00E-01	6.46E-07			1.44E-05	9.85E-06			7.59E-10	5.20E-10			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	4.89E-07	4.0E-02	8.2E+04	1.00E-01	6.46E-07	4.0E-02	6.2E+04	4.42E-05	3.03E-05			7.59E-10	5.20E-10			3.5E+04
SVOC	Pentachlorophenol	87-86-5	B2	4.89E-07	3.0E-02	6.1E+04	2.50E-01	1.61E-06	3.0E-02	1.9E+04	7.14E-07	4.89E-07	1.1E-01	2.1E+05	7.59E-10	5.20E-10	1.1E-01	2.0E+08	1.3E+04
SVOC	Phenanthrene	85-01-8	D	4.89E-07	3.0E-02	6.1E+04	1.30E-01	8.40E-07	3.0E-02	3.6E+04	1.67E-06	1.15E-06	1.1E-01	9.2E+04	7.59E-10	5.20E-10	1.1E-01	2.0E+08	1.8E+04
SVOC	Phenol	108-95-2	ID	4.89E-07	3.0E-01	6.1E+05	1.00E-01	6.46E-07	3.0E-01	4.6E+05	7.38E-06	5.05E-06			7.59E-10	5.20E-10			2.6E+05
SVOC	Pyrene	129-00-0	D	4.89E-07	3.0E-02	6.1E+04	1.30E-01	8.40E-07	3.0E-02	3.6E+04	4.72E-07	3.23E-07	1.1E-01	3.2E+05	7.59E-10	5.20E-10	1.1E-01	2.0E+08	2.1E+04

Attachment G1: Risk-Based Noncancer Criteria for Exposure of Routine Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		4.89E-07	1.0E-01	2.0E+05	1.00E-01	6.46E-07	1.0E-01	1.5E+05	2.49E-06	1.71E-06			7.59E-10	5.20E-10			8.8E+04
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	4.89E-07	1.0E-04	2.0E+02	1.00E-01	6.46E-07	1.0E-04	1.5E+02	6.94E-06	4.75E-06			7.59E-10	5.20E-10			8.8E+01
PCB	PCBs (total)	1336-36-3	B2	4.89E-07	2.0E-05	4.1E+01	1.40E-01	9.04E-07	2.0E-05	2.2E+01	1.13E-06	7.74E-07			7.59E-10	5.20E-10			1.4E+01
INORG	Antimony	7440-36-0		4.89E-07	4.0E-04	8.2E+02			6.0E-05				1.4E-03		7.59E-10	5.20E-10	1.4E-03	2.7E+06	8.2E+02
INORG	Arsenic	7440-38-2	A	4.89E-07	3.0E-04	6.1E+02	3.00E-02	1.94E-07	3.0E-04	1.5E+03					7.59E-10	5.20E-10			4.4E+02
INORG	Barium	7440-39-3	D	4.89E-07	7.0E-02	1.4E+05			4.9E-03						7.59E-10	5.20E-10			
INORG	Beryllium	7440-41-7	B1	4.89E-07	2.0E-03	4.1E+03			1.4E-05				2.0E-05		7.59E-10	5.20E-10	2.0E-05	3.8E+04	3.7E+03
INORG	Cadmium	7440-43-9	B1	4.89E-07	1.0E-03	2.0E+03	1.00E-03	6.46E-09	2.5E-05	3.9E+03			2.0E-04		7.59E-10	5.20E-10	2.0E-04	3.8E+05	1.3E+03
INORG	Chromium (total)	7440-47-3		4.89E-07	3.0E-03	6.1E+03			7.5E-05				1.0E-04		7.59E-10	5.20E-10	1.0E-04	1.9E+05	5.9E+03
INORG	Chromium III	16065-83-1	D	4.89E-07	1.5E+00	3.1E+06			2.0E-02				5.3E+00		7.59E-10	5.20E-10	5.3E+00	1.0E+10	3.1E+06
INORG	Chromium VI	18540-29-9	A	4.89E-07	3.0E-03	6.1E+03			7.5E-05				1.0E-04		7.59E-10	5.20E-10	1.0E-04	1.9E+05	5.9E+03
INORG	Cobalt	7440-48-4	B1	4.89E-07	2.0E-02	4.1E+04			2.0E-02				2.0E-05		7.59E-10	5.20E-10	2.0E-05	3.8E+04	2.0E+04
INORG	Copper	7440-50-8	D	4.89E-07	4.0E-02	8.2E+04			4.0E-02				1.4E-01		7.59E-10	5.20E-10	1.4E-01	2.7E+08	8.2E+04
INORG	Cyanide (total)	57-12-5	D	4.89E-07	2.0E-02	4.1E+04			2.0E-02				7.0E-02		7.59E-10	5.20E-10	7.0E-02	1.3E+08	4.1E+04
INORG	Fluoride	16984-48-8		4.89E-07											7.59E-10	5.20E-10			
INORG	Lead	7439-92-1	B2	4.89E-07											7.59E-10	5.20E-10			
INORG	Manganese	7439-96-5	D	4.89E-07	1.4E-01	2.9E+05			8.4E-03				5.0E-05		7.59E-10	5.20E-10	5.0E-05	9.6E+04	7.2E+04
INORG	Mercury	7439-97-6	D	4.89E-07	3.0E-04	6.1E+02			3.0E-04		5.81E-06	3.98E-06	3.0E-04	7.5E+01	7.59E-10	5.20E-10	3.0E-04	5.8E+05	6.7E+01
INORG	Nickel	7440-02-0	A	4.89E-07	2.0E-02	4.1E+04			8.0E-04						7.59E-10	5.20E-10			
INORG	Selenium	7782-49-2	D	4.89E-07	5.0E-03	1.0E+04			5.0E-03				1.8E-02		7.59E-10	5.20E-10	1.8E-02	3.4E+07	1.0E+04
INORG	Silver	7440-22-4	D	4.89E-07	5.0E-03	1.0E+04			2.0E-04				1.0E-05		7.59E-10	5.20E-10	1.0E-05	1.9E+04	6.7E+03
INORG	Thallium	7440-28-0		4.89E-07	7.0E-05	1.4E+02			7.0E-05				2.5E-04		7.59E-10	5.20E-10	2.5E-04	4.7E+05	1.4E+02
INORG	Vanadium	7440-62-2		4.89E-07	7.0E-03	1.4E+04			1.8E-04				2.5E-02		7.59E-10	5.20E-10	2.5E-02	4.7E+07	1.4E+04
INORG	Zinc	7440-66-6	D	4.89E-07	3.0E-01	6.1E+05			3.0E-01				1.1E+00		7.59E-10	5.20E-10	1.1E+00	2.0E+09	6.1E+05

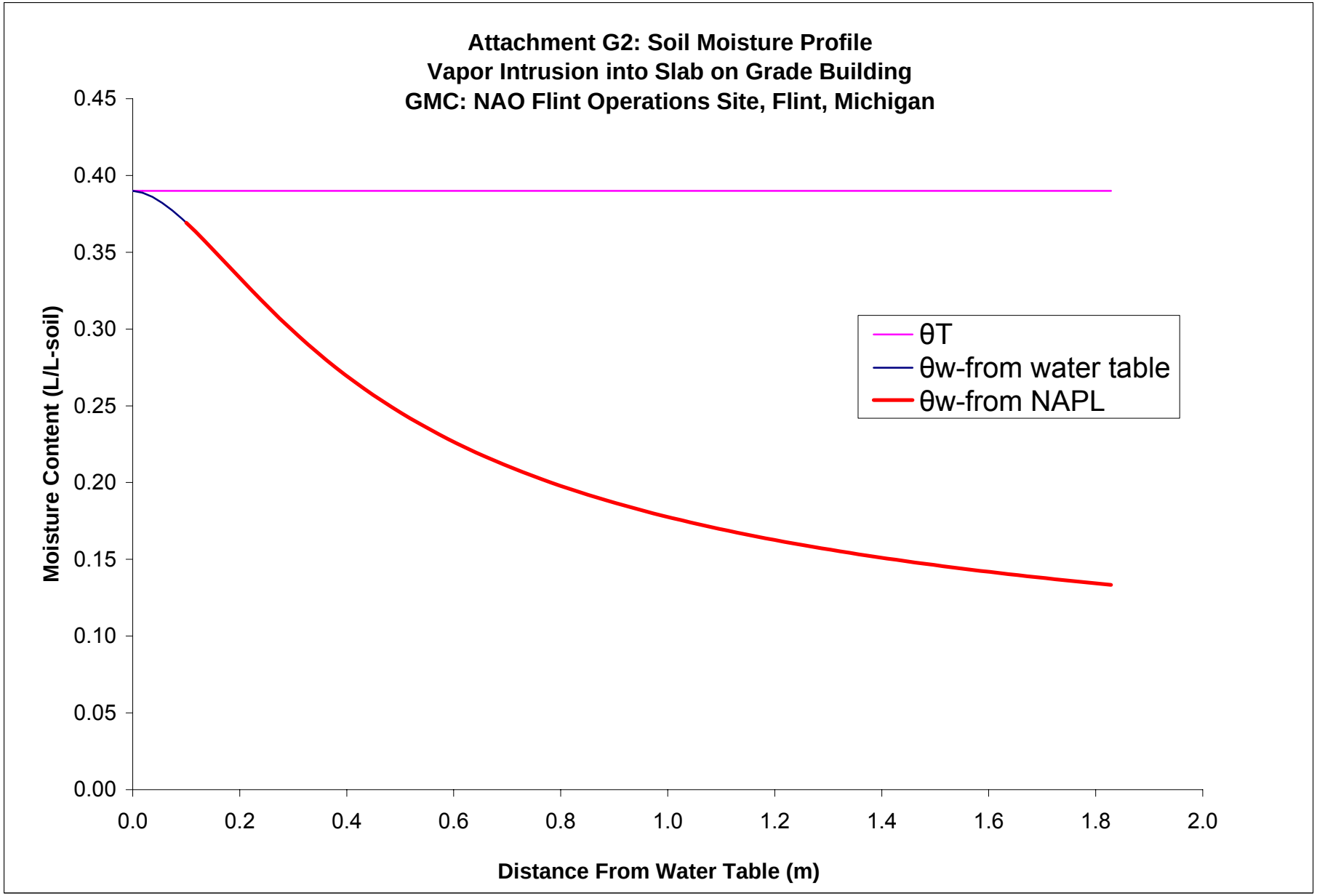
Notes:

Target hazard index of 1

C/Q based on the annual maximum exposure for a 1/2 acre source area = 14.53 kg/m3 per (kg/m2-s)

PM10 flux modeled based on average wind speed in Flint

Attachment G2
Exposure of Routine Workers via Vapor Intrusion
from Soil, Groundwater, and LNAPL


Attachment G2: Soil Moisture Profile
Vapor Intrusion into Slab on Grade Building
GMC: NAO Flint Operations Site, Flint, Michigan
Moisture Content (L/L-soil)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Distance From Water Table (m)
θT
θw-from water table
θw-from NAPL

Attachment G2:Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
VOC	Acetone	67-64-1	1.07E+00	9.85E-05	7.95E-04	7.17E-02	7.17E-02	1.12E-05	5.81E-01	1.16E-03	9.15E+00	8.08E-04	1.12E-05	1.02E-04
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.14E-01	5.01E-02	5.01E-02	1.11E-05	5.82E+01	1.16E-01	5.19E+02	1.42E-05	1.11E-05	5.78E-03
VOC	Bromodichloromethane	75-27-4	2.57E-01	9.16E-05	3.28E-02	1.70E-02	1.70E-02	1.11E-05	5.51E+01	1.10E-01	1.63E+02	4.53E-05	1.11E-05	1.81E-03
VOC	2-Butanone	78-93-3	6.98E-01	8.47E-05	1.14E-03	4.67E-02	4.67E-02	1.11E-05	2.00E+00	3.99E-03	1.27E+01	5.81E-04	1.11E-05	1.42E-04
VOC	Carbon Disulfide	75-15-0	8.99E-01	8.64E-05	6.20E-01	5.92E-02	5.92E-02	1.12E-05	4.59E+01	9.19E-02	2.27E+03	3.26E-06	3.26E-06	7.39E-03
VOC	Carbon Tetrachloride	56-23-5	6.74E-01	7.60E-05	6.25E-01	4.44E-02	4.44E-02	1.11E-05	1.74E+02	3.48E-01	1.18E+03	6.27E-06	6.27E-06	7.39E-03
VOC	Chlorobenzene	108-90-7	6.31E-01	7.52E-05	7.60E-02	4.16E-02	4.16E-02	1.11E-05	2.20E+02	4.41E-01	1.41E+02	5.24E-05	1.11E-05	1.57E-03
VOC	Chloroethane	75-00-3	2.34E+00	9.94E-05	1.80E-01	1.54E-01	1.54E-01	1.12E-05	1.62E+01	3.25E-02	1.23E+03	5.99E-06	5.99E-06	7.39E-03
VOC	Chloroform	67-66-3	8.99E-01	8.64E-05	7.50E-02	5.92E-02	5.92E-02	1.12E-05	3.97E+01	7.94E-02	4.25E+02	1.74E-05	1.12E-05	4.74E-03
VOC	Chloromethane	74-87-3	1.09E+00	5.62E-05	1.80E-01	7.17E-02	7.17E-02	1.12E-05	3.97E+01	7.94E-02	9.34E+02	7.91E-06	7.91E-06	7.39E-03
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	2.66E-01	3.70E-02	3.70E-02	1.11E-05	7.05E+02	1.41E+00	1.73E+02	4.27E-05	1.11E-05	1.93E-03
VOC	Cyclohexane	110-82-7	7.25E-01	7.86E-05	3.98E+00	4.78E-02	4.78E-02	1.11E-05	6.35E+02	1.27E+00	2.02E+03	3.66E-06	3.66E-06	7.39E-03
VOC	Dibromochloromethane	124-48-1	1.69E-01	9.07E-05	1.61E-02	1.12E-02	1.12E-02	1.10E-05	6.26E+01	1.25E-01	7.52E+01	9.83E-05	1.10E-05	8.27E-04
VOC	1,2-Dichlorobenzene	95-50-1	5.96E-01	6.83E-05	3.90E-02	3.93E-02	3.93E-02	1.11E-05	6.23E+02	1.25E+00	2.91E+01	2.54E-04	1.11E-05	3.24E-04
VOC	1,3-Dichlorobenzene	541-73-1	5.98E-01	6.79E-05	6.33E-02	3.94E-02	3.94E-02	1.11E-05	5.69E+02	1.14E+00	5.14E+01	1.44E-04	1.11E-05	5.72E-04
VOC	1,4-Dichlorobenzene	106-46-7	5.96E-01	6.83E-05	4.98E-02	3.93E-02	3.93E-02	1.11E-05	6.12E+02	1.22E+00	3.78E+01	1.96E-04	1.11E-05	4.21E-04
VOC	Dichlorodifluoromethane	75-71-8	6.91E-01	6.91E-05	7.01E+00	4.55E-02	4.55E-02	1.11E-05	6.15E+01	1.23E-01	5.41E+03	1.37E-06	1.37E-06	7.39E-03
VOC	1,1-Dichloroethane	75-34-3	6.41E-01	9.07E-05	1.15E-01	4.22E-02	4.22E-02	1.11E-05	3.13E+01	6.27E-02	6.92E+02	1.07E-05	1.07E-05	7.39E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.01E-02	5.92E-02	5.92E-02	1.12E-05	1.75E+01	3.50E-02	1.62E+02	4.56E-05	1.12E-05	1.81E-03
VOC	1,1-Dichloroethene	75-35-4	7.78E-01	8.99E-05	5.35E-01	5.12E-02	5.12E-02	1.11E-05	5.82E+01	1.16E-01	1.88E+03	3.94E-06	3.94E-06	7.39E-03
VOC	cis-1,2-Dichloroethene	156-59-2	6.36E-01	9.76E-05	8.35E-02	4.19E-02	4.19E-02	1.11E-05	3.56E+01	7.12E-02	4.92E+02	1.50E-05	1.11E-05	5.48E-03
VOC	trans-1,2-Dichloroethene	156-60-5	6.11E-01	1.03E-04	1.93E-01	4.02E-02	4.02E-02	1.11E-05	5.22E+01	1.04E-01	8.76E+02	8.44E-06	8.44E-06	7.39E-03
VOC	1,2-Dichloropropane	78-87-5	6.76E-01	7.54E-05	5.75E-02	4.45E-02	4.45E-02	1.11E-05	4.35E+01	8.70E-02	3.17E+02	2.33E-05	1.11E-05	3.53E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	1.62E-01	4.27E-02	4.27E-02	1.11E-05	3.67E+02	7.35E-01	1.91E+02	3.87E-05	1.11E-05	2.13E-03
VOC	2-Hexanone	591-78-6			3.58E-02				1.48E+01	2.97E-02	2.96E+02	2.50E-05	2.50E-05	7.39E-03
VOC	Methyl Acetate	79-20-9	8.27E-01	9.50E-05	1.85E-03	5.49E-02	5.49E-02	1.12E-05	1.66E+00	3.33E-03	2.08E+01	3.56E-04	1.12E-05	2.32E-04
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.20E-02	4.90E-02	4.90E-02	1.11E-05	1.15E+01	2.30E-02	1.09E+02	6.81E-05	1.11E-05	1.21E-03
VOC	4-Methyl-2-pentanone	108-10-1	6.48E-01	6.74E-05	2.82E-03	4.29E-02	4.29E-02	1.11E-05	1.05E+01	2.10E-02	2.64E+01	2.81E-04	1.11E-05	2.94E-04
VOC	Methylcyclohexane	108-87-2	6.35E-01	7.36E-05	8.78E+00	4.18E-02	4.18E-02	1.11E-05	2.66E+02	5.33E-01	4.43E+03	1.67E-06	1.67E-06	7.39E-03
VOC	Methylene Chloride	75-09-2	8.73E-01	1.01E-04	4.49E-02	5.75E-02	5.75E-02	1.12E-05	1.17E+01	2.34E-02	3.87E+02	1.91E-05	1.12E-05	4.32E-03
VOC	Styrene	100-42-5	6.13E-01	6.91E-05	5.65E-02	4.04E-02	4.04E-02	1.11E-05	7.77E+02	1.55E+00	3.43E+01	2.16E-04	1.11E-05	3.82E-04
VOC	Tetrachloroethene	127-18-4	6.22E-01	7.08E-05	3.77E-01	4.10E-02	4.10E-02	1.11E-05	1.56E+02	3.12E-01	8.27E+02	8.94E-06	8.94E-06	7.39E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.36E-01	4.95E-02	4.95E-02	1.11E-05	1.80E+02	3.61E-01	2.91E+02	2.54E-05	1.11E-05	3.24E-03
VOC	1,2,4-Trichlorobenzene	120-82-1	2.59E-01	7.11E-05	2.91E-02	1.71E-02	1.71E-02	1.11E-05	1.79E+03	3.59E+00	7.91E+00	9.35E-04	1.11E-05	8.75E-05
VOC	1,1,1-Trichloroethane	71-55-6	6.74E-01	7.60E-05	3.53E-01	4.44E-02	4.44E-02	1.11E-05	1.10E+02	2.20E-01	9.77E+02	7.57E-06	7.57E-06	7.39E-03
VOC	1,1,2-Trichloroethane	79-00-5	6.74E-01	7.60E-05	1.87E-02	4.44E-02	4.44E-02	1.11E-05	5.03E+01	1.01E-01	9.89E+01	7.48E-05	1.11E-05	1.10E-03
VOC	Trichloroethene	79-01-6	6.83E-01	7.86E-05	2.11E-01	4.50E-02	4.50E-02	1.11E-05	1.68E+02	3.35E-01	4.65E+02	1.59E-05	1.11E-05	5.18E-03
VOC	Trichlorofluoromethane	75-69-4	7.52E-01	8.38E-05	1.98E+00	4.95E-02	4.95E-02	1.11E-05	1.21E+02	2.42E-01	3.12E+03	2.37E-06	2.37E-06	7.39E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroet	76-13-1	6.74E-01	7.08E-05	9.83E+00	4.44E-02	4.44E-02	1.11E-05	3.81E+02	7.62E-01	4.14E+03	1.78E-06	1.78E-06	7.39E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.26E-01	3.45E-02	3.45E-02	1.11E-05	8.97E+02	1.79E+00	6.63E+01	1.12E-04	1.11E-05	7.37E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.20E-01	3.43E-02	3.43E-02	1.11E-05	1.76E+03	3.52E+00	3.31E+01	2.23E-04	1.11E-05	3.69E-04
VOC	Vinyl Chloride	75-01-4	9.16E-01	1.06E-04	5.55E-01	6.03E-02	6.03E-02	1.12E-05	1.85E+01	3.69E-02	2.66E+03	2.78E-06	2.78E-06	7.39E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	1.38E-01	4.44E-02	4.44E-02	1.11E-05	3.86E+02	7.71E-01	1.57E+02	4.70E-05	1.11E-05	1.75E-03
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.18E-03	2.42E-02	2.42E-02	1.11E-05	7.14E+03	1.43E+01	2.21E-01	3.34E-02	1.11E-05	2.46E-06
SVOC	Acenaphthylene	208-96-8	3.88E-01	6.03E-05	2.31E-03	2.58E-02	2.58E-02	1.11E-05	7.47E+03	1.49E+01	1.54E-01	4.81E-02	1.11E-05	1.71E-06
SVOC	Acetophenone	98-86-2	6.91E-01	6.91E-05	2.19E-04	4.84E-02	4.84E-02	1.11E-05	3.58E+01	7.15E-02	1.39E+00	5.31E-03	1.11E-05	1.55E-05
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.34E-03	1.89E-02	1.89E-02	1.11E-05	2.97E+04	5.94E+01	2.24E-02	3.30E-01	1.11E-05	2.48E-07
SVOC	Atrazine	1912-24-9	2.24E-01	5.76E-05	1.25E-07	4.20E+00	4.20E+00	3.08E-05	3.68E+02	7.36E-01	1.52E-04	4.86E+01	3.08E-05	4.68E-09

Attachment G2:Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
SVOC	Benzaldehyde	100-52-7	6.23E-01	7.84E-05	4.86E-04	4.25E-02	4.25E-02	1.11E-05	2.85E+01	5.70E-02	3.41E+00	2.17E-03	1.11E-05	3.80E-05
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	6.85E-05	3.93E-02	3.93E-02	1.11E-05	4.01E+05	8.02E+02	8.54E-05	8.66E+01	1.11E-05	9.51E-10
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	2.32E-05	5.49E-02	5.49E-02	1.12E-05	1.01E+06	2.03E+03	1.14E-05	6.48E+02	1.12E-05	1.27E-10
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	2.28E-03	1.31E-02	1.31E-02	1.10E-05	1.24E+06	2.49E+03	9.14E-04	8.09E+00	1.10E-05	1.01E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	2.88E-06	1.55E-01	1.55E-01	1.12E-05	1.28E+07	2.56E+04	1.13E-07	6.57E+04	1.12E-05	1.26E-12
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.70E-05	3.85E-02	3.85E-02	1.11E-05	1.24E+06	2.49E+03	6.83E-06	1.08E+03	1.11E-05	7.61E-11
SVOC	Biphenyl	92-52-4	3.49E-01	7.04E-05	6.13E-03	2.31E-02	2.31E-02	1.11E-05	1.05E+04	2.10E+01	2.91E-01	2.54E-02	1.11E-05	3.23E-06
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.77E-01	7.31E-05	3.47E-06	2.16E-01	2.16E-01	1.12E-05	1.73E+01	3.47E-02	2.89E-02	2.56E-01	1.12E-05	3.23E-07
SVOC	bis(2-Chloroethyl) ether	111-44-4	5.98E-01	6.51E-05	3.69E-04	4.10E-02	4.10E-02	1.11E-05	1.55E+01	3.10E-02	3.16E+00	2.34E-03	1.11E-05	3.52E-05
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.03E-01	3.16E-05	2.09E-06	1.57E-01	1.57E-01	1.12E-05	1.50E+07	3.00E+04	6.97E-08	1.06E+05	1.12E-05	7.79E-13
SVOC	Butylbenzylphthalate	85-68-7	1.50E-01	4.17E-05	2.59E-05	2.45E-02	2.45E-02	1.11E-05	5.73E+04	1.15E+02	2.25E-04	3.28E+01	1.11E-05	2.50E-09
SVOC	Caprolactam	105-60-2	5.98E-01	7.77E-05	1.03E-07	6.88E+00	6.88E+00	4.65E-05	6.51E-01	1.30E-03	1.19E-03	6.24E+00	4.65E-05	5.51E-08
SVOC	Carbazole	86-74-8	3.37E-01	6.07E-05	3.13E-07	1.78E+00	1.78E+00	1.71E-05	3.38E+03	6.77E+00	4.57E-05	1.62E+02	1.71E-05	7.81E-10
SVOC	4-Chloro-3-methylphenol	59-50-7	5.24E-01	8.22E-05	8.15E-06	1.26E-01	1.26E-01	1.12E-05	1.12E+03	2.23E+00	3.52E-03	2.10E+00	1.12E-05	3.93E-08
SVOC	2-Chloronaphthalene	91-58-7	4.25E-01	7.59E-05	6.42E-03	2.81E-02	2.81E-02	1.11E-05	1.12E+04	2.25E+01	2.85E-01	2.60E-02	1.11E-05	3.16E-06
SVOC	2-Chlorophenol	95-57-8	4.33E-01	8.17E-05	8.00E-03	2.86E-02	2.86E-02	1.11E-05	3.88E+02	7.76E-01	9.27E+00	7.97E-04	1.11E-05	1.03E-04
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.94E-03	1.44E-02	1.44E-02	1.10E-05	4.01E+05	8.02E+02	2.42E-03	3.06E+00	1.10E-05	2.67E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	3.02E-07	1.36E+00	1.36E+00	1.49E-05	3.77E+06	7.54E+03	4.00E-08	1.85E+05	1.49E-05	5.94E-13
SVOC	Dibenzofuran	132-64-9	2.06E-01	5.18E-05	2.57E-04	1.54E-02	1.54E-02	1.11E-05	2.07E+04	4.14E+01	6.21E-03	1.19E+00	1.11E-05	6.86E-08
SVOC	2,4-Dichlorophenol	120-83-2	2.99E-01	7.58E-05	6.50E-05	3.03E-02	3.03E-02	1.11E-05	1.47E+02	2.94E-01	1.71E-01	4.32E-02	1.11E-05	1.90E-06
SVOC	Diethylphthalate	84-66-2	2.21E-01	5.49E-05	9.25E-06	6.84E-02	6.84E-02	1.12E-05	2.87E+02	5.74E-01	1.40E-02	5.27E-01	1.12E-05	1.57E-07
SVOC	2,4-Dimethylphenol	105-67-9	5.05E-01	7.51E-05	4.10E-05	4.99E-02	4.99E-02	1.11E-05	2.09E+02	4.18E-01	8.14E-02	9.08E-02	1.11E-05	9.08E-07
SVOC	Dimethylphthalate	131-11-3	4.91E-01	5.43E-05	2.15E-06	2.62E-01	2.62E-01	1.12E-05	6.89E+01	1.38E-01	9.60E-03	7.70E-01	1.12E-05	1.07E-07
SVOC	Di-n-butylphthalate	84-74-2	3.78E-01	6.79E-05	1.93E-08	3.20E+01	3.20E+01	1.95E-04	3.40E+04	6.81E+01	2.82E-07	2.62E+04	1.95E-04	5.50E-11
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.38E-01	5.97E-05	8.73E-06	7.78E-02	7.78E-02	1.12E-05	1.21E+02	2.43E-01	2.66E-02	2.78E-01	1.12E-05	2.97E-07
SVOC	2,4-Dinitrotoluene	121-14-2	1.75E+00	6.10E-05	1.90E-06	4.07E-01	4.07E-01	1.13E-05	9.46E+01	1.89E-01	6.91E-03	1.07E+00	1.13E-05	7.81E-08
SVOC	2,6-Dinitrotoluene	606-20-2	2.83E-01	6.27E-05	1.53E-05	5.58E-02	5.58E-02	1.12E-05	6.89E+01	1.38E-01	6.85E-02	1.08E-01	1.12E-05	7.64E-07
SVOC	Di-n-octylphthalate	117-84-0	1.30E-01	3.09E-05	1.37E-03	8.80E-03	8.80E-03	1.09E-05	8.38E+07	1.68E+05	8.17E-06	9.04E+02	1.09E-05	8.95E-11
SVOC	Fluoranthene	206-44-0	2.61E-01	5.49E-05	3.30E-04	1.87E-02	1.87E-02	1.11E-05	1.08E+05	2.16E+02	1.53E-03	4.84E+00	1.11E-05	1.69E-08
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.31E-03	2.11E-02	2.11E-02	1.11E-05	1.38E+04	2.75E+01	4.73E-02	1.56E-01	1.11E-05	5.24E-07
SVOC	Formaldehyde	50-00-0	1.56E+00	1.73E-04	6.95E-06	3.28E-01	3.28E-01	1.12E-05					1.12E-05	
SVOC	Hexachlorobutadiene	87-68-3	4.85E-01	5.32E-05	1.67E-01	3.19E-02	3.19E-02	1.11E-05	5.35E+04	1.07E+02	1.56E+00	4.74E-03	1.11E-05	1.73E-05
SVOC	Hexachlorocyclopentadiene	77-47-4	1.39E-01	6.23E-05	5.55E-01	9.16E-03	9.16E-03	1.10E-05	1.99E+05	3.98E+02	1.39E+00	5.30E-03	1.10E-05	1.53E-05
SVOC	Hexachloroethane	67-72-1	2.16E-02	5.88E-05	7.95E-02	1.43E-03	1.43E-03	9.84E-06	1.76E+03	3.52E+00	2.19E+01	3.37E-04	9.84E-06	2.16E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	3.28E-05	2.43E-02	2.43E-02	1.11E-05	3.45E+06	6.89E+03	4.76E-06	1.55E+03	1.11E-05	5.28E-11
SVOC	Isophorone	78-59-1	5.38E-01	5.84E-05	1.36E-04	3.94E-02	3.94E-02	1.11E-05	4.69E+01	9.38E-02	7.58E-01	9.75E-03	1.11E-05	8.44E-06
SVOC	2-Methylnaphthalene	91-57-6	4.18E-01	6.70E-05	1.06E-02	2.76E-02	2.76E-02	1.11E-05	6.23E+03	1.25E+01	8.43E-01	8.77E-03	1.11E-05	9.37E-06
SVOC	Methylphenol (total)	1319-77-3	6.39E-01	8.64E-05	1.77E-05	8.65E-02	8.65E-02	1.12E-05	8.45E+01	1.69E-01	6.94E-02	1.06E-01	1.12E-05	7.75E-07
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	9.90E-03	3.36E-02	3.36E-02	1.11E-05	2.01E+03	4.02E+00	2.41E+00	3.07E-03	1.11E-05	2.68E-05
SVOC	2-Nitroaniline	88-74-4	6.31E-01	6.91E-05	3.27E-06	2.34E-01	2.34E-01	1.12E-05	6.59E+01	1.32E-01	1.50E-02	4.92E-01	1.12E-05	1.68E-07
SVOC	Nitrobenzene	98-95-3	6.57E-01	7.43E-05	4.92E-04	4.46E-02	4.46E-02	1.11E-05	6.44E+01	1.29E-01	2.29E+00	3.22E-03	1.11E-05	2.56E-05
SVOC	2-Nitrophenol	88-75-5	4.66E-01	6.78E-05	1.94E-04	3.39E-02	3.39E-02	1.11E-05	5.75E+01	1.15E-01	9.64E-01	7.67E-03	1.11E-05	1.07E-05
SVOC	4-Nitrophenol	100-02-7	5.40E-01	8.30E-05	8.48E-09	8.89E+01	8.89E+01	5.30E-04	7.55E+01	1.51E-01	3.59E-05	2.06E+02	5.30E-04	1.90E-08
SVOC	N-Nitrosodiphenylamine	86-30-6	2.70E-01	5.49E-05	1.03E-04	2.26E-02	2.26E-02	1.11E-05	1.29E+03	2.58E+00	3.85E-02	1.92E-01	1.11E-05	4.27E-07
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.71E-01	7.06E-05	4.62E-05	4.49E-02	4.49E-02	1.11E-05	2.40E+01	4.80E-02	3.45E-01	2.14E-02	1.11E-05	3.85E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	5.20E-01	5.54E-05	2.39E-03	3.45E-02	3.45E-02	1.11E-05	2.56E+02	5.12E-01	4.00E+00	1.85E-03	1.11E-05	4.45E-05
SVOC	Pentachlorophenol	87-86-5	4.84E-01	5.27E-05	5.00E-07	9.88E-01	9.88E-01	1.31E-05	5.92E+02	1.18E+00	3.94E-04	1.88E+01	1.31E-05	5.16E-09
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	4.76E-04	2.26E-02	2.26E-02	1.11E-05	2.42E+04	4.85E+01	9.81E-03	7.54E-01	1.11E-05	1.09E-07

Attachment G2:Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
SVOC	Phenol	108-95-2	7.08E-01	7.86E-05	8.15E-06	1.34E-01	1.34E-01	1.12E-05	2.88E+01	5.76E-02	5.69E-02	1.30E-01	1.12E-05	6.36E-07
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.26E-04	1.80E-02	1.80E-02	1.11E-05	1.06E+05	2.11E+02	1.07E-03	6.92E+00	1.11E-05	1.18E-08
SVOC	2,4,5-Trichlorophenol	95-95-4	2.51E-01	6.07E-05	8.90E-05	2.28E-02	2.28E-02	1.11E-05	1.60E+03	3.19E+00	2.71E-02	2.72E-01	1.11E-05	3.01E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	2.75E-01	5.40E-05	1.60E-04	2.12E-02	2.12E-02	1.11E-05	3.81E+02	7.62E-01	1.88E-01	3.93E-02	1.11E-05	2.09E-06
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	4.09E-02	1.15E-02	1.15E-02	1.10E-05	2.45E+06	4.91E+03	8.33E-03	8.88E-01	1.10E-05	9.16E-08
INORG	Antimony	7440-36-0								4.50E+01				
INORG	Arsenic	7440-38-2								2.90E+01				
INORG	Barium	7440-39-3								4.10E+01				
INORG	Beryllium	7440-41-7								7.90E+02				
INORG	Cadmium	7440-43-9								7.50E+01				
INORG	Chromium (total)	7440-47-3								1.90E+01				
INORG	Chromium III	16065-83-1								1.80E+06				
INORG	Chromium VI	18540-29-9								1.90E+01				
INORG	Cobalt	7440-48-4								4.50E+01				
INORG	Copper	7440-50-8								3.50E+01				
INORG	Cyanide (total)	57-12-5								9.90E+00				
INORG	Fluoride	16984-48-8												
INORG	Lead	7439-92-1								9.00E+02				
INORG	Manganese	7439-96-5								6.50E+01				
INORG	Mercury	7439-97-6	2.65E-01	5.44E-05	1.45E-01	1.75E-02	1.75E-02	1.11E-05		1.00E+03	1.45E-01	5.10E-02	1.11E-05	1.61E-06
INORG	Nickel	7440-02-0								6.50E+01				
INORG	Selenium	7782-49-2								5.00E+00				
INORG	Silver	7440-22-4								8.30E+00				
INORG	Thallium	7440-28-0								7.10E+01				
INORG	Vanadium	7440-62-2								1.00E+03				
INORG	Zinc	7440-66-6								6.20E+01				
Notes:	**Soil and Building Characteristics**													
	SCS Soil texture class			Loamy Sand										
	Bulk density	kg/L	ρ_b	1.62										
	Total porosity	L/L-soil	θ	0.390										
	Water-filled porosity	L/L-soil	θ_w	0.139										
	Air-filled porosity	L/L-soil	θ_a	0.251										
	Organic carbon fraction	unitless	f_{oc}	0.002										
	Residual saturation	L/L-soil	θ_r	0.0490										
	Hydraulic conductivity	cm/s	K	1.2E-03										
	Dynamic viscosity of water	g/cm-s	μ	0.01307										
	Density of water	g/cm^3	ρ_w	1.0										
	Gravitational acceleration	cm/s^2	g	980.7										
	Intrinsic permeability	cm^2	k	1.62E-08										
	Relative saturation	unitless	S_e	0.263										
	van Genuchten N	unitless	N	1.746										
	van Genuchten M	unitless	M	0.427										
	Relative air permeability	unitless	k_{rg}	0.826										
	Permeability to vapor	cm^2	k_v	1.34E-08										

Attachment G2:Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Subsurface Soil GMC: NAO Flint Operations Site, Flint, Michigan														
Chem Group	**Chemical**	**CASRN**	**D_{air}** (m^2/d)	**D_{water}** (m^2/d)	**H** (unitless)	**D_{crack}** (m^2/d)	**D_{eff}^T** (m^2/d)	**α_∞** (unitless)	**K_{oc}** (L/kg)	**K_d** (L/kg)	**$C_{s, vap}$** (kg-soil/m^3)	**α_{ML}** (unitless)	**α** (unitless)	**C_{bldg}** (kg-soil/m^3)
	Distance from building foundation to source	m	**L_T**	0.15										
	Bldg foundation thickness	m	**L_{crack}**	0.15										
	Bldg foundation length	m		19.29										
	Bldg foundation width	m		19.29										
	Bldg occupied height	m		2.44										
	Bldg occupied volume	m^3		907.93										
	Occupied depth below ground	m		0.0										
	Bldg area for vapor intrusion	m^2	**A_B**	372.1										
	Ratio of A_{crack} to A_B		**η**	1E-04										
	Area of cracks	m^2	**A_{crack}**	3.86E-02										
	Air exchange rate	$hour^{-1}$	**ac/h**	2.0										
	Building ventilation rate	m^3/d	**Q_{bldg}**	4.36E+04										
	Pressure difference between outdoors-indoors	kg/m-s^2	**ΔP**	1.0										
	Air viscosity	kg/m-s	**μ**	1.8E-05										
	Crack length (bldg perimeter)	m	**X_{crack}**	77.16										
	Crack depth below ground	m	**Z_{crack}**	0.15										
	Crack radius	m	**r_{crack}**	5E-04										
	Soil gas flow rate into bldg	m^3/d	**Q_{soil}**	4.88E-01										
	Averaging period	s	**T**	7.88E+08										
	Contaminant thickness	m	**ΔH**	4.88										

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
VOC	Acetone	67-64-1	ID	1.02E-04		
VOC	Benzene	71-43-2	A	5.78E-03	7.8E-03	9.1E-01
VOC	Bromodichloromethane	75-27-4	B2	1.81E-03	1.8E-02	1.3E+00
VOC	2-Butanone	78-93-3	ID	1.42E-04		
VOC	Carbon Disulfide	75-15-0		7.39E-03		
VOC	Carbon Tetrachloride	56-23-5	B2	7.39E-03	1.5E-02	3.7E-01
VOC	Chlorobenzene	108-90-7	D	1.57E-03		
VOC	Chloroethane	75-00-3		7.39E-03		
VOC	Chloroform	67-66-3	B2	4.74E-03	2.3E-02	3.8E-01
VOC	Chloromethane	74-87-3	D	7.39E-03		
VOC	Cumene	98-82-8	D	1.93E-03		
VOC	Cyclohexane	110-82-7	ID	7.39E-03		
VOC	Dibromochloromethane	124-48-1	C	8.27E-04	2.4E-02	2.1E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	3.24E-04		
VOC	1,3-Dichlorobenzene	541-73-1	D	5.72E-04		
VOC	1,4-Dichlorobenzene	106-46-7	C	4.21E-04	6.3E-03	1.5E+01
VOC	Dichlorodifluoromethane	75-71-8		7.39E-03		
VOC	1,1-Dichloroethane	75-34-3	C	7.39E-03		
VOC	1,2-Dichloroethane	107-06-2	B2	1.81E-03	2.6E-02	8.7E-01
VOC	1,1-Dichloroethene	75-35-4	C	7.39E-03		
VOC	cis-1,2-Dichloroethene	156-59-2	D	5.48E-03		
VOC	trans-1,2-Dichloroethene	156-60-5		7.39E-03		
VOC	1,2-Dichloropropane	78-87-5	B2	3.53E-03		
VOC	Ethyl Benzene	100-41-4	D	2.13E-03		
VOC	2-Hexanone	591-78-6		7.39E-03		
VOC	Methyl Acetate	79-20-9		2.32E-04		
VOC	Methyl tert-butyl ether	1634-04-4		1.21E-03		
VOC	4-Methyl-2-pentanone	108-10-1	ID	2.94E-04		
VOC	Methylcyclohexane	108-87-2		7.39E-03		
VOC	Methylene Chloride	75-09-2	B2	4.32E-03	4.7E-04	2.0E+01
VOC	Styrene	100-42-5		3.82E-04		
VOC	Tetrachloroethene	127-18-4	C-B2	7.39E-03	3.1E-03	1.8E+00
VOC	Toluene	108-88-3	D	3.24E-03		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	8.75E-05		
VOC	1,1,1-Trichloroethane	71-55-6	D	7.39E-03		
VOC	1,1,2-Trichloroethane	79-00-5	C	1.10E-03	1.6E-02	2.3E+00
VOC	Trichloroethene	79-01-6	C-B2	5.18E-03	1.7E-03	4.6E+00
VOC	Trichlorofluoromethane	75-69-4		7.39E-03		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		7.39E-03		
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	7.37E-04		
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	3.69E-04		
VOC	Vinyl Chloride	75-01-4	A	7.39E-03	8.8E-03	6.3E-01
VOC	Xylenes (total)	1330-20-7	ID	1.75E-03		
SVOC	Acenaphthene	83-32-9		2.46E-06		
SVOC	Acenaphthylene	208-96-8	D	1.71E-06		
SVOC	Acetophenone	98-86-2	D	1.55E-05		
SVOC	Anthracene	120-12-7	D	2.48E-07		

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
SVOC	Atrazine	1912-24-9	C	4.68E-09	6.3E-02	1.4E+05
SVOC	Benzaldehyde	100-52-7		3.80E-05		
SVOC	Benzo(a)anthracene	56-55-3	B2	9.51E-10	8.9E-02	4.9E+05
SVOC	Benzo(a)pyrene	50-32-8	B2	1.27E-10	8.9E-01	3.6E+05
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.01E-08	8.9E-02	4.6E+04
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.26E-12		
SVOC	Benzo(k)fluoranthene	207-08-9	B2	7.61E-11	8.9E-03	6.1E+07
SVOC	Biphenyl	92-52-4	D	3.23E-06		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.23E-07		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.52E-05	3.3E-01	3.5E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	7.79E-13	4.0E-03	1.3E+10
SVOC	Butylbenzylphthalate	85-68-7	C	2.50E-09	5.4E-04	3.0E+07
SVOC	Caprolactam	105-60-2		5.51E-08		
SVOC	Carbazole	86-74-8	B2	7.81E-10	5.7E-03	9.2E+06
SVOC	4-Chloro-3-methylphenol	59-50-7		3.93E-08		
SVOC	2-Chloronaphthalene	91-58-7		3.16E-06		
SVOC	2-Chlorophenol	95-57-8		1.03E-04		
SVOC	Chrysene	218-01-9	B2	2.67E-08	8.9E-04	1.7E+06
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	5.94E-13	8.9E-01	7.8E+07
SVOC	Dibenzofuran	132-64-9	D	6.86E-08		
SVOC	2,4-Dichlorophenol	120-83-2		1.90E-06		
SVOC	Diethylphthalate	84-66-2	D	1.57E-07		
SVOC	2,4-Dimethylphenol	105-67-9		9.08E-07		
SVOC	Dimethylphthalate	131-11-3	D	1.07E-07		
SVOC	Di-n-butylphthalate	84-74-2	D	5.50E-11		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		2.97E-07		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	7.81E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	7.64E-07	1.9E-01	2.8E+02
SVOC	Di-n-octylphthalate	117-84-0		8.95E-11		
SVOC	Fluoranthene	206-44-0	D	1.69E-08		
SVOC	Fluorene	86-73-7	D	5.24E-07		
SVOC	Formaldehyde	50-00-0	B1		1.3E-02	
SVOC	Hexachlorobutadiene	87-68-3	C	1.73E-05	2.2E-02	1.1E+02
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.53E-05		
SVOC	Hexachloroethane	67-72-1	C	2.16E-04	4.0E-03	4.7E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	5.28E-11	8.9E-02	8.7E+06
SVOC	Isophorone	78-59-1	C	8.44E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	9.37E-06		
SVOC	Methylphenol (total)	1319-77-3		7.75E-07		
SVOC	Naphthalene	91-20-3	C	2.68E-05		
SVOC	2-Nitroaniline	88-74-4		1.68E-07		
SVOC	Nitrobenzene	98-95-3	D	2.56E-05		
SVOC	2-Nitrophenol	88-75-5		1.07E-05		
SVOC	4-Nitrophenol	100-02-7		1.90E-08		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	4.27E-07		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3.85E-06	2.0E+00	5.3E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	4.45E-05	1.0E-02	9.2E+01

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
SVOC	Pentachlorophenol	87-86-5	B2	5.16E-09	3.4E-02	2.3E+05
SVOC	Phenanthrene	85-01-8	D	1.09E-07		
SVOC	Phenol	108-95-2	ID	6.36E-07		
SVOC	Pyrene	129-00-0	D	1.18E-08		
SVOC	2,4,5-Trichlorophenol	95-95-4		3.01E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2.09E-06	3.1E-03	6.3E+03
PCB	PCBs (total)	1336-36-3	B2	9.16E-08	5.7E-01	7.8E+02
INORG	Antimony	7440-36-0				
INORG	Arsenic	7440-38-2	A		4.3E+00	
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.4E+00	
INORG	Cadmium	7440-43-9	B1		1.8E+00	
INORG	Chromium (total)	7440-47-3			1.2E+01	
INORG	Chromium III	16065-83-1	D			
INORG	Chromium VI	18540-29-9	A		1.2E+01	
INORG	Cobalt	7440-48-4	B1		2.8E+00	
INORG	Copper	7440-50-8	D			
INORG	Cyanide (total)	57-12-5	D			
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D			
INORG	Mercury	7439-97-6	D	1.61E-06		
INORG	Nickel	7440-02-0	A		2.4E-01	
INORG	Selenium	7782-49-2	D			
INORG	Silver	7440-22-4	D			
INORG	Thallium	7440-28-0				
INORG	Vanadium	7440-62-2				
INORG	Zinc	7440-66-6	D			
Note:						
Target cancer risk of 1E-05						

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/kg)
VOC	Acetone	67-64-1	ID	1.02E-04	3.2E+00	4.5E+04
VOC	Benzene	71-43-2	A	5.78E-03	3.0E-02	7.6E+00
VOC	Bromodichloromethane	75-27-4	B2	1.81E-03	7.0E-02	5.7E+01
VOC	2-Butanone	78-93-3	ID	1.42E-04	5.0E+00	5.1E+04
VOC	Carbon Disulfide	75-15-0		7.39E-03	7.0E-01	1.4E+02
VOC	Carbon Tetrachloride	56-23-5	B2	7.39E-03		
VOC	Chlorobenzene	108-90-7	D	1.57E-03	6.0E-02	5.6E+01
VOC	Chloroethane	75-00-3		7.39E-03	1.0E+01	2.0E+03
VOC	Chloroform	67-66-3	B2	4.74E-03	5.0E-02	1.5E+01
VOC	Chloromethane	74-87-3	D	7.39E-03	9.0E-02	1.8E+01
VOC	Cumene	98-82-8	D	1.93E-03	4.0E-01	3.0E+02
VOC	Cyclohexane	110-82-7	ID	7.39E-03	6.0E+00	1.2E+03
VOC	Dibromochloromethane	124-48-1	C	8.27E-04	7.0E-02	1.2E+02
VOC	1,2-Dichlorobenzene	95-50-1	D	3.24E-04	2.0E-01	9.0E+02
VOC	1,3-Dichlorobenzene	541-73-1	D	5.72E-04	1.4E-01	3.6E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	4.21E-04	8.0E-01	2.8E+03
VOC	Dichlorodifluoromethane	75-71-8		7.39E-03	2.0E-01	3.9E+01
VOC	1,1-Dichloroethane	75-34-3	C	7.39E-03	5.0E-01	9.9E+01
VOC	1,2-Dichloroethane	107-06-2	B2	1.81E-03	5.0E-03	4.0E+00
VOC	1,1-Dichloroethene	75-35-4	C	7.39E-03	2.0E-01	3.9E+01
VOC	cis-1,2-Dichloroethene	156-59-2	D	5.48E-03	3.5E-02	9.3E+00
VOC	trans-1,2-Dichloroethene	156-60-5		7.39E-03	6.0E-02	1.2E+01
VOC	1,2-Dichloropropane	78-87-5	B2	3.53E-03	4.0E-03	1.7E+00
VOC	Ethyl Benzene	100-41-4	D	2.13E-03	1.0E+00	6.9E+02
VOC	2-Hexanone	591-78-6		7.39E-03	5.0E-03	9.9E-01
VOC	Methyl Acetate	79-20-9		2.32E-04	3.5E+00	2.2E+04
VOC	Methyl tert-butyl ether	1634-04-4		1.21E-03	3.0E+00	3.6E+03
VOC	4-Methyl-2-pentanone	108-10-1	ID	2.94E-04	3.0E+00	1.5E+04
VOC	Methylcyclohexane	108-87-2		7.39E-03	3.0E+00	5.9E+02
VOC	Methylene Chloride	75-09-2	B2	4.32E-03	3.0E+00	1.0E+03
VOC	Styrene	100-42-5		3.82E-04	1.0E+00	3.8E+03
VOC	Tetrachloroethene	127-18-4	C-B2	7.39E-03	4.0E-01	7.9E+01
VOC	Toluene	108-88-3	D	3.24E-03	5.0E+00	2.3E+03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	8.75E-05	2.0E-01	3.3E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	7.39E-03	2.2E+00	4.3E+02
VOC	1,1,2-Trichloroethane	79-00-5	C	1.10E-03		
VOC	Trichloroethene	79-01-6	C-B2	5.18E-03		
VOC	Trichlorofluoromethane	75-69-4		7.39E-03	7.0E-01	1.4E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		7.39E-03	3.0E+01	5.9E+03
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	7.37E-04	6.0E-03	1.2E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	3.69E-04	6.0E-03	2.4E+01
VOC	Vinyl Chloride	75-01-4	A	7.39E-03	1.0E-01	2.0E+01
VOC	Xylenes (total)	1330-20-7	ID	1.75E-03	1.0E-01	8.3E+01
SVOC	Acenaphthene	83-32-9		2.46E-06	2.1E-01	1.2E+05
SVOC	Acenaphthylene	208-96-8	D	1.71E-06	1.1E-01	9.0E+04
SVOC	Acetophenone	98-86-2	D	1.55E-05	3.5E-01	3.3E+04
SVOC	Anthracene	120-12-7	D	2.48E-07		
SVOC	Atrazine	1912-24-9	C	4.68E-09	1.2E-01	3.8E+07
SVOC	Benzaldehyde	100-52-7		3.80E-05	3.5E-01	1.3E+04

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	9.51E-10		
SVOC	Benzo(a)pyrene	50-32-8	B2	1.27E-10		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.01E-08		
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.26E-12	1.1E-01	1.2E+11
SVOC	Benzo(k)fluoranthene	207-08-9	B2	7.61E-11		
SVOC	Biphenyl	92-52-4	D	3.23E-06	1.8E-01	7.9E+04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.23E-07		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.52E-05		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	7.79E-13	7.0E-02	1.3E+11
SVOC	Butylbenzylphthalate	85-68-7	C	2.50E-09	7.0E-01	4.1E+08
SVOC	Caprolactam	105-60-2		5.51E-08	1.8E+00	4.6E+07
SVOC	Carbazole	86-74-8	B2	7.81E-10		
SVOC	4-Chloro-3-methylphenol	59-50-7		3.93E-08		
SVOC	2-Chloronaphthalene	91-58-7		3.16E-06	2.8E-01	1.3E+05
SVOC	2-Chlorophenol	95-57-8		1.03E-04	1.8E-02	2.5E+02
SVOC	Chrysene	218-01-9	B2	2.67E-08		
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	5.94E-13		
SVOC	Dibenzofuran	132-64-9	D	6.86E-08	7.0E-03	1.5E+05
SVOC	2,4-Dichlorophenol	120-83-2		1.90E-06	1.1E-02	8.1E+03
SVOC	Diethylphthalate	84-66-2	D	1.57E-07	2.8E+00	2.6E+07
SVOC	2,4-Dimethylphenol	105-67-9		9.08E-07	7.0E-02	1.1E+05
SVOC	Dimethylphthalate	131-11-3	D	1.07E-07		
SVOC	Di-n-butylphthalate	84-74-2	D	5.50E-11		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		2.97E-07	3.5E-04	1.7E+03
SVOC	2,4-Dinitrotoluene	121-14-2	B2	7.81E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	7.64E-07	3.5E-03	6.7E+03
SVOC	Di-n-octylphthalate	117-84-0		8.95E-11		
SVOC	Fluoranthene	206-44-0	D	1.69E-08	1.4E-01	1.2E+07
SVOC	Fluorene	86-73-7	D	5.24E-07	1.4E-01	3.9E+05
SVOC	Formaldehyde	50-00-0	B1			
SVOC	Hexachlorobutadiene	87-68-3	C	1.73E-05		
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.53E-05	2.0E-04	1.9E+01
SVOC	Hexachloroethane	67-72-1	C	2.16E-04		
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	5.28E-11		
SVOC	Isophorone	78-59-1	C	8.44E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	9.37E-06	3.0E-03	4.7E+02
SVOC	Methylphenol (total)	1319-77-3		7.75E-07		
SVOC	Naphthalene	91-20-3	C	2.68E-05	3.0E-03	1.6E+02
SVOC	2-Nitroaniline	88-74-4		1.68E-07	2.0E-04	1.7E+03
SVOC	Nitrobenzene	98-95-3	D	2.56E-05	2.0E-03	1.1E+02
SVOC	2-Nitrophenol	88-75-5		1.07E-05		
SVOC	4-Nitrophenol	100-02-7		1.90E-08		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	4.27E-07		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3.85E-06		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	4.45E-05		
SVOC	Pentachlorophenol	87-86-5	B2	5.16E-09	1.1E-01	3.0E+07
SVOC	Phenanthrene	85-01-8	D	1.09E-07	1.1E-01	1.4E+06
SVOC	Phenol	108-95-2	ID	6.36E-07		
SVOC	Pyrene	129-00-0	D	1.18E-08	1.1E-01	1.3E+07

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Soil Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		3.01E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2.09E-06		
PCB	PCBs (total)	1336-36-3	B2	9.16E-08		
INORG	Antimony	7440-36-0			1.4E-03	
INORG	Arsenic	7440-38-2	A			
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.0E-05	
INORG	Cadmium	7440-43-9	B1		2.0E-04	
INORG	Chromium (total)	7440-47-3			1.0E-04	
INORG	Chromium III	16065-83-1	D		5.3E+00	
INORG	Chromium VI	18540-29-9	A		1.0E-04	
INORG	Cobalt	7440-48-4	B1		2.0E-05	
INORG	Copper	7440-50-8	D		1.4E-01	
INORG	Cyanide (total)	57-12-5	D		7.0E-02	
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D		5.0E-05	
INORG	Mercury	7439-97-6	D	1.61E-06	3.0E-04	2.7E+02
INORG	Nickel	7440-02-0	A			
INORG	Selenium	7782-49-2	D		1.8E-02	
INORG	Silver	7440-22-4	D		1.0E-05	
INORG	Thallium	7440-28-0			2.5E-04	
INORG	Vanadium	7440-62-2			2.5E-02	
INORG	Zinc	7440-66-6	D		1.1E+00	
Note:						
Target hazard quotient of 1						

Attachment G2: Routine Worker Occupational Based Criteria for Soil Vapor Intrusion Inhalation (Commercial/Industrial Slab on Grade Building) GMC: NAO Flint Operations Site, Flint, Michigan					
Chem Group	**Chemical**	**CASRN**	**C_{air}** (mg/m^3)	**Occupational Indoor Air Standard** (mg/m3)	**Occupational Criteria** (mg/kg)
VOC	Acetone	67-64-1	1.02E-04	1.80E+03	1.8E+07
VOC	Benzene	71-43-2	5.78E-03	3.19E+00	5.5E+02
VOC	Bromodichloromethane	75-27-4	1.81E-03		
VOC	2-Butanone	78-93-3	1.42E-04	5.90E+02	4.2E+06
VOC	Carbon Disulfide	75-15-0	7.39E-03	1.20E+01	1.6E+03
VOC	Carbon Tetrachloride	56-23-5	7.39E-03	1.26E+01	1.7E+03
VOC	Chlorobenzene	108-90-7	1.57E-03	3.50E+02	2.2E+05
VOC	Chloroethane	75-00-3	7.39E-03	2.60E+03	3.5E+05
VOC	Chloroform	67-66-3	4.74E-03	9.78E+00	2.1E+03
VOC	Chloromethane	74-87-3	7.39E-03	1.03E+02	1.4E+04
VOC	Cumene	98-82-8	1.93E-03	2.45E+02	1.3E+05
VOC	Cyclohexane	110-82-7	7.39E-03	1.05E+03	1.4E+05
VOC	Dibromochloromethane	124-48-1	8.27E-04		
VOC	1,2-Dichlorobenzene	95-50-1	3.24E-04	1.50E+02	4.6E+05
VOC	1,3-Dichlorobenzene	541-73-1	5.72E-04		
VOC	1,4-Dichlorobenzene	106-46-7	4.21E-04	4.50E+02	1.1E+06
VOC	Dichlorodifluoromethane	75-71-8	7.39E-03	4.95E+03	6.7E+05
VOC	1,1-Dichloroethane	75-34-3	7.39E-03	4.00E+02	5.4E+04
VOC	1,2-Dichloroethane	107-06-2	1.81E-03	4.00E+00	2.2E+03
VOC	1,1-Dichloroethene	75-35-4	7.39E-03	1.98E+01	2.7E+03
VOC	cis-1,2-Dichloroethene	156-59-2	5.48E-03	7.93E+02	1.4E+05
VOC	trans-1,2-Dichloroethene	156-60-5	7.39E-03	7.93E+02	1.1E+05
VOC	1,2-Dichloropropane	78-87-5	3.53E-03	3.50E+02	9.9E+04
VOC	Ethyl Benzene	100-41-4	2.13E-03	4.35E+02	2.0E+05
VOC	2-Hexanone	591-78-6	7.39E-03	2.00E+01	2.7E+03
VOC	Methyl Acetate	79-20-9	2.32E-04	6.10E+02	2.6E+06
VOC	Methyl tert-butyl ether	1634-04-4	1.21E-03	1.80E+02	1.5E+05
VOC	4-Methyl-2-pentanone	108-10-1	2.94E-04	4.10E+02	1.4E+06
VOC	Methylcyclohexane	108-87-2	7.39E-03	2.00E+03	2.7E+05
VOC	Methylene Chloride	75-09-2	4.32E-03	8.70E+01	2.0E+04
VOC	Styrene	100-42-5	3.82E-04	2.15E+02	5.6E+05
VOC	Tetrachloroethene	127-18-4	7.39E-03	1.70E+02	2.3E+04
VOC	Toluene	108-88-3	3.24E-03	3.75E+02	1.2E+05
VOC	1,2,4-Trichlorobenzene	120-82-1	8.75E-05		
VOC	1,1,1-Trichloroethane	71-55-6	7.39E-03	1.90E+03	2.6E+05
VOC	1,1,2-Trichloroethane	79-00-5	1.10E-03	4.50E+01	4.1E+04
VOC	Trichloroethene	79-01-6	5.18E-03	2.70E+02	5.2E+04
VOC	Trichlorofluoromethane	75-69-4	7.39E-03	5.60E+03	7.6E+05
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	7.39E-03	7.60E+03	1.0E+06
VOC	1,2,4-Trimethylbenzene	95-63-6	7.37E-04	1.25E+02	1.7E+05
VOC	1,3,5-Trimethylbenzene	108-67-8	3.69E-04	1.25E+02	3.4E+05
VOC	Vinyl Chloride	75-01-4	7.39E-03	2.50E+00	3.4E+02
VOC	Xylenes (total)	1330-20-7	1.75E-03	4.35E+02	2.5E+05
SVOC	Acenaphthene	83-32-9	2.46E-06		
SVOC	Acenaphthylene	208-96-8	1.71E-06		
SVOC	Acetophenone	98-86-2	1.55E-05	4.91E+01	3.2E+06
SVOC	Anthracene	120-12-7	2.48E-07		
SVOC	Atrazine	1912-24-9	4.68E-09	5.00E+00	1.1E+09
SVOC	Benzaldehyde	100-52-7	3.80E-05		
SVOC	Benzo(a)anthracene	56-55-3	9.51E-10		
SVOC	Benzo(a)pyrene	50-32-8	1.27E-10		

Attachment G2: Routine Worker Occupational Based Criteria for Soil Vapor Intrusion Inhalation (Commercial/Industrial Slab on Grade Building) GMC: NAO Flint Operations Site, Flint, Michigan					
Chem Group	**Chemical**	**CASRN**	**C_{air}** (mg/m^3)	**Occupational Indoor Air Standard** (mg/m3)	**Occupational Criteria** (mg/kg)
SVOC	Benzo(b)fluoranthene	205-99-2	1.01E-08		
SVOC	Benzo(g,h,i)perylene	191-24-2	1.26E-12		
SVOC	Benzo(k)fluoranthene	207-08-9	7.61E-11		
SVOC	Biphenyl	92-52-4	3.23E-06	1.00E+00	3.1E+05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.23E-07		
SVOC	bis(2-Chloroethyl) ether	111-44-4	3.52E-05	2.92E+01	8.3E+05
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	7.79E-13	5.00E+00	6.4E+12
SVOC	Butylbenzylphthalate	85-68-7	2.50E-09		
SVOC	Caprolactam	105-60-2	5.51E-08	5.00E+00	9.1E+07
SVOC	Carbazole	86-74-8	7.81E-10		
SVOC	4-Chloro-3-methylphenol	59-50-7	3.93E-08		
SVOC	2-Chloronaphthalene	91-58-7	3.16E-06		
SVOC	2-Chlorophenol	95-57-8	1.03E-04		
SVOC	Chrysene	218-01-9	2.67E-08		
SVOC	Dibenz(a,h)anthracene	53-70-3	5.94E-13		
SVOC	Dibenzofuran	132-64-9	6.86E-08		
SVOC	2,4-Dichlorophenol	120-83-2	1.90E-06		
SVOC	Diethylphthalate	84-66-2	1.57E-07	5.00E+00	3.2E+07
SVOC	2,4-Dimethylphenol	105-67-9	9.08E-07		
SVOC	Dimethylphthalate	131-11-3	1.07E-07	5.00E+00	4.7E+07
SVOC	Di-n-butylphthalate	84-74-2	5.50E-11	5.00E+00	9.1E+10
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.97E-07	2.00E-01	6.7E+05
SVOC	2,4-Dinitrotoluene	121-14-2	7.81E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	7.64E-07		
SVOC	Di-n-octylphthalate	117-84-0	8.95E-11		
SVOC	Fluoranthene	206-44-0	1.69E-08		
SVOC	Fluorene	86-73-7	5.24E-07		
SVOC	Formaldehyde	50-00-0		9.00E-01	
SVOC	Hexachlorobutadiene	87-68-3	1.73E-05	2.00E-02	1.2E+03
SVOC	Hexachlorocyclopentadiene	77-47-4	1.53E-05	1.00E-01	6.5E+03
SVOC	Hexachloroethane	67-72-1	2.16E-04	1.00E+01	4.6E+04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.28E-11		
SVOC	Isophorone	78-59-1	8.44E-06	2.30E+01	2.7E+06
SVOC	2-Methylnaphthalene	91-57-6	9.37E-06		
SVOC	Methylphenol (total)	1319-77-3	7.75E-07	2.20E+01	2.8E+07
SVOC	Naphthalene	91-20-3	2.68E-05	5.00E+01	1.9E+06
SVOC	2-Nitroaniline	88-74-4	1.68E-07		
SVOC	Nitrobenzene	98-95-3	2.56E-05	5.00E+00	2.0E+05
SVOC	2-Nitrophenol	88-75-5	1.07E-05		
SVOC	4-Nitrophenol	100-02-7	1.90E-08		
SVOC	N-Nitrosodiphenylamine	86-30-6	4.27E-07		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	3.85E-06		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	4.45E-05		
SVOC	Pentachlorophenol	87-86-5	5.16E-09	5.00E-01	9.7E+07
SVOC	Phenanthrene	85-01-8	1.09E-07		
SVOC	Phenol	108-95-2	6.36E-07	1.90E+01	3.0E+07
SVOC	Pyrene	129-00-0	1.18E-08		
SVOC	2,4,5-Trichlorophenol	95-95-4	3.01E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	2.09E-06		
PCB	PCBs (total)	1336-36-3	9.16E-08	5.00E-01	5.5E+06
INORG	Antimony	7440-36-0		5.00E-01	

Attachment G2: Routine Worker Occupational Based Criteria for Soil Vapor Intrusion Inhalation (Commercial/Industrial Slab on Grade Building) GMC: NAO Flint Operations Site, Flint, Michigan					
Chem Group	**Chemical**	**CASRN**	**C_{air}** (mg/m^3)	**Occupational Indoor Air Standard** (mg/m3)	**Occupational Criteria** (mg/kg)
INORG	Arsenic	7440-38-2		5.00E-01	
INORG	Barium	7440-39-3		5.00E-01	
INORG	Beryllium	7440-41-7		2.00E-03	
INORG	Cadmium	7440-43-9		5.00E-03	
INORG	Chromium (total)	7440-47-3		1.00E+00	
INORG	Chromium III	16065-83-1		5.00E-01	
INORG	Chromium VI	18540-29-9			
INORG	Cobalt	7440-48-4		5.00E-02	
INORG	Copper	7440-50-8		1.00E+00	
INORG	Cyanide (total)	57-12-5		5.00E+00	
INORG	Fluoride	16984-48-8		2.50E+00	
INORG	Lead	7439-92-1		5.00E-02	
INORG	Manganese	7439-96-5		2.00E-01	
INORG	Mercury	7439-97-6	1.61E-06	5.00E-02	3.1E+04
INORG	Nickel	7440-02-0		1.00E+00	
INORG	Selenium	7782-49-2		2.00E-01	
INORG	Silver	7440-22-4		1.00E-02	
INORG	Thallium	7440-28-0		1.00E-01	
INORG	Vanadium	7440-62-2			
INORG	Zinc	7440-66-6			

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
VOC	Acetone	67-64-1	1.07E+00	9.85E-05	7.95E-04	7.17E-02	3.12E-02	1.05E-05	8.31E-06
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.14E-01	5.01E-02	1.52E-03	4.57E-06	5.21E-04
VOC	Bromodichloromethane	75-27-4	2.57E-01	9.16E-05	3.28E-02	1.70E-02	2.36E-03	5.80E-06	1.90E-04
VOC	2-Butanone	78-93-3	6.98E-01	8.47E-05	1.14E-03	4.67E-02	1.96E-02	1.01E-05	1.15E-05
VOC	Carbon Disulfide	75-15-0	8.99E-01	8.64E-05	6.20E-01	5.92E-02	4.68E-04	1.96E-06	1.22E-03
VOC	Carbon Tetrachloride	56-23-5	6.74E-01	7.60E-05	6.25E-01	4.44E-02	3.94E-04	1.70E-06	1.06E-03
VOC	Chlorobenzene	108-90-7	6.31E-01	7.52E-05	7.60E-02	4.16E-02	1.74E-03	4.95E-06	3.76E-04
VOC	Chloroethane	75-00-3	2.34E+00	9.94E-05	1.80E-01	1.54E-01	1.67E-03	4.83E-06	8.70E-04
VOC	Chloroform	67-66-3	8.99E-01	8.64E-05	7.50E-02	5.92E-02	2.17E-03	5.55E-06	4.16E-04
VOC	Chloromethane	74-87-3	1.09E+00	5.62E-05	1.80E-01	7.17E-02	8.98E-04	3.24E-06	5.85E-04
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	2.66E-01	3.70E-02	6.04E-04	2.41E-06	6.41E-04
VOC	Cyclohexane	110-82-7	7.25E-01	7.86E-05	3.98E+00	4.78E-02	9.88E-05	4.81E-07	1.92E-03
VOC	Dibromochloromethane	124-48-1	1.69E-01	9.07E-05	1.61E-02	1.12E-02	2.80E-03	6.27E-06	1.01E-04
VOC	1,2-Dichlorobenzene	95-50-1	5.96E-01	6.83E-05	3.90E-02	3.93E-02	2.49E-03	5.95E-06	2.32E-04
VOC	1,3-Dichlorobenzene	541-73-1	5.98E-01	6.79E-05	6.33E-02	3.94E-02	1.81E-03	5.05E-06	3.20E-04
VOC	1,4-Dichlorobenzene	106-46-7	5.96E-01	6.83E-05	4.98E-02	3.93E-02	2.13E-03	5.50E-06	2.74E-04
VOC	Dichlorodifluoromethane	75-71-8	6.91E-01	6.91E-05	7.01E+00	4.55E-02	5.68E-05	2.81E-07	1.97E-03
VOC	1,1-Dichloroethane	75-34-3	6.41E-01	9.07E-05	1.15E-01	4.22E-02	1.50E-03	4.54E-06	5.22E-04
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.01E-02	5.92E-02	5.08E-03	7.81E-06	1.57E-04
VOC	1,1-Dichloroethene	75-35-4	7.78E-01	8.99E-05	5.35E-01	5.12E-02	5.20E-04	2.14E-06	1.14E-03
VOC	cis-1,2-Dichloroethene	156-59-2	6.36E-01	9.76E-05	8.35E-02	4.19E-02	1.96E-03	5.27E-06	4.40E-04
VOC	trans-1,2-Dichloroethene	156-60-5	6.11E-01	1.03E-04	1.93E-01	4.02E-02	1.13E-03	3.79E-06	7.31E-04
VOC	1,2-Dichloropropane	78-87-5	6.76E-01	7.54E-05	5.75E-02	4.45E-02	2.16E-03	5.54E-06	3.18E-04
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	1.62E-01	4.27E-02	9.64E-04	3.41E-06	5.51E-04
VOC	2-Hexanone	591-78-6			3.58E-02				
VOC	Methyl Acetate	79-20-9	8.27E-01	9.50E-05	1.85E-03	5.49E-02	1.83E-02	9.99E-06	1.85E-05
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.20E-02	4.90E-02	6.44E-03	8.34E-06	1.00E-04
VOC	4-Methyl-2-pentanone	108-10-1	6.48E-01	6.74E-05	2.82E-03	4.29E-02	1.12E-02	9.36E-06	2.64E-05
VOC	Methylcyclohexane	108-87-2	6.35E-01	7.36E-05	8.78E+00	4.18E-02	4.91E-05	2.44E-07	2.14E-03
VOC	Methylene Chloride	75-09-2	8.73E-01	1.01E-04	4.49E-02	5.75E-02	3.36E-03	6.76E-06	3.03E-04
VOC	Styrene	100-42-5	6.13E-01	6.91E-05	5.65E-02	4.04E-02	1.99E-03	5.32E-06	3.00E-04
VOC	Tetrachloroethene	127-18-4	6.22E-01	7.08E-05	3.77E-01	4.10E-02	5.34E-04	2.19E-06	8.24E-04
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.36E-01	4.95E-02	1.22E-03	3.99E-06	5.43E-04

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
VOC	1,2,4-Trichlorobenzene	120-82-1	2.59E-01	7.11E-05	2.91E-02	1.71E-02	2.20E-03	5.59E-06	1.63E-04
VOC	1,1,1-Trichloroethane	71-55-6	6.74E-01	7.60E-05	3.53E-01	4.44E-02	6.04E-04	2.41E-06	8.49E-04
VOC	1,1,2-Trichloroethane	79-00-5	6.74E-01	7.60E-05	1.87E-02	4.44E-02	4.40E-03	7.46E-06	1.40E-04
VOC	Trichloroethene	79-01-6	6.83E-01	7.86E-05	2.11E-01	4.50E-02	9.02E-04	3.25E-06	6.87E-04
VOC	Trichlorofluoromethane	75-69-4	7.52E-01	8.38E-05	1.98E+00	4.95E-02	1.80E-04	8.48E-07	1.68E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.74E-01	7.08E-05	9.83E+00	4.44E-02	4.41E-05	2.20E-07	2.16E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.26E-01	3.45E-02	1.09E-03	3.71E-06	4.67E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.20E-01	3.43E-02	1.20E-03	3.94E-06	4.74E-04
VOC	Vinyl Chloride	75-01-4	9.16E-01	1.06E-04	5.55E-01	6.03E-02	5.98E-04	2.39E-06	1.33E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	1.38E-01	4.44E-02	1.18E-03	3.91E-06	5.40E-04
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.18E-03	2.42E-02	7.77E-03	8.72E-06	2.77E-05
SVOC	Acenaphthylene	208-96-8	3.88E-01	6.03E-05	2.31E-03	2.58E-02	8.90E-03	8.97E-06	2.07E-05
SVOC	Acetophenone	98-86-2	6.91E-01	6.91E-05	2.19E-04	4.84E-02	3.61E-02	1.05E-05	2.31E-06
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.34E-03	1.89E-02	9.82E-03	9.14E-06	1.22E-05
SVOC	Atrazine	1912-24-9	2.24E-01	5.76E-05	1.25E-07	4.20E+00	1.07E+01	3.08E-05	3.85E-09
SVOC	Benzaldehyde	100-52-7	6.23E-01	7.84E-05	4.86E-04	4.25E-02	2.55E-02	1.03E-05	5.01E-06
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	6.85E-05	3.93E-02	5.37E-02	1.08E-05	7.36E-07
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	2.32E-05	5.49E-02	1.05E-01	1.10E-05	2.54E-07
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	2.28E-03	1.31E-02	5.53E-03	8.00E-06	1.82E-05
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	2.88E-06	1.55E-01	3.80E-01	1.11E-05	3.21E-08
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.70E-05	3.85E-02	8.03E-02	1.09E-05	1.85E-07
SVOC	Biphenyl	92-52-4	3.49E-01	7.04E-05	6.13E-03	2.31E-02	5.73E-03	8.09E-06	4.96E-05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.77E-01	7.31E-05	3.47E-06	2.16E-01	5.17E-01	1.11E-05	3.87E-08
SVOC	bis(2-Chloroethyl) ether	111-44-4	5.98E-01	6.51E-05	3.69E-04	4.10E-02	2.59E-02	1.03E-05	3.81E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.03E-01	3.16E-05	2.09E-06	1.57E-01	3.74E-01	1.11E-05	2.33E-08
SVOC	Butylbenzylphthalate	85-68-7	1.50E-01	4.17E-05	2.59E-05	2.45E-02	4.86E-02	1.07E-05	2.77E-07
SVOC	Caprolactam	105-60-2	5.98E-01	7.77E-05	1.03E-07	6.88E+00	1.75E+01	4.64E-05	4.78E-09
SVOC	Carbazole	86-74-8	3.37E-01	6.07E-05	3.13E-07	1.78E+00	4.51E+00	1.71E-05	5.35E-09
SVOC	4-Chloro-3-methylphenol	59-50-7	5.24E-01	8.22E-05	8.15E-06	1.26E-01	2.74E-01	1.11E-05	9.05E-08
SVOC	2-Chloronaphthalene	91-58-7	4.25E-01	7.59E-05	6.42E-03	2.81E-02	6.42E-03	8.34E-06	5.35E-05
SVOC	2-Chlorophenol	95-57-8	4.33E-01	8.17E-05	8.00E-03	2.86E-02	6.02E-03	8.20E-06	6.56E-05
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.94E-03	1.44E-02	6.54E-03	8.37E-06	1.62E-05
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	3.02E-07	1.36E+00	3.44E+00	1.49E-05	4.48E-09

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
SVOC	Dibenzofuran	132-64-9	2.06E-01	5.18E-05	2.57E-04	1.54E-02	1.51E-02	9.77E-06	2.52E-06
SVOC	2,4-Dichlorophenol	120-83-2	2.99E-01	7.58E-05	6.50E-05	3.03E-02	4.69E-02	1.07E-05	6.95E-07
SVOC	Diethylphthalate	84-66-2	2.21E-01	5.49E-05	9.25E-06	6.84E-02	1.55E-01	1.10E-05	1.02E-07
SVOC	2,4-Dimethylphenol	105-67-9	5.05E-01	7.51E-05	4.10E-05	4.99E-02	7.56E-02	1.09E-05	4.46E-07
SVOC	Dimethylphthalate	131-11-3	4.91E-01	5.43E-05	2.15E-06	2.62E-01	6.25E-01	1.12E-05	2.39E-08
SVOC	Di-n-butylphthalate	84-74-2	3.78E-01	6.79E-05	1.93E-08	3.20E+01	8.16E+01	1.95E-04	3.75E-09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.38E-01	5.97E-05	8.73E-06	7.78E-02	1.77E-01	1.11E-05	9.65E-08
SVOC	2,4-Dinitrotoluene	121-14-2	1.75E+00	6.10E-05	1.90E-06	4.07E-01	8.78E-01	1.13E-05	2.14E-08
SVOC	2,6-Dinitrotoluene	606-20-2	2.83E-01	6.27E-05	1.53E-05	5.58E-02	1.16E-01	1.10E-05	1.68E-07
SVOC	Di-n-octylphthalate	117-84-0	1.30E-01	3.09E-05	1.37E-03	8.80E-03	4.51E-03	7.52E-06	1.03E-05
SVOC	Fluoranthene	206-44-0	2.61E-01	5.49E-05	3.30E-04	1.87E-02	1.58E-02	9.82E-06	3.24E-06
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.31E-03	2.11E-02	1.07E-02	9.28E-06	1.21E-05
SVOC	Formaldehyde	50-00-0	1.56E+00	1.73E-04	6.95E-06	3.28E-01	6.95E-01	1.12E-05	7.78E-08
SVOC	Hexachlorobutadiene	87-68-3	4.85E-01	5.32E-05	1.67E-01	3.19E-02	7.32E-04	2.79E-06	4.67E-04
SVOC	Hexachlorocyclopentadiene	77-47-4	1.39E-01	6.23E-05	5.55E-01	9.16E-03	2.43E-04	1.11E-06	6.18E-04
SVOC	Hexachloroethane	67-72-1	2.16E-02	5.88E-05	7.95E-02	1.43E-03	3.61E-04	1.58E-06	1.25E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	3.28E-05	2.43E-02	4.66E-02	1.07E-05	3.51E-07
SVOC	Isophorone	78-59-1	5.38E-01	5.84E-05	1.36E-04	3.94E-02	3.60E-02	1.05E-05	1.43E-06
SVOC	2-Methylnaphthalene	91-57-6	4.18E-01	6.70E-05	1.06E-02	2.76E-02	4.61E-03	7.57E-06	8.02E-05
SVOC	Methylphenol (total)	1319-77-3	6.39E-01	8.64E-05	1.77E-05	8.65E-02	1.59E-01	1.10E-05	1.95E-07
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	9.90E-03	3.36E-02	5.14E-03	7.84E-06	7.76E-05
SVOC	2-Nitroaniline	88-74-4	6.31E-01	6.91E-05	3.27E-06	2.34E-01	5.39E-01	1.11E-05	3.64E-08
SVOC	Nitrobenzene	98-95-3	6.57E-01	7.43E-05	4.92E-04	4.46E-02	2.56E-02	1.03E-05	5.07E-06
SVOC	2-Nitrophenol	88-75-5	4.66E-01	6.78E-05	1.94E-04	3.39E-02	3.03E-02	1.04E-05	2.02E-06
SVOC	4-Nitrophenol	100-02-7	5.40E-01	8.30E-05	8.48E-09	8.89E+01	2.26E+02	5.30E-04	4.49E-09
SVOC	N-Nitrosodiphenylamine	86-30-6	2.70E-01	5.49E-05	1.03E-04	2.26E-02	2.84E-02	1.04E-05	1.06E-06
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.71E-01	7.06E-05	4.62E-05	4.49E-02	6.59E-02	1.08E-05	5.00E-07
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	5.20E-01	5.54E-05	2.39E-03	3.45E-02	9.87E-03	9.15E-06	2.19E-05
SVOC	Pentachlorophenol	87-86-5	4.84E-01	5.27E-05	5.00E-07	9.88E-01	2.48E+00	1.31E-05	6.55E-09
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	4.76E-04	2.26E-02	1.63E-02	9.86E-06	4.69E-06
SVOC	Phenol	108-95-2	7.08E-01	7.86E-05	8.15E-06	1.34E-01	2.77E-01	1.11E-05	9.05E-08
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.26E-04	1.80E-02	1.89E-02	1.00E-05	2.26E-06
SVOC	2,4,5-Trichlorophenol	95-95-4	2.51E-01	6.07E-05	8.90E-05	2.28E-02	3.16E-02	1.05E-05	9.31E-07

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
SVOC	2,4,6-Trichlorophenol	88-06-2	2.75E-01	5.40E-05	1.60E-04	2.12E-02	2.26E-02	1.02E-05	1.63E-06
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	4.09E-02	1.15E-02	1.14E-03	3.83E-06	1.56E-04
INORG	Antimony	7440-36-0							
INORG	Arsenic	7440-38-2							
INORG	Barium	7440-39-3							
INORG	Beryllium	7440-41-7							
INORG	Cadmium	7440-43-9							
INORG	Chromium (total)	7440-47-3							
INORG	Chromium III	16065-83-1							
INORG	Chromium VI	18540-29-9							
INORG	Cobalt	7440-48-4							
INORG	Copper	7440-50-8							
INORG	Cyanide (total)	57-12-5							
INORG	Fluoride	16984-48-8							
INORG	Lead	7439-92-1							
INORG	Manganese	7439-96-5							
INORG	Mercury	7439-97-6	2.65E-01	5.44E-05	1.45E-01	1.75E-02	6.84E-04	2.65E-06	3.85E-04
INORG	Nickel	7440-02-0							
INORG	Selenium	7782-49-2							
INORG	Silver	7440-22-4							
INORG	Thallium	7440-28-0							
INORG	Vanadium	7440-62-2							
INORG	Zinc	7440-66-6							
Notes:	**Crack Soil and Building Characteristics**								
	SCS Soil texture class	Loamy Sand							
	Bulk density	kg/L	ρ_b	1.62					
	Total porosity	L/L-soil	θ	0.390					
	Water-filled porosity	L/L-soil	θ_w	0.139					
	Air-filled porosity	L/L-soil	θ_a	0.251					
	Residual saturation	L/L-soil	θ_r	0.049					

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from Groundwater GMC: NAO Flint Operations Site, Flint, Michigan									
Chem Group	**Chemical**	**CASRN**	**D_{air}** (m^2/d)	**D_{water}** (m^2/d)	**H** (unitless)	**D_{crack}** (m^2/d)	**D_{eff}^T** (m^2/d)	**α_∞**	**C_{bldg}** (L-water/m^3)
	Hydraulic conductivity	cm/s	**K**	1.2E-03					
	Dynamic viscosity of water	g/cm-s	**μ**	0.01307					
	Density of water	g/cm^3	**ρ_w**	1.0					
	Gravitational acceleration	cm/s^2	**g**	980.7					
	Intrinsic permeability	cm^2	**k**	1.6E-08					
	Relative saturation	unitless	**S_e**	0.263					
	van Genuchten N	unitless	**N**	1.746					
	van Genuchten M	unitless	**M**	0.427					
	Relative air permeability	unitless	**k_{rg}**	0.826					
	Permeability to vapor	cm^2	**k_v**	1.3E-08					
	Distance from building foundation to source	m	**L_T**	1.68					
	Bldg foundation thickness	m	**L_{crack}**	0.15					
	Bldg foundation length	m		19.29					
	Bldg foundation width	m		19.29					
	Bldg occupied height	m		2.44					
	Bldg occupied volume	m^3		907.93					
	Occupied depth below ground	m		0.0					
	Bldg area for vapor intrusion	m^2	**A_B**	372.1					
	Ratio of A_{crack} to A_B		**η**	1E-04					
	Area of cracks	m^2	**A_{crack}**	3.86E-02					
	Air exchange rate	$hour^{-1}$	**ac/h**	2.0					
	Building ventilation rate	m^3/d	**Q_{bldg}**	4.36E+04					
	Pressure difference between outdoors-indoors	$kg/m\text{-}s^2$	**ΔP**	1.0					
	Air viscosity	kg/m-s	**μ**	1.8E-05					
	Crack length (bldg perimeter)	m	**X_{crack}**	77.16					
	Crack depth below ground	m	**Z_{crack}**	0.15					
	Crack radius	m	**r_{crack}**	5E-04					
	Soil gas flow rate into bldg	m^3/d	**Q_{soil}**	4.88E-01					

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
VOC	Acetone	67-64-1	ID	8.31E-06		
VOC	Benzene	71-43-2	A	5.21E-04	7.8E-03	1.0E+01
VOC	Bromodichloromethane	75-27-4	B2	1.90E-04	1.8E-02	1.2E+01
VOC	2-Butanone	78-93-3	ID	1.15E-05		
VOC	Carbon Disulfide	75-15-0		1.22E-03		
VOC	Carbon Tetrachloride	56-23-5	B2	1.06E-03	1.5E-02	2.6E+00
VOC	Chlorobenzene	108-90-7	D	3.76E-04		
VOC	Chloroethane	75-00-3		8.70E-04		
VOC	Chloroform	67-66-3	B2	4.16E-04	2.3E-02	4.3E+00
VOC	Chloromethane	74-87-3	D	5.85E-04		
VOC	Cumene	98-82-8	D	6.41E-04		
VOC	Cyclohexane	110-82-7	ID	1.92E-03		
VOC	Dibromochloromethane	124-48-1	C	1.01E-04	2.4E-02	1.7E+01
VOC	1,2-Dichlorobenzene	95-50-1	D	2.32E-04		
VOC	1,3-Dichlorobenzene	541-73-1	D	3.20E-04		
VOC	1,4-Dichlorobenzene	106-46-7	C	2.74E-04	6.3E-03	2.4E+01
VOC	Dichlorodifluoromethane	75-71-8		1.97E-03		
VOC	1,1-Dichloroethane	75-34-3	C	5.22E-04		
VOC	1,2-Dichloroethane	107-06-2	B2	1.57E-04	2.6E-02	1.0E+01
VOC	1,1-Dichloroethene	75-35-4	C	1.14E-03		
VOC	cis-1,2-Dichloroethene	156-59-2	D	4.40E-04		
VOC	trans-1,2-Dichloroethene	156-60-5		7.31E-04		
VOC	1,2-Dichloropropane	78-87-5	B2	3.18E-04		
VOC	Ethyl Benzene	100-41-4	D	5.51E-04		
VOC	2-Hexanone	591-78-6				
VOC	Methyl Acetate	79-20-9		1.85E-05		
VOC	Methyl tert-butyl ether	1634-04-4		1.00E-04		
VOC	4-Methyl-2-pentanone	108-10-1	ID	2.64E-05		
VOC	Methylcyclohexane	108-87-2		2.14E-03		
VOC	Methylene Chloride	75-09-2	B2	3.03E-04	4.7E-04	2.9E+02
VOC	Styrene	100-42-5		3.00E-04		
VOC	Tetrachloroethene	127-18-4	C-B2	8.24E-04	3.1E-03	1.6E+01
VOC	Toluene	108-88-3	D	5.43E-04		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.63E-04		
VOC	1,1,1-Trichloroethane	71-55-6	D	8.49E-04		
VOC	1,1,2-Trichloroethane	79-00-5	C	1.40E-04	1.6E-02	1.8E+01
VOC	Trichloroethene	79-01-6	C-B2	6.87E-04	1.7E-03	3.5E+01
VOC	Trichlorofluoromethane	75-69-4		1.68E-03		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.16E-03		
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	4.67E-04		
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	4.74E-04		
VOC	Vinyl Chloride	75-01-4	A	1.33E-03	8.8E-03	3.5E+00
VOC	Xylenes (total)	1330-20-7	ID	5.40E-04		
SVOC	Acenaphthene	83-32-9		2.77E-05		
SVOC	Acenaphthylene	208-96-8	D	2.07E-05		
SVOC	Acetophenone	98-86-2	D	2.31E-06		
SVOC	Anthracene	120-12-7	D	1.22E-05		

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
SVOC	Atrazine	1912-24-9	C	3.85E-09	6.3E-02	1.7E+05
SVOC	Benzaldehyde	100-52-7		5.01E-06		
SVOC	Benzo(a)anthracene	56-55-3	B2	7.36E-07	8.9E-02	6.3E+02
SVOC	Benzo(a)pyrene	50-32-8	B2	2.54E-07	8.9E-01	1.8E+02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.82E-05	8.9E-02	2.5E+01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3.21E-08		
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.85E-07	8.9E-03	2.5E+04
SVOC	Biphenyl	92-52-4	D	4.96E-05		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.87E-08		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.81E-06	3.3E-01	3.3E+01
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	2.33E-08	4.0E-03	4.4E+05
SVOC	Butylbenzylphthalate	85-68-7	C	2.77E-07	5.4E-04	2.7E+05
SVOC	Caprolactam	105-60-2		4.78E-09		
SVOC	Carbazole	86-74-8	B2	5.35E-09	5.7E-03	1.3E+06
SVOC	4-Chloro-3-methylphenol	59-50-7		9.05E-08		
SVOC	2-Chloronaphthalene	91-58-7		5.35E-05		
SVOC	2-Chlorophenol	95-57-8		6.56E-05		
SVOC	Chrysene	218-01-9	B2	1.62E-05	8.9E-04	2.8E+03
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	4.48E-09	8.9E-01	1.0E+04
SVOC	Dibenzofuran	132-64-9	D	2.52E-06		
SVOC	2,4-Dichlorophenol	120-83-2		6.95E-07		
SVOC	Diethylphthalate	84-66-2	D	1.02E-07		
SVOC	2,4-Dimethylphenol	105-67-9		4.46E-07		
SVOC	Dimethylphthalate	131-11-3	D	2.39E-08		
SVOC	Di-n-butylphthalate	84-74-2	D	3.75E-09		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		9.65E-08		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	2.14E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.68E-07	1.9E-01	1.3E+03
SVOC	Di-n-octylphthalate	117-84-0		1.03E-05		
SVOC	Fluoranthene	206-44-0	D	3.24E-06		
SVOC	Fluorene	86-73-7	D	1.21E-05		
SVOC	Formaldehyde	50-00-0	B1	7.78E-08	1.3E-02	4.0E+04
SVOC	Hexachlorobutadiene	87-68-3	C	4.67E-04	2.2E-02	4.0E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6.18E-04		
SVOC	Hexachloroethane	67-72-1	C	1.25E-04	4.0E-03	8.1E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.51E-07	8.9E-02	1.3E+03
SVOC	Isophorone	78-59-1	C	1.43E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	8.02E-05		
SVOC	Methylphenol (total)	1319-77-3		1.95E-07		
SVOC	Naphthalene	91-20-3	C	7.76E-05		
SVOC	2-Nitroaniline	88-74-4		3.64E-08		

Attachment G2: Risk-Based Cancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion (Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
SVOC	Nitrobenzene	98-95-3	D	5.07E-06		
SVOC	2-Nitrophenol	88-75-5		2.02E-06		
SVOC	4-Nitrophenol	100-02-7		4.49E-09		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.06E-06		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	5.00E-07	2.0E+00	4.1E+01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2.19E-05	1.0E-02	1.9E+02
SVOC	Pentachlorophenol	87-86-5	B2	6.55E-09	3.4E-02	1.8E+05
SVOC	Phenanthrene	85-01-8	D	4.69E-06		
SVOC	Phenol	108-95-2	ID	9.05E-08		
SVOC	Pyrene	129-00-0	D	2.26E-06		
SVOC	2,4,5-Trichlorophenol	95-95-4		9.31E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.63E-06	3.1E-03	8.1E+03
PCB	PCBs (total)	1336-36-3	B2	1.56E-04	5.7E-01	4.6E-01
INORG	Antimony	7440-36-0				
INORG	Arsenic	7440-38-2	A		4.3E+00	
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.4E+00	
INORG	Cadmium	7440-43-9	B1		1.8E+00	
INORG	Chromium (total)	7440-47-3			1.2E+01	
INORG	Chromium III	16065-83-1	D			
INORG	Chromium VI	18540-29-9	A		1.2E+01	
INORG	Cobalt	7440-48-4	B1		2.8E+00	
INORG	Copper	7440-50-8	D			
INORG	Cyanide (total)	57-12-5	D			
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D			
INORG	Mercury	7439-97-6	D	3.85E-04		
INORG	Nickel	7440-02-0	A		2.4E-01	
INORG	Selenium	7782-49-2	D			
INORG	Silver	7440-22-4	D			
INORG	Thallium	7440-28-0				
INORG	Vanadium	7440-62-2				
INORG	Zinc	7440-66-6	D			
Note:						
Target cancer risk of 1E-05						

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion
(Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
VOC	Acetone	67-64-1	ID	8.31E-06	3.2E+00	5.5E+05
VOC	Benzene	71-43-2	A	5.21E-04	3.0E-02	8.4E+01
VOC	Bromodichloromethane	75-27-4	B2	1.90E-04	7.0E-02	5.4E+02
VOC	2-Butanone	78-93-3	ID	1.15E-05	5.0E+00	6.4E+05
VOC	Carbon Disulfide	75-15-0		1.22E-03	7.0E-01	8.4E+02
VOC	Carbon Tetrachloride	56-23-5	B2	1.06E-03		
VOC	Chlorobenzene	108-90-7	D	3.76E-04	6.0E-02	2.3E+02
VOC	Chloroethane	75-00-3		8.70E-04	1.0E+01	1.7E+04
VOC	Chloroform	67-66-3	B2	4.16E-04	5.0E-02	1.8E+02
VOC	Chloromethane	74-87-3	D	5.85E-04	9.0E-02	2.2E+02
VOC	Cumene	98-82-8	D	6.41E-04	4.0E-01	9.1E+02
VOC	Cyclohexane	110-82-7	ID	1.92E-03	6.0E+00	4.6E+03
VOC	Dibromochloromethane	124-48-1	C	1.01E-04	7.0E-02	1.0E+03
VOC	1,2-Dichlorobenzene	95-50-1	D	2.32E-04	2.0E-01	1.3E+03
VOC	1,3-Dichlorobenzene	541-73-1	D	3.20E-04	1.4E-01	6.4E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	2.74E-04	8.0E-01	4.3E+03
VOC	Dichlorodifluoromethane	75-71-8		1.97E-03	2.0E-01	1.5E+02
VOC	1,1-Dichloroethane	75-34-3	C	5.22E-04	5.0E-01	1.4E+03
VOC	1,2-Dichloroethane	107-06-2	B2	1.57E-04	5.0E-03	4.7E+01
VOC	1,1-Dichloroethene	75-35-4	C	1.14E-03	2.0E-01	2.6E+02
VOC	cis-1,2-Dichloroethene	156-59-2	D	4.40E-04	3.5E-02	1.2E+02
VOC	trans-1,2-Dichloroethene	156-60-5		7.31E-04	6.0E-02	1.2E+02
VOC	1,2-Dichloropropane	78-87-5	B2	3.18E-04	4.0E-03	1.8E+01
VOC	Ethyl Benzene	100-41-4	D	5.51E-04	1.0E+00	2.7E+03
VOC	2-Hexanone	591-78-6			5.0E-03	
VOC	Methyl Acetate	79-20-9		1.85E-05	3.5E+00	2.8E+05
VOC	Methyl tert-butyl ether	1634-04-4		1.00E-04	3.0E+00	4.4E+04
VOC	4-Methyl-2-pentanone	108-10-1	ID	2.64E-05	3.0E+00	1.7E+05
VOC	Methylcyclohexane	108-87-2		2.14E-03	3.0E+00	2.0E+03
VOC	Methylene Chloride	75-09-2	B2	3.03E-04	3.0E+00	1.4E+04
VOC	Styrene	100-42-5		3.00E-04	1.0E+00	4.9E+03
VOC	Tetrachloroethene	127-18-4	C-B2	8.24E-04	4.0E-01	7.1E+02
VOC	Toluene	108-88-3	D	5.43E-04	5.0E+00	1.3E+04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.63E-04	2.0E-01	1.8E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	8.49E-04	2.2E+00	3.8E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	1.40E-04		
VOC	Trichloroethene	79-01-6	C-B2	6.87E-04		
VOC	Trichlorofluoromethane	75-69-4		1.68E-03	7.0E-01	6.1E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.16E-03	3.0E+01	2.0E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	4.67E-04	6.0E-03	1.9E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	4.74E-04	6.0E-03	1.8E+01
VOC	Vinyl Chloride	75-01-4	A	1.33E-03	1.0E-01	1.1E+02
VOC	Xylenes (total)	1330-20-7	ID	5.40E-04	1.0E-01	2.7E+02
SVOC	Acenaphthene	83-32-9		2.77E-05	2.1E-01	1.1E+04
SVOC	Acenaphthylene	208-96-8	D	2.07E-05	1.1E-01	7.4E+03
SVOC	Acetophenone	98-86-2	D	2.31E-06	3.5E-01	2.2E+05
SVOC	Anthracene	120-12-7	D	1.22E-05		

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion
(Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
SVOC	Atrazine	1912-24-9	C	3.85E-09	1.2E-01	4.7E+07
SVOC	Benzaldehyde	100-52-7		5.01E-06	3.5E-01	1.0E+05
SVOC	Benzo(a)anthracene	56-55-3	B2	7.36E-07		
SVOC	Benzo(a)pyrene	50-32-8	B2	2.54E-07		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.82E-05		
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3.21E-08	1.1E-01	4.8E+06
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.85E-07		
SVOC	Biphenyl	92-52-4	D	4.96E-05	1.8E-01	5.2E+03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.87E-08		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.81E-06		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	2.33E-08	7.0E-02	4.4E+06
SVOC	Butylbenzylphthalate	85-68-7	C	2.77E-07	7.0E-01	3.7E+06
SVOC	Caprolactam	105-60-2		4.78E-09	1.8E+00	5.3E+08
SVOC	Carbazole	86-74-8	B2	5.35E-09		
SVOC	4-Chloro-3-methylphenol	59-50-7		9.05E-08		
SVOC	2-Chloronaphthalene	91-58-7		5.35E-05	2.8E-01	7.6E+03
SVOC	2-Chlorophenol	95-57-8		6.56E-05	1.8E-02	3.9E+02
SVOC	Chrysene	218-01-9	B2	1.62E-05		
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	4.48E-09		
SVOC	Dibenzofuran	132-64-9	D	2.52E-06	7.0E-03	4.1E+03
SVOC	2,4-Dichlorophenol	120-83-2		6.95E-07	1.1E-02	2.2E+04
SVOC	Diethylphthalate	84-66-2	D	1.02E-07	2.8E+00	4.0E+07
SVOC	2,4-Dimethylphenol	105-67-9		4.46E-07	7.0E-02	2.3E+05
SVOC	Dimethylphthalate	131-11-3	D	2.39E-08		
SVOC	Di-n-butylphthalate	84-74-2	D	3.75E-09		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		9.65E-08	3.5E-04	5.3E+03
SVOC	2,4-Dinitrotoluene	121-14-2	B2	2.14E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.68E-07	3.5E-03	3.0E+04
SVOC	Di-n-octylphthalate	117-84-0		1.03E-05		
SVOC	Fluoranthene	206-44-0	D	3.24E-06	1.4E-01	6.3E+04
SVOC	Fluorene	86-73-7	D	1.21E-05	1.4E-01	1.7E+04
SVOC	Formaldehyde	50-00-0	B1	7.78E-08		
SVOC	Hexachlorobutadiene	87-68-3	C	4.67E-04		
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6.18E-04	2.0E-04	4.7E-01
SVOC	Hexachloroethane	67-72-1	C	1.25E-04		
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.51E-07		
SVOC	Isophorone	78-59-1	C	1.43E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	8.02E-05	3.0E-03	5.5E+01
SVOC	Methylphenol (total)	1319-77-3		1.95E-07		
SVOC	Naphthalene	91-20-3	C	7.76E-05	3.0E-03	5.6E+01
SVOC	2-Nitroaniline	88-74-4		3.64E-08	2.0E-04	8.0E+03
SVOC	Nitrobenzene	98-95-3	D	5.07E-06	2.0E-03	5.8E+02
SVOC	2-Nitrophenol	88-75-5		2.02E-06		
SVOC	4-Nitrophenol	100-02-7		4.49E-09		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.06E-06		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	5.00E-07		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2.19E-05		

Attachment G2: Risk-Based Noncancer Criteria for Routine Worker Exposure to Groundwater Vapor Intrusion
(Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
SVOC	Pentachlorophenol	87-86-5	B2	6.55E-09	1.1E-01	2.3E+07
SVOC	Phenanthrene	85-01-8	D	4.69E-06	1.1E-01	3.3E+04
SVOC	Phenol	108-95-2	ID	9.05E-08		
SVOC	Pyrene	129-00-0	D	2.26E-06	1.1E-01	6.8E+04
SVOC	2,4,5-Trichlorophenol	95-95-4		9.31E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.63E-06		
PCB	PCBs (total)	1336-36-3	B2	1.56E-04		
INORG	Antimony	7440-36-0			1.4E-03	
INORG	Arsenic	7440-38-2	A			
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.0E-05	
INORG	Cadmium	7440-43-9	B1		2.0E-04	
INORG	Chromium (total)	7440-47-3			1.0E-04	
INORG	Chromium III	16065-83-1	D		5.3E+00	
INORG	Chromium VI	18540-29-9	A		1.0E-04	
INORG	Cobalt	7440-48-4	B1		2.0E-05	
INORG	Copper	7440-50-8	D		1.4E-01	
INORG	Cyanide (total)	57-12-5	D		7.0E-02	
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D		5.0E-05	
INORG	Mercury	7439-97-6	D	3.85E-04	3.0E-04	1.1E+00
INORG	Nickel	7440-02-0	A			
INORG	Selenium	7782-49-2	D		1.8E-02	
INORG	Silver	7440-22-4	D		1.0E-05	
INORG	Thallium	7440-28-0			2.5E-04	
INORG	Vanadium	7440-62-2			2.5E-02	
INORG	Zinc	7440-66-6	D		1.1E+00	
Note:						
Target hazard quotient of 1						

Attachment G2: Routine Worker Occupational Based Criteria for Groundwater Vapor Intrusion Inhalation
(Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{air} (mg/m^3)	Occupational Indoor Air Standard (mg/m^3)	Occupational Criteria (mg/L)
VOC	Acetone	67-64-1	8.31E-06	1.80E+03	2.2E+08
VOC	Benzene	71-43-2	5.21E-04	3.19E+00	6.1E+03
VOC	Bromodichloromethane	75-27-4	1.90E-04		
VOC	2-Butanone	78-93-3	1.15E-05	5.90E+02	5.1E+07
VOC	Carbon Disulfide	75-15-0	1.22E-03	1.20E+01	9.9E+03
VOC	Carbon Tetrachloride	56-23-5	1.06E-03	1.26E+01	1.2E+04
VOC	Chlorobenzene	108-90-7	3.76E-04	3.50E+02	9.3E+05
VOC	Chloroethane	75-00-3	8.70E-04	2.60E+03	3.0E+06
VOC	Chloroform	67-66-3	4.16E-04	9.78E+00	2.3E+04
VOC	Chloromethane	74-87-3	5.85E-04	1.03E+02	1.8E+05
VOC	Cumene	98-82-8	6.41E-04	2.45E+02	3.8E+05
VOC	Cyclohexane	110-82-7	1.92E-03	1.05E+03	5.5E+05
VOC	Dibromochloromethane	124-48-1	1.01E-04		
VOC	1,2-Dichlorobenzene	95-50-1	2.32E-04	1.50E+02	6.5E+05
VOC	1,3-Dichlorobenzene	541-73-1	3.20E-04		
VOC	1,4-Dichlorobenzene	106-46-7	2.74E-04	4.50E+02	1.6E+06
VOC	Dichlorodifluoromethane	75-71-8	1.97E-03	4.95E+03	2.5E+06
VOC	1,1-Dichloroethane	75-34-3	5.22E-04	4.00E+02	7.7E+05
VOC	1,2-Dichloroethane	107-06-2	1.57E-04	4.00E+00	2.6E+04
VOC	1,1-Dichloroethene	75-35-4	1.14E-03	1.98E+01	1.7E+04
VOC	cis-1,2-Dichloroethene	156-59-2	4.40E-04	7.93E+02	1.8E+06
VOC	trans-1,2-Dichloroethene	156-60-5	7.31E-04	7.93E+02	1.1E+06
VOC	1,2-Dichloropropane	78-87-5	3.18E-04	3.50E+02	1.1E+06
VOC	Ethyl Benzene	100-41-4	5.51E-04	4.35E+02	7.9E+05
VOC	2-Hexanone	591-78-6		2.00E+01	
VOC	Methyl Acetate	79-20-9	1.85E-05	6.10E+02	3.3E+07
VOC	Methyl tert-butyl ether	1634-04-4	1.00E-04	1.80E+02	1.8E+06
VOC	4-Methyl-2-pentanone	108-10-1	2.64E-05	4.10E+02	1.6E+07
VOC	Methylcyclohexane	108-87-2	2.14E-03	2.00E+03	9.3E+05
VOC	Methylene Chloride	75-09-2	3.03E-04	8.70E+01	2.9E+05
VOC	Styrene	100-42-5	3.00E-04	2.15E+02	7.2E+05
VOC	Tetrachloroethene	127-18-4	8.24E-04	1.70E+02	2.1E+05
VOC	Toluene	108-88-3	5.43E-04	3.75E+02	6.9E+05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.63E-04		
VOC	1,1,1-Trichloroethane	71-55-6	8.49E-04	1.90E+03	2.2E+06
VOC	1,1,2-Trichloroethane	79-00-5	1.40E-04	4.50E+01	3.2E+05
VOC	Trichloroethene	79-01-6	6.87E-04	2.70E+02	3.9E+05
VOC	Trichlorofluoromethane	75-69-4	1.68E-03	5.60E+03	3.3E+06
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	2.16E-03	7.60E+03	3.5E+06
VOC	1,2,4-Trimethylbenzene	95-63-6	4.67E-04	1.25E+02	2.7E+05
VOC	1,3,5-Trimethylbenzene	108-67-8	4.74E-04	1.25E+02	2.6E+05
VOC	Vinyl Chloride	75-01-4	1.33E-03	2.50E+00	1.9E+03
VOC	Xylenes (total)	1330-20-7	5.40E-04	4.35E+02	8.1E+05
SVOC	Acenaphthene	83-32-9	2.77E-05		
SVOC	Acenaphthylene	208-96-8	2.07E-05		
SVOC	Acetophenone	98-86-2	2.31E-06	4.91E+01	2.1E+07

Attachment G2: Routine Worker Occupational Based Criteria for Groundwater Vapor Intrusion Inhalation
(Commercial/Industrial Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{air} (mg/m^3)	Occupational Indoor Air Standard (mg/m^3)	Occupational Criteria (mg/L)
SVOC	Anthracene	120-12-7	1.22E-05		
SVOC	Atrazine	1912-24-9	3.85E-09	5.00E+00	1.3E+09
SVOC	Benzaldehyde	100-52-7	5.01E-06		
SVOC	Benzo(a)anthracene	56-55-3	7.36E-07		
SVOC	Benzo(a)pyrene	50-32-8	2.54E-07		
SVOC	Benzo(b)fluoranthene	205-99-2	1.82E-05		
SVOC	Benzo(g,h,i)perylene	191-24-2	3.21E-08		
SVOC	Benzo(k)fluoranthene	207-08-9	1.85E-07		
SVOC	Biphenyl	92-52-4	4.96E-05	1.00E+00	2.0E+04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.87E-08		
SVOC	bis(2-Chloroethyl) ether	111-44-4	3.81E-06	2.92E+01	7.7E+06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.33E-08	5.00E+00	2.2E+08
SVOC	Butylbenzylphthalate	85-68-7	2.77E-07		
SVOC	Caprolactam	105-60-2	4.78E-09	5.00E+00	1.0E+09
SVOC	Carbazole	86-74-8	5.35E-09		
SVOC	4-Chloro-3-methylphenol	59-50-7	9.05E-08		
SVOC	2-Chloronaphthalene	91-58-7	5.35E-05		
SVOC	2-Chlorophenol	95-57-8	6.56E-05		
SVOC	Chrysene	218-01-9	1.62E-05		
SVOC	Dibenz(a,h)anthracene	53-70-3	4.48E-09		
SVOC	Dibenzofuran	132-64-9	2.52E-06		
SVOC	2,4-Dichlorophenol	120-83-2	6.95E-07		
SVOC	Diethylphthalate	84-66-2	1.02E-07	5.00E+00	4.9E+07
SVOC	2,4-Dimethylphenol	105-67-9	4.46E-07		
SVOC	Dimethylphthalate	131-11-3	2.39E-08	5.00E+00	2.1E+08
SVOC	Di-n-butylphthalate	84-74-2	3.75E-09	5.00E+00	1.3E+09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	9.65E-08	2.00E-01	2.1E+06
SVOC	2,4-Dinitrotoluene	121-14-2	2.14E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	1.68E-07		
SVOC	Di-n-octylphthalate	117-84-0	1.03E-05		
SVOC	Fluoranthene	206-44-0	3.24E-06		
SVOC	Fluorene	86-73-7	1.21E-05		
SVOC	Formaldehyde	50-00-0	7.78E-08	9.00E-01	1.2E+07
SVOC	Hexachlorobutadiene	87-68-3	4.67E-04	2.00E-02	4.3E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	6.18E-04	1.00E-01	1.6E+02
SVOC	Hexachloroethane	67-72-1	1.25E-04	1.00E+01	8.0E+04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.51E-07		
SVOC	Isophorone	78-59-1	1.43E-06	2.30E+01	1.6E+07
SVOC	2-Methylnaphthalene	91-57-6	8.02E-05		
SVOC	Methylphenol (total)	1319-77-3	1.95E-07	2.20E+01	1.1E+08
SVOC	Naphthalene	91-20-3	7.76E-05	5.00E+01	6.4E+05
SVOC	2-Nitroaniline	88-74-4	3.64E-08		
SVOC	Nitrobenzene	98-95-3	5.07E-06	5.00E+00	9.9E+05
SVOC	2-Nitrophenol	88-75-5	2.02E-06		
SVOC	4-Nitrophenol	100-02-7	4.49E-09		
SVOC	N-Nitrosodiphenylamine	86-30-6	1.06E-06		

Attachment G2: Routine Worker Occupational Based Criteria for Groundwater Vapor Intrusion Inhalation (Commercial/Industrial Slab on Grade Building) GMC: NAO Flint Operations Site, Flint, Michigan					
Chem Group	**Chemical**	**CASRN**	**C_{air}** (mg/m^3)	**Occupational Indoor Air Standard** (mg/m^3)	**Occupational Criteria** (mg/L)
SVOC	N-Nitroso-di-n-propylamine	621-64-7	5.00E-07		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.19E-05		
SVOC	Pentachlorophenol	87-86-5	6.55E-09	5.00E-01	7.6E+07
SVOC	Phenanthrene	85-01-8	4.69E-06		
SVOC	Phenol	108-95-2	9.05E-08	1.90E+01	2.1E+08
SVOC	Pyrene	129-00-0	2.26E-06		
SVOC	2,4,5-Trichlorophenol	95-95-4	9.31E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	1.63E-06		
PCB	PCBs (total)	1336-36-3	1.56E-04	5.00E-01	3.2E+03
INORG	Antimony	7440-36-0		5.00E-01	
INORG	Arsenic	7440-38-2		5.00E-01	
INORG	Barium	7440-39-3		5.00E-01	
INORG	Beryllium	7440-41-7		2.00E-03	
INORG	Cadmium	7440-43-9		5.00E-03	
INORG	Chromium (total)	7440-47-3		1.00E+00	
INORG	Chromium III	16065-83-1		5.00E-01	
INORG	Chromium VI	18540-29-9			
INORG	Cobalt	7440-48-4		5.00E-02	
INORG	Copper	7440-50-8		1.00E+00	
INORG	Cyanide (total)	57-12-5		5.00E+00	
INORG	Fluoride	16984-48-8		2.50E+00	
INORG	Lead	7439-92-1		5.00E-02	
INORG	Manganese	7439-96-5		2.00E-01	
INORG	Mercury	7439-97-6	3.85E-04	5.00E-02	1.3E+02
INORG	Nickel	7440-02-0		1.00E+00	
INORG	Selenium	7782-49-2		2.00E-01	
INORG	Silver	7440-22-4		1.00E-02	
INORG	Thallium	7440-28-0		1.00E-01	
INORG	Vanadium	7440-62-2			
INORG	Zinc	7440-66-6			

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from NAPL at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞
VOC	Acetone	67-64-1	2.30E+02	1.07E+00	7.95E-04	3.17E+01	2.92E+01	1.93E-04
VOC	Benzene	71-43-2	9.50E+01	7.60E-01	1.14E-01	1.22E+01	9.95E+00	7.81E-05
VOC	2-Butanone	78-93-3	9.53E+01	6.98E-01	1.14E-03	1.32E+01	1.23E+01	8.43E-05
VOC	Carbon Disulfide	75-15-0	3.59E+02	8.99E-01	6.20E-01	4.60E+01	3.75E+01	2.77E-04
VOC	Chloroethane	75-00-3	1.01E+03	2.34E+00	1.80E-01	1.29E+02	1.05E+02	7.65E-04
VOC	Chloromethane	74-87-3	4.30E+03	1.09E+00	1.80E-01	5.51E+02	4.49E+02	3.23E-03
VOC	Cumene	98-82-8	4.50E+00	5.62E-01	2.66E-01	5.80E-01	4.79E-01	1.29E-05
VOC	Cyclohexane	110-82-7	9.69E+01	7.25E-01	3.98E+00	1.24E+01	1.01E+01	7.95E-05
VOC	1,2-Dichlorobenzene	95-50-1	1.36E+00	5.96E-01	3.90E-02	1.99E-01	1.98E-01	1.24E-05
VOC	Dichlorodifluoromethane	75-71-8	4.85E+03	6.91E-01	7.01E+00	6.21E+02	5.06E+02	3.64E-03
VOC	1,1-Dichloroethane	75-34-3	2.27E+02	6.41E-01	1.15E-01	2.91E+01	2.38E+01	1.78E-04
VOC	cis-1,2-Dichloroethene	156-59-2	2.03E+02	6.36E-01	8.35E-02	2.60E+01	2.12E+01	1.59E-04
VOC	Ethyl Benzene	100-41-4	9.60E+00	6.48E-01	1.62E-01	1.24E+00	1.02E+00	1.54E-05
VOC	Methyl Acetate	79-20-9	2.16E+02	8.27E-01	1.85E-03	2.84E+01	2.44E+01	1.74E-04
VOC	4-Methyl-2-pentanone	108-10-1	1.99E+01	6.48E-01	2.82E-03	2.92E+00	2.91E+00	2.43E-05
VOC	Methylcyclohexane	108-87-2	4.30E+01	6.35E-01	8.78E+00	5.51E+00	4.49E+00	3.91E-05
VOC	Methylene Chloride	75-09-2	4.33E+02	8.73E-01	4.49E-02	5.55E+01	4.53E+01	3.33E-04
VOC	Tetrachloroethene	127-18-4	1.86E+01	6.22E-01	3.77E-01	2.38E+00	1.94E+00	2.13E-05
VOC	Toluene	108-88-3	2.84E+01	7.52E-01	1.36E-01	3.65E+00	2.99E+00	2.84E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	4.31E-01	2.59E-01	2.91E-02	6.99E-02	7.56E-02	1.17E-05
VOC	1,1,1-Trichloroethane	71-55-6	1.24E+02	6.74E-01	3.53E-01	1.59E+01	1.29E+01	9.97E-05
VOC	1,1,2-Trichloroethane	79-00-5	2.33E+01	6.74E-01	1.87E-02	3.04E+00	2.57E+00	2.50E-05
VOC	Trichloroethene	79-01-6	7.35E+01	6.83E-01	2.11E-01	9.42E+00	7.68E+00	6.19E-05
VOC	Trichlorofluoromethane	75-69-4	8.03E+02	7.52E-01	1.98E+00	1.03E+02	8.38E+01	6.11E-04
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	3.32E+02	6.74E-01	9.83E+00	4.25E+01	3.46E+01	2.56E-04
VOC	Vinyl Chloride	75-01-4	2.98E+03	9.16E-01	5.55E-01	3.82E+02	3.11E+02	2.25E-03
VOC	Xylenes (total)	1330-20-7	7.99E+00	6.74E-01	1.38E-01	1.03E+00	8.54E-01	1.44E-05
SVOC	Acenaphthene	83-32-9	2.50E-03	3.64E-01	3.18E-03	1.89E-01	3.18E-01	1.25E-05
SVOC	Benzo(a)anthracene	56-55-3	1.05E-07	4.41E-01	6.85E-05	1.06E+01	1.79E+01	6.91E-05
SVOC	Benzo(a)pyrene	50-32-8	5.49E-09	3.72E-01	2.32E-05	2.65E+01	4.46E+01	1.62E-04
SVOC	Benzo(b)fluoranthene	205-99-2	5.00E-07	1.95E-01	2.28E-03	1.42E-01	2.39E-01	1.24E-05
SVOC	Benzo(k)fluoranthene	207-08-9	2.00E-09	1.95E-01	1.70E-05	1.90E+01	3.19E+01	1.18E-04
SVOC	Biphenyl	92-52-4	9.64E-03	3.49E-01	6.13E-03	9.52E-02	1.60E-01	1.23E-05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.40E-04	3.77E-01	3.47E-06	1.79E+02	3.01E+02	1.06E-03
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6.45E-06	3.03E-01	2.09E-06	2.39E+02	4.03E+02	1.42E-03
SVOC	Butylbenzylphthalate	85-68-7	8.25E-06	1.50E-01	2.59E-05	9.60E+00	1.62E+01	6.31E-05
SVOC	Chrysene	218-01-9	6.23E-09	2.14E-01	1.94E-03	1.82E-01	3.07E-01	1.25E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.47E-04	1.75E+00	1.90E-06	1.52E+03	2.57E+03	8.90E-03
SVOC	Di-n-octylphthalate	117-84-0	2.60E-06	1.30E-01	1.37E-03	1.57E-01	2.65E-01	1.25E-05
SVOC	Fluoranthene	206-44-0	7.80E-06	2.61E-01	3.30E-04	1.30E+00	2.20E+00	1.57E-05
SVOC	Fluorene	86-73-7	6.33E-04	3.14E-01	1.31E-03	3.97E-01	6.68E-01	1.27E-05
SVOC	2-Methylnaphthalene	91-57-6	5.50E-02	4.18E-01	1.06E-02	7.22E-02	1.17E-01	1.21E-05
SVOC	Naphthalene	91-20-3	8.50E-02	5.10E-01	9.90E-03	9.59E-02	1.55E-01	1.23E-05
SVOC	Phenanthrene	85-01-8	1.12E-04	3.24E-01	4.76E-04	1.12E+00	1.89E+00	1.49E-05
SVOC	Pyrene	129-00-0	4.59E-06	2.35E-01	2.26E-04	1.72E+00	2.90E+00	1.78E-05
PCB	PCBs (total)	1336-36-3	7.71E-05	1.75E-01	4.09E-02	7.06E-03	1.19E-02	8.15E-06
INORG	Antimony	7440-36-0						
INORG	Arsenic	7440-38-2						
INORG	Barium	7440-39-3						
INORG	Beryllium	7440-41-7						
INORG	Cadmium	7440-43-9						
INORG	Chromium (total)	7440-47-3						

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from NAPL at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞
INORG	Cobalt	7440-48-4						
INORG	Copper	7440-50-8						
INORG	Cyanide (total)	57-12-5						
INORG	Lead	7439-92-1						
INORG	Manganese	7439-96-5						
INORG	Mercury	7439-97-6	1.96E-03	2.65E-01	1.45E-01	3.27E-03	5.35E-03	5.65E-06
INORG	Nickel	7440-02-0						
INORG	Selenium	7782-49-2						
INORG	Silver	7440-22-4						
INORG	Thallium	7440-28-0						
INORG	Vanadium	7440-62-2						
INORG	Zinc	7440-66-6						
Notes:	**Crack Soil and Building Characteristics**							
	SCS Soil texture class		Loamy Sand					
	Bulk density	kg/L	ρ_b	1.62				
	Total porosity	L/L-soil	θ	0.390				
	Water-filled porosity	L/L-soil	θ_w	0.083				
	Air-filled porosity	L/L-soil	θ_a	0.307				
	Residual saturation	L/L-soil	θ_r	0.049				
	Hydraulic conductivity	cm/s	K	1.2E-03				
	Dynamic viscosity of water	g/cm-s	μ	0.01307				
	Density of water	g/cm^3	ρ_w	1.0				
	Gravitational acceleration	cm/s^2	g	980.7				
	Intrinsic permeability	cm^2	k	1.6E-08				
	Relative saturation	unitless	S_e	0.100				
	van Genuchten N	unitless	N	1.746				
	van Genuchten M	unitless	M	0.427				
	Relative air permeability	unitless	k_{rg}	0.945				
	Permeability to vapor	cm^2	k_v	1.5E-08				
	Distance from building foundation to source	m	L_T	4.51				
	Bldg foundation thickness	m	L_{crack}	0.15				
	Bldg foundation length	m		19.29				
	Bldg foundation width	m		19.29				
	Bldg occupied height	m		2.44				
	Bldg occupied volume	m^3		907.93				
	Occupied depth below ground	m		0.0				
	Bldg area for vapor intrusion	m^2	A_B	372.1				
	Ratio of A_{crack} to A_B		η	1E-04				
	Area of cracks	m^2	A_{crack}	3.86E-02				
	Air exchange rate	$hour^{-1}$	ac/h	2.0				
	Building ventilation rate	m^3/d	Q_{bldg}	4.36E+04				
	Pressure difference between outdoors-indoors	kg/m-s^2	ΔP	1.0				
	Air viscosity	kg/m-s	μ	1.8E-05				
	Crack length (bldg perimeter)	m	X_{crack}	77.16				
	Crack depth below ground	m	Z_{crack}	0.15				
	Crack radius	m	r_{crack}	5E-04				

Attachment G2: Vapor Intrusion into Commercial/Industrial Slab on Grade Building from NAPL at AOI 36-1 GMC: NAO Flint Operations Site, Flint, Michigan								
Chem Group	**Chemical**	**CASRN**	**D_{air}** (m^2/d)	**D_{water}** (m^2/d)	**H** (unitless)	**D_{crack}** (m^2/d)	**D_{eff}^T** (m^2/d)	**α_∞**
	Soil gas flow rate into bldg	m^3/d	**Q_{soil}**	5.58E-01				

Attachment G2: Risk Calculations for Routine Worker Exposure to LNAPL via Vapor Intrusion at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

								LNAPL Indoor Vapor Inhalation							
Chem Group	Chemical	CASRN	Carc Class	C_{LNAPL} (mg/kg)	VP (mmHg)	v* (mg/m^3)	α_∞	$C_{indoor\ air}$ (mg/m^3)	URF (m^3/mg)	Risk		RfC (mg/m^3)	HQ		Occupational Air Concentration Limit (mg/m^3)	Ratio
VOC	Acetone	67-64-1	ID		2.30E+02		1.93E-04					3.2E+00			1.8E+03	
VOC	Benzene	71-43-2	A	2.90E+03	9.50E+01	4.61E+03	7.81E-05	3.60E-01	7.8E-03	7E-04		3.0E-02	8E+00		3.2E+00	1E-01
VOC	2-Butanone	78-93-3	ID		9.53E+01		8.43E-05					5.0E+00			5.9E+02	
VOC	Carbon Disulfide	75-15-0			3.59E+02		2.77E-04					7.0E-01			1.2E+01	
VOC	Chloroethane	75-00-3			1.01E+03		7.65E-04					1.0E+01			2.6E+03	
VOC	Chloromethane	74-87-3	D		4.30E+03		3.23E-03					9.0E-02			1.0E+02	
VOC	Cumene	98-82-8	D	6.10E+02	4.50E+00	4.59E+01	1.29E-05	5.93E-04				4.0E-01	1E-03		2.5E+02	2E-06
VOC	Cyclohexane	110-82-7	ID		9.69E+01		7.95E-05					6.0E+00			1.1E+03	
VOC	1,2-Dichlorobenzene	95-50-1	D		1.36E+00		1.24E-05					2.0E-01			1.5E+02	
VOC	Dichlorodifluoromethane	75-71-8			4.85E+03		3.64E-03					2.0E-01			5.0E+03	
VOC	1,1-Dichloroethane	75-34-3	C	1.04E+00	2.27E+02	3.95E+00	1.78E-04	7.02E-04				5.0E-01	1E-03		4.0E+02	2E-06
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.35E+00	2.03E+02	4.58E+00	1.59E-04	7.29E-04				3.5E-02	1E-02		7.9E+02	9E-07
VOC	Ethyl Benzene	100-41-4	D	8.60E+03	9.60E+00	1.38E+03	1.54E-05	2.12E-02				1.0E+00	1E-02		4.4E+02	5E-05
VOC	Methyl Acetate	79-20-9			2.16E+02		1.74E-04					3.5E+00			6.1E+02	
VOC	4-Methyl-2-pentanone	108-10-1	ID		1.99E+01		2.43E-05					3.0E+00			4.1E+02	
VOC	Methylcyclohexane	108-87-2		3.90E+02	4.30E+01	2.80E+02	3.91E-05	1.10E-02				3.0E+00	3E-03		2.0E+03	5E-06
VOC	Methylene Chloride	75-09-2	B2	1.80E+02	4.33E+02	1.30E+03	3.33E-04	4.34E-01	4.7E-04	5E-05		3.0E+00	1E-01		8.7E+01	5E-03
VOC	Tetrachloroethene	127-18-4	C-B2		1.86E+01		2.13E-05		3.1E-03			4.0E-01			1.7E+02	
VOC	Toluene	108-88-3	D	5.20E+04	2.84E+01	2.47E+04	2.84E-05	7.02E-01				5.0E+00	1E-01		3.8E+02	2E-03
VOC	1,2,4-Trichlorobenzene	120-82-1	D		4.31E-01		1.17E-05					2.0E-01				
VOC	1,1,1-Trichloroethane	71-55-6	D		1.24E+02		9.97E-05					2.2E+00			1.9E+03	
VOC	1,1,2-Trichloroethane	79-00-5	C		2.33E+01		2.50E-05		1.6E-02						4.5E+01	
VOC	Trichloroethene	79-01-6	C-B2	4.19E+00	7.35E+01	5.15E+00	6.19E-05	3.19E-04	1.7E-03	1E-07					2.7E+02	1E-06
VOC	Trichlorofluoromethane	75-69-4			8.03E+02		6.11E-04					7.0E-01			5.6E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1			3.32E+02		2.56E-04					3.0E+01			7.6E+03	
VOC	Vinyl Chloride	75-01-4	A		2.98E+03		2.25E-03		8.8E-03			1.0E-01			2.5E+00	
VOC	Xylenes (total)	1330-20-7	ID	3.18E+04	7.99E+00	4.25E+03	1.44E-05	6.14E-02				1.0E-01	4E-01		4.4E+02	1E-04
SVOC	Acenaphthene	83-32-9			2.50E-03		1.25E-05					2.1E-01				
SVOC	Benzo(a)anthracene	56-55-3	B2		1.05E-07		6.91E-05		8.9E-02							
SVOC	Benzo(a)pyrene	50-32-8	B2		5.49E-09		1.62E-04		8.9E-01							
SVOC	Benzo(b)fluoranthene	205-99-2	B2		5.00E-07		1.24E-05		8.9E-02							
SVOC	Benzo(k)fluoranthene	207-08-9	B2		2.00E-09		1.18E-04		8.9E-03							
SVOC	Biphenyl	92-52-4	D		9.64E-03		1.23E-05					1.8E-01			1.0E+00	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D		1.40E-04		1.06E-03									
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2		6.45E-06		1.42E-03		4.0E-03			7.0E-02			5.0E+00	
SVOC	Butylbenzylphthalate	85-68-7	C		8.25E-06		6.31E-05		5.4E-04			7.0E-01				
SVOC	Chrysene	218-01-9	B2		6.23E-09		1.25E-05		8.9E-04							
SVOC	2,4-Dinitrotoluene	121-14-2	B2		1.47E-04		8.90E-03									
SVOC	Di-n-octylphthalate	117-84-0			2.60E-06		1.25E-05									
SVOC	Fluoranthene	206-44-0	D		7.80E-06		1.57E-05					1.4E-01				
SVOC	Fluorene	86-73-7	D		6.33E-04		1.27E-05					1.4E-01				
SVOC	2-Methylnaphthalene	91-57-6	ID	8.80E+02	5.50E-02	8.09E-01	1.21E-05	9.79E-06				3.0E-03	2E-03			

Attachment G2: Risk Calculations for Routine Worker Exposure to LNAPL via Vapor Intrusion at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

								LNAPL Indoor Vapor Inhalation								
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{LNAPL}** (mg/kg)	**VP** (mmHg)	**v*** (mg/m^3)	**α_∞**	**$C_{indoor\ air}$** (mg/m^3)	**URF** (m^3/mg)	**Risk**		**RfC** (mg/m^3)	**HQ**		**Occupational Air Concentration Limit** (mg/m^3)	**Ratio**
SVOC	Naphthalene	91-20-3	C	1.40E+03	8.50E-02	1.99E+00	1.23E-05	2.44E-05				3.0E-03	6E-03		5.0E+01	5E-07
SVOC	Phenanthrene	85-01-8	D		1.12E-04		1.49E-05					1.1E-01				
SVOC	Pyrene	129-00-0	D		4.59E-06		1.78E-05					1.1E-01				
PCB	PCBs (total)	1336-36-3	B2		7.71E-05		8.15E-06		5.7E-01						5.0E-01	
INORG	Antimony	7440-36-0										1.4E-03			5.0E-01	
INORG	Arsenic	7440-38-2	A	1.50E+00					4.3E+00						5.0E-01	
INORG	Barium	7440-39-3	D	1.30E+00											5.0E-01	
INORG	Beryllium	7440-41-7	B1						2.4E+00			2.0E-05			2.0E-03	
INORG	Cadmium	7440-43-9	B1	1.90E-01					1.8E+00			2.0E-04			5.0E-03	
INORG	Chromium (total)	7440-47-3		3.90E+00					1.2E+01			1.0E-04			1.0E+00	
INORG	Cobalt	7440-48-4	B1	5.70E-02					2.8E+00			2.0E-05			5.0E-02	
INORG	Copper	7440-50-8	D	1.60E+00								1.4E-01			1.0E+00	
INORG	Cyanide (total)	57-12-5	D									7.0E-02			5.0E+00	
INORG	Lead	7439-92-1	B2	3.40E+00											5.0E-02	
INORG	Manganese	7439-96-5	D	1.10E+00								5.0E-05			2.0E-01	
INORG	Mercury	7439-97-6	D		1.96E-03		5.65E-06					3.0E-04			5.0E-02	
INORG	Nickel	7440-02-0	A	4.80E-01					2.4E-01						1.0E+00	
INORG	Selenium	7782-49-2	D									1.8E-02			2.0E-01	
INORG	Silver	7440-22-4	D									1.0E-05			1.0E-02	
INORG	Thallium	7440-28-0										2.5E-04			1.0E-01	
INORG	Vanadium	7440-62-2		8.90E-01								2.5E-02				
INORG	Zinc	7440-66-6	D	2.10E+00								1.1E+00				
									Cumulative Risk:	**7E-04**		**Cumulative HI:**	**9E+00**		**Sum of ratios:**	**1E-01**

Attachment G3
Exposure of Maintenance Workers to Soil

Attachment G3: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.07E+00	9.85E-05	7.81E-02	1.47E-01	1.21E-07	1.50E-03	1.36E-05
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	7.60E-01	8.47E-05	3.00E-01	1.04E-01	1.04E-07	3.96E-02	6.97E-05
VOC	Bromodichloromethane	75-27-4	5.51E+01		3.28E-02	2.57E-01	9.16E-05	2.65E-01	3.54E-02	1.13E-07	4.38E-03	2.32E-05
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	6.98E-01	8.47E-05	8.28E-02	9.59E-02	1.04E-07	1.32E-03	1.27E-05
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	8.99E-01	8.64E-05	4.19E-01	1.23E-01	1.06E-07	1.83E-01	1.50E-04
VOC	Carbon Tetrachloride	56-23-5	1.74E+02		6.25E-01	6.74E-01	7.60E-05	8.35E-01	9.26E-02	9.36E-08	6.93E-02	9.22E-05
VOC	Chlorobenzene	108-90-7	2.20E+02		7.60E-02	6.31E-01	7.52E-05	8.14E-01	8.66E-02	9.25E-08	8.09E-03	3.15E-05
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.34E+00	9.94E-05	1.85E-01	3.22E-01	1.22E-07	3.13E-01	1.96E-04
VOC	Chloroform	67-66-3	3.97E+01		7.50E-02	8.99E-01	8.64E-05	2.28E-01	1.23E-01	1.06E-07	4.06E-02	7.05E-05
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.09E+00	5.62E-05	2.61E-01	1.50E-01	6.91E-08	1.03E-01	1.13E-04
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	5.62E-01	6.13E-05	2.44E+00	7.71E-02	7.55E-08	8.39E-03	3.21E-05
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	7.25E-01	7.86E-05	3.38E+00	9.96E-02	9.68E-08	1.17E-01	1.20E-04
VOC	Dibromochloromethane	124-48-1	6.26E+01		1.61E-02	1.69E-01	9.07E-05	2.84E-01	2.33E-02	1.12E-07	1.32E-03	1.27E-05
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	5.96E-01	6.83E-05	2.11E+00	8.19E-02	8.40E-08	1.51E-03	1.36E-05
VOC	1,3-Dichlorobenzene	541-73-1	5.69E+02		6.33E-02	5.98E-01	6.79E-05	1.94E+00	8.21E-02	8.36E-08	2.68E-03	1.81E-05
VOC	1,4-Dichlorobenzene	106-46-7	6.12E+02		4.98E-02	5.96E-01	6.83E-05	2.07E+00	8.19E-02	8.40E-08	1.97E-03	1.55E-05
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	6.91E-01	6.91E-05	2.47E+00	9.49E-02	8.51E-08	2.70E-01	1.82E-04
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	6.41E-01	9.07E-05	2.13E-01	8.81E-02	1.12E-07	4.74E-02	7.63E-05
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.01E-02	8.99E-01	8.55E-05	1.39E-01	1.23E-01	1.05E-07	1.78E-02	4.67E-05
VOC	1,1-Dichloroethene	75-35-4	5.82E+01		5.35E-01	7.78E-01	8.99E-05	4.32E-01	1.07E-01	1.11E-07	1.32E-01	1.27E-04
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	6.36E-01	9.76E-05	2.17E-01	8.73E-02	1.20E-07	3.35E-02	6.41E-05
VOC	trans-1,2-Dichloroethene	156-60-5	5.22E+01		1.93E-01	6.11E-01	1.03E-04	3.05E-01	8.39E-02	1.27E-07	5.29E-02	8.05E-05
VOC	1,2-Dichloropropane	78-87-5	4.35E+01		5.75E-02	6.76E-01	7.54E-05	2.35E-01	9.28E-02	9.28E-08	2.27E-02	5.28E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	6.48E-01	6.74E-05	1.32E+00	8.90E-02	8.29E-08	1.09E-02	3.66E-05
VOC	2-Hexanone	591-78-6	1.48E+01		3.58E-02							
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	8.27E-01	9.50E-05	8.20E-02	1.14E-01	1.17E-07	2.57E-03	1.78E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.20E-02	7.42E-01	8.73E-05	1.17E-01	1.02E-01	1.07E-07	1.05E-02	3.58E-05
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	6.48E-01	6.74E-05	1.11E-01	8.90E-02	8.29E-08	2.26E-03	1.67E-05
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	6.35E-01	7.36E-05	3.68E+00	8.72E-02	9.06E-08	2.08E-01	1.60E-04

Attachment G3: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	8.73E-01	1.01E-04	1.28E-01	1.20E-01	1.24E-07	4.21E-02	7.18E-05
VOC	Styrene	100-42-5	7.77E+02		5.65E-02	6.13E-01	6.91E-05	2.61E+00	8.43E-02	8.51E-08	1.82E-03	1.50E-05
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	6.22E-01	7.08E-05	6.99E-01	8.54E-02	8.72E-08	4.61E-02	7.52E-05
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	7.52E-01	7.43E-05	7.03E-01	1.03E-01	9.15E-08	2.00E-02	4.95E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	2.59E-01	7.11E-05	5.90E+00	3.56E-02	8.75E-08	1.76E-04	4.64E-06
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	6.74E-01	7.60E-05	5.43E-01	9.26E-02	9.36E-08	6.00E-02	8.58E-05
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	6.74E-01	7.60E-05	2.45E-01	9.26E-02	9.36E-08	7.07E-03	2.94E-05
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	6.83E-01	7.86E-05	6.85E-01	9.37E-02	9.68E-08	2.89E-02	5.95E-05
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	7.52E-01	8.38E-05	1.09E+00	1.03E-01	1.03E-07	1.88E-01	1.52E-04
VOC	1,1,2-Trichloro-1,2,2-trifluoroe	76-13-1	3.81E+02		9.83E+00	6.74E-01	7.08E-05	4.38E+00	9.26E-02	8.72E-08	2.08E-01	1.60E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.26E-01	5.24E-01	6.84E-05	3.02E+00	7.19E-02	8.42E-08	2.99E-03	1.92E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.20E-01	5.20E-01	7.49E-05	5.82E+00	7.14E-02	9.22E-08	1.48E-03	1.35E-05
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	9.16E-01	1.06E-04	3.09E-01	1.26E-01	1.31E-07	2.26E-01	1.66E-04
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	6.74E-01	7.56E-05	1.37E+00	9.25E-02	9.30E-08	9.33E-03	3.38E-05
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	3.64E-01	6.64E-05	2.32E+01	5.00E-02	8.18E-08	6.85E-06	9.16E-07
SVOC	Acenaphthylene	208-96-8	7.47E+03		2.31E-03	3.88E-01	6.03E-05	2.43E+01	5.33E-02	7.42E-08	5.07E-06	7.89E-07
SVOC	Acetophenone	98-86-2	3.58E+01		2.19E-04	6.91E-01	6.91E-05	1.92E-01	9.49E-02	8.51E-08	1.09E-04	3.65E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.34E-03	2.80E-01	6.69E-05	9.63E+01	3.84E-02	8.23E-08	5.34E-07	2.56E-07
SVOC	Atrazine	1912-24-9	3.68E+02		1.25E-07	2.24E-01	5.76E-05	1.27E+00	3.07E-02	7.09E-08	5.89E-08	8.50E-08
SVOC	Benzaldehyde	100-52-7	2.85E+01		4.86E-04	6.23E-01	7.84E-05	1.69E-01	8.56E-02	9.65E-08	2.47E-04	5.51E-06
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	4.41E-01	7.78E-05	1.30E+03	6.05E-02	9.57E-08	3.26E-09	2.00E-08
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	3.72E-01	7.78E-05	3.29E+03	5.10E-02	9.57E-08	3.88E-10	6.90E-09
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.51E-08	4.31E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		2.88E-06	1.88E-01	4.54E-05	4.15E+04	2.58E-02	5.59E-08	3.14E-12	6.20E-10
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.28E-10	3.96E-09
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	3.49E-01	7.04E-05	3.41E+01	4.79E-02	8.67E-08	8.63E-06	1.03E-06
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	3.77E-01	7.31E-05	1.32E-01	5.17E-02	9.00E-08	2.04E-06	5.00E-07
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.55E+01		3.69E-04	5.98E-01	6.51E-05	1.26E-01	8.21E-02	8.01E-08	2.41E-04	5.43E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.03E-01	3.16E-05	4.86E+04	4.17E-02	3.89E-08	2.59E-12	5.64E-10

Attachment G3: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.50E-01	4.17E-05	1.86E+02	2.06E-02	5.14E-08	3.15E-09	1.97E-08
SVOC	Caprolactam	105-60-2	6.51E-01		1.03E-07	5.98E-01	7.77E-05	7.81E-02	8.21E-02	9.56E-08	1.33E-06	4.04E-07
SVOC	Carbazole	86-74-8	3.38E+03		3.13E-07	3.37E-01	6.07E-05	1.10E+01	4.63E-02	7.48E-08	8.09E-09	3.15E-08
SVOC	4-Chloro-3-methylphenol	59-50-7	1.12E+03		8.15E-06	5.24E-01	8.22E-05	3.69E+00	7.19E-02	1.01E-07	1.86E-07	1.51E-07
SVOC	2-Chloronaphthalene	91-58-7	1.12E+04		6.42E-03	4.25E-01	7.59E-05	3.65E+01	5.84E-02	9.35E-08	1.03E-05	1.12E-06
SVOC	2-Chlorophenol	95-57-8	3.88E+02		8.00E-03	4.33E-01	8.17E-05	1.34E+00	5.95E-02	1.01E-07	3.56E-04	6.61E-06
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.14E-01	5.37E-05	1.30E+03	2.94E-02	6.60E-08	4.40E-08	7.34E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		3.02E-07	1.75E-01	4.48E-05	1.22E+04	2.40E-02	5.51E-08	5.10E-12	7.91E-10
SVOC	Dibenzofuran	132-64-9	2.07E+04		2.57E-04	2.06E-01	5.18E-05	6.71E+01	2.82E-02	6.38E-08	1.09E-07	1.16E-07
SVOC	2,4-Dichlorophenol	120-83-2	1.47E+02		6.50E-05	2.99E-01	7.58E-05	5.52E-01	4.11E-02	9.33E-08	5.00E-06	7.83E-07
SVOC	Diethylphthalate	84-66-2	2.87E+02		9.25E-06	2.21E-01	5.49E-05	1.01E+00	3.04E-02	6.75E-08	3.47E-07	2.06E-07
SVOC	2,4-Dimethylphenol	105-67-9	2.09E+02		4.10E-05	5.05E-01	7.51E-05	7.53E-01	6.93E-02	9.24E-08	3.90E-06	6.91E-07
SVOC	Dimethylphthalate	131-11-3	6.89E+01		2.15E-06	4.91E-01	5.43E-05	2.99E-01	6.74E-02	6.69E-08	7.07E-07	2.94E-07
SVOC	Di-n-butylphthalate	84-74-2	3.40E+04		1.93E-08	3.78E-01	6.79E-05	1.10E+02	5.20E-02	8.36E-08	7.67E-10	9.70E-09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	1.21E+02		8.73E-06	2.38E-01	5.97E-05	4.69E-01	3.28E-02	7.35E-08	7.65E-07	3.06E-07
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	1.75E+00	6.10E-05	3.83E-01	2.41E-01	7.51E-08	1.39E-06	4.13E-07
SVOC	2,6-Dinitrotoluene	606-20-2	6.89E+01		1.53E-05	2.83E-01	6.27E-05	2.99E-01	3.88E-02	7.72E-08	2.24E-06	5.24E-07
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.30E-01	3.09E-05	2.72E+05	1.79E-02	3.81E-08	9.06E-11	3.33E-09
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	2.61E-01	5.49E-05	3.50E+02	3.58E-02	6.75E-08	3.40E-08	6.46E-08
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.14E-01	6.81E-05	4.47E+01	4.31E-02	8.38E-08	1.26E-06	3.93E-07
SVOC	Formaldehyde	50-00-0			6.95E-06	1.56E+00	1.73E-04					
SVOC	Hexachlorobutadiene	87-68-3	5.35E+04		1.67E-01	4.85E-01	5.32E-05	1.74E+02	6.66E-02	6.55E-08	6.41E-05	2.80E-06
SVOC	Hexachlorocyclopentadiene	77-47-4	1.99E+05		5.55E-01	1.39E-01	6.23E-05	6.45E+02	1.91E-02	7.67E-08	1.64E-05	1.42E-06
SVOC	Hexachloroethane	67-72-1	1.76E+03		7.95E-02	2.16E-02	5.88E-05	5.81E+00	2.97E-03	7.23E-08	4.06E-05	2.23E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		3.28E-05	1.64E-01	4.89E-05	1.12E+04	2.25E-02	6.02E-08	7.16E-11	2.96E-09
SVOC	Isophorone	78-59-1	4.69E+01		1.36E-04	5.38E-01	5.84E-05	2.28E-01	7.39E-02	7.19E-08	4.44E-05	2.33E-06
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.18E-01	6.70E-05	2.03E+01	5.74E-02	8.24E-08	3.00E-05	1.92E-06
SVOC	Methylphenol (total)	1319-77-3	8.45E+01		1.77E-05	6.39E-01	8.64E-05	3.50E-01	8.78E-02	1.06E-07	4.74E-06	7.62E-07
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.10E-01	6.48E-05	6.59E+00	7.00E-02	7.98E-08	1.05E-04	3.59E-06

Attachment G3: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	2-Nitroaniline	88-74-4	6.59E+01		3.27E-06	6.31E-01	6.91E-05	2.89E-01	8.66E-02	8.51E-08	1.27E-06	3.95E-07
SVOC	Nitrobenzene	98-95-3	6.44E+01		4.92E-04	6.57E-01	7.43E-05	2.85E-01	9.02E-02	9.15E-08	1.56E-04	4.38E-06
SVOC	2-Nitrophenol	88-75-5	5.75E+01		1.94E-04	4.66E-01	6.78E-05	2.62E-01	6.40E-02	8.35E-08	4.75E-05	2.41E-06
SVOC	4-Nitrophenol	100-02-7	7.55E+01		8.48E-09	5.40E-01	8.30E-05	3.21E-01	7.42E-02	1.02E-07	3.21E-07	1.98E-07
SVOC	N-Nitrosodiphenylamine	86-30-6	1.29E+03		1.03E-04	2.70E-01	5.49E-05	4.26E+00	3.70E-02	6.75E-08	9.08E-07	3.34E-07
SVOC	N-Nitroso-di-n-propylamine	621-64-7	2.40E+01		4.62E-05	4.71E-01	7.06E-05	1.54E-01	6.47E-02	8.69E-08	2.00E-05	1.57E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.56E+02		2.39E-03	5.20E-01	5.54E-05	9.07E-01	7.14E-02	6.82E-08	1.88E-04	4.81E-06
SVOC	Pentachlorophenol	87-86-5	5.92E+02		5.00E-07	4.84E-01	5.27E-05	1.99E+00	6.65E-02	6.49E-08	4.92E-08	7.77E-08
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.24E-01	6.45E-05	7.86E+01	4.45E-02	7.94E-08	2.71E-07	1.82E-07
SVOC	Phenol	108-95-2	2.88E+01		8.15E-06	7.08E-01	7.86E-05	1.69E-01	9.73E-02	9.68E-08	5.26E-06	8.03E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.35E-01	6.26E-05	3.42E+02	3.23E-02	7.70E-08	2.15E-08	5.14E-08
SVOC	2,4,5-Trichlorophenol	95-95-4	1.60E+03		8.90E-05	2.51E-01	6.07E-05	5.25E+00	3.45E-02	7.48E-08	6.00E-07	2.71E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	3.81E+02		1.60E-04	2.75E-01	5.40E-05	1.31E+00	3.77E-02	6.65E-08	4.64E-06	7.55E-07
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	1.75E-01	4.32E-05	7.95E+03	2.40E-02	5.32E-08	1.23E-07	1.23E-07
INORG	Antimony	7440-36-0		4.50E+01								
INORG	Arsenic	7440-38-2		2.90E+01								
INORG	Barium	7440-39-3		4.10E+01								
INORG	Beryllium	7440-41-7		7.90E+02								
INORG	Cadmium	7440-43-9		7.50E+01								
INORG	Chromium (total)	7440-47-3		1.90E+01								
INORG	Chromium III	16065-83-1		1.80E+06								
INORG	Chromium VI	18540-29-9		1.90E+01								
INORG	Cobalt	7440-48-4		4.50E+01								
INORG	Copper	7440-50-8		3.50E+01								
INORG	Cyanide (total)	57-12-5		9.90E+00								
INORG	Fluoride	16984-48-8										
INORG	Lead	7439-92-1		9.00E+02								
INORG	Manganese	7439-96-5		6.50E+01								
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	2.65E-01	5.44E-05	1.62E+03	3.64E-02	6.70E-08	3.26E-06	6.33E-07

Attachment G3: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
INORG	Nickel	7440-02-0		6.50E+01								
INORG	Selenium	7782-49-2		5.00E+00								
INORG	Silver	7440-22-4		8.30E+00								
INORG	Thallium	7440-28-0		7.10E+01								
INORG	Vanadium	7440-62-2		1.00E+03								
INORG	Zinc	7440-66-6		6.20E+01								
Notes:	Soil bulk density	kg/L	ρ_b	1.62	*Loamy Sand*							
	Soil particle density	kg/L	ρ_s	2.65	*EPA default/MDEQ 1998*							
	Soil porosity	L/L-soil	θ	0.39	*1-(pb/ps)*							
	Soil water content	L/L-soil	θ_w	0.076	*Loamy Sand*							
	Soil air-filled porosity	L/L-soil	θ_a	0.31	*porosity-water content*							
	Soil organic carbon fraction	unitless	f_{oc}	0.002								
	Averaging period	year	**ED**	10								
		s	**ED**	3.2E+08								
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411								
	Temperature	^oC	**T**	12								
		K	**T**	285								

Attachment G3: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	5.59E-09							1.49E-04	2.91E-07			1.50E-07	2.94E-10			
VOC	Benzene	71-43-2	A	5.59E-09	5.5E-02	3.3E+04			5.5E-02		7.64E-04	1.50E-06	7.8E-03	8.6E+02	1.50E-07	2.94E-10	7.8E-03	4.4E+06	8.4E+02
VOC	Bromodichloromethane	75-27-4	B2	5.59E-09	6.2E-02	2.9E+04			6.2E-02		2.54E-04	4.97E-07	1.8E-02	1.1E+03	1.50E-07	2.94E-10	1.8E-02	1.9E+06	1.1E+03
VOC	2-Butanone	78-93-3	ID	5.59E-09							1.40E-04	2.73E-07			1.50E-07	2.94E-10			
VOC	Carbon Disulfide	75-15-0		5.59E-09							1.64E-03	3.21E-06			1.50E-07	2.94E-10			
VOC	Carbon Tetrachloride	56-23-5	B2	5.59E-09	1.3E-01	1.4E+04			1.3E-01		1.01E-03	1.98E-06	1.5E-02	3.4E+02	1.50E-07	2.94E-10	1.5E-02	2.3E+06	3.3E+02
VOC	Chlorobenzene	108-90-7	D	5.59E-09							3.45E-04	6.76E-07			1.50E-07	2.94E-10			
VOC	Chloroethane	75-00-3		5.59E-09	2.9E-03	6.2E+05			2.9E-03		2.15E-03	4.20E-06			1.50E-07	2.94E-10			
VOC	Chloroform	67-66-3	B2	5.59E-09							7.73E-04	1.51E-06	2.3E-02	2.9E+02	1.50E-07	2.94E-10	2.3E-02	1.5E+06	2.9E+02
VOC	Chloromethane	74-87-3	D	5.59E-09							1.23E-03	2.41E-06			1.50E-07	2.94E-10			
VOC	Cumene	98-82-8	D	5.59E-09							3.52E-04	6.88E-07			1.50E-07	2.94E-10			
VOC	Cyclohexane	110-82-7	ID	5.59E-09							1.32E-03	2.57E-06			1.50E-07	2.94E-10			
VOC	Dibromochloromethane	124-48-1	C	5.59E-09	8.4E-02	2.1E+04			8.4E-02		1.39E-04	2.72E-07	2.4E-02	1.5E+03	1.50E-07	2.94E-10	2.4E-02	1.4E+06	1.4E+03
VOC	1,2-Dichlorobenzene	95-50-1	D	5.59E-09							1.49E-04	2.92E-07			1.50E-07	2.94E-10			
VOC	1,3-Dichlorobenzene	541-73-1	D	5.59E-09							1.99E-04	3.89E-07			1.50E-07	2.94E-10			
VOC	1,4-Dichlorobenzene	106-46-7	C	5.59E-09	2.4E-02	7.5E+04			2.4E-02		1.70E-04	3.33E-07	6.3E-03	4.8E+03	1.50E-07	2.94E-10	6.3E-03	5.4E+06	4.5E+03
VOC	Dichlorodifluoromethane	75-71-8		5.59E-09							1.99E-03	3.90E-06			1.50E-07	2.94E-10			
VOC	1,1-Dichloroethane	75-34-3	C	5.59E-09							8.36E-04	1.64E-06			1.50E-07	2.94E-10			
VOC	1,2-Dichloroethane	107-06-2	B2	5.59E-09	9.1E-02	2.0E+04			9.1E-02		5.12E-04	1.00E-06	2.6E-02	3.8E+02	1.50E-07	2.94E-10	2.6E-02	1.3E+06	3.8E+02
VOC	1,1-Dichloroethene	75-35-4	C	5.59E-09							1.40E-03	2.73E-06			1.50E-07	2.94E-10			
VOC	cis-1,2-Dichloroethene	156-59-2	D	5.59E-09							7.03E-04	1.38E-06			1.50E-07	2.94E-10			
VOC	trans-1,2-Dichloroethene	156-60-5		5.59E-09							8.83E-04	1.73E-06			1.50E-07	2.94E-10			
VOC	1,2-Dichloropropane	78-87-5	B2	5.59E-09	6.8E-02	2.6E+04			6.8E-02		5.78E-04	1.13E-06			1.50E-07	2.94E-10			
VOC	Ethyl Benzene	100-41-4	D	5.59E-09							4.01E-04	7.85E-07			1.50E-07	2.94E-10			
VOC	2-Hexanone	591-78-6		5.59E-09											1.50E-07	2.94E-10			
VOC	Methyl Acetate	79-20-9		5.59E-09							1.95E-04	3.81E-07			1.50E-07	2.94E-10			
VOC	Methyl tert-butyl ether	1634-04-4		5.59E-09							3.92E-04	7.68E-07			1.50E-07	2.94E-10			
VOC	4-Methyl-2-pentanone	108-10-1	ID	5.59E-09							1.83E-04	3.57E-07			1.50E-07	2.94E-10			
VOC	Methylcyclohexane	108-87-2		5.59E-09							1.75E-03	3.42E-06			1.50E-07	2.94E-10			
VOC	Methylene Chloride	75-09-2	B2	5.59E-09	7.5E-03	2.4E+05			7.5E-03		7.87E-04	1.54E-06	4.7E-04	1.4E+04	1.50E-07	2.94E-10	4.7E-04	7.2E+07	1.3E+04
VOC	Styrene	100-42-5		5.59E-09							1.64E-04	3.21E-07			1.50E-07	2.94E-10			
VOC	Tetrachloroethene	127-18-4	C-B2	5.59E-09	5.2E-02	3.4E+04			5.2E-02		8.24E-04	1.61E-06	3.1E-03	2.0E+03	1.50E-07	2.94E-10	3.1E-03	1.1E+07	1.9E+03
VOC	Toluene	108-88-3	D	5.59E-09							5.42E-04	1.06E-06			1.50E-07	2.94E-10			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	5.59E-09							5.09E-05	9.95E-08			1.50E-07	2.94E-10			
VOC	1,1,1-Trichloroethane	71-55-6	D	5.59E-09							9.41E-04	1.84E-06			1.50E-07	2.94E-10			
VOC	1,1,2-Trichloroethane	79-00-5	C	5.59E-09	5.7E-02	3.1E+04			5.7E-02		3.23E-04	6.31E-07	1.6E-02	9.9E+02	1.50E-07	2.94E-10	1.6E-02	2.1E+06	9.6E+02
VOC	Trichloroethene	79-01-6	C-B2	5.59E-09	1.1E-02	1.6E+05			1.1E-02		6.52E-04	1.28E-06	1.7E-03	4.6E+03	1.50E-07	2.94E-10	1.7E-03	2.0E+07	4.5E+03
VOC	Trichlorofluoromethane	75-69-4		5.59E-09							1.67E-03	3.26E-06			1.50E-07	2.94E-10			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		5.59E-09							1.75E-03	3.42E-06			1.50E-07	2.94E-10			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	5.59E-09							2.10E-04	4.11E-07			1.50E-07	2.94E-10			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	5.59E-09							1.47E-04	2.89E-07			1.50E-07	2.94E-10			
VOC	Vinyl Chloride	75-01-4	A	5.59E-09	1.4E+00	1.3E+03			1.4E+00		1.82E-03	3.57E-06	8.8E-03	3.2E+02	1.50E-07	2.94E-10	8.8E-03	3.9E+06	2.5E+02
VOC	Xylenes (total)	1330-20-7	ID	5.59E-09							3.71E-04	7.26E-07			1.50E-07	2.94E-10			
SVOC	Acenaphthene	83-32-9		5.59E-09			1.30E-01	2.40E-09			1.00E-05	1.97E-08			1.50E-07	2.94E-10			
SVOC	Acenaphthylene	208-96-8	D	5.59E-09			1.30E-01	2.40E-09			8.64E-06	1.69E-08			1.50E-07	2.94E-10			
SVOC	Acetophenone	98-86-2	D	5.59E-09			1.00E-01	1.85E-09			4.00E-05	7.83E-08			1.50E-07	2.94E-10			
SVOC	Anthracene	120-12-7	D	5.59E-09			1.30E-01	2.40E-09			2.80E-06	5.49E-09			1.50E-07	2.94E-10			
SVOC	Atrazine	1912-24-9	C	5.59E-09	2.2E-01	8.1E+03	1.00E-01	1.85E-09	2.2E-01	2.4E+04	9.32E-07	1.82E-09	6.3E-02	8.6E+04	1.50E-07	2.94E-10	6.3E-02	5.4E+05	5.6E+03
SVOC	Benzaldehyde	100-52-7		5.59E-09			1.00E-01	1.85E-09			6.04E-05	1.18E-07			1.50E-07	2.94E-10			

Attachment G3: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	5.59E-09	7.3E-01	2.5E+03	1.30E-01	2.40E-09	7.3E-01	5.7E+03	2.19E-07	4.29E-10	8.9E-02	2.6E+05	1.50E-07	2.94E-10	8.9E-02	3.8E+05	1.7E+03
SVOC	Benzo(a)pyrene	50-32-8	B2	5.59E-09	7.3E+00	2.5E+02	1.30E-01	2.40E-09	7.3E+00	5.7E+02	7.56E-08	1.48E-10	8.9E-01	7.6E+04	1.50E-07	2.94E-10	8.9E-01	3.8E+04	1.7E+02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	5.59E-09	7.3E-01	2.5E+03	1.30E-01	2.40E-09	7.3E-01	5.7E+03	4.72E-07	9.24E-10	8.9E-02	1.2E+05	1.50E-07	2.94E-10	8.9E-02	3.8E+05	1.7E+03
SVOC	Benzo(g,h,i)perylene	191-24-2	D	5.59E-09			1.30E-01	2.40E-09			6.80E-09	1.33E-11			1.50E-07	2.94E-10			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	5.59E-09	7.3E-02	2.5E+04	1.30E-01	2.40E-09	7.3E-02	5.7E+04	4.34E-08	8.49E-11	8.9E-03	1.3E+07	1.50E-07	2.94E-10	8.9E-03	3.8E+06	1.7E+04
SVOC	Biphenyl	92-52-4	D	5.59E-09			1.00E-01	1.85E-09			1.13E-05	2.21E-08			1.50E-07	2.94E-10			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	5.59E-09			1.00E-01	1.85E-09			5.48E-06	1.07E-08			1.50E-07	2.94E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	5.59E-09	1.1E+00	1.6E+03	1.00E-01	1.85E-09	1.1E+00	4.9E+03	5.95E-05	1.17E-07	3.3E-01	2.6E+02	1.50E-07	2.94E-10	3.3E-01	1.0E+05	2.1E+02
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	5.59E-09	1.4E-02	1.3E+05	1.00E-01	1.85E-09	1.4E-02	3.9E+05	6.18E-09	1.21E-11	4.0E-03	2.1E+08	1.50E-07	2.94E-10	4.0E-03	8.5E+06	9.5E+04
SVOC	Butylbenzylphthalate	85-68-7	C	5.59E-09	1.9E-03	9.4E+05	1.00E-01	1.85E-09	1.9E-03	2.9E+06	2.15E-07	4.22E-10	5.4E-04	4.4E+07	1.50E-07	2.94E-10	5.4E-04	6.3E+07	6.9E+05
SVOC	Caprolactam	105-60-2		5.59E-09			1.00E-01	1.85E-09			4.43E-06	8.67E-09			1.50E-07	2.94E-10			
SVOC	Carbazole	86-74-8	B2	5.59E-09	2.0E-02	8.9E+04	1.00E-01	1.85E-09	2.0E-02	2.7E+05	3.45E-07	6.75E-10	5.7E-03	2.6E+06	1.50E-07	2.94E-10	5.7E-03	6.0E+06	6.5E+04
SVOC	4-Chloro-3-methylphenol	59-50-7		5.59E-09			1.00E-01	1.85E-09			1.66E-06	3.24E-09			1.50E-07	2.94E-10			
SVOC	2-Chloronaphthalene	91-58-7		5.59E-09			1.00E-01	1.85E-09			1.23E-05	2.41E-08			1.50E-07	2.94E-10			
SVOC	2-Chlorophenol	95-57-8		5.59E-09			1.00E-01	1.85E-09			7.24E-05	1.42E-07			1.50E-07	2.94E-10			
SVOC	Chrysene	218-01-9	B2	5.59E-09	7.3E-03	2.5E+05	1.30E-01	2.40E-09	7.3E-03	5.7E+05	8.05E-07	1.57E-09	8.9E-04	7.2E+06	1.50E-07	2.94E-10	8.9E-04	3.8E+07	1.7E+05
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	5.59E-09	7.3E+00	2.5E+02	1.30E-01	2.40E-09	7.3E+00	5.7E+02	8.67E-09	1.70E-11	8.9E-01	6.7E+05	1.50E-07	2.94E-10	8.9E-01	3.8E+04	1.7E+02
SVOC	Dibenzofuran	132-64-9	D	5.59E-09			1.00E-01	1.85E-09			1.27E-06	2.48E-09			1.50E-07	2.94E-10			
SVOC	2,4-Dichlorophenol	120-83-2		5.59E-09			1.00E-01	1.85E-09			8.58E-06	1.68E-08			1.50E-07	2.94E-10			
SVOC	Diethylphthalate	84-66-2	D	5.59E-09			1.00E-01	1.85E-09			2.26E-06	4.42E-09			1.50E-07	2.94E-10			
SVOC	2,4-Dimethylphenol	105-67-9		5.59E-09			1.00E-01	1.85E-09			7.58E-06	1.48E-08			1.50E-07	2.94E-10			
SVOC	Dimethylphthalate	131-11-3	D	5.59E-09			1.00E-01	1.85E-09			3.23E-06	6.31E-09			1.50E-07	2.94E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	5.59E-09			1.00E-01	1.85E-09			1.06E-07	2.08E-10			1.50E-07	2.94E-10			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		5.59E-09			1.00E-01	1.85E-09			3.36E-06	6.57E-09			1.50E-07	2.94E-10			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	5.59E-09	6.8E-01	2.6E+03	1.00E-01	1.85E-09	6.8E-01	8.0E+03	4.53E-06	8.86E-09			1.50E-07	2.94E-10			2.0E+03
SVOC	2,6-Dinitrotoluene	606-20-2	B2	5.59E-09	6.8E-01	2.6E+03	1.00E-01	1.85E-09	6.8E-01	8.0E+03	5.75E-06	1.12E-08	1.9E-01	4.6E+03	1.50E-07	2.94E-10	1.9E-01	1.8E+05	1.4E+03
SVOC	Di-n-octylphthalate	117-84-0		5.59E-09			1.00E-01	1.85E-09			3.65E-08	7.15E-11			1.50E-07	2.94E-10			
SVOC	Fluoranthene	206-44-0	D	5.59E-09			1.30E-01	2.40E-09			7.08E-07	1.38E-09			1.50E-07	2.94E-10			
SVOC	Fluorene	86-73-7	D	5.59E-09			1.30E-01	2.40E-09			4.31E-06	8.43E-09			1.50E-07	2.94E-10			
SVOC	Formaldehyde	50-00-0	B1	5.59E-09									1.3E-02		1.50E-07	2.94E-10	1.3E-02	2.6E+06	2.6E+06
SVOC	Hexachlorobutadiene	87-68-3	C	5.59E-09	7.8E-02	2.3E+04	1.00E-01	1.85E-09	7.8E-02	6.9E+04	3.07E-05	6.01E-08	2.2E-02	7.6E+03	1.50E-07	2.94E-10	2.2E-02	1.5E+06	5.2E+03
SVOC	Hexachlorocyclopentadiene	77-47-4	E	5.59E-09			1.00E-01	1.85E-09			1.56E-05	3.05E-08			1.50E-07	2.94E-10			
SVOC	Hexachloroethane	67-72-1	C	5.59E-09	1.4E-02	1.3E+05	1.00E-01	1.85E-09	1.4E-02	3.9E+05	2.45E-05	4.79E-08	4.0E-03	5.2E+04	1.50E-07	2.94E-10	4.0E-03	8.5E+06	3.4E+04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	5.59E-10	7.3E-01	2.5E+03	1.30E-01	2.40E-10	7.3E-01	5.7E+03	3.25E-09	6.36E-12	8.9E-02	1.8E+06	1.50E-08	2.94E-11	8.9E-02	3.8E+05	1.7E+03
SVOC	Isophorone	78-59-1	C	5.59E-09	9.5E-04	1.9E+06	1.00E-01	1.85E-09	9.5E-04	5.7E+06	2.56E-05	5.00E-08			1.50E-07	2.94E-10			1.4E+06
SVOC	2-Methylnaphthalene	91-57-6	ID	5.59E-09			1.00E-01	1.85E-09			2.10E-05	4.11E-08			1.50E-07	2.94E-10			
SVOC	Methylphenol (total)	1319-77-3		5.59E-09			1.00E-01	1.85E-09			8.36E-06	1.64E-08			1.50E-07	2.94E-10			
SVOC	Naphthalene	91-20-3	C	5.59E-09			1.30E-01	2.40E-09			3.94E-05	7.70E-08			1.50E-07	2.94E-10			
SVOC	2-Nitroaniline	88-74-4		5.59E-09			1.00E-01	1.85E-09			4.33E-06	8.47E-09			1.50E-07	2.94E-10			
SVOC	Nitrobenzene	98-95-3	D	5.59E-09			1.00E-01	1.85E-09			4.80E-05	9.38E-08			1.50E-07	2.94E-10			
SVOC	2-Nitrophenol	88-75-5		5.59E-09			1.00E-01	1.85E-09			2.64E-05	5.18E-08			1.50E-07	2.94E-10			
SVOC	4-Nitrophenol	100-02-7		5.59E-09			1.00E-01	1.85E-09			2.17E-06	4.25E-09			1.50E-07	2.94E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	5.59E-09	4.9E-03	3.7E+05	1.00E-01	1.85E-09	4.9E-03	1.1E+06	3.66E-06	7.16E-09			1.50E-07	2.94E-10			2.7E+05
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	5.59E-09	7.0E+00	2.6E+02	1.00E-01	1.85E-09	7.0E+00	7.7E+02	1.72E-05	3.36E-08	2.0E+00	1.5E+02	1.50E-07	2.94E-10	2.0E+00	1.7E+04	8.3E+01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	5.59E-09	7.0E-02	2.6E+04	1.00E-01	1.85E-09	7.0E-02	7.7E+04	5.27E-05	1.03E-07	1.0E-02	9.7E+03	1.50E-07	2.94E-10	1.0E-02	3.4E+06	6.4E+03
SVOC	Pentachlorophenol	87-86-5	B2	5.59E-09	1.2E-01	1.5E+04	2.50E-01	4.61E-09	1.2E-01	1.8E+04	8.51E-07	1.67E-09	3.4E-02	1.8E+05	1.50E-07	2.94E-10	3.4E-02	9.9E+05	7.7E+03
SVOC	Phenanthrene	85-01-8	D	5.59E-09			1.30E-01	2.40E-09			2.00E-06	3.91E-09			1.50E-07	2.94E-10			
SVOC	Phenol	108-95-2	ID	5.59E-09			1.00E-01	1.85E-09			8.80E-06	1.72E-08			1.50E-07	2.94E-10			
SVOC	Pyrene	129-00-0	D	5.59E-09			1.30E-01	2.40E-09			5.63E-07	1.10E-09			1.50E-07	2.94E-10			

Attachment G3: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		5.59E-09			1.00E-01	1.85E-09			2.97E-06	5.82E-09			1.50E-07	2.94E-10			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	5.59E-09	1.1E-02	1.6E+05	1.00E-01	1.85E-09	1.1E-02	4.9E+05	8.27E-06	1.62E-08	3.1E-03	2.0E+05	1.50E-07	2.94E-10	3.1E-03	1.1E+07	7.5E+04
PCB	PCBs (total)	1336-36-3	B2	5.59E-09	2.0E+00	8.9E+02	1.40E-01	2.58E-09	2.0E+00	1.9E+03	1.35E-06	2.64E-09	5.7E-01	6.6E+03	1.50E-07	2.94E-10	5.7E-01	6.0E+04	5.5E+02
INORG	Antimony	7440-36-0		5.59E-09											1.50E-07	2.94E-10			
INORG	Arsenic	7440-38-2	A	5.59E-09	1.5E+00	1.2E+03	3.00E-02	5.54E-10	1.5E+00	1.2E+04			4.3E+00		1.50E-07	2.94E-10	4.3E+00	7.9E+03	9.5E+02
INORG	Barium	7440-39-3	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Beryllium	7440-41-7	B1	5.59E-09									2.4E+00		1.50E-07	2.94E-10	2.4E+00	1.4E+04	1.4E+04
INORG	Cadmium	7440-43-9	B1	5.59E-09			1.00E-03	1.85E-11					1.8E+00		1.50E-07	2.94E-10	1.8E+00	1.9E+04	1.9E+04
INORG	Chromium (total)	7440-47-3		5.59E-09									1.2E+01		1.50E-07	2.94E-10	1.2E+01	2.8E+03	2.8E+03
INORG	Chromium III	16065-83-1	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Chromium VI	18540-29-9	A	5.59E-09									1.2E+01		1.50E-07	2.94E-10	1.2E+01	2.8E+03	2.8E+03
INORG	Cobalt	7440-48-4	B1	5.59E-09									2.8E+00		1.50E-07	2.94E-10	2.8E+00	1.2E+04	1.2E+04
INORG	Copper	7440-50-8	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Cyanide (total)	57-12-5	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Fluoride	16984-48-8		5.59E-09											1.50E-07	2.94E-10			
INORG	Lead	7439-92-1	B2	5.59E-09											1.50E-07	2.94E-10			
INORG	Manganese	7439-96-5	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Mercury	7439-97-6	D	5.59E-09							6.93E-06	1.36E-08			1.50E-07	2.94E-10			
INORG	Nickel	7440-02-0	A	5.59E-09									2.4E-01		1.50E-07	2.94E-10	2.4E-01	1.4E+05	1.42E+05
INORG	Selenium	7782-49-2	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Silver	7440-22-4	D	5.59E-09											1.50E-07	2.94E-10			
INORG	Thallium	7440-28-0		5.59E-09											1.50E-07	2.94E-10			
INORG	Vanadium	7440-62-2		5.59E-09											1.50E-07	2.94E-10			
INORG	Zinc	7440-66-6	D	5.59E-09											1.50E-07	2.94E-10			

Notes:

Target cancer risk of 1E-05

C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)

PM10 based on 24-hour NAAQS standards of 150 ug/m3

Attachment G3: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	3.91E-08	9.0E-01	2.3E+07			9.0E-01		1.49E-04	2.04E-06	3.2E+00	1.5E+06	1.50E-07	2.05E-09	3.2E+00	1.5E+09	1.4E+06
VOC	Benzene	71-43-2	A	3.91E-08	4.0E-03	1.0E+05			4.0E-03		7.64E-04	1.05E-05	3.0E-02	2.9E+03	1.50E-07	2.05E-09	3.0E-02	1.5E+07	2.8E+03
VOC	Bromodichloromethane	75-27-4	B2	3.91E-08	2.0E-02	5.1E+05			2.0E-02		2.54E-04	3.48E-06	7.0E-02	2.0E+04	1.50E-07	2.05E-09	7.0E-02	3.4E+07	1.9E+04
VOC	2-Butanone	78-93-3	ID	3.91E-08	6.0E-01	1.5E+07			6.0E-01		1.40E-04	1.91E-06	5.0E+00	2.6E+06	1.50E-07	2.05E-09	5.0E+00	2.4E+09	2.2E+06
VOC	Carbon Disulfide	75-15-0		3.91E-08	1.0E-01	2.6E+06			1.0E-01		1.64E-03	2.25E-05	7.0E-01	3.1E+04	1.50E-07	2.05E-09	7.0E-01	3.4E+08	3.1E+04
VOC	Carbon Tetrachloride	56-23-5	B2	3.91E-08	7.0E-04	1.8E+04			7.0E-04		1.01E-03	1.38E-05			1.50E-07	2.05E-09			
VOC	Chlorobenzene	108-90-7	D	3.91E-08	2.0E-02	5.1E+05			2.0E-02		3.45E-04	4.73E-06	6.0E-02	1.3E+04	1.50E-07	2.05E-09	6.0E-02	2.9E+07	1.2E+04
VOC	Chloroethane	75-00-3		3.91E-08	4.0E-01	1.0E+07			4.0E-01		2.15E-03	2.94E-05	1.0E+01	3.4E+05	1.50E-07	2.05E-09	1.0E+01	4.9E+09	3.3E+05
VOC	Chloroform	67-66-3	B2	3.91E-08	1.0E-02	2.6E+05			1.0E-02		7.73E-04	1.06E-05	5.0E-02	4.7E+03	1.50E-07	2.05E-09	5.0E-02	2.4E+07	4.6E+03
VOC	Chloromethane	74-87-3	D	3.91E-08							1.23E-03	1.69E-05	9.0E-02	5.3E+03	1.50E-07	2.05E-09	9.0E-02	4.4E+07	5.3E+03
VOC	Cumene	98-82-8	D	3.91E-08	1.0E-01	2.6E+06			1.0E-01		3.52E-04	4.82E-06	4.0E-01	8.3E+04	1.50E-07	2.05E-09	4.0E-01	1.9E+08	8.0E+04
VOC	Cyclohexane	110-82-7	ID	3.91E-08							1.32E-03	1.80E-05	6.0E+00	3.3E+05	1.50E-07	2.05E-09	6.0E+00	2.9E+09	3.3E+05
VOC	Dibromochloromethane	124-48-1	C	3.91E-08	2.0E-02	5.1E+05			2.0E-02		1.39E-04	1.91E-06	7.0E-02	3.7E+04	1.50E-07	2.05E-09	7.0E-02	3.4E+07	3.4E+04
VOC	1,2-Dichlorobenzene	95-50-1	D	3.91E-08	9.0E-02	2.3E+06			9.0E-02		1.49E-04	2.05E-06	2.0E-01	9.8E+04	1.50E-07	2.05E-09	2.0E-01	9.7E+07	9.4E+04
VOC	1,3-Dichlorobenzene	541-73-1	D	3.91E-08	9.0E-02	2.3E+06			9.0E-02		1.99E-04	2.72E-06	1.4E-01	5.1E+04	1.50E-07	2.05E-09	1.4E-01	6.8E+07	5.0E+04
VOC	1,4-Dichlorobenzene	106-46-7	C	3.91E-08	3.0E-02	7.7E+05			3.0E-02		1.70E-04	2.33E-06	8.0E-01	3.4E+05	1.50E-07	2.05E-09	8.0E-01	3.9E+08	2.4E+05
VOC	Dichlorodifluoromethane	75-71-8		3.91E-08	2.0E-01	5.1E+06			2.0E-01		1.99E-03	2.73E-05	2.0E-01	7.3E+03	1.50E-07	2.05E-09	2.0E-01	9.7E+07	7.3E+03
VOC	1,1-Dichloroethane	75-34-3	C	3.91E-08	1.0E-01	2.6E+06			1.0E-01		8.36E-04	1.15E-05	5.0E-01	4.4E+04	1.50E-07	2.05E-09	5.0E-01	2.4E+08	4.3E+04
VOC	1,2-Dichloroethane	107-06-2	B2	3.91E-08	2.0E-02	5.1E+05			2.0E-02		5.12E-04	7.02E-06	5.0E-03	7.1E+02	1.50E-07	2.05E-09	5.0E-03	2.4E+06	7.1E+02
VOC	1,1-Dichloroethene	75-35-4	C	3.91E-08	5.0E-02	1.3E+06			5.0E-02		1.40E-03	1.91E-05	2.0E-01	1.0E+04	1.50E-07	2.05E-09	2.0E-01	9.7E+07	1.0E+04
VOC	cis-1,2-Dichloroethene	156-59-2	D	3.91E-08	1.0E-02	2.6E+05			1.0E-02		7.03E-04	9.63E-06	3.5E-02	3.6E+03	1.50E-07	2.05E-09	3.5E-02	1.7E+07	3.6E+03
VOC	trans-1,2-Dichloroethene	156-60-5		3.91E-08	2.0E-02	5.1E+05			2.0E-02		8.83E-04	1.21E-05	6.0E-02	4.9E+03	1.50E-07	2.05E-09	6.0E-02	2.9E+07	4.9E+03
VOC	1,2-Dichloropropane	78-87-5	B2	3.91E-08							5.78E-04	7.92E-06	4.0E-03	5.0E+02	1.50E-07	2.05E-09	4.0E-03	1.9E+06	5.0E+02
VOC	Ethyl Benzene	100-41-4	D	3.91E-08	1.0E-01	2.6E+06			1.0E-01		4.01E-04	5.49E-06	1.0E+00	1.8E+05	1.50E-07	2.05E-09	1.0E+00	4.9E+08	1.7E+05
VOC	2-Hexanone	591-78-6		3.91E-08	4.0E-02	1.0E+06			4.0E-02				5.0E-03		1.50E-07	2.05E-09	5.0E-03	2.4E+06	7.2E+05
VOC	Methyl Acetate	79-20-9		3.91E-08	1.0E+00	2.6E+07			1.0E+00		1.95E-04	2.67E-06	3.5E+00	1.3E+06	1.50E-07	2.05E-09	3.5E+00	1.7E+09	1.2E+06
VOC	Methyl tert-butyl ether	1634-04-4		3.91E-08							3.92E-04	5.38E-06	3.0E+00	5.6E+05	1.50E-07	2.05E-09	3.0E+00	1.5E+09	5.6E+05
VOC	4-Methyl-2-pentanone	108-10-1	ID	3.91E-08							1.83E-04	2.50E-06	3.0E+00	1.2E+06	1.50E-07	2.05E-09	3.0E+00	1.5E+09	1.2E+06
VOC	Methylcyclohexane	108-87-2		3.91E-08							1.75E-03	2.40E-05	3.0E+00	1.3E+05	1.50E-07	2.05E-09	3.0E+00	1.5E+09	1.3E+05
VOC	Methylene Chloride	75-09-2	B2	3.91E-08	6.0E-02	1.5E+06			6.0E-02		7.87E-04	1.08E-05	3.0E+00	2.8E+05	1.50E-07	2.05E-09	3.0E+00	1.5E+09	2.4E+05
VOC	Styrene	100-42-5		3.91E-08	2.0E-01	5.1E+06			2.0E-01		1.64E-04	2.25E-06	1.0E+00	4.5E+05	1.50E-07	2.05E-09	1.0E+00	4.9E+08	4.1E+05
VOC	Tetrachloroethene	127-18-4	C-B2	3.91E-08	1.0E-02	2.6E+05			1.0E-02		8.24E-04	1.13E-05	4.0E-01	3.5E+04	1.50E-07	2.05E-09	4.0E-01	1.9E+08	3.1E+04
VOC	Toluene	108-88-3	D	3.91E-08	8.0E-02	2.0E+06			8.0E-02		5.42E-04	7.43E-06	5.0E+00	6.7E+05	1.50E-07	2.05E-09	5.0E+00	2.4E+09	5.1E+05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	3.91E-08	1.0E-02	2.6E+05			1.0E-02		5.09E-05	6.97E-07	2.0E-01	2.9E+05	1.50E-07	2.05E-09	2.0E-01	9.7E+07	1.3E+05
VOC	1,1,1-Trichloroethane	71-55-6	D	3.91E-08	2.8E-01	7.2E+06			2.8E-01		9.41E-04	1.29E-05	2.2E+00	1.7E+05	1.50E-07	2.05E-09	2.2E+00	1.1E+09	1.7E+05
VOC	1,1,2-Trichloroethane	79-00-5	C	3.91E-08	4.0E-03	1.0E+05			4.0E-03		3.23E-04	4.42E-06			1.50E-07	2.05E-09			
VOC	Trichloroethene	79-01-6	C-B2	3.91E-08	6.0E-03	1.5E+05			6.0E-03		6.52E-04	8.93E-06			1.50E-07	2.05E-09			
VOC	Trichlorofluoromethane	75-69-4		3.91E-08	3.0E-01	7.7E+06			3.0E-01		1.67E-03	2.28E-05	7.0E-01	3.1E+04	1.50E-07	2.05E-09	7.0E-01	3.4E+08	3.1E+04
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		3.91E-08	3.0E+01	7.7E+08			3.0E+01		1.75E-03	2.40E-05	3.0E+01	1.3E+06	1.50E-07	2.05E-09	3.0E+01	1.5E+10	1.3E+06
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	3.91E-08	5.0E-02	1.3E+06			5.0E-02		2.10E-04	2.88E-06	6.0E-03	2.1E+03	1.50E-07	2.05E-09	6.0E-03	2.9E+06	2.1E+03
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	3.91E-08	5.0E-02	1.3E+06			5.0E-02		1.47E-04	2.02E-06	6.0E-03	3.0E+03	1.50E-07	2.05E-09	6.0E-03	2.9E+06	3.0E+03
VOC	Vinyl Chloride	75-01-4	A	3.91E-08	3.0E-03	7.7E+04			3.0E-03		1.82E-03	2.50E-05	1.0E-01	4.0E+03	1.50E-07	2.05E-09	1.0E-01	4.9E+07	3.8E+03
VOC	Xylenes (total)	1330-20-7	ID	3.91E-08	2.0E-01	5.1E+06			2.0E-01		3.71E-04	5.08E-06	1.0E-01	2.0E+04	1.50E-07	2.05E-09	1.0E-01	4.9E+07	2.0E+04
SVOC	Acenaphthene	83-32-9		3.91E-08	6.0E-02	1.5E+06	1.30E-01	1.68E-08	6.0E-02	3.6E+06	1.00E-05	1.38E-07	2.1E-01	1.5E+06	1.50E-07	2.05E-09	2.1E-01	1.0E+08	6.3E+05
SVOC	Acenaphthylene	208-96-8	D	3.91E-08	3.0E-02	7.7E+05	1.30E-01	1.68E-08	3.0E-02	1.8E+06	8.64E-06	1.18E-07	1.1E-01	8.9E+05	1.50E-07	2.05E-09	1.1E-01	5.1E+07	3.3E+05
SVOC	Acetophenone	98-86-2	D	3.91E-08	1.0E-01	2.6E+06	1.00E-01	1.29E-08	1.0E-01	7.7E+06	4.00E-05	5.48E-07	3.5E-01	6.4E+05	1.50E-07	2.05E-09	3.5E-01	1.7E+08	4.8E+05
SVOC	Anthracene	120-12-7	D	3.91E-08	3.0E-01	7.7E+06	1.30E-01	1.68E-08	3.0E-01	1.8E+07	2.80E-06	3.84E-08			1.50E-07	2.05E-09			5.4E+06
SVOC	Atrazine	1912-24-9	C	3.91E-08	3.5E-02	8.9E+05	1.00E-01	1.29E-08	3.5E-02	2.7E+06	9.32E-07	1.28E-08	1.2E-01	9.6E+06	1.50E-07	2.05E-09	1.2E-01	6.0E+07	6.2E+05
SVOC	Benzaldehyde	100-52-7		3.91E-08	1.0E-01	2.6E+06	1.00E-01	1.29E-08	1.0E-01	7.7E+06	6.04E-05	8.27E-07	3.5E-01	4.2E+05	1.50E-07	2.05E-09	3.5E-01	1.7E+08	3.5E+05

Attachment G3: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	3.91E-08			1.30E-01	1.68E-08			2.19E-07	3.00E-09			1.50E-07	2.05E-09			
SVOC	Benzo(a)pyrene	50-32-8	B2	3.91E-08			1.30E-01	1.68E-08			7.56E-08	1.04E-09			1.50E-07	2.05E-09			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	3.91E-08			1.30E-01	1.68E-08			4.72E-07	6.47E-09			1.50E-07	2.05E-09			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3.91E-08	3.0E-02	7.7E+05	1.30E-01	1.68E-08	3.0E-02	1.8E+06	6.80E-09	9.31E-11	1.1E-01	1.1E+09	1.50E-07	2.05E-09	1.1E-01	5.1E+07	5.3E+05
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3.91E-08			1.30E-01	1.68E-08			4.34E-08	5.94E-10			1.50E-07	2.05E-09			
SVOC	Biphenyl	92-52-4	D	3.91E-08	5.0E-02	1.3E+06	1.00E-01	1.29E-08	5.0E-02	3.9E+06	1.13E-05	1.54E-07	1.8E-01	1.1E+06	1.50E-07	2.05E-09	1.8E-01	8.5E+07	5.2E+05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.91E-08			1.00E-01	1.29E-08			5.48E-06	7.51E-08			1.50E-07	2.05E-09			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.91E-08			1.00E-01	1.29E-08			5.95E-05	8.16E-07			1.50E-07	2.05E-09			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	3.91E-08	2.0E-02	5.1E+05	1.00E-01	1.29E-08	2.0E-02	1.5E+06	6.18E-09	8.46E-11	7.0E-02	8.3E+08	1.50E-07	2.05E-09	7.0E-02	3.4E+07	3.8E+05
SVOC	Butylbenzylphthalate	85-68-7	C	3.91E-08	2.0E-01	5.1E+06	1.00E-01	1.29E-08	2.0E-01	1.5E+07	2.15E-07	2.95E-09	7.0E-01	2.4E+08	1.50E-07	2.05E-09	7.0E-01	3.4E+08	3.7E+06
SVOC	Caprolactam	105-60-2		3.91E-08	5.0E-01	1.3E+07	1.00E-01	1.29E-08	5.0E-01	3.9E+07	4.43E-06	6.07E-08	1.8E+00	2.9E+07	1.50E-07	2.05E-09	1.8E+00	8.5E+08	7.1E+06
SVOC	Carbazole	86-74-8	B2	3.91E-08			1.00E-01	1.29E-08			3.45E-07	4.73E-09			1.50E-07	2.05E-09			
SVOC	4-Chloro-3-methylphenol	59-50-7		3.91E-08			1.00E-01	1.29E-08			1.66E-06	2.27E-08			1.50E-07	2.05E-09			
SVOC	2-Chloronaphthalene	91-58-7		3.91E-08	8.0E-02	2.0E+06	1.00E-01	1.29E-08	8.0E-02	6.2E+06	1.23E-05	1.69E-07	2.8E-01	1.7E+06	1.50E-07	2.05E-09	2.8E-01	1.4E+08	7.9E+05
SVOC	2-Chlorophenol	95-57-8		3.91E-08	5.0E-03	1.3E+05	1.00E-01	1.29E-08	5.0E-03	3.9E+05	7.24E-05	9.92E-07	1.8E-02	1.8E+04	1.50E-07	2.05E-09	1.8E-02	8.5E+06	1.5E+04
SVOC	Chrysene	218-01-9	B2	3.91E-08			1.30E-01	1.68E-08			8.05E-07	1.10E-08			1.50E-07	2.05E-09			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	3.91E-08			1.30E-01	1.68E-08			8.67E-09	1.19E-10			1.50E-07	2.05E-09			
SVOC	Dibenzofuran	132-64-9	D	3.91E-08	2.0E-03	5.1E+04	1.00E-01	1.29E-08	2.0E-03	1.5E+05	1.27E-06	1.74E-08	7.0E-03	4.0E+05	1.50E-07	2.05E-09	7.0E-03	3.4E+06	3.5E+04
SVOC	2,4-Dichlorophenol	120-83-2		3.91E-08	3.0E-03	7.7E+04	1.00E-01	1.29E-08	3.0E-03	2.3E+05	8.58E-06	1.18E-07	1.1E-02	8.9E+04	1.50E-07	2.05E-09	1.1E-02	5.1E+06	3.5E+04
SVOC	Diethylphthalate	84-66-2	D	3.91E-08	8.0E-01	2.0E+07	1.00E-01	1.29E-08	8.0E-01	6.2E+07	2.26E-06	3.10E-08	2.8E+00	9.0E+07	1.50E-07	2.05E-09	2.8E+00	1.4E+09	1.3E+07
SVOC	2,4-Dimethylphenol	105-67-9		3.91E-08	2.0E-02	5.1E+05	1.00E-01	1.29E-08	2.0E-02	1.5E+06	7.58E-06	1.04E-07	7.0E-02	6.7E+05	1.50E-07	2.05E-09	7.0E-02	3.4E+07	2.4E+05
SVOC	Dimethylphthalate	131-11-3	D	3.91E-08			1.00E-01	1.29E-08			3.23E-06	4.42E-08			1.50E-07	2.05E-09			
SVOC	Di-n-butylphthalate	84-74-2	D	3.91E-08	1.0E-01	2.6E+06	1.00E-01	1.29E-08	1.0E-01	7.7E+06	1.06E-07	1.46E-09			1.50E-07	2.05E-09			1.9E+06
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3.91E-08	1.0E-04	2.6E+03	1.00E-01	1.29E-08	1.0E-04	7.7E+03	3.36E-06	4.60E-08	3.5E-04	7.6E+03	1.50E-07	2.05E-09	3.5E-04	1.7E+05	1.5E+03
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3.91E-08	2.0E-03	5.1E+04	1.00E-01	1.29E-08	2.0E-03	1.5E+05	4.53E-06	6.20E-08			1.50E-07	2.05E-09			3.8E+04
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3.91E-08	1.0E-03	2.6E+04	1.00E-01	1.29E-08	1.0E-03	7.7E+04	5.75E-06	7.87E-08	3.5E-03	4.4E+04	1.50E-07	2.05E-09	3.5E-03	1.7E+06	1.3E+04
SVOC	Di-n-octylphthalate	117-84-0		3.91E-08	4.0E-02	1.0E+06	1.00E-01	1.29E-08	4.0E-02	3.1E+06	3.65E-08	5.00E-10			1.50E-07	2.05E-09			7.7E+05
SVOC	Fluoranthene	206-44-0	D	3.91E-08	4.0E-02	1.0E+06	1.30E-01	1.68E-08	4.0E-02	2.4E+06	7.08E-07	9.69E-09	1.4E-01	1.4E+07	1.50E-07	2.05E-09	1.4E-01	6.8E+07	6.7E+05
SVOC	Fluorene	86-73-7	D	3.91E-08	4.0E-02	1.0E+06	1.30E-01	1.68E-08	4.0E-02	2.4E+06	4.31E-06	5.90E-08	1.4E-01	2.4E+06	1.50E-07	2.05E-09	1.4E-01	6.8E+07	5.5E+05
SVOC	Formaldehyde	50-00-0	B1	3.91E-08	2.0E-01	5.1E+06			2.0E-01						1.50E-07	2.05E-09			
SVOC	Hexachlorobutadiene	87-68-3	C	3.91E-08	2.0E-04	5.1E+03	1.00E-01	1.29E-08	2.0E-04	1.5E+04	3.07E-05	4.21E-07			1.50E-07	2.05E-09			3.8E+03
SVOC	Hexachlorocyclopentadiene	77-47-4	E	3.91E-08	6.0E-03	1.5E+05	1.00E-01	1.29E-08	6.0E-03	4.6E+05	1.56E-05	2.13E-07	2.0E-04	9.4E+02	1.50E-07	2.05E-09	2.0E-04	9.7E+04	9.2E+02
SVOC	Hexachloroethane	67-72-1	C	3.91E-08	1.0E-03	2.6E+04	1.00E-01	1.29E-08	1.0E-03	7.7E+04	2.45E-05	3.35E-07			1.50E-07	2.05E-09			1.9E+04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.91E-09			1.30E-01	1.68E-09			3.25E-09	4.45E-11			1.50E-08	2.05E-10			
SVOC	Isophorone	78-59-1	C	3.91E-08	2.0E-01	5.1E+06	1.00E-01	1.29E-08	2.0E-01	1.5E+07	2.56E-05	3.50E-07			1.50E-07	2.05E-09			3.8E+06
SVOC	2-Methylnaphthalene	91-57-6	ID	3.91E-08	4.0E-03	1.0E+05	1.00E-01	1.29E-08	4.0E-03	3.1E+05	2.10E-05	2.88E-07	3.0E-03	1.0E+04	1.50E-07	2.05E-09	3.0E-03	1.5E+06	9.1E+03
SVOC	Methylphenol (total)	1319-77-3		3.91E-08	5.0E-02	1.3E+06	1.00E-01	1.29E-08	5.0E-02	3.9E+06	8.36E-06	1.14E-07			1.50E-07	2.05E-09			9.6E+05
SVOC	Naphthalene	91-20-3	C	3.91E-08	2.0E-02	5.1E+05	1.30E-01	1.68E-08	2.0E-02	1.2E+06	3.94E-05	5.39E-07	3.0E-03	5.6E+03	1.50E-07	2.05E-09	3.0E-03	1.5E+06	5.5E+03
SVOC	2-Nitroaniline	88-74-4		3.91E-08	3.0E-03	7.7E+04	1.00E-01	1.29E-08	3.0E-03	2.3E+05	4.33E-06	5.93E-08	2.0E-04	3.4E+03	1.50E-07	2.05E-09	2.0E-04	9.7E+04	3.1E+03
SVOC	Nitrobenzene	98-95-3	D	3.91E-08	5.0E-04	1.3E+04	1.00E-01	1.29E-08	5.0E-04	3.9E+04	4.80E-05	6.57E-07	2.0E-03	3.0E+03	1.50E-07	2.05E-09	2.0E-03	9.7E+05	2.3E+03
SVOC	2-Nitrophenol	88-75-5		3.91E-08			1.00E-01	1.29E-08			2.64E-05	3.62E-07			1.50E-07	2.05E-09			
SVOC	4-Nitrophenol	100-02-7		3.91E-08			1.00E-01	1.29E-08			2.17E-06	2.98E-08			1.50E-07	2.05E-09			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	3.91E-08	2.0E-02	5.1E+05	1.00E-01	1.29E-08	2.0E-02	1.5E+06	3.66E-06	5.01E-08			1.50E-07	2.05E-09			3.8E+05
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3.91E-08			1.00E-01	1.29E-08			1.72E-05	2.35E-07			1.50E-07	2.05E-09			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3.91E-08	4.0E-02	1.0E+06	1.00E-01	1.29E-08	4.0E-02	3.1E+06	5.27E-05	7.22E-07			1.50E-07	2.05E-09			7.7E+05
SVOC	Pentachlorophenol	87-86-5	B2	3.91E-08	3.0E-02	7.7E+05	2.50E-01	3.23E-08	3.0E-02	9.3E+05	8.51E-07	1.17E-08	1.1E-01	9.0E+06	1.50E-07	2.05E-09	1.1E-01	5.1E+07	4.0E+05
SVOC	Phenanthrene	85-01-8	D	3.91E-08	3.0E-02	7.7E+05	1.30E-01	1.68E-08	3.0E-02	1.8E+06	2.00E-06	2.73E-08	1.1E-01	3.8E+06	1.50E-07	2.05E-09	1.1E-01	5.1E+07	4.7E+05
SVOC	Phenol	108-95-2	ID	3.91E-08	3.0E-01	7.7E+06	1.00E-01	1.29E-08	3.0E-01	2.3E+07	8.80E-06	1.21E-07			1.50E-07	2.05E-09			5.8E+06
SVOC	Pyrene	129-00-0	D	3.91E-08	3.0E-02	7.7E+05	1.30E-01	1.68E-08	3.0E-02	1.8E+06	5.63E-07	7.71E-09	1.1E-01	1.4E+07	1.50E-07	2.05E-09	1.1E-01	5.1E+07	5.1E+05

Attachment G3: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		3.91E-08	1.0E-01	2.6E+06	1.00E-01	1.29E-08	1.0E-01	7.7E+06	2.97E-06	4.07E-08			1.50E-07	2.05E-09			1.9E+06
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3.91E-08	1.0E-04	2.6E+03	1.00E-01	1.29E-08	1.0E-04	7.7E+03	8.27E-06	1.13E-07			1.50E-07	2.05E-09			1.9E+03
PCB	PCBs (total)	1336-36-3	B2	3.91E-08	2.0E-05	5.1E+02	1.40E-01	1.81E-08	2.0E-05	1.1E+03	1.35E-06	1.85E-08			1.50E-07	2.05E-09			3.5E+02
INORG	Antimony	7440-36-0		3.91E-08	4.0E-04	1.0E+04			6.0E-05				1.4E-03		1.50E-07	2.05E-09	1.4E-03	6.8E+05	1.0E+04
INORG	Arsenic	7440-38-2	A	3.91E-08	3.0E-04	7.7E+03	3.00E-02	3.87E-09	3.0E-04	7.7E+04					1.50E-07	2.05E-09			7.0E+03
INORG	Barium	7440-39-3	D	3.91E-08	7.0E-02	1.8E+06			4.9E-03						1.50E-07	2.05E-09			
INORG	Beryllium	7440-41-7	B1	3.91E-08	2.0E-03	5.1E+04			1.4E-05				2.0E-05		1.50E-07	2.05E-09	2.0E-05	9.7E+03	8.2E+03
INORG	Cadmium	7440-43-9	B1	3.91E-08	1.0E-03	2.6E+04	1.00E-03	1.29E-10	2.5E-05	1.9E+05			2.0E-04		1.50E-07	2.05E-09	2.0E-04	9.7E+04	1.8E+04
INORG	Chromium (total)	7440-47-3		3.91E-08	3.0E-03	7.7E+04			7.5E-05				1.0E-04		1.50E-07	2.05E-09	1.0E-04	4.9E+04	3.0E+04
INORG	Chromium III	16065-83-1	D	3.91E-08	1.5E+00	3.8E+07			2.0E-02				5.3E+00		1.50E-07	2.05E-09	5.3E+00	2.6E+09	3.8E+07
INORG	Chromium VI	18540-29-9	A	3.91E-08	3.0E-03	7.7E+04			7.5E-05				1.0E-04		1.50E-07	2.05E-09	1.0E-04	4.9E+04	3.0E+04
INORG	Cobalt	7440-48-4	B1	3.91E-08	2.0E-02	5.1E+05			2.0E-02				2.0E-05		1.50E-07	2.05E-09	2.0E-05	9.7E+03	9.6E+03
INORG	Copper	7440-50-8	D	3.91E-08	4.0E-02	1.0E+06			4.0E-02				1.4E-01		1.50E-07	2.05E-09	1.4E-01	6.8E+07	1.0E+06
INORG	Cyanide (total)	57-12-5	D	3.91E-08	2.0E-02	5.1E+05			2.0E-02				7.0E-02		1.50E-07	2.05E-09	7.0E-02	3.4E+07	5.0E+05
INORG	Fluoride	16984-48-8		3.91E-08											1.50E-07	2.05E-09			
INORG	Lead	7439-92-1	B2	3.91E-08											1.50E-07	2.05E-09			
INORG	Manganese	7439-96-5	D	3.91E-08	1.4E-01	3.6E+06			8.4E-03				5.0E-05		1.50E-07	2.05E-09	5.0E-05	2.4E+04	2.4E+04
INORG	Mercury	7439-97-6	D	3.91E-08	3.0E-04	7.7E+03			3.0E-04		6.93E-06	9.50E-08	3.0E-04	3.2E+03	1.50E-07	2.05E-09	3.0E-04	1.5E+05	2.2E+03
INORG	Nickel	7440-02-0	A	3.91E-08	2.0E-02	5.1E+05			8.0E-04						1.50E-07	2.05E-09			
INORG	Selenium	7782-49-2	D	3.91E-08	5.0E-03	1.3E+05			5.0E-03				1.8E-02		1.50E-07	2.05E-09	1.8E-02	8.5E+06	1.3E+05
INORG	Silver	7440-22-4	D	3.91E-08	5.0E-03	1.3E+05			2.0E-04				1.0E-05		1.50E-07	2.05E-09	1.0E-05	4.9E+03	4.7E+03
INORG	Thallium	7440-28-0		3.91E-08	7.0E-05	1.8E+03			7.0E-05				2.5E-04		1.50E-07	2.05E-09	2.5E-04	1.2E+05	1.8E+03
INORG	Vanadium	7440-62-2		3.91E-08	7.0E-03	1.8E+05			1.8E-04				2.5E-02		1.50E-07	2.05E-09	2.5E-02	1.2E+07	1.8E+05
INORG	Zinc	7440-66-6	D	3.91E-08	3.0E-01	7.7E+06			3.0E-01				1.1E+00		1.50E-07	2.05E-09	1.1E+00	5.1E+08	7.6E+06

Notes:

Target hazard index of 1

C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)

PM10 based on 24-hour NAAQS standards of 150 ug/m3

Attachment G4
Exposure of Maintenance Workers to Groundwater

Attachment G4: Vapor Flux (mg/m2-s per mg/L) from Exposed Groundwater to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	K_{Gi} (cm/s)	K_{li} (cm/s)	$1/K_L$ (cm/s)	K_L (cm/s)	J_L (L/m^2-s)
VOC	Acetone	67-64-1	8.0E-04	5.8E+01	5.34E-01	1.41E-03	3.06E+03	3.26E-04	3.26E-03
VOC	Benzene	71-43-2	1.1E-01	7.8E+01	4.84E-01	1.22E-03	8.41E+02	1.19E-03	1.19E-02
VOC	Bromodichloromethane	75-27-4	3.3E-02	1.6E+02	3.77E-01	8.39E-04	1.27E+03	7.86E-04	7.86E-03
VOC	2-Butanone	78-93-3	1.1E-03	7.2E+01	4.97E-01	1.27E-03	2.55E+03	3.92E-04	3.92E-03
VOC	Carbon Disulfide	75-15-0	6.2E-01	7.6E+01	4.88E-01	1.23E-03	8.15E+02	1.23E-03	1.23E-02
VOC	Carbon Tetrachloride	56-23-5	6.3E-01	1.5E+02	3.85E-01	8.66E-04	1.16E+03	8.63E-04	8.63E-03
VOC	Chlorobenzene	108-90-7	7.6E-02	1.1E+02	4.28E-01	1.01E-03	1.02E+03	9.82E-04	9.82E-03
VOC	Chloroethane	75-00-3	1.8E-01	6.5E+01	5.16E-01	1.34E-03	7.58E+02	1.32E-03	1.32E-02
VOC	Chloroform	67-66-3	7.5E-02	1.2E+02	4.20E-01	9.83E-04	1.05E+03	9.54E-04	9.54E-03
VOC	Chloromethane	74-87-3	1.8E-01	5.0E+01	5.60E-01	1.51E-03	6.71E+02	1.49E-03	1.49E-02
VOC	Cumene	98-82-8	2.7E-01	1.2E+02	4.19E-01	9.80E-04	1.03E+03	9.71E-04	9.71E-03
VOC	Cyclohexane	110-82-7	4.0E+00	8.4E+01	4.72E-01	1.17E-03	8.54E+02	1.17E-03	1.17E-02
VOC	Dibromochloromethane	124-48-1	1.6E-02	2.1E+02	3.48E-01	7.44E-04	1.52E+03	6.57E-04	6.57E-03
VOC	1,2-Dichlorobenzene	95-50-1	3.9E-02	1.5E+02	3.91E-01	8.86E-04	1.19E+03	8.37E-04	8.37E-03
VOC	1,3-Dichlorobenzene	541-73-1	6.3E-02	1.5E+02	3.91E-01	8.86E-04	1.17E+03	8.56E-04	8.56E-03
VOC	1,4-Dichlorobenzene	106-46-7	5.0E-02	1.5E+02	3.91E-01	8.86E-04	1.18E+03	8.48E-04	8.48E-03
VOC	Dichlorodifluoromethane	75-71-8	7.0E+00	1.2E+02	4.18E-01	9.77E-04	1.02E+03	9.77E-04	9.77E-03
VOC	1,1-Dichloroethane	75-34-3	1.2E-01	9.9E+01	4.47E-01	1.08E-03	9.45E+02	1.06E-03	1.06E-02
VOC	1,2-Dichloroethane	107-06-2	2.0E-02	9.9E+01	4.47E-01	1.08E-03	1.04E+03	9.64E-04	9.64E-03
VOC	1,1-Dichloroethene	75-35-4	5.4E-01	9.7E+01	4.50E-01	1.09E-03	9.21E+02	1.09E-03	1.09E-02
VOC	cis-1,2-Dichloroethene	156-59-2	8.4E-02	9.7E+01	4.50E-01	1.09E-03	9.43E+02	1.06E-03	1.06E-02
VOC	trans-1,2-Dichloroethene	156-60-5	1.9E-01	9.7E+01	4.50E-01	1.09E-03	9.28E+02	1.08E-03	1.08E-02
VOC	1,2-Dichloropropane	78-87-5	5.8E-02	1.1E+02	4.27E-01	1.01E-03	1.03E+03	9.71E-04	9.71E-03
VOC	Ethyl Benzene	100-41-4	1.6E-01	1.1E+02	4.36E-01	1.04E-03	9.73E+02	1.03E-03	1.03E-02
VOC	2-Hexanone	591-78-6	3.6E-02	1.0E+02	4.45E-01	1.07E-03	9.94E+02	1.01E-03	1.01E-02
VOC	Methyl Acetate	79-20-9	1.9E-03	7.4E+01	4.92E-01	1.25E-03	1.90E+03	5.27E-04	5.27E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.2E-02	8.8E+01	4.64E-01	1.14E-03	1.05E+03	9.49E-04	9.49E-03
VOC	4-Methyl-2-pentanone	108-10-1	2.8E-03	1.0E+02	4.45E-01	1.07E-03	1.73E+03	5.79E-04	5.79E-03
VOC	Methylcyclohexane	108-87-2	8.8E+00	9.8E+01	4.48E-01	1.08E-03	9.23E+02	1.08E-03	1.08E-02
VOC	Methylene Chloride	75-09-2	4.5E-02	8.5E+01	4.70E-01	1.17E-03	9.05E+02	1.10E-03	1.10E-02
VOC	Styrene	100-42-5	5.7E-02	1.0E+02	4.39E-01	1.05E-03	9.90E+02	1.01E-03	1.01E-02
VOC	Tetrachloroethene	127-18-4	3.8E-01	1.7E+02	3.76E-01	8.34E-04	1.21E+03	8.29E-04	8.29E-03
VOC	Toluene	108-88-3	1.4E-01	9.2E+01	4.58E-01	1.12E-03	9.09E+02	1.10E-03	1.10E-02
VOC	1,2,4-Trichlorobenzene	120-82-1	2.9E-02	1.8E+02	3.65E-01	7.98E-04	1.35E+03	7.42E-04	7.42E-03
VOC	1,1,1-Trichloroethane	71-55-6	3.5E-01	1.3E+02	4.04E-01	9.30E-04	1.08E+03	9.24E-04	9.24E-03
VOC	1,1,2-Trichloroethane	79-00-5	1.9E-02	1.3E+02	4.04E-01	9.30E-04	1.21E+03	8.28E-04	8.28E-03
VOC	Trichloroethene	79-01-6	2.1E-01	1.3E+02	4.06E-01	9.37E-04	1.08E+03	9.27E-04	9.27E-03
VOC	Trichlorofluoromethane	75-69-4	2.0E+00	1.4E+02	4.00E-01	9.17E-04	1.09E+03	9.16E-04	9.16E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	9.8E+00	1.9E+02	3.61E-01	7.85E-04	1.27E+03	7.85E-04	7.85E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.3E-01	1.2E+02	4.19E-01	9.80E-04	1.04E+03	9.62E-04	9.62E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E-01	1.2E+02	4.19E-01	9.80E-04	1.04E+03	9.61E-04	9.61E-03
VOC	Vinyl Chloride	75-01-4	5.6E-01	6.3E+01	5.21E-01	1.36E-03	7.39E+02	1.35E-03	1.35E-02
VOC	Xylenes (total)	1330-20-7	1.4E-01	1.1E+02	4.36E-01	1.04E-03	9.76E+02	1.02E-03	1.02E-02
SVOC	Acenaphthene	83-32-9	3.2E-03	1.5E+02	3.85E-01	8.65E-04	1.97E+03	5.07E-04	5.07E-03
SVOC	Acenaphthylene	208-96-8	2.3E-03	1.5E+02	3.87E-01	8.71E-04	2.27E+03	4.41E-04	4.41E-03
SVOC	Acetophenone	98-86-2	2.2E-04	1.2E+02	4.19E-01	9.80E-04	1.19E+04	8.37E-05	8.37E-04
SVOC	Anthracene	120-12-7	1.3E-03	1.8E+02	3.67E-01	8.05E-04	3.28E+03	3.04E-04	3.04E-03
SVOC	Atrazine	1912-24-9	1.2E-07	2.2E+02	3.44E-01	7.32E-04	2.33E+07	4.30E-08	4.30E-07
SVOC	Benzaldehyde	100-52-7	4.9E-04	1.1E+02	4.36E-01	1.04E-03	5.67E+03	1.76E-04	1.76E-03
SVOC	Benzo(a)anthracene	56-55-3	6.9E-05	2.3E+02	3.38E-01	7.11E-04	4.46E+04	2.24E-05	2.24E-04
SVOC	Benzo(a)pyrene	50-32-8	2.3E-05	2.5E+02	3.27E-01	6.76E-04	1.34E+05	7.48E-06	7.48E-05
SVOC	Benzo(b)fluoranthene	205-99-2	2.3E-03	2.5E+02	3.27E-01	6.76E-04	2.82E+03	3.54E-04	3.54E-03
SVOC	Benzo(g,h,i)perylene	191-24-2	2.9E-06	2.8E+02	3.17E-01	6.46E-04	1.10E+06	9.11E-07	9.11E-06
SVOC	Benzo(k)fluoranthene	207-08-9	1.7E-05	2.5E+02	3.27E-01	6.76E-04	1.82E+05	5.51E-06	5.51E-05
SVOC	Biphenyl	92-52-4	6.1E-03	1.5E+02	3.85E-01	8.65E-04	1.58E+03	6.33E-04	6.33E-03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.5E-06	1.7E+02	3.71E-01	8.17E-04	7.78E+05	1.29E-06	1.29E-05
SVOC	bis(2-Chloroethyl) ether	111-44-4	3.7E-04	1.4E+02	3.95E-01	8.98E-04	7.97E+03	1.25E-04	1.25E-03
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.1E-06	3.9E+02	2.82E-01	5.44E-04	1.70E+06	5.89E-07	5.89E-06
SVOC	Butylbenzylphthalate	85-68-7	2.6E-05	3.1E+02	3.04E-01	6.08E-04	1.29E+05	7.76E-06	7.76E-05
SVOC	Caprolactam	105-60-2	1.0E-07	1.1E+02	4.27E-01	1.01E-03	2.27E+07	4.40E-08	4.40E-07
SVOC	Carbazole	86-74-8	3.1E-07	1.7E+02	3.75E-01	8.31E-04	8.52E+06	1.17E-07	1.17E-06
SVOC	4-Chloro-3-methylphenol	59-50-7	8.2E-06	1.4E+02	3.95E-01	9.00E-04	3.11E+05	3.21E-06	3.21E-05
SVOC	2-Chloronaphthalene	91-58-7	6.4E-03	1.6E+02	3.78E-01	8.43E-04	1.60E+03	6.25E-04	6.25E-03
SVOC	2-Chlorophenol	95-57-8	8.0E-03	1.3E+02	4.09E-01	9.48E-04	1.36E+03	7.35E-04	7.35E-03
SVOC	Chrysene	218-01-9	1.9E-03	2.3E+02	3.38E-01	7.11E-04	2.93E+03	3.41E-04	3.41E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	3.0E-07	2.8E+02	3.16E-01	6.44E-04	1.05E+07	9.53E-08	9.53E-07
SVOC	Dibenzofuran	132-64-9	2.6E-04	1.7E+02	3.74E-01	8.28E-04	1.16E+04	8.63E-05	8.63E-04
SVOC	2,4-Dichlorophenol	120-83-2	6.5E-05	1.6E+02	3.78E-01	8.42E-04	4.19E+04	2.39E-05	2.39E-04
SVOC	Diethylphthalate	84-66-2	9.3E-06	2.2E+02	3.41E-01	7.21E-04	3.19E+05	3.14E-06	3.14E-05
SVOC	2,4-Dimethylphenol	105-67-9	4.1E-05	1.2E+02	4.16E-01	9.72E-04	5.96E+04	1.68E-05	1.68E-04

Attachment G4: Vapor Flux (mg/m2-s per mg/L) from Exposed Groundwater to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	K_{Gi} (cm/s)	K_{li} (cm/s)	$1/K_L$ (cm/s)	K_L (cm/s)	J_L (L/m^2-s)
SVOC	Dimethylphthalate	131-11-3	2.1E-06	1.9E+02	3.57E-01	7.71E-04	1.31E+06	7.64E-07	7.64E-06
SVOC	Di-n-butylphthalate	84-74-2	1.9E-08	2.8E+02	3.16E-01	6.44E-04	1.64E+08	6.08E-09	6.08E-08
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	8.7E-06	2.0E+02	3.54E-01	7.63E-04	3.25E+05	3.08E-06	3.08E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.9E-06	1.8E+02	3.64E-01	7.96E-04	1.45E+06	6.91E-07	6.91E-06
SVOC	2,6-Dinitrotoluene	606-20-2	1.5E-05	1.8E+02	3.64E-01	7.96E-04	1.81E+05	5.53E-06	5.53E-05
SVOC	Di-n-octylphthalate	117-84-0	1.4E-03	3.9E+02	2.82E-01	5.44E-04	4.43E+03	2.26E-04	2.26E-03
SVOC	Fluoranthene	206-44-0	3.3E-04	2.0E+02	3.52E-01	7.55E-04	9.94E+03	1.01E-04	1.01E-03
SVOC	Fluorene	86-73-7	1.3E-03	1.7E+02	3.76E-01	8.33E-04	3.24E+03	3.09E-04	3.09E-03
SVOC	Formaldehyde	50-00-0	6.9E-06	3.0E+01	6.66E-01	1.96E-03	2.17E+05	4.62E-06	4.62E-05
SVOC	Hexachlorobutadiene	87-68-3	1.7E-01	2.6E+02	3.23E-01	6.65E-04	1.52E+03	6.57E-04	6.57E-03
SVOC	Hexachlorocyclopentadiene	77-47-4	5.6E-01	2.7E+02	3.18E-01	6.51E-04	1.54E+03	6.48E-04	6.48E-03
SVOC	Hexachloroethane	67-72-1	8.0E-02	2.4E+02	3.34E-01	6.98E-04	1.47E+03	6.80E-04	6.80E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.3E-05	2.8E+02	3.17E-01	6.46E-04	9.78E+04	1.02E-05	1.02E-04
SVOC	Isophorone	78-59-1	1.4E-04	1.4E+02	4.00E-01	9.14E-04	1.95E+04	5.13E-05	5.13E-04
SVOC	2-Methylnaphthalene	91-57-6	1.1E-02	1.4E+02	3.96E-01	9.01E-04	1.35E+03	7.42E-04	7.42E-03
SVOC	Methylphenol (total)	1319-77-3	1.8E-05	1.1E+02	4.34E-01	1.03E-03	1.31E+05	7.61E-06	7.61E-05
SVOC	Naphthalene	91-20-3	9.9E-03	1.3E+02	4.10E-01	9.49E-04	1.30E+03	7.69E-04	7.69E-03
SVOC	2-Nitroaniline	88-74-4	3.3E-06	1.4E+02	4.00E-01	9.14E-04	7.67E+05	1.30E-06	1.30E-05
SVOC	Nitrobenzene	98-95-3	4.9E-04	1.2E+02	4.15E-01	9.68E-04	5.93E+03	1.69E-04	1.69E-03
SVOC	2-Nitrophenol	88-75-5	1.9E-04	1.4E+02	3.99E-01	9.11E-04	1.41E+04	7.11E-05	7.11E-04
SVOC	4-Nitrophenol	100-02-7	8.5E-09	1.4E+02	3.99E-01	9.11E-04	2.96E+08	3.38E-09	3.38E-08
SVOC	N-Nitrosodiphenylamine	86-30-6	1.0E-04	2.0E+02	3.54E-01	7.63E-04	2.89E+04	3.46E-05	3.46E-04
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.6E-05	1.3E+02	4.08E-01	9.42E-04	5.42E+04	1.84E-05	1.84E-04
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.4E-03	1.7E+02	3.72E-01	8.21E-04	2.34E+03	4.27E-04	4.27E-03
SVOC	Pentachlorophenol	87-86-5	5.0E-07	2.7E+02	3.21E-01	6.58E-04	6.24E+06	1.60E-07	1.60E-06
SVOC	Phenanthrene	85-01-8	4.8E-04	1.8E+02	3.67E-01	8.05E-04	6.97E+03	1.44E-04	1.44E-03
SVOC	Phenol	108-95-2	8.2E-06	9.4E+01	4.54E-01	1.11E-03	2.71E+05	3.69E-06	3.69E-05
SVOC	Pyrene	129-00-0	2.3E-04	2.0E+02	3.52E-01	7.55E-04	1.39E+04	7.18E-05	7.18E-04
SVOC	2,4,5-Trichlorophenol	95-95-4	8.9E-05	2.0E+02	3.55E-01	7.65E-04	3.30E+04	3.03E-05	3.03E-04
SVOC	2,4,6-Trichlorophenol	88-06-2	1.6E-04	2.0E+02	3.55E-01	7.65E-04	1.90E+04	5.27E-05	5.27E-04
PCB	PCBs (total)	1336-36-3	4.1E-02	3.3E+02	2.99E-01	5.93E-04	1.77E+03	5.66E-04	5.66E-03
INORG	Antimony	7440-36-0		1.2E+02	4.17E-01	9.74E-04			
INORG	Arsenic	7440-38-2		7.5E+01	4.90E-01	1.24E-03			
INORG	Barium	7440-39-3		1.4E+02	4.00E-01	9.17E-04			
INORG	Beryllium	7440-41-7		9.0E+00	9.97E-01	3.58E-03			
INORG	Cadmium	7440-43-9		1.1E+02	4.28E-01	1.01E-03			
INORG	Chromium (total)	7440-47-3		5.2E+01	5.54E-01	1.49E-03			
INORG	Chromium III	16065-83-1		5.2E+01	5.54E-01	1.49E-03			
INORG	Chromium VI	18540-29-9		5.2E+01	5.54E-01	1.49E-03			
INORG	Cobalt	7440-48-4		5.9E+01	5.32E-01	1.40E-03			
INORG	Copper	7440-50-8		6.4E+01	5.18E-01	1.35E-03			
INORG	Cyanide (total)	57-12-5		2.6E+01	6.99E-01	2.11E-03			
INORG	Fluoride	16984-48-8							
INORG	Lead	7439-92-1		2.1E+02	3.49E-01	7.46E-04			
INORG	Manganese	7439-96-5		5.5E+01	5.44E-01	1.45E-03			
INORG	Mercury	7439-97-6	1.5E-01	2.0E+02	3.52E-01	7.58E-04	1.34E+03	7.47E-04	7.47E-03
INORG	Nickel	7440-02-0		5.9E+01	5.32E-01	1.40E-03			
INORG	Selenium	7782-49-2		7.9E+01	4.82E-01	1.21E-03			
INORG	Silver	7440-22-4		1.1E+02	4.34E-01	1.03E-03			
INORG	Thallium	7440-28-0		2.0E+02	3.50E-01	7.52E-04			
INORG	Vanadium	7440-62-2		5.1E+01	5.58E-01	1.51E-03			
INORG	Zinc	7440-66-6		6.5E+01	5.13E-01	1.33E-03			
Notes:	molecular weight of oxygen	g/mol	MW_{O2}	32					
	molecular weight of water	g/mol	MW_{H2O}	18					
	absolute temperature	K	**T**	283					
	liquid-phase mass transfer coefficient for oxygen	cm/s	$k_{L,O2}$	0.002					
	gas-phase mass transfer coefficient for water vapor at 25 C	cm/s	$K_{G,H2O}$	0.833					

Attachment G4: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	Acetone	67-64-1	5.8E+01	-2.4E-01	5.2E-04	1.5E-03	2.2E-01	3.3E-01	3.0E-01	5.3E-01	1.0E+00	1.27E-06
VOC	Benzene	71-43-2	7.8E+01	2.1E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	1.0E+00	3.70E-05
VOC	Bromodichloromethane	75-27-4	1.6E+02	2.1E+00	4.7E-03	2.3E-02	8.7E-01	3.5E-01	3.2E-01	2.1E+00	1.0E+00	1.70E-05
VOC	2-Butanone	78-93-3	7.2E+01	2.8E-01	9.6E-04	3.1E-03	2.7E-01	3.4E-01	3.1E-01	6.4E-01	1.0E+00	2.42E-06
VOC	Carbon Disulfide	75-15-0	7.6E+01	2.0E+00	1.2E-02	4.2E-02	2.8E-01	3.6E-01	3.3E-01	6.7E-01	1.0E+00	3.11E-05
VOC	Carbon Tetrachloride	56-23-5	1.5E+02	2.7E+00	1.4E-02	6.6E-02	7.6E-01	3.8E-01	3.4E-01	1.8E+00	1.0E+00	4.84E-05
VOC	Chlorobenzene	108-90-7	1.1E+02	2.9E+00	2.9E-02	1.2E-01	4.5E-01	4.2E-01	3.8E-01	1.1E+00	1.0E+00	8.00E-05
VOC	Chloroethane	75-00-3	6.5E+01	1.4E+00	6.1E-03	1.9E-02	2.4E-01	3.5E-01	3.1E-01	5.8E-01	1.0E+00	1.49E-05
VOC	Chloroform	67-66-3	1.2E+02	1.9E+00	6.3E-03	2.6E-02	4.9E-01	3.5E-01	3.2E-01	1.2E+00	1.0E+00	1.86E-05
VOC	Chloromethane	74-87-3	5.0E+01	1.9E+00	1.5E-02	4.2E-02	2.0E-01	3.6E-01	3.3E-01	4.8E-01	1.0E+00	3.58E-05
VOC	Cumene	98-82-8	1.2E+02	3.5E+00	6.8E-02	2.9E-01	5.0E-01	5.5E-01	5.1E-01	1.2E+00	1.0E+00	1.93E-04
VOC	Cyclohexane	110-82-7	8.4E+01	3.4E+00	1.0E-01	3.5E-01	3.1E-01	6.0E-01	5.7E-01	7.5E-01	1.0E+00	2.30E-04
VOC	Dibromochloromethane	124-48-1	2.1E+02	2.2E+00	2.9E-03	1.6E-02	1.5E+00	3.4E-01	3.1E-01	3.7E+00	1.0E+00	1.42E-05
VOC	1,2-Dichlorobenzene	95-50-1	1.5E+02	3.4E+00	4.4E-02	2.0E-01	7.0E-01	4.8E-01	4.4E-01	1.7E+00	1.0E+00	1.46E-04
VOC	1,3-Dichlorobenzene	541-73-1	1.5E+02	3.4E+00	4.1E-02	1.9E-01	7.0E-01	4.7E-01	4.3E-01	1.7E+00	1.0E+00	1.35E-04
VOC	1,4-Dichlorobenzene	106-46-7	1.5E+02	3.4E+00	4.3E-02	2.0E-01	7.0E-01	4.8E-01	4.4E-01	1.7E+00	1.0E+00	1.44E-04
VOC	Dichlorodifluoromethane	75-71-8	1.2E+02	2.2E+00	8.9E-03	3.8E-02	5.0E-01	3.6E-01	3.3E-01	1.2E+00	1.0E+00	2.63E-05
VOC	1,1-Dichloroethane	75-34-3	9.9E+01	1.8E+00	6.7E-03	2.6E-02	3.8E-01	3.5E-01	3.2E-01	9.0E-01	1.0E+00	1.83E-05
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.5E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.0E+00	1.13E-05
VOC	1,1-Dichloroethene	75-35-4	9.7E+01	2.1E+00	1.2E-02	4.4E-02	3.7E-01	3.6E-01	3.3E-01	8.8E-01	1.0E+00	3.10E-05
VOC	cis-1,2-Dichloroethene	156-59-2	9.7E+01	1.9E+00	7.7E-03	2.9E-02	3.7E-01	3.5E-01	3.2E-01	8.8E-01	1.0E+00	2.07E-05
VOC	trans-1,2-Dichloroethene	156-60-5	9.7E+01	2.1E+00	1.1E-02	4.0E-02	3.7E-01	3.6E-01	3.3E-01	8.8E-01	1.0E+00	2.83E-05
VOC	1,2-Dichloropropane	78-87-5	1.1E+02	2.0E+00	7.4E-03	3.0E-02	4.5E-01	3.5E-01	3.2E-01	1.1E+00	1.0E+00	2.12E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	3.1E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.0E+00	1.27E-04
VOC	2-Hexanone	591-78-6	1.0E+02	1.4E+00	3.5E-03	1.4E-02	3.8E-01	3.4E-01	3.1E-01	9.2E-01	1.0E+00	9.75E-06
VOC	Methyl Acetate	79-20-9	7.4E+01	1.8E-01	8.0E-04	2.7E-03	2.7E-01	3.4E-01	3.0E-01	6.6E-01	1.0E+00	2.04E-06
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.2E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	1.0E+00	8.84E-06
VOC	4-Methyl-2-pentanone	108-10-1	1.0E+02	1.2E+00	2.7E-03	1.0E-02	3.8E-01	3.4E-01	3.1E-01	9.2E-01	1.0E+00	7.32E-06
VOC	Methylcyclohexane	108-87-2	9.8E+01	3.0E+00	4.0E-02	1.5E-01	3.7E-01	4.4E-01	4.0E-01	9.0E-01	1.0E+00	1.05E-04
VOC	Methylene Chloride	75-09-2	8.5E+01	1.3E+00	3.5E-03	1.3E-02	3.1E-01	3.4E-01	3.1E-01	7.5E-01	1.0E+00	9.25E-06
VOC	Styrene	100-42-5	1.0E+02	2.9E+00	3.6E-02	1.4E-01	4.0E-01	4.3E-01	4.0E-01	9.7E-01	1.0E+00	9.63E-05
VOC	Tetrachloroethene	127-18-4	1.7E+02	2.7E+00	1.1E-02	5.4E-02	8.9E-01	3.7E-01	3.4E-01	2.1E+00	1.0E+00	3.99E-05
VOC	Toluene	108-88-3	9.2E+01	2.8E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	1.0E+00	8.08E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.8E+02	4.0E+00	6.8E-02	3.5E-01	1.1E+00	6.0E-01	5.6E-01	2.6E+00	1.0E+00	2.76E-04
VOC	1,1,1-Trichloroethane	71-55-6	1.3E+02	2.5E+00	1.2E-02	5.5E-02	5.9E-01	3.7E-01	3.4E-01	1.4E+00	1.0E+00	3.85E-05
VOC	1,1,2-Trichloroethane	79-00-5	1.3E+02	2.1E+00	6.4E-03	2.8E-02	5.9E-01	3.5E-01	3.2E-01	1.4E+00	1.0E+00	2.02E-05
VOC	Trichloroethene	79-01-6	1.3E+02	2.7E+00	1.8E-02	7.9E-02	5.7E-01	3.9E-01	3.5E-01	1.4E+00	1.0E+00	5.53E-05
VOC	Trichlorofluoromethane	75-69-4	1.4E+02	2.5E+00	1.3E-02	5.7E-02	6.2E-01	3.7E-01	3.4E-01	1.5E+00	1.0E+00	4.03E-05
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.9E+02	3.2E+00	1.7E-02	9.1E-02	1.2E+00	4.0E-01	3.6E-01	2.8E+00	1.0E+00	7.31E-05

Attachment G4: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	3.6E+00	8.4E-02	3.5E-01	5.0E-01	6.0E-01	5.7E-01	1.2E+00	1.0E+00	2.34E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	4.0E+00	1.5E-01	6.2E-01	5.0E-01	8.2E-01	8.4E-01	2.0E+00	1.0E+00	4.04E-04
VOC	Vinyl Chloride	75-01-4	6.3E+01	1.5E+00	6.9E-03	2.1E-02	2.4E-01	3.5E-01	3.2E-01	5.7E-01	1.0E+00	1.69E-05
VOC	Xylenes (total)	1330-20-7	1.1E+02	3.2E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.0E+00	1.32E-04
SVOC	Acenaphthene	83-32-9	1.5E+02	3.9E+00	8.4E-02	4.0E-01	7.7E-01	6.4E-01	6.1E-01	1.8E+00	1.0E+00	2.96E-04
SVOC	Acenaphthylene	208-96-8	1.5E+02	3.9E+00	8.9E-02	4.2E-01	7.5E-01	6.6E-01	6.3E-01	1.8E+00	1.0E+00	3.09E-04
SVOC	Acetophenone	98-86-2	1.2E+02	1.6E+00	3.7E-03	1.6E-02	5.0E-01	3.4E-01	3.1E-01	1.2E+00	1.0E+00	1.11E-05
SVOC	Anthracene	120-12-7	1.8E+02	4.6E+00	1.6E-01	8.2E-01	1.0E+00	1.0E+00	1.1E+00	4.0E+00	1.0E+00	6.41E-04
SVOC	Atrazine	1912-24-9	2.2E+02	2.6E+00	5.2E-03	2.9E-02	1.7E+00	3.5E-01	3.2E-01	4.1E+00	1.0E+00	2.64E-05
SVOC	Benzaldehyde	100-52-7	1.1E+02	1.5E+00	3.8E-03	1.5E-02	4.1E-01	3.4E-01	3.1E-01	9.9E-01	1.0E+00	1.07E-05
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	5.7E+00	4.8E-01	2.8E+00	2.0E+00	2.9E+00	6.3E+00	8.4E+00	9.0E-01	2.40E-03
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	6.1E+00	6.6E-01	4.0E+00	2.7E+00	4.1E+00	1.2E+01	1.2E+01	8.0E-01	3.41E-03
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	6.2E+00	7.6E-01	4.6E+00	2.7E+00	4.7E+00	1.5E+01	1.2E+01	8.0E-01	3.90E-03
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.2E+00	1.0E+00	6.4E+00	3.7E+00	6.4E+00	2.8E+01	1.6E+01	7.0E-01	5.27E-03
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	6.2E+00	7.6E-01	4.6E+00	2.7E+00	4.7E+00	1.5E+01	1.2E+01	8.0E-01	3.90E-03
SVOC	Biphenyl	92-52-4	1.5E+02	4.1E+00	1.1E-01	5.2E-01	7.7E-01	7.4E-01	7.3E-01	1.8E+00	1.0E+00	3.86E-04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.7E+02	1.3E+00	1.2E-03	5.8E-03	9.8E-01	3.4E-01	3.1E-01	2.3E+00	1.0E+00	4.47E-06
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.4E+02	1.2E+00	1.6E-03	7.3E-03	6.6E-01	3.4E-01	3.1E-01	1.6E+00	1.0E+00	5.24E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.9E+02	7.3E+00	6.8E-01	5.1E+00	1.6E+01	5.2E+00	1.9E+01	7.1E+01	4.0E-01	4.26E-03
SVOC	Butylbenzylphthalate	85-68-7	3.1E+02	4.8E+00	4.4E-02	3.0E-01	5.9E+00	5.6E-01	5.2E-01	1.4E+01	9.0E-01	3.78E-04
SVOC	Caprolactam	105-60-2	1.1E+02	-1.9E-01	2.8E-04	1.1E-03	4.5E-01	3.3E-01	3.0E-01	1.1E+00	1.0E+00	8.01E-07
SVOC	Carbazole	86-74-8	1.7E+02	3.6E+00	4.3E-02	2.1E-01	9.1E-01	4.9E-01	4.5E-01	2.2E+00	1.0E+00	1.60E-04
SVOC	4-Chloro-3-methylphenol	59-50-7	1.4E+02	3.1E+00	2.8E-02	1.3E-01	6.6E-01	4.2E-01	3.9E-01	1.6E+00	1.0E+00	9.14E-05
SVOC	2-Chloronaphthalene	91-58-7	1.6E+02	4.1E+00	1.0E-01	5.0E-01	8.6E-01	7.2E-01	7.1E-01	2.1E+00	1.0E+00	3.69E-04
SVOC	2-Chlorophenol	95-57-8	1.3E+02	2.2E+00	7.9E-03	3.5E-02	5.5E-01	3.6E-01	3.2E-01	1.3E+00	1.0E+00	2.44E-05
SVOC	Chrysene	218-01-9	2.3E+02	5.7E+00	4.8E-01	2.8E+00	2.0E+00	2.9E+00	6.3E+00	8.4E+00	9.0E-01	2.40E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	2.8E+02	6.7E+00	1.0E+00	6.4E+00	3.8E+00	6.5E+00	2.9E+01	1.7E+01	7.0E-01	5.34E-03
SVOC	Dibenzofuran	132-64-9	1.7E+02	4.4E+00	1.4E-01	7.1E-01	9.2E-01	9.1E-01	9.6E-01	3.6E+00	1.0E+00	5.36E-04
SVOC	2,4-Dichlorophenol	120-83-2	1.6E+02	3.1E+00	2.1E-02	1.0E-01	8.6E-01	4.0E-01	3.7E-01	2.1E+00	1.0E+00	7.57E-05
SVOC	Diethylphthalate	84-66-2	2.2E+02	2.5E+00	4.0E-03	2.3E-02	1.8E+00	3.5E-01	3.2E-01	4.4E+00	1.0E+00	2.14E-05
SVOC	2,4-Dimethylphenol	105-67-9	1.2E+02	2.4E+00	1.2E-02	5.0E-02	5.1E-01	3.7E-01	3.3E-01	1.2E+00	1.0E+00	3.52E-05
SVOC	Dimethylphthalate	131-11-3	1.9E+02	1.9E+00	2.2E-03	1.2E-02	1.3E+00	3.4E-01	3.1E-01	3.1E+00	1.0E+00	9.85E-06
SVOC	Di-n-butylphthalate	84-74-2	2.8E+02	4.6E+00	4.8E-02	3.1E-01	3.8E+00	5.6E-01	5.3E-01	9.1E+00	9.0E-01	3.31E-04
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.0E+02	2.1E+00	3.1E-03	1.7E-02	1.4E+00	3.4E-01	3.1E-01	3.2E+00	1.0E+00	1.40E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.8E+02	2.0E+00	3.2E-03	1.7E-02	1.1E+00	3.4E-01	3.1E-01	2.6E+00	1.0E+00	1.32E-05
SVOC	2,6-Dinitrotoluene	606-20-2	1.8E+02	1.9E+00	2.6E-03	1.3E-02	1.1E+00	3.4E-01	3.1E-01	2.6E+00	1.0E+00	1.06E-05
SVOC	Di-n-octylphthalate	117-84-0	3.9E+02	8.1E+00	1.0E+00	7.6E+00	1.6E+01	7.6E+00	3.9E+01	7.2E+01	3.0E-01	4.72E-03
SVOC	Fluoranthene	206-44-0	2.0E+02	5.1E+00	2.8E-01	1.5E+00	1.4E+00	1.7E+00	2.4E+00	5.7E+00	1.0E+00	1.31E-03
SVOC	Fluorene	86-73-7	1.7E+02	4.2E+00	1.1E-01	5.5E-01	9.0E-01	7.7E-01	7.7E-01	2.2E+00	1.0E+00	4.13E-04

Attachment G4: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
SVOC	Formaldehyde	50-00-0	3.0E+01	3.5E-01	1.8E-03	3.9E-03	1.5E-01	3.4E-01	3.1E-01	3.7E-01	1.0E+00	4.22E-06
SVOC	Hexachlorobutadiene	87-68-3	2.6E+02	4.8E+00	8.2E-02	5.1E-01	3.0E+00	7.3E-01	7.2E-01	7.3E+00	9.0E-01	5.03E-04
SVOC	Hexachlorocyclopentadiene	77-47-4	2.7E+02	5.4E+00	1.7E-01	1.1E+00	3.5E+00	1.2E+00	1.5E+00	1.4E+01	9.0E-01	1.12E-03
SVOC	Hexachloroethane	67-72-1	2.4E+02	4.0E+00	3.3E-02	1.9E-01	2.2E+00	4.7E-01	4.3E-01	5.3E+00	1.0E+00	1.91E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	6.7E+00	1.0E+00	6.4E+00	3.7E+00	6.4E+00	2.8E+01	1.6E+01	7.0E-01	5.27E-03
SVOC	Isophorone	78-59-1	1.4E+02	1.7E+00	3.5E-03	1.6E-02	6.2E-01	3.4E-01	3.1E-01	1.5E+00	1.0E+00	1.14E-05
SVOC	2-Methylnaphthalene	91-57-6	1.4E+02	3.9E+00	8.9E-02	4.1E-01	6.6E-01	6.5E-01	6.2E-01	1.6E+00	1.0E+00	2.89E-04
SVOC	Methylphenol (total)	1319-77-3	1.1E+02	2.0E+00	7.7E-03	3.1E-02	4.2E-01	3.5E-01	3.2E-01	1.0E+00	1.0E+00	2.17E-05
SVOC	Naphthalene	91-20-3	1.3E+02	3.4E+00	5.0E-02	2.2E-01	5.5E-01	4.9E-01	4.5E-01	1.3E+00	1.0E+00	1.49E-04
SVOC	2-Nitroaniline	88-74-4	1.4E+02	1.9E+00	4.4E-03	2.0E-02	6.2E-01	3.5E-01	3.2E-01	1.5E+00	1.0E+00	1.44E-05
SVOC	Nitrobenzene	98-95-3	1.2E+02	1.8E+00	5.3E-03	2.3E-02	5.1E-01	3.5E-01	3.2E-01	1.2E+00	1.0E+00	1.60E-05
SVOC	2-Nitrophenol	88-75-5	1.4E+02	1.8E+00	4.0E-03	1.8E-02	6.3E-01	3.5E-01	3.1E-01	1.5E+00	1.0E+00	1.30E-05
SVOC	4-Nitrophenol	100-02-7	1.4E+02	1.9E+00	4.8E-03	2.2E-02	6.3E-01	3.5E-01	3.2E-01	1.5E+00	1.0E+00	1.56E-05
SVOC	N-Nitrosodiphenylamine	86-30-6	2.0E+02	3.2E+00	1.5E-02	8.1E-02	1.4E+00	3.9E-01	3.5E-01	3.3E+00	1.0E+00	6.82E-05
SVOC	N-Nitroso-di-n-propylamine	621-64-7	1.3E+02	1.4E+00	2.5E-03	1.1E-02	5.6E-01	3.4E-01	3.1E-01	1.4E+00	1.0E+00	7.74E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	1.7E+02	2.5E+00	7.2E-03	3.6E-02	9.5E-01	3.6E-01	3.3E-01	2.3E+00	1.0E+00	2.76E-05
SVOC	Pentachlorophenol	87-86-5	2.7E+02	5.1E+00	1.2E-01	7.3E-01	3.3E+00	9.3E-01	9.9E-01	1.3E+01	9.0E-01	7.43E-04
SVOC	Phenanthrene	85-01-8	1.8E+02	4.5E+00	1.4E-01	7.2E-01	1.0E+00	9.1E-01	9.7E-01	4.1E+00	1.0E+00	5.59E-04
SVOC	Phenol	108-95-2	9.4E+01	1.5E+00	4.5E-03	1.7E-02	3.5E-01	3.4E-01	3.1E-01	8.5E-01	1.0E+00	1.20E-05
SVOC	Pyrene	129-00-0	2.0E+02	5.1E+00	2.8E-01	1.5E+00	1.4E+00	1.6E+00	2.4E+00	5.7E+00	1.0E+00	1.29E-03
SVOC	2,4,5-Trichlorophenol	95-95-4	2.0E+02	3.9E+00	4.7E-02	2.5E-01	1.3E+00	5.2E-01	4.8E-01	3.2E+00	1.0E+00	2.11E-04
SVOC	2,4,6-Trichlorophenol	88-06-2	2.0E+02	3.7E+00	3.4E-02	1.9E-01	1.3E+00	4.7E-01	4.3E-01	3.2E+00	1.0E+00	1.56E-04
PCB	PCBs (total)	1336-36-3	3.3E+02	6.5E+00	4.5E-01	3.1E+00	7.2E+00	3.2E+00	7.7E+00	3.1E+01	7.0E-01	3.31E-03
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03							2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03							2.00E-06
INORG	Barium	7440-39-3	1.4E+02		1.0E-03							2.00E-06
INORG	Beryllium	7440-41-7	9.0E+00		1.0E-03							2.00E-06
INORG	Cadmium	7440-43-9	1.1E+02		1.0E-03							2.00E-06
INORG	Chromium (total)	7440-47-3	5.2E+01		2.0E-03							4.00E-06
INORG	Chromium III	16065-83-1	5.2E+01		1.0E-03							2.00E-06
INORG	Chromium VI	18540-29-9	5.2E+01		2.0E-03							4.00E-06
INORG	Cobalt	7440-48-4	5.9E+01		4.0E-04							8.00E-07
INORG	Copper	7440-50-8	6.4E+01		1.0E-03							2.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03							2.00E-06
INORG	Fluoride	16984-48-8			1.0E-03							2.00E-06
INORG	Lead	7439-92-1	2.1E+02		1.0E-04							2.00E-07
INORG	Manganese	7439-96-5	5.5E+01		1.0E-03							2.00E-06
INORG	Mercury	7439-97-6	2.0E+02		1.0E-03							2.00E-06
INORG	Nickel	7440-02-0	5.9E+01		2.0E-04							4.00E-07

Attachment G4: Nonsteady State Dermal Absorption of Chemical from Water GMC: NAO Flint Operations Site, Flint, Michigan												
Chem Group	**Chemical**	**CASRN**	**MW** (g/mole)	**Log K_{ow}** (unitless)	**K_p** (cm/hr)	**B** (unitless)	**τ** (hr)	**c**	**b**	**ts** (hr)	**FA** (unitless)	**DA** (L/cm^2-event)
INORG	Selenium	7782-49-2	7.9E+01		1.0E-03							2.00E-06
INORG	Silver	7440-22-4	1.1E+02		6.0E-04							1.20E-06
INORG	Thallium	7440-28-0	2.0E+02		1.0E-03							2.00E-06
INORG	Vanadium	7440-62-2	5.1E+01		1.0E-03							2.00E-06
INORG	Zinc	7440-66-6	6.5E+01		6.0E-04							1.20E-06
Note:	Event Time	hours	**t**	2								
	K_p capped at 1 cm/hr (USEPA 1992)											

Attachment G4: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
VOC	Acetone	67-64-1	ID	1.0E+00	2.8E-07			1.3E-06	1.2E-07			3.6E-02	7.0E-05			
VOC	Benzene	71-43-2	A	1.0E+00	2.8E-07	5.5E-02	6.5E+02	3.7E-05	3.4E-06	5.5E-02	5.3E+01	1.3E-01	2.6E-04	7.8E-03	5.0E+00	4.6E+00
VOC	Bromodichloromethane	75-27-4	B2	1.0E+00	2.8E-07	6.2E-02	5.8E+02	1.7E-05	1.6E-06	6.2E-02	1.0E+02	8.6E-02	1.7E-04	1.8E-02	3.3E+00	3.2E+00
VOC	2-Butanone	78-93-3	ID	1.0E+00	2.8E-07			2.4E-06	2.2E-07			4.3E-02	8.4E-05			
VOC	Carbon Disulfide	75-15-0		1.0E+00	2.8E-07			3.1E-05	2.9E-06			1.3E-01	2.6E-04			
VOC	Carbon Tetrachloride	56-23-5	B2	1.0E+00	2.8E-07	1.3E-01	2.8E+02	4.8E-05	4.5E-06	1.3E-01	1.7E+01	9.5E-02	1.9E-04	1.5E-02	3.6E+00	2.9E+00
VOC	Chlorobenzene	108-90-7	D	1.0E+00	2.8E-07			8.0E-05	7.4E-06			1.1E-01	2.1E-04			
VOC	Chloroethane	75-00-3		1.0E+00	2.8E-07	2.9E-03	1.2E+04	1.5E-05	1.4E-06	2.9E-03	2.5E+03	1.4E-01	2.8E-04			2.1E+03
VOC	Chloroform	67-66-3	B2	1.0E+00	2.8E-07			1.9E-05	1.7E-06			1.0E-01	2.0E-04	2.3E-02	2.1E+00	2.1E+00
VOC	Chloromethane	74-87-3	D	1.0E+00	2.8E-07			3.6E-05	3.3E-06			1.6E-01	3.2E-04			
VOC	Cumene	98-82-8	D	1.0E+00	2.8E-07			1.9E-04	1.8E-05			1.1E-01	2.1E-04			
VOC	Cyclohexane	110-82-7	ID	1.0E+00	2.8E-07			2.3E-04	2.1E-05			1.3E-01	2.5E-04			
VOC	Dibromochloromethane	124-48-1	C	1.0E+00	2.8E-07	8.4E-02	4.3E+02	1.4E-05	1.3E-06	8.4E-02	9.1E+01	7.2E-02	1.4E-04	2.4E-02	3.0E+00	2.8E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	1.0E+00	2.8E-07			1.5E-04	1.3E-05			9.2E-02	1.8E-04			
VOC	1,3-Dichlorobenzene	541-73-1	D	1.0E+00	2.8E-07			1.4E-04	1.2E-05			9.4E-02	1.8E-04			
VOC	1,4-Dichlorobenzene	106-46-7	C	1.0E+00	2.8E-07	2.4E-02	1.5E+03	1.4E-04	1.3E-05	2.4E-02	3.1E+01	9.3E-02	1.8E-04	6.3E-03	8.8E+00	6.8E+00
VOC	Dichlorodifluoromethane	75-71-8		1.0E+00	2.8E-07			2.6E-05	2.4E-06			1.1E-01	2.1E-04			
VOC	1,1-Dichloroethane	75-34-3	C	1.0E+00	2.8E-07			1.8E-05	1.7E-06			1.2E-01	2.3E-04			
VOC	1,2-Dichloroethane	107-06-2	B2	1.0E+00	2.8E-07	9.1E-02	3.9E+02	1.1E-05	1.0E-06	9.1E-02	1.1E+02	1.1E-01	2.1E-04	2.6E-02	1.9E+00	1.8E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.0E+00	2.8E-07			3.1E-05	2.9E-06			1.2E-01	2.3E-04			
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.0E+00	2.8E-07			2.1E-05	1.9E-06			1.2E-01	2.3E-04			
VOC	trans-1,2-Dichloroethene	156-60-5		1.0E+00	2.8E-07			2.8E-05	2.6E-06			1.2E-01	2.3E-04			
VOC	1,2-Dichloropropane	78-87-5	B2	1.0E+00	2.8E-07	6.8E-02	5.3E+02	2.1E-05	2.0E-06	6.8E-02	7.5E+01	1.1E-01	2.1E-04			6.6E+01
VOC	Ethyl Benzene	100-41-4	D	1.0E+00	2.8E-07			1.3E-04	1.2E-05			1.1E-01	2.2E-04			
VOC	2-Hexanone	591-78-6		1.0E+00	2.8E-07			9.8E-06	9.0E-07			1.1E-01	2.2E-04			
VOC	Methyl Acetate	79-20-9		1.0E+00	2.8E-07			2.0E-06	1.9E-07			5.8E-02	1.1E-04			
VOC	Methyl tert-butyl ether	1634-04-4		1.0E+00	2.8E-07			8.8E-06	8.2E-07			1.0E-01	2.0E-04			
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.0E+00	2.8E-07			7.3E-06	6.7E-07			6.3E-02	1.2E-04			
VOC	Methylcyclohexane	108-87-2		1.0E+00	2.8E-07			1.0E-04	9.7E-06			1.2E-01	2.3E-04			
VOC	Methylene Chloride	75-09-2	B2	1.0E+00	2.8E-07	7.5E-03	4.8E+03	9.3E-06	8.5E-07	7.5E-03	1.6E+03	1.2E-01	2.4E-04	4.7E-04	9.0E+01	8.3E+01
VOC	Styrene	100-42-5		1.0E+00	2.8E-07			9.6E-05	8.9E-06			1.1E-01	2.2E-04			
VOC	Tetrachloroethene	127-18-4	C-B2	1.0E+00	2.8E-07	5.2E-02	6.9E+02	4.0E-05	3.7E-06	5.2E-02	5.2E+01	9.1E-02	1.8E-04	3.1E-03	1.8E+01	1.3E+01
VOC	Toluene	108-88-3	D	1.0E+00	2.8E-07			8.1E-05	7.5E-06			1.2E-01	2.4E-04			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.0E+00	2.8E-07			2.8E-04	2.5E-05			8.1E-02	1.6E-04			
VOC	1,1,1-Trichloroethane	71-55-6	D	1.0E+00	2.8E-07			3.9E-05	3.6E-06			1.0E-01	2.0E-04			
VOC	1,1,2-Trichloroethane	79-00-5	C	1.0E+00	2.8E-07	5.7E-02	6.3E+02	2.0E-05	1.9E-06	5.7E-02	9.4E+01	9.1E-02	1.8E-04	1.6E-02	3.5E+00	3.4E+00
VOC	Trichloroethene	79-01-6	C-B2	1.0E+00	2.8E-07	1.1E-02	3.3E+03	5.5E-05	5.1E-06	1.1E-02	1.8E+02	1.0E-01	2.0E-04	1.7E-03	3.0E+01	2.5E+01
VOC	Trichlorofluoromethane	75-69-4		1.0E+00	2.8E-07			4.0E-05	3.7E-06			1.0E-01	2.0E-04			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.0E+00	2.8E-07			7.3E-05	6.7E-06			8.6E-02	1.7E-04			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.0E+00	2.8E-07			2.3E-04	2.2E-05			1.1E-01	2.1E-04			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.0E+00	2.8E-07			4.0E-04	3.7E-05			1.1E-01	2.1E-04			
VOC	Vinyl Chloride	75-01-4	A	1.0E+00	2.8E-07	1.4E+00	2.6E+01	1.7E-05	1.6E-06	1.4E+00	4.6E+00	1.5E-01	2.9E-04	8.8E-03	3.9E+00	2.0E+00
VOC	Xylenes (total)	1330-20-7	ID	1.0E+00	2.8E-07			1.3E-04	1.2E-05			1.1E-01	2.2E-04			
SVOC	Acenaphthene	83-32-9		1.0E+00	2.8E-07			3.0E-04	2.7E-05			5.6E-02	1.1E-04			
SVOC	Acenaphthylene	208-96-8	D	1.0E+00	2.8E-07			3.1E-04	2.8E-05			4.8E-02	9.5E-05			
SVOC	Acetophenone	98-86-2	D	1.0E+00	2.8E-07			1.1E-05	1.0E-06			9.2E-03	1.8E-05			

Attachment G4: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
SVOC	Anthracene	120-12-7	D	1.0E+00	2.8E-07			6.4E-04	5.9E-05			3.3E-02	6.5E-05			
SVOC	Atrazine	1912-24-9	C	1.0E+00	2.8E-07	2.2E-01	1.6E+02	2.6E-05	2.4E-06	2.2E-01	1.8E+01	4.7E-06	9.2E-09	6.3E-02	1.7E+04	1.7E+01
SVOC	Benzaldehyde	100-52-7		1.0E+00	2.8E-07			1.1E-05	9.9E-07			1.9E-02	3.8E-05			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.0E+00	2.8E-07	7.3E-01	4.9E+01	2.4E-03	2.2E-04	7.3E-01	6.2E-02	2.5E-03	4.8E-06	8.9E-02	2.3E+01	6.2E-02
SVOC	Benzo(a)pyrene	50-32-8	B2	1.0E+00	2.8E-07	7.3E+00	4.9E+00	3.4E-03	3.1E-04	7.3E+00	4.4E-03	8.2E-04	1.6E-06	8.9E-01	7.0E+00	4.4E-03
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.0E+00	2.8E-07	7.3E-01	4.9E+01	3.9E-03	3.6E-04	7.3E-01	3.8E-02	3.9E-02	7.6E-05	8.9E-02	1.5E+00	3.7E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.0E+00	2.8E-07			5.3E-03	4.9E-04			1.0E-04	2.0E-07			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.0E+00	2.8E-07	7.3E-02	4.9E+02	3.9E-03	3.6E-04	7.3E-02	3.8E-01	6.0E-04	1.2E-06	8.9E-03	9.6E+02	3.8E-01
SVOC	Biphenyl	92-52-4	D	1.0E+00	2.8E-07			3.9E-04	3.6E-05			6.9E-02	1.4E-04			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.0E+00	2.8E-07			4.5E-06	4.1E-07			1.4E-04	2.8E-07			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.0E+00	2.8E-07	1.1E+00	3.3E+01	5.2E-06	4.8E-07	1.1E+00	1.9E+01	1.4E-02	2.7E-05	3.3E-01	1.1E+00	1.0E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.0E+00	2.8E-07	1.4E-02	2.6E+03	4.3E-03	3.9E-04	1.4E-02	1.8E+00	6.5E-05	1.3E-07	4.0E-03	2.0E+04	1.8E+00
SVOC	Butylbenzylphthalate	85-68-7	C	1.0E+00	2.8E-07	1.9E-03	1.9E+04	3.8E-04	3.5E-05	1.9E-03	1.5E+02	8.5E-04	1.7E-06	5.4E-04	1.1E+04	1.5E+02
SVOC	Caprolactam	105-60-2		1.0E+00	2.8E-07			8.0E-07	7.4E-08			4.8E-06	9.4E-09			
SVOC	Carbazole	86-74-8	B2	1.0E+00	2.8E-07	2.0E-02	1.8E+03	1.6E-04	1.5E-05	2.0E-02	3.4E+01	1.3E-05	2.5E-08	5.7E-03	7.0E+04	3.3E+01
SVOC	4-Chloro-3-methylphenol	59-50-7		1.0E+00	2.8E-07			9.1E-05	8.4E-06			3.5E-04	6.9E-07			
SVOC	2-Chloronaphthalene	91-58-7		1.0E+00	2.8E-07			3.7E-04	3.4E-05			6.9E-02	1.3E-04			
SVOC	2-Chlorophenol	95-57-8		1.0E+00	2.8E-07			2.4E-05	2.2E-06			8.1E-02	1.6E-04			
SVOC	Chrysene	218-01-9	B2	1.0E+00	2.8E-07	7.3E-03	4.9E+03	2.4E-03	2.2E-04	7.3E-03	6.2E+00	3.7E-02	7.3E-05	8.9E-04	1.5E+02	5.9E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.0E+00	2.8E-07	7.3E+00	4.9E+00	5.3E-03	4.9E-04	7.3E+00	2.8E-03	1.0E-05	2.0E-08	8.9E-01	5.5E+02	2.8E-03
SVOC	Dibenzofuran	132-64-9	D	1.0E+00	2.8E-07			5.4E-04	4.9E-05			9.5E-03	1.9E-05			
SVOC	2,4-Dichlorophenol	120-83-2		1.0E+00	2.8E-07			7.6E-05	7.0E-06			2.6E-03	5.1E-06			
SVOC	Diethylphthalate	84-66-2	D	1.0E+00	2.8E-07			2.1E-05	2.0E-06			3.4E-04	6.7E-07			
SVOC	2,4-Dimethylphenol	105-67-9		1.0E+00	2.8E-07			3.5E-05	3.2E-06			1.8E-03	3.6E-06			
SVOC	Dimethylphthalate	131-11-3	D	1.0E+00	2.8E-07			9.9E-06	9.1E-07			8.4E-05	1.6E-07			
SVOC	Di-n-butylphthalate	84-74-2	D	1.0E+00	2.8E-07			3.3E-04	3.1E-05			6.7E-07	1.3E-09			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.0E+00	2.8E-07			1.4E-05	1.3E-06			3.4E-04	6.6E-07			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.0E+00	2.8E-07	6.8E-01	5.3E+01	1.3E-05	1.2E-06	6.8E-01	1.2E+01	7.6E-05	1.5E-07			9.8E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.0E+00	2.8E-07	6.8E-01	5.3E+01	1.1E-05	9.8E-07	6.8E-01	1.5E+01	6.1E-04	1.2E-06	1.9E-01	4.3E+01	9.2E+00
SVOC	Di-n-octylphthalate	117-84-0		1.0E+00	2.8E-07			4.7E-03	4.4E-04			2.5E-02	4.8E-05			
SVOC	Fluoranthene	206-44-0	D	1.0E+00	2.8E-07			1.3E-03	1.2E-04			1.1E-02	2.2E-05			
SVOC	Fluorene	86-73-7	D	1.0E+00	2.8E-07			4.1E-04	3.8E-05			3.4E-02	6.6E-05			
SVOC	Formaldehyde	50-00-0	B1	1.0E+00	2.8E-07			4.2E-06	3.9E-07			5.1E-04	9.9E-07	1.3E-02	7.8E+02	7.8E+02
SVOC	Hexachlorobutadiene	87-68-3	C	1.0E+00	2.8E-07	7.8E-02	4.6E+02	5.0E-04	4.6E-05	7.8E-02	2.8E+00	7.2E-02	1.4E-04	2.2E-02	3.2E+00	1.5E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.0E+00	2.8E-07			1.1E-03	1.0E-04			7.1E-02	1.4E-04			
SVOC	Hexachloroethane	67-72-1	C	1.0E+00	2.8E-07	1.4E-02	2.6E+03	1.9E-04	1.8E-05	1.4E-02	4.1E+01	7.5E-02	1.5E-04	4.0E-03	1.7E+01	1.2E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.0E+00	2.8E-07	7.3E-01	4.9E+01	5.3E-03	4.9E-04	7.3E-01	2.8E-02	1.1E-03	2.2E-06	8.9E-02	5.1E+01	2.8E-02
SVOC	Isophorone	78-59-1	C	1.0E+00	2.8E-07	9.5E-04	3.8E+04	1.1E-05	1.1E-06	9.5E-04	1.0E+04	5.6E-03	1.1E-05			7.9E+03
SVOC	2-Methylnaphthalene	91-57-6	ID	1.0E+00	2.8E-07			2.9E-04	2.7E-05			8.1E-02	1.6E-04			
SVOC	Methylphenol (total)	1319-77-3		1.0E+00	2.8E-07			2.2E-05	2.0E-06			8.3E-04	1.6E-06			
SVOC	Naphthalene	91-20-3	C	1.0E+00	2.8E-07			1.5E-04	1.4E-05			8.4E-02	1.6E-04			
SVOC	2-Nitroaniline	88-74-4		1.0E+00	2.8E-07			1.4E-05	1.3E-06			1.4E-04	2.8E-07			
SVOC	Nitrobenzene	98-95-3	D	1.0E+00	2.8E-07			1.6E-05	1.5E-06			1.8E-02	3.6E-05			
SVOC	2-Nitrophenol	88-75-5		1.0E+00	2.8E-07			1.3E-05	1.2E-06			7.8E-03	1.5E-05			
SVOC	4-Nitrophenol	100-02-7		1.0E+00	2.8E-07			1.6E-05	1.4E-06			3.7E-07	7.3E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.0E+00	2.8E-07	4.9E-03	7.3E+03	6.8E-05	6.3E-06	4.9E-03	3.2E+02	3.8E-03	7.4E-06			3.1E+02

Attachment G4: Risk-Based Cancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.0E+00	2.8E-07	7.0E+00	5.1E+00	7.7E-06	7.1E-07	7.0E+00	2.0E+00	2.0E-03	4.0E-06	2.0E+00	1.3E+00	6.7E-01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.0E+00	2.8E-07	7.0E-02	5.1E+02	2.8E-05	2.5E-06	7.0E-02	5.6E+01	4.7E-02	9.2E-05	1.0E-02	1.1E+01	9.0E+00
SVOC	Pentachlorophenol	87-86-5	B2	1.0E+00	2.8E-07	1.2E-01	3.0E+02	7.4E-04	6.9E-05	1.2E-01	1.2E+00	1.8E-05	3.4E-08	3.4E-02	8.5E+03	1.2E+00
SVOC	Phenanthrene	85-01-8	D	1.0E+00	2.8E-07			5.6E-04	5.2E-05			1.6E-02	3.1E-05			
SVOC	Phenol	108-95-2	ID	1.0E+00	2.8E-07			1.2E-05	1.1E-06			4.0E-04	7.9E-07			
SVOC	Pyrene	129-00-0	D	1.0E+00	2.8E-07			1.3E-03	1.2E-04			7.9E-03	1.5E-05			
SVOC	2,4,5-Trichlorophenol	95-95-4		1.0E+00	2.8E-07			2.1E-04	1.9E-05			3.3E-03	6.5E-06			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.0E+00	2.8E-07	1.1E-02	3.3E+03	1.6E-04	1.4E-05	1.1E-02	6.3E+01	5.8E-03	1.1E-05	3.1E-03	2.9E+02	5.1E+01
PCB	PCBs (total)	1336-36-3	B2	1.0E+00	2.8E-07	2.0E+00	1.8E+01	3.3E-03	3.1E-04	2.0E+00	1.6E-02	6.2E-02	1.2E-04	5.7E-01	1.4E-01	1.5E-02
INORG	Antimony	7440-36-0		1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Arsenic	7440-38-2	A	1.0E+00	2.8E-07	1.5E+00	2.4E+01	2.0E-06	1.8E-07	1.5E+00	3.6E+01			4.3E+00		1.4E+01
INORG	Barium	7440-39-3	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Beryllium	7440-41-7	B1	1.0E+00	2.8E-07			2.0E-06	1.8E-07					2.4E+00		
INORG	Cadmium	7440-43-9	B1	1.0E+00	2.8E-07			2.0E-06	1.8E-07					1.8E+00		
INORG	Chromium (total)	7440-47-3		1.0E+00	2.8E-07			4.0E-06	3.7E-07					1.2E+01		
INORG	Chromium III	16065-83-1	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Chromium VI	18540-29-9	A	1.0E+00	2.8E-07			4.0E-06	3.7E-07					1.2E+01		
INORG	Cobalt	7440-48-4	B1	1.0E+00	2.8E-07			8.0E-07	7.4E-08					2.8E+00		
INORG	Copper	7440-50-8	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Cyanide (total)	57-12-5	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Fluoride	16984-48-8		1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Lead	7439-92-1	B2	1.0E+00	2.8E-07			2.0E-07	1.8E-08							
INORG	Manganese	7439-96-5	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Mercury	7439-97-6	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07			8.2E-02	1.6E-04			
INORG	Nickel	7440-02-0	A	1.0E+00	2.8E-07			4.0E-07	3.7E-08					2.4E-01		
INORG	Selenium	7782-49-2	D	1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Silver	7440-22-4	D	1.0E+00	2.8E-07			1.2E-06	1.1E-07							
INORG	Thallium	7440-28-0		1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Vanadium	7440-62-2		1.0E+00	2.8E-07			2.0E-06	1.8E-07							
INORG	Zinc	7440-66-6	D	1.0E+00	2.8E-07			1.2E-06	1.1E-07							

Note:

Target cancer risk of 1E-05

C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)

Attachment G4: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
VOC	Acetone	67-64-1	ID	1.0E+00	2.0E-06	9.0E-01	4.6E+05	1.3E-06	8.2E-07	9.0E-01	1.1E+06	3.6E-02	4.9E-04	3.2E+00	6.4E+03	6.3E+03
VOC	Benzene	71-43-2	A	1.0E+00	2.0E-06	4.0E-03	2.0E+03	3.7E-05	2.4E-05	4.0E-03	1.7E+02	1.3E-01	1.8E-03	3.0E-02	1.7E+01	1.5E+01
VOC	Bromodichloromethane	75-27-4	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.7E-05	1.1E-05	2.0E-02	1.8E+03	8.6E-02	1.2E-03	7.0E-02	5.9E+01	5.7E+01
VOC	Bromoform	75-25-2	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.4E-05	9.0E-06	2.0E-02	2.2E+03	6.2E-02	8.5E-04			1.8E+03
VOC	Bromomethane	74-83-9	D	1.0E+00	2.0E-06	1.4E-03	7.2E+02	7.7E-06	5.0E-06	1.4E-03	2.8E+02	1.2E-01	1.6E-03	5.0E-03	3.1E+00	3.0E+00
VOC	2-Butanone	78-93-3	ID	1.0E+00	2.0E-06	6.0E-01	3.1E+05	2.4E-06	1.6E-06	6.0E-01	3.8E+05	4.3E-02	5.9E-04	5.0E+00	8.5E+03	8.1E+03
VOC	Carbon Disulfide	75-15-0		1.0E+00	2.0E-06	1.0E-01	5.1E+04	3.1E-05	2.0E-05	1.0E-01	5.0E+03	1.3E-01	1.8E-03	7.0E-01	3.8E+02	3.5E+02
VOC	Carbon Tetrachloride	56-23-5	B2	1.0E+00	2.0E-06	7.0E-04	3.6E+02	4.8E-05	3.1E-05	7.0E-04	2.2E+01	9.5E-02	1.3E-03			2.1E+01
VOC	Chlorobenzene	108-90-7	D	1.0E+00	2.0E-06	2.0E-02	1.0E+04	8.0E-05	5.2E-05	2.0E-02	3.9E+02	1.1E-01	1.5E-03	6.0E-02	4.1E+01	3.7E+01
VOC	Chloroethane	75-00-3		1.0E+00	2.0E-06	4.0E-01	2.0E+05	1.5E-05	9.6E-06	4.0E-01	4.2E+04	1.4E-01	2.0E-03	1.0E+01	5.1E+03	4.4E+03
VOC	Chloroform	67-66-3	B2	1.0E+00	2.0E-06	1.0E-02	5.1E+03	1.9E-05	1.2E-05	1.0E-02	8.3E+02	1.0E-01	1.4E-03	5.0E-02	3.5E+01	3.3E+01
VOC	Chloromethane	74-87-3	D	1.0E+00	2.0E-06			3.6E-05	2.3E-05			1.6E-01	2.2E-03	9.0E-02	4.0E+01	4.0E+01
VOC	Cumene	98-82-8	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.9E-04	1.2E-04	1.0E-01	8.0E+02	1.1E-01	1.5E-03	4.0E-01	2.7E+02	2.0E+02
VOC	Cyclohexane	110-82-7	ID	1.0E+00	2.0E-06			2.3E-04	1.5E-04			1.3E-01	1.8E-03	6.0E+00	3.4E+03	3.4E+03
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1.0E+00	2.0E-06			2.4E-05	1.5E-05			4.5E-02	6.2E-04	2.0E-04	3.2E-01	3.2E-01
VOC	Dibromochloromethane	124-48-1	C	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.4E-05	9.2E-06	2.0E-02	2.2E+03	7.2E-02	9.9E-04	7.0E-02	7.1E+01	6.8E+01
VOC	1,2-Dibromoethane	106-93-4	LC	1.0E+00	2.0E-06	9.0E-03	4.6E+03	6.8E-06	4.4E-06	9.0E-03	2.0E+03	7.5E-02	1.0E-03	9.0E-03	8.7E+00	8.7E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	1.0E+00	2.0E-06	9.0E-02	4.6E+04	1.5E-04	9.4E-05	9.0E-02	9.6E+02	9.2E-02	1.3E-03	2.0E-01	1.6E+02	1.4E+02
VOC	1,3-Dichlorobenzene	541-73-1	D	1.0E+00	2.0E-06	9.0E-02	4.6E+04	1.4E-04	8.7E-05	9.0E-02	1.0E+03	9.4E-02	1.3E-03	1.4E-01	1.1E+02	9.8E+01
VOC	1,4-Dichlorobenzene	106-46-7	C	1.0E+00	2.0E-06	3.0E-02	1.5E+04	1.4E-04	9.3E-05	3.0E-02	3.2E+02	9.3E-02	1.3E-03	8.0E-01	6.3E+02	2.1E+02
VOC	Dichlorodifluoromethane	75-71-8		1.0E+00	2.0E-06	2.0E-01	1.0E+05	2.6E-05	1.7E-05	2.0E-01	1.2E+04	1.1E-01	1.5E-03	2.0E-01	1.4E+02	1.3E+02
VOC	1,1-Dichloroethane	75-34-3	C	1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.8E-05	1.2E-05	1.0E-01	8.5E+03	1.2E-01	1.6E-03	5.0E-01	3.1E+02	3.0E+02
VOC	1,2-Dichloroethane	107-06-2	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.1E-05	7.3E-06	2.0E-02	2.7E+03	1.1E-01	1.4E-03	5.0E-03	3.5E+00	3.4E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.0E+00	2.0E-06	5.0E-02	2.6E+04	3.1E-05	2.0E-05	5.0E-02	2.5E+03	1.2E-01	1.6E-03	2.0E-01	1.2E+02	1.2E+02
VOC	1,2-Dichloroethene (total)	540-59-0		1.0E+00	2.0E-06	9.0E-03	4.6E+03	2.1E-05	1.3E-05	9.0E-03	6.7E+02	1.2E-01	1.6E-03	3.2E-02	1.9E+01	1.9E+01
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.0E+00	2.0E-06	1.0E-02	5.1E+03	2.1E-05	1.3E-05	1.0E-02	7.5E+02	1.2E-01	1.6E-03	3.5E-02	2.2E+01	2.1E+01
VOC	trans-1,2-Dichloroethene	156-60-5		1.0E+00	2.0E-06	2.0E-02	1.0E+04	2.8E-05	1.8E-05	2.0E-02	1.1E+03	1.2E-01	1.6E-03	6.0E-02	3.7E+01	3.5E+01
VOC	1,2-Dichloropropane	78-87-5	B2	1.0E+00	2.0E-06			2.1E-05	1.4E-05			1.1E-01	1.5E-03	4.0E-03	2.7E+00	2.7E+00
VOC	1,3-Dichloropropene (total)	542-75-6	B2	1.0E+00	2.0E-06	3.0E-02	1.5E+04	2.3E-05	1.5E-05	3.0E-02	2.1E+03	1.1E-01	1.5E-03	2.0E-02	1.3E+01	1.3E+01
VOC	cis-1,3-Dichloropropene	10061-01-5		1.0E+00	2.0E-06	3.0E-02	1.5E+04	9.3E-06	6.0E-06	3.0E-02	5.0E+03	1.1E-01	1.5E-03	2.0E-02	1.3E+01	1.3E+01
VOC	trans-1,3-Dichloropropene	10061-02-6		1.0E+00	2.0E-06			2.2E-05	1.4E-05			1.0E-01	1.4E-03			
VOC	Ethyl Benzene	100-41-4	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.3E-04	8.2E-05	1.0E-01	1.2E+03	1.1E-01	1.5E-03	1.0E+00	6.5E+02	4.2E+02
VOC	2-Hexanone	591-78-6		1.0E+00	2.0E-06	4.0E-02	2.0E+04	9.8E-06	6.3E-06	4.0E-02	6.4E+03	1.1E-01	1.5E-03	5.0E-03	3.3E+00	3.3E+00
VOC	Methyl Acetate	79-20-9		1.0E+00	2.0E-06	1.0E+00	5.1E+05	2.0E-06	1.3E-06	1.0E+00	7.6E+05	5.8E-02	7.9E-04	3.5E+00	4.4E+03	4.4E+03
VOC	Methyl tert-butyl ether	1634-04-4		1.0E+00	2.0E-06			8.8E-06	5.7E-06			1.0E-01	1.4E-03	3.0E+00	2.1E+03	2.1E+03
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.0E+00	2.0E-06			7.3E-06	4.7E-06			6.3E-02	8.7E-04	3.0E+00	3.5E+03	3.5E+03
VOC	Methylcyclohexane	108-87-2		1.0E+00	2.0E-06			1.0E-04	6.8E-05			1.2E-01	1.6E-03	3.0E+00	1.8E+03	1.8E+03
VOC	Methylene Chloride	75-09-2	B2	1.0E+00	2.0E-06	6.0E-02	3.1E+04	9.3E-06	6.0E-06	6.0E-02	1.0E+04	1.2E-01	1.7E-03	3.0E+00	1.8E+03	1.5E+03
VOC	Styrene	100-42-5		1.0E+00	2.0E-06	2.0E-01	1.0E+05	9.6E-05	6.2E-05	2.0E-01	3.2E+03	1.1E-01	1.5E-03	1.0E+00	6.6E+02	5.4E+02
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1.0E+00	2.0E-06	6.0E-02	3.1E+04	2.6E-05	1.7E-05	6.0E-02	3.6E+03	6.9E-02	9.5E-04			3.2E+03
VOC	Tetrachloroethene	127-18-4	C-B2	1.0E+00	2.0E-06	1.0E-02	5.1E+03	4.0E-05	2.6E-05	1.0E-02	3.9E+02	9.1E-02	1.2E-03	4.0E-01	3.2E+02	1.7E+02
VOC	Toluene	108-88-3	D	1.0E+00	2.0E-06	8.0E-02	4.1E+04	8.1E-05	5.2E-05	8.0E-02	1.5E+03	1.2E-01	1.7E-03	5.0E+00	3.0E+03	9.9E+02
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.0E+00	2.0E-06	1.0E-02	5.1E+03	2.8E-04	1.8E-04	1.0E-02	5.6E+01	8.1E-02	1.1E-03	2.0E-01	1.8E+02	4.2E+01
VOC	1,1,1-Trichloroethane	71-55-6	D	1.0E+00	2.0E-06	2.8E-01	1.4E+05	3.9E-05	2.5E-05	2.8E-01	1.1E+04	1.0E-01	1.4E-03	2.2E+00	1.6E+03	1.4E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	1.0E+00	2.0E-06	4.0E-03	2.0E+03	2.0E-05	1.3E-05	4.0E-03	3.1E+02	9.1E-02	1.2E-03			2.7E+02

Attachment G4: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
VOC	Trichloroethene	79-01-6	C-B2	1.0E+00	2.0E-06	6.0E-03	3.1E+03	5.5E-05	3.6E-05	6.0E-03	1.7E+02	1.0E-01	1.4E-03			1.6E+02
VOC	Trichlorofluoromethane	75-69-4		1.0E+00	2.0E-06	3.0E-01	1.5E+05	4.0E-05	2.6E-05	3.0E-01	1.2E+04	1.0E-01	1.4E-03	7.0E-01	5.1E+02	4.9E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.0E+00	2.0E-06	3.0E+01	1.5E+07	7.3E-05	4.7E-05	3.0E+01	6.4E+05	8.6E-02	1.2E-03	3.0E+01	2.5E+04	2.4E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.0E+00	2.0E-06	5.0E-02	2.6E+04	2.3E-04	1.5E-04	5.0E-02	3.3E+02	1.1E-01	1.4E-03	6.0E-03	4.2E+00	4.1E+00
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.0E+00	2.0E-06	5.0E-02	2.6E+04	4.0E-04	2.6E-04	5.0E-02	1.9E+02	1.1E-01	1.4E-03	6.0E-03	4.2E+00	4.1E+00
VOC	Vinyl Chloride	75-01-4	A	1.0E+00	2.0E-06	3.0E-03	1.5E+03	1.7E-05	1.1E-05	3.0E-03	2.8E+02	1.5E-01	2.0E-03	1.0E-01	4.9E+01	4.1E+01
VOC	Xylenes (total)	1330-20-7	ID	1.0E+00	2.0E-06	2.0E-01	1.0E+05	1.3E-04	8.5E-05	2.0E-01	2.4E+03	1.1E-01	1.5E-03	1.0E-01	6.5E+01	6.3E+01
SVOC	Acenaphthene	83-32-9		1.0E+00	2.0E-06	6.0E-02	3.1E+04	3.0E-04	1.9E-04	6.0E-02	3.1E+02	5.6E-02	7.6E-04	2.1E-01	2.8E+02	1.5E+02
SVOC	Acenaphthylene	208-96-8	D	1.0E+00	2.0E-06	3.0E-02	1.5E+04	3.1E-04	2.0E-04	3.0E-02	1.5E+02	4.8E-02	6.6E-04	1.1E-01	1.6E+02	7.7E+01
SVOC	Acetophenone	98-86-2	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.1E-05	7.1E-06	1.0E-01	1.4E+04	9.2E-03	1.3E-04	3.5E-01	2.8E+03	2.2E+03
SVOC	Anthracene	120-12-7	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	6.4E-04	4.1E-04	3.0E-01	7.2E+02	3.3E-02	4.6E-04			7.2E+02
SVOC	Atrazine	1912-24-9	C	1.0E+00	2.0E-06	3.5E-02	1.8E+04	2.6E-05	1.7E-05	3.5E-02	2.1E+03	4.7E-06	6.5E-08	1.2E-01	1.9E+06	1.8E+03
SVOC	Benzaldehyde	100-52-7		1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.1E-05	6.9E-06	1.0E-01	1.4E+04	1.9E-02	2.6E-04	3.5E-01	1.3E+03	1.2E+03
SVOC	Benzo(a)anthracene	56-55-3	B2	1.0E+00	2.0E-06			2.4E-03	1.5E-03			2.5E-03	3.4E-05			
SVOC	Benzo(a)pyrene	50-32-8	B2	1.0E+00	2.0E-06			3.4E-03	2.2E-03			8.2E-04	1.1E-05			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.0E+00	2.0E-06			3.9E-03	2.5E-03			3.9E-02	5.3E-04			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.0E+00	2.0E-06	3.0E-02	1.5E+04	5.3E-03	3.4E-03	3.0E-02	8.8E+00	1.0E-04	1.4E-06	1.1E-01	7.7E+04	8.8E+00
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.0E+00	2.0E-06			3.9E-03	2.5E-03			6.0E-04	8.3E-06			
SVOC	Biphenyl	92-52-4	D	1.0E+00	2.0E-06	5.0E-02	2.6E+04	3.9E-04	2.5E-04	5.0E-02	2.0E+02	6.9E-02	9.5E-04	1.8E-01	1.8E+02	9.6E+01
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.0E+00	2.0E-06			4.5E-06	2.9E-06			1.4E-04	1.9E-06			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.0E+00	2.0E-06			5.2E-06	3.4E-06			1.4E-02	1.9E-04			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.3E-03	2.8E-03	2.0E-02	7.3E+00	6.5E-05	8.8E-07	7.0E-02	7.9E+04	7.3E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1.0E+00	2.0E-06			2.7E-04	1.7E-04			4.0E-02	5.5E-04			
SVOC	Butylbenzylphthalate	85-68-7	C	1.0E+00	2.0E-06	2.0E-01	1.0E+05	3.8E-04	2.4E-04	2.0E-01	8.2E+02	8.5E-04	1.2E-05	7.0E-01	6.0E+04	8.0E+02
SVOC	Caprolactam	105-60-2		1.0E+00	2.0E-06	5.0E-01	2.6E+05	8.0E-07	5.2E-07	5.0E-01	9.7E+05	4.8E-06	6.6E-08	1.8E+00	2.6E+07	2.0E+05
SVOC	Carbazole	86-74-8	B2	1.0E+00	2.0E-06			1.6E-04	1.0E-04			1.3E-05	1.8E-07			
SVOC	4-Chloro-3-methylphenol	59-50-7		1.0E+00	2.0E-06			9.1E-05	5.9E-05			3.5E-04	4.8E-06			
SVOC	4-Chloroaniline	106-47-8		1.0E+00	2.0E-06	4.0E-03	2.0E+03	1.6E-05	1.0E-05	4.0E-03	4.0E+02	3.0E-04	4.2E-06	1.4E-02	3.4E+03	3.0E+02
SVOC	2-Chloronaphthalene	91-58-7		1.0E+00	2.0E-06	8.0E-02	4.1E+04	3.7E-04	2.4E-04	8.0E-02	3.4E+02	6.9E-02	9.4E-04	2.8E-01	3.0E+02	1.6E+02
SVOC	2-Chlorophenol	95-57-8		1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.4E-05	1.6E-05	5.0E-03	3.2E+02	8.1E-02	1.1E-03	1.8E-02	1.6E+01	1.5E+01
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1.0E+00	2.0E-06			2.6E-04	1.7E-04			5.6E-02	7.6E-04			
SVOC	Chrysene	218-01-9	B2	1.0E+00	2.0E-06			2.4E-03	1.5E-03			3.7E-02	5.1E-04			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.0E+00	2.0E-06			5.3E-03	3.4E-03			1.0E-05	1.4E-07			
SVOC	Dibenzofuran	132-64-9	D	1.0E+00	2.0E-06	2.0E-03	1.0E+03	5.4E-04	3.5E-04	2.0E-03	5.8E+00	9.5E-03	1.3E-04	7.0E-03	5.4E+01	5.2E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1.0E+00	2.0E-06			8.1E-05	5.3E-05			2.9E-06	4.0E-08			
SVOC	2,4-Dichlorophenol	120-83-2		1.0E+00	2.0E-06	3.0E-03	1.5E+03	7.6E-05	4.9E-05	3.0E-03	6.1E+01	2.6E-03	3.6E-05	1.1E-02	2.9E+02	4.9E+01
SVOC	Diethylphthalate	84-66-2	D	1.0E+00	2.0E-06	8.0E-01	4.1E+05	2.1E-05	1.4E-05	8.0E-01	5.8E+04	3.4E-04	4.7E-06	2.8E+00	5.9E+05	4.7E+04
SVOC	2,4-Dimethylphenol	105-67-9		1.0E+00	2.0E-06	2.0E-02	1.0E+04	3.5E-05	2.3E-05	2.0E-02	8.8E+02	1.8E-03	2.5E-05	7.0E-02	2.8E+03	6.3E+02
SVOC	Dimethylphthalate	131-11-3	D	1.0E+00	2.0E-06			9.9E-06	6.4E-06			8.4E-05	1.1E-06			
SVOC	Di-n-butylphthalate	84-74-2	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	3.3E-04	2.1E-04	1.0E-01	4.7E+02	6.7E-07	9.1E-09			4.6E+02
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.0E+00	2.0E-06	1.0E-04	5.1E+01	1.4E-05	9.1E-06	1.0E-04	1.1E+01	3.4E-04	4.6E-06	3.5E-04	7.6E+01	8.1E+00
SVOC	2,4-Dinitrophenol	51-28-5		1.0E+00	2.0E-06	2.0E-03	1.0E+03	6.5E-06	4.2E-06	2.0E-03	4.8E+02	3.6E-04	4.9E-06			3.3E+02
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.0E+00	2.0E-06	2.0E-03	1.0E+03	1.3E-05	8.5E-06	2.0E-03	2.4E+02	7.6E-05	1.0E-06			1.9E+02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.0E+00	2.0E-06	1.0E-03	5.1E+02	1.1E-05	6.9E-06	1.0E-03	1.5E+02	6.1E-04	8.3E-06	3.5E-03	4.2E+02	8.9E+01
SVOC	Di-n-octylphthalate	117-84-0		1.0E+00	2.0E-06	4.0E-02	2.0E+04	4.7E-03	3.0E-03	4.0E-02	1.3E+01	2.5E-02	3.4E-04			1.3E+01

Attachment G4: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
SVOC	Fluoranthene	206-44-0	D	1.0E+00	2.0E-06	4.0E-02	2.0E+04	1.3E-03	8.4E-04	4.0E-02	4.7E+01	1.1E-02	1.5E-04	1.4E-01	9.3E+02	4.5E+01
SVOC	Fluorene	86-73-7	D	1.0E+00	2.0E-06	4.0E-02	2.0E+04	4.1E-04	2.7E-04	4.0E-02	1.5E+02	3.4E-02	4.6E-04	1.4E-01	3.0E+02	1.0E+02
SVOC	Formaldehyde	50-00-0	B1	1.0E+00	2.0E-06	2.0E-01	1.0E+05	4.2E-06	2.7E-06	2.0E-01	7.3E+04	5.1E-04	6.9E-06			4.3E+04
SVOC	Hexachlorobenzene	118-74-1	B2	1.0E+00	2.0E-06	8.0E-04	4.1E+02	2.0E-03	1.3E-03	8.0E-04	6.3E-01	6.5E-02	8.9E-04			6.3E-01
SVOC	Hexachlorobutadiene	87-68-3	C	1.0E+00	2.0E-06	2.0E-04	1.0E+02	5.0E-04	3.2E-04	2.0E-04	6.2E-01	7.2E-02	9.9E-04			6.1E-01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.0E+00	2.0E-06	6.0E-03	3.1E+03	1.1E-03	7.3E-04	6.0E-03	8.3E+00	7.1E-02	9.7E-04	2.0E-04	2.1E-01	2.0E-01
SVOC	Hexachloroethane	67-72-1	C	1.0E+00	2.0E-06	1.0E-03	5.1E+02	1.9E-04	1.2E-04	1.0E-03	8.1E+00	7.5E-02	1.0E-03			8.0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.0E+00	2.0E-06			5.3E-03	3.4E-03			1.1E-03	1.5E-05			
SVOC	Isophorone	78-59-1	C	1.0E+00	2.0E-06	2.0E-01	1.0E+05	1.1E-05	7.4E-06	2.0E-01	2.7E+04	5.6E-03	7.7E-05			2.1E+04
SVOC	2-Methylnaphthalene	91-57-6	ID	1.0E+00	2.0E-06	4.0E-03	2.0E+03	2.9E-04	1.9E-04	4.0E-03	2.1E+01	8.1E-02	1.1E-03	3.0E-03	2.7E+00	2.4E+00
SVOC	Methylphenol (total)	1319-77-3		1.0E+00	2.0E-06	5.0E-02	2.6E+04	2.2E-05	1.4E-05	5.0E-02	3.6E+03	8.3E-04	1.1E-05			3.1E+03
SVOC	2-Methylphenol	95-48-7	C	1.0E+00	2.0E-06	5.0E-02	2.6E+04	2.3E-05	1.5E-05	5.0E-02	3.4E+03	1.2E-03	1.6E-05			3.0E+03
SVOC	4-Methylphenol	106-44-5	C	1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.0E-05	1.3E-05	5.0E-03	3.8E+02	7.6E-04	1.0E-05			3.3E+02
SVOC	Naphthalene	91-20-3	C	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.5E-04	9.6E-05	2.0E-02	2.1E+02	8.4E-02	1.2E-03	3.0E-03	2.6E+00	2.6E+00
SVOC	2-Nitroaniline	88-74-4		1.0E+00	2.0E-06	3.0E-03	1.5E+03	1.4E-05	9.3E-06	3.0E-03	3.2E+02	1.4E-04	2.0E-06	2.0E-04	1.0E+02	7.4E+01
SVOC	3-Nitroaniline	99-09-2	C	1.0E+00	2.0E-06	3.0E-04	1.5E+02	6.9E-06	4.5E-06	3.0E-04	6.7E+01	1.3E-04	1.8E-06	1.0E-03	5.7E+02	4.3E+01
SVOC	4-Nitroaniline	100-01-6	C	1.0E+00	2.0E-06	3.0E-03	1.5E+03	7.2E-06	4.6E-06	3.0E-03	6.5E+02	1.9E-06	2.5E-08	4.0E-03	1.6E+05	4.5E+02
SVOC	Nitrobenzene	98-95-3	D	1.0E+00	2.0E-06	5.0E-04	2.6E+02	1.6E-05	1.0E-05	5.0E-04	4.8E+01	1.8E-02	2.5E-04	2.0E-03	7.9E+00	6.6E+00
SVOC	2-Nitrophenol	88-75-5		1.0E+00	2.0E-06			1.3E-05	8.4E-06			7.8E-03	1.1E-04			
SVOC	4-Nitrophenol	100-02-7		1.0E+00	2.0E-06			1.6E-05	1.0E-05			3.7E-07	5.1E-09			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	6.8E-05	4.4E-05	2.0E-02	4.5E+02	3.8E-03	5.2E-05			4.4E+02
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.0E+00	2.0E-06			7.7E-06	5.0E-06			2.0E-03	2.8E-05			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.0E+00	2.0E-06	4.0E-02	2.0E+04	2.8E-05	1.8E-05	4.0E-02	2.2E+03	4.7E-02	6.4E-04			2.0E+03
SVOC	Pentachlorophenol	87-86-5	B2	1.0E+00	2.0E-06	3.0E-02	1.5E+04	7.4E-04	4.8E-04	3.0E-02	6.3E+01	1.8E-05	2.4E-07	1.1E-01	4.4E+05	6.2E+01
SVOC	Phenanthrene	85-01-8	D	1.0E+00	2.0E-06	3.0E-02	1.5E+04	5.6E-04	3.6E-04	3.0E-02	8.3E+01	1.6E-02	2.2E-04	1.1E-01	4.9E+02	7.1E+01
SVOC	Phenol	108-95-2	ID	1.0E+00	2.0E-06	3.0E-01	1.5E+05	1.2E-05	7.7E-06	3.0E-01	3.9E+04	4.0E-04	5.5E-06			3.1E+04
SVOC	Pyrene	129-00-0	D	1.0E+00	2.0E-06	3.0E-02	1.5E+04	1.3E-03	8.3E-04	3.0E-02	3.6E+01	7.9E-03	1.1E-04	1.1E-01	9.7E+02	3.5E+01
SVOC	2,4,5-Trichlorophenol	95-95-4		1.0E+00	2.0E-06	1.0E-01	5.1E+04	2.1E-04	1.4E-04	1.0E-01	7.3E+02	3.3E-03	4.5E-05			7.2E+02
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.0E+00	2.0E-06	1.0E-04	5.1E+01	1.6E-04	1.0E-04	1.0E-04	9.9E-01	5.8E-03	7.9E-05			9.8E-01
PCB	PCBs (total)	1336-36-3	B2	1.0E+00	2.0E-06	2.0E-05	1.0E+01	3.3E-03	2.1E-03	2.0E-05	9.4E-03	6.2E-02	8.5E-04			9.4E-03
INORG	Antimony	7440-36-0		1.0E+00	2.0E-06	4.0E-04	2.0E+02	2.0E-06	1.3E-06	6.0E-05	4.6E+01			1.4E-03		3.8E+01
INORG	Arsenic	7440-38-2	A	1.0E+00	2.0E-06	3.0E-04	1.5E+02	2.0E-06	1.3E-06	3.0E-04	2.3E+02					9.2E+01
INORG	Barium	7440-39-3	D	1.0E+00	2.0E-06	7.0E-02	3.6E+04	2.0E-06	1.3E-06	4.9E-03	3.8E+03					3.4E+03
INORG	Beryllium	7440-41-7	B1	1.0E+00	2.0E-06	2.0E-03	1.0E+03	2.0E-06	1.3E-06	1.4E-05	1.1E+01			2.0E-05		1.1E+01
INORG	Cadmium	7440-43-9	B1	1.0E+00	2.0E-06	1.0E-03	5.1E+02	2.0E-06	1.3E-06	2.5E-05	1.9E+01			2.0E-04		1.9E+01
INORG	Chromium (total)	7440-47-3		1.0E+00	2.0E-06	3.0E-03	1.5E+03	4.0E-06	2.6E-06	7.5E-05	2.9E+01			1.0E-04		2.8E+01
INORG	Chromium III	16065-83-1	D	1.0E+00	2.0E-06	1.5E+00	7.7E+05	2.0E-06	1.3E-06	2.0E-02	1.5E+04			5.3E+00		1.5E+04
INORG	Chromium VI	18540-29-9	A	1.0E+00	2.0E-06	3.0E-03	1.5E+03	4.0E-06	2.6E-06	7.5E-05	2.9E+01			1.0E-04		2.8E+01
INORG	Cobalt	7440-48-4	B1	1.0E+00	2.0E-06	2.0E-02	1.0E+04	8.0E-07	5.2E-07	2.0E-02	3.9E+04			2.0E-05		8.1E+03
INORG	Copper	7440-50-8	D	1.0E+00	2.0E-06	4.0E-02	2.0E+04	2.0E-06	1.3E-06	4.0E-02	3.1E+04			1.4E-01		1.2E+04
INORG	Cyanide (total)	57-12-5	D	1.0E+00	2.0E-06	2.0E-02	1.0E+04	2.0E-06	1.3E-06	2.0E-02	1.5E+04			7.0E-02		6.2E+03
INORG	Fluoride	16984-48-8		1.0E+00	2.0E-06			2.0E-06	1.3E-06							
INORG	Lead	7439-92-1	B2	1.0E+00	2.0E-06			2.0E-07	1.3E-07							
INORG	Manganese	7439-96-5	D	1.0E+00	2.0E-06	1.4E-01	7.2E+04	2.0E-06	1.3E-06	8.4E-03	6.5E+03			5.0E-05		6.0E+03
INORG	Mercury	7439-97-6	D	1.0E+00	2.0E-06	3.0E-04	1.5E+02	2.0E-06	1.3E-06	3.0E-04	2.3E+02	8.2E-02	1.1E-03	3.0E-04	2.7E-01	2.7E-01

Attachment G4: Risk-Based Noncancer Criteria for Exposure of Maintenance Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
INORG	Nickel	7440-02-0	A	1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.0E-07	2.6E-07	8.0E-04	3.1E+03					2.4E+03
INORG	Selenium	7782-49-2	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.0E-06	1.3E-06	5.0E-03	3.9E+03			1.8E-02		1.5E+03
INORG	Silver	7440-22-4	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	1.2E-06	7.7E-07	2.0E-04	2.6E+02			1.0E-05		2.3E+02
INORG	Thallium	7440-28-0		1.0E+00	2.0E-06	7.0E-05	3.6E+01	2.0E-06	1.3E-06	7.0E-05	5.4E+01			2.5E-04		2.2E+01
INORG	Vanadium	7440-62-2		1.0E+00	2.0E-06	7.0E-03	3.6E+03	2.0E-06	1.3E-06	1.8E-04	1.4E+02			2.5E-02		1.4E+02
INORG	Zinc	7440-66-6	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	1.2E-06	7.7E-07	3.0E-01	3.9E+05			1.1E+00		1.1E+05
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
Note:																
Target hazard index of 1																
C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)																

Attachment G5

Exposure of Maintenance Workers to LNAPL and Smear Zone Soil

Attachment G5: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
VOC	Acetone	67-64-1		4.62E-03	1.24E-01	1.13E+00	2.17E-03	1.00E-05		
VOC	Benzene	71-43-2	2.90E+03	1.91E-03	8.80E-02	1.59E+00	1.72E-03	3.28E-06	8.38E+00	9.19E+01
VOC	2-Butanone	78-93-3		1.91E-03	8.08E-02	1.73E+00	1.63E-03	3.11E-06		
VOC	Carbon Disulfide	75-15-0		7.21E-03	1.04E-01	1.34E+00	1.92E-03	1.39E-05		
VOC	Chloroethane	75-00-3		2.03E-02	2.71E-01	5.15E-01	3.66E-03	7.40E-05		
VOC	Chloromethane	74-87-3		8.64E-02	1.26E-01	1.11E+00	2.19E-03	1.89E-04		
VOC	Cumene	98-82-8	6.10E+02	9.04E-05	6.50E-02	2.15E+00	1.40E-03	1.27E-07	6.82E-02	7.47E-01
VOC	Cyclohexane	110-82-7		1.95E-03	8.39E-02	1.66E+00	1.67E-03	3.24E-06		
VOC	1,2-Dichlorobenzene	95-50-1		2.73E-05	6.90E-02	2.02E+00	1.46E-03	3.99E-08		
VOC	Dichlorodifluoromethane	75-71-8		9.74E-02	8.00E-02	1.74E+00	1.61E-03	1.57E-04		
VOC	1,1-Dichloroethane	75-34-3	1.04E+00	4.57E-03	7.42E-02	1.88E+00	1.53E-03	7.01E-06	6.42E-03	7.03E-02
VOC	cis-1,2-Dichloroethene	156-59-2	1.35E+00	4.08E-03	7.36E-02	1.90E+00	1.53E-03	6.22E-06	7.39E-03	8.10E-02
VOC	Ethyl Benzene	100-41-4	8.60E+03	1.93E-04	7.50E-02	1.86E+00	1.55E-03	2.98E-07	2.26E+00	2.47E+01
VOC	Methyl Acetate	79-20-9		4.34E-03	9.57E-02	1.46E+00	1.82E-03	7.91E-06		
VOC	4-Methyl-2-pentanone	108-10-1		3.99E-04	7.50E-02	1.86E+00	1.55E-03	6.17E-07		
VOC	Methylcyclohexane	108-87-2	3.90E+02	8.64E-04	7.35E-02	1.90E+00	1.53E-03	1.32E-06	4.52E-01	4.96E+00
VOC	Methylene Chloride	75-09-2	1.80E+02	8.70E-03	1.01E-01	1.38E+00	1.89E-03	1.64E-05	2.60E+00	2.85E+01
VOC	Tetrachloroethene	127-18-4		3.73E-04	7.20E-02	1.94E+00	1.50E-03	5.61E-07		
VOC	Toluene	108-88-3	5.20E+04	5.71E-04	8.70E-02	1.60E+00	1.71E-03	9.74E-07	4.46E+01	4.89E+02
VOC	1,2,4-Trichlorobenzene	120-82-1		8.65E-06	3.00E-02	4.65E+00	8.37E-04	7.24E-09		
VOC	1,1,1-Trichloroethane	71-55-6		2.49E-03	7.80E-02	1.79E+00	1.59E-03	3.95E-06		
VOC	1,1,2-Trichloroethane	79-00-5		4.67E-04	7.80E-02	1.79E+00	1.59E-03	7.41E-07		
VOC	Trichloroethene	79-01-6	4.19E+00	1.48E-03	7.90E-02	1.77E+00	1.60E-03	2.36E-06	8.71E-03	9.55E-02
VOC	Trichlorofluoromethane	75-69-4		1.61E-02	8.70E-02	1.60E+00	1.71E-03	2.75E-05		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6.66E-03	7.80E-02	1.79E+00	1.59E-03	1.06E-05		
VOC	Vinyl Chloride	75-01-4		5.99E-02	1.06E-01	1.32E+00	1.95E-03	1.17E-04		
VOC	Xylenes (total)	1330-20-7	3.18E+04	1.60E-04	7.80E-02	1.79E+00	1.59E-03	2.55E-07	7.13E+00	7.81E+01
SVOC	Acenaphthene	83-32-9		5.02E-08	4.21E-02	3.31E+00	1.05E-03	5.27E-11		
SVOC	Benzo(a)anthracene	56-55-3		2.11E-12	5.10E-02	2.74E+00	1.19E-03	2.52E-15		
SVOC	Benzo(a)pyrene	50-32-8		1.10E-13	4.30E-02	3.24E+00	1.06E-03	1.17E-16		

Attachment G5: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
SVOC	Benzo(b)fluoranthene	205-99-2		1.00E-11	2.26E-02	6.17E+00	6.92E-04	6.95E-15		
SVOC	Benzo(k)fluoranthene	207-08-9		4.02E-14	2.26E-02	6.17E+00	6.92E-04	2.78E-17		
SVOC	Biphenyl	92-52-4		1.94E-07	4.04E-02	3.45E+00	1.02E-03	1.98E-10		
SVOC	bis(2-Chloroethoxy)methane	111-91-1		2.81E-09	4.36E-02	3.20E+00	1.07E-03	3.02E-12		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7		1.30E-10	3.51E-02	3.98E+00	9.30E-04	1.20E-13		
SVOC	Butylbenzylphthalate	85-68-7		1.66E-10	1.74E-02	8.02E+00	5.81E-04	9.63E-14		
SVOC	Chrysene	218-01-9		1.25E-13	2.48E-02	5.63E+00	7.37E-04	9.22E-17		
SVOC	2,4-Dinitrotoluene	121-14-2		2.95E-09	2.03E-01	6.87E-01	3.01E-03	8.90E-12		
SVOC	Di-n-octylphthalate	117-84-0		5.22E-11	1.51E-02	9.24E+00	5.28E-04	2.76E-14		
SVOC	Fluoranthene	206-44-0		1.57E-10	3.02E-02	4.62E+00	8.40E-04	1.32E-13		
SVOC	Fluorene	86-73-7		1.27E-08	3.63E-02	3.84E+00	9.51E-04	1.21E-11		
SVOC	2-Methylnaphthalene	91-57-6	8.80E+02	1.11E-06	4.84E-02	2.88E+00	1.15E-03	1.27E-09	9.87E-04	1.08E-02
SVOC	Naphthalene	91-20-3	1.40E+03	1.71E-06	5.90E-02	2.36E+00	1.32E-03	2.25E-09	2.77E-03	3.04E-02
SVOC	Phenanthrene	85-01-8		2.25E-09	3.75E-02	3.72E+00	9.72E-04	2.19E-12		
SVOC	Pyrene	129-00-0		9.22E-11	2.72E-02	5.13E+00	7.84E-04	7.23E-14		
PCB	PCBs (total)	1336-36-3		1.55E-09	2.02E-02	6.91E+00	6.42E-04	9.94E-13		
INORG	Antimony	7440-36-0								
INORG	Arsenic	7440-38-2	1.50E+00							
INORG	Barium	7440-39-3	1.30E+00							
INORG	Beryllium	7440-41-7								
INORG	Cadmium	7440-43-9	1.90E-01							
INORG	Chromium (total)	7440-47-3	3.90E+00							
INORG	Cobalt	7440-48-4	5.70E-02							
INORG	Copper	7440-50-8	1.60E+00							
INORG	Cyanide (total)	57-12-5								
INORG	Lead	7439-92-1	3.40E+00							
INORG	Manganese	7439-96-5	1.10E+00							
INORG	Mercury	7439-97-6		3.93E-08	3.07E-02	4.55E+00	8.50E-04	3.34E-11		
INORG	Nickel	7440-02-0	4.80E-01							
INORG	Selenium	7782-49-2								
INORG	Silver	7440-22-4								

Attachment G5: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
INORG	Thallium	7440-28-0								
INORG	Vanadium	7440-62-2	8.90E-01							
INORG	Zinc	7440-66-6	2.10E+00							
Notes:										
Physical Properties of Air										
	Pressure	1	atm	assumed						
	Molecular Weight	28.8	g/g mol	Perry and Chilton (1973)						
	Viscosity	1.80E-04	g/(cm.s)	Perry and Chilton (1973)						
	Density	0.00129	g/cm^3	Perry and Chilton (1973)						
Physical Properties of NAPL										
	Molecular Weight	300	g/g mol							
	Density	0.88	g/cm^3							
Physical Characteristics of Excavation Pit										
	Windspeed	0.5	m/s	assumed						
	Surface Area	2.1E+01	m^2							
	Effective Diameter of Area	5.2E+00	m	calculated						

Attachment G5: Vapor Flux from Soil to Ambient Air at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (cm^2/s)	D_{water} (cm^2/s)	R_L (unitless)	D_G (cm^2/s)	D_L (cm^2/s)	D_E (cm^2/s)		MW (g/mole)	VP (mm Hg)	s (mg/L)	v* (mg/L)	C_{sat} (mg/kg)	C_{soil} (mg/kg)	J_{sat} (mg/m^2-s)	J_{unsat} (mg/m^2-s)	$J_{critical}$ (mg/m^2-s)	J (mg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.24E-01	1.14E-05	5.10E-02	2.73E-02	2.61E-09	4.26E-04		5.81E+01	2.30E+02	1.00E+06	7.18E+02	3.40E+04				5.7E+00	
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	8.80E-02	9.80E-06	2.68E-01	1.94E-02	2.24E-09	8.26E-03		7.81E+01	9.50E+01	1.75E+03	3.99E+02	3.12E+02	1.5E+02		1.1E-01	2.3E-01	1.1E-01
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	8.08E-02	9.80E-06	5.54E-02	1.78E-02	2.24E-09	3.67E-04		7.21E+01	9.53E+01	2.75E+05	3.69E+02	1.02E+04				1.6E+00	
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	1.04E-01	1.00E-05	4.25E-01	2.29E-02	2.29E-09	3.34E-02		7.61E+01	3.59E+02	1.19E+03	1.47E+03	3.38E+02				5.0E-01	
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.71E-01	1.15E-05	1.67E-01	5.97E-02	2.63E-09	6.44E-02		6.45E+01	1.01E+03	5.68E+03	3.50E+03	6.33E+02				1.3E+00	
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.26E-01	6.50E-06	2.38E-01	2.78E-02	1.49E-09	2.11E-02		5.05E+01	4.30E+03	5.33E+03	1.17E+04	8.43E+02				1.0E+00	
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	6.50E-02	7.10E-06	2.27E+00	1.43E-02	1.62E-09	1.68E-03		1.20E+02	4.50E+00	6.13E+01	2.91E+01	9.26E+01	3.1E+01		1.0E-02	3.1E-02	1.0E-02
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	8.39E-02	9.10E-06	3.49E+00	1.85E-02	2.08E-09	2.11E-02		8.42E+01	9.69E+01	5.50E+01	4.38E+02	1.28E+02				1.5E-01	
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	6.90E-02	7.90E-06	1.933549	1.52E-02	1.81E-09	3.06E-04		1.47E+02	1.36E+00	1.56E+02	1.07E+01	2.01E+02				2.9E-02	
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	8.00E-02	8.00E-06	2.93E+00	1.76E-02	1.83E-09	4.21E-02		1.21E+02	4.85E+03	2.80E+02	3.15E+04	5.47E+02				9.1E-01	
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	7.42E-02	1.05E-05	1.87E-01	1.64E-02	2.40E-09	1.00E-02		9.90E+01	2.27E+02	5.06E+03	1.21E+03	6.32E+02	5.2E-02		4.3E-05	5.2E-01	4.3E-05
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	7.36E-02	1.13E-05	1.88E-01	1.62E-02	2.58E-09	7.21E-03		9.69E+01	2.03E+02	3.50E+03	1.06E+03	4.38E+02	6.8E-02		4.7E-05	3.0E-01	4.7E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	7.50E-02	7.80E-06	1.21E+00	1.65E-02	1.78E-09	2.20E-03		1.06E+02	9.60E+00	1.69E+02	5.48E+01	1.37E+02	4.3E+02	1.1E-01		5.2E-02	1.1E-01
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	9.57E-02	1.10E-05	5.47E-02	2.11E-02	2.51E-09	7.15E-04		7.41E+01	2.16E+02	2.44E+05	8.61E+02	8.88E+03				1.9E+00	
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	7.50E-02	7.80E-06	8.16E-02	1.65E-02	1.78E-09	5.72E-04		1.00E+02	1.99E+01	1.90E+04	1.07E+02	1.03E+03				2.0E-01	
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	7.35E-02	8.52E-06	4.23E+00	1.62E-02	1.95E-09	3.36E-02		9.82E+01	4.30E+01	1.40E+01	2.27E+02	3.95E+01	2.0E+01		2.9E-02	5.9E-02	2.9E-02
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	1.01E-01	1.17E-05	1.01E-01	2.23E-02	2.67E-09	9.86E-03		8.49E+01	4.33E+02	1.30E+04	1.98E+03	8.79E+02	9.1E+00		7.3E-03	7.1E-01	7.3E-03
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	7.20E-02	8.20E-06	6.62E-01	1.59E-02	1.87E-09	9.04E-03		1.66E+02	1.86E+01	2.00E+02	1.65E+02	8.82E+01				6.8E-02	
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	8.70E-02	8.60E-06	6.42E-01	1.92E-02	1.97E-09	4.06E-03		9.21E+01	2.84E+01	5.26E+02	1.41E+02	2.25E+02	2.6E+03	4.9E-01		1.2E-01	4.9E-01
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	3.00E-02	8.23E-06	5.44E+00	6.61E-03	1.88E-09	3.53E-05		1.81E+02	4.31E-01	3.00E+02	4.20E+00	1.09E+03				5.3E-02	
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	7.80E-02	8.80E-06	5.15E-01	1.72E-02	2.01E-09	1.18E-02		1.33E+02	1.24E+02	1.33E+03	8.87E+02	4.57E+02				4.0E-01	
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	7.80E-02	8.80E-06	2.07E-01	1.72E-02	2.01E-09	1.55E-03		1.33E+02	2.33E+01	4.42E+03	1.67E+02	6.10E+02				2.0E-01	
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	7.90E-02	9.10E-06	6.33E-01	1.74E-02	2.08E-09	5.80E-03		1.31E+02	7.35E+01	1.10E+03	5.19E+02	4.64E+02	2.1E-01		1.3E-04	2.9E-01	1.3E-04
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	8.70E-02	9.70E-06	1.17E+00	1.92E-02	2.22E-09	3.24E-02		1.37E+02	8.03E+02	1.10E+03	5.93E+03	8.61E+02				1.3E+00	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	3.81E+02		9.83E+00	7.80E-02	8.20E-06	4.97E+00	1.72E-02	1.87E-09	3.40E-02		1.87E+02	3.32E+02	1.70E+02	3.34E+03	5.64E+02				8.5E-01	
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	1.06E-01	1.23E-05	3.18E-01	2.34E-02	2.81E-09	4.08E-02		6.25E+01	2.98E+03	2.76E+03	1.00E+04	5.85E+02				9.6E-01	
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	7.80E-02	8.75E-06	1.26E+00	1.72E-02	2.00E-09	1.88E-03		1.06E+02	7.99E+00	1.75E+02	4.56E+01	1.47E+02	1.6E+03	2.1E-01		5.2E-02	2.1E-01
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	4.21E-02	7.69E-06	2.15E+01	9.28E-03	1.76E-09	1.37E-06		1.54E+02	2.50E-03	4.24E+00	2.07E-02	6.07E+01				5.8E-04	
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	5.10E-02	9.00E-06	1.20E+03	1.12E-02	2.06E-09	6.41E-10		2.28E+02	1.05E-07	9.40E-03	1.29E-06	7.54E+00				1.6E-06	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	4.30E-02	9.00E-06	3.04E+03	9.48E-03	2.06E-09	7.27E-11		2.52E+02	5.49E-09	1.62E-03	7.45E-08	3.29E+00				2.3E-07	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	2.26E-02	5.56E-06	3.73E+03	4.98E-03	1.27E-09	3.04E-09		2.52E+02	5.00E-07	1.50E-03	6.78E-06	3.73E+00				1.7E-06	
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	2.26E-02	5.56E-06	3.73E+03	4.98E-03	1.27E-09	2.30E-11		2.52E+02	2.00E-09	8.00E-04	2.71E-08	1.99E+00				7.8E-08	
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	4.04E-02	8.15E-06	3.15E+01	8.90E-03	1.86E-09	1.73E-06		1.54E+02	9.64E-03	6.03E+00	7.99E-02	1.27E+02				1.4E-03	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	4.36E-02	8.46E-06	1.01E-01	9.61E-03	1.93E-09	3.50E-07		1.73E+02	1.40E-04	1.21E+05	1.30E-03	8.15E+03				3.9E-02	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.51E-02	3.66E-06	4.50E+04	7.74E-03	8.37E-10	3.78E-13		3.91E+02	6.45E-06	3.40E-01	1.35E-04	1.02E+04				5.1E-05	
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.74E-02	4.83E-06	1.72E+02	3.83E-03	1.10E-09	5.83E-10		3.12E+02	8.25E-06	2.69E+00	1.39E-04	3.08E+02				6.1E-05	
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.48E-02	6.21E-06	1.20E+03	5.47E-03	1.42E-09	8.81E-09		2.28E+02	6.23E-09	1.60E-03	7.65E-08	1.28E+00				9.8E-07	
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	2.03E-01	7.06E-06	3.33E-01	4.47E-02	1.61E-09	2.60E-07		1.82E+02	1.47E-04	2.70E+02	1.44E-03	5.99E+01				2.5E-04	
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.51E-02	3.58E-06	2.51E+05	3.33E-03	8.18E-10	1.81E-11		3.91E+02	2.60E-06	2.00E-02	5.46E-05	3.35E+03				1.2E-04	
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	3.02E-02	6.35E-06	3.24E+02	6.66E-03	1.45E-09	6.78E-09		2.02E+02	7.80E-06	2.06E-01	8.48E-05	4.45E+01				3.0E-05	
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.63E-02	7.88E-06	4.13E+01	8.00E-03	1.80E-09	2.53E-07		1.66E+02	6.33E-04	1.98E+00	5.66E-03	5.46E+01				2.2E-04	
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.84E-02	7.75E-06	1.88E+01	1.07E-02	1.77E-09	6.02E-06		1.42E+02	5.50E-02	2.46E+01	4.21E-01	3.08E+02	4.4E+01		8.9E-04	6.1E-03	8.9E-04
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.90E-02	7.50E-06	6.08E+00	1.30E-02	1.71E-09	2.12E-05		1.28E+02	8.50E-02	3.10E+01	5.86E-01	1.26E+02	7.1E+01		2.6E-03	4.7E-03	2.6E-03
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.75E-02	7.47E-06	7.28E+01	8.26E-03	1.71E-09	5.41E-08		1.78E+02	1.12E-04	1.15E+00	1.07E-03	5.58E+01				1.1E-04	
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.72E-02	7.24E-06	3.17E+02	5.99E-03	1.66E-09	4.27E-09		2.02E+02	4.59E-06	1.35E-01	4.99E-05	2.85E+01				1.5E-05	
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	2.02E-02	5.00E-06	7.36E+03	4.45E-03	1.14E-09	2.47E-08		3.28E+02	7.71E-05	1.20E-02	1.36E-03	5.89E+01				7.5E-05	
INORG	Antimony	7440-36-0		4.50E+01									1.22E+02									
INORG	Arsenic	7440-38-2		2.90E+01									7.49E+01					7.6E-02				
INORG	Barium	7440-39-3		4.10E+01									1.37E+02					6.6E-02				
INORG	Beryllium	7440-41-7		7.90E+02									9.01E+00									
INORG	Cadmium	7440-43-9		7.50E+01									1.12E+02					9.6E-03				
INORG	Chromium (total)	7440-47-3		1.90E+01									5.20E+01					2.0E-01				

Attachment G5: Vapor Flux from Soil to Ambient Air at AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (cm^2/s)	D_{water} (cm^2/s)	R_L (unitless)	D_G (cm^2/s)	D_L (cm^2/s)	D_E (cm^2/s)		MW (g/mole)	VP (mm Hg)	s (mg/L)	v* (mg/L)	C_{sat} (mg/kg)	C_{soil} (mg/kg)	J_{sat} (mg/m^2-s)	J_{unsat} (mg/m^2-s)	$J_{critical}$ (mg/m^2-s)	J (mg/m^2-s)
INORG	Cobalt	7440-48-4		4.50E+01									5.89E+01					2.9E-03				
INORG	Copper	7440-50-8		3.50E+01									6.35E+01					8.1E-02				
INORG	Cyanide (total)	57-12-5		9.90E+00									2.60E+01									
INORG	Lead	7439-92-1		9.00E+02									2.07E+02					1.7E-01				
INORG	Manganese	7439-96-5		6.50E+01									5.49E+01					5.5E-02				
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	3.07E-02	6.30E-06	0.104854	6.77E-03	1.44E-09	9.36E-03		2.01E+02	1.96E-03	5.60E-02	2.12E-02	3.91E-03				3.1E-06	
INORG	Nickel	7440-02-0		6.50E+01									5.87E+01					2.4E-02				
INORG	Selenium	7782-49-2		5.00E+00									7.90E+01									
INORG	Silver	7440-22-4		8.30E+00									1.08E+02									
INORG	Thallium	7440-28-0		7.10E+01									2.04E+02									
INORG	Vanadium	7440-62-2		1.00E+03									5.09E+01					4.5E-02				
INORG	Zinc	7440-66-6		6.20E+01									6.54E+01					1.1E-01				
Notes:	Soil bulk density	kg/L	ρ_b	1.50																		
	Soil particle density	kg/L	ρ_s	2.65																		
	Soil porosity	L/L-soil	θ	0.43																		
	Soil water content	L/L-soil	θ_w	0.049																		
	Soil air-filled porosity	L/L-soil	θ_a	0.38																		
	Soil organic carbon fraction	unitless	f_{oc}	0.002																		
	Averaging period	day	**EF * ED**	50																		
	Averaging period	s	**EF * ED**	4.32E+06																		
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411																		
	Temperature	^oC	**T**	25																		
		K	**T**	298																		

Attachment G5: Concentrations in Ambient Air - AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor		
		C/Q (kg/m^3 per kg/m^2-s):		10.96		
	Chem Chem	**Chemical**	**CASRN**	C_{SZsoil} (mg/kg)	**J** (mg/m^2-s)	C_{air} (mg/m^3)
X	VOC	Acetone	67-64-1			
X	VOC	Benzene	71-43-2	1.46E+02	1.08E-01	1.19E+00
X	VOC	2-Butanone	78-93-3			
X	VOC	Carbon Disulfide	75-15-0			
X	VOC	Chloroethane	75-00-3			
X	VOC	Chloromethane	74-87-3			
X	VOC	Cumene	98-82-8	3.08E+01	1.03E-02	1.13E-01
X	VOC	Cyclohexane	110-82-7			
X	VOC	1,2-Dichlorobenzene	95-50-1			
X	VOC	Dichlorodifluoromethane	75-71-8			
X	VOC	1,1-Dichloroethane	75-34-3	5.25E-02	4.28E-05	4.69E-04
X	VOC	cis-1,2-Dichloroethene	156-59-2	6.81E-02	4.71E-05	5.16E-04
X	VOC	Ethyl Benzene	100-41-4	4.34E+02	1.07E-01	1.17E+00
X	VOC	Methyl Acetate	79-20-9			
X	VOC	4-Methyl-2-pentanone	108-10-1			
X	VOC	Methylcyclohexane	108-87-2	1.97E+01	2.94E-02	3.22E-01
X	VOC	Methylene Chloride	75-09-2	9.08E+00	7.34E-03	8.05E-02
X	VOC	Tetrachloroethene	127-18-4			
X	VOC	Toluene	108-88-3	2.62E+03	4.89E-01	5.36E+00
X	VOC	1,2,4-Trichlorobenzene	120-82-1			
X	VOC	1,1,1-Trichloroethane	71-55-6			
X	VOC	1,1,2-Trichloroethane	79-00-5			
X	VOC	Trichloroethene	79-01-6	2.11E-01	1.31E-04	1.44E-03
X	VOC	Trichlorofluoromethane	75-69-4			
X	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1			
X	VOC	Vinyl Chloride	75-01-4			
X	VOC	Xylenes (total)	1330-20-7	1.60E+03	2.10E-01	2.30E+00
X	SVOC	Acenaphthene	83-32-9			
X	SVOC	Benzo(a)anthracene	56-55-3			
X	SVOC	Benzo(a)pyrene	50-32-8			
X	SVOC	Benzo(b)fluoranthene	205-99-2			
X	SVOC	Benzo(k)fluoranthene	207-08-9			
X	SVOC	Biphenyl	92-52-4			
X	SVOC	bis(2-Chloroethoxy)methane	111-91-1			
X	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7			
X	SVOC	Butylbenzylphthalate	85-68-7			
X	SVOC	Chrysene	218-01-9			
X	SVOC	2,4-Dinitrotoluene	121-14-2			
X	SVOC	Di-n-octylphthalate	117-84-0			
X	SVOC	Fluoranthene	206-44-0			
X	SVOC	Fluorene	86-73-7			
X	SVOC	2-Methylnaphthalene	91-57-6	4.44E+01	8.87E-04	9.72E-03
X	SVOC	Naphthalene	91-20-3	7.06E+01	2.65E-03	2.90E-02
X	SVOC	Phenanthrene	85-01-8			
X	SVOC	Pyrene	129-00-0			
X	PCB	PCBs (total)	1336-36-3			
X	INORG	Antimony	7440-36-0			
X	INORG	Arsenic	7440-38-2	7.57E-02		
X	INORG	Barium	7440-39-3	6.56E-02		
X	INORG	Beryllium	7440-41-7			
X	INORG	Cadmium	7440-43-9	9.59E-03		
X	INORG	Chromium (total)	7440-47-3	1.97E-01		
X	INORG	Cobalt	7440-48-4	2.88E-03		

	Attachment G5: Concentrations in Ambient Air - AOI 36-1 GMC: NAO Flint Operations Site, Flint, Michigan					
				Vapor		
		C/Q (kg/m^3 per kg/m^2-s)**:**		10.96		
	Chem Chem	**Chemical**	**CASRN**	**C_{SZsoil}** (mg/kg)	**J** (mg/m^2-s)	**C_{air}** (mg/m^3)
X	INORG	Copper	7440-50-8	8.07E-02		
X	INORG	Cyanide (total)	57-12-5			
X	INORG	Lead	7439-92-1	1.72E-01		
X	INORG	Manganese	7439-96-5	5.55E-02		
X	INORG	Mercury	7439-97-6			
X	INORG	Nickel	7440-02-0	2.42E-02		
X	INORG	Selenium	7782-49-2			
X	INORG	Silver	7440-22-4			
X	INORG	Thallium	7440-28-0			
X	INORG	Vanadium	7440-62-2	4.49E-02		
X	INORG	Zinc	7440-66-6	1.06E-01		

Attachment G5: Nonsteady State Dermal Absorption of Chemical from NAPL
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	Acetone	67-64-1	5.8E+01	-2.4E-01	9.0E-04	2.7E-03	2.2E-01	3.4E-01	3.0E-01	5.3E-01	1.0E+00	2.21E-06
VOC	Benzene	71-43-2	7.8E+01	2.1E+00	1.1E-04	3.7E-04	2.9E-01	3.3E-01	3.0E-01	6.9E-01	1.0E+00	2.81E-07
VOC	2-Butanone	78-93-3	7.2E+01	2.8E-01	5.0E-04	1.6E-03	2.7E-01	3.3E-01	3.0E-01	6.4E-01	1.0E+00	1.27E-06
VOC	Carbon Disulfide	75-15-0	7.6E+01	2.0E+00	1.2E-04	4.2E-04	2.8E-01	3.3E-01	3.0E-01	6.7E-01	1.0E+00	3.18E-07
VOC	Chloroethane	75-00-3	6.5E+01	1.4E+00	2.3E-04	7.0E-04	2.4E-01	3.3E-01	3.0E-01	5.8E-01	1.0E+00	5.59E-07
VOC	Chloromethane	74-87-3	5.0E+01	1.9E+00	1.8E-04	5.0E-04	2.0E-01	3.3E-01	3.0E-01	4.8E-01	1.0E+00	4.42E-07
VOC	Cumene	98-82-8	1.2E+02	3.5E+00	2.2E-05	9.2E-05	5.0E-01	3.3E-01	3.0E-01	1.2E+00	1.0E+00	6.51E-08
VOC	Cyclohexane	110-82-7	8.4E+01	3.4E+00	3.6E-05	1.3E-04	3.1E-01	3.3E-01	3.0E-01	7.5E-01	1.0E+00	9.50E-08
VOC	1,2-Dichlorobenzene	95-50-1	1.5E+02	3.4E+00	1.6E-05	7.6E-05	7.0E-01	3.3E-01	3.0E-01	1.7E+00	1.0E+00	5.52E-08
VOC	Dichlorodifluoromethane	75-71-8	1.2E+02	2.2E+00	6.1E-05	2.6E-04	5.0E-01	3.3E-01	3.0E-01	1.2E+00	1.0E+00	1.84E-07
VOC	1,1-Dichloroethane	75-34-3	9.9E+01	1.8E+00	1.1E-04	4.2E-04	3.8E-01	3.3E-01	3.0E-01	9.0E-01	1.0E+00	3.00E-07
VOC	cis-1,2-Dichloroethene	156-59-2	9.7E+01	1.9E+00	1.1E-04	4.0E-04	3.7E-01	3.3E-01	3.0E-01	8.8E-01	1.0E+00	2.89E-07
VOC	Ethyl Benzene	100-41-4	1.1E+02	3.1E+00	3.5E-05	1.4E-04	4.1E-01	3.3E-01	3.0E-01	9.9E-01	1.0E+00	9.75E-08
VOC	Methyl Acetate	79-20-9	7.4E+01	1.8E-01	5.3E-04	1.8E-03	2.7E-01	3.3E-01	3.0E-01	6.6E-01	1.0E+00	1.35E-06
VOC	4-Methyl-2-pentanone	108-10-1	1.0E+02	1.2E+00	1.7E-04	6.6E-04	3.8E-01	3.3E-01	3.0E-01	9.2E-01	1.0E+00	4.74E-07
VOC	Methylcyclohexane	108-87-2	9.8E+01	3.0E+00	4.4E-05	1.7E-04	3.7E-01	3.3E-01	3.0E-01	9.0E-01	1.0E+00	1.21E-07
VOC	Methylene Chloride	75-09-2	8.5E+01	1.3E+00	2.0E-04	7.1E-04	3.1E-01	3.3E-01	3.0E-01	7.5E-01	1.0E+00	5.24E-07
VOC	Tetrachloroethene	127-18-4	1.7E+02	2.7E+00	2.3E-05	1.1E-04	8.9E-01	3.3E-01	3.0E-01	2.1E+00	1.0E+00	8.53E-08
VOC	Toluene	108-88-3	9.2E+01	2.8E+00	5.6E-05	2.1E-04	3.5E-01	3.3E-01	3.0E-01	8.3E-01	1.0E+00	1.51E-07
VOC	1,2,4-Trichlorobenzene	120-82-1	1.8E+02	4.0E+00	6.6E-06	3.4E-05	1.1E+00	3.3E-01	3.0E-01	2.6E+00	1.0E+00	2.70E-08
VOC	1,1,1-Trichloroethane	71-55-6	1.3E+02	2.5E+00	4.1E-05	1.8E-04	5.9E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.29E-07
VOC	1,1,2-Trichloroethane	79-00-5	1.3E+02	2.1E+00	5.7E-05	2.5E-04	5.9E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.81E-07
VOC	Trichloroethene	79-01-6	1.3E+02	2.7E+00	3.5E-05	1.5E-04	5.7E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.10E-07
VOC	Trichlorofluoromethane	75-69-4	1.4E+02	2.5E+00	3.7E-05	1.7E-04	6.2E-01	3.3E-01	3.0E-01	1.5E+00	1.0E+00	1.20E-07
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.9E+02	3.2E+00	1.2E-05	6.3E-05	1.2E+00	3.3E-01	3.0E-01	2.8E+00	1.0E+00	5.06E-08
VOC	Vinyl Chloride	75-01-4	6.3E+01	1.5E+00	2.2E-04	6.7E-04	2.4E-01	3.3E-01	3.0E-01	5.7E-01	1.0E+00	5.40E-07
VOC	Xylenes (total)	1330-20-7	1.1E+02	3.2E+00	3.4E-05	1.3E-04	4.1E-01	3.3E-01	3.0E-01	9.9E-01	1.0E+00	9.55E-08
SVOC	Acenaphthene	83-32-9	1.5E+02	3.9E+00	1.0E-05	4.8E-05	7.7E-01	3.3E-01	3.0E-01	1.8E+00	1.0E+00	3.57E-08
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	5.7E+00	9.6E-07	5.6E-06	2.0E+00	3.3E-01	3.0E-01	4.8E+00	9.0E-01	4.79E-09
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	6.1E+00	5.1E-07	3.1E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.64E-09
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	6.2E+00	4.8E-07	2.9E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.46E-09
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	6.2E+00	4.8E-07	2.9E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.46E-09
SVOC	Biphenyl	92-52-4	1.5E+02	4.1E+00	8.8E-06	4.2E-05	7.7E-01	3.3E-01	3.0E-01	1.8E+00	1.0E+00	3.12E-08
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.7E+02	1.3E+00	6.4E-05	3.2E-04	9.8E-01	3.3E-01	3.0E-01	2.3E+00	1.0E+00	2.46E-07
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.9E+02	7.3E+00	3.4E-08	2.6E-07	1.6E+01	3.3E-01	3.0E-01	3.9E+01	4.0E-01	2.14E-10
SVOC	Butylbenzylphthalate	85-68-7	3.1E+02	4.8E+00	6.4E-07	4.3E-06	5.9E+00	3.3E-01	3.0E-01	1.4E+01	9.0E-01	5.46E-09
SVOC	Chrysene	218-01-9	2.3E+02	5.7E+00	9.6E-07	5.6E-06	2.0E+00	3.3E-01	3.0E-01	4.8E+00	9.0E-01	4.79E-09

Attachment G5: Nonsteady State Dermal Absorption of Chemical from NAPL
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
SVOC	2,4-Dinitrotoluene	121-14-2	1.8E+02	2.0E+00	3.1E-05	1.6E-04	1.1E+00	3.3E-01	3.0E-01	2.6E+00	1.0E+00	1.29E-07
SVOC	Di-n-octylphthalate	117-84-0	3.9E+02	8.1E+00	1.9E-08	1.4E-07	1.6E+01	3.3E-01	3.0E-01	3.9E+01	3.0E-01	8.83E-11
SVOC	Fluoranthene	206-44-0	2.0E+02	5.1E+00	2.1E-06	1.2E-05	1.4E+00	3.3E-01	3.0E-01	3.4E+00	1.0E+00	9.90E-09
SVOC	Fluorene	86-73-7	1.7E+02	4.2E+00	6.9E-06	3.4E-05	9.0E-01	3.3E-01	3.0E-01	2.2E+00	1.0E+00	2.55E-08
SVOC	2-Methylnaphthalene	91-57-6	1.4E+02	3.9E+00	1.2E-05	5.7E-05	6.6E-01	3.3E-01	3.0E-01	1.6E+00	1.0E+00	4.09E-08
SVOC	Naphthalene	91-20-3	1.3E+02	3.4E+00	2.2E-05	9.5E-05	5.5E-01	3.3E-01	3.0E-01	1.3E+00	1.0E+00	6.78E-08
SVOC	Phenanthrene	85-01-8	1.8E+02	4.5E+00	4.8E-06	2.5E-05	1.0E+00	3.3E-01	3.0E-01	2.5E+00	1.0E+00	1.94E-08
SVOC	Pyrene	129-00-0	2.0E+02	5.1E+00	2.1E-06	1.2E-05	1.4E+00	3.3E-01	3.0E-01	3.4E+00	1.0E+00	9.98E-09
PCB	PCBs (total)	1336-36-3	3.3E+02	6.5E+00	1.4E-07	9.9E-07	7.2E+00	3.3E-01	3.0E-01	1.7E+01	7.0E-01	1.05E-09
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03							2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03							2.00E-06
INORG	Barium	7440-39-3	1.4E+02		1.0E-03							2.00E-06
INORG	Beryllium	7440-41-7	9.0E+00		1.0E-03							2.00E-06
INORG	Cadmium	7440-43-9	1.1E+02		1.0E-03							2.00E-06
INORG	Chromium (total)	7440-47-3	5.2E+01		2.0E-03							4.00E-06
INORG	Cobalt	7440-48-4	5.9E+01		4.0E-04							8.00E-07
INORG	Copper	7440-50-8	6.4E+01		1.0E-03							2.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03							2.00E-06
INORG	Lead	7439-92-1	207.2		1.0E-04							2.00E-07
INORG	Manganese	7439-96-5	54.9		1.0E-03							2.00E-06
INORG	Mercury	7439-97-6	201.0		1.0E-03							2.00E-06
INORG	Nickel	7440-02-0	58.7		2.0E-04							4.00E-07
INORG	Selenium	7782-49-2	79.0		1.0E-03							2.00E-06
INORG	Silver	7440-22-4	107.9		6.0E-04							1.20E-06
INORG	Thallium	7440-28-0	204.4		1.0E-03							2.00E-06
INORG	Vanadium	7440-62-2	50.9		1.0E-03							2.00E-06
INORG	Zinc	7440-66-6	65.4		6.0E-04							1.20E-06

Attachment G5: Maintenance Worker Cancer Risk Calculations - AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	Risk	AF_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	URF (m^3/mg)	Risk	C_{NAPL} (mg/L)	DA (L/cm^2)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{air} (mg/m^3)	URF (m^3/mg)	Risk
VOC	Acetone	67-64-1	ID														2.21E-06							
VOC	Benzene	71-43-2	A	1.46E+02	8.18E-07	5.5E-02	4E-08			5.5E-02		1.2E+00	2.3E-03	7.8E-03	2E-05	2.55E+03	2.81E-07	6.62E-05	5.5E-02	4E-06	9.19E+01	1.80E-01	7.8E-03	**1E-03**
VOC	2-Butanone	78-93-3	ID														1.27E-06							
VOC	Carbon Disulfide	75-15-0															3.18E-07							
VOC	Chloroethane	75-00-3				2.9E-03				2.9E-03							5.59E-07		2.9E-03					
VOC	Chloromethane	74-87-3	D														4.42E-07							
VOC	Cumene	98-82-8	D	3.08E+01	1.72E-07							1.1E-01	2.2E-04			5.37E+02	6.51E-08	3.22E-06			7.47E-01	1.46E-03		
VOC	Cyclohexane	110-82-7	ID														9.50E-08							
VOC	1,2-Dichlorobenzene	95-50-1	D														5.52E-08							
VOC	Dichlorodifluoromethane	75-71-8															1.84E-07							
VOC	1,1-Dichloroethane	75-34-3	C	5.25E-02	2.93E-10							4.7E-04	9.2E-07			9.15E-01	3.00E-07	2.53E-08			7.03E-02	1.38E-04		
VOC	cis-1,2-Dichloroethene	156-59-2	D	6.81E-02	3.81E-10							5.2E-04	1.0E-06			1.19E+00	2.89E-07	3.17E-08			8.10E-02	1.59E-04		
VOC	Ethyl Benzene	100-41-4	D	4.34E+02	2.43E-06							1.2E+00	2.3E-03			7.57E+03	9.75E-08	6.81E-05			2.47E+01	4.84E-02		
VOC	Methyl Acetate	79-20-9															1.35E-06							
VOC	4-Methyl-2-pentanone	108-10-1	ID														4.74E-07							
VOC	Methylcyclohexane	108-87-2		1.97E+01	1.10E-07							3.2E-01	6.3E-04			3.43E+02	1.21E-07	3.82E-06			4.96E+00	9.70E-03		
VOC	Methylene Chloride	75-09-2	B2	9.08E+00	5.08E-08	7.5E-03	4E-10			7.5E-03		8.0E-02	1.6E-04	4.7E-04	7E-08	1.58E+02	5.24E-07	7.65E-06	7.5E-03	6E-08	2.85E+01	5.58E-02	4.7E-04	3E-05
VOC	Tetrachloroethene	127-18-4	C-B2			5.2E-02				5.2E-02				3.1E-03			8.53E-08		5.2E-02				3.1E-03	
VOC	Toluene	108-88-3	D	2.62E+03	1.47E-05							5.4E+00	1.0E-02			4.58E+04	1.51E-07	6.37E-04			4.89E+02	9.56E-01		
VOC	1,2,4-Trichlorobenzene	120-82-1	D														2.70E-08							
VOC	1,1,1-Trichloroethane	71-55-6	D														1.29E-07							
VOC	1,1,2-Trichloroethane	79-00-5	C			5.7E-02				5.7E-02				1.6E-02			1.81E-07		5.7E-02				1.6E-02	
VOC	Trichloroethene	79-01-6	C-B2	2.11E-01	1.18E-09	1.1E-02	1E-11			1.1E-02		1.4E-03	2.8E-06	1.7E-03	5E-09	3.69E+00	1.10E-07	3.73E-08	1.1E-02	4E-10	9.55E-02	1.87E-04	1.7E-03	3E-07
VOC	Trichlorofluoromethane	75-69-4															1.20E-07							
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1															5.06E-08							
VOC	Vinyl Chloride	75-01-4	A			1.4E+00				1.4E+00				8.8E-03			5.40E-07		1.4E+00				8.8E-03	
VOC	Xylenes (total)	1330-20-7	ID	1.60E+03	8.97E-06							2.3E+00	4.5E-03			2.80E+04	9.55E-08	2.47E-04			7.81E+01	1.53E-01		
SVOC	Acenaphthene	83-32-9						1.3E-01									3.57E-08							
SVOC	Benzo(a)anthracene	56-55-3	B2			7.3E-01		1.3E-01		7.3E-01				8.9E-02			4.79E-09		7.3E-01				8.9E-02	
SVOC	Benzo(a)pyrene	50-32-8	B2			7.3E+00		1.3E-01		7.3E+00				8.9E-01			2.64E-09		7.3E+00				8.9E-01	
SVOC	Benzo(b)fluoranthene	205-99-2	B2			7.3E-01		1.3E-01		7.3E-01				8.9E-02			2.46E-09		7.3E-01				8.9E-02	
SVOC	Benzo(k)fluoranthene	207-08-9	B2			7.3E-02		1.3E-01		7.3E-02				8.9E-03			2.46E-09		7.3E-02				8.9E-03	
SVOC	Biphenyl	92-52-4	D					1.0E-01									3.12E-08							
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D					1.0E-01									2.46E-07							
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2			1.4E-02		1.0E-01		1.4E-02				4.0E-03			2.14E-10		1.4E-02				4.0E-03	
SVOC	Butylbenzylphthalate	85-68-7	C			1.9E-03		1.0E-01		1.9E-03				5.4E-04			5.46E-09		1.9E-03				5.4E-04	
SVOC	Chrysene	218-01-9	B2			7.3E-03		1.3E-01		7.3E-03				8.9E-04			4.79E-09		7.3E-03				8.9E-04	
SVOC	2,4-Dinitrotoluene	121-14-2	B2			6.8E-01		1.0E-01		6.8E-01							1.29E-07		6.8E-01					
SVOC	Di-n-octylphthalate	117-84-0						1.0E-01									8.83E-11							
SVOC	Fluoranthene	206-44-0	D					1.3E-01									9.90E-09							
SVOC	Fluorene	86-73-7	D					1.3E-01									2.55E-08							
SVOC	2-Methylnaphthalene	91-57-6	ID	4.44E+01	2.48E-07			1.0E-01	8.19E-08			9.7E-03	1.9E-05			7.74E+02	4.09E-08	2.92E-06			1.08E-02	2.12E-05		
SVOC	Naphthalene	91-20-3	C	7.06E+01	3.95E-07			1.3E-01	1.69E-07			2.9E-02	5.7E-05			1.23E+03	6.78E-08	7.70E-06			3.04E-02	5.94E-05		
SVOC	Phenanthrene	85-01-8	D					1.3E-01									1.94E-08							
SVOC	Pyrene	129-00-0	D					1.3E-01									9.98E-09							
PCB	PCBs (total)	1336-36-3	B2			2.0E+00		1.4E-01		2.0E+00				5.7E-01			1.05E-09		2.0E+00				5.7E-01	
INORG	Antimony	7440-36-0															2.00E-06							
INORG	Arsenic	7440-38-2	A	7.57E-02	4.23E-10	1.5E+00	6E-10	3.0E-02	4.19E-11	1.5E+00	6E-11			4.3E+00		1.32E+00	2.00E-06	2.44E-07	1.5E+00	4E-07			4.3E+00	
INORG	Barium	7440-39-3	D	6.56E-02	3.67E-10											1.14E+00	2.00E-06	2.11E-07						
INORG	Beryllium	7440-41-7	B1											2.4E+00			2.00E-06						2.4E+00	
INORG	Cadmium	7440-43-9	B1	9.59E-03	5.36E-11			1.0E-03	1.77E-13					1.8E+00		1.67E-01	2.00E-06	3.09E-08					1.8E+00	
INORG	Chromium (total)	7440-47-3		1.97E-01	1.10E-09									1.2E+01		3.43E+00	4.00E-06	1.27E-06					1.2E+01	
INORG	Cobalt	7440-48-4	B1	2.88E-03	1.61E-11									2.8E+00		5.02E-02	8.00E-07	3.70E-09					2.8E+00	
INORG	Copper	7440-50-8	D	8.07E-02	4.51E-10											1.41E+00	2.00E-06	2.60E-07						
INORG	Cyanide (total)	57-12-5	D														2.00E-06							
INORG	Lead	7439-92-1	B2	1.72E-01	9.59E-10											2.99E+00	2.00E-07	5.52E-08						
INORG	Manganese	7439-96-5	D	5.55E-02	3.10E-10											9.68E-01	2.00E-06	1.79E-07						
INORG	Mercury	7439-97-6	D														2.00E-06							

Attachment G5: Maintenance Worker Cancer Risk Calculations - AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	Risk	AF_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	URF (m^3/mg)	Risk	C_{NAPL} (mg/L)	DA (L/cm^2)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{air} (mg/m^3)	URF (m^3/mg)	Risk
INORG	Nickel	7440-02-0	A	2.42E-02	1.35E-10									2.4E-01		4.22E-01	4.00E-07	1.56E-08					2.4E-01	
INORG	Selenium	7782-49-2	D														2.00E-06							
INORG	Silver	7440-22-4	D														1.20E-06							
INORG	Thallium	7440-28-0															2.00E-06							
INORG	Vanadium	7440-62-2		4.49E-02	2.51E-10											7.83E-01	2.00E-06	1.45E-07						
INORG	Zinc	7440-66-6	D	1.06E-01	5.92E-10											1.85E+00	1.20E-06	2.05E-07						

Attachment G5: Maintenance Worker Hazard Index Calculations - AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	HQ	AF_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	RfC (mg/m^3)	HQ	C_{NAPL} (mg/L)	DA (L/cm^2)	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{air} (mg/m^3)	RfC (mg/m^3)	HQ
VOC	Acetone	67-64-1	ID			9.0E-01				9.0E-01				3.2E+00			2.21E-06		9.0E-01				3.2E+00	
VOC	Benzene	71-43-2	A	1.46E+02	5.73E-06	4.0E-03	1E-03			4.0E-03		1.2E+00	1.6E-02	3.0E-02	5E-01	2.55E+03	2.81E-07	4.64E-04	4.0E-03	1E-01	9.19E+01	1.26E+00	3.0E-02	**4E+01**
VOC	2-Butanone	78-93-3	ID			6.0E-01				6.0E-01				5.0E+00			1.27E-06		6.0E-01				5.0E+00	
VOC	Carbon Disulfide	75-15-0				1.0E-01				1.0E-01				7.0E-01			3.18E-07		1.0E-01				7.0E-01	
VOC	Chloroethane	75-00-3				4.0E-01				4.0E-01				1.0E+01			5.59E-07		4.0E-01				1.0E+01	
VOC	Chloromethane	74-87-3	D											9.0E-02			4.42E-07						9.0E-02	
VOC	Cumene	98-82-8	D	3.08E+01	1.20E-06	1.0E-01	1E-05			1.0E-01		1.1E-01	1.5E-03	4.0E-01	4E-03	5.37E+02	6.51E-08	2.26E-05	1.0E-01	2E-04	7.47E-01	1.02E-02	4.0E-01	3E-02
VOC	Cyclohexane	110-82-7	ID											6.0E+00			9.50E-08						6.0E+00	
VOC	1,2-Dichlorobenzene	95-50-1	D			9.0E-02				9.0E-02				2.0E-01			5.52E-08		9.0E-02				2.0E-01	
VOC	Dichlorodifluoromethane	75-71-8				2.0E-01				2.0E-01				2.0E-01			1.84E-07		2.0E-01				2.0E-01	
VOC	1,1-Dichloroethane	75-34-3	C	5.25E-02	2.05E-09	1.0E-01	2E-08			1.0E-01		4.7E-04	6.4E-06	5.0E-01	1E-05	9.15E-01	3.00E-07	1.77E-07	1.0E-01	2E-06	7.03E-02	9.63E-04	5.0E-01	2E-03
VOC	cis-1,2-Dichloroethene	156-59-2	D	6.81E-02	2.67E-09	1.0E-02	3E-07			1.0E-02		5.2E-04	7.1E-06	3.5E-02	2E-04	1.19E+00	2.89E-07	2.22E-07	1.0E-02	2E-05	8.10E-02	1.11E-03	3.5E-02	3E-02
VOC	Ethyl Benzene	100-41-4	D	4.34E+02	1.70E-05	1.0E-01	2E-04			1.0E-01		1.2E+00	1.6E-02	1.0E+00	2E-02	7.57E+03	9.75E-08	4.77E-04	1.0E-01	5E-03	2.47E+01	3.39E-01	1.0E+00	3E-01
VOC	Methyl Acetate	79-20-9				1.0E+00				1.0E+00				3.5E+00			1.35E-06		1.0E+00				3.5E+00	
VOC	4-Methyl-2-pentanone	108-10-1	ID											3.0E+00			4.74E-07						3.0E+00	
VOC	Methylcyclohexane	108-87-2		1.97E+01	7.70E-07							3.2E-01	4.4E-03	3.0E+00	1E-03	3.43E+02	1.21E-07	2.67E-05			4.96E+00	6.79E-02	3.0E+00	2E-02
VOC	Methylene Chloride	75-09-2	B2	9.08E+00	3.55E-07	6.0E-02	6E-06			6.0E-02		8.0E-02	1.1E-03	3.0E+00	4E-04	1.58E+02	5.24E-07	5.36E-05	6.0E-02	9E-04	2.85E+01	3.91E-01	3.0E+00	1E-01
VOC	Tetrachloroethene	127-18-4	C-B2			1.0E-02				1.0E-02				4.0E-01			8.53E-08		1.0E-02				4.0E-01	
VOC	Toluene	108-88-3	D	2.62E+03	1.03E-04	8.0E-02	1E-03			8.0E-02		5.4E+00	7.3E-02	5.0E+00	1E-02	4.58E+04	1.51E-07	4.46E-03	8.0E-02	6E-02	4.89E+02	6.69E+00	5.0E+00	1E+00
VOC	1,2,4-Trichlorobenzene	120-82-1	D			1.0E-02				1.0E-02				2.0E-01			2.70E-08		1.0E-02				2.0E-01	
VOC	1,1,1-Trichloroethane	71-55-6	D			2.8E-01				2.8E-01				2.2E+00			1.29E-07		2.8E-01				2.2E+00	
VOC	1,1,2-Trichloroethane	79-00-5	C			4.0E-03				4.0E-03							1.81E-07		4.0E-03					
VOC	Trichloroethene	79-01-6	C-B2	2.11E-01	8.27E-09	6.0E-03	1E-06			6.0E-03		1.4E-03	2.0E-05			3.69E+00	1.10E-07	2.61E-07	6.0E-03	4E-05	9.55E-02	1.31E-03		
VOC	Trichlorofluoromethane	75-69-4				3.0E-01				3.0E-01				7.0E-01			1.20E-07		3.0E-01				7.0E-01	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1				3.0E+01				3.0E+01				3.0E+01			5.06E-08		3.0E+01				3.0E+01	
VOC	Vinyl Chloride	75-01-4	A			3.0E-03				3.0E-03				1.0E-01			5.40E-07		3.0E-03				1.0E-01	
VOC	Xylenes (total)	1330-20-7	ID	1.60E+03	6.28E-05	2.0E-01	3E-04			2.0E-01		2.3E+00	3.2E-02	1.0E-01	3E-01	2.80E+04	9.55E-08	1.73E-03	2.0E-01	9E-03	7.81E+01	1.07E+00	1.0E-01	**1E+01**
SVOC	Acenaphthene	83-32-9				6.0E-02		1.30E-01		6.0E-02				2.1E-01			3.57E-08		6.0E-02				2.1E-01	
SVOC	Benzo(a)anthracene	56-55-3	B2					1.30E-01									4.79E-09							
SVOC	Benzo(a)pyrene	50-32-8	B2					1.30E-01									2.64E-09							
SVOC	Benzo(b)fluoranthene	205-99-2	B2					1.30E-01									2.46E-09							
SVOC	Benzo(k)fluoranthene	207-08-9	B2					1.30E-01									2.46E-09							
SVOC	Biphenyl	92-52-4	D			5.0E-02		1.00E-01		5.0E-02				1.8E-01			3.12E-08		5.0E-02				1.8E-01	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D					1.00E-01									2.46E-07							
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2			2.0E-02		1.00E-01		2.0E-02				7.0E-02			2.14E-10		2.0E-02				7.0E-02	
SVOC	Butylbenzylphthalate	85-68-7	C			2.0E-01		1.00E-01		2.0E-01				7.0E-01			5.46E-09		2.0E-01				7.0E-01	
SVOC	Chrysene	218-01-9	B2					1.30E-01									4.79E-09							
SVOC	2,4-Dinitrotoluene	121-14-2	B2			2.0E-03		1.00E-01		2.0E-03							1.29E-07		2.0E-03					
SVOC	Di-n-octylphthalate	117-84-0				4.0E-02		1.00E-01		4.0E-02							8.83E-11		4.0E-02					
SVOC	Fluoranthene	206-44-0	D			4.0E-02		1.30E-01		4.0E-02				1.4E-01			9.90E-09		4.0E-02				1.4E-01	
SVOC	Fluorene	86-73-7	D			4.0E-02		1.30E-01		4.0E-02				1.4E-01			2.55E-08		4.0E-02				1.4E-01	
SVOC	2-Methylnaphthalene	91-57-6	ID	4.44E+01	1.74E-06	4.0E-03	4E-04	1.00E-01	5.73E-07	4.0E-03	1E-04	9.7E-03	1.3E-04	3.0E-03	4E-02	7.74E+02	4.09E-08	2.05E-05	4.0E-03	5E-03	1.08E-02	1.48E-04	3.0E-03	5E-02
SVOC	Naphthalene	91-20-3	C	7.06E+01	2.76E-06	2.0E-02	1E-04	1.30E-01	1.19E-06	2.0E-02	6E-05	2.9E-02	4.0E-04	3.0E-03	1E-01	1.23E+03	6.78E-08	5.39E-05	2.0E-02	3E-03	3.04E-02	4.16E-04	3.0E-03	1E-01
SVOC	Phenanthrene	85-01-8	D			3.0E-02		1.30E-01		3.0E-02				1.1E-01			1.94E-08		3.0E-02				1.1E-01	
SVOC	Pyrene	129-00-0	D			3.0E-02		1.30E-01		3.0E-02				1.1E-01			9.98E-09		3.0E-02				1.1E-01	
PCB	PCBs (total)	1336-36-3	B2			2.0E-05		1.40E-01		2.0E-05							1.05E-09		2.0E-05					
INORG	Antimony	7440-36-0				4.0E-04				6.0E-05				1.4E-03			2.00E-06		6.0E-05				1.4E-03	
INORG	Arsenic	7440-38-2	A	7.57E-02	2.96E-09	3.0E-04	1E-05	3.00E-02	2.93E-10	3.0E-04	1E-06					1.32E+00	2.00E-06	1.70E-06	3.0E-04	6E-03				
INORG	Barium	7440-39-3	D	6.56E-02	2.57E-09	7.0E-02	4E-08			4.9E-03						1.14E+00	2.00E-06	1.48E-06	4.9E-03	3E-04				
INORG	Beryllium	7440-41-7	B1			2.0E-03				1.4E-05				2.0E-05			2.00E-06		1.4E-05				2.0E-05	
INORG	Cadmium	7440-43-9	B1	9.59E-03	3.75E-10	1.0E-03	4E-07	1.00E-03	1.24E-12	2.5E-05	5E-08			2.0E-04		1.67E-01	2.00E-06	2.16E-07	2.5E-05	9E-03			2.0E-04	
INORG	Chromium (total)	7440-47-3		1.97E-01	7.70E-09	3.0E-03	3E-06			7.5E-05				1.0E-04		3.43E+00	4.00E-06	8.87E-06	7.5E-05	1E-01			1.0E-04	
INORG	Cobalt	7440-48-4	B1	2.88E-03	1.13E-10	2.0E-02	6E-09			2.0E-02				2.0E-05		5.02E-02	8.00E-07	2.59E-08	2.0E-02	1E-06			2.0E-05	
INORG	Copper	7440-50-8	D	8.07E-02	3.16E-09	4.0E-02	8E-08			4.0E-02				1.4E-01		1.41E+00	2.00E-06	1.82E-06	4.0E-02	5E-05			1.4E-01	
INORG	Cyanide (total)	57-12-5	D			2.0E-02				2.0E-02				7.0E-02			2.00E-06		2.0E-02				7.0E-02	
INORG	Lead	7439-92-1	B2	1.72E-01	6.71E-09											2.99E+00	2.00E-07	3.86E-07						
INORG	Manganese	7439-96-5	D	5.55E-02	2.17E-09	1.4E-01	2E-08			8.4E-03				5.0E-05		9.68E-01	2.00E-06	1.25E-06	8.4E-03	1E-04			5.0E-05	
INORG	Mercury	7439-97-6	D			3.0E-04				3.0E-04				3.0E-04			2.00E-06		3.0E-04				3.0E-04	
INORG	Nickel	7440-02-0	A	2.42E-02	9.48E-10	2.0E-02	5E-08			8.0E-04						4.22E-01	4.00E-07	1.09E-07	8.0E-04	1E-04				

Attachment G5: Maintenance Worker Hazard Index Calculations - AOI 36-1
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	**Chemical**	**CASRN**	**Cancer Class**	**C_{SZsoil}** (mg/kg)	**ADD** (mg/kg/d)	**RfD_{oral}** (mg/kg/d)	**HQ**	**AF_{derm}**	**ADD** (mg/kg/d)	**RfD_{derm}** (mg/kg/d)	**HQ**	**C_{air}** (mg/m^3)	**C_{exp}** (mg/m^3)	**RfC** (mg/m^3)	**HQ**	**C_{NAPL}** (mg/L)	**DA** (L/cm^2)	**ADD** (mg/kg/d)	**RfD_{derm}** (mg/kg/d)	**HQ**	**C_{air}** (mg/m^3)	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**HQ**
INORG	Selenium	7782-49-2	D			5.0E-03				5.0E-03				1.8E-02			2.00E-06		5.0E-03				1.8E-02	
INORG	Silver	7440-22-4	D			5.0E-03				2.0E-04				1.0E-05			1.20E-06		2.0E-04				1.0E-05	
INORG	Thallium	7440-28-0				7.0E-05				7.0E-05				2.5E-04			2.00E-06		7.0E-05				2.5E-04	
INORG	Vanadium	7440-62-2		4.49E-02	1.76E-09	7.0E-03	3E-07			1.8E-04				2.5E-02		7.83E-01	2.00E-06	1.01E-06	1.8E-04	6E-03			2.5E-02	
INORG	Zinc	7440-66-6	D	1.06E-01	4.15E-09	3.0E-01	1E-08			3.0E-01				1.1E+00		1.85E+00	1.20E-06	1.43E-06	3.0E-01	5E-06			1.1E+00	

Attachment G6
Exposure of Redevelopment Construction Workers to Soil

Attachment G6: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.07E+00	9.85E-05	7.81E-02	1.47E-01	1.21E-07	1.50E-03	4.29E-05
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	7.60E-01	8.47E-05	3.00E-01	1.04E-01	1.04E-07	3.96E-02	2.20E-04
VOC	Bromodichloromethane	75-27-4	5.51E+01		3.28E-02	2.57E-01	9.16E-05	2.65E-01	3.54E-02	1.13E-07	4.38E-03	7.33E-05
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	6.98E-01	8.47E-05	8.28E-02	9.59E-02	1.04E-07	1.32E-03	4.03E-05
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	8.99E-01	8.64E-05	4.19E-01	1.23E-01	1.06E-07	1.83E-01	4.73E-04
VOC	Carbon Tetrachloride	56-23-5	1.74E+02		6.25E-01	6.74E-01	7.60E-05	8.35E-01	9.26E-02	9.36E-08	6.93E-02	2.92E-04
VOC	Chlorobenzene	108-90-7	2.20E+02		7.60E-02	6.31E-01	7.52E-05	8.14E-01	8.66E-02	9.25E-08	8.09E-03	9.96E-05
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.34E+00	9.94E-05	1.85E-01	3.22E-01	1.22E-07	3.13E-01	6.20E-04
VOC	Chloroform	67-66-3	3.97E+01		7.50E-02	8.99E-01	8.64E-05	2.28E-01	1.23E-01	1.06E-07	4.06E-02	2.23E-04
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.09E+00	5.62E-05	2.61E-01	1.50E-01	6.91E-08	1.03E-01	3.56E-04
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	5.62E-01	6.13E-05	2.44E+00	7.71E-02	7.55E-08	8.39E-03	1.01E-04
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	7.25E-01	7.86E-05	3.38E+00	9.96E-02	9.68E-08	1.17E-01	3.80E-04
VOC	Dibromochloromethane	124-48-1	6.26E+01		1.61E-02	1.69E-01	9.07E-05	2.84E-01	2.33E-02	1.12E-07	1.32E-03	4.02E-05
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	5.96E-01	6.83E-05	2.11E+00	8.19E-02	8.40E-08	1.51E-03	4.31E-05
VOC	1,3-Dichlorobenzene	541-73-1	5.69E+02		6.33E-02	5.98E-01	6.79E-05	1.94E+00	8.21E-02	8.36E-08	2.68E-03	5.74E-05
VOC	1,4-Dichlorobenzene	106-46-7	6.12E+02		4.98E-02	5.96E-01	6.83E-05	2.07E+00	8.19E-02	8.40E-08	1.97E-03	4.91E-05
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	6.91E-01	6.91E-05	2.47E+00	9.49E-02	8.51E-08	2.70E-01	5.75E-04
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	6.41E-01	9.07E-05	2.13E-01	8.81E-02	1.12E-07	4.74E-02	2.41E-04
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.01E-02	8.99E-01	8.55E-05	1.39E-01	1.23E-01	1.05E-07	1.78E-02	1.48E-04
VOC	1,1-Dichloroethene	75-35-4	5.82E+01		5.35E-01	7.78E-01	8.99E-05	4.32E-01	1.07E-01	1.11E-07	1.32E-01	4.03E-04
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	6.36E-01	9.76E-05	2.17E-01	8.73E-02	1.20E-07	3.35E-02	2.03E-04
VOC	trans-1,2-Dichloroethene	156-60-5	5.22E+01		1.93E-01	6.11E-01	1.03E-04	3.05E-01	8.39E-02	1.27E-07	5.29E-02	2.55E-04
VOC	1,2-Dichloropropane	78-87-5	4.35E+01		5.75E-02	6.76E-01	7.54E-05	2.35E-01	9.28E-02	9.28E-08	2.27E-02	1.67E-04
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	6.48E-01	6.74E-05	1.32E+00	8.90E-02	8.29E-08	1.09E-02	1.16E-04
VOC	2-Hexanone	591-78-6	1.48E+01		3.58E-02							
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	8.27E-01	9.50E-05	8.20E-02	1.14E-01	1.17E-07	2.57E-03	5.61E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.20E-02	7.42E-01	8.73E-05	1.17E-01	1.02E-01	1.07E-07	1.05E-02	1.13E-04
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	6.48E-01	6.74E-05	1.11E-01	8.90E-02	8.29E-08	2.26E-03	5.27E-05
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	6.35E-01	7.36E-05	3.68E+00	8.72E-02	9.06E-08	2.08E-01	5.05E-04

Attachment G6: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	8.73E-01	1.01E-04	1.28E-01	1.20E-01	1.24E-07	4.21E-02	2.27E-04
VOC	Styrene	100-42-5	7.77E+02		5.65E-02	6.13E-01	6.91E-05	2.61E+00	8.43E-02	8.51E-08	1.82E-03	4.73E-05
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	6.22E-01	7.08E-05	6.99E-01	8.54E-02	8.72E-08	4.61E-02	2.38E-04
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	7.52E-01	7.43E-05	7.03E-01	1.03E-01	9.15E-08	2.00E-02	1.57E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	2.59E-01	7.11E-05	5.90E+00	3.56E-02	8.75E-08	1.76E-04	1.47E-05
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	6.74E-01	7.60E-05	5.43E-01	9.26E-02	9.36E-08	6.00E-02	2.71E-04
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	6.74E-01	7.60E-05	2.45E-01	9.26E-02	9.36E-08	7.07E-03	9.31E-05
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	6.83E-01	7.86E-05	6.85E-01	9.37E-02	9.68E-08	2.89E-02	1.88E-04
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	7.52E-01	8.38E-05	1.09E+00	1.03E-01	1.03E-07	1.88E-01	4.80E-04
VOC	1,1,2-Trichloro-1,2,2-trifluoroe	76-13-1	3.81E+02		9.83E+00	6.74E-01	7.08E-05	4.38E+00	9.26E-02	8.72E-08	2.08E-01	5.04E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.26E-01	5.24E-01	6.84E-05	3.02E+00	7.19E-02	8.42E-08	2.99E-03	6.06E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.20E-01	5.20E-01	7.49E-05	5.82E+00	7.14E-02	9.22E-08	1.48E-03	4.25E-05
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	9.16E-01	1.06E-04	3.09E-01	1.26E-01	1.31E-07	2.26E-01	5.26E-04
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	6.74E-01	7.56E-05	1.37E+00	9.25E-02	9.30E-08	9.33E-03	1.07E-04
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	3.64E-01	6.64E-05	2.32E+01	5.00E-02	8.18E-08	6.85E-06	2.90E-06
SVOC	Acenaphthylene	208-96-8	7.47E+03		2.31E-03	3.88E-01	6.03E-05	2.43E+01	5.33E-02	7.42E-08	5.07E-06	2.49E-06
SVOC	Acetophenone	98-86-2	3.58E+01		2.19E-04	6.91E-01	6.91E-05	1.92E-01	9.49E-02	8.51E-08	1.09E-04	1.15E-05
SVOC	Anthracene	120-12-7	2.97E+04		1.34E-03	2.80E-01	6.69E-05	9.63E+01	3.84E-02	8.23E-08	5.34E-07	8.09E-07
SVOC	Atrazine	1912-24-9	3.68E+02		1.25E-07	2.24E-01	5.76E-05	1.27E+00	3.07E-02	7.09E-08	5.89E-08	2.69E-07
SVOC	Benzaldehyde	100-52-7	2.85E+01		4.86E-04	6.23E-01	7.84E-05	1.69E-01	8.56E-02	9.65E-08	2.47E-04	1.74E-05
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	4.41E-01	7.78E-05	1.30E+03	6.05E-02	9.57E-08	3.26E-09	6.33E-08
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	3.72E-01	7.78E-05	3.29E+03	5.10E-02	9.57E-08	3.88E-10	2.18E-08
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.51E-08	1.36E-07
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		2.88E-06	1.88E-01	4.54E-05	4.15E+04	2.58E-02	5.59E-08	3.14E-12	1.96E-09
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.28E-10	1.25E-08
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	3.49E-01	7.04E-05	3.41E+01	4.79E-02	8.67E-08	8.63E-06	3.25E-06
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	3.77E-01	7.31E-05	1.32E-01	5.17E-02	9.00E-08	2.04E-06	1.58E-06
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.55E+01		3.69E-04	5.98E-01	6.51E-05	1.26E-01	8.21E-02	8.01E-08	2.41E-04	1.72E-05
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.03E-01	3.16E-05	4.86E+04	4.17E-02	3.89E-08	2.59E-12	1.78E-09

Attachment G6: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.50E-01	4.17E-05	1.86E+02	2.06E-02	5.14E-08	3.15E-09	6.22E-08
SVOC	Caprolactam	105-60-2	6.51E-01		1.03E-07	5.98E-01	7.77E-05	7.81E-02	8.21E-02	9.56E-08	1.33E-06	1.28E-06
SVOC	Carbazole	86-74-8	3.38E+03		3.13E-07	3.37E-01	6.07E-05	1.10E+01	4.63E-02	7.48E-08	8.09E-09	9.96E-08
SVOC	4-Chloro-3-methylphenol	59-50-7	1.12E+03		8.15E-06	5.24E-01	8.22E-05	3.69E+00	7.19E-02	1.01E-07	1.86E-07	4.78E-07
SVOC	2-Chloronaphthalene	91-58-7	1.12E+04		6.42E-03	4.25E-01	7.59E-05	3.65E+01	5.84E-02	9.35E-08	1.03E-05	3.55E-06
SVOC	2-Chlorophenol	95-57-8	3.88E+02		8.00E-03	4.33E-01	8.17E-05	1.34E+00	5.95E-02	1.01E-07	3.56E-04	2.09E-05
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.14E-01	5.37E-05	1.30E+03	2.94E-02	6.60E-08	4.40E-08	2.32E-07
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		3.02E-07	1.75E-01	4.48E-05	1.22E+04	2.40E-02	5.51E-08	5.10E-12	2.50E-09
SVOC	Dibenzofuran	132-64-9	2.07E+04		2.57E-04	2.06E-01	5.18E-05	6.71E+01	2.82E-02	6.38E-08	1.09E-07	3.66E-07
SVOC	2,4-Dichlorophenol	120-83-2	1.47E+02		6.50E-05	2.99E-01	7.58E-05	5.52E-01	4.11E-02	9.33E-08	5.00E-06	2.48E-06
SVOC	Diethylphthalate	84-66-2	2.87E+02		9.25E-06	2.21E-01	5.49E-05	1.01E+00	3.04E-02	6.75E-08	3.47E-07	6.52E-07
SVOC	2,4-Dimethylphenol	105-67-9	2.09E+02		4.10E-05	5.05E-01	7.51E-05	7.53E-01	6.93E-02	9.24E-08	3.90E-06	2.19E-06
SVOC	Dimethylphthalate	131-11-3	6.89E+01		2.15E-06	4.91E-01	5.43E-05	2.99E-01	6.74E-02	6.69E-08	7.07E-07	9.31E-07
SVOC	Di-n-butylphthalate	84-74-2	3.40E+04		1.93E-08	3.78E-01	6.79E-05	1.10E+02	5.20E-02	8.36E-08	7.67E-10	3.07E-08
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	1.21E+02		8.73E-06	2.38E-01	5.97E-05	4.69E-01	3.28E-02	7.35E-08	7.65E-07	9.69E-07
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	1.75E+00	6.10E-05	3.83E-01	2.41E-01	7.51E-08	1.39E-06	1.31E-06
SVOC	2,6-Dinitrotoluene	606-20-2	6.89E+01		1.53E-05	2.83E-01	6.27E-05	2.99E-01	3.88E-02	7.72E-08	2.24E-06	1.66E-06
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.30E-01	3.09E-05	2.72E+05	1.79E-02	3.81E-08	9.06E-11	1.05E-08
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	2.61E-01	5.49E-05	3.50E+02	3.58E-02	6.75E-08	3.40E-08	2.04E-07
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.14E-01	6.81E-05	4.47E+01	4.31E-02	8.38E-08	1.26E-06	1.24E-06
SVOC	Formaldehyde	50-00-0			6.95E-06	1.56E+00	1.73E-04					
SVOC	Hexachlorobutadiene	87-68-3	5.35E+04		1.67E-01	4.85E-01	5.32E-05	1.74E+02	6.66E-02	6.55E-08	6.41E-05	8.86E-06
SVOC	Hexachlorocyclopentadiene	77-47-4	1.99E+05		5.55E-01	1.39E-01	6.23E-05	6.45E+02	1.91E-02	7.67E-08	1.64E-05	4.49E-06
SVOC	Hexachloroethane	67-72-1	1.76E+03		7.95E-02	2.16E-02	5.88E-05	5.81E+00	2.97E-03	7.23E-08	4.06E-05	7.06E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		3.28E-05	1.64E-01	4.89E-05	1.12E+04	2.25E-02	6.02E-08	7.16E-11	9.37E-09
SVOC	Isophorone	78-59-1	4.69E+01		1.36E-04	5.38E-01	5.84E-05	2.28E-01	7.39E-02	7.19E-08	4.44E-05	7.38E-06
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.18E-01	6.70E-05	2.03E+01	5.74E-02	8.24E-08	3.00E-05	6.06E-06
SVOC	Methylphenol (total)	1319-77-3	8.45E+01		1.77E-05	6.39E-01	8.64E-05	3.50E-01	8.78E-02	1.06E-07	4.74E-06	2.41E-06
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.10E-01	6.48E-05	6.59E+00	7.00E-02	7.98E-08	1.05E-04	1.14E-05

Attachment G6: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	2-Nitroaniline	88-74-4	6.59E+01		3.27E-06	6.31E-01	6.91E-05	2.89E-01	8.66E-02	8.51E-08	1.27E-06	1.25E-06
SVOC	Nitrobenzene	98-95-3	6.44E+01		4.92E-04	6.57E-01	7.43E-05	2.85E-01	9.02E-02	9.15E-08	1.56E-04	1.38E-05
SVOC	2-Nitrophenol	88-75-5	5.75E+01		1.94E-04	4.66E-01	6.78E-05	2.62E-01	6.40E-02	8.35E-08	4.75E-05	7.63E-06
SVOC	4-Nitrophenol	100-02-7	7.55E+01		8.48E-09	5.40E-01	8.30E-05	3.21E-01	7.42E-02	1.02E-07	3.21E-07	6.27E-07
SVOC	N-Nitrosodiphenylamine	86-30-6	1.29E+03		1.03E-04	2.70E-01	5.49E-05	4.26E+00	3.70E-02	6.75E-08	9.08E-07	1.06E-06
SVOC	N-Nitroso-di-n-propylamine	621-64-7	2.40E+01		4.62E-05	4.71E-01	7.06E-05	1.54E-01	6.47E-02	8.69E-08	2.00E-05	4.95E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.56E+02		2.39E-03	5.20E-01	5.54E-05	9.07E-01	7.14E-02	6.82E-08	1.88E-04	1.52E-05
SVOC	Pentachlorophenol	87-86-5	5.92E+02		5.00E-07	4.84E-01	5.27E-05	1.99E+00	6.65E-02	6.49E-08	4.92E-08	2.46E-07
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.24E-01	6.45E-05	7.86E+01	4.45E-02	7.94E-08	2.71E-07	5.76E-07
SVOC	Phenol	108-95-2	2.88E+01		8.15E-06	7.08E-01	7.86E-05	1.69E-01	9.73E-02	9.68E-08	5.26E-06	2.54E-06
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.35E-01	6.26E-05	3.42E+02	3.23E-02	7.70E-08	2.15E-08	1.62E-07
SVOC	2,4,5-Trichlorophenol	95-95-4	1.60E+03		8.90E-05	2.51E-01	6.07E-05	5.25E+00	3.45E-02	7.48E-08	6.00E-07	8.58E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	3.81E+02		1.60E-04	2.75E-01	5.40E-05	1.31E+00	3.77E-02	6.65E-08	4.64E-06	2.39E-06
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	1.75E-01	4.32E-05	7.95E+03	2.40E-02	5.32E-08	1.23E-07	3.89E-07
INORG	Antimony	7440-36-0		4.50E+01								
INORG	Arsenic	7440-38-2		2.90E+01								
INORG	Barium	7440-39-3		4.10E+01								
INORG	Beryllium	7440-41-7		7.90E+02								
INORG	Cadmium	7440-43-9		7.50E+01								
INORG	Chromium (total)	7440-47-3		1.90E+01								
INORG	Chromium III	16065-83-1		1.80E+06								
INORG	Chromium VI	18540-29-9		1.90E+01								
INORG	Cobalt	7440-48-4		4.50E+01								
INORG	Copper	7440-50-8		3.50E+01								
INORG	Cyanide (total)	57-12-5		9.90E+00								
INORG	Fluoride	16984-48-8										
INORG	Lead	7439-92-1		9.00E+02								
INORG	Manganese	7439-96-5		6.50E+01								
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	2.65E-01	5.44E-05	1.62E+03	3.64E-02	6.70E-08	3.26E-06	2.00E-06

Attachment G6: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
INORG	Nickel	7440-02-0		6.50E+01								
INORG	Selenium	7782-49-2		5.00E+00								
INORG	Silver	7440-22-4		8.30E+00								
INORG	Thallium	7440-28-0		7.10E+01								
INORG	Vanadium	7440-62-2		1.00E+03								
INORG	Zinc	7440-66-6		6.20E+01								
Notes:	Soil bulk density	kg/L	ρ_b	1.62	*Loamy Sand*							
	Soil particle density	kg/L	ρ_s	2.65	*EPA default/MDEQ 1998*							
	Soil porosity	L/L-soil	θ	0.39	*1-(pb/ps)*							
	Soil water content	L/L-soil	θ_w	0.076	*Loamy Sand*							
	Soil air-filled porosity	L/L-soil	θ_a	0.31	*porosity-water content*							
	Soil organic carbon fraction	unitless	f_{oc}	0.002								
	Averaging period	year	**ED**	1								
		s	**ED**	3.2E+07								
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411								
	Temperature	^oC	**T**	12								
		K	**T**	285								

Attachment G6: Risk-Based Cancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	2.80E-08							1.16E-03	1.13E-05			5.00E-08	4.89E-10			
VOC	Benzene	71-43-2	A	2.80E-08	5.5E-02	6.5E+03			5.5E-02		5.96E-03	5.83E-05	7.8E-03	2.2E+01	5.00E-08	4.89E-10	7.8E-03	2.6E+06	2.2E+01
VOC	Bromodichloromethane	75-27-4	B2	2.80E-08	6.2E-02	5.8E+03			6.2E-02		1.98E-03	1.94E-05	1.8E-02	2.9E+01	5.00E-08	4.89E-10	1.8E-02	1.2E+06	2.9E+01
VOC	2-Butanone	78-93-3	ID	2.80E-08							1.09E-03	1.06E-05			5.00E-08	4.89E-10			
VOC	Carbon Disulfide	75-15-0		2.80E-08							1.28E-02	1.25E-04			5.00E-08	4.89E-10			
VOC	Carbon Tetrachloride	56-23-5	B2	2.80E-08	1.3E-01	2.8E+03			1.3E-01		7.87E-03	7.70E-05	1.5E-02	8.7E+00	5.00E-08	4.89E-10	1.5E-02	1.4E+06	8.6E+00
VOC	Chlorobenzene	108-90-7	D	2.80E-08							2.69E-03	2.63E-05			5.00E-08	4.89E-10			
VOC	Chloroethane	75-00-3		2.80E-08	2.9E-03	1.2E+05			2.9E-03		1.67E-02	1.64E-04			5.00E-08	4.89E-10			
VOC	Chloroform	67-66-3	B2	2.80E-08							6.03E-03	5.90E-05	2.3E-02	7.4E+00	5.00E-08	4.89E-10	2.3E-02	8.9E+05	7.4E+00
VOC	Chloromethane	74-87-3	D	2.80E-08							9.61E-03	9.40E-05			5.00E-08	4.89E-10			
VOC	Cumene	98-82-8	D	2.80E-08							2.74E-03	2.68E-05			5.00E-08	4.89E-10			
VOC	Cyclohexane	110-82-7	ID	2.80E-08							1.03E-02	1.00E-04			5.00E-08	4.89E-10			
VOC	Dibromochloromethane	124-48-1	C	2.80E-08	8.4E-02	4.3E+03			8.4E-02		1.08E-03	1.06E-05	2.4E-02	3.9E+01	5.00E-08	4.89E-10	2.4E-02	8.5E+05	3.9E+01
VOC	1,2-Dichlorobenzene	95-50-1	D	2.80E-08							1.16E-03	1.14E-05			5.00E-08	4.89E-10			
VOC	1,3-Dichlorobenzene	541-73-1	D	2.80E-08							1.55E-03	1.52E-05			5.00E-08	4.89E-10			
VOC	1,4-Dichlorobenzene	106-46-7	C	2.80E-08	2.4E-02	1.5E+04			2.4E-02		1.33E-03	1.30E-05	6.3E-03	1.2E+02	5.00E-08	4.89E-10	6.3E-03	3.3E+06	1.2E+02
VOC	Dichlorodifluoromethane	75-71-8		2.80E-08							1.55E-02	1.52E-04			5.00E-08	4.89E-10			
VOC	1,1-Dichloroethane	75-34-3	C	2.80E-08							6.51E-03	6.37E-05			5.00E-08	4.89E-10			
VOC	1,2-Dichloroethane	107-06-2	B2	2.80E-08	9.1E-02	3.9E+03			9.1E-02		3.99E-03	3.91E-05	2.6E-02	9.8E+00	5.00E-08	4.89E-10	2.6E-02	7.9E+05	9.8E+00
VOC	1,1-Dichloroethene	75-35-4	C	2.80E-08							1.09E-02	1.06E-04			5.00E-08	4.89E-10			
VOC	cis-1,2-Dichloroethene	156-59-2	D	2.80E-08							5.48E-03	5.36E-05			5.00E-08	4.89E-10			
VOC	trans-1,2-Dichloroethene	156-60-5		2.80E-08							6.88E-03	6.73E-05			5.00E-08	4.89E-10			
VOC	1,2-Dichloropropane	78-87-5	B2	2.80E-08	6.8E-02	5.3E+03			6.8E-02		4.51E-03	4.41E-05			5.00E-08	4.89E-10			
VOC	Ethyl Benzene	100-41-4	D	2.80E-08							3.13E-03	3.06E-05			5.00E-08	4.89E-10			
VOC	2-Hexanone	591-78-6		2.80E-08											5.00E-08	4.89E-10			
VOC	Methyl Acetate	79-20-9		2.80E-08							1.52E-03	1.48E-05			5.00E-08	4.89E-10			
VOC	Methyl tert-butyl ether	1634-04-4		2.80E-08							3.06E-03	2.99E-05			5.00E-08	4.89E-10			
VOC	4-Methyl-2-pentanone	108-10-1	ID	2.80E-08							1.42E-03	1.39E-05			5.00E-08	4.89E-10			
VOC	Methylcyclohexane	108-87-2		2.80E-08							1.36E-02	1.33E-04			5.00E-08	4.89E-10			
VOC	Methylene Chloride	75-09-2	B2	2.80E-08	7.5E-03	4.8E+04			7.5E-03		6.13E-03	6.00E-05	4.7E-04	3.5E+02	5.00E-08	4.89E-10	4.7E-04	4.3E+07	3.5E+02
VOC	Styrene	100-42-5		2.80E-08							1.28E-03	1.25E-05			5.00E-08	4.89E-10			
VOC	Tetrachloroethene	127-18-4	C-B2	2.80E-08	5.2E-02	6.9E+03			5.2E-02		6.42E-03	6.28E-05	3.1E-03	5.2E+01	5.00E-08	4.89E-10	3.1E-03	6.7E+06	5.2E+01
VOC	Toluene	108-88-3	D	2.80E-08							4.23E-03	4.14E-05			5.00E-08	4.89E-10			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	2.80E-08							3.96E-04	3.88E-06			5.00E-08	4.89E-10			
VOC	1,1,1-Trichloroethane	71-55-6	D	2.80E-08							7.33E-03	7.17E-05			5.00E-08	4.89E-10			
VOC	1,1,2-Trichloroethane	79-00-5	C	2.80E-08	5.7E-02	6.3E+03			5.7E-02		2.51E-03	2.46E-05	1.6E-02	2.5E+01	5.00E-08	4.89E-10	1.6E-02	1.3E+06	2.5E+01
VOC	Trichloroethene	79-01-6	C-B2	2.80E-08	1.1E-02	3.3E+04			1.1E-02		5.08E-03	4.97E-05	1.7E-03	1.2E+02	5.00E-08	4.89E-10	1.7E-03	1.2E+07	1.2E+02
VOC	Trichlorofluoromethane	75-69-4		2.80E-08							1.30E-02	1.27E-04			5.00E-08	4.89E-10			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.80E-08							1.36E-02	1.33E-04			5.00E-08	4.89E-10			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	2.80E-08							1.64E-03	1.60E-05			5.00E-08	4.89E-10			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	2.80E-08							1.15E-03	1.12E-05			5.00E-08	4.89E-10			
VOC	Vinyl Chloride	75-01-4	A	2.80E-08	1.4E+00	2.6E+02			1.4E+00		1.42E-02	1.39E-04	8.8E-03	8.2E+00	5.00E-08	4.89E-10	8.8E-03	2.3E+06	7.9E+00
VOC	Xylenes (total)	1330-20-7	ID	2.80E-08							2.89E-03	2.83E-05			5.00E-08	4.89E-10			
SVOC	Acenaphthene	83-32-9		2.80E-08			1.30E-01	1.20E-08			7.83E-05	7.66E-07			5.00E-08	4.89E-10			
SVOC	Acenaphthylene	208-96-8	D	2.80E-08			1.30E-01	1.20E-08			6.74E-05	6.59E-07			5.00E-08	4.89E-10			
SVOC	Acetophenone	98-86-2	D	2.80E-08			1.00E-01	9.23E-09			3.12E-04	3.05E-06			5.00E-08	4.89E-10			
SVOC	Anthracene	120-12-7	D	2.80E-08			1.30E-01	1.20E-08			2.18E-05	2.14E-07			5.00E-08	4.89E-10			
SVOC	Atrazine	1912-24-9	C	2.80E-08	2.2E-01	1.6E+03	1.00E-01	9.23E-09	2.2E-01	4.9E+03	7.26E-06	7.11E-08	6.3E-02	2.2E+03	5.00E-08	4.89E-10	6.3E-02	3.2E+05	7.8E+02
SVOC	Benzaldehyde	100-52-7		2.80E-08			1.00E-01	9.23E-09			4.71E-04	4.60E-06			5.00E-08	4.89E-10			

Attachment G6: Risk-Based Cancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	2.80E-08	7.3E-01	4.9E+02	1.30E-01	1.20E-08	7.3E-01	1.1E+03	1.71E-06	1.67E-08	8.9E-02	6.8E+03	5.00E-08	4.89E-10	8.9E-02	2.3E+05	3.3E+02
SVOC	Benzo(a)pyrene	50-32-8	B2	2.80E-08	7.3E+00	4.9E+01	1.30E-01	1.20E-08	7.3E+00	1.1E+02	5.89E-07	5.77E-09	8.9E-01	2.0E+03	5.00E-08	4.89E-10	8.9E-01	2.3E+04	3.4E+01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	2.80E-08	7.3E-01	4.9E+02	1.30E-01	1.20E-08	7.3E-01	1.1E+03	3.68E-06	3.60E-08	8.9E-02	3.1E+03	5.00E-08	4.89E-10	8.9E-02	2.3E+05	3.1E+02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	2.80E-08			1.30E-01	1.20E-08			5.30E-08	5.18E-10			5.00E-08	4.89E-10			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	2.80E-08	7.3E-02	4.9E+03	1.30E-01	1.20E-08	7.3E-02	1.1E+04	3.38E-07	3.31E-09	8.9E-03	3.4E+05	5.00E-08	4.89E-10	8.9E-03	2.3E+06	3.4E+03
SVOC	Biphenyl	92-52-4	D	2.80E-08			1.00E-01	9.23E-09			8.79E-05	8.60E-07			5.00E-08	4.89E-10			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	2.80E-08			1.00E-01	9.23E-09			4.27E-05	4.18E-07			5.00E-08	4.89E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	2.80E-08	1.1E+00	3.3E+02	1.00E-01	9.23E-09	1.1E+00	9.9E+02	4.64E-04	4.54E-06	3.3E-01	6.7E+00	5.00E-08	4.89E-10	3.3E-01	6.2E+04	6.5E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	2.80E-08	1.4E-02	2.6E+04	1.00E-01	9.23E-09	1.4E-02	7.7E+04	4.82E-08	4.71E-10	4.0E-03	5.3E+06	5.00E-08	4.89E-10	4.0E-03	5.1E+06	1.9E+04
SVOC	Butylbenzylphthalate	85-68-7	C	2.80E-08	1.9E-03	1.9E+05	1.00E-01	9.23E-09	1.9E-03	5.7E+05	1.68E-06	1.64E-08	5.4E-04	1.1E+06	5.00E-08	4.89E-10	5.4E-04	3.8E+07	1.3E+05
SVOC	Caprolactam	105-60-2		2.80E-08			1.00E-01	9.23E-09			3.45E-05	3.38E-07			5.00E-08	4.89E-10			
SVOC	Carbazole	86-74-8	B2	2.80E-08	2.0E-02	1.8E+04	1.00E-01	9.23E-09	2.0E-02	5.4E+04	2.69E-06	2.63E-08	5.7E-03	6.6E+04	5.00E-08	4.89E-10	5.7E-03	3.6E+06	1.1E+04
SVOC	4-Chloro-3-methylphenol	59-50-7		2.80E-08			1.00E-01	9.23E-09			1.29E-05	1.26E-07			5.00E-08	4.89E-10			
SVOC	2-Chloronaphthalene	91-58-7		2.80E-08			1.00E-01	9.23E-09			9.59E-05	9.38E-07			5.00E-08	4.89E-10			
SVOC	2-Chlorophenol	95-57-8		2.80E-08			1.00E-01	9.23E-09			5.64E-04	5.52E-06			5.00E-08	4.89E-10			
SVOC	Chrysene	218-01-9	B2	2.80E-08	7.3E-03	4.9E+04	1.30E-01	1.20E-08	7.3E-03	1.1E+05	6.27E-06	6.14E-08	8.9E-04	1.8E+05	5.00E-08	4.89E-10	8.9E-04	2.3E+07	2.9E+04
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	2.80E-08	7.3E+00	4.9E+01	1.30E-01	1.20E-08	7.3E+00	1.1E+02	6.75E-08	6.61E-10	8.9E-01	1.7E+04	5.00E-08	4.89E-10	8.9E-01	2.3E+04	3.4E+01
SVOC	Dibenzofuran	132-64-9	D	2.80E-08			1.00E-01	9.23E-09			9.89E-06	9.68E-08			5.00E-08	4.89E-10			
SVOC	2,4-Dichlorophenol	120-83-2		2.80E-08			1.00E-01	9.23E-09			6.69E-05	6.54E-07			5.00E-08	4.89E-10			
SVOC	Diethylphthalate	84-66-2	D	2.80E-08			1.00E-01	9.23E-09			1.76E-05	1.72E-07			5.00E-08	4.89E-10			
SVOC	2,4-Dimethylphenol	105-67-9		2.80E-08			1.00E-01	9.23E-09			5.90E-05	5.78E-07			5.00E-08	4.89E-10			
SVOC	Dimethylphthalate	131-11-3	D	2.80E-08			1.00E-01	9.23E-09			2.51E-05	2.46E-07			5.00E-08	4.89E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	2.80E-08			1.00E-01	9.23E-09			8.28E-07	8.10E-09			5.00E-08	4.89E-10			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		2.80E-08			1.00E-01	9.23E-09			2.62E-05	2.56E-07			5.00E-08	4.89E-10			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	2.80E-08	6.8E-01	5.3E+02	1.00E-01	9.23E-09	6.8E-01	1.6E+03	3.53E-05	3.45E-07			5.00E-08	4.89E-10			4.0E+02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	2.80E-08	6.8E-01	5.3E+02	1.00E-01	9.23E-09	6.8E-01	1.6E+03	4.48E-05	4.38E-07	1.9E-01	1.2E+02	5.00E-08	4.89E-10	1.9E-01	1.1E+05	9.0E+01
SVOC	Di-n-octylphthalate	117-84-0		2.80E-08			1.00E-01	9.23E-09			2.85E-07	2.78E-09			5.00E-08	4.89E-10			
SVOC	Fluoranthene	206-44-0	D	2.80E-08			1.30E-01	1.20E-08			5.52E-06	5.40E-08			5.00E-08	4.89E-10			
SVOC	Fluorene	86-73-7	D	2.80E-08			1.30E-01	1.20E-08			3.36E-05	3.29E-07			5.00E-08	4.89E-10			
SVOC	Formaldehyde	50-00-0	B1	2.80E-08									1.3E-02		5.00E-08	4.89E-10	1.3E-02	1.6E+06	1.6E+06
SVOC	Hexachlorobutadiene	87-68-3	C	2.80E-08	7.8E-02	4.6E+03	1.00E-01	9.23E-09	7.8E-02	1.4E+04	2.39E-04	2.34E-06	2.2E-02	1.9E+02	5.00E-08	4.89E-10	2.2E-02	9.3E+05	1.8E+02
SVOC	Hexachlorocyclopentadiene	77-47-4	E	2.80E-08			1.00E-01	9.23E-09			1.21E-04	1.19E-06			5.00E-08	4.89E-10			
SVOC	Hexachloroethane	67-72-1	C	2.80E-08	1.4E-02	2.6E+04	1.00E-01	9.23E-09	1.4E-02	7.7E+04	1.91E-04	1.87E-06	4.0E-03	1.3E+03	5.00E-08	4.89E-10	4.0E-03	5.1E+06	1.3E+03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	2.80E-09	7.3E-01	4.9E+02	1.30E-01	1.20E-09	7.3E-01	1.1E+03	2.53E-08	2.48E-10	8.9E-02	4.6E+04	5.00E-09	4.89E-11	8.9E-02	2.3E+05	3.4E+02
SVOC	Isophorone	78-59-1	C	2.80E-08	9.5E-04	3.8E+05	1.00E-01	9.23E-09	9.5E-04	1.1E+06	1.99E-04	1.95E-06			5.00E-08	4.89E-10			2.8E+05
SVOC	2-Methylnaphthalene	91-57-6	ID	2.80E-08			1.00E-01	9.23E-09			1.64E-04	1.60E-06			5.00E-08	4.89E-10			
SVOC	Methylphenol (total)	1319-77-3		2.80E-08			1.00E-01	9.23E-09			6.51E-05	6.37E-07			5.00E-08	4.89E-10			
SVOC	Naphthalene	91-20-3	C	2.80E-08			1.30E-01	1.20E-08			3.07E-04	3.00E-06			5.00E-08	4.89E-10			
SVOC	2-Nitroaniline	88-74-4		2.80E-08			1.00E-01	9.23E-09			3.37E-05	3.30E-07			5.00E-08	4.89E-10			
SVOC	Nitrobenzene	98-95-3	D	2.80E-08			1.00E-01	9.23E-09			3.74E-04	3.66E-06			5.00E-08	4.89E-10			
SVOC	2-Nitrophenol	88-75-5		2.80E-08			1.00E-01	9.23E-09			2.06E-04	2.02E-06			5.00E-08	4.89E-10			
SVOC	4-Nitrophenol	100-02-7		2.80E-08			1.00E-01	9.23E-09			1.69E-05	1.66E-07			5.00E-08	4.89E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	2.80E-08	4.9E-03	7.3E+04	1.00E-01	9.23E-09	4.9E-03	2.2E+05	2.85E-05	2.79E-07			5.00E-08	4.89E-10			5.5E+04
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	2.80E-08	7.0E+00	5.1E+01	1.00E-01	9.23E-09	7.0E+00	1.5E+02	1.34E-04	1.31E-06	2.0E+00	3.8E+00	5.00E-08	4.89E-10	2.0E+00	1.0E+04	3.5E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2.80E-08	7.0E-02	5.1E+03	1.00E-01	9.23E-09	7.0E-02	1.5E+04	4.11E-04	4.02E-06	1.0E-02	2.5E+02	5.00E-08	4.89E-10	1.0E-02	2.0E+06	2.3E+02
SVOC	Pentachlorophenol	87-86-5	B2	2.80E-08	1.2E-01	3.0E+03	2.50E-01	2.31E-08	1.2E-01	3.6E+03	6.63E-06	6.49E-08	3.4E-02	4.5E+03	5.00E-08	4.89E-10	3.4E-02	6.0E+05	1.2E+03
SVOC	Phenanthrene	85-01-8	D	2.80E-08			1.30E-01	1.20E-08			1.56E-05	1.52E-07			5.00E-08	4.89E-10			
SVOC	Phenol	108-95-2	ID	2.80E-08			1.00E-01	9.23E-09			6.86E-05	6.71E-07			5.00E-08	4.89E-10			
SVOC	Pyrene	129-00-0	D	2.80E-08			1.30E-01	1.20E-08			4.39E-06	4.29E-08			5.00E-08	4.89E-10			

Attachment G6: Risk-Based Cancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		2.80E-08			1.00E-01	9.23E-09			2.32E-05	2.27E-07			5.00E-08	4.89E-10			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2.80E-08	1.1E-02	3.3E+04	1.00E-01	9.23E-09	1.1E-02	9.9E+04	6.45E-05	6.31E-07	3.1E-03	5.1E+03	5.00E-08	4.89E-10	3.1E-03	6.6E+06	4.2E+03
PCB	PCBs (total)	1336-36-3	B2	2.80E-08	2.0E+00	1.8E+02	1.40E-01	1.29E-08	2.0E+00	3.9E+02	1.05E-05	1.03E-07	5.7E-01	1.7E+02	5.00E-08	4.89E-10	5.7E-01	3.6E+04	7.1E+01
INORG	Antimony	7440-36-0		2.80E-08											5.00E-08	4.89E-10			
INORG	Arsenic	7440-38-2	A	2.80E-08	1.5E+00	2.4E+02	3.00E-02	2.77E-09	1.5E+00	2.4E+03			4.3E+00		5.00E-08	4.89E-10	4.3E+00	4.8E+03	2.1E+02
INORG	Barium	7440-39-3	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Beryllium	7440-41-7	B1	2.80E-08									2.4E+00		5.00E-08	4.89E-10	2.4E+00	8.5E+03	8.5E+03
INORG	Cadmium	7440-43-9	B1	2.80E-08			1.00E-03	9.23E-11					1.8E+00		5.00E-08	4.89E-10	1.8E+00	1.1E+04	1.1E+04
INORG	Chromium (total)	7440-47-3		2.80E-08									1.2E+01		5.00E-08	4.89E-10	1.2E+01	1.7E+03	1.7E+03
INORG	Chromium III	16065-83-1	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Chromium VI	18540-29-9	A	2.80E-08									1.2E+01		5.00E-08	4.89E-10	1.2E+01	1.7E+03	1.7E+03
INORG	Cobalt	7440-48-4	B1	2.80E-08									2.8E+00		5.00E-08	4.89E-10	2.8E+00	7.3E+03	7.3E+03
INORG	Copper	7440-50-8	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Cyanide (total)	57-12-5	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Fluoride	16984-48-8		2.80E-08											5.00E-08	4.89E-10			
INORG	Lead	7439-92-1	B2	2.80E-08											5.00E-08	4.89E-10			
INORG	Manganese	7439-96-5	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Mercury	7439-97-6	D	2.80E-08							5.40E-05	5.29E-07			5.00E-08	4.89E-10			
INORG	Nickel	7440-02-0	A	2.80E-08									2.4E-01		5.00E-08	4.89E-10	2.4E-01	8.5E+04	8.52E+04
INORG	Selenium	7782-49-2	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Silver	7440-22-4	D	2.80E-08											5.00E-08	4.89E-10			
INORG	Thallium	7440-28-0		2.80E-08											5.00E-08	4.89E-10			
INORG	Vanadium	7440-62-2		2.80E-08											5.00E-08	4.89E-10			
INORG	Zinc	7440-66-6	D	2.80E-08											5.00E-08	4.89E-10			

Notes:

Target cancer risk of 1E-05

C/Q based on the annual maximum exposure for a 180-acre (entire Southend) source area = 27.01 kg/m3 per (kg/m2-s)

PM10 based on annual NAAQS standards of 50 ug/m3

Attachment G6: Risk-Based Noncancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	1.96E-06	1.0E+00	5.1E+05			1.0E+00		1.16E-03	7.93E-04	3.5E+00	4.4E+03	5.00E-08	3.42E-08	3.5E+00	1.0E+08	4.4E+03
VOC	Benzene	71-43-2	A	1.96E-06	4.0E-03	2.0E+03			4.0E-03		5.96E-03	4.08E-03	6.0E-02	1.5E+01	5.00E-08	3.42E-08	6.0E-02	1.8E+06	1.5E+01
VOC	Bromodichloromethane	75-27-4	B2	1.96E-06	2.0E-02	1.0E+04			2.0E-02		1.98E-03	1.36E-03	7.0E-02	5.2E+01	5.00E-08	3.42E-08	7.0E-02	2.0E+06	5.1E+01
VOC	2-Butanone	78-93-3	ID	1.96E-06	2.0E+00	1.0E+06			2.0E+00		1.09E-03	7.45E-04	5.0E+00	6.7E+03	5.00E-08	3.42E-08	5.0E+00	1.5E+08	6.7E+03
VOC	Carbon Disulfide	75-15-0		1.96E-06	1.0E-01	5.1E+04			1.0E-01		1.28E-02	8.76E-03	7.0E-01	8.0E+01	5.00E-08	3.42E-08	7.0E-01	2.0E+07	8.0E+01
VOC	Carbon Tetrachloride	56-23-5	B2	1.96E-06	7.0E-03	3.6E+03			7.0E-03		7.87E-03	5.39E-03			5.00E-08	3.42E-08			
VOC	Chlorobenzene	108-90-7	D	1.96E-06	2.0E-02	1.0E+04			2.0E-02		2.69E-03	1.84E-03	6.0E-02	3.3E+01	5.00E-08	3.42E-08	6.0E-02	1.8E+06	3.2E+01
VOC	Chloroethane	75-00-3		1.96E-06	4.0E-01	2.0E+05			4.0E-01		1.67E-02	1.15E-02	1.0E+01	8.7E+02	5.00E-08	3.42E-08	1.0E+01	2.9E+08	8.7E+02
VOC	Chloroform	67-66-3	B2	1.96E-06	1.0E-02	5.1E+03			1.0E-02		6.03E-03	4.13E-03	5.0E-02	1.2E+01	5.00E-08	3.42E-08	5.0E-02	1.5E+06	1.2E+01
VOC	Chloromethane	74-87-3	D	1.96E-06							9.61E-03	6.58E-03	9.0E-02	1.4E+01	5.00E-08	3.42E-08	9.0E-02	2.6E+06	1.4E+01
VOC	Cumene	98-82-8	D	1.96E-06	4.0E-01	2.0E+05			4.0E-01		2.74E-03	1.88E-03	4.0E-01	2.1E+02	5.00E-08	3.42E-08	4.0E-01	1.2E+07	2.1E+02
VOC	Cyclohexane	110-82-7	ID	1.96E-06							1.03E-02	7.02E-03	6.0E+00	8.5E+02	5.00E-08	3.42E-08	6.0E+00	1.8E+08	8.5E+02
VOC	Dibromochloromethane	124-48-1	C	1.96E-06	2.0E-01	1.0E+05			2.0E-01		1.08E-03	7.43E-04	7.0E-01	9.4E+02	5.00E-08	3.42E-08	7.0E-01	2.0E+07	9.3E+02
VOC	1,2-Dichlorobenzene	95-50-1	D	1.96E-06	9.0E-02	4.6E+04			9.0E-02		1.16E-03	7.97E-04	2.0E+00	2.5E+03	5.00E-08	3.42E-08	2.0E+00	5.8E+07	2.4E+03
VOC	1,3-Dichlorobenzene	541-73-1	D	1.96E-06	9.0E-02	4.6E+04			9.0E-02		1.55E-03	1.06E-03	1.4E-01	1.3E+02	5.00E-08	3.42E-08	1.4E-01	4.1E+06	1.3E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	1.96E-06	3.0E-02	1.5E+04			3.0E-02		1.33E-03	9.08E-04	2.5E+00	2.8E+03	5.00E-08	3.42E-08	2.5E+00	7.3E+07	2.3E+03
VOC	Dichlorodifluoromethane	75-71-8		1.96E-06	9.0E-01	4.6E+05			9.0E-01		1.55E-02	1.06E-02	2.0E+00	1.9E+02	5.00E-08	3.42E-08	2.0E+00	5.8E+07	1.9E+02
VOC	1,1-Dichloroethane	75-34-3	C	1.96E-06	1.0E+00	5.1E+05			1.0E+00		6.51E-03	4.46E-03	5.0E+00	1.1E+03	5.00E-08	3.42E-08	5.0E+00	1.5E+08	1.1E+03
VOC	1,2-Dichloroethane	107-06-2	B2	1.96E-06	2.0E-02	1.0E+04			2.0E-02		3.99E-03	2.73E-03	5.0E-03	1.8E+00	5.00E-08	3.42E-08	5.0E-03	1.5E+05	1.8E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.96E-06	5.0E-02	2.6E+04			5.0E-02		1.09E-02	7.45E-03	2.0E-01	2.7E+01	5.00E-08	3.42E-08	2.0E-01	5.8E+06	2.7E+01
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.96E-06	1.0E-01	5.1E+04			1.0E-01		5.48E-03	3.75E-03	3.5E-01	9.3E+01	5.00E-08	3.42E-08	3.5E-01	1.0E+07	9.3E+01
VOC	trans-1,2-Dichloroethene	156-60-5		1.96E-06	2.0E-01	1.0E+05			2.0E-01		6.88E-03	4.71E-03	6.0E-02	1.3E+01	5.00E-08	3.42E-08	6.0E-02	1.7E+06	1.3E+01
VOC	1,2-Dichloropropane	78-87-5	B2	1.96E-06							4.51E-03	3.09E-03	1.3E-02	4.2E+00	5.00E-08	3.42E-08	1.3E-02	3.8E+05	4.2E+00
VOC	Ethyl Benzene	100-41-4	D	1.96E-06	1.0E-01	5.1E+04			1.0E-01		3.13E-03	2.14E-03	1.0E+00	4.7E+02	5.00E-08	3.42E-08	1.0E+00	2.9E+07	4.6E+02
VOC	2-Hexanone	591-78-6		1.96E-06	4.0E-02	2.0E+04			4.0E-02				5.0E-03		5.00E-08	3.42E-08	5.0E-03	1.5E+05	1.8E+04
VOC	Methyl Acetate	79-20-9		1.96E-06	1.0E+01	5.1E+06			1.0E+01		1.52E-03	1.04E-03	3.5E+01	3.4E+04	5.00E-08	3.42E-08	3.5E+01	1.0E+09	3.3E+04
VOC	Methyl tert-butyl ether	1634-04-4		1.96E-06							3.06E-03	2.09E-03	3.0E+00	1.4E+03	5.00E-08	3.42E-08	3.0E+00	8.8E+07	1.4E+03
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.96E-06							1.42E-03	9.75E-04	3.0E+00	3.1E+03	5.00E-08	3.42E-08	3.0E+00	8.8E+07	3.1E+03
VOC	Methylcyclohexane	108-87-2		1.96E-06							1.36E-02	9.34E-03	3.0E+00	3.2E+02	5.00E-08	3.42E-08	3.0E+00	8.8E+07	3.2E+02
VOC	Methylene Chloride	75-09-2	B2	1.96E-06	6.0E-02	3.1E+04			6.0E-02		6.13E-03	4.20E-03	3.0E+00	7.1E+02	5.00E-08	3.42E-08	3.0E+00	8.8E+07	7.0E+02
VOC	Styrene	100-42-5		1.96E-06	2.0E-01	1.0E+05			2.0E-01		1.28E-03	8.75E-04	3.0E+00	3.4E+03	5.00E-08	3.42E-08	3.0E+00	8.8E+07	3.3E+03
VOC	Tetrachloroethene	127-18-4	C-B2	1.96E-06	1.0E-01	5.1E+04			1.0E-01		6.42E-03	4.40E-03	4.0E-01	9.1E+01	5.00E-08	3.42E-08	4.0E-01	1.2E+07	9.1E+01
VOC	Toluene	108-88-3	D	1.96E-06	8.0E-01	4.1E+05			8.0E-01		4.23E-03	2.90E-03	5.0E+00	1.7E+03	5.00E-08	3.42E-08	5.0E+00	1.5E+08	1.7E+03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.96E-06	1.0E-02	5.1E+03			1.0E-02		3.96E-04	2.72E-04	2.0E+00	7.4E+03	5.00E-08	3.42E-08	2.0E+00	5.8E+07	3.0E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	1.96E-06	2.8E-01	1.4E+05			2.8E-01		7.33E-03	5.02E-03	2.2E+01	4.4E+03	5.00E-08	3.42E-08	2.2E+01	6.4E+08	4.3E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	1.96E-06	4.0E-02	2.0E+04			4.0E-02		2.51E-03	1.72E-03			5.00E-08	3.42E-08			
VOC	Trichloroethene	79-01-6	C-B2	1.96E-06	6.0E-03	3.1E+03			6.0E-03		5.08E-03	3.48E-03			5.00E-08	3.42E-08			
VOC	Trichlorofluoromethane	75-69-4		1.96E-06	7.0E-01	3.6E+05			7.0E-01		1.30E-02	8.89E-03	7.0E+00	7.9E+02	5.00E-08	3.42E-08	7.0E+00	2.0E+08	7.9E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.96E-06	3.0E+01	1.5E+07			3.0E+01		1.36E-02	9.33E-03	3.0E+01	3.2E+03	5.00E-08	3.42E-08	3.0E+01	8.8E+08	3.2E+03
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.96E-06	5.0E-01	2.6E+05			5.0E-01		1.64E-03	1.12E-03	6.0E-02	5.4E+01	5.00E-08	3.42E-08	6.0E-02	1.8E+06	5.4E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.96E-06	5.0E-01	2.6E+05			5.0E-01		1.15E-03	7.87E-04	6.0E-02	7.6E+01	5.00E-08	3.42E-08	6.0E-02	1.8E+06	7.6E+01
VOC	Vinyl Chloride	75-01-4	A	1.96E-06	3.0E-03	1.5E+03			3.0E-03		1.42E-02	9.73E-03	1.0E-01	1.0E+01	5.00E-08	3.42E-08	1.0E-01	2.9E+06	1.0E+01
VOC	Xylenes (total)	1330-20-7	ID	1.96E-06	4.0E-01	2.0E+05			4.0E-01		2.89E-03	1.98E-03	1.0E-01	5.1E+01	5.00E-08	3.42E-08	1.0E-01	2.9E+06	5.1E+01
SVOC	Acenaphthene	83-32-9		1.96E-06	6.0E-01	3.1E+05	1.30E-01	8.40E-07	6.0E-01	7.1E+05	7.83E-05	5.36E-05	2.1E+00	3.9E+04	5.00E-08	3.42E-08	2.1E+00	6.1E+07	3.3E+04
SVOC	Acenaphthylene	208-96-8	D	1.96E-06	3.0E-01	1.5E+05	1.30E-01	8.40E-07	3.0E-01	3.6E+05	6.74E-05	4.61E-05	1.1E+00	2.3E+04	5.00E-08	3.42E-08	1.1E+00	3.1E+07	1.9E+04
SVOC	Acetophenone	98-86-2	D	1.96E-06	1.0E+00	5.1E+05	1.00E-01	6.46E-07	1.0E+00	1.5E+06	3.12E-04	2.13E-04	3.5E+00	1.6E+04	5.00E-08	3.42E-08	3.5E+00	1.0E+08	1.6E+04
SVOC	Anthracene	120-12-7	D	1.96E-06	3.0E+00	1.5E+06	1.30E-01	8.40E-07	3.0E+00	3.6E+06	2.18E-05	1.50E-05			5.00E-08	3.42E-08			1.1E+06
SVOC	Atrazine	1912-24-9	C	1.96E-06	3.5E-02	1.8E+04	1.00E-01	6.46E-07	3.5E-02	5.4E+04	7.26E-06	4.97E-06	1.2E-01	2.5E+04	5.00E-08	3.42E-08	1.2E-01	3.6E+06	8.7E+03
SVOC	Benzaldehyde	100-52-7		1.96E-06	1.0E-01	5.1E+04	1.00E-01	6.46E-07	1.0E-01	1.5E+05	4.71E-04	3.22E-04	3.5E-01	1.1E+03	5.00E-08	3.42E-08	3.5E-01	1.0E+07	1.1E+03

Attachment G6: Risk-Based Noncancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	1.96E-06			1.30E-01	8.40E-07			1.71E-06	1.17E-06			5.00E-08	3.42E-08			
SVOC	Benzo(a)pyrene	50-32-8	B2	1.96E-06			1.30E-01	8.40E-07			5.89E-07	4.04E-07			5.00E-08	3.42E-08			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.96E-06			1.30E-01	8.40E-07			3.68E-06	2.52E-06			5.00E-08	3.42E-08			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.96E-06	3.0E-01	1.5E+05	1.30E-01	8.40E-07	3.0E-01	3.6E+05	5.30E-08	3.63E-08	1.1E+00	2.9E+07	5.00E-08	3.42E-08	1.1E+00	3.1E+07	1.1E+05
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.96E-06			1.30E-01	8.40E-07			3.38E-07	2.32E-07			5.00E-08	3.42E-08			
SVOC	Biphenyl	92-52-4	D	1.96E-06	5.0E-02	2.6E+04	1.00E-01	6.46E-07	5.0E-02	7.7E+04	8.79E-05	6.02E-05	1.8E-01	2.9E+03	5.00E-08	3.42E-08	1.8E-01	5.1E+06	2.5E+03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.96E-06			1.00E-01	6.46E-07			4.27E-05	2.93E-05			5.00E-08	3.42E-08			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.96E-06			1.00E-01	6.46E-07			4.64E-04	3.18E-04			5.00E-08	3.42E-08			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.96E-06	2.0E-02	1.0E+04	1.00E-01	6.46E-07	2.0E-02	3.1E+04	4.82E-08	3.30E-08	2.0E-01	6.1E+06	5.00E-08	3.42E-08	2.0E-01	5.8E+06	7.7E+03
SVOC	Butylbenzylphthalate	85-68-7	C	1.96E-06	2.0E+00	1.0E+06	1.00E-01	6.46E-07	2.0E+00	3.1E+06	1.68E-06	1.15E-06	7.0E+00	6.1E+06	5.00E-08	3.42E-08	7.0E+00	2.0E+08	6.8E+05
SVOC	Caprolactam	105-60-2		1.96E-06	5.0E-01	2.6E+05	1.00E-01	6.46E-07	5.0E-01	7.7E+05	3.45E-05	2.36E-05	1.8E+00	7.4E+04	5.00E-08	3.42E-08	1.8E+00	5.1E+07	5.3E+04
SVOC	Carbazole	86-74-8	B2	1.96E-06			1.00E-01	6.46E-07			2.69E-06	1.84E-06			5.00E-08	3.42E-08			
SVOC	4-Chloro-3-methylphenol	59-50-7		1.96E-06	2.0E+00	1.0E+06	1.00E-01	6.46E-07	2.0E+00	3.1E+06	1.29E-05	8.84E-06	7.0E+00	7.9E+05	5.00E-08	3.42E-08	7.0E+00	2.0E+08	3.9E+05
SVOC	2-Chloronaphthalene	91-58-7		1.96E-06	8.0E-02	4.1E+04	1.00E-01	6.46E-07	8.0E-02	1.2E+05	9.59E-05	6.57E-05	2.8E-01	4.3E+03	5.00E-08	3.42E-08	2.8E-01	8.2E+06	3.7E+03
SVOC	2-Chlorophenol	95-57-8		1.96E-06	5.0E-02	2.6E+04	1.00E-01	6.46E-07	5.0E-02	7.7E+04	5.64E-04	3.87E-04	1.8E-01	4.5E+02	5.00E-08	3.42E-08	1.8E-01	5.1E+06	4.4E+02
SVOC	Chrysene	218-01-9	B2	1.96E-06			1.30E-01	8.40E-07			6.27E-06	4.30E-06			5.00E-08	3.42E-08			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.96E-06			1.30E-01	8.40E-07			6.75E-08	4.63E-08			5.00E-08	3.42E-08			
SVOC	Dibenzofuran	132-64-9	D	1.96E-06	2.0E-03	1.0E+03	1.00E-01	6.46E-07	2.0E-03	3.1E+03	9.89E-06	6.77E-06	7.0E-03	1.0E+03	5.00E-08	3.42E-08	7.0E-03	2.0E+05	4.4E+02
SVOC	2,4-Dichlorophenol	120-83-2		1.96E-06	3.0E-03	1.5E+03	1.00E-01	6.46E-07	3.0E-03	4.6E+03	6.69E-05	4.58E-05	1.1E-02	2.3E+02	5.00E-08	3.42E-08	1.1E-02	3.1E+05	1.9E+02
SVOC	Diethylphthalate	84-66-2	D	1.96E-06	8.0E+00	4.1E+06	1.00E-01	6.46E-07	8.0E+00	1.2E+07	1.76E-05	1.21E-05	2.8E+01	2.3E+06	5.00E-08	3.42E-08	2.8E+01	8.2E+08	1.3E+06
SVOC	2,4-Dimethylphenol	105-67-9		1.96E-06	2.0E-01	1.0E+05	1.00E-01	6.46E-07	2.0E-01	3.1E+05	5.90E-05	4.04E-05	7.0E-01	1.7E+04	5.00E-08	3.42E-08	7.0E-01	2.0E+07	1.4E+04
SVOC	Dimethylphthalate	131-11-3	D	1.96E-06	1.0E+01	5.1E+06	1.00E-01	6.46E-07	1.0E+01	1.5E+07	2.51E-05	1.72E-05			5.00E-08	3.42E-08			3.8E+06
SVOC	Di-n-butylphthalate	84-74-2	D	1.96E-06	1.0E+00	5.1E+05	1.00E-01	6.46E-07	1.0E+00	1.5E+06	8.28E-07	5.67E-07			5.00E-08	3.42E-08			3.8E+05
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.96E-06	1.0E-04	5.1E+01	1.00E-01	6.46E-07	1.0E-04	1.5E+02	2.62E-05	1.79E-05	3.5E-04	2.0E+01	5.00E-08	3.42E-08	3.5E-04	1.0E+04	1.3E+01
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.96E-06	2.0E-03	1.0E+03	1.00E-01	6.46E-07	2.0E-03	3.1E+03	3.53E-05	2.42E-05			5.00E-08	3.42E-08			7.7E+02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.96E-06	1.0E-02	5.1E+03	1.00E-01	6.46E-07	1.0E-02	1.5E+04	4.48E-05	3.07E-05	3.5E-02	1.1E+03	5.00E-08	3.42E-08	3.5E-02	1.0E+06	8.8E+02
SVOC	Di-n-octylphthalate	117-84-0		1.96E-06	4.0E-01	2.0E+05	1.00E-01	6.46E-07	4.0E-01	6.2E+05	2.85E-07	1.95E-07			5.00E-08	3.42E-08			1.5E+05
SVOC	Fluoranthene	206-44-0	D	1.96E-06	4.0E-01	2.0E+05	1.30E-01	8.40E-07	4.0E-01	4.8E+05	5.52E-06	3.78E-06	1.4E+00	3.7E+05	5.00E-08	3.42E-08	1.4E+00	4.1E+07	1.0E+05
SVOC	Fluorene	86-73-7	D	1.96E-06	4.0E-01	2.0E+05	1.30E-01	8.40E-07	4.0E-01	4.8E+05	3.36E-05	2.30E-05	1.4E+00	6.1E+04	5.00E-08	3.42E-08	1.4E+00	4.1E+07	4.3E+04
SVOC	Formaldehyde	50-00-0	B1	1.96E-06	2.0E-01	1.0E+05			2.0E-01						5.00E-08	3.42E-08			
SVOC	Hexachlorobutadiene	87-68-3	C	1.96E-06	7.0E-04	3.6E+02	1.00E-01	6.46E-07	7.0E-04	1.1E+03	2.39E-04	1.64E-04			5.00E-08	3.42E-08			2.7E+02
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.96E-06	7.0E-02	3.6E+04	1.00E-01	6.46E-07	7.0E-02	1.1E+05	1.21E-04	8.31E-05	7.0E-04	8.4E+00	5.00E-08	3.42E-08	7.0E-04	2.0E+04	8.4E+00
SVOC	Hexachloroethane	67-72-1	C	1.96E-06	1.0E-02	5.1E+03	1.00E-01	6.46E-07	1.0E-02	1.5E+04	1.91E-04	1.31E-04			5.00E-08	3.42E-08			3.8E+03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.96E-07			1.30E-01	8.40E-08			2.53E-08	1.73E-08			5.00E-09	3.42E-09			
SVOC	Isophorone	78-59-1	C	1.96E-06	2.0E+00	1.0E+06	1.00E-01	6.46E-07	2.0E+00	3.1E+06	1.99E-04	1.37E-04			5.00E-08	3.42E-08			7.7E+05
SVOC	2-Methylnaphthalene	91-57-6	ID	1.96E-06	4.0E-03	2.0E+03	1.00E-01	6.46E-07	4.0E-03	6.2E+03	1.64E-04	1.12E-04	3.0E-03	2.7E+01	5.00E-08	3.42E-08	3.0E-03	8.8E+04	2.6E+01
SVOC	Methylphenol (total)	1319-77-3		1.96E-06	5.0E-01	2.6E+05	1.00E-01	6.46E-07	5.0E-01	7.7E+05	6.51E-05	4.46E-05			5.00E-08	3.42E-08			1.9E+05
SVOC	Naphthalene	91-20-3	C	1.96E-06	2.0E-01	1.0E+05	1.30E-01	8.40E-07	2.0E-01	2.4E+05	3.07E-04	2.10E-04	3.0E-03	1.4E+01	5.00E-08	3.42E-08	3.0E-03	8.8E+04	1.4E+01
SVOC	2-Nitroaniline	88-74-4		1.96E-06	3.0E-03	1.5E+03	1.00E-01	6.46E-07	3.0E-03	4.6E+03	3.37E-05	2.31E-05	2.0E-03	8.7E+01	5.00E-08	3.42E-08	2.0E-03	5.8E+04	8.0E+01
SVOC	Nitrobenzene	98-95-3	D	1.96E-06	5.0E-03	2.6E+03	1.00E-01	6.46E-07	5.0E-03	7.7E+03	3.74E-04	2.56E-04	2.0E-02	7.8E+01	5.00E-08	3.42E-08	2.0E-02	5.8E+05	7.5E+01
SVOC	2-Nitrophenol	88-75-5		1.96E-06			1.00E-01	6.46E-07			2.06E-04	1.41E-04			5.00E-08	3.42E-08			
SVOC	4-Nitrophenol	100-02-7		1.96E-06			1.00E-01	6.46E-07			1.69E-05	1.16E-05			5.00E-08	3.42E-08			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.96E-06	2.0E-02	1.0E+04	1.00E-01	6.46E-07	2.0E-02	3.1E+04	2.85E-05	1.95E-05			5.00E-08	3.42E-08			7.7E+03
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.96E-06			1.00E-01	6.46E-07			1.34E-04	9.16E-05			5.00E-08	3.42E-08			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.96E-06	4.0E-02	2.0E+04	1.00E-01	6.46E-07	4.0E-02	6.2E+04	4.11E-04	2.81E-04			5.00E-08	3.42E-08			1.5E+04
SVOC	Pentachlorophenol	87-86-5	B2	1.96E-06	3.0E-02	1.5E+04	2.50E-01	1.61E-06	3.0E-02	1.9E+04	6.63E-06	4.54E-06	1.1E-01	2.3E+04	5.00E-08	3.42E-08	1.1E-01	3.1E+06	6.1E+03
SVOC	Phenanthrene	85-01-8	D	1.96E-06	3.0E-01	1.5E+05	1.30E-01	8.40E-07	3.0E-01	3.6E+05	1.56E-05	1.07E-05	1.1E+00	9.9E+04	5.00E-08	3.42E-08	1.1E+00	3.1E+07	5.1E+04
SVOC	Phenol	108-95-2	ID	1.96E-06	3.0E-01	1.5E+05	1.00E-01	6.46E-07	3.0E-01	4.6E+05	6.86E-05	4.70E-05			5.00E-08	3.42E-08			1.2E+05
SVOC	Pyrene	129-00-0	D	1.96E-06	3.0E-01	1.5E+05	1.30E-01	8.40E-07	3.0E-01	3.6E+05	4.39E-06	3.00E-06	1.1E+00	3.5E+05	5.00E-08	3.42E-08	1.1E+00	3.1E+07	8.2E+04

Attachment G6: Risk-Based Noncancer Criteria for Exposure of Redevelopment Construction Workers to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		1.96E-06	1.0E+00	5.1E+05	1.00E-01	6.46E-07	1.0E+00	1.5E+06	2.32E-05	1.59E-05			5.00E-08	3.42E-08			3.8E+05
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.96E-06	1.0E-04	5.1E+01	1.00E-01	6.46E-07	1.0E-04	1.5E+02	6.45E-05	4.41E-05			5.00E-08	3.42E-08			3.8E+01
PCB	PCBs (total)	1336-36-3	B2	1.96E-06	5.0E-05	2.6E+01	1.40E-01	9.04E-07	5.0E-05	5.5E+01	1.05E-05	7.19E-06			5.00E-08	3.42E-08			1.7E+01
INORG	Antimony	7440-36-0		1.96E-06	4.0E-04	2.0E+02			6.0E-05				1.4E-03		5.00E-08	3.42E-08	1.4E-03	4.1E+04	2.0E+02
INORG	Arsenic	7440-38-2	A	1.96E-06	5.0E-03	2.6E+03	3.00E-02	1.94E-07	5.0E-03	2.6E+04					5.00E-08	3.42E-08			2.3E+03
INORG	Barium	7440-39-3	D	1.96E-06	7.0E-02	3.6E+04			4.9E-03						5.00E-08	3.42E-08			
INORG	Beryllium	7440-41-7	B1	1.96E-06	2.0E-03	1.0E+03			1.4E-05				2.0E-05		5.00E-08	3.42E-08	2.0E-05	5.8E+02	3.7E+02
INORG	Cadmium	7440-43-9	B1	1.96E-06	1.0E-03	5.1E+02	1.00E-03	6.46E-09	2.5E-05	3.9E+03			9.0E-04		5.00E-08	3.42E-08	9.0E-04	2.6E+04	4.4E+02
INORG	Chromium (total)	7440-47-3		1.96E-06	2.0E-02	1.0E+04			5.0E-04				1.0E-04		5.00E-08	3.42E-08	1.0E-04	2.9E+03	2.3E+03
INORG	Chromium III	16065-83-1	D	1.96E-06	1.5E+00	7.7E+05			2.0E-02				5.3E+00		5.00E-08	3.42E-08	5.3E+00	1.5E+08	7.6E+05
INORG	Chromium VI	18540-29-9	A	1.96E-06	2.0E-02	1.0E+04			5.0E-04				1.0E-04		5.00E-08	3.42E-08	1.0E-04	2.9E+03	2.3E+03
INORG	Cobalt	7440-48-4	B1	1.96E-06	2.0E-02	1.0E+04			2.0E-02				2.0E-05		5.00E-08	3.42E-08	2.0E-05	5.8E+02	5.5E+02
INORG	Copper	7440-50-8	D	1.96E-06	4.0E-02	2.0E+04			4.0E-02				1.4E-01		5.00E-08	3.42E-08	1.4E-01	4.1E+06	2.0E+04
INORG	Cyanide (total)	57-12-5	D	1.96E-06	2.0E-02	1.0E+04			2.0E-02				7.0E-02		5.00E-08	3.42E-08	7.0E-02	2.0E+06	1.0E+04
INORG	Fluoride	16984-48-8		1.96E-06											5.00E-08	3.42E-08			
INORG	Lead	7439-92-1	B2	1.96E-06											5.00E-08	3.42E-08			
INORG	Manganese	7439-96-5	D	1.96E-06	1.4E-01	7.2E+04			8.4E-03				5.0E-05		5.00E-08	3.42E-08	5.0E-05	1.5E+03	1.4E+03
INORG	Mercury	7439-97-6	D	1.96E-06	3.0E-04	1.5E+02			3.0E-04		5.40E-05	3.70E-05	3.0E-04	8.1E+00	5.00E-08	3.42E-08	3.0E-04	8.8E+03	7.7E+00
INORG	Nickel	7440-02-0	A	1.96E-06	2.0E-02	1.0E+04			8.0E-04						5.00E-08	3.42E-08			
INORG	Selenium	7782-49-2	D	1.96E-06	5.0E-03	2.6E+03			5.0E-03				1.8E-02		5.00E-08	3.42E-08	1.8E-02	5.1E+05	2.5E+03
INORG	Silver	7440-22-4	D	1.96E-06	5.0E-03	2.6E+03			2.0E-04				1.0E-05		5.00E-08	3.42E-08	1.0E-05	2.9E+02	2.6E+02
INORG	Thallium	7440-28-0		1.96E-06	7.0E-05	3.6E+01			7.0E-05				2.5E-04		5.00E-08	3.42E-08	2.5E-04	7.2E+03	3.6E+01
INORG	Vanadium	7440-62-2		1.96E-06	7.0E-03	3.6E+03			1.8E-04				2.5E-02		5.00E-08	3.42E-08	2.5E-02	7.2E+05	3.6E+03
INORG	Zinc	7440-66-6	D	1.96E-06	3.0E-01	1.5E+05			3.0E-01				1.1E+00		5.00E-08	3.42E-08	1.1E+00	3.1E+07	1.5E+05

Notes:

Target hazard index of 1

C/Q based on the annual maximum exposure for a 180-acre (entire Southend) source area = 27.01 kg/m3 per (kg/m2-s)

PM10 based on annual NAAQS standards of 50 ug/m3

Attachment G7
Exposure of Redevelopment Construction Workers to Groundwater

Attachment G7: Vapor Flux (mg/m2-s per mg/L) from Exposed Groundwater to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	K_{Gi} (cm/s)	K_{li} (cm/s)	$1/K_L$ (cm/s)	K_L (cm/s)	J_L (L/m^2-s)
VOC	Acetone	67-64-1	8.0E-04	5.8E+01	5.34E-01	1.41E-03	3.06E+03	3.26E-04	3.26E-03
VOC	Benzene	71-43-2	1.1E-01	7.8E+01	4.84E-01	1.22E-03	8.41E+02	1.19E-03	1.19E-02
VOC	Bromodichloromethane	75-27-4	3.3E-02	1.6E+02	3.77E-01	8.39E-04	1.27E+03	7.86E-04	7.86E-03
VOC	2-Butanone	78-93-3	1.1E-03	7.2E+01	4.97E-01	1.27E-03	2.55E+03	3.92E-04	3.92E-03
VOC	Carbon Disulfide	75-15-0	6.2E-01	7.6E+01	4.88E-01	1.23E-03	8.15E+02	1.23E-03	1.23E-02
VOC	Carbon Tetrachloride	56-23-5	6.3E-01	1.5E+02	3.85E-01	8.66E-04	1.16E+03	8.63E-04	8.63E-03
VOC	Chlorobenzene	108-90-7	7.6E-02	1.1E+02	4.28E-01	1.01E-03	1.02E+03	9.82E-04	9.82E-03
VOC	Chloroethane	75-00-3	1.8E-01	6.5E+01	5.16E-01	1.34E-03	7.58E+02	1.32E-03	1.32E-02
VOC	Chloroform	67-66-3	7.5E-02	1.2E+02	4.20E-01	9.83E-04	1.05E+03	9.54E-04	9.54E-03
VOC	Chloromethane	74-87-3	1.8E-01	5.0E+01	5.60E-01	1.51E-03	6.71E+02	1.49E-03	1.49E-02
VOC	Cumene	98-82-8	2.7E-01	1.2E+02	4.19E-01	9.80E-04	1.03E+03	9.71E-04	9.71E-03
VOC	Cyclohexane	110-82-7	4.0E+00	8.4E+01	4.72E-01	1.17E-03	8.54E+02	1.17E-03	1.17E-02
VOC	Dibromochloromethane	124-48-1	1.6E-02	2.1E+02	3.48E-01	7.44E-04	1.52E+03	6.57E-04	6.57E-03
VOC	1,2-Dichlorobenzene	95-50-1	3.9E-02	1.5E+02	3.91E-01	8.86E-04	1.19E+03	8.37E-04	8.37E-03
VOC	1,3-Dichlorobenzene	541-73-1	6.3E-02	1.5E+02	3.91E-01	8.86E-04	1.17E+03	8.56E-04	8.56E-03
VOC	1,4-Dichlorobenzene	106-46-7	5.0E-02	1.5E+02	3.91E-01	8.86E-04	1.18E+03	8.48E-04	8.48E-03
VOC	Dichlorodifluoromethane	75-71-8	7.0E+00	1.2E+02	4.18E-01	9.77E-04	1.02E+03	9.77E-04	9.77E-03
VOC	1,1-Dichloroethane	75-34-3	1.2E-01	9.9E+01	4.47E-01	1.08E-03	9.45E+02	1.06E-03	1.06E-02
VOC	1,2-Dichloroethane	107-06-2	2.0E-02	9.9E+01	4.47E-01	1.08E-03	1.04E+03	9.64E-04	9.64E-03
VOC	1,1-Dichloroethene	75-35-4	5.4E-01	9.7E+01	4.50E-01	1.09E-03	9.21E+02	1.09E-03	1.09E-02
VOC	cis-1,2-Dichloroethene	156-59-2	8.4E-02	9.7E+01	4.50E-01	1.09E-03	9.43E+02	1.06E-03	1.06E-02
VOC	trans-1,2-Dichloroethene	156-60-5	1.9E-01	9.7E+01	4.50E-01	1.09E-03	9.28E+02	1.08E-03	1.08E-02
VOC	1,2-Dichloropropane	78-87-5	5.8E-02	1.1E+02	4.27E-01	1.01E-03	1.03E+03	9.71E-04	9.71E-03
VOC	Ethyl Benzene	100-41-4	1.6E-01	1.1E+02	4.36E-01	1.04E-03	9.73E+02	1.03E-03	1.03E-02
VOC	2-Hexanone	591-78-6	3.6E-02	1.0E+02	4.45E-01	1.07E-03	9.94E+02	1.01E-03	1.01E-02
VOC	Methyl Acetate	79-20-9	1.9E-03	7.4E+01	4.92E-01	1.25E-03	1.90E+03	5.27E-04	5.27E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.2E-02	8.8E+01	4.64E-01	1.14E-03	1.05E+03	9.49E-04	9.49E-03
VOC	4-Methyl-2-pentanone	108-10-1	2.8E-03	1.0E+02	4.45E-01	1.07E-03	1.73E+03	5.79E-04	5.79E-03
VOC	Methylcyclohexane	108-87-2	8.8E+00	9.8E+01	4.48E-01	1.08E-03	9.23E+02	1.08E-03	1.08E-02
VOC	Methylene Chloride	75-09-2	4.5E-02	8.5E+01	4.70E-01	1.17E-03	9.05E+02	1.10E-03	1.10E-02
VOC	Styrene	100-42-5	5.7E-02	1.0E+02	4.39E-01	1.05E-03	9.90E+02	1.01E-03	1.01E-02
VOC	Tetrachloroethene	127-18-4	3.8E-01	1.7E+02	3.76E-01	8.34E-04	1.21E+03	8.29E-04	8.29E-03
VOC	Toluene	108-88-3	1.4E-01	9.2E+01	4.58E-01	1.12E-03	9.09E+02	1.10E-03	1.10E-02
VOC	1,2,4-Trichlorobenzene	120-82-1	2.9E-02	1.8E+02	3.65E-01	7.98E-04	1.35E+03	7.42E-04	7.42E-03
VOC	1,1,1-Trichloroethane	71-55-6	3.5E-01	1.3E+02	4.04E-01	9.30E-04	1.08E+03	9.24E-04	9.24E-03
VOC	1,1,2-Trichloroethane	79-00-5	1.9E-02	1.3E+02	4.04E-01	9.30E-04	1.21E+03	8.28E-04	8.28E-03
VOC	Trichloroethene	79-01-6	2.1E-01	1.3E+02	4.06E-01	9.37E-04	1.08E+03	9.27E-04	9.27E-03
VOC	Trichlorofluoromethane	75-69-4	2.0E+00	1.4E+02	4.00E-01	9.17E-04	1.09E+03	9.16E-04	9.16E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	9.8E+00	1.9E+02	3.61E-01	7.85E-04	1.27E+03	7.85E-04	7.85E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.3E-01	1.2E+02	4.19E-01	9.80E-04	1.04E+03	9.62E-04	9.62E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E-01	1.2E+02	4.19E-01	9.80E-04	1.04E+03	9.61E-04	9.61E-03
VOC	Vinyl Chloride	75-01-4	5.6E-01	6.3E+01	5.21E-01	1.36E-03	7.39E+02	1.35E-03	1.35E-02
VOC	Xylenes (total)	1330-20-7	1.4E-01	1.1E+02	4.36E-01	1.04E-03	9.76E+02	1.02E-03	1.02E-02
SVOC	Acenaphthene	83-32-9	3.2E-03	1.5E+02	3.85E-01	8.65E-04	1.97E+03	5.07E-04	5.07E-03
SVOC	Acenaphthylene	208-96-8	2.3E-03	1.5E+02	3.87E-01	8.71E-04	2.27E+03	4.41E-04	4.41E-03
SVOC	Acetophenone	98-86-2	2.2E-04	1.2E+02	4.19E-01	9.80E-04	1.19E+04	8.37E-05	8.37E-04
SVOC	Anthracene	120-12-7	1.3E-03	1.8E+02	3.67E-01	8.05E-04	3.28E+03	3.04E-04	3.04E-03
SVOC	Atrazine	1912-24-9	1.2E-07	2.2E+02	3.44E-01	7.32E-04	2.33E+07	4.30E-08	4.30E-07
SVOC	Benzaldehyde	100-52-7	4.9E-04	1.1E+02	4.36E-01	1.04E-03	5.67E+03	1.76E-04	1.76E-03
SVOC	Benzo(a)anthracene	56-55-3	6.9E-05	2.3E+02	3.38E-01	7.11E-04	4.46E+04	2.24E-05	2.24E-04
SVOC	Benzo(a)pyrene	50-32-8	2.3E-05	2.5E+02	3.27E-01	6.76E-04	1.34E+05	7.48E-06	7.48E-05
SVOC	Benzo(b)fluoranthene	205-99-2	2.3E-03	2.5E+02	3.27E-01	6.76E-04	2.82E+03	3.54E-04	3.54E-03
SVOC	Benzo(g,h,i)perylene	191-24-2	2.9E-06	2.8E+02	3.17E-01	6.46E-04	1.10E+06	9.11E-07	9.11E-06
SVOC	Benzo(k)fluoranthene	207-08-9	1.7E-05	2.5E+02	3.27E-01	6.76E-04	1.82E+05	5.51E-06	5.51E-05
SVOC	Biphenyl	92-52-4	6.1E-03	1.5E+02	3.85E-01	8.65E-04	1.58E+03	6.33E-04	6.33E-03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.5E-06	1.7E+02	3.71E-01	8.17E-04	7.78E+05	1.29E-06	1.29E-05
SVOC	bis(2-Chloroethyl) ether	111-44-4	3.7E-04	1.4E+02	3.95E-01	8.98E-04	7.97E+03	1.25E-04	1.25E-03
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.1E-06	3.9E+02	2.82E-01	5.44E-04	1.70E+06	5.89E-07	5.89E-06
SVOC	Butylbenzylphthalate	85-68-7	2.6E-05	3.1E+02	3.04E-01	6.08E-04	1.29E+05	7.76E-06	7.76E-05
SVOC	Caprolactam	105-60-2	1.0E-07	1.1E+02	4.27E-01	1.01E-03	2.27E+07	4.40E-08	4.40E-07
SVOC	Carbazole	86-74-8	3.1E-07	1.7E+02	3.75E-01	8.31E-04	8.52E+06	1.17E-07	1.17E-06
SVOC	4-Chloro-3-methylphenol	59-50-7	8.2E-06	1.4E+02	3.95E-01	9.00E-04	3.11E+05	3.21E-06	3.21E-05
SVOC	2-Chloronaphthalene	91-58-7	6.4E-03	1.6E+02	3.78E-01	8.43E-04	1.60E+03	6.25E-04	6.25E-03
SVOC	2-Chlorophenol	95-57-8	8.0E-03	1.3E+02	4.09E-01	9.48E-04	1.36E+03	7.35E-04	7.35E-03
SVOC	Chrysene	218-01-9	1.9E-03	2.3E+02	3.38E-01	7.11E-04	2.93E+03	3.41E-04	3.41E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	3.0E-07	2.8E+02	3.16E-01	6.44E-04	1.05E+07	9.53E-08	9.53E-07
SVOC	Dibenzofuran	132-64-9	2.6E-04	1.7E+02	3.74E-01	8.28E-04	1.16E+04	8.63E-05	8.63E-04
SVOC	2,4-Dichlorophenol	120-83-2	6.5E-05	1.6E+02	3.78E-01	8.42E-04	4.19E+04	2.39E-05	2.39E-04
SVOC	Diethylphthalate	84-66-2	9.3E-06	2.2E+02	3.41E-01	7.21E-04	3.19E+05	3.14E-06	3.14E-05
SVOC	2,4-Dimethylphenol	105-67-9	4.1E-05	1.2E+02	4.16E-01	9.72E-04	5.96E+04	1.68E-05	1.68E-04

Attachment G7: Vapor Flux (mg/m2-s per mg/L) from Exposed Groundwater to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	K_{Gi} (cm/s)	K_{li} (cm/s)	$1/K_L$ (cm/s)	K_L (cm/s)	J_L (L/m^2-s)
SVOC	Dimethylphthalate	131-11-3	2.1E-06	1.9E+02	3.57E-01	7.71E-04	1.31E+06	7.64E-07	7.64E-06
SVOC	Di-n-butylphthalate	84-74-2	1.9E-08	2.8E+02	3.16E-01	6.44E-04	1.64E+08	6.08E-09	6.08E-08
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	8.7E-06	2.0E+02	3.54E-01	7.63E-04	3.25E+05	3.08E-06	3.08E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.9E-06	1.8E+02	3.64E-01	7.96E-04	1.45E+06	6.91E-07	6.91E-06
SVOC	2,6-Dinitrotoluene	606-20-2	1.5E-05	1.8E+02	3.64E-01	7.96E-04	1.81E+05	5.53E-06	5.53E-05
SVOC	Di-n-octylphthalate	117-84-0	1.4E-03	3.9E+02	2.82E-01	5.44E-04	4.43E+03	2.26E-04	2.26E-03
SVOC	Fluoranthene	206-44-0	3.3E-04	2.0E+02	3.52E-01	7.55E-04	9.94E+03	1.01E-04	1.01E-03
SVOC	Fluorene	86-73-7	1.3E-03	1.7E+02	3.76E-01	8.33E-04	3.24E+03	3.09E-04	3.09E-03
SVOC	Formaldehyde	50-00-0	6.9E-06	3.0E+01	6.66E-01	1.96E-03	2.17E+05	4.62E-06	4.62E-05
SVOC	Hexachlorobutadiene	87-68-3	1.7E-01	2.6E+02	3.23E-01	6.65E-04	1.52E+03	6.57E-04	6.57E-03
SVOC	Hexachlorocyclopentadiene	77-47-4	5.6E-01	2.7E+02	3.18E-01	6.51E-04	1.54E+03	6.48E-04	6.48E-03
SVOC	Hexachloroethane	67-72-1	8.0E-02	2.4E+02	3.34E-01	6.98E-04	1.47E+03	6.80E-04	6.80E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.3E-05	2.8E+02	3.17E-01	6.46E-04	9.78E+04	1.02E-05	1.02E-04
SVOC	Isophorone	78-59-1	1.4E-04	1.4E+02	4.00E-01	9.14E-04	1.95E+04	5.13E-05	5.13E-04
SVOC	2-Methylnaphthalene	91-57-6	1.1E-02	1.4E+02	3.96E-01	9.01E-04	1.35E+03	7.42E-04	7.42E-03
SVOC	Methylphenol (total)	1319-77-3	1.8E-05	1.1E+02	4.34E-01	1.03E-03	1.31E+05	7.61E-06	7.61E-05
SVOC	Naphthalene	91-20-3	9.9E-03	1.3E+02	4.10E-01	9.49E-04	1.30E+03	7.69E-04	7.69E-03
SVOC	2-Nitroaniline	88-74-4	3.3E-06	1.4E+02	4.00E-01	9.14E-04	7.67E+05	1.30E-06	1.30E-05
SVOC	Nitrobenzene	98-95-3	4.9E-04	1.2E+02	4.15E-01	9.68E-04	5.93E+03	1.69E-04	1.69E-03
SVOC	2-Nitrophenol	88-75-5	1.9E-04	1.4E+02	3.99E-01	9.11E-04	1.41E+04	7.11E-05	7.11E-04
SVOC	4-Nitrophenol	100-02-7	8.5E-09	1.4E+02	3.99E-01	9.11E-04	2.96E+08	3.38E-09	3.38E-08
SVOC	N-Nitrosodiphenylamine	86-30-6	1.0E-04	2.0E+02	3.54E-01	7.63E-04	2.89E+04	3.46E-05	3.46E-04
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.6E-05	1.3E+02	4.08E-01	9.42E-04	5.42E+04	1.84E-05	1.84E-04
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.4E-03	1.7E+02	3.72E-01	8.21E-04	2.34E+03	4.27E-04	4.27E-03
SVOC	Pentachlorophenol	87-86-5	5.0E-07	2.7E+02	3.21E-01	6.58E-04	6.24E+06	1.60E-07	1.60E-06
SVOC	Phenanthrene	85-01-8	4.8E-04	1.8E+02	3.67E-01	8.05E-04	6.97E+03	1.44E-04	1.44E-03
SVOC	Phenol	108-95-2	8.2E-06	9.4E+01	4.54E-01	1.11E-03	2.71E+05	3.69E-06	3.69E-05
SVOC	Pyrene	129-00-0	2.3E-04	2.0E+02	3.52E-01	7.55E-04	1.39E+04	7.18E-05	7.18E-04
SVOC	2,4,5-Trichlorophenol	95-95-4	8.9E-05	2.0E+02	3.55E-01	7.65E-04	3.30E+04	3.03E-05	3.03E-04
SVOC	2,4,6-Trichlorophenol	88-06-2	1.6E-04	2.0E+02	3.55E-01	7.65E-04	1.90E+04	5.27E-05	5.27E-04
PCB	PCBs (total)	1336-36-3	4.1E-02	3.3E+02	2.99E-01	5.93E-04	1.77E+03	5.66E-04	5.66E-03
INORG	Antimony	7440-36-0		1.2E+02	4.17E-01	9.74E-04			
INORG	Arsenic	7440-38-2		7.5E+01	4.90E-01	1.24E-03			
INORG	Barium	7440-39-3		1.4E+02	4.00E-01	9.17E-04			
INORG	Beryllium	7440-41-7		9.0E+00	9.97E-01	3.58E-03			
INORG	Cadmium	7440-43-9		1.1E+02	4.28E-01	1.01E-03			
INORG	Chromium (total)	7440-47-3		5.2E+01	5.54E-01	1.49E-03			
INORG	Chromium III	16065-83-1		5.2E+01	5.54E-01	1.49E-03			
INORG	Chromium VI	18540-29-9		5.2E+01	5.54E-01	1.49E-03			
INORG	Cobalt	7440-48-4		5.9E+01	5.32E-01	1.40E-03			
INORG	Copper	7440-50-8		6.4E+01	5.18E-01	1.35E-03			
INORG	Cyanide (total)	57-12-5		2.6E+01	6.99E-01	2.11E-03			
INORG	Fluoride	16984-48-8							
INORG	Lead	7439-92-1		2.1E+02	3.49E-01	7.46E-04			
INORG	Manganese	7439-96-5		5.5E+01	5.44E-01	1.45E-03			
INORG	Mercury	7439-97-6	1.5E-01	2.0E+02	3.52E-01	7.58E-04	1.34E+03	7.47E-04	7.47E-03
INORG	Nickel	7440-02-0		5.9E+01	5.32E-01	1.40E-03			
INORG	Selenium	7782-49-2		7.9E+01	4.82E-01	1.21E-03			
INORG	Silver	7440-22-4		1.1E+02	4.34E-01	1.03E-03			
INORG	Thallium	7440-28-0		2.0E+02	3.50E-01	7.52E-04			
INORG	Vanadium	7440-62-2		5.1E+01	5.58E-01	1.51E-03			
INORG	Zinc	7440-66-6		6.5E+01	5.13E-01	1.33E-03			
Notes:	molecular weight of oxygen	g/mol	MW_{O2}	32					
	molecular weight of water	g/mol	MW_{H2O}	18					
	absolute temperature	K	**T**	283					
	liquid-phase mass transfer coefficient for oxygen	cm/s	$k_{L,O2}$	0.002					
	gas-phase mass transfer coefficient for water vapor at 25 C	cm/s	$K_{G,H2O}$	0.833					

Attachment G7: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	Acetone	67-64-1	5.8E+01	-2.4E-01	5.2E-04	1.5E-03	2.2E-01	3.3E-01	3.0E-01	5.3E-01	1.0E+00	1.27E-06
VOC	Benzene	71-43-2	7.8E+01	2.1E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	1.0E+00	3.70E-05
VOC	Bromodichloromethane	75-27-4	1.6E+02	2.1E+00	4.7E-03	2.3E-02	8.7E-01	3.5E-01	3.2E-01	2.1E+00	1.0E+00	1.70E-05
VOC	2-Butanone	78-93-3	7.2E+01	2.8E-01	9.6E-04	3.1E-03	2.7E-01	3.4E-01	3.1E-01	6.4E-01	1.0E+00	2.42E-06
VOC	Carbon Disulfide	75-15-0	7.6E+01	2.0E+00	1.2E-02	4.2E-02	2.8E-01	3.6E-01	3.3E-01	6.7E-01	1.0E+00	3.11E-05
VOC	Carbon Tetrachloride	56-23-5	1.5E+02	2.7E+00	1.4E-02	6.6E-02	7.6E-01	3.8E-01	3.4E-01	1.8E+00	1.0E+00	4.84E-05
VOC	Chlorobenzene	108-90-7	1.1E+02	2.9E+00	2.9E-02	1.2E-01	4.5E-01	4.2E-01	3.8E-01	1.1E+00	1.0E+00	8.00E-05
VOC	Chloroethane	75-00-3	6.5E+01	1.4E+00	6.1E-03	1.9E-02	2.4E-01	3.5E-01	3.1E-01	5.8E-01	1.0E+00	1.49E-05
VOC	Chloroform	67-66-3	1.2E+02	1.9E+00	6.3E-03	2.6E-02	4.9E-01	3.5E-01	3.2E-01	1.2E+00	1.0E+00	1.86E-05
VOC	Chloromethane	74-87-3	5.0E+01	1.9E+00	1.5E-02	4.2E-02	2.0E-01	3.6E-01	3.3E-01	4.8E-01	1.0E+00	3.58E-05
VOC	Cumene	98-82-8	1.2E+02	3.5E+00	6.8E-02	2.9E-01	5.0E-01	5.5E-01	5.1E-01	1.2E+00	1.0E+00	1.93E-04
VOC	Cyclohexane	110-82-7	8.4E+01	3.4E+00	1.0E-01	3.5E-01	3.1E-01	6.0E-01	5.7E-01	7.5E-01	1.0E+00	2.30E-04
VOC	Dibromochloromethane	124-48-1	2.1E+02	2.2E+00	2.9E-03	1.6E-02	1.5E+00	3.4E-01	3.1E-01	3.7E+00	1.0E+00	1.42E-05
VOC	1,2-Dichlorobenzene	95-50-1	1.5E+02	3.4E+00	4.4E-02	2.0E-01	7.0E-01	4.8E-01	4.4E-01	1.7E+00	1.0E+00	1.46E-04
VOC	1,3-Dichlorobenzene	541-73-1	1.5E+02	3.4E+00	4.1E-02	1.9E-01	7.0E-01	4.7E-01	4.3E-01	1.7E+00	1.0E+00	1.35E-04
VOC	1,4-Dichlorobenzene	106-46-7	1.5E+02	3.4E+00	4.3E-02	2.0E-01	7.0E-01	4.8E-01	4.4E-01	1.7E+00	1.0E+00	1.44E-04
VOC	Dichlorodifluoromethane	75-71-8	1.2E+02	2.2E+00	8.9E-03	3.8E-02	5.0E-01	3.6E-01	3.3E-01	1.2E+00	1.0E+00	2.63E-05
VOC	1,1-Dichloroethane	75-34-3	9.9E+01	1.8E+00	6.7E-03	2.6E-02	3.8E-01	3.5E-01	3.2E-01	9.0E-01	1.0E+00	1.83E-05
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.5E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.0E+00	1.13E-05
VOC	1,1-Dichloroethene	75-35-4	9.7E+01	2.1E+00	1.2E-02	4.4E-02	3.7E-01	3.6E-01	3.3E-01	8.8E-01	1.0E+00	3.10E-05
VOC	cis-1,2-Dichloroethene	156-59-2	9.7E+01	1.9E+00	7.7E-03	2.9E-02	3.7E-01	3.5E-01	3.2E-01	8.8E-01	1.0E+00	2.07E-05
VOC	trans-1,2-Dichloroethene	156-60-5	9.7E+01	2.1E+00	1.1E-02	4.0E-02	3.7E-01	3.6E-01	3.3E-01	8.8E-01	1.0E+00	2.83E-05
VOC	1,2-Dichloropropane	78-87-5	1.1E+02	2.0E+00	7.4E-03	3.0E-02	4.5E-01	3.5E-01	3.2E-01	1.1E+00	1.0E+00	2.12E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	3.1E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.0E+00	1.27E-04
VOC	2-Hexanone	591-78-6	1.0E+02	1.4E+00	3.5E-03	1.4E-02	3.8E-01	3.4E-01	3.1E-01	9.2E-01	1.0E+00	9.75E-06
VOC	Methyl Acetate	79-20-9	7.4E+01	1.8E-01	8.0E-04	2.7E-03	2.7E-01	3.4E-01	3.0E-01	6.6E-01	1.0E+00	2.04E-06
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.2E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	1.0E+00	8.84E-06
VOC	4-Methyl-2-pentanone	108-10-1	1.0E+02	1.2E+00	2.7E-03	1.0E-02	3.8E-01	3.4E-01	3.1E-01	9.2E-01	1.0E+00	7.32E-06
VOC	Methylcyclohexane	108-87-2	9.8E+01	3.0E+00	4.0E-02	1.5E-01	3.7E-01	4.4E-01	4.0E-01	9.0E-01	1.0E+00	1.05E-04
VOC	Methylene Chloride	75-09-2	8.5E+01	1.3E+00	3.5E-03	1.3E-02	3.1E-01	3.4E-01	3.1E-01	7.5E-01	1.0E+00	9.25E-06
VOC	Styrene	100-42-5	1.0E+02	2.9E+00	3.6E-02	1.4E-01	4.0E-01	4.3E-01	4.0E-01	9.7E-01	1.0E+00	9.63E-05
VOC	Tetrachloroethene	127-18-4	1.7E+02	2.7E+00	1.1E-02	5.4E-02	8.9E-01	3.7E-01	3.4E-01	2.1E+00	1.0E+00	3.99E-05
VOC	Toluene	108-88-3	9.2E+01	2.8E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	1.0E+00	8.08E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.8E+02	4.0E+00	6.8E-02	3.5E-01	1.1E+00	6.0E-01	5.6E-01	2.6E+00	1.0E+00	2.76E-04
VOC	1,1,1-Trichloroethane	71-55-6	1.3E+02	2.5E+00	1.2E-02	5.5E-02	5.9E-01	3.7E-01	3.4E-01	1.4E+00	1.0E+00	3.85E-05
VOC	1,1,2-Trichloroethane	79-00-5	1.3E+02	2.1E+00	6.4E-03	2.8E-02	5.9E-01	3.5E-01	3.2E-01	1.4E+00	1.0E+00	2.02E-05
VOC	Trichloroethene	79-01-6	1.3E+02	2.7E+00	1.8E-02	7.9E-02	5.7E-01	3.9E-01	3.5E-01	1.4E+00	1.0E+00	5.53E-05
VOC	Trichlorofluoromethane	75-69-4	1.4E+02	2.5E+00	1.3E-02	5.7E-02	6.2E-01	3.7E-01	3.4E-01	1.5E+00	1.0E+00	4.03E-05
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.9E+02	3.2E+00	1.7E-02	9.1E-02	1.2E+00	4.0E-01	3.6E-01	2.8E+00	1.0E+00	7.31E-05

Attachment G7: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	3.6E+00	8.4E-02	3.5E-01	5.0E-01	6.0E-01	5.7E-01	1.2E+00	1.0E+00	2.34E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	4.0E+00	1.5E-01	6.2E-01	5.0E-01	8.2E-01	8.4E-01	2.0E+00	1.0E+00	4.04E-04
VOC	Vinyl Chloride	75-01-4	6.3E+01	1.5E+00	6.9E-03	2.1E-02	2.4E-01	3.5E-01	3.2E-01	5.7E-01	1.0E+00	1.69E-05
VOC	Xylenes (total)	1330-20-7	1.1E+02	3.2E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.0E+00	1.32E-04
SVOC	Acenaphthene	83-32-9	1.5E+02	3.9E+00	8.4E-02	4.0E-01	7.7E-01	6.4E-01	6.1E-01	1.8E+00	1.0E+00	2.96E-04
SVOC	Acenaphthylene	208-96-8	1.5E+02	3.9E+00	8.9E-02	4.2E-01	7.5E-01	6.6E-01	6.3E-01	1.8E+00	1.0E+00	3.09E-04
SVOC	Acetophenone	98-86-2	1.2E+02	1.6E+00	3.7E-03	1.6E-02	5.0E-01	3.4E-01	3.1E-01	1.2E+00	1.0E+00	1.11E-05
SVOC	Anthracene	120-12-7	1.8E+02	4.6E+00	1.6E-01	8.2E-01	1.0E+00	1.0E+00	1.1E+00	4.0E+00	1.0E+00	6.41E-04
SVOC	Atrazine	1912-24-9	2.2E+02	2.6E+00	5.2E-03	2.9E-02	1.7E+00	3.5E-01	3.2E-01	4.1E+00	1.0E+00	2.64E-05
SVOC	Benzaldehyde	100-52-7	1.1E+02	1.5E+00	3.8E-03	1.5E-02	4.1E-01	3.4E-01	3.1E-01	9.9E-01	1.0E+00	1.07E-05
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	5.7E+00	4.8E-01	2.8E+00	2.0E+00	2.9E+00	6.3E+00	8.4E+00	9.0E-01	2.40E-03
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	6.1E+00	6.6E-01	4.0E+00	2.7E+00	4.1E+00	1.2E+01	1.2E+01	8.0E-01	3.41E-03
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	6.2E+00	7.6E-01	4.6E+00	2.7E+00	4.7E+00	1.5E+01	1.2E+01	8.0E-01	3.90E-03
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.2E+00	1.0E+00	6.4E+00	3.7E+00	6.4E+00	2.8E+01	1.6E+01	7.0E-01	5.27E-03
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	6.2E+00	7.6E-01	4.6E+00	2.7E+00	4.7E+00	1.5E+01	1.2E+01	8.0E-01	3.90E-03
SVOC	Biphenyl	92-52-4	1.5E+02	4.1E+00	1.1E-01	5.2E-01	7.7E-01	7.4E-01	7.3E-01	1.8E+00	1.0E+00	3.86E-04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.7E+02	1.3E+00	1.2E-03	5.8E-03	9.8E-01	3.4E-01	3.1E-01	2.3E+00	1.0E+00	4.47E-06
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.4E+02	1.2E+00	1.6E-03	7.3E-03	6.6E-01	3.4E-01	3.1E-01	1.6E+00	1.0E+00	5.24E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.9E+02	7.3E+00	6.8E-01	5.1E+00	1.6E+01	5.2E+00	1.9E+01	7.1E+01	4.0E-01	4.26E-03
SVOC	Butylbenzylphthalate	85-68-7	3.1E+02	4.8E+00	4.4E-02	3.0E-01	5.9E+00	5.6E-01	5.2E-01	1.4E+01	9.0E-01	3.78E-04
SVOC	Caprolactam	105-60-2	1.1E+02	-1.9E-01	2.8E-04	1.1E-03	4.5E-01	3.3E-01	3.0E-01	1.1E+00	1.0E+00	8.01E-07
SVOC	Carbazole	86-74-8	1.7E+02	3.6E+00	4.3E-02	2.1E-01	9.1E-01	4.9E-01	4.5E-01	2.2E+00	1.0E+00	1.60E-04
SVOC	4-Chloro-3-methylphenol	59-50-7	1.4E+02	3.1E+00	2.8E-02	1.3E-01	6.6E-01	4.2E-01	3.9E-01	1.6E+00	1.0E+00	9.14E-05
SVOC	2-Chloronaphthalene	91-58-7	1.6E+02	4.1E+00	1.0E-01	5.0E-01	8.6E-01	7.2E-01	7.1E-01	2.1E+00	1.0E+00	3.69E-04
SVOC	2-Chlorophenol	95-57-8	1.3E+02	2.2E+00	7.9E-03	3.5E-02	5.5E-01	3.6E-01	3.2E-01	1.3E+00	1.0E+00	2.44E-05
SVOC	Chrysene	218-01-9	2.3E+02	5.7E+00	4.8E-01	2.8E+00	2.0E+00	2.9E+00	6.3E+00	8.4E+00	9.0E-01	2.40E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	2.8E+02	6.7E+00	1.0E+00	6.4E+00	3.8E+00	6.5E+00	2.9E+01	1.7E+01	7.0E-01	5.34E-03
SVOC	Dibenzofuran	132-64-9	1.7E+02	4.4E+00	1.4E-01	7.1E-01	9.2E-01	9.1E-01	9.6E-01	3.6E+00	1.0E+00	5.36E-04
SVOC	2,4-Dichlorophenol	120-83-2	1.6E+02	3.1E+00	2.1E-02	1.0E-01	8.6E-01	4.0E-01	3.7E-01	2.1E+00	1.0E+00	7.57E-05
SVOC	Diethylphthalate	84-66-2	2.2E+02	2.5E+00	4.0E-03	2.3E-02	1.8E+00	3.5E-01	3.2E-01	4.4E+00	1.0E+00	2.14E-05
SVOC	2,4-Dimethylphenol	105-67-9	1.2E+02	2.4E+00	1.2E-02	5.0E-02	5.1E-01	3.7E-01	3.3E-01	1.2E+00	1.0E+00	3.52E-05
SVOC	Dimethylphthalate	131-11-3	1.9E+02	1.9E+00	2.2E-03	1.2E-02	1.3E+00	3.4E-01	3.1E-01	3.1E+00	1.0E+00	9.85E-06
SVOC	Di-n-butylphthalate	84-74-2	2.8E+02	4.6E+00	4.8E-02	3.1E-01	3.8E+00	5.6E-01	5.3E-01	9.1E+00	9.0E-01	3.31E-04
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.0E+02	2.1E+00	3.1E-03	1.7E-02	1.4E+00	3.4E-01	3.1E-01	3.2E+00	1.0E+00	1.40E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.8E+02	2.0E+00	3.2E-03	1.7E-02	1.1E+00	3.4E-01	3.1E-01	2.6E+00	1.0E+00	1.32E-05
SVOC	2,6-Dinitrotoluene	606-20-2	1.8E+02	1.9E+00	2.6E-03	1.3E-02	1.1E+00	3.4E-01	3.1E-01	2.6E+00	1.0E+00	1.06E-05
SVOC	Di-n-octylphthalate	117-84-0	3.9E+02	8.1E+00	1.0E+00	7.6E+00	1.6E+01	7.6E+00	3.9E+01	7.2E+01	3.0E-01	4.72E-03
SVOC	Fluoranthene	206-44-0	2.0E+02	5.1E+00	2.8E-01	1.5E+00	1.4E+00	1.7E+00	2.4E+00	5.7E+00	1.0E+00	1.31E-03
SVOC	Fluorene	86-73-7	1.7E+02	4.2E+00	1.1E-01	5.5E-01	9.0E-01	7.7E-01	7.7E-01	2.2E+00	1.0E+00	4.13E-04

Attachment G7: Nonsteady State Dermal Absorption of Chemical from Water
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
SVOC	Formaldehyde	50-00-0	3.0E+01	3.5E-01	1.8E-03	3.9E-03	1.5E-01	3.4E-01	3.1E-01	3.7E-01	1.0E+00	4.22E-06
SVOC	Hexachlorobutadiene	87-68-3	2.6E+02	4.8E+00	8.2E-02	5.1E-01	3.0E+00	7.3E-01	7.2E-01	7.3E+00	9.0E-01	5.03E-04
SVOC	Hexachlorocyclopentadiene	77-47-4	2.7E+02	5.4E+00	1.7E-01	1.1E+00	3.5E+00	1.2E+00	1.5E+00	1.4E+01	9.0E-01	1.12E-03
SVOC	Hexachloroethane	67-72-1	2.4E+02	4.0E+00	3.3E-02	1.9E-01	2.2E+00	4.7E-01	4.3E-01	5.3E+00	1.0E+00	1.91E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	6.7E+00	1.0E+00	6.4E+00	3.7E+00	6.4E+00	2.8E+01	1.6E+01	7.0E-01	5.27E-03
SVOC	Isophorone	78-59-1	1.4E+02	1.7E+00	3.5E-03	1.6E-02	6.2E-01	3.4E-01	3.1E-01	1.5E+00	1.0E+00	1.14E-05
SVOC	2-Methylnaphthalene	91-57-6	1.4E+02	3.9E+00	8.9E-02	4.1E-01	6.6E-01	6.5E-01	6.2E-01	1.6E+00	1.0E+00	2.89E-04
SVOC	Methylphenol (total)	1319-77-3	1.1E+02	2.0E+00	7.7E-03	3.1E-02	4.2E-01	3.5E-01	3.2E-01	1.0E+00	1.0E+00	2.17E-05
SVOC	Naphthalene	91-20-3	1.3E+02	3.4E+00	5.0E-02	2.2E-01	5.5E-01	4.9E-01	4.5E-01	1.3E+00	1.0E+00	1.49E-04
SVOC	2-Nitroaniline	88-74-4	1.4E+02	1.9E+00	4.4E-03	2.0E-02	6.2E-01	3.5E-01	3.2E-01	1.5E+00	1.0E+00	1.44E-05
SVOC	Nitrobenzene	98-95-3	1.2E+02	1.8E+00	5.3E-03	2.3E-02	5.1E-01	3.5E-01	3.2E-01	1.2E+00	1.0E+00	1.60E-05
SVOC	2-Nitrophenol	88-75-5	1.4E+02	1.8E+00	4.0E-03	1.8E-02	6.3E-01	3.5E-01	3.1E-01	1.5E+00	1.0E+00	1.30E-05
SVOC	4-Nitrophenol	100-02-7	1.4E+02	1.9E+00	4.8E-03	2.2E-02	6.3E-01	3.5E-01	3.2E-01	1.5E+00	1.0E+00	1.56E-05
SVOC	N-Nitrosodiphenylamine	86-30-6	2.0E+02	3.2E+00	1.5E-02	8.1E-02	1.4E+00	3.9E-01	3.5E-01	3.3E+00	1.0E+00	6.82E-05
SVOC	N-Nitroso-di-n-propylamine	621-64-7	1.3E+02	1.4E+00	2.5E-03	1.1E-02	5.6E-01	3.4E-01	3.1E-01	1.4E+00	1.0E+00	7.74E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	1.7E+02	2.5E+00	7.2E-03	3.6E-02	9.5E-01	3.6E-01	3.3E-01	2.3E+00	1.0E+00	2.76E-05
SVOC	Pentachlorophenol	87-86-5	2.7E+02	5.1E+00	1.2E-01	7.3E-01	3.3E+00	9.3E-01	9.9E-01	1.3E+01	9.0E-01	7.43E-04
SVOC	Phenanthrene	85-01-8	1.8E+02	4.5E+00	1.4E-01	7.2E-01	1.0E+00	9.1E-01	9.7E-01	4.1E+00	1.0E+00	5.59E-04
SVOC	Phenol	108-95-2	9.4E+01	1.5E+00	4.5E-03	1.7E-02	3.5E-01	3.4E-01	3.1E-01	8.5E-01	1.0E+00	1.20E-05
SVOC	Pyrene	129-00-0	2.0E+02	5.1E+00	2.8E-01	1.5E+00	1.4E+00	1.6E+00	2.4E+00	5.7E+00	1.0E+00	1.29E-03
SVOC	2,4,5-Trichlorophenol	95-95-4	2.0E+02	3.9E+00	4.7E-02	2.5E-01	1.3E+00	5.2E-01	4.8E-01	3.2E+00	1.0E+00	2.11E-04
SVOC	2,4,6-Trichlorophenol	88-06-2	2.0E+02	3.7E+00	3.4E-02	1.9E-01	1.3E+00	4.7E-01	4.3E-01	3.2E+00	1.0E+00	1.56E-04
PCB	PCBs (total)	1336-36-3	3.3E+02	6.5E+00	4.5E-01	3.1E+00	7.2E+00	3.2E+00	7.7E+00	3.1E+01	7.0E-01	3.31E-03
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03							2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03							2.00E-06
INORG	Barium	7440-39-3	1.4E+02		1.0E-03							2.00E-06
INORG	Beryllium	7440-41-7	9.0E+00		1.0E-03							2.00E-06
INORG	Cadmium	7440-43-9	1.1E+02		1.0E-03							2.00E-06
INORG	Chromium (total)	7440-47-3	5.2E+01		2.0E-03							4.00E-06
INORG	Chromium III	16065-83-1	5.2E+01		1.0E-03							2.00E-06
INORG	Chromium VI	18540-29-9	5.2E+01		2.0E-03							4.00E-06
INORG	Cobalt	7440-48-4	5.9E+01		4.0E-04							8.00E-07
INORG	Copper	7440-50-8	6.4E+01		1.0E-03							2.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03							2.00E-06
INORG	Fluoride	16984-48-8			1.0E-03							2.00E-06
INORG	Lead	7439-92-1	2.1E+02		1.0E-04							2.00E-07
INORG	Manganese	7439-96-5	5.5E+01		1.0E-03							2.00E-06
INORG	Mercury	7439-97-6	2.0E+02		1.0E-03							2.00E-06
INORG	Nickel	7440-02-0	5.9E+01		2.0E-04							4.00E-07

Attachment G7: Nonsteady State Dermal Absorption of Chemical from Water GMC: NAO Flint Operations Site, Flint, Michigan												
Chem Group	**Chemical**	**CASRN**	**MW** (g/mole)	**Log K_{ow}** (unitless)	**K_p** (cm/hr)	**B** (unitless)	**τ** (hr)	**c**	**b**	**ts** (hr)	**FA** (unitless)	**DA** (L/cm^2-event)
INORG	Selenium	7782-49-2	7.9E+01		1.0E-03							2.00E-06
INORG	Silver	7440-22-4	1.1E+02		6.0E-04							1.20E-06
INORG	Thallium	7440-28-0	2.0E+02		1.0E-03							2.00E-06
INORG	Vanadium	7440-62-2	5.1E+01		1.0E-03							2.00E-06
INORG	Zinc	7440-66-6	6.5E+01		6.0E-04							1.20E-06
Note:	Event Time	hours	**t**	2								
	K_p capped at 1 cm/hr (USEPA 1992)											

Attachment G7: Risk-Based Cancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
VOC	Acetone	67-64-1	ID	1.0E+00	2.8E-08			1.3E-06	1.2E-08			3.6E-02	7.0E-06			
VOC	Benzene	71-43-2	A	1.0E+00	2.8E-08	5.5E-02	6.5E+03	3.7E-05	3.4E-07	5.5E-02	5.3E+02	1.3E-01	2.6E-05	7.8E-03	5.0E+01	4.6E+01
VOC	Bromodichloromethane	75-27-4	B2	1.0E+00	2.8E-08	6.2E-02	5.8E+03	1.7E-05	1.6E-07	6.2E-02	1.0E+03	8.6E-02	1.7E-05	1.8E-02	3.3E+01	3.2E+01
VOC	2-Butanone	78-93-3	ID	1.0E+00	2.8E-08			2.4E-06	2.2E-08			4.3E-02	8.4E-06			
VOC	Carbon Disulfide	75-15-0		1.0E+00	2.8E-08			3.1E-05	2.9E-07			1.3E-01	2.6E-05			
VOC	Carbon Tetrachloride	56-23-5	B2	1.0E+00	2.8E-08	1.3E-01	2.8E+03	4.8E-05	4.5E-07	1.3E-01	1.7E+02	9.5E-02	1.9E-05	1.5E-02	3.6E+01	2.9E+01
VOC	Chlorobenzene	108-90-7	D	1.0E+00	2.8E-08			8.0E-05	7.4E-07			1.1E-01	2.1E-05			
VOC	Chloroethane	75-00-3		1.0E+00	2.8E-08	2.9E-03	1.2E+05	1.5E-05	1.4E-07	2.9E-03	2.5E+04	1.4E-01	2.8E-05			2.1E+04
VOC	Chloroform	67-66-3	B2	1.0E+00	2.8E-08			1.9E-05	1.7E-07			1.0E-01	2.0E-05	2.3E-02	2.1E+01	2.1E+01
VOC	Chloromethane	74-87-3	D	1.0E+00	2.8E-08			3.6E-05	3.3E-07			1.6E-01	3.2E-05			
VOC	Cumene	98-82-8	D	1.0E+00	2.8E-08			1.9E-04	1.8E-06			1.1E-01	2.1E-05			
VOC	Cyclohexane	110-82-7	ID	1.0E+00	2.8E-08			2.3E-04	2.1E-06			1.3E-01	2.5E-05			
VOC	Dibromochloromethane	124-48-1	C	1.0E+00	2.8E-08	8.4E-02	4.3E+03	1.4E-05	1.3E-07	8.4E-02	9.1E+02	7.2E-02	1.4E-05	2.4E-02	3.0E+01	2.8E+01
VOC	1,2-Dichlorobenzene	95-50-1	D	1.0E+00	2.8E-08			1.5E-04	1.3E-06			9.2E-02	1.8E-05			
VOC	1,3-Dichlorobenzene	541-73-1	D	1.0E+00	2.8E-08			1.4E-04	1.2E-06			9.4E-02	1.8E-05			
VOC	1,4-Dichlorobenzene	106-46-7	C	1.0E+00	2.8E-08	2.4E-02	1.5E+04	1.4E-04	1.3E-06	2.4E-02	3.1E+02	9.3E-02	1.8E-05	6.3E-03	8.8E+01	6.8E+01
VOC	Dichlorodifluoromethane	75-71-8		1.0E+00	2.8E-08			2.6E-05	2.4E-07			1.1E-01	2.1E-05			
VOC	1,1-Dichloroethane	75-34-3	C	1.0E+00	2.8E-08			1.8E-05	1.7E-07			1.2E-01	2.3E-05			
VOC	1,2-Dichloroethane	107-06-2	B2	1.0E+00	2.8E-08	9.1E-02	3.9E+03	1.1E-05	1.0E-07	9.1E-02	1.1E+03	1.1E-01	2.1E-05	2.6E-02	1.9E+01	1.8E+01
VOC	1,1-Dichloroethene	75-35-4	C	1.0E+00	2.8E-08			3.1E-05	2.9E-07			1.2E-01	2.3E-05			
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.0E+00	2.8E-08			2.1E-05	1.9E-07			1.2E-01	2.3E-05			
VOC	trans-1,2-Dichloroethene	156-60-5		1.0E+00	2.8E-08			2.8E-05	2.6E-07			1.2E-01	2.3E-05			
VOC	1,2-Dichloropropane	78-87-5	B2	1.0E+00	2.8E-08	6.8E-02	5.3E+03	2.1E-05	2.0E-07	6.8E-02	7.5E+02	1.1E-01	2.1E-05			6.6E+02
VOC	Ethyl Benzene	100-41-4	D	1.0E+00	2.8E-08			1.3E-04	1.2E-06			1.1E-01	2.2E-05			
VOC	2-Hexanone	591-78-6		1.0E+00	2.8E-08			9.8E-06	9.0E-08			1.1E-01	2.2E-05			
VOC	Methyl Acetate	79-20-9		1.0E+00	2.8E-08			2.0E-06	1.9E-08			5.8E-02	1.1E-05			
VOC	Methyl tert-butyl ether	1634-04-4		1.0E+00	2.8E-08			8.8E-06	8.2E-08			1.0E-01	2.0E-05			
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.0E+00	2.8E-08			7.3E-06	6.7E-08			6.3E-02	1.2E-05			
VOC	Methylcyclohexane	108-87-2		1.0E+00	2.8E-08			1.0E-04	9.7E-07			1.2E-01	2.3E-05			
VOC	Methylene Chloride	75-09-2	B2	1.0E+00	2.8E-08	7.5E-03	4.8E+04	9.3E-06	8.5E-08	7.5E-03	1.6E+04	1.2E-01	2.4E-05	4.7E-04	9.0E+02	8.3E+02
VOC	Styrene	100-42-5		1.0E+00	2.8E-08			9.6E-05	8.9E-07			1.1E-01	2.2E-05			
VOC	Tetrachloroethene	127-18-4	C-B2	1.0E+00	2.8E-08	5.2E-02	6.9E+03	4.0E-05	3.7E-07	5.2E-02	5.2E+02	9.1E-02	1.8E-05	3.1E-03	1.8E+02	1.3E+02
VOC	Toluene	108-88-3	D	1.0E+00	2.8E-08			8.1E-05	7.5E-07			1.2E-01	2.4E-05			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.0E+00	2.8E-08			2.8E-04	2.5E-06			8.1E-02	1.6E-05			
VOC	1,1,1-Trichloroethane	71-55-6	D	1.0E+00	2.8E-08			3.9E-05	3.6E-07			1.0E-01	2.0E-05			
VOC	1,1,2-Trichloroethane	79-00-5	C	1.0E+00	2.8E-08	5.7E-02	6.3E+03	2.0E-05	1.9E-07	5.7E-02	9.4E+02	9.1E-02	1.8E-05	1.6E-02	3.5E+01	3.4E+01
VOC	Trichloroethene	79-01-6	C-B2	1.0E+00	2.8E-08	1.1E-02	3.3E+04	5.5E-05	5.1E-07	1.1E-02	1.8E+03	1.0E-01	2.0E-05	1.7E-03	3.0E+02	2.5E+02
VOC	Trichlorofluoromethane	75-69-4		1.0E+00	2.8E-08			4.0E-05	3.7E-07			1.0E-01	2.0E-05			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.0E+00	2.8E-08			7.3E-05	6.7E-07			8.6E-02	1.7E-05			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.0E+00	2.8E-08			2.3E-04	2.2E-06			1.1E-01	2.1E-05			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.0E+00	2.8E-08			4.0E-04	3.7E-06			1.1E-01	2.1E-05			
VOC	Vinyl Chloride	75-01-4	A	1.0E+00	2.8E-08	1.4E+00	2.6E+02	1.7E-05	1.6E-07	1.4E+00	4.6E+01	1.5E-01	2.9E-05	8.8E-03	3.9E+01	2.0E+01
VOC	Xylenes (total)	1330-20-7	ID	1.0E+00	2.8E-08			1.3E-04	1.2E-06			1.1E-01	2.2E-05			
SVOC	Acenaphthene	83-32-9		1.0E+00	2.8E-08			3.0E-04	2.7E-06			5.6E-02	1.1E-05			
SVOC	Acenaphthylene	208-96-8	D	1.0E+00	2.8E-08			3.1E-04	2.8E-06			4.8E-02	9.5E-06			
SVOC	Acetophenone	98-86-2	D	1.0E+00	2.8E-08			1.1E-05	1.0E-07			9.2E-03	1.8E-06			

Attachment G7: Risk-Based Cancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
SVOC	Anthracene	120-12-7	D	1.0E+00	2.8E-08			6.4E-04	5.9E-06			3.3E-02	6.5E-06			
SVOC	Atrazine	1912-24-9	C	1.0E+00	2.8E-08	2.2E-01	1.6E+03	2.6E-05	2.4E-07	2.2E-01	1.8E+02	4.7E-06	9.2E-10	6.3E-02	1.7E+05	1.7E+02
SVOC	Benzaldehyde	100-52-7		1.0E+00	2.8E-08			1.1E-05	9.9E-08			1.9E-02	3.8E-06			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.0E+00	2.8E-08	7.3E-01	4.9E+02	2.4E-03	2.2E-05	7.3E-01	6.2E-01	2.5E-03	4.8E-07	8.9E-02	2.3E+02	6.2E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	1.0E+00	2.8E-08	7.3E+00	4.9E+01	3.4E-03	3.1E-05	7.3E+00	4.4E-02	8.2E-04	1.6E-07	8.9E-01	7.0E+01	4.4E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.0E+00	2.8E-08	7.3E-01	4.9E+02	3.9E-03	3.6E-05	7.3E-01	3.8E-01	3.9E-02	7.6E-06	8.9E-02	1.5E+01	3.7E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.0E+00	2.8E-08			5.3E-03	4.9E-05			1.0E-04	2.0E-08			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.0E+00	2.8E-08	7.3E-02	4.9E+03	3.9E-03	3.6E-05	7.3E-02	3.8E+00	6.0E-04	1.2E-07	8.9E-03	9.6E+03	3.8E+00
SVOC	Biphenyl	92-52-4	D	1.0E+00	2.8E-08			3.9E-04	3.6E-06			6.9E-02	1.4E-05			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.0E+00	2.8E-08			4.5E-06	4.1E-08			1.4E-04	2.8E-08			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.0E+00	2.8E-08	1.1E+00	3.3E+02	5.2E-06	4.8E-08	1.1E+00	1.9E+02	1.4E-02	2.7E-06	3.3E-01	1.1E+01	1.0E+01
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.0E+00	2.8E-08	1.4E-02	2.6E+04	4.3E-03	3.9E-05	1.4E-02	1.8E+01	6.5E-05	1.3E-08	4.0E-03	2.0E+05	1.8E+01
SVOC	Butylbenzylphthalate	85-68-7	C	1.0E+00	2.8E-08	1.9E-03	1.9E+05	3.8E-04	3.5E-06	1.9E-03	1.5E+03	8.5E-04	1.7E-07	5.4E-04	1.1E+05	1.5E+03
SVOC	Caprolactam	105-60-2		1.0E+00	2.8E-08			8.0E-07	7.4E-09			4.8E-06	9.4E-10			
SVOC	Carbazole	86-74-8	B2	1.0E+00	2.8E-08	2.0E-02	1.8E+04	1.6E-04	1.5E-06	2.0E-02	3.4E+02	1.3E-05	2.5E-09	5.7E-03	7.0E+05	3.3E+02
SVOC	4-Chloro-3-methylphenol	59-50-7		1.0E+00	2.8E-08			9.1E-05	8.4E-07			3.5E-04	6.9E-08			
SVOC	2-Chloronaphthalene	91-58-7		1.0E+00	2.8E-08			3.7E-04	3.4E-06			6.9E-02	1.3E-05			
SVOC	2-Chlorophenol	95-57-8		1.0E+00	2.8E-08			2.4E-05	2.2E-07			8.1E-02	1.6E-05			
SVOC	Chrysene	218-01-9	B2	1.0E+00	2.8E-08	7.3E-03	4.9E+04	2.4E-03	2.2E-05	7.3E-03	6.2E+01	3.7E-02	7.3E-06	8.9E-04	1.5E+03	5.9E+01
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.0E+00	2.8E-08	7.3E+00	4.9E+01	5.3E-03	4.9E-05	7.3E+00	2.8E-02	1.0E-05	2.0E-09	8.9E-01	5.5E+03	2.8E-02
SVOC	Dibenzofuran	132-64-9	D	1.0E+00	2.8E-08			5.4E-04	4.9E-06			9.5E-03	1.9E-06			
SVOC	2,4-Dichlorophenol	120-83-2		1.0E+00	2.8E-08			7.6E-05	7.0E-07			2.6E-03	5.1E-07			
SVOC	Diethylphthalate	84-66-2	D	1.0E+00	2.8E-08			2.1E-05	2.0E-07			3.4E-04	6.7E-08			
SVOC	2,4-Dimethylphenol	105-67-9		1.0E+00	2.8E-08			3.5E-05	3.2E-07			1.8E-03	3.6E-07			
SVOC	Dimethylphthalate	131-11-3	D	1.0E+00	2.8E-08			9.9E-06	9.1E-08			8.4E-05	1.6E-08			
SVOC	Di-n-butylphthalate	84-74-2	D	1.0E+00	2.8E-08			3.3E-04	3.1E-06			6.7E-07	1.3E-10			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.0E+00	2.8E-08			1.4E-05	1.3E-07			3.4E-04	6.6E-08			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.0E+00	2.8E-08	6.8E-01	5.3E+02	1.3E-05	1.2E-07	6.8E-01	1.2E+02	7.6E-05	1.5E-08			9.8E+01
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.0E+00	2.8E-08	6.8E-01	5.3E+02	1.1E-05	9.8E-08	6.8E-01	1.5E+02	6.1E-04	1.2E-07	1.9E-01	4.3E+02	9.2E+01
SVOC	Di-n-octylphthalate	117-84-0		1.0E+00	2.8E-08			4.7E-03	4.4E-05			2.5E-02	4.8E-06			
SVOC	Fluoranthene	206-44-0	D	1.0E+00	2.8E-08			1.3E-03	1.2E-05			1.1E-02	2.2E-06			
SVOC	Fluorene	86-73-7	D	1.0E+00	2.8E-08			4.1E-04	3.8E-06			3.4E-02	6.6E-06			
SVOC	Formaldehyde	50-00-0	B1	1.0E+00	2.8E-08			4.2E-06	3.9E-08			5.1E-04	9.9E-08	1.3E-02	7.8E+03	7.8E+03
SVOC	Hexachlorobutadiene	87-68-3	C	1.0E+00	2.8E-08	7.8E-02	4.6E+03	5.0E-04	4.6E-06	7.8E-02	2.8E+01	7.2E-02	1.4E-05	2.2E-02	3.2E+01	1.5E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.0E+00	2.8E-08			1.1E-03	1.0E-05			7.1E-02	1.4E-05			
SVOC	Hexachloroethane	67-72-1	C	1.0E+00	2.8E-08	1.4E-02	2.6E+04	1.9E-04	1.8E-06	1.4E-02	4.1E+02	7.5E-02	1.5E-05	4.0E-03	1.7E+02	1.2E+02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.0E+00	2.8E-08	7.3E-01	4.9E+02	5.3E-03	4.9E-05	7.3E-01	2.8E-01	1.1E-03	2.2E-07	8.9E-02	5.1E+02	2.8E-01
SVOC	Isophorone	78-59-1	C	1.0E+00	2.8E-08	9.5E-04	3.8E+05	1.1E-05	1.1E-07	9.5E-04	1.0E+05	5.6E-03	1.1E-06			7.9E+04
SVOC	2-Methylnaphthalene	91-57-6	ID	1.0E+00	2.8E-08			2.9E-04	2.7E-06			8.1E-02	1.6E-05			
SVOC	Methylphenol (total)	1319-77-3		1.0E+00	2.8E-08			2.2E-05	2.0E-07			8.3E-04	1.6E-07			
SVOC	Naphthalene	91-20-3	C	1.0E+00	2.8E-08			1.5E-04	1.4E-06			8.4E-02	1.6E-05			
SVOC	2-Nitroaniline	88-74-4		1.0E+00	2.8E-08			1.4E-05	1.3E-07			1.4E-04	2.8E-08			
SVOC	Nitrobenzene	98-95-3	D	1.0E+00	2.8E-08			1.6E-05	1.5E-07			1.8E-02	3.6E-06			
SVOC	2-Nitrophenol	88-75-5		1.0E+00	2.8E-08			1.3E-05	1.2E-07			7.8E-03	1.5E-06			
SVOC	4-Nitrophenol	100-02-7		1.0E+00	2.8E-08			1.6E-05	1.4E-07			3.7E-07	7.3E-11			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.0E+00	2.8E-08	4.9E-03	7.3E+04	6.8E-05	6.3E-07	4.9E-03	3.2E+03	3.8E-03	7.4E-07			3.1E+03

Attachment G7: Risk-Based Cancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	LADD (mg/m^3)	URF (m^3/mg)	RBC_{inh} (mg/L)	Cancer RBC (mg/L)
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.0E+00	2.8E-08	7.0E+00	5.1E+01	7.7E-06	7.1E-08	7.0E+00	2.0E+01	2.0E-03	4.0E-07	2.0E+00	1.3E+01	6.7E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.0E+00	2.8E-08	7.0E-02	5.1E+03	2.8E-05	2.5E-07	7.0E-02	5.6E+02	4.7E-02	9.2E-06	1.0E-02	1.1E+02	9.0E+01
SVOC	Pentachlorophenol	87-86-5	B2	1.0E+00	2.8E-08	1.2E-01	3.0E+03	7.4E-04	6.9E-06	1.2E-01	1.2E+01	1.8E-05	3.4E-09	3.4E-02	8.5E+04	1.2E+01
SVOC	Phenanthrene	85-01-8	D	1.0E+00	2.8E-08			5.6E-04	5.2E-06			1.6E-02	3.1E-06			
SVOC	Phenol	108-95-2	ID	1.0E+00	2.8E-08			1.2E-05	1.1E-07			4.0E-04	7.9E-08			
SVOC	Pyrene	129-00-0	D	1.0E+00	2.8E-08			1.3E-03	1.2E-05			7.9E-03	1.5E-06			
SVOC	2,4,5-Trichlorophenol	95-95-4		1.0E+00	2.8E-08			2.1E-04	1.9E-06			3.3E-03	6.5E-07			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.0E+00	2.8E-08	1.1E-02	3.3E+04	1.6E-04	1.4E-06	1.1E-02	6.3E+02	5.8E-03	1.1E-06	3.1E-03	2.9E+03	5.1E+02
PCB	PCBs (total)	1336-36-3	B2	1.0E+00	2.8E-08	2.0E+00	1.8E+02	3.3E-03	3.1E-05	2.0E+00	1.6E-01	6.2E-02	1.2E-05	5.7E-01	1.4E+00	1.5E-01
INORG	Antimony	7440-36-0		1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Arsenic	7440-38-2	A	1.0E+00	2.8E-08	1.5E+00	2.4E+02	2.0E-06	1.8E-08	1.5E+00	3.6E+02			4.3E+00		1.4E+02
INORG	Barium	7440-39-3	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Beryllium	7440-41-7	B1	1.0E+00	2.8E-08			2.0E-06	1.8E-08					2.4E+00		
INORG	Cadmium	7440-43-9	B1	1.0E+00	2.8E-08			2.0E-06	1.8E-08					1.8E+00		
INORG	Chromium (total)	7440-47-3		1.0E+00	2.8E-08			4.0E-06	3.7E-08					1.2E+01		
INORG	Chromium III	16065-83-1	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Chromium VI	18540-29-9	A	1.0E+00	2.8E-08			4.0E-06	3.7E-08					1.2E+01		
INORG	Cobalt	7440-48-4	B1	1.0E+00	2.8E-08			8.0E-07	7.4E-09					2.8E+00		
INORG	Copper	7440-50-8	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Cyanide (total)	57-12-5	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Fluoride	16984-48-8		1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Lead	7439-92-1	B2	1.0E+00	2.8E-08			2.0E-07	1.8E-09							
INORG	Manganese	7439-96-5	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Mercury	7439-97-6	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08			8.2E-02	1.6E-05			
INORG	Nickel	7440-02-0	A	1.0E+00	2.8E-08			4.0E-07	3.7E-09					2.4E-01		
INORG	Selenium	7782-49-2	D	1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Silver	7440-22-4	D	1.0E+00	2.8E-08			1.2E-06	1.1E-08							
INORG	Thallium	7440-28-0		1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Vanadium	7440-62-2		1.0E+00	2.8E-08			2.0E-06	1.8E-08							
INORG	Zinc	7440-66-6	D	1.0E+00	2.8E-08			1.2E-06	1.1E-08							

Note:

Target cancer risk of 1E-05

C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)

Attachment G7: Risk-Based Noncancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
VOC	Acetone	67-64-1	ID	1.0E+00	2.0E-06	1.0E+00	5.1E+05	1.3E-06	8.2E-07	1.0E+00	1.2E+06	3.6E-02	4.9E-04	3.5E+00	7.1E+03	7.0E+03
VOC	Benzene	71-43-2	A	1.0E+00	2.0E-06	4.0E-03	2.0E+03	3.7E-05	2.4E-05	4.0E-03	1.7E+02	1.3E-01	1.8E-03	6.0E-02	3.4E+01	2.8E+01
VOC	Bromodichloromethane	75-27-4	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.7E-05	1.1E-05	2.0E-02	1.8E+03	8.6E-02	1.2E-03	7.0E-02	5.9E+01	5.7E+01
VOC	Bromoform	75-25-2	B2	1.0E+00	2.0E-06	2.0E-01	1.0E+05	1.4E-05	9.0E-06	2.0E-01	2.2E+04	6.2E-02	8.5E-04			1.8E+04
VOC	Bromomethane	74-83-9	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	7.7E-06	5.0E-06	5.0E-03	1.0E+03	1.2E-01	1.6E-03	2.0E-01	1.2E+02	1.1E+02
VOC	2-Butanone	78-93-3	ID	1.0E+00	2.0E-06	2.0E+00	1.0E+06	2.4E-06	1.6E-06	2.0E+00	1.3E+06	4.3E-02	5.9E-04	5.0E+00	8.5E+03	8.4E+03
VOC	Carbon Disulfide	75-15-0		1.0E+00	2.0E-06	1.0E-01	5.1E+04	3.1E-05	2.0E-05	1.0E-01	5.0E+03	1.3E-01	1.8E-03	7.0E-01	3.8E+02	3.5E+02
VOC	Carbon Tetrachloride	56-23-5	B2	1.0E+00	2.0E-06	7.0E-03	3.6E+03	4.8E-05	3.1E-05	7.0E-03	2.2E+02	9.5E-02	1.3E-03			2.1E+02
VOC	Chlorobenzene	108-90-7	D	1.0E+00	2.0E-06	2.0E-02	1.0E+04	8.0E-05	5.2E-05	2.0E-02	3.9E+02	1.1E-01	1.5E-03	6.0E-02	4.1E+01	3.7E+01
VOC	Chloroethane	75-00-3		1.0E+00	2.0E-06	4.0E-01	2.0E+05	1.5E-05	9.6E-06	4.0E-01	4.2E+04	1.4E-01	2.0E-03	1.0E+01	5.1E+03	4.4E+03
VOC	Chloroform	67-66-3	B2	1.0E+00	2.0E-06	1.0E-02	5.1E+03	1.9E-05	1.2E-05	1.0E-02	8.3E+02	1.0E-01	1.4E-03	5.0E-02	3.5E+01	3.3E+01
VOC	Chloromethane	74-87-3	D	1.0E+00	2.0E-06			3.6E-05	2.3E-05			1.6E-01	2.2E-03	9.0E-02	4.0E+01	4.0E+01
VOC	Cumene	98-82-8	D	1.0E+00	2.0E-06	4.0E-01	2.0E+05	1.9E-04	1.2E-04	4.0E-01	3.2E+03	1.1E-01	1.5E-03	4.0E-01	2.7E+02	2.5E+02
VOC	Cyclohexane	110-82-7	ID	1.0E+00	2.0E-06			2.3E-04	1.5E-04			1.3E-01	1.8E-03	6.0E+00	3.4E+03	3.4E+03
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1.0E+00	2.0E-06			2.4E-05	1.5E-05			4.5E-02	6.2E-04	2.0E-04	3.2E-01	3.2E-01
VOC	Dibromochloromethane	124-48-1	C	1.0E+00	2.0E-06	2.0E-01	1.0E+05	1.4E-05	9.2E-06	2.0E-01	2.2E+04	7.2E-02	9.9E-04	7.0E-01	7.1E+02	6.8E+02
VOC	1,2-Dibromoethane	106-93-4	LC	1.0E+00	2.0E-06	9.0E-03	4.6E+03	6.8E-06	4.4E-06	9.0E-03	2.0E+03	7.5E-02	1.0E-03	9.0E-03	8.7E+00	8.7E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	1.0E+00	2.0E-06	9.0E-02	4.6E+04	1.5E-04	9.4E-05	9.0E-02	9.6E+02	9.2E-02	1.3E-03	2.0E+00	1.6E+03	5.9E+02
VOC	1,3-Dichlorobenzene	541-73-1	D	1.0E+00	2.0E-06	9.0E-02	4.6E+04	1.4E-04	8.7E-05	9.0E-02	1.0E+03	9.4E-02	1.3E-03	1.4E-01	1.1E+02	9.8E+01
VOC	1,4-Dichlorobenzene	106-46-7	C	1.0E+00	2.0E-06	3.0E-02	1.5E+04	1.4E-04	9.3E-05	3.0E-02	3.2E+02	9.3E-02	1.3E-03	2.5E+00	2.0E+03	2.7E+02
VOC	Dichlorodifluoromethane	75-71-8		1.0E+00	2.0E-06	9.0E-01	4.6E+05	2.6E-05	1.7E-05	9.0E-01	5.3E+04	1.1E-01	1.5E-03	2.0E+00	1.4E+03	1.3E+03
VOC	1,1-Dichloroethane	75-34-3	C	1.0E+00	2.0E-06	1.0E+00	5.1E+05	1.8E-05	1.2E-05	1.0E+00	8.5E+04	1.2E-01	1.6E-03	5.0E+00	3.1E+03	3.0E+03
VOC	1,2-Dichloroethane	107-06-2	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	1.1E-05	7.3E-06	2.0E-02	2.7E+03	1.1E-01	1.4E-03	5.0E-03	3.5E+00	3.4E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.0E+00	2.0E-06	5.0E-02	2.6E+04	3.1E-05	2.0E-05	5.0E-02	2.5E+03	1.2E-01	1.6E-03	2.0E-01	1.2E+02	1.2E+02
VOC	1,2-Dichloroethene (total)	540-59-0		1.0E+00	2.0E-06	9.0E-03	4.6E+03	2.1E-05	1.3E-05	9.0E-03	6.7E+02	1.2E-01	1.6E-03	3.2E-02	1.9E+01	1.9E+01
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	2.1E-05	1.3E-05	1.0E-01	7.5E+03	1.2E-01	1.6E-03	3.5E-01	2.2E+02	2.1E+02
VOC	trans-1,2-Dichloroethene	156-60-5		1.0E+00	2.0E-06	2.0E-01	1.0E+05	2.8E-05	1.8E-05	2.0E-01	1.1E+04	1.2E-01	1.6E-03	6.0E-02	3.7E+01	3.7E+01
VOC	1,2-Dichloropropane	78-87-5	B2	1.0E+00	2.0E-06			2.1E-05	1.4E-05			1.1E-01	1.5E-03	1.3E-02	8.9E+00	8.9E+00
VOC	1,3-Dichloropropene (total)	542-75-6	B2	1.0E+00	2.0E-06	3.0E-02	1.5E+04	2.3E-05	1.5E-05	3.0E-02	2.1E+03	1.1E-01	1.5E-03	2.0E-02	1.3E+01	1.3E+01
VOC	cis-1,3-Dichloropropene	10061-01-5		1.0E+00	2.0E-06	3.0E-02	1.5E+04	9.3E-06	6.0E-06	3.0E-02	5.0E+03	1.1E-01	1.5E-03	2.0E-02	1.3E+01	1.3E+01
VOC	trans-1,3-Dichloropropene	10061-02-6		1.0E+00	2.0E-06			2.2E-05	1.4E-05			1.0E-01	1.4E-03			
VOC	Ethyl Benzene	100-41-4	D	1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.3E-04	8.2E-05	1.0E-01	1.2E+03	1.1E-01	1.5E-03	1.0E+00	6.5E+02	4.2E+02
VOC	2-Hexanone	591-78-6		1.0E+00	2.0E-06	4.0E-02	2.0E+04	9.8E-06	6.3E-06	4.0E-02	6.4E+03	1.1E-01	1.5E-03	5.0E-03	3.3E+00	3.3E+00
VOC	Methyl Acetate	79-20-9		1.0E+00	2.0E-06	1.0E+01	5.1E+06	2.0E-06	1.3E-06	1.0E+01	7.6E+06	5.8E-02	7.9E-04	3.5E+01	4.4E+04	4.4E+04
VOC	Methyl tert-butyl ether	1634-04-4		1.0E+00	2.0E-06			8.8E-06	5.7E-06			1.0E-01	1.4E-03	3.0E+00	2.1E+03	2.1E+03
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.0E+00	2.0E-06			7.3E-06	4.7E-06			6.3E-02	8.7E-04	3.0E+00	3.5E+03	3.5E+03
VOC	Methylcyclohexane	108-87-2		1.0E+00	2.0E-06			1.0E-04	6.8E-05			1.2E-01	1.6E-03	3.0E+00	1.8E+03	1.8E+03
VOC	Methylene Chloride	75-09-2	B2	1.0E+00	2.0E-06	6.0E-02	3.1E+04	9.3E-06	6.0E-06	6.0E-02	1.0E+04	1.2E-01	1.7E-03	3.0E+00	1.8E+03	1.5E+03
VOC	Styrene	100-42-5		1.0E+00	2.0E-06	2.0E-01	1.0E+05	9.6E-05	6.2E-05	2.0E-01	3.2E+03	1.1E-01	1.5E-03	3.0E+00	2.0E+03	1.2E+03
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1.0E+00	2.0E-06	6.0E-02	3.1E+04	2.6E-05	1.7E-05	6.0E-02	3.6E+03	6.9E-02	9.5E-04			3.2E+03
VOC	Tetrachloroethene	127-18-4	C-B2	1.0E+00	2.0E-06	1.0E-01	5.1E+04	4.0E-05	2.6E-05	1.0E-01	3.9E+03	9.1E-02	1.2E-03	4.0E-01	3.2E+02	2.9E+02
VOC	Toluene	108-88-3	D	1.0E+00	2.0E-06	8.0E-01	4.1E+05	8.1E-05	5.2E-05	8.0E-01	1.5E+04	1.2E-01	1.7E-03	5.0E+00	3.0E+03	2.5E+03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.0E+00	2.0E-06	1.0E-02	5.1E+03	2.8E-04	1.8E-04	1.0E-02	5.6E+01	8.1E-02	1.1E-03	2.0E+00	1.8E+03	5.4E+01
VOC	1,1,1-Trichloroethane	71-55-6	D	1.0E+00	2.0E-06	2.8E-01	1.4E+05	3.9E-05	2.5E-05	2.8E-01	1.1E+04	1.0E-01	1.4E-03	2.2E+01	1.6E+04	6.3E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	1.0E+00	2.0E-06	4.0E-02	2.0E+04	2.0E-05	1.3E-05	4.0E-02	3.1E+03	9.1E-02	1.2E-03			2.7E+03

Attachment G7: Risk-Based Noncancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
VOC	Trichloroethene	79-01-6	C-B2	1.0E+00	2.0E-06	6.0E-03	3.1E+03	5.5E-05	3.6E-05	6.0E-03	1.7E+02	1.0E-01	1.4E-03			1.6E+02
VOC	Trichlorofluoromethane	75-69-4		1.0E+00	2.0E-06	7.0E-01	3.6E+05	4.0E-05	2.6E-05	7.0E-01	2.7E+04	1.0E-01	1.4E-03	7.0E+00	5.1E+03	4.2E+03
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.0E+00	2.0E-06	3.0E+01	1.5E+07	7.3E-05	4.7E-05	3.0E+01	6.4E+05	8.6E-02	1.2E-03	3.0E+01	2.5E+04	2.4E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.0E+00	2.0E-06	5.0E-01	2.6E+05	2.3E-04	1.5E-04	5.0E-01	3.3E+03	1.1E-01	1.4E-03	6.0E-02	4.2E+01	4.1E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.0E+00	2.0E-06	5.0E-01	2.6E+05	4.0E-04	2.6E-04	5.0E-01	1.9E+03	1.1E-01	1.4E-03	6.0E-02	4.2E+01	4.1E+01
VOC	Vinyl Chloride	75-01-4	A	1.0E+00	2.0E-06	3.0E-03	1.5E+03	1.7E-05	1.1E-05	3.0E-03	2.8E+02	1.5E-01	2.0E-03	1.0E-01	4.9E+01	4.1E+01
VOC	Xylenes (total)	1330-20-7	ID	1.0E+00	2.0E-06	4.0E-01	2.0E+05	1.3E-04	8.5E-05	4.0E-01	4.7E+03	1.1E-01	1.5E-03	1.0E-01	6.5E+01	6.4E+01
SVOC	Acenaphthene	83-32-9		1.0E+00	2.0E-06	6.0E-01	3.1E+05	3.0E-04	1.9E-04	6.0E-01	3.1E+03	5.6E-02	7.6E-04	2.1E+00	2.8E+03	1.5E+03
SVOC	Acenaphthylene	208-96-8	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	3.1E-04	2.0E-04	3.0E-01	1.5E+03	4.8E-02	6.6E-04	1.1E+00	1.6E+03	7.7E+02
SVOC	Acetophenone	98-86-2	D	1.0E+00	2.0E-06	1.0E+00	5.1E+05	1.1E-05	7.1E-06	1.0E+00	1.4E+05	9.2E-03	1.3E-04	3.5E+00	2.8E+04	2.2E+04
SVOC	Anthracene	120-12-7	D	1.0E+00	2.0E-06	3.0E+00	1.5E+06	6.4E-04	4.1E-04	3.0E+00	7.2E+03	3.3E-02	4.6E-04			7.2E+03
SVOC	Atrazine	1912-24-9	C	1.0E+00	2.0E-06	3.5E-02	1.8E+04	2.6E-05	1.7E-05	3.5E-02	2.1E+03	4.7E-06	6.5E-08	1.2E-01	1.9E+06	1.8E+03
SVOC	Benzaldehyde	100-52-7		1.0E+00	2.0E-06	1.0E-01	5.1E+04	1.1E-05	6.9E-06	1.0E-01	1.4E+04	1.9E-02	2.6E-04	3.5E-01	1.3E+03	1.2E+03
SVOC	Benzo(a)anthracene	56-55-3	B2	1.0E+00	2.0E-06			2.4E-03	1.5E-03			2.5E-03	3.4E-05			
SVOC	Benzo(a)pyrene	50-32-8	B2	1.0E+00	2.0E-06			3.4E-03	2.2E-03			8.2E-04	1.1E-05			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.0E+00	2.0E-06			3.9E-03	2.5E-03			3.9E-02	5.3E-04			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	5.3E-03	3.4E-03	3.0E-01	8.8E+01	1.0E-04	1.4E-06	1.1E+00	7.7E+05	8.8E+01
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.0E+00	2.0E-06			3.9E-03	2.5E-03			6.0E-04	8.3E-06			
SVOC	Biphenyl	92-52-4	D	1.0E+00	2.0E-06	5.0E-02	2.6E+04	3.9E-04	2.5E-04	5.0E-02	2.0E+02	6.9E-02	9.5E-04	1.8E-01	1.8E+02	9.6E+01
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.0E+00	2.0E-06			4.5E-06	2.9E-06			1.4E-04	1.9E-06			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.0E+00	2.0E-06			5.2E-06	3.4E-06			1.4E-02	1.9E-04			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.3E-03	2.8E-03	2.0E-02	7.3E+00	6.5E-05	8.8E-07	2.0E-01	2.3E+05	7.3E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1.0E+00	2.0E-06			2.7E-04	1.7E-04			4.0E-02	5.5E-04			
SVOC	Butylbenzylphthalate	85-68-7	C	1.0E+00	2.0E-06	2.0E+00	1.0E+06	3.8E-04	2.4E-04	2.0E+00	8.2E+03	8.5E-04	1.2E-05	7.0E+00	6.0E+05	8.0E+03
SVOC	Caprolactam	105-60-2		1.0E+00	2.0E-06	5.0E-01	2.6E+05	8.0E-07	5.2E-07	5.0E-01	9.7E+05	4.8E-06	6.6E-08	1.8E+00	2.6E+07	2.0E+05
SVOC	Carbazole	86-74-8	B2	1.0E+00	2.0E-06			1.6E-04	1.0E-04			1.3E-05	1.8E-07			
SVOC	4-Chloro-3-methylphenol	59-50-7		1.0E+00	2.0E-06	2.0E+00	1.0E+06	9.1E-05	5.9E-05	2.0E+00	3.4E+04	3.5E-04	4.8E-06	7.0E+00	1.5E+06	3.2E+04
SVOC	4-Chloroaniline	106-47-8		1.0E+00	2.0E-06	4.0E-03	2.0E+03	1.6E-05	1.0E-05	4.0E-03	4.0E+02	3.0E-04	4.2E-06	1.4E-02	3.4E+03	3.0E+02
SVOC	2-Chloronaphthalene	91-58-7		1.0E+00	2.0E-06	8.0E-02	4.1E+04	3.7E-04	2.4E-04	8.0E-02	3.4E+02	6.9E-02	9.4E-04	2.8E-01	3.0E+02	1.6E+02
SVOC	2-Chlorophenol	95-57-8		1.0E+00	2.0E-06	5.0E-02	2.6E+04	2.4E-05	1.6E-05	5.0E-02	3.2E+03	8.1E-02	1.1E-03	1.8E-01	1.6E+02	1.5E+02
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1.0E+00	2.0E-06			2.6E-04	1.7E-04			5.6E-02	7.6E-04			
SVOC	Chrysene	218-01-9	B2	1.0E+00	2.0E-06			2.4E-03	1.5E-03			3.7E-02	5.1E-04			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.0E+00	2.0E-06			5.3E-03	3.4E-03			1.0E-05	1.4E-07			
SVOC	Dibenzofuran	132-64-9	D	1.0E+00	2.0E-06	2.0E-03	1.0E+03	5.4E-04	3.5E-04	2.0E-03	5.8E+00	9.5E-03	1.3E-04	7.0E-03	5.4E+01	5.2E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1.0E+00	2.0E-06			8.1E-05	5.3E-05			2.9E-06	4.0E-08			
SVOC	2,4-Dichlorophenol	120-83-2		1.0E+00	2.0E-06	3.0E-03	1.5E+03	7.6E-05	4.9E-05	3.0E-03	6.1E+01	2.6E-03	3.6E-05	1.1E-02	2.9E+02	4.9E+01
SVOC	Diethylphthalate	84-66-2	D	1.0E+00	2.0E-06	8.0E+00	4.1E+06	2.1E-05	1.4E-05	8.0E+00	5.8E+05	3.4E-04	4.7E-06	2.8E+01	5.9E+06	4.7E+05
SVOC	2,4-Dimethylphenol	105-67-9		1.0E+00	2.0E-06	2.0E-01	1.0E+05	3.5E-05	2.3E-05	2.0E-01	8.8E+03	1.8E-03	2.5E-05	7.0E-01	2.8E+04	6.3E+03
SVOC	Dimethylphthalate	131-11-3	D	1.0E+00	2.0E-06	1.0E+01	5.1E+06	9.9E-06	6.4E-06	1.0E+01	1.6E+06	8.4E-05	1.1E-06			1.2E+06
SVOC	Di-n-butylphthalate	84-74-2	D	1.0E+00	2.0E-06	1.0E+00	5.1E+05	3.3E-04	2.1E-04	1.0E+00	4.7E+03	6.7E-07	9.1E-09			4.6E+03
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.0E+00	2.0E-06	1.0E-04	5.1E+01	1.4E-05	9.1E-06	1.0E-04	1.1E+01	3.4E-04	4.6E-06	3.5E-04	7.6E+01	8.1E+00
SVOC	2,4-Dinitrophenol	51-28-5		1.0E+00	2.0E-06	2.0E-03	1.0E+03	6.5E-06	4.2E-06	2.0E-03	4.8E+02	3.6E-04	4.9E-06			3.3E+02
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.0E+00	2.0E-06	2.0E-03	1.0E+03	1.3E-05	8.5E-06	2.0E-03	2.4E+02	7.6E-05	1.0E-06			1.9E+02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.0E+00	2.0E-06	1.0E-02	5.1E+03	1.1E-05	6.9E-06	1.0E-02	1.5E+03	6.1E-04	8.3E-06	3.5E-02	4.2E+03	8.9E+02
SVOC	Di-n-octylphthalate	117-84-0		1.0E+00	2.0E-06	4.0E-01	2.0E+05	4.7E-03	3.0E-03	4.0E-01	1.3E+02	2.5E-02	3.4E-04			1.3E+02

Attachment G7: Risk-Based Noncancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
SVOC	Fluoranthene	206-44-0	D	1.0E+00	2.0E-06	4.0E-01	2.0E+05	1.3E-03	8.4E-04	4.0E-01	4.7E+02	1.1E-02	1.5E-04	1.4E+00	9.3E+03	4.5E+02
SVOC	Fluorene	86-73-7	D	1.0E+00	2.0E-06	4.0E-01	2.0E+05	4.1E-04	2.7E-04	4.0E-01	1.5E+03	3.4E-02	4.6E-04	1.4E+00	3.0E+03	1.0E+03
SVOC	Formaldehyde	50-00-0	B1	1.0E+00	2.0E-06	2.0E-01	1.0E+05	4.2E-06	2.7E-06	2.0E-01	7.3E+04	5.1E-04	6.9E-06			4.3E+04
SVOC	Hexachlorobenzene	118-74-1	B2	1.0E+00	2.0E-06	8.0E-04	4.1E+02	2.0E-03	1.3E-03	8.0E-04	6.3E-01	6.5E-02	8.9E-04			6.3E-01
SVOC	Hexachlorobutadiene	87-68-3	C	1.0E+00	2.0E-06	7.0E-04	3.6E+02	5.0E-04	3.2E-04	7.0E-04	2.2E+00	7.2E-02	9.9E-04			2.1E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.0E+00	2.0E-06	7.0E-02	3.6E+04	1.1E-03	7.3E-04	7.0E-02	9.6E+01	7.1E-02	9.7E-04	7.0E-04	7.2E-01	7.1E-01
SVOC	Hexachloroethane	67-72-1	C	1.0E+00	2.0E-06	1.0E-02	5.1E+03	1.9E-04	1.2E-04	1.0E-02	8.1E+01	7.5E-02	1.0E-03			8.0E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.0E+00	2.0E-06			5.3E-03	3.4E-03			1.1E-03	1.5E-05			
SVOC	Isophorone	78-59-1	C	1.0E+00	2.0E-06	2.0E+00	1.0E+06	1.1E-05	7.4E-06	2.0E+00	2.7E+05	5.6E-03	7.7E-05			2.1E+05
SVOC	2-Methylnaphthalene	91-57-6	ID	1.0E+00	2.0E-06	4.0E-03	2.0E+03	2.9E-04	1.9E-04	4.0E-03	2.1E+01	8.1E-02	1.1E-03	3.0E-03	2.7E+00	2.4E+00
SVOC	Methylphenol (total)	1319-77-3		1.0E+00	2.0E-06	5.0E-01	2.6E+05	2.2E-05	1.4E-05	5.0E-01	3.6E+04	8.3E-04	1.1E-05			3.1E+04
SVOC	2-Methylphenol	95-48-7	C	1.0E+00	2.0E-06	5.0E-01	2.6E+05	2.3E-05	1.5E-05	5.0E-01	3.4E+04	1.2E-03	1.6E-05			3.0E+04
SVOC	4-Methylphenol	106-44-5	C	1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.0E-05	1.3E-05	5.0E-03	3.8E+02	7.6E-04	1.0E-05			3.3E+02
SVOC	Naphthalene	91-20-3	C	1.0E+00	2.0E-06	2.0E-01	1.0E+05	1.5E-04	9.6E-05	2.0E-01	2.1E+03	8.4E-02	1.2E-03	3.0E-03	2.6E+00	2.6E+00
SVOC	2-Nitroaniline	88-74-4		1.0E+00	2.0E-06	3.0E-03	1.5E+03	1.4E-05	9.3E-06	3.0E-03	3.2E+02	1.4E-04	2.0E-06	2.0E-03	1.0E+03	2.1E+02
SVOC	3-Nitroaniline	99-09-2	C	1.0E+00	2.0E-06	3.0E-04	1.5E+02	6.9E-06	4.5E-06	3.0E-04	6.7E+01	1.3E-04	1.8E-06	1.0E-03	5.7E+02	4.3E+01
SVOC	4-Nitroaniline	100-01-6	C	1.0E+00	2.0E-06	3.0E-03	1.5E+03	7.2E-06	4.6E-06	3.0E-03	6.5E+02	1.9E-06	2.5E-08	4.0E-03	1.6E+05	4.5E+02
SVOC	Nitrobenzene	98-95-3	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	1.6E-05	1.0E-05	5.0E-03	4.8E+02	1.8E-02	2.5E-04	2.0E-02	7.9E+01	6.6E+01
SVOC	2-Nitrophenol	88-75-5		1.0E+00	2.0E-06			1.3E-05	8.4E-06			7.8E-03	1.1E-04			
SVOC	4-Nitrophenol	100-02-7		1.0E+00	2.0E-06			1.6E-05	1.0E-05			3.7E-07	5.1E-09			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.0E+00	2.0E-06	2.0E-02	1.0E+04	6.8E-05	4.4E-05	2.0E-02	4.5E+02	3.8E-03	5.2E-05			4.4E+02
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.0E+00	2.0E-06			7.7E-06	5.0E-06			2.0E-03	2.8E-05			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.0E+00	2.0E-06	4.0E-02	2.0E+04	2.8E-05	1.8E-05	4.0E-02	2.2E+03	4.7E-02	6.4E-04			2.0E+03
SVOC	Pentachlorophenol	87-86-5	B2	1.0E+00	2.0E-06	3.0E-02	1.5E+04	7.4E-04	4.8E-04	3.0E-02	6.3E+01	1.8E-05	2.4E-07	1.1E-01	4.4E+05	6.2E+01
SVOC	Phenanthrene	85-01-8	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	5.6E-04	3.6E-04	3.0E-01	8.3E+02	1.6E-02	2.2E-04	1.1E+00	4.9E+03	7.1E+02
SVOC	Phenol	108-95-2	ID	1.0E+00	2.0E-06	3.0E-01	1.5E+05	1.2E-05	7.7E-06	3.0E-01	3.9E+04	4.0E-04	5.5E-06			3.1E+04
SVOC	Pyrene	129-00-0	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	1.3E-03	8.3E-04	3.0E-01	3.6E+02	7.9E-03	1.1E-04	1.1E+00	9.7E+03	3.5E+02
SVOC	2,4,5-Trichlorophenol	95-95-4		1.0E+00	2.0E-06	1.0E+00	5.1E+05	2.1E-04	1.4E-04	1.0E+00	7.3E+03	3.3E-03	4.5E-05			7.2E+03
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.0E+00	2.0E-06	1.0E-04	5.1E+01	1.6E-04	1.0E-04	1.0E-04	9.9E-01	5.8E-03	7.9E-05			9.8E-01
PCB	PCBs (total)	1336-36-3	B2	1.0E+00	2.0E-06	5.0E-05	2.6E+01	3.3E-03	2.1E-03	5.0E-05	2.3E-02	6.2E-02	8.5E-04			2.3E-02
INORG	Antimony	7440-36-0		1.0E+00	2.0E-06	4.0E-04	2.0E+02	2.0E-06	1.3E-06	6.0E-05	4.6E+01			1.4E-03		3.8E+01
INORG	Arsenic	7440-38-2	A	1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.0E-06	1.3E-06	5.0E-03	3.9E+03					1.5E+03
INORG	Barium	7440-39-3	D	1.0E+00	2.0E-06	7.0E-02	3.6E+04	2.0E-06	1.3E-06	4.9E-03	3.8E+03					3.4E+03
INORG	Beryllium	7440-41-7	B1	1.0E+00	2.0E-06	2.0E-03	1.0E+03	2.0E-06	1.3E-06	1.4E-05	1.1E+01			2.0E-05		1.1E+01
INORG	Cadmium	7440-43-9	B1	1.0E+00	2.0E-06	1.0E-03	5.1E+02	2.0E-06	1.3E-06	2.5E-05	1.9E+01			9.0E-04		1.9E+01
INORG	Chromium (total)	7440-47-3		1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.0E-06	2.6E-06	5.0E-04	1.9E+02			1.0E-04		1.9E+02
INORG	Chromium III	16065-83-1	D	1.0E+00	2.0E-06	1.5E+00	7.7E+05	2.0E-06	1.3E-06	2.0E-02	1.5E+04			5.3E+00		1.5E+04
INORG	Chromium VI	18540-29-9	A	1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.0E-06	2.6E-06	5.0E-04	1.9E+02			1.0E-04		1.9E+02
INORG	Cobalt	7440-48-4	B1	1.0E+00	2.0E-06	2.0E-02	1.0E+04	8.0E-07	5.2E-07	2.0E-02	3.9E+04			2.0E-05		8.1E+03
INORG	Copper	7440-50-8	D	1.0E+00	2.0E-06	4.0E-02	2.0E+04	2.0E-06	1.3E-06	4.0E-02	3.1E+04			1.4E-01		1.2E+04
INORG	Cyanide (total)	57-12-5	D	1.0E+00	2.0E-06	2.0E-02	1.0E+04	2.0E-06	1.3E-06	2.0E-02	1.5E+04			7.0E-02		6.2E+03
INORG	Fluoride	16984-48-8		1.0E+00	2.0E-06			2.0E-06	1.3E-06							
INORG	Lead	7439-92-1	B2	1.0E+00	2.0E-06			2.0E-07	1.3E-07							
INORG	Manganese	7439-96-5	D	1.0E+00	2.0E-06	1.4E-01	7.2E+04	2.0E-06	1.3E-06	8.4E-03	6.5E+03			5.0E-05		6.0E+03
INORG	Mercury	7439-97-6	D	1.0E+00	2.0E-06	3.0E-04	1.5E+02	2.0E-06	1.3E-06	3.0E-04	2.3E+02	8.2E-02	1.1E-03	3.0E-04	2.7E-01	2.7E-01

Attachment G7: Risk-Based Noncancer Criteria for Exposure of Redevelopment Workers to Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

					Incidental Ingestion			Dermal Contact				Vapor Inhalation				
Chem Group	Chemical	CASRN	Carc Class	C_{gw} (mg/L)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC_{ing} (mg/L)	DA (L/cm^2 - event)	ADD (mg/kg/d)	RfD_{derm} $(mg/kg/d)^{-1}$	RBC_{derm} (mg/L)	C_{air} (mg/m^3)	ADD (mg/m^3)	RfC (mg/m^3)	RBC_{inh} (mg/L)	Noncancer RBC (mg/L)
INORG	Nickel	7440-02-0	A	1.0E+00	2.0E-06	2.0E-02	1.0E+04	4.0E-07	2.6E-07	8.0E-04	3.1E+03					2.4E+03
INORG	Selenium	7782-49-2	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	2.0E-06	1.3E-06	5.0E-03	3.9E+03			1.8E-02		1.5E+03
INORG	Silver	7440-22-4	D	1.0E+00	2.0E-06	5.0E-03	2.6E+03	1.2E-06	7.7E-07	2.0E-04	2.6E+02			1.0E-05		2.3E+02
INORG	Thallium	7440-28-0		1.0E+00	2.0E-06	7.0E-05	3.6E+01	2.0E-06	1.3E-06	7.0E-05	5.4E+01			2.5E-04		2.2E+01
INORG	Vanadium	7440-62-2		1.0E+00	2.0E-06	7.0E-03	3.6E+03	2.0E-06	1.3E-06	1.8E-04	1.4E+02			2.5E-02		1.4E+02
INORG	Zinc	7440-66-6	D	1.0E+00	2.0E-06	3.0E-01	1.5E+05	1.2E-06	7.7E-07	3.0E-01	3.9E+05			1.1E+00		1.1E+05
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
				1.0E+00	2.0E-06											
Note:																
Target hazard index of 1																
C/Q based on the 24-hour maximum exposure for a 15' x 15' excavation area = 10.96 kg/m3 per (kg/m2-s)																

Attachment G8
Exposure of Redevelopment Construction Workers to LNAPL and Smear Zone Soil

Attachment G8: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
VOC	Acetone	67-64-1		4.62E-03	1.24E-01	1.13E+00	2.17E-03	1.00E-05		
VOC	Benzene	71-43-2	9.30E+02	1.91E-03	8.80E-02	1.59E+00	1.72E-03	3.28E-06	2.69E+00	5.89E+00
VOC	2-Butanone	78-93-3		1.91E-03	8.08E-02	1.73E+00	1.63E-03	3.11E-06		
VOC	Carbon Disulfide	75-15-0		7.21E-03	1.04E-01	1.34E+00	1.92E-03	1.39E-05		
VOC	Chloroethane	75-00-3		2.03E-02	2.71E-01	5.15E-01	3.66E-03	7.40E-05		
VOC	Chloromethane	74-87-3		8.64E-02	1.26E-01	1.11E+00	2.19E-03	1.89E-04		
VOC	Cumene	98-82-8	7.90E+02	9.04E-05	6.50E-02	2.15E+00	1.40E-03	1.27E-07	8.83E-02	1.94E-01
VOC	Cyclohexane	110-82-7	1.00E+04	1.95E-03	8.39E-02	1.66E+00	1.67E-03	3.24E-06	2.85E+01	6.26E+01
VOC	1,2-Dichlorobenzene	95-50-1		2.73E-05	6.90E-02	2.02E+00	1.46E-03	3.99E-08		
VOC	Dichlorodifluoromethane	75-71-8		9.74E-02	8.00E-02	1.74E+00	1.61E-03	1.57E-04		
VOC	1,1-Dichloroethane	75-34-3		4.57E-03	7.42E-02	1.88E+00	1.53E-03	7.01E-06		
VOC	cis-1,2-Dichloroethene	156-59-2		4.08E-03	7.36E-02	1.90E+00	1.53E-03	6.22E-06		
VOC	Ethyl Benzene	100-41-4	2.20E+03	1.93E-04	7.50E-02	1.86E+00	1.55E-03	2.98E-07	5.77E-01	1.27E+00
VOC	Methyl Acetate	79-20-9		4.34E-03	9.57E-02	1.46E+00	1.82E-03	7.91E-06		
VOC	4-Methyl-2-pentanone	108-10-1		3.99E-04	7.50E-02	1.86E+00	1.55E-03	6.17E-07		
VOC	Methylcyclohexane	108-87-2	2.60E+04	8.64E-04	7.35E-02	1.90E+00	1.53E-03	1.32E-06	3.01E+01	6.61E+01
VOC	Methylene Chloride	75-09-2		8.70E-03	1.01E-01	1.38E+00	1.89E-03	1.64E-05		
VOC	Tetrachloroethene	127-18-4		3.73E-04	7.20E-02	1.94E+00	1.50E-03	5.61E-07		
VOC	Toluene	108-88-3	4.20E+03	5.71E-04	8.70E-02	1.60E+00	1.71E-03	9.74E-07	3.60E+00	7.89E+00
VOC	1,2,4-Trichlorobenzene	120-82-1		8.65E-06	3.00E-02	4.65E+00	8.37E-04	7.24E-09		
VOC	1,1,1-Trichloroethane	71-55-6		2.49E-03	7.80E-02	1.79E+00	1.59E-03	3.95E-06		
VOC	1,1,2-Trichloroethane	79-00-5		4.67E-04	7.80E-02	1.79E+00	1.59E-03	7.41E-07		
VOC	Trichloroethene	79-01-6		1.48E-03	7.90E-02	1.77E+00	1.60E-03	2.36E-06		
VOC	Trichlorofluoromethane	75-69-4		1.61E-02	8.70E-02	1.60E+00	1.71E-03	2.75E-05		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6.66E-03	7.80E-02	1.79E+00	1.59E-03	1.06E-05		
VOC	Vinyl Chloride	75-01-4		5.99E-02	1.06E-01	1.32E+00	1.95E-03	1.17E-04		
VOC	Xylenes (total)	1330-20-7	1.02E+04	1.60E-04	7.80E-02	1.79E+00	1.59E-03	2.55E-07	2.29E+00	5.01E+00
SVOC	Acenaphthene	83-32-9		5.02E-08	4.21E-02	3.31E+00	1.05E-03	5.27E-11		
SVOC	Benzo(a)anthracene	56-55-3		2.11E-12	5.10E-02	2.74E+00	1.19E-03	2.52E-15		
SVOC	Benzo(a)pyrene	50-32-8		1.10E-13	4.30E-02	3.24E+00	1.06E-03	1.17E-16		

Attachment G8: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
SVOC	Benzo(b)fluoranthene	205-99-2		1.00E-11	2.26E-02	6.17E+00	6.92E-04	6.95E-15		
SVOC	Benzo(k)fluoranthene	207-08-9		4.02E-14	2.26E-02	6.17E+00	6.92E-04	2.78E-17		
SVOC	Biphenyl	92-52-4		1.94E-07	4.04E-02	3.45E+00	1.02E-03	1.98E-10		
SVOC	bis(2-Chloroethoxy)methane	111-91-1		2.81E-09	4.36E-02	3.20E+00	1.07E-03	3.02E-12		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7		1.30E-10	3.51E-02	3.98E+00	9.30E-04	1.20E-13		
SVOC	Butylbenzylphthalate	85-68-7		1.66E-10	1.74E-02	8.02E+00	5.81E-04	9.63E-14		
SVOC	Chrysene	218-01-9		1.25E-13	2.48E-02	5.63E+00	7.37E-04	9.22E-17		
SVOC	2,4-Dinitrotoluene	121-14-2		2.95E-09	2.03E-01	6.87E-01	3.01E-03	8.90E-12		
SVOC	Di-n-octylphthalate	117-84-0		5.22E-11	1.51E-02	9.24E+00	5.28E-04	2.76E-14		
SVOC	Fluoranthene	206-44-0		1.57E-10	3.02E-02	4.62E+00	8.40E-04	1.32E-13		
SVOC	Fluorene	86-73-7		1.27E-08	3.63E-02	3.84E+00	9.51E-04	1.21E-11		
SVOC	2-Methylnaphthalene	91-57-6	5.60E+02	1.11E-06	4.84E-02	2.88E+00	1.15E-03	1.27E-09	6.28E-04	1.38E-03
SVOC	Naphthalene	91-20-3	8.30E+02	1.71E-06	5.90E-02	2.36E+00	1.32E-03	2.25E-09	1.64E-03	3.60E-03
SVOC	Phenanthrene	85-01-8		2.25E-09	3.75E-02	3.72E+00	9.72E-04	2.19E-12		
SVOC	Pyrene	129-00-0		9.22E-11	2.72E-02	5.13E+00	7.84E-04	7.23E-14		
PCB	PCBs (total)	1336-36-3		1.55E-09	2.02E-02	6.91E+00	6.42E-04	9.94E-13		
INORG	Antimony	7440-36-0								
INORG	Arsenic	7440-38-2	3.60E+00							
INORG	Barium	7440-39-3	6.60E-01							
INORG	Beryllium	7440-41-7								
INORG	Cadmium	7440-43-9	7.00E-03							
INORG	Chromium (total)	7440-47-3	6.40E-01							
INORG	Cobalt	7440-48-4								
INORG	Copper	7440-50-8	9.60E-01							
INORG	Cyanide (total)	57-12-5								
INORG	Lead	7439-92-1	2.30E+02							
INORG	Manganese	7439-96-5	6.00E-02							
INORG	Mercury	7439-97-6		3.93E-08	3.07E-02	4.55E+00	8.50E-04	3.34E-11		
INORG	Nickel	7440-02-0	1.90E+00							
INORG	Selenium	7782-49-2	4.10E+00							
INORG	Silver	7440-22-4								

Attachment G8: Estimated Ambient Air Concentration from Excavation Into Soil with Free-Phase NAPL at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	C_{NAPL} (mg/kg)	K_{eq} (unitless)	D_{air} (cm^2/s)	Sc	k_G (m/s)	K (m/s)	J_L (mg/m^2-s)	$C_{air, worker}$ (mg/m^3)
INORG	Thallium	7440-28-0								
INORG	Vanadium	7440-62-2	1.70E-01							
INORG	Zinc	7440-66-6	4.70E-01							
Notes:										
Physical Properties of Air										
	Pressure	1	atm	assumed						
	Molecular Weight	28.8	g/g mol	Perry and Chilton (1973)						
	Viscosity	1.80E-04	g/(cm.s)	Perry and Chilton (1973)						
	Density	0.00129	g/cm^3	Perry and Chilton (1973)						
Physical Properties of NAPL										
	Molecular Weight	300	g/g mol							
	Density	0.88	g/cm^3							
Physical Characteristics of Excavation Pit										
	Windspeed	0.5	m/s	assumed						
	Surface Area	2.1E+01	m^2							
	Effective Diameter of Area	5.2E+00	m	calculated						

Attachment G8: Vapor Flux from Soil to Ambient Air at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (cm^2/s)	D_{water} (cm^2/s)	R_L (unitless)	D_G (cm^2/s)	D_L (cm^2/s)	D_E (cm^2/s)		MW (g/mole)	VP (mm Hg)	s (mg/L)	v* (mg/L)	C_{sat} (mg/kg)	C_{soil} (mg/kg)	J_{sat} (mg/m^2-s)	J_{unsat} (mg/m^2-s)	$J_{critical}$ (mg/m^2-s)	J (mg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.24E-01	1.14E-05	5.10E-02	2.73E-02	2.61E-09	4.26E-04		5.81E+01	2.30E+02	1.00E+06	7.18E+02	3.40E+04				1.8E+01	
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	8.80E-02	9.80E-06	2.68E-01	1.94E-02	2.24E-09	8.26E-03		7.81E+01	9.50E+01	1.75E+03	3.99E+02	3.12E+02	4.7E+01		1.1E-01	7.3E-01	1.1E-01
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	8.08E-02	9.80E-06	5.54E-02	1.78E-02	2.24E-09	3.67E-04		7.21E+01	9.53E+01	2.75E+05	3.69E+02	1.02E+04				5.0E+00	
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	1.04E-01	1.00E-05	4.25E-01	2.29E-02	2.29E-09	3.34E-02		7.61E+01	3.59E+02	1.19E+03	1.47E+03	3.38E+02				1.6E+00	
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.71E-01	1.15E-05	1.67E-01	5.97E-02	2.63E-09	6.44E-02		6.45E+01	1.01E+03	5.68E+03	3.50E+03	6.33E+02				4.1E+00	
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.26E-01	6.50E-06	2.38E-01	2.78E-02	1.49E-09	2.11E-02		5.05E+01	4.30E+03	5.33E+03	1.17E+04	8.43E+02				3.2E+00	
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	6.50E-02	7.10E-06	2.27E+00	1.43E-02	1.62E-09	1.68E-03		1.20E+02	4.50E+00	6.13E+01	2.91E+01	9.26E+01	4.0E+01		4.2E-02	9.8E-02	4.2E-02
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	8.39E-02	9.10E-06	3.49E+00	1.85E-02	2.08E-09	2.11E-02		8.42E+01	9.69E+01	5.50E+01	4.38E+02	1.28E+02	5.0E+02	1.1E+00		4.8E-01	1.1E+00
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	6.90E-02	7.90E-06	1.933549	1.52E-02	1.81E-09	3.06E-04		1.47E+02	1.36E+00	1.56E+02	1.07E+01	2.01E+02				9.1E-02	
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	8.00E-02	8.00E-06	2.93E+00	1.76E-02	1.83E-09	4.21E-02		1.21E+02	4.85E+03	2.80E+02	3.15E+04	5.47E+02				2.9E+00	
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	7.42E-02	1.05E-05	1.87E-01	1.64E-02	2.40E-09	1.00E-02		9.90E+01	2.27E+02	5.06E+03	1.21E+03	6.32E+02				1.6E+00	
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	7.36E-02	1.13E-05	1.88E-01	1.62E-02	2.58E-09	7.21E-03		9.69E+01	2.03E+02	3.50E+03	1.06E+03	4.38E+02				9.6E-01	
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	7.50E-02	7.80E-06	1.21E+00	1.65E-02	1.78E-09	2.20E-03		1.06E+02	9.60E+00	1.69E+02	5.48E+01	1.37E+02	1.1E+02		1.3E-01	1.7E-01	1.3E-01
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	9.57E-02	1.10E-05	5.47E-02	2.11E-02	2.51E-09	7.15E-04		7.41E+01	2.16E+02	2.44E+05	8.61E+02	8.88E+03				6.1E+00	
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	7.50E-02	7.80E-06	8.16E-02	1.65E-02	1.78E-09	5.72E-04		1.00E+02	1.99E+01	1.90E+04	1.07E+02	1.03E+03				6.4E-01	
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	7.35E-02	8.52E-06	4.23E+00	1.62E-02	1.95E-09	3.36E-02		9.82E+01	4.30E+01	1.40E+01	2.27E+02	3.95E+01	1.3E+03	1.3E+00		1.9E-01	1.3E+00
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	1.01E-01	1.17E-05	1.01E-01	2.23E-02	2.67E-09	9.86E-03		8.49E+01	4.33E+02	1.30E+04	1.98E+03	8.79E+02				2.2E+00	
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	7.20E-02	8.20E-06	6.62E-01	1.59E-02	1.87E-09	9.04E-03		1.66E+02	1.86E+01	2.00E+02	1.65E+02	8.82E+01				2.2E-01	
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	8.70E-02	8.60E-06	6.42E-01	1.92E-02	1.97E-09	4.06E-03		9.21E+01	2.84E+01	5.26E+02	1.41E+02	2.25E+02	2.1E+02		3.5E-01	3.7E-01	3.5E-01
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	3.00E-02	8.23E-06	5.44E+00	6.61E-03	1.88E-09	3.53E-05		1.81E+02	4.31E-01	3.00E+02	4.20E+00	1.09E+03				1.7E-01	
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	7.80E-02	8.80E-06	5.15E-01	1.72E-02	2.01E-09	1.18E-02		1.33E+02	1.24E+02	1.33E+03	8.87E+02	4.57E+02				1.3E+00	
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	7.80E-02	8.80E-06	2.07E-01	1.72E-02	2.01E-09	1.55E-03		1.33E+02	2.33E+01	4.42E+03	1.67E+02	6.10E+02				6.2E-01	
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	7.90E-02	9.10E-06	6.33E-01	1.74E-02	2.08E-09	5.80E-03		1.31E+02	7.35E+01	1.10E+03	5.19E+02	4.64E+02				9.1E-01	
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	8.70E-02	9.70E-06	1.17E+00	1.92E-02	2.22E-09	3.24E-02		1.37E+02	8.03E+02	1.10E+03	5.93E+03	8.61E+02				4.0E+00	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	3.81E+02		9.83E+00	7.80E-02	8.20E-06	4.97E+00	1.72E-02	1.87E-09	3.40E-02		1.87E+02	3.32E+02	1.70E+02	3.34E+03	5.64E+02				2.7E+00	
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	1.06E-01	1.23E-05	3.18E-01	2.34E-02	2.81E-09	4.08E-02		6.25E+01	2.98E+03	2.76E+03	1.00E+04	5.85E+02				3.0E+00	
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	7.80E-02	8.75E-06	1.26E+00	1.72E-02	2.00E-09	1.88E-03		1.06E+02	7.99E+00	1.75E+02	4.56E+01	1.47E+02	5.1E+02	3.6E-01		1.6E-01	3.6E-01
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	4.21E-02	7.69E-06	2.15E+01	9.28E-03	1.76E-09	1.37E-06		1.54E+02	2.50E-03	4.24E+00	2.07E-02	6.07E+01				1.8E-03	
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	5.10E-02	9.00E-06	1.20E+03	1.12E-02	2.06E-09	6.41E-10		2.28E+02	1.05E-07	9.40E-03	1.29E-06	7.54E+00				4.9E-06	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	4.30E-02	9.00E-06	3.04E+03	9.48E-03	2.06E-09	7.27E-11		2.52E+02	5.49E-09	1.62E-03	7.45E-08	3.29E+00				7.2E-07	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	2.26E-02	5.56E-06	3.73E+03	4.98E-03	1.27E-09	3.04E-09		2.52E+02	5.00E-07	1.50E-03	6.78E-06	3.73E+00				5.3E-06	
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	2.26E-02	5.56E-06	3.73E+03	4.98E-03	1.27E-09	2.30E-11		2.52E+02	2.00E-09	8.00E-04	2.71E-08	1.99E+00				2.5E-07	
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	4.04E-02	8.15E-06	3.15E+01	8.90E-03	1.86E-09	1.73E-06		1.54E+02	9.64E-03	6.03E+00	7.99E-02	1.27E+02				4.3E-03	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	4.36E-02	8.46E-06	1.01E-01	9.61E-03	1.93E-09	3.50E-07		1.73E+02	1.40E-04	1.21E+05	1.30E-03	8.15E+03				1.2E-01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.51E-02	3.66E-06	4.50E+04	7.74E-03	8.37E-10	3.78E-13		3.91E+02	6.45E-06	3.40E-01	1.35E-04	1.02E+04				1.6E-04	
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.74E-02	4.83E-06	1.72E+02	3.83E-03	1.10E-09	5.83E-10		3.12E+02	8.25E-06	2.69E+00	1.39E-04	3.08E+02				1.9E-04	
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.48E-02	6.21E-06	1.20E+03	5.47E-03	1.42E-09	8.81E-09		2.28E+02	6.23E-09	1.60E-03	7.65E-08	1.28E+00				3.1E-06	
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	2.03E-01	7.06E-06	3.33E-01	4.47E-02	1.61E-09	2.60E-07		1.82E+02	1.47E-04	2.70E+02	1.44E-03	5.99E+01				7.9E-04	
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.51E-02	3.58E-06	2.51E+05	3.33E-03	8.18E-10	1.81E-11		3.91E+02	2.60E-06	2.00E-02	5.46E-05	3.35E+03				3.7E-04	
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	3.02E-02	6.35E-06	3.24E+02	6.66E-03	1.45E-09	6.78E-09		2.02E+02	7.80E-06	2.06E-01	8.48E-05	4.45E+01				9.4E-05	
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.63E-02	7.88E-06	4.13E+01	8.00E-03	1.80E-09	2.53E-07		1.66E+02	6.33E-04	1.98E+00	5.66E-03	5.46E+01				7.1E-04	
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.84E-02	7.75E-06	1.88E+01	1.07E-02	1.77E-09	6.02E-06		1.42E+02	5.50E-02	2.46E+01	4.21E-01	3.08E+02	2.8E+01		1.8E-03	1.9E-02	1.8E-03
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.90E-02	7.50E-06	6.08E+00	1.30E-02	1.71E-09	2.12E-05		1.28E+02	8.50E-02	3.10E+01	5.86E-01	1.26E+02	4.2E+01		5.0E-03	1.5E-02	5.0E-03
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.75E-02	7.47E-06	7.28E+01	8.26E-03	1.71E-09	5.41E-08		1.78E+02	1.12E-04	1.15E+00	1.07E-03	5.58E+01				3.3E-04	
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.72E-02	7.24E-06	3.17E+02	5.99E-03	1.66E-09	4.27E-09		2.02E+02	4.59E-06	1.35E-01	4.99E-05	2.85E+01				4.8E-05	
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	2.02E-02	5.00E-06	7.36E+03	4.45E-03	1.14E-09	2.47E-08		3.28E+02	7.71E-05	1.20E-02	1.36E-03	5.89E+01				2.4E-04	
INORG	Antimony	7440-36-0		4.50E+01									1.22E+02									
INORG	Arsenic	7440-38-2		2.90E+01									7.49E+01					1.8E-01				
INORG	Barium	7440-39-3		4.10E+01									1.37E+02					3.3E-02				
INORG	Beryllium	7440-41-7		7.90E+02									9.01E+00									
INORG	Cadmium	7440-43-9		7.50E+01									1.12E+02					3.5E-04				
INORG	Chromium (total)	7440-47-3		1.90E+01									5.20E+01					3.2E-02				

Attachment G8: Vapor Flux from Soil to Ambient Air at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (cm^2/s)	D_{water} (cm^2/s)	R_L (unitless)	D_G (cm^2/s)	D_L (cm^2/s)	D_E (cm^2/s)		MW (g/mole)	VP (mm Hg)	s (mg/L)	v* (mg/L)	C_{sat} (mg/kg)	C_{soil} (mg/kg)	J_{sat} (mg/m^2-s)	J_{unsat} (mg/m^2-s)	$J_{critical}$ (mg/m^2-s)	J (mg/m^2-s)
INORG	Cobalt	7440-48-4		4.50E+01									5.89E+01									
INORG	Copper	7440-50-8		3.50E+01									6.35E+01					4.8E-02				
INORG	Cyanide (total)	57-12-5		9.90E+00									2.60E+01									
INORG	Lead	7439-92-1		9.00E+02									2.07E+02					1.2E+01				
INORG	Manganese	7439-96-5		6.50E+01									5.49E+01					3.0E-03				
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	3.07E-02	6.30E-06	0.104854	6.77E-03	1.44E-09	9.36E-03		2.01E+02	1.96E-03	5.60E-02	2.12E-02	3.91E-03				9.8E-06	
INORG	Nickel	7440-02-0		6.50E+01									5.87E+01					9.6E-02				
INORG	Selenium	7782-49-2		5.00E+00									7.90E+01					2.1E-01				
INORG	Silver	7440-22-4		8.30E+00									1.08E+02									
INORG	Thallium	7440-28-0		7.10E+01									2.04E+02									
INORG	Vanadium	7440-62-2		1.00E+03									5.09E+01					8.6E-03				
INORG	Zinc	7440-66-6		6.20E+01									6.54E+01					2.4E-02				
Notes:	Soil bulk density	kg/L	ρ_b	1.50																		
	Soil particle density	kg/L	ρ_s	2.65																		
	Soil porosity	L/L-soil	θ	0.43																		
	Soil water content	L/L-soil	θ_w	0.049																		
	Soil air-filled porosity	L/L-soil	θ_a	0.38																		
	Soil organic carbon fraction	unitless	f_{oc}	0.002																		
	Averaging period	day	**EF * ED**	5																		
	Averaging period	s	**EF * ED**	4.32E+05																		
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411																		
	Temperature	^oC	**T**	25																		
		K	**T**	298																		

Attachment G8: Concentrations in Ambient Air - AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor		
		C/Q (kg/m^3 per kg/m^2-s):		2.192		
	Chem Chem	**Chemical**	**CASRN**	C_{SZsoil} (mg/kg)	**J** (mg/m^2-s)	C_{air} (mg/m^3)
X	VOC	Acetone	67-64-1			
X	VOC	Benzene	71-43-2	4.69E+01	1.10E-01	2.41E-01
X	VOC	2-Butanone	78-93-3			
X	VOC	Carbon Disulfide	75-15-0			
X	VOC	Chloroethane	75-00-3			
X	VOC	Chloromethane	74-87-3			
X	VOC	Cumene	98-82-8	3.99E+01	4.21E-02	9.22E-02
X	VOC	Cyclohexane	110-82-7	5.05E+02	1.11E+00	2.44E+00
X	VOC	1,2-Dichlorobenzene	95-50-1			
X	VOC	Dichlorodifluoromethane	75-71-8			
X	VOC	1,1-Dichloroethane	75-34-3			
X	VOC	cis-1,2-Dichloroethene	156-59-2			
X	VOC	Ethyl Benzene	100-41-4	1.11E+02	1.34E-01	2.94E-01
X	VOC	Methyl Acetate	79-20-9			
X	VOC	4-Methyl-2-pentanone	108-10-1			
X	VOC	Methylcyclohexane	108-87-2	1.31E+03	1.34E+00	2.93E+00
X	VOC	Methylene Chloride	75-09-2			
X	VOC	Tetrachloroethene	127-18-4			
X	VOC	Toluene	108-88-3	2.12E+02	3.48E-01	7.62E-01
X	VOC	1,2,4-Trichlorobenzene	120-82-1			
X	VOC	1,1,1-Trichloroethane	71-55-6			
X	VOC	1,1,2-Trichloroethane	79-00-5			
X	VOC	Trichloroethene	79-01-6			
X	VOC	Trichlorofluoromethane	75-69-4			
X	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1			
X	VOC	Vinyl Chloride	75-01-4			
X	VOC	Xylenes (total)	1330-20-7	5.15E+02	3.56E-01	7.81E-01
X	SVOC	Acenaphthene	83-32-9			
X	SVOC	Benzo(a)anthracene	56-55-3			
X	SVOC	Benzo(a)pyrene	50-32-8			
X	SVOC	Benzo(b)fluoranthene	205-99-2			
X	SVOC	Benzo(k)fluoranthene	207-08-9			
X	SVOC	Biphenyl	92-52-4			
X	SVOC	bis(2-Chloroethoxy)methane	111-91-1			
X	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7			
X	SVOC	Butylbenzylphthalate	85-68-7			
X	SVOC	Chrysene	218-01-9			
X	SVOC	2,4-Dinitrotoluene	121-14-2			
X	SVOC	Di-n-octylphthalate	117-84-0			
X	SVOC	Fluoranthene	206-44-0			
X	SVOC	Fluorene	86-73-7			
X	SVOC	2-Methylnaphthalene	91-57-6	2.83E+01	1.79E-03	3.91E-03
X	SVOC	Naphthalene	91-20-3	4.19E+01	4.96E-03	1.09E-02
X	SVOC	Phenanthrene	85-01-8			
X	SVOC	Pyrene	129-00-0			
X	PCB	PCBs (total)	1336-36-3			
X	INORG	Antimony	7440-36-0			
X	INORG	Arsenic	7440-38-2	1.82E-01		
X	INORG	Barium	7440-39-3	3.33E-02		
X	INORG	Beryllium	7440-41-7			
X	INORG	Cadmium	7440-43-9	3.53E-04		
X	INORG	Chromium (total)	7440-47-3	3.23E-02		
X	INORG	Cobalt	7440-48-4			

	Attachment G8: Concentrations in Ambient Air - AOI 09-B GMC: NAO Flint Operations Site, Flint, Michigan					
				Vapor		
		C/Q (kg/m^3 per kg/m^2-s)**:**		2.192		
	Chem Chem	**Chemical**	**CASRN**	**C_{SZsoil}** (mg/kg)	**J** (mg/m^2-s)	**C_{air}** (mg/m^3)
X	INORG	Copper	7440-50-8	4.84E-02		
X	INORG	Cyanide (total)	57-12-5			
X	INORG	Lead	7439-92-1	1.16E+01		
X	INORG	Manganese	7439-96-5	3.03E-03		
X	INORG	Mercury	7439-97-6			
X	INORG	Nickel	7440-02-0	9.59E-02		
X	INORG	Selenium	7782-49-2	2.07E-01		
X	INORG	Silver	7440-22-4			
X	INORG	Thallium	7440-28-0			
X	INORG	Vanadium	7440-62-2	8.58E-03		
X	INORG	Zinc	7440-66-6	2.37E-02		

Attachment G8: Nonsteady State Dermal Absorption of Chemical from NAPL
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
VOC	Acetone	67-64-1	5.8E+01	-2.4E-01	9.0E-04	2.7E-03	2.2E-01	3.4E-01	3.0E-01	5.3E-01	1.0E+00	2.21E-06
VOC	Benzene	71-43-2	7.8E+01	2.1E+00	1.1E-04	3.7E-04	2.9E-01	3.3E-01	3.0E-01	6.9E-01	1.0E+00	2.81E-07
VOC	2-Butanone	78-93-3	7.2E+01	2.8E-01	5.0E-04	1.6E-03	2.7E-01	3.3E-01	3.0E-01	6.4E-01	1.0E+00	1.27E-06
VOC	Carbon Disulfide	75-15-0	7.6E+01	2.0E+00	1.2E-04	4.2E-04	2.8E-01	3.3E-01	3.0E-01	6.7E-01	1.0E+00	3.18E-07
VOC	Chloroethane	75-00-3	6.5E+01	1.4E+00	2.3E-04	7.0E-04	2.4E-01	3.3E-01	3.0E-01	5.8E-01	1.0E+00	5.59E-07
VOC	Chloromethane	74-87-3	5.0E+01	1.9E+00	1.8E-04	5.0E-04	2.0E-01	3.3E-01	3.0E-01	4.8E-01	1.0E+00	4.42E-07
VOC	Cumene	98-82-8	1.2E+02	3.5E+00	2.2E-05	9.2E-05	5.0E-01	3.3E-01	3.0E-01	1.2E+00	1.0E+00	6.51E-08
VOC	Cyclohexane	110-82-7	8.4E+01	3.4E+00	3.6E-05	1.3E-04	3.1E-01	3.3E-01	3.0E-01	7.5E-01	1.0E+00	9.50E-08
VOC	1,2-Dichlorobenzene	95-50-1	1.5E+02	3.4E+00	1.6E-05	7.6E-05	7.0E-01	3.3E-01	3.0E-01	1.7E+00	1.0E+00	5.52E-08
VOC	Dichlorodifluoromethane	75-71-8	1.2E+02	2.2E+00	6.1E-05	2.6E-04	5.0E-01	3.3E-01	3.0E-01	1.2E+00	1.0E+00	1.84E-07
VOC	1,1-Dichloroethane	75-34-3	9.9E+01	1.8E+00	1.1E-04	4.2E-04	3.8E-01	3.3E-01	3.0E-01	9.0E-01	1.0E+00	3.00E-07
VOC	cis-1,2-Dichloroethene	156-59-2	9.7E+01	1.9E+00	1.1E-04	4.0E-04	3.7E-01	3.3E-01	3.0E-01	8.8E-01	1.0E+00	2.89E-07
VOC	Ethyl Benzene	100-41-4	1.1E+02	3.1E+00	3.5E-05	1.4E-04	4.1E-01	3.3E-01	3.0E-01	9.9E-01	1.0E+00	9.75E-08
VOC	Methyl Acetate	79-20-9	7.4E+01	1.8E-01	5.3E-04	1.8E-03	2.7E-01	3.3E-01	3.0E-01	6.6E-01	1.0E+00	1.35E-06
VOC	4-Methyl-2-pentanone	108-10-1	1.0E+02	1.2E+00	1.7E-04	6.6E-04	3.8E-01	3.3E-01	3.0E-01	9.2E-01	1.0E+00	4.74E-07
VOC	Methylcyclohexane	108-87-2	9.8E+01	3.0E+00	4.4E-05	1.7E-04	3.7E-01	3.3E-01	3.0E-01	9.0E-01	1.0E+00	1.21E-07
VOC	Methylene Chloride	75-09-2	8.5E+01	1.3E+00	2.0E-04	7.1E-04	3.1E-01	3.3E-01	3.0E-01	7.5E-01	1.0E+00	5.24E-07
VOC	Tetrachloroethene	127-18-4	1.7E+02	2.7E+00	2.3E-05	1.1E-04	8.9E-01	3.3E-01	3.0E-01	2.1E+00	1.0E+00	8.53E-08
VOC	Toluene	108-88-3	9.2E+01	2.8E+00	5.6E-05	2.1E-04	3.5E-01	3.3E-01	3.0E-01	8.3E-01	1.0E+00	1.51E-07
VOC	1,2,4-Trichlorobenzene	120-82-1	1.8E+02	4.0E+00	6.6E-06	3.4E-05	1.1E+00	3.3E-01	3.0E-01	2.6E+00	1.0E+00	2.70E-08
VOC	1,1,1-Trichloroethane	71-55-6	1.3E+02	2.5E+00	4.1E-05	1.8E-04	5.9E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.29E-07
VOC	1,1,2-Trichloroethane	79-00-5	1.3E+02	2.1E+00	5.7E-05	2.5E-04	5.9E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.81E-07
VOC	Trichloroethene	79-01-6	1.3E+02	2.7E+00	3.5E-05	1.5E-04	5.7E-01	3.3E-01	3.0E-01	1.4E+00	1.0E+00	1.10E-07
VOC	Trichlorofluoromethane	75-69-4	1.4E+02	2.5E+00	3.7E-05	1.7E-04	6.2E-01	3.3E-01	3.0E-01	1.5E+00	1.0E+00	1.20E-07
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.9E+02	3.2E+00	1.2E-05	6.3E-05	1.2E+00	3.3E-01	3.0E-01	2.8E+00	1.0E+00	5.06E-08
VOC	Vinyl Chloride	75-01-4	6.3E+01	1.5E+00	2.2E-04	6.7E-04	2.4E-01	3.3E-01	3.0E-01	5.7E-01	1.0E+00	5.40E-07
VOC	Xylenes (total)	1330-20-7	1.1E+02	3.2E+00	3.4E-05	1.3E-04	4.1E-01	3.3E-01	3.0E-01	9.9E-01	1.0E+00	9.55E-08
SVOC	Acenaphthene	83-32-9	1.5E+02	3.9E+00	1.0E-05	4.8E-05	7.7E-01	3.3E-01	3.0E-01	1.8E+00	1.0E+00	3.57E-08
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	5.7E+00	9.6E-07	5.6E-06	2.0E+00	3.3E-01	3.0E-01	4.8E+00	9.0E-01	4.79E-09
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	6.1E+00	5.1E-07	3.1E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.64E-09
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	6.2E+00	4.8E-07	2.9E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.46E-09
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	6.2E+00	4.8E-07	2.9E-06	2.7E+00	3.3E-01	3.0E-01	6.5E+00	8.0E-01	2.46E-09
SVOC	Biphenyl	92-52-4	1.5E+02	4.1E+00	8.8E-06	4.2E-05	7.7E-01	3.3E-01	3.0E-01	1.8E+00	1.0E+00	3.12E-08
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.7E+02	1.3E+00	6.4E-05	3.2E-04	9.8E-01	3.3E-01	3.0E-01	2.3E+00	1.0E+00	2.46E-07
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.9E+02	7.3E+00	3.4E-08	2.6E-07	1.6E+01	3.3E-01	3.0E-01	3.9E+01	4.0E-01	2.14E-10
SVOC	Butylbenzylphthalate	85-68-7	3.1E+02	4.8E+00	6.4E-07	4.3E-06	5.9E+00	3.3E-01	3.0E-01	1.4E+01	9.0E-01	5.46E-09
SVOC	Chrysene	218-01-9	2.3E+02	5.7E+00	9.6E-07	5.6E-06	2.0E+00	3.3E-01	3.0E-01	4.8E+00	9.0E-01	4.79E-09

Attachment G8: Nonsteady State Dermal Absorption of Chemical from NAPL
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	MW (g/mole)	Log K_{ow} (unitless)	K_p (cm/hr)	B (unitless)	τ (hr)	c	b	ts (hr)	FA (unitless)	DA (L/cm^2-event)
SVOC	2,4-Dinitrotoluene	121-14-2	1.8E+02	2.0E+00	3.1E-05	1.6E-04	1.1E+00	3.3E-01	3.0E-01	2.6E+00	1.0E+00	1.29E-07
SVOC	Di-n-octylphthalate	117-84-0	3.9E+02	8.1E+00	1.9E-08	1.4E-07	1.6E+01	3.3E-01	3.0E-01	3.9E+01	3.0E-01	8.83E-11
SVOC	Fluoranthene	206-44-0	2.0E+02	5.1E+00	2.1E-06	1.2E-05	1.4E+00	3.3E-01	3.0E-01	3.4E+00	1.0E+00	9.90E-09
SVOC	Fluorene	86-73-7	1.7E+02	4.2E+00	6.9E-06	3.4E-05	9.0E-01	3.3E-01	3.0E-01	2.2E+00	1.0E+00	2.55E-08
SVOC	2-Methylnaphthalene	91-57-6	1.4E+02	3.9E+00	1.2E-05	5.7E-05	6.6E-01	3.3E-01	3.0E-01	1.6E+00	1.0E+00	4.09E-08
SVOC	Naphthalene	91-20-3	1.3E+02	3.4E+00	2.2E-05	9.5E-05	5.5E-01	3.3E-01	3.0E-01	1.3E+00	1.0E+00	6.78E-08
SVOC	Phenanthrene	85-01-8	1.8E+02	4.5E+00	4.8E-06	2.5E-05	1.0E+00	3.3E-01	3.0E-01	2.5E+00	1.0E+00	1.94E-08
SVOC	Pyrene	129-00-0	2.0E+02	5.1E+00	2.1E-06	1.2E-05	1.4E+00	3.3E-01	3.0E-01	3.4E+00	1.0E+00	9.98E-09
PCB	PCBs (total)	1336-36-3	3.3E+02	6.5E+00	1.4E-07	9.9E-07	7.2E+00	3.3E-01	3.0E-01	1.7E+01	7.0E-01	1.05E-09
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03							2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03							2.00E-06
INORG	Barium	7440-39-3	1.4E+02		1.0E-03							2.00E-06
INORG	Beryllium	7440-41-7	9.0E+00		1.0E-03							2.00E-06
INORG	Cadmium	7440-43-9	1.1E+02		1.0E-03							2.00E-06
INORG	Chromium (total)	7440-47-3	5.2E+01		2.0E-03							4.00E-06
INORG	Cobalt	7440-48-4	5.9E+01		4.0E-04							8.00E-07
INORG	Copper	7440-50-8	6.4E+01		1.0E-03							2.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03							2.00E-06
INORG	Lead	7439-92-1	207.2		1.0E-04							2.00E-07
INORG	Manganese	7439-96-5	54.9		1.0E-03							2.00E-06
INORG	Mercury	7439-97-6	201.0		1.0E-03							2.00E-06
INORG	Nickel	7440-02-0	58.7		2.0E-04							4.00E-07
INORG	Selenium	7782-49-2	79.0		1.0E-03							2.00E-06
INORG	Silver	7440-22-4	107.9		6.0E-04							1.20E-06
INORG	Thallium	7440-28-0	204.4		1.0E-03							2.00E-06
INORG	Vanadium	7440-62-2	50.9		1.0E-03							2.00E-06
INORG	Zinc	7440-66-6	65.4		6.0E-04							1.20E-06

Attachment G8: Redevelopment Construction Worker Cancer Risk Calculations - AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	Risk	AF_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	URF (m^3/mg)	Risk	C_{NAPL} (mg/L)	DA (L/cm^2)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{air} (mg/m^3)	URF (m^3/mg)	Risk
VOC	Acetone	67-64-1	ID														2.21E-06							
VOC	Benzene	71-43-2	A	4.69E+01	2.62E-08	5.5E-02	1E-09			5.5E-02		2.4E-01	4.7E-05	7.8E-03	4E-07	8.18E+02	2.81E-07	2.12E-06	5.5E-02	1E-07	5.89E+00	1.15E-03	7.8E-03	9E-06
VOC	2-Butanone	78-93-3	ID														1.27E-06							
VOC	Carbon Disulfide	75-15-0															3.18E-07							
VOC	Chloroethane	75-00-3				2.9E-03				2.9E-03							5.59E-07		2.9E-03					
VOC	Chloromethane	74-87-3	D														4.42E-07							
VOC	Cumene	98-82-8	D	3.99E+01	2.23E-08							9.2E-02	1.8E-05			6.95E+02	6.51E-08	4.17E-07			1.94E-01	3.79E-05		
VOC	Cyclohexane	110-82-7	ID	5.05E+02	2.82E-07							2.4E+00	4.8E-04			8.80E+03	9.50E-08	7.71E-06			6.26E+01	1.22E-02		
VOC	1,2-Dichlorobenzene	95-50-1	D														5.52E-08							
VOC	Dichlorodifluoromethane	75-71-8															1.84E-07							
VOC	1,1-Dichloroethane	75-34-3	C														3.00E-07							
VOC	cis-1,2-Dichloroethene	156-59-2	D														2.89E-07							
VOC	Ethyl Benzene	100-41-4	D	1.11E+02	6.21E-08							2.9E-01	5.8E-05			1.94E+03	9.75E-08	1.74E-06			1.27E+00	2.48E-04		
VOC	Methyl Acetate	79-20-9															1.35E-06							
VOC	4-Methyl-2-pentanone	108-10-1	ID														4.74E-07							
VOC	Methylcyclohexane	108-87-2		1.31E+03	7.33E-07							2.9E+00	5.7E-04			2.29E+04	1.21E-07	2.54E-05			6.61E+01	1.29E-02		
VOC	Methylene Chloride	75-09-2	B2			7.5E-03				7.5E-03				4.7E-04			5.24E-07		7.5E-03				4.7E-04	
VOC	Tetrachloroethene	127-18-4	C-B2			5.2E-02				5.2E-02				3.1E-03			8.53E-08		5.2E-02				3.1E-03	
VOC	Toluene	108-88-3	D	2.12E+02	1.18E-07							7.6E-01	1.5E-04			3.70E+03	1.51E-07	5.15E-06			7.89E+00	1.54E-03		
VOC	1,2,4-Trichlorobenzene	120-82-1	D														2.70E-08							
VOC	1,1,1-Trichloroethane	71-55-6	D														1.29E-07							
VOC	1,1,2-Trichloroethane	79-00-5	C			5.7E-02				5.7E-02				1.6E-02			1.81E-07		5.7E-02				1.6E-02	
VOC	Trichloroethene	79-01-6	C-B2			1.1E-02				1.1E-02				1.7E-03			1.10E-07		1.1E-02				1.7E-03	
VOC	Trichlorofluoromethane	75-69-4															1.20E-07							
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1															5.06E-08							
VOC	Vinyl Chloride	75-01-4	A			1.4E+00				1.4E+00				8.8E-03			5.40E-07		1.4E+00				8.8E-03	
VOC	Xylenes (total)	1330-20-7	ID	5.15E+02	2.88E-07							7.8E-01	1.5E-04			8.98E+03	9.55E-08	7.91E-06			5.01E+00	9.81E-04		
SVOC	Acenaphthene	83-32-9						1.3E-01									3.57E-08							
SVOC	Benzo(a)anthracene	56-55-3	B2			7.3E-01		1.3E-01		7.3E-01				8.9E-02			4.79E-09		7.3E-01				8.9E-02	
SVOC	Benzo(a)pyrene	50-32-8	B2			7.3E+00		1.3E-01		7.3E+00				8.9E-01			2.64E-09		7.3E+00				8.9E-01	
SVOC	Benzo(b)fluoranthene	205-99-2	B2			7.3E-01		1.3E-01		7.3E-01				8.9E-02			2.46E-09		7.3E-01				8.9E-02	
SVOC	Benzo(k)fluoranthene	207-08-9	B2			7.3E-02		1.3E-01		7.3E-02				8.9E-03			2.46E-09		7.3E-02				8.9E-03	
SVOC	Biphenyl	92-52-4	D					1.0E-01									3.12E-08							
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D					1.0E-01									2.46E-07							
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2			1.4E-02		1.0E-01		1.4E-02				4.0E-03			2.14E-10		1.4E-02				4.0E-03	
SVOC	Butylbenzylphthalate	85-68-7	C			1.9E-03		1.0E-01		1.9E-03				5.4E-04			5.46E-09		1.9E-03				5.4E-04	
SVOC	Chrysene	218-01-9	B2			7.3E-03		1.3E-01		7.3E-03				8.9E-04			4.79E-09		7.3E-03				8.9E-04	
SVOC	2,4-Dinitrotoluene	121-14-2	B2			6.8E-01		1.0E-01		6.8E-01							1.29E-07		6.8E-01					
SVOC	Di-n-octylphthalate	117-84-0						1.0E-01									8.83E-11							
SVOC	Fluoranthene	206-44-0	D					1.3E-01									9.90E-09							
SVOC	Fluorene	86-73-7	D					1.3E-01									2.55E-08							
SVOC	2-Methylnaphthalene	91-57-6	ID	2.83E+01	1.58E-08			1.0E-01	5.21E-09			3.9E-03	7.7E-07			4.93E+02	4.09E-08	1.86E-07			1.38E-03	2.69E-07		
SVOC	Naphthalene	91-20-3	C	4.19E+01	2.34E-08			1.3E-01	1.00E-08			1.1E-02	2.1E-06			7.30E+02	6.78E-08	4.57E-07			3.60E-03	7.04E-07		
SVOC	Phenanthrene	85-01-8	D					1.3E-01									1.94E-08							
SVOC	Pyrene	129-00-0	D					1.3E-01									9.98E-09							
PCB	PCBs (total)	1336-36-3	B2			2.0E+00		1.4E-01		2.0E+00				5.7E-01			1.05E-09		2.0E+00				5.7E-01	
INORG	Antimony	7440-36-0															2.00E-06							
INORG	Arsenic	7440-38-2	A	1.82E-01	1.02E-10	1.5E+00	2E-10	3.0E-02	1.01E-11	1.5E+00	2E-11			4.3E+00		3.17E+00	2.00E-06	5.85E-08	1.5E+00	9E-08			4.3E+00	
INORG	Barium	7440-39-3	D	3.33E-02	1.86E-11											5.81E-01	2.00E-06	1.07E-08						
INORG	Beryllium	7440-41-7	B1											2.4E+00			2.00E-06						2.4E+00	
INORG	Cadmium	7440-43-9	B1	3.53E-04	1.97E-13			1.0E-03	6.52E-16					1.8E+00		6.16E-03	2.00E-06	1.14E-10					1.8E+00	
INORG	Chromium (total)	7440-47-3		3.23E-02	1.81E-11									1.2E+01		5.63E-01	4.00E-06	2.08E-08					1.2E+01	
INORG	Cobalt	7440-48-4	B1											2.8E+00			8.00E-07						2.8E+00	
INORG	Copper	7440-50-8	D	4.84E-02	2.71E-11											8.45E-01	2.00E-06	1.56E-08						
INORG	Cyanide (total)	57-12-5	D														2.00E-06							
INORG	Lead	7439-92-1	B2	1.16E+01	6.49E-09											2.02E+02	2.00E-07	3.73E-07						
INORG	Manganese	7439-96-5	D	3.03E-03	1.69E-12											5.28E-02	2.00E-06	9.74E-10						
INORG	Mercury	7439-97-6	D														2.00E-06							

Attachment G8: Redevelopment Construction Worker Cancer Risk Calculations - AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	Risk	AF_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	URF (m^3/mg)	Risk	C_{NAPL} (mg/L)	DA (L/cm^2)	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	Risk	C_{air} (mg/m^3)	C_{air} (mg/m^3)	URF (m^3/mg)	Risk
INORG	Nickel	7440-02-0	A	9.59E-02	5.36E-11									2.4E-01		1.67E+00	4.00E-07	6.17E-09					2.4E-01	
INORG	Selenium	7782-49-2	D	2.07E-01	1.16E-10											3.61E+00	2.00E-06	6.66E-08						
INORG	Silver	7440-22-4	D														1.20E-06							
INORG	Thallium	7440-28-0															2.00E-06							
INORG	Vanadium	7440-62-2		8.58E-03	4.80E-12											1.50E-01	2.00E-06	2.76E-09						
INORG	Zinc	7440-66-6	D	2.37E-02	1.33E-11											4.14E-01	1.20E-06	4.58E-09						

Attachment G8: Redevelopment Construction Worker Hazard Index Calculations - AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	HQ	AF_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	RfC (mg/m^3)	HQ	C_{NAPL} (mg/L)	DA (L/cm^2)	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{air} (mg/m^3)	RfC (mg/m^3)	HQ
VOC	Acetone	67-64-1	ID			1.0E+00				1.0E+00				3.5E+00			2.21E-06		1.0E+00				3.5E+00	
VOC	Benzene	71-43-2	A	4.69E+01	1.84E-06	4.0E-03	5E-04			4.0E-03		2.4E-01	3.3E-03	6.0E-02	5E-02	8.18E+02	2.81E-07	1.49E-05	4.0E-03	4E-03	5.89E+00	8.07E-02	6.0E-02	1E+00
VOC	2-Butanone	78-93-3	ID			2.0E+00				2.0E+00				5.0E+00			1.27E-06		2.0E+00				5.0E+00	
VOC	Carbon Disulfide	75-15-0				1.0E-01				1.0E-01				7.0E-01			3.18E-07		1.0E-01				7.0E-01	
VOC	Chloroethane	75-00-3				4.0E-01				4.0E-01				1.0E+01			5.59E-07		4.0E-01				1.0E+01	
VOC	Chloromethane	74-87-3	D											9.0E-02			4.42E-07						9.0E-02	
VOC	Cumene	98-82-8	D	3.99E+01	1.56E-06	4.0E-01	4E-06			4.0E-01		9.2E-02	1.3E-03	4.0E-01	3E-03	6.95E+02	6.51E-08	2.92E-06	4.0E-01	7E-06	1.94E-01	2.65E-03	4.0E-01	7E-03
VOC	Cyclohexane	110-82-7	ID	5.05E+02	1.97E-05							2.4E+00	3.3E-02	6.0E+00	6E-03	8.80E+03	9.50E-08	5.40E-05			6.26E+01	8.57E-01	6.0E+00	1E-01
VOC	1,2-Dichlorobenzene	95-50-1	D			9.0E-02				9.0E-02				2.0E+00			5.52E-08		9.0E-02				2.0E+00	
VOC	Dichlorodifluoromethane	75-71-8				9.0E-01				9.0E-01				2.0E+00			1.84E-07		9.0E-01				2.0E+00	
VOC	1,1-Dichloroethane	75-34-3	C			1.0E+00				1.0E+00				5.0E+00			3.00E-07		1.0E+00				5.0E+00	
VOC	cis-1,2-Dichloroethene	156-59-2	D			1.0E-01				1.0E-01				3.5E-01			2.89E-07		1.0E-01				3.5E-01	
VOC	Ethyl Benzene	100-41-4	D	1.11E+02	4.34E-06	1.0E-01	4E-05			1.0E-01		2.9E-01	4.0E-03	1.0E+00	4E-03	1.94E+03	9.75E-08	1.22E-05	1.0E-01	1E-04	1.27E+00	1.73E-02	1.0E+00	2E-02
VOC	Methyl Acetate	79-20-9				1.0E+01				1.0E+01				3.5E+01			1.35E-06		1.0E+01				3.5E+01	
VOC	4-Methyl-2-pentanone	108-10-1	ID											3.0E+00			4.74E-07						3.0E+00	
VOC	Methylcyclohexane	108-87-2		1.31E+03	5.13E-05							2.9E+00	4.0E-02	3.0E+00	1E-02	2.29E+04	1.21E-07	1.78E-04			6.61E+01	9.05E-01	3.0E+00	3E-01
VOC	Methylene Chloride	75-09-2	B2			6.0E-02				6.0E-02				3.0E+00			5.24E-07		6.0E-02				3.0E+00	
VOC	Tetrachloroethene	127-18-4	C-B2			1.0E-01				1.0E-01				4.0E-01			8.53E-08		1.0E-01				4.0E-01	
VOC	Toluene	108-88-3	D	2.12E+02	8.29E-06	8.0E-01	1E-05			8.0E-01		7.6E-01	1.0E-02	5.0E+00	2E-03	3.70E+03	1.51E-07	3.60E-05	8.0E-01	5E-05	7.89E+00	1.08E-01	5.0E+00	2E-02
VOC	1,2,4-Trichlorobenzene	120-82-1	D			1.0E-02				1.0E-02				2.0E+00			2.70E-08		1.0E-02				2.0E+00	
VOC	1,1,1-Trichloroethane	71-55-6	D			2.8E-01				2.8E-01				2.2E+01			1.29E-07		2.8E-01				2.2E+01	
VOC	1,1,2-Trichloroethane	79-00-5	C			4.0E-02				4.0E-02							1.81E-07		4.0E-02					
VOC	Trichloroethene	79-01-6	C-B2			6.0E-03				6.0E-03							1.10E-07		6.0E-03					
VOC	Trichlorofluoromethane	75-69-4				7.0E-01				7.0E-01				7.0E+00			1.20E-07		7.0E-01				7.0E+00	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1				3.0E+01				3.0E+01				3.0E+01			5.06E-08		3.0E+01				3.0E+01	
VOC	Vinyl Chloride	75-01-4	A			3.0E-03				3.0E-03				1.0E-01			5.40E-07		3.0E-03				1.0E-01	
VOC	Xylenes (total)	1330-20-7	ID	5.15E+02	2.01E-05	4.0E-01	5E-05			4.0E-01		7.8E-01	1.1E-02	1.0E-01	1E-01	8.98E+03	9.55E-08	5.54E-05	4.0E-01	1E-04	5.01E+00	6.86E-02	1.0E-01	7E-01
SVOC	Acenaphthene	83-32-9				6.0E-01		1.30E-01		6.0E-01				2.1E+00			3.57E-08		6.0E-01				2.1E+00	
SVOC	Benzo(a)anthracene	56-55-3	B2					1.30E-01									4.79E-09							
SVOC	Benzo(a)pyrene	50-32-8	B2					1.30E-01									2.64E-09							
SVOC	Benzo(b)fluoranthene	205-99-2	B2					1.30E-01									2.46E-09							
SVOC	Benzo(k)fluoranthene	207-08-9	B2					1.30E-01									2.46E-09							
SVOC	Biphenyl	92-52-4	D			5.0E-02		1.00E-01		5.0E-02				1.8E-01			3.12E-08		5.0E-02				1.8E-01	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D					1.00E-01									2.46E-07							
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2			2.0E-02		1.00E-01		2.0E-02				2.0E-01			2.14E-10		2.0E-02				2.0E-01	
SVOC	Butylbenzylphthalate	85-68-7	C			2.0E+00		1.00E-01		2.0E+00				7.0E+00			5.46E-09		2.0E+00				7.0E+00	
SVOC	Chrysene	218-01-9	B2					1.30E-01									4.79E-09							
SVOC	2,4-Dinitrotoluene	121-14-2	B2			2.0E-03		1.00E-01		2.0E-03							1.29E-07		2.0E-03					
SVOC	Di-n-octylphthalate	117-84-0				4.0E-01		1.00E-01		4.0E-01							8.83E-11		4.0E-01					
SVOC	Fluoranthene	206-44-0	D			4.0E-01		1.30E-01		4.0E-01				1.4E+00			9.90E-09		4.0E-01				1.4E+00	
SVOC	Fluorene	86-73-7	D			4.0E-01		1.30E-01		4.0E-01				1.4E+00			2.55E-08		4.0E-01				1.4E+00	
SVOC	2-Methylnaphthalene	91-57-6	ID	2.83E+01	1.11E-06	4.0E-03	3E-04	1.00E-01	3.65E-07	4.0E-03	9E-05	3.9E-03	5.4E-05	3.0E-03	2E-02	4.93E+02	4.09E-08	1.30E-06	4.0E-03	3E-04	1.38E-03	1.89E-05	3.0E-03	6E-03
SVOC	Naphthalene	91-20-3	C	4.19E+01	1.64E-06	2.0E-01	8E-06	1.30E-01	7.03E-07	2.0E-01	4E-06	1.1E-02	1.5E-04	3.0E-03	5E-02	7.30E+02	6.78E-08	3.20E-06	2.0E-01	2E-05	3.60E-03	4.93E-05	3.0E-03	2E-02
SVOC	Phenanthrene	85-01-8	D			3.0E-01		1.30E-01		3.0E-01				1.1E+00			1.94E-08		3.0E-01				1.1E+00	
SVOC	Pyrene	129-00-0	D			3.0E-01		1.30E-01		3.0E-01				1.1E+00			9.98E-09		3.0E-01				1.1E+00	
PCB	PCBs (total)	1336-36-3	B2			5.0E-05		1.40E-01		5.0E-05							1.05E-09		5.0E-05					
INORG	Antimony	7440-36-0				4.0E-04				6.0E-05				1.4E-03			2.00E-06		6.0E-05				1.4E-03	
INORG	Arsenic	7440-38-2	A	1.82E-01	7.11E-09	5.0E-03	1E-06	3.00E-02	7.04E-10	5.0E-03	1E-07					3.17E+00	2.00E-06	4.09E-07	5.0E-03	8E-05				
INORG	Barium	7440-39-3	D	3.33E-02	1.30E-09	7.0E-02	2E-08			4.9E-03						5.81E-01	2.00E-06	7.50E-08	4.9E-03	2E-05				
INORG	Beryllium	7440-41-7	B1			2.0E-03				1.4E-05				2.0E-05			2.00E-06		1.4E-05				2.0E-05	
INORG	Cadmium	7440-43-9	B1	3.53E-04	1.38E-11	1.0E-03	1E-08	1.00E-03	4.56E-14	2.5E-05	2E-09			9.0E-04		6.16E-03	2.00E-06	7.96E-10	2.5E-05	3E-05			9.0E-04	
INORG	Chromium (total)	7440-47-3		3.23E-02	1.26E-09	2.0E-02	6E-08			5.0E-04				1.0E-04		5.63E-01	4.00E-06	1.45E-07	5.0E-04	3E-04			1.0E-04	
INORG	Cobalt	7440-48-4	B1			2.0E-02				2.0E-02				2.0E-05			8.00E-07		2.0E-02				2.0E-05	
INORG	Copper	7440-50-8	D	4.84E-02	1.90E-09	4.0E-02	5E-08			4.0E-02				1.4E-01		8.45E-01	2.00E-06	1.09E-07	4.0E-02	3E-06			1.4E-01	
INORG	Cyanide (total)	57-12-5	D			2.0E-02				2.0E-02				7.0E-02			2.00E-06		2.0E-02				7.0E-02	
INORG	Lead	7439-92-1	B2	1.16E+01	4.54E-07											2.02E+02	2.00E-07	2.61E-06						
INORG	Manganese	7439-96-5	D	3.03E-03	1.18E-10	1.4E-01	8E-10			8.4E-03				5.0E-05		5.28E-02	2.00E-06	6.82E-09	8.4E-03	8E-07			5.0E-05	
INORG	Mercury	7439-97-6	D			3.0E-04				3.0E-04				3.0E-04			2.00E-06		3.0E-04				3.0E-04	
INORG	Nickel	7440-02-0	A	9.59E-02	3.75E-09	2.0E-02	2E-07			8.0E-04						1.67E+00	4.00E-07	4.32E-08	8.0E-04	5E-05				

Attachment G8: Redevelopment Construction Worker Hazard Index Calculations - AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

				Smear Zone Soil Ingestion				Smear Zone Soil Dermal Contact				Smear Zone Soil Vapor Inhalation				NAPL Dermal Contact					NAPL Vapor Inhalation			
Chem Group	Chemical	CASRN	Cancer Class	C_{SZsoil} (mg/kg)	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	HQ	AF_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{exp} (mg/m^3)	RfC (mg/m^3)	HQ	C_{NAPL} (mg/L)	DA (L/cm^2)	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	HQ	C_{air} (mg/m^3)	C_{air} (mg/m^3)	RfC (mg/m^3)	HQ
INORG	Selenium	7782-49-2	D	2.07E-01	8.10E-09	5.0E-03	2E-06			5.0E-03				1.8E-02		3.61E+00	2.00E-06	4.66E-07	5.0E-03	9E-05			1.8E-02	
INORG	Silver	7440-22-4	D			5.0E-03				2.0E-04				1.0E-05			1.20E-06		2.0E-04				1.0E-05	
INORG	Thallium	7440-28-0				7.0E-05				7.0E-05				2.5E-04			2.00E-06		7.0E-05				2.5E-04	
INORG	Vanadium	7440-62-2		8.58E-03	3.36E-10	7.0E-03	5E-08			1.8E-04				2.5E-02		1.50E-01	2.00E-06	1.93E-08	1.8E-04	1E-04			2.5E-02	
INORG	Zinc	7440-66-6	D	2.37E-02	9.28E-10	3.0E-01	3E-09			3.0E-01				1.1E+00		4.14E-01	1.20E-06	3.21E-08	3.0E-01	1E-07			1.1E+00	

Attachment G9
Exposure of Residents to Outdoor Soil

Attachment G9: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Acetone	67-64-1	5.81E-01		7.95E-04	1.07E+00	9.85E-05	7.81E-02	1.47E-01	1.21E-07	1.50E-03	7.83E-06
VOC	Benzene	71-43-2	5.82E+01		1.14E-01	7.60E-01	8.47E-05	3.00E-01	1.04E-01	1.04E-07	3.96E-02	4.03E-05
VOC	Bromodichloromethane	75-27-4	5.51E+01		3.28E-02	2.57E-01	9.16E-05	2.65E-01	3.54E-02	1.13E-07	4.38E-03	1.34E-05
VOC	2-Butanone	78-93-3	2.00E+00		1.14E-03	6.98E-01	8.47E-05	8.28E-02	9.59E-02	1.04E-07	1.32E-03	7.36E-06
VOC	Carbon Disulfide	75-15-0	4.59E+01		6.20E-01	8.99E-01	8.64E-05	4.19E-01	1.23E-01	1.06E-07	1.83E-01	8.64E-05
VOC	Carbon Tetrachloride	56-23-5	1.74E+02		6.25E-01	6.74E-01	7.60E-05	8.35E-01	9.26E-02	9.36E-08	6.93E-02	5.32E-05
VOC	Chlorobenzene	108-90-7	2.20E+02		7.60E-02	6.31E-01	7.52E-05	8.14E-01	8.66E-02	9.25E-08	8.09E-03	1.82E-05
VOC	Chloroethane	75-00-3	1.62E+01		1.80E-01	2.34E+00	9.94E-05	1.85E-01	3.22E-01	1.22E-07	3.13E-01	1.13E-04
VOC	Chloroform	67-66-3	3.97E+01		7.50E-02	8.99E-01	8.64E-05	2.28E-01	1.23E-01	1.06E-07	4.06E-02	4.07E-05
VOC	Chloromethane	74-87-3	3.97E+01		1.80E-01	1.09E+00	5.62E-05	2.61E-01	1.50E-01	6.91E-08	1.03E-01	6.50E-05
VOC	Cumene	98-82-8	7.05E+02		2.66E-01	5.62E-01	6.13E-05	2.44E+00	7.71E-02	7.55E-08	8.39E-03	1.85E-05
VOC	Cyclohexane	110-82-7	6.35E+02		3.98E+00	7.25E-01	7.86E-05	3.38E+00	9.96E-02	9.68E-08	1.17E-01	6.93E-05
VOC	Dibromochloromethane	124-48-1	6.26E+01		1.61E-02	1.69E-01	9.07E-05	2.84E-01	2.33E-02	1.12E-07	1.32E-03	7.33E-06
VOC	1,2-Dichlorobenzene	95-50-1	6.23E+02		3.90E-02	5.96E-01	6.83E-05	2.11E+00	8.19E-02	8.40E-08	1.51E-03	7.87E-06
VOC	1,3-Dichlorobenzene	541-73-1	5.69E+02		6.33E-02	5.98E-01	6.79E-05	1.94E+00	8.21E-02	8.36E-08	2.68E-03	1.05E-05
VOC	1,4-Dichlorobenzene	106-46-7	6.12E+02		4.98E-02	5.96E-01	6.83E-05	2.07E+00	8.19E-02	8.40E-08	1.97E-03	8.96E-06
VOC	Dichlorodifluoromethane	75-71-8	6.15E+01		7.01E+00	6.91E-01	6.91E-05	2.47E+00	9.49E-02	8.51E-08	2.70E-01	1.05E-04
VOC	1,1-Dichloroethane	75-34-3	3.13E+01		1.15E-01	6.41E-01	9.07E-05	2.13E-01	8.81E-02	1.12E-07	4.74E-02	4.40E-05
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.01E-02	8.99E-01	8.55E-05	1.39E-01	1.23E-01	1.05E-07	1.78E-02	2.70E-05
VOC	1,1-Dichloroethene	75-35-4	5.82E+01		5.35E-01	7.78E-01	8.99E-05	4.32E-01	1.07E-01	1.11E-07	1.32E-01	7.35E-05
VOC	cis-1,2-Dichloroethene	156-59-2	3.56E+01		8.35E-02	6.36E-01	9.76E-05	2.17E-01	8.73E-02	1.20E-07	3.35E-02	3.70E-05
VOC	trans-1,2-Dichloroethene	156-60-5	5.22E+01		1.93E-01	6.11E-01	1.03E-04	3.05E-01	8.39E-02	1.27E-07	5.29E-02	4.65E-05
VOC	1,2-Dichloropropane	78-87-5	4.35E+01		5.75E-02	6.76E-01	7.54E-05	2.35E-01	9.28E-02	9.28E-08	2.27E-02	3.05E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		1.62E-01	6.48E-01	6.74E-05	1.32E+00	8.90E-02	8.29E-08	1.09E-02	2.11E-05
VOC	2-Hexanone	591-78-6	1.48E+01		3.58E-02							
VOC	Methyl Acetate	79-20-9	1.66E+00		1.85E-03	8.27E-01	9.50E-05	8.20E-02	1.14E-01	1.17E-07	2.57E-03	1.02E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.20E-02	7.42E-01	8.73E-05	1.17E-01	1.02E-01	1.07E-07	1.05E-02	2.07E-05
VOC	4-Methyl-2-pentanone	108-10-1	1.05E+01		2.82E-03	6.48E-01	6.74E-05	1.11E-01	8.90E-02	8.29E-08	2.26E-03	9.62E-06
VOC	Methylcyclohexane	108-87-2	2.66E+02		8.78E+00	6.35E-01	7.36E-05	3.68E+00	8.72E-02	9.06E-08	2.08E-01	9.22E-05

Attachment G9: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
VOC	Methylene Chloride	75-09-2	1.17E+01		4.49E-02	8.73E-01	1.01E-04	1.28E-01	1.20E-01	1.24E-07	4.21E-02	4.15E-05
VOC	Styrene	100-42-5	7.77E+02		5.65E-02	6.13E-01	6.91E-05	2.61E+00	8.43E-02	8.51E-08	1.82E-03	8.63E-06
VOC	Tetrachloroethene	127-18-4	1.56E+02		3.77E-01	6.22E-01	7.08E-05	6.99E-01	8.54E-02	8.72E-08	4.61E-02	4.34E-05
VOC	Toluene	108-88-3	1.80E+02		1.36E-01	7.52E-01	7.43E-05	7.03E-01	1.03E-01	9.15E-08	2.00E-02	2.86E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	1.79E+03		2.91E-02	2.59E-01	7.11E-05	5.90E+00	3.56E-02	8.75E-08	1.76E-04	2.68E-06
VOC	1,1,1-Trichloroethane	71-55-6	1.10E+02		3.53E-01	6.74E-01	7.60E-05	5.43E-01	9.26E-02	9.36E-08	6.00E-02	4.95E-05
VOC	1,1,2-Trichloroethane	79-00-5	5.03E+01		1.87E-02	6.74E-01	7.60E-05	2.45E-01	9.26E-02	9.36E-08	7.07E-03	1.70E-05
VOC	Trichloroethene	79-01-6	1.68E+02		2.11E-01	6.83E-01	7.86E-05	6.85E-01	9.37E-02	9.68E-08	2.89E-02	3.44E-05
VOC	Trichlorofluoromethane	75-69-4	1.21E+02		1.98E+00	7.52E-01	8.38E-05	1.09E+00	1.03E-01	1.03E-07	1.88E-01	8.77E-05
VOC	1,1,2-Trichloro-1,2,2-trifluoroe	76-13-1	3.81E+02		9.83E+00	6.74E-01	7.08E-05	4.38E+00	9.26E-02	8.72E-08	2.08E-01	9.21E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.26E-01	5.24E-01	6.84E-05	3.02E+00	7.19E-02	8.42E-08	2.99E-03	1.11E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.20E-01	5.20E-01	7.49E-05	5.82E+00	7.14E-02	9.22E-08	1.48E-03	7.77E-06
VOC	Vinyl Chloride	75-01-4	1.85E+01		5.55E-01	9.16E-01	1.06E-04	3.09E-01	1.26E-01	1.31E-07	2.26E-01	9.60E-05
VOC	Xylenes (total)	1330-20-7	3.86E+02		1.38E-01	6.74E-01	7.56E-05	1.37E+00	9.25E-02	9.30E-08	9.33E-03	1.95E-05
SVOC	Acenaphthene	83-32-9	7.14E+03		3.18E-03	3.64E-01	6.64E-05	2.32E+01	5.00E-02	8.18E-08	6.85E-06	5.29E-07
SVOC	Acenaphthylene	208-96-8	7.47E+03		2.31E-03	3.88E-01	6.03E-05	2.43E+01	5.33E-02	7.42E-08	5.07E-06	4.55E-07
SVOC	Acetophenone	98-86-2	3.58E+01		2.19E-04	6.91E-01	6.91E-05	1.92E-01	9.49E-02	8.51E-08	1.09E-04	2.11E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.34E-03	2.80E-01	6.69E-05	9.63E+01	3.84E-02	8.23E-08	5.34E-07	1.48E-07
SVOC	Atrazine	1912-24-9	3.68E+02		1.25E-07	2.24E-01	5.76E-05	1.27E+00	3.07E-02	7.09E-08	5.89E-08	4.91E-08
SVOC	Benzaldehyde	100-52-7	2.85E+01		4.86E-04	6.23E-01	7.84E-05	1.69E-01	8.56E-02	9.65E-08	2.47E-04	3.18E-06
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		6.85E-05	4.41E-01	7.78E-05	1.30E+03	6.05E-02	9.57E-08	3.26E-09	1.15E-08
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		2.32E-05	3.72E-01	7.78E-05	3.29E+03	5.10E-02	9.57E-08	3.88E-10	3.98E-09
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		2.28E-03	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.51E-08	2.49E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		2.88E-06	1.88E-01	4.54E-05	4.15E+04	2.58E-02	5.59E-08	3.14E-12	3.58E-10
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.70E-05	1.95E-01	4.80E-05	4.03E+03	2.68E-02	5.91E-08	1.28E-10	2.29E-09
SVOC	Biphenyl	92-52-4	1.05E+04		6.13E-03	3.49E-01	7.04E-05	3.41E+01	4.79E-02	8.67E-08	8.63E-06	5.94E-07
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.73E+01		3.47E-06	3.77E-01	7.31E-05	1.32E-01	5.17E-02	9.00E-08	2.04E-06	2.89E-07
SVOC	bis(2-Chloroethyl) ether	111-44-4	1.55E+01		3.69E-04	5.98E-01	6.51E-05	1.26E-01	8.21E-02	8.01E-08	2.41E-04	3.14E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.50E+07		2.09E-06	3.03E-01	3.16E-05	4.86E+04	4.17E-02	3.89E-08	2.59E-12	3.25E-10

Attachment G9: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	Butylbenzylphthalate	85-68-7	5.73E+04		2.59E-05	1.50E-01	4.17E-05	1.86E+02	2.06E-02	5.14E-08	3.15E-09	1.14E-08
SVOC	Caprolactam	105-60-2	6.51E-01		1.03E-07	5.98E-01	7.77E-05	7.81E-02	8.21E-02	9.56E-08	1.33E-06	2.33E-07
SVOC	Carbazole	86-74-8	3.38E+03		3.13E-07	3.37E-01	6.07E-05	1.10E+01	4.63E-02	7.48E-08	8.09E-09	1.82E-08
SVOC	4-Chloro-3-methylphenol	59-50-7	1.12E+03		8.15E-06	5.24E-01	8.22E-05	3.69E+00	7.19E-02	1.01E-07	1.86E-07	8.73E-08
SVOC	2-Chloronaphthalene	91-58-7	1.12E+04		6.42E-03	4.25E-01	7.59E-05	3.65E+01	5.84E-02	9.35E-08	1.03E-05	6.48E-07
SVOC	2-Chlorophenol	95-57-8	3.88E+02		8.00E-03	4.33E-01	8.17E-05	1.34E+00	5.95E-02	1.01E-07	3.56E-04	3.82E-06
SVOC	Chrysene	218-01-9	4.01E+05		1.94E-03	2.14E-01	5.37E-05	1.30E+03	2.94E-02	6.60E-08	4.40E-08	4.24E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		3.02E-07	1.75E-01	4.48E-05	1.22E+04	2.40E-02	5.51E-08	5.10E-12	4.57E-10
SVOC	Dibenzofuran	132-64-9	2.07E+04		2.57E-04	2.06E-01	5.18E-05	6.71E+01	2.82E-02	6.38E-08	1.09E-07	6.69E-08
SVOC	2,4-Dichlorophenol	120-83-2	1.47E+02		6.50E-05	2.99E-01	7.58E-05	5.52E-01	4.11E-02	9.33E-08	5.00E-06	4.52E-07
SVOC	Diethylphthalate	84-66-2	2.87E+02		9.25E-06	2.21E-01	5.49E-05	1.01E+00	3.04E-02	6.75E-08	3.47E-07	1.19E-07
SVOC	2,4-Dimethylphenol	105-67-9	2.09E+02		4.10E-05	5.05E-01	7.51E-05	7.53E-01	6.93E-02	9.24E-08	3.90E-06	3.99E-07
SVOC	Dimethylphthalate	131-11-3	6.89E+01		2.15E-06	4.91E-01	5.43E-05	2.99E-01	6.74E-02	6.69E-08	7.07E-07	1.70E-07
SVOC	Di-n-butylphthalate	84-74-2	3.40E+04		1.93E-08	3.78E-01	6.79E-05	1.10E+02	5.20E-02	8.36E-08	7.67E-10	5.60E-09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	1.21E+02		8.73E-06	2.38E-01	5.97E-05	4.69E-01	3.28E-02	7.35E-08	7.65E-07	1.77E-07
SVOC	2,4-Dinitrotoluene	121-14-2	9.46E+01		1.90E-06	1.75E+00	6.10E-05	3.83E-01	2.41E-01	7.51E-08	1.39E-06	2.39E-07
SVOC	2,6-Dinitrotoluene	606-20-2	6.89E+01		1.53E-05	2.83E-01	6.27E-05	2.99E-01	3.88E-02	7.72E-08	2.24E-06	3.03E-07
SVOC	Di-n-octylphthalate	117-84-0	8.38E+07		1.37E-03	1.30E-01	3.09E-05	2.72E+05	1.79E-02	3.81E-08	9.06E-11	1.92E-09
SVOC	Fluoranthene	206-44-0	1.08E+05		3.30E-04	2.61E-01	5.49E-05	3.50E+02	3.58E-02	6.75E-08	3.40E-08	3.73E-08
SVOC	Fluorene	86-73-7	1.38E+04		1.31E-03	3.14E-01	6.81E-05	4.47E+01	4.31E-02	8.38E-08	1.26E-06	2.27E-07
SVOC	Formaldehyde	50-00-0			6.95E-06	1.56E+00	1.73E-04					
SVOC	Hexachlorobutadiene	87-68-3	5.35E+04		1.67E-01	4.85E-01	5.32E-05	1.74E+02	6.66E-02	6.55E-08	6.41E-05	1.62E-06
SVOC	Hexachlorocyclopentadiene	77-47-4	1.99E+05		5.55E-01	1.39E-01	6.23E-05	6.45E+02	1.91E-02	7.67E-08	1.64E-05	8.20E-07
SVOC	Hexachloroethane	67-72-1	1.76E+03		7.95E-02	2.16E-02	5.88E-05	5.81E+00	2.97E-03	7.23E-08	4.06E-05	1.29E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		3.28E-05	1.64E-01	4.89E-05	1.12E+04	2.25E-02	6.02E-08	7.16E-11	1.71E-09
SVOC	Isophorone	78-59-1	4.69E+01		1.36E-04	5.38E-01	5.84E-05	2.28E-01	7.39E-02	7.19E-08	4.44E-05	1.35E-06
SVOC	2-Methylnaphthalene	91-57-6	6.23E+03		1.06E-02	4.18E-01	6.70E-05	2.03E+01	5.74E-02	8.24E-08	3.00E-05	1.11E-06
SVOC	Methylphenol (total)	1319-77-3	8.45E+01		1.77E-05	6.39E-01	8.64E-05	3.50E-01	8.78E-02	1.06E-07	4.74E-06	4.40E-07
SVOC	Naphthalene	91-20-3	2.01E+03		9.90E-03	5.10E-01	6.48E-05	6.59E+00	7.00E-02	7.98E-08	1.05E-04	2.07E-06

Attachment G9: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
SVOC	2-Nitroaniline	88-74-4	6.59E+01		3.27E-06	6.31E-01	6.91E-05	2.89E-01	8.66E-02	8.51E-08	1.27E-06	2.28E-07
SVOC	Nitrobenzene	98-95-3	6.44E+01		4.92E-04	6.57E-01	7.43E-05	2.85E-01	9.02E-02	9.15E-08	1.56E-04	2.53E-06
SVOC	2-Nitrophenol	88-75-5	5.75E+01		1.94E-04	4.66E-01	6.78E-05	2.62E-01	6.40E-02	8.35E-08	4.75E-05	1.39E-06
SVOC	4-Nitrophenol	100-02-7	7.55E+01		8.48E-09	5.40E-01	8.30E-05	3.21E-01	7.42E-02	1.02E-07	3.21E-07	1.15E-07
SVOC	N-Nitrosodiphenylamine	86-30-6	1.29E+03		1.03E-04	2.70E-01	5.49E-05	4.26E+00	3.70E-02	6.75E-08	9.08E-07	1.93E-07
SVOC	N-Nitroso-di-n-propylamine	621-64-7	2.40E+01		4.62E-05	4.71E-01	7.06E-05	1.54E-01	6.47E-02	8.69E-08	2.00E-05	9.04E-07
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	2.56E+02		2.39E-03	5.20E-01	5.54E-05	9.07E-01	7.14E-02	6.82E-08	1.88E-04	2.78E-06
SVOC	Pentachlorophenol	87-86-5	5.92E+02		5.00E-07	4.84E-01	5.27E-05	1.99E+00	6.65E-02	6.49E-08	4.92E-08	4.48E-08
SVOC	Phenanthrene	85-01-8	2.42E+04		4.76E-04	3.24E-01	6.45E-05	7.86E+01	4.45E-02	7.94E-08	2.71E-07	1.05E-07
SVOC	Phenol	108-95-2	2.88E+01		8.15E-06	7.08E-01	7.86E-05	1.69E-01	9.73E-02	9.68E-08	5.26E-06	4.64E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.26E-04	2.35E-01	6.26E-05	3.42E+02	3.23E-02	7.70E-08	2.15E-08	2.97E-08
SVOC	2,4,5-Trichlorophenol	95-95-4	1.60E+03		8.90E-05	2.51E-01	6.07E-05	5.25E+00	3.45E-02	7.48E-08	6.00E-07	1.57E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	3.81E+02		1.60E-04	2.75E-01	5.40E-05	1.31E+00	3.77E-02	6.65E-08	4.64E-06	4.36E-07
PCB	PCBs (total)	1336-36-3	2.45E+06		4.09E-02	1.75E-01	4.32E-05	7.95E+03	2.40E-02	5.32E-08	1.23E-07	7.10E-08
INORG	Antimony	7440-36-0		4.50E+01								
INORG	Arsenic	7440-38-2		2.90E+01								
INORG	Barium	7440-39-3		4.10E+01								
INORG	Beryllium	7440-41-7		7.90E+02								
INORG	Cadmium	7440-43-9		7.50E+01								
INORG	Chromium (total)	7440-47-3		1.90E+01								
INORG	Chromium III	16065-83-1		1.80E+06								
INORG	Chromium VI	18540-29-9		1.90E+01								
INORG	Cobalt	7440-48-4		4.50E+01								
INORG	Copper	7440-50-8		3.50E+01								
INORG	Cyanide (total)	57-12-5		9.90E+00								
INORG	Fluoride	16984-48-8										
INORG	Lead	7439-92-1		9.00E+02								
INORG	Manganese	7439-96-5		6.50E+01								
INORG	Mercury	7439-97-6		1.00E+03	1.45E-01	2.65E-01	5.44E-05	1.62E+03	3.64E-02	6.70E-08	3.26E-06	3.65E-07

Attachment G9: Vapor Flux from Soil to Ambient Air
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	K_{oc} (L/kg)	K_d (L/kg)	H (unitless)	D_{air} (m^2/d)	D_{water} (m^2/d)	R_L (unitless)	D_G (m^2/d)	D_L (m^2/d)	D_E (m^2/d)	J_G (kg/m^2-s)
INORG	Nickel	7440-02-0		6.50E+01								
INORG	Selenium	7782-49-2		5.00E+00								
INORG	Silver	7440-22-4		8.30E+00								
INORG	Thallium	7440-28-0		7.10E+01								
INORG	Vanadium	7440-62-2		1.00E+03								
INORG	Zinc	7440-66-6		6.20E+01								
Notes:	Soil bulk density	kg/L	ρ_b	1.62	*Loamy Sand*							
	Soil particle density	kg/L	ρ_s	2.65	*EPA default/MDEQ 1998*							
	Soil porosity	L/L-soil	θ	0.39	*1-(pb/ps)*							
	Soil water content	L/L-soil	θ_w	0.076	*Loamy Sand*							
	Soil air-filled porosity	L/L-soil	θ_a	0.31	*porosity-water content*							
	Soil organic carbon fraction	unitless	f_{oc}	0.002								
	Averaging period	year	**ED**	30								
		s	**ED**	9.5E+08								
	Molar Gas Constant	L-mmHg/mole-^oK	**R**	62.411								
	Temperature	^oC	**T**	12								
		K	**T**	285								

Attachment G9: Risk-Based Cancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	1.57E-06							1.14E-04	4.67E-05			7.59E-10	3.12E-10			
VOC	Benzene	71-43-2	A	1.57E-06	5.5E-02	1.2E+02			5.5E-02		5.85E-04	2.40E-04	7.8E-03	5.3E+00	7.59E-10	3.12E-10	7.8E-03	4.1E+06	5.1E+00
VOC	Bromodichloromethane	75-27-4	B2	1.57E-06	6.2E-02	1.0E+02			6.2E-02		1.94E-04	7.99E-05	1.8E-02	7.1E+00	7.59E-10	3.12E-10	1.8E-02	1.8E+06	6.6E+00
VOC	2-Butanone	78-93-3	ID	1.57E-06							1.07E-04	4.39E-05			7.59E-10	3.12E-10			
VOC	Carbon Disulfide	75-15-0		1.57E-06							1.26E-03	5.16E-04			7.59E-10	3.12E-10			
VOC	Carbon Tetrachloride	56-23-5	B2	1.57E-06	1.3E-01	4.9E+01			1.3E-01		7.73E-04	3.18E-04	1.5E-02	2.1E+00	7.59E-10	3.12E-10	1.5E-02	2.1E+06	2.0E+00
VOC	Chlorobenzene	108-90-7	D	1.57E-06							2.64E-04	1.09E-04			7.59E-10	3.12E-10			
VOC	Chloroethane	75-00-3		1.57E-06	2.9E-03	2.2E+03			2.9E-03		1.64E-03	6.76E-04			7.59E-10	3.12E-10			
VOC	Chloroform	67-66-3	B2	1.57E-06							5.92E-04	2.43E-04	2.3E-02	1.8E+00	7.59E-10	3.12E-10	2.3E-02	1.4E+06	1.8E+00
VOC	Chloromethane	74-87-3	D	1.57E-06							9.44E-04	3.88E-04			7.59E-10	3.12E-10			
VOC	Cumene	98-82-8	D	1.57E-06							2.69E-04	1.11E-04			7.59E-10	3.12E-10			
VOC	Cyclohexane	110-82-7	ID	1.57E-06							1.01E-03	4.14E-04			7.59E-10	3.12E-10			
VOC	Dibromochloromethane	124-48-1	C	1.57E-06	8.4E-02	7.6E+01			8.4E-02		1.07E-04	4.38E-05	2.4E-02	9.5E+00	7.59E-10	3.12E-10	2.4E-02	1.3E+06	8.5E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	1.57E-06							1.14E-04	4.70E-05			7.59E-10	3.12E-10			
VOC	1,3-Dichlorobenzene	541-73-1	D	1.57E-06							1.52E-04	6.25E-05			7.59E-10	3.12E-10			
VOC	1,4-Dichlorobenzene	106-46-7	C	1.57E-06	2.4E-02	2.7E+02			2.4E-02		1.30E-04	5.35E-05	6.3E-03	3.0E+01	7.59E-10	3.12E-10	6.3E-03	5.1E+06	2.7E+01
VOC	Dichlorodifluoromethane	75-71-8		1.57E-06							1.53E-03	6.27E-04			7.59E-10	3.12E-10			
VOC	1,1-Dichloroethane	75-34-3	C	1.57E-06							6.40E-04	2.63E-04			7.59E-10	3.12E-10			
VOC	1,2-Dichloroethane	107-06-2	B2	1.57E-06	9.1E-02	7.0E+01			9.1E-02		3.92E-04	1.61E-04	2.6E-02	2.4E+00	7.59E-10	3.12E-10	2.6E-02	1.2E+06	2.3E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.57E-06							1.07E-03	4.39E-04			7.59E-10	3.12E-10			
VOC	cis-1,2-Dichloroethene	156-59-2	D	1.57E-06							5.38E-04	2.21E-04			7.59E-10	3.12E-10			
VOC	trans-1,2-Dichloroethene	156-60-5		1.57E-06							6.76E-04	2.78E-04			7.59E-10	3.12E-10			
VOC	1,2-Dichloropropane	78-87-5	B2	1.57E-06	6.8E-02	9.4E+01			6.8E-02		4.43E-04	1.82E-04			7.59E-10	3.12E-10			
VOC	Ethyl Benzene	100-41-4	D	1.57E-06							3.07E-04	1.26E-04			7.59E-10	3.12E-10			
VOC	2-Hexanone	591-78-6		1.57E-06											7.59E-10	3.12E-10			
VOC	Methyl Acetate	79-20-9		1.57E-06							1.49E-04	6.12E-05			7.59E-10	3.12E-10			
VOC	Methyl tert-butyl ether	1634-04-4		1.57E-06							3.00E-04	1.23E-04			7.59E-10	3.12E-10			
VOC	4-Methyl-2-pentanone	108-10-1	ID	1.57E-06							1.40E-04	5.75E-05			7.59E-10	3.12E-10			
VOC	Methylcyclohexane	108-87-2		1.57E-06							1.34E-03	5.50E-04			7.59E-10	3.12E-10			
VOC	Methylene Chloride	75-09-2	B2	1.57E-06	7.5E-03	8.5E+02			7.5E-03		6.03E-04	2.48E-04	4.7E-04	8.6E+01	7.59E-10	3.12E-10	4.7E-04	6.8E+07	7.8E+01
VOC	Styrene	100-42-5		1.57E-06							1.25E-04	5.16E-05			7.59E-10	3.12E-10			
VOC	Tetrachloroethene	127-18-4	C-B2	1.57E-06	5.2E-02	1.2E+02			5.2E-02		6.31E-04	2.59E-04	3.1E-03	1.3E+01	7.59E-10	3.12E-10	3.1E-03	1.0E+07	1.1E+01
VOC	Toluene	108-88-3	D	1.57E-06							4.15E-04	1.71E-04			7.59E-10	3.12E-10			
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.57E-06							3.89E-05	1.60E-05			7.59E-10	3.12E-10			
VOC	1,1,1-Trichloroethane	71-55-6	D	1.57E-06							7.20E-04	2.96E-04			7.59E-10	3.12E-10			
VOC	1,1,2-Trichloroethane	79-00-5	C	1.57E-06	5.7E-02	1.1E+02			5.7E-02		2.47E-04	1.02E-04	1.6E-02	6.2E+00	7.59E-10	3.12E-10	1.6E-02	2.0E+06	5.8E+00
VOC	Trichloroethene	79-01-6	C-B2	1.57E-06	1.1E-02	5.8E+02			1.1E-02		4.99E-04	2.05E-04	1.7E-03	2.9E+01	7.59E-10	3.12E-10	1.7E-03	1.9E+07	2.7E+01
VOC	Trichlorofluoromethane	75-69-4		1.57E-06							1.27E-03	5.24E-04			7.59E-10	3.12E-10			
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.57E-06							1.34E-03	5.50E-04			7.59E-10	3.12E-10			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.57E-06							1.61E-04	6.61E-05			7.59E-10	3.12E-10			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.57E-06							1.13E-04	4.64E-05			7.59E-10	3.12E-10			
VOC	Vinyl Chloride	75-01-4	A	1.57E-06	1.4E+00	4.6E+00			1.4E+00		1.40E-03	5.74E-04	8.8E-03	2.0E+00	7.59E-10	3.12E-10	8.8E-03	3.6E+06	1.4E+00
VOC	Xylenes (total)	1330-20-7	ID	1.57E-06							2.84E-04	1.17E-04			7.59E-10	3.12E-10			
SVOC	Acenaphthene	83-32-9		1.57E-06			1.30E-01	6.43E-07			7.69E-06	3.16E-06			7.59E-10	3.12E-10			
SVOC	Acenaphthylene	208-96-8	D	1.57E-06			1.30E-01	6.43E-07			6.62E-06	2.72E-06			7.59E-10	3.12E-10			
SVOC	Acetophenone	98-86-2	D	1.57E-06			1.00E-01	4.94E-07			3.06E-05	1.26E-05			7.59E-10	3.12E-10			
SVOC	Anthracene	120-12-7	D	1.57E-06			1.30E-01	6.43E-07			2.15E-06	8.82E-07			7.59E-10	3.12E-10			
SVOC	Atrazine	1912-24-9	C	1.57E-06	2.2E-01	2.9E+01	1.00E-01	4.94E-07	2.2E-01	9.1E+01	7.13E-07	2.93E-07	6.3E-02	5.4E+02	7.59E-10	3.12E-10	6.3E-02	5.1E+05	2.1E+01
SVOC	Benzaldehyde	100-52-7		1.57E-06			1.00E-01	4.94E-07			4.62E-05	1.90E-05			7.59E-10	3.12E-10			

Attachment G9: Risk-Based Cancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	LADD (mg/kg/d)	SF_{oral} $(mg/kg/d)^{-1}$	RBC (mg/kg)	ABS_{derm}	LADD (mg/kg/d)	SF_{derm} $(mg/kg/d)^{-1}$	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	URF (m^3/mg)	RBC (mg/kg)	Cancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	1.57E-06	7.3E-01	8.8E+00	1.30E-01	6.43E-07	7.3E-01	2.1E+01	1.68E-07	6.90E-08	8.9E-02	1.6E+03	7.59E-10	3.12E-10	8.9E-02	3.6E+05	6.2E+00
SVOC	Benzo(a)pyrene	50-32-8	B2	1.57E-06	7.3E+00	8.8E-01	1.30E-01	6.43E-07	7.3E+00	2.1E+00	5.79E-08	2.38E-08	8.9E-01	4.7E+02	7.59E-10	3.12E-10	8.9E-01	3.6E+04	6.2E-01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.57E-06	7.3E-01	8.8E+00	1.30E-01	6.43E-07	7.3E-01	2.1E+01	3.62E-07	1.49E-07	8.9E-02	7.6E+02	7.59E-10	3.12E-10	8.9E-02	3.6E+05	6.2E+00
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.57E-06			1.30E-01	6.43E-07			5.20E-09	2.14E-09			7.59E-10	3.12E-10			
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.57E-06	7.3E-02	8.8E+01	1.30E-01	6.43E-07	7.3E-02	2.1E+02	3.32E-08	1.36E-08	8.9E-03	8.3E+04	7.59E-10	3.12E-10	8.9E-03	3.6E+06	6.2E+01
SVOC	Biphenyl	92-52-4	D	1.57E-06			1.00E-01	4.94E-07			8.63E-06	3.55E-06			7.59E-10	3.12E-10			
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1.57E-06			1.00E-01	4.94E-07			4.20E-06	1.72E-06			7.59E-10	3.12E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1.57E-06	1.1E+00	5.8E+00	1.00E-01	4.94E-07	1.1E+00	1.8E+01	4.56E-05	1.87E-05	3.3E-01	1.6E+00	7.59E-10	3.12E-10	3.3E-01	9.7E+04	1.2E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.57E-06	1.4E-02	4.6E+02	1.00E-01	4.94E-07	1.4E-02	1.4E+03	4.73E-09	1.94E-09	4.0E-03	1.3E+06	7.59E-10	3.12E-10	4.0E-03	8.0E+06	3.5E+02
SVOC	Butylbenzylphthalate	85-68-7	C	1.57E-06	1.9E-03	3.4E+03	1.00E-01	4.94E-07	1.9E-03	1.1E+04	1.65E-07	6.78E-08	5.4E-04	2.7E+05	7.59E-10	3.12E-10	5.4E-04	5.9E+07	2.5E+03
SVOC	Caprolactam	105-60-2		1.57E-06			1.00E-01	4.94E-07			3.39E-06	1.39E-06			7.59E-10	3.12E-10			
SVOC	Carbazole	86-74-8	B2	1.57E-06	2.0E-02	3.2E+02	1.00E-01	4.94E-07	2.0E-02	1.0E+03	2.64E-07	1.09E-07	5.7E-03	1.6E+04	7.59E-10	3.12E-10	5.7E-03	5.6E+06	2.4E+02
SVOC	4-Chloro-3-methylphenol	59-50-7		1.57E-06			1.00E-01	4.94E-07			1.27E-06	5.21E-07			7.59E-10	3.12E-10			
SVOC	2-Chloronaphthalene	91-58-7		1.57E-06			1.00E-01	4.94E-07			9.42E-06	3.87E-06			7.59E-10	3.12E-10			
SVOC	2-Chlorophenol	95-57-8		1.57E-06			1.00E-01	4.94E-07			5.55E-05	2.28E-05			7.59E-10	3.12E-10			
SVOC	Chrysene	218-01-9	B2	1.57E-06	7.3E-03	8.8E+02	1.30E-01	6.43E-07	7.3E-03	2.1E+03	6.16E-07	2.53E-07	8.9E-04	4.5E+04	7.59E-10	3.12E-10	8.9E-04	3.6E+07	6.1E+02
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.57E-06	7.3E+00	8.8E-01	1.30E-01	6.43E-07	7.3E+00	2.1E+00	6.63E-09	2.73E-09	8.9E-01	4.1E+03	7.59E-10	3.12E-10	8.9E-01	3.6E+04	6.2E-01
SVOC	Dibenzofuran	132-64-9	D	1.57E-06			1.00E-01	4.94E-07			9.72E-07	3.99E-07			7.59E-10	3.12E-10			
SVOC	2,4-Dichlorophenol	120-83-2		1.57E-06			1.00E-01	4.94E-07			6.57E-06	2.70E-06			7.59E-10	3.12E-10			
SVOC	Diethylphthalate	84-66-2	D	1.57E-06			1.00E-01	4.94E-07			1.73E-06	7.11E-07			7.59E-10	3.12E-10			
SVOC	2,4-Dimethylphenol	105-67-9		1.57E-06			1.00E-01	4.94E-07			5.80E-06	2.38E-06			7.59E-10	3.12E-10			
SVOC	Dimethylphthalate	131-11-3	D	1.57E-06			1.00E-01	4.94E-07			2.47E-06	1.01E-06			7.59E-10	3.12E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	1.57E-06			1.00E-01	4.94E-07			8.14E-08	3.34E-08			7.59E-10	3.12E-10			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.57E-06			1.00E-01	4.94E-07			2.57E-06	1.06E-06			7.59E-10	3.12E-10			
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.57E-06	6.8E-01	9.4E+00	1.00E-01	4.94E-07	6.8E-01	3.0E+01	3.47E-06	1.42E-06			7.59E-10	3.12E-10			7.1E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.57E-06	6.8E-01	9.4E+00	1.00E-01	4.94E-07	6.8E-01	3.0E+01	4.40E-06	1.81E-06	1.9E-01	2.8E+01	7.59E-10	3.12E-10	1.9E-01	1.7E+05	5.7E+00
SVOC	Di-n-octylphthalate	117-84-0		1.57E-06			1.00E-01	4.94E-07			2.80E-08	1.15E-08			7.59E-10	3.12E-10			
SVOC	Fluoranthene	206-44-0	D	1.57E-06			1.30E-01	6.43E-07			5.42E-07	2.23E-07			7.59E-10	3.12E-10			
SVOC	Fluorene	86-73-7	D	1.57E-06			1.30E-01	6.43E-07			3.30E-06	1.36E-06			7.59E-10	3.12E-10			
SVOC	Formaldehyde	50-00-0	B1	1.57E-06									1.3E-02		7.59E-10	3.12E-10	1.3E-02	2.5E+06	2.5E+06
SVOC	Hexachlorobutadiene	87-68-3	C	1.57E-06	7.8E-02	8.2E+01	1.00E-01	4.94E-07	7.8E-02	2.6E+02	2.35E-05	9.67E-06	2.2E-02	4.7E+01	7.59E-10	3.12E-10	2.2E-02	1.5E+06	2.7E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1.57E-06			1.00E-01	4.94E-07			1.19E-05	4.90E-06			7.59E-10	3.12E-10			
SVOC	Hexachloroethane	67-72-1	C	1.57E-06	1.4E-02	4.6E+02	1.00E-01	4.94E-07	1.4E-02	1.4E+03	1.87E-05	7.69E-06	4.0E-03	3.2E+02	7.59E-10	3.12E-10	4.0E-03	8.0E+06	1.7E+02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.57E-07	7.3E-01	8.8E+00	1.30E-01	6.43E-08	7.3E-01	2.1E+01	2.49E-09	1.02E-09	8.9E-02	1.1E+04	7.59E-11	3.12E-11	8.9E-02	3.6E+05	6.2E+00
SVOC	Isophorone	78-59-1	C	1.57E-06	9.5E-04	6.7E+03	1.00E-01	4.94E-07	9.5E-04	2.1E+04	1.96E-05	8.05E-06			7.59E-10	3.12E-10			5.1E+03
SVOC	2-Methylnaphthalene	91-57-6	ID	1.57E-06			1.00E-01	4.94E-07			1.61E-05	6.61E-06			7.59E-10	3.12E-10			
SVOC	Methylphenol (total)	1319-77-3		1.57E-06			1.00E-01	4.94E-07			6.40E-06	2.63E-06			7.59E-10	3.12E-10			
SVOC	Naphthalene	91-20-3	C	1.57E-06			1.30E-01	6.43E-07			3.01E-05	1.24E-05			7.59E-10	3.12E-10			
SVOC	2-Nitroaniline	88-74-4		1.57E-06			1.00E-01	4.94E-07			3.31E-06	1.36E-06			7.59E-10	3.12E-10			
SVOC	Nitrobenzene	98-95-3	D	1.57E-06			1.00E-01	4.94E-07			3.67E-05	1.51E-05			7.59E-10	3.12E-10			
SVOC	2-Nitrophenol	88-75-5		1.57E-06			1.00E-01	4.94E-07			2.02E-05	8.32E-06			7.59E-10	3.12E-10			
SVOC	4-Nitrophenol	100-02-7		1.57E-06			1.00E-01	4.94E-07			1.66E-06	6.84E-07			7.59E-10	3.12E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.57E-06	4.9E-03	1.3E+03	1.00E-01	4.94E-07	4.9E-03	4.1E+03	2.80E-06	1.15E-06			7.59E-10	3.12E-10			9.9E+02
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1.57E-06	7.0E+00	9.1E-01	1.00E-01	4.94E-07	7.0E+00	2.9E+00	1.31E-05	5.40E-06	2.0E+00	9.3E-01	7.59E-10	3.12E-10	2.0E+00	1.6E+04	4.0E-01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1.57E-06	7.0E-02	9.1E+01	1.00E-01	4.94E-07	7.0E-02	2.9E+02	4.03E-05	1.66E-05	1.0E-02	6.0E+01	7.59E-10	3.12E-10	1.0E-02	3.2E+06	3.2E+01
SVOC	Pentachlorophenol	87-86-5	B2	1.57E-06	1.2E-01	5.3E+01	2.50E-01	1.24E-06	1.2E-01	6.7E+01	6.52E-07	2.68E-07	3.4E-02	1.1E+03	7.59E-10	3.12E-10	3.4E-02	9.4E+05	2.9E+01
SVOC	Phenanthrene	85-01-8	D	1.57E-06			1.30E-01	6.43E-07			1.53E-06	6.28E-07			7.59E-10	3.12E-10			
SVOC	Phenol	108-95-2	ID	1.57E-06			1.00E-01	4.94E-07			6.74E-06	2.77E-06			7.59E-10	3.12E-10			
SVOC	Pyrene	129-00-0	D	1.57E-06			1.30E-01	6.43E-07			4.31E-07	1.77E-07			7.59E-10	3.12E-10			

Attachment G9: Risk-Based Cancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	**Chemical**	**CASRN**	**Cancer Class**	**LADD** (mg/kg/d)	**SF_{oral}** $(mg/kg/d)^{-1}$	**RBC** (mg/kg)	**ABS_{derm}**	**LADD** (mg/kg/d)	**SF_{derm}** $(mg/kg/d)^{-1}$	**RBC** (mg/kg)	**C_{air}** (mg/m^3)	**Dose** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)	**C_{air}** (mg/m^3)	**Dose** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)	**Cancer RBC** (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		1.57E-06			1.00E-01	4.94E-07			2.28E-06	9.35E-07			7.59E-10	3.12E-10			
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1.57E-06	1.1E-02	5.8E+02	1.00E-01	4.94E-07	1.1E-02	1.8E+03	6.33E-06	2.60E-06	3.1E-03	1.2E+03	7.59E-10	3.12E-10	3.1E-03	1.0E+07	3.3E+02
PCB	PCBs (total)	1336-36-3	B2	1.57E-06	2.0E+00	3.2E+00	1.40E-01	6.92E-07	2.0E+00	7.2E+00	1.03E-06	4.24E-07	5.7E-01	4.1E+01	7.59E-10	3.12E-10	5.7E-01	5.6E+04	2.1E+00
INORG	Antimony	7440-36-0		1.57E-06											7.59E-10	3.12E-10			
INORG	Arsenic	7440-38-2	A	1.57E-06	1.5E+00	4.3E+00	3.00E-02	1.48E-07	1.5E+00	4.5E+01			4.3E+00		7.59E-10	3.12E-10	4.3E+00	7.5E+03	3.9E+00
INORG	Barium	7440-39-3	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Beryllium	7440-41-7	B1	1.57E-06									2.4E+00		7.59E-10	3.12E-10	2.4E+00	1.3E+04	1.3E+04
INORG	Cadmium	7440-43-9	B1	1.57E-06			1.00E-03	4.94E-09					1.8E+00		7.59E-10	3.12E-10	1.8E+00	1.8E+04	1.8E+04
INORG	Chromium (total)	7440-47-3		1.57E-06									1.2E+01		7.59E-10	3.12E-10	1.2E+01	2.7E+03	2.7E+03
INORG	Chromium III	16065-83-1	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Chromium VI	18540-29-9	A	1.57E-06									1.2E+01		7.59E-10	3.12E-10	1.2E+01	2.7E+03	2.7E+03
INORG	Cobalt	7440-48-4	B1	1.57E-06									2.8E+00		7.59E-10	3.12E-10	2.8E+00	1.1E+04	1.1E+04
INORG	Copper	7440-50-8	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Cyanide (total)	57-12-5	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Fluoride	16984-48-8		1.57E-06											7.59E-10	3.12E-10			
INORG	Lead	7439-92-1	B2	1.57E-06											7.59E-10	3.12E-10			
INORG	Manganese	7439-96-5	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Mercury	7439-97-6	D	1.57E-06							5.31E-06	2.18E-06			7.59E-10	3.12E-10			
INORG	Nickel	7440-02-0	A	1.57E-06									2.4E-01		7.59E-10	3.12E-10	2.4E-01	1.3E+05	1.34E+05
INORG	Selenium	7782-49-2	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Silver	7440-22-4	D	1.57E-06											7.59E-10	3.12E-10			
INORG	Thallium	7440-28-0		1.57E-06											7.59E-10	3.12E-10			
INORG	Vanadium	7440-62-2		1.57E-06											7.59E-10	3.12E-10			
INORG	Zinc	7440-66-6	D	1.57E-06											7.59E-10	3.12E-10			

Notes:

Target cancer risk of 1E-05

C/Q based on the annual maximum exposure for a 1/2 acre source area = 14.53 kg/m3 per (kg/m2-s)

PM10 flux modeled based on average wind speed in Flint

Attachment G9: Risk-Based Noncancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
VOC	Acetone	67-64-1	ID	3.65E-06	9.0E-01	2.5E+05			9.0E-01		1.14E-04	1.09E-04	3.2E+00	2.9E+04	7.59E-10	7.28E-10	3.2E+00	4.3E+09	2.6E+04
VOC	Benzene	71-43-2	A	3.65E-06	4.0E-03	1.1E+03			4.0E-03		5.85E-04	5.61E-04	3.0E-02	5.3E+01	7.59E-10	7.28E-10	3.0E-02	4.1E+07	5.1E+01
VOC	Bromodichloromethane	75-27-4	B2	3.65E-06	2.0E-02	5.5E+03			2.0E-02		1.94E-04	1.86E-04	7.0E-02	3.8E+02	7.59E-10	7.28E-10	7.0E-02	9.6E+07	3.5E+02
VOC	2-Butanone	78-93-3	ID	3.65E-06	6.0E-01	1.6E+05			6.0E-01		1.07E-04	1.03E-04	5.0E+00	4.9E+04	7.59E-10	7.28E-10	5.0E+00	6.9E+09	3.8E+04
VOC	Carbon Disulfide	75-15-0		3.65E-06	1.0E-01	2.7E+04			1.0E-01		1.26E-03	1.20E-03	7.0E-01	5.8E+02	7.59E-10	7.28E-10	7.0E-01	9.6E+08	5.7E+02
VOC	Carbon Tetrachloride	56-23-5	B2	3.65E-06	7.0E-04	1.9E+02			7.0E-04		7.73E-04	7.42E-04			7.59E-10	7.28E-10			
VOC	Chlorobenzene	108-90-7	D	3.65E-06	2.0E-02	5.5E+03			2.0E-02		2.64E-04	2.53E-04	6.0E-02	2.4E+02	7.59E-10	7.28E-10	6.0E-02	8.2E+07	2.3E+02
VOC	Chloroethane	75-00-3		3.65E-06	4.0E-01	1.1E+05			4.0E-01		1.64E-03	1.58E-03	1.0E+01	6.3E+03	7.59E-10	7.28E-10	1.0E+01	1.4E+10	6.0E+03
VOC	Chloroform	67-66-3	B2	3.65E-06	1.0E-02	2.7E+03			1.0E-02		5.92E-04	5.68E-04	5.0E-02	8.8E+01	7.59E-10	7.28E-10	5.0E-02	6.9E+07	8.5E+01
VOC	Chloromethane	74-87-3	D	3.65E-06							9.44E-04	9.05E-04	9.0E-02	9.9E+01	7.59E-10	7.28E-10	9.0E-02	1.2E+08	9.9E+01
VOC	Cumene	98-82-8	D	3.65E-06	1.0E-01	2.7E+04			1.0E-01		2.69E-04	2.58E-04	4.0E-01	1.5E+03	7.59E-10	7.28E-10	4.0E-01	5.5E+08	1.5E+03
VOC	Cyclohexane	110-82-7	ID	3.65E-06							1.01E-03	9.66E-04	6.0E+00	6.2E+03	7.59E-10	7.28E-10	6.0E+00	8.2E+09	6.2E+03
VOC	Dibromochloromethane	124-48-1	C	3.65E-06	2.0E-02	5.5E+03			2.0E-02		1.07E-04	1.02E-04	7.0E-02	6.9E+02	7.59E-10	7.28E-10	7.0E-02	9.6E+07	6.1E+02
VOC	1,2-Dichlorobenzene	95-50-1	D	3.65E-06	9.0E-02	2.5E+04			9.0E-02		1.14E-04	1.10E-04	2.0E-01	1.8E+03	7.59E-10	7.28E-10	2.0E-01	2.7E+08	1.7E+03
VOC	1,3-Dichlorobenzene	541-73-1	D	3.65E-06	9.0E-02	2.5E+04			9.0E-02		1.52E-04	1.46E-04	1.4E-01	9.6E+02	7.59E-10	7.28E-10	1.4E-01	1.9E+08	9.2E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	3.65E-06	3.0E-02	8.2E+03			3.0E-02		1.30E-04	1.25E-04	8.0E-01	6.4E+03	7.59E-10	7.28E-10	8.0E-01	1.1E+09	3.6E+03
VOC	Dichlorodifluoromethane	75-71-8		3.65E-06	2.0E-01	5.5E+04			2.0E-01		1.53E-03	1.46E-03	2.0E-01	1.4E+02	7.59E-10	7.28E-10	2.0E-01	2.7E+08	1.4E+02
VOC	1,1-Dichloroethane	75-34-3	C	3.65E-06	1.0E-01	2.7E+04			1.0E-01		6.40E-04	6.14E-04	5.0E-01	8.1E+02	7.59E-10	7.28E-10	5.0E-01	6.9E+08	7.9E+02
VOC	1,2-Dichloroethane	107-06-2	B2	3.65E-06	2.0E-02	5.5E+03			2.0E-02		3.92E-04	3.76E-04	5.0E-03	1.3E+01	7.59E-10	7.28E-10	5.0E-03	6.9E+06	1.3E+01
VOC	1,1-Dichloroethene	75-35-4	C	3.65E-06	5.0E-02	1.4E+04			5.0E-02		1.07E-03	1.02E-03	2.0E-01	2.0E+02	7.59E-10	7.28E-10	2.0E-01	2.7E+08	1.9E+02
VOC	cis-1,2-Dichloroethene	156-59-2	D	3.65E-06	1.0E-02	2.7E+03			1.0E-02		5.38E-04	5.16E-04	3.5E-02	6.8E+01	7.59E-10	7.28E-10	3.5E-02	4.8E+07	6.6E+01
VOC	trans-1,2-Dichloroethene	156-60-5		3.65E-06	2.0E-02	5.5E+03			2.0E-02		6.76E-04	6.48E-04	6.0E-02	9.2E+01	7.59E-10	7.28E-10	6.0E-02	8.2E+07	9.0E+01
VOC	1,2-Dichloropropane	78-87-5	B2	3.65E-06							4.43E-04	4.25E-04	4.0E-03	9.4E+00	7.59E-10	7.28E-10	4.0E-03	5.5E+06	9.4E+00
VOC	Ethyl Benzene	100-41-4	D	3.65E-06	1.0E-01	2.7E+04			1.0E-01		3.07E-04	2.94E-04	1.0E+00	3.4E+03	7.59E-10	7.28E-10	1.0E+00	1.4E+09	3.0E+03
VOC	2-Hexanone	591-78-6		3.65E-06	4.0E-02	1.1E+04			4.0E-02				5.0E-03		7.59E-10	7.28E-10	5.0E-03	6.9E+06	1.1E+04
VOC	Methyl Acetate	79-20-9		3.65E-06	1.0E+00	2.7E+05			1.0E+00		1.49E-04	1.43E-04	3.5E+00	2.5E+04	7.59E-10	7.28E-10	3.5E+00	4.8E+09	2.2E+04
VOC	Methyl tert-butyl ether	1634-04-4		3.65E-06							3.00E-04	2.88E-04	3.0E+00	1.0E+04	7.59E-10	7.28E-10	3.0E+00	4.1E+09	1.0E+04
VOC	4-Methyl-2-pentanone	108-10-1	ID	3.65E-06							1.40E-04	1.34E-04	3.0E+00	2.2E+04	7.59E-10	7.28E-10	3.0E+00	4.1E+09	2.2E+04
VOC	Methylcyclohexane	108-87-2		3.65E-06							1.34E-03	1.28E-03	3.0E+00	2.3E+03	7.59E-10	7.28E-10	3.0E+00	4.1E+09	2.3E+03
VOC	Methylene Chloride	75-09-2	B2	3.65E-06	6.0E-02	1.6E+04			6.0E-02		6.03E-04	5.78E-04	3.0E+00	5.2E+03	7.59E-10	7.28E-10	3.0E+00	4.1E+09	3.9E+03
VOC	Styrene	100-42-5		3.65E-06	2.0E-01	5.5E+04			2.0E-01		1.25E-04	1.20E-04	1.0E+00	8.3E+03	7.59E-10	7.28E-10	1.0E+00	1.4E+09	7.2E+03
VOC	Tetrachloroethene	127-18-4	C-B2	3.65E-06	1.0E-02	2.7E+03			1.0E-02		6.31E-04	6.05E-04	4.0E-01	6.6E+02	7.59E-10	7.28E-10	4.0E-01	5.5E+08	5.3E+02
VOC	Toluene	108-88-3	D	3.65E-06	8.0E-02	2.2E+04			8.0E-02		4.15E-04	3.98E-04	5.0E+00	1.3E+04	7.59E-10	7.28E-10	5.0E+00	6.9E+09	8.0E+03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	3.65E-06	1.0E-02	2.7E+03			1.0E-02		3.89E-05	3.73E-05	2.0E-01	5.4E+03	7.59E-10	7.28E-10	2.0E-01	2.7E+08	1.8E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	3.65E-06	2.8E-01	7.7E+04			2.8E-01		7.20E-04	6.90E-04	2.2E+00	3.2E+03	7.59E-10	7.28E-10	2.2E+00	3.0E+09	3.1E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	3.65E-06	4.0E-03	1.1E+03			4.0E-03		2.47E-04	2.37E-04			7.59E-10	7.28E-10			
VOC	Trichloroethene	79-01-6	C-B2	3.65E-06	6.0E-03	1.6E+03			6.0E-03		4.99E-04	4.79E-04			7.59E-10	7.28E-10			
VOC	Trichlorofluoromethane	75-69-4		3.65E-06	3.0E-01	8.2E+04			3.0E-01		1.27E-03	1.22E-03	7.0E-01	5.7E+02	7.59E-10	7.28E-10	7.0E-01	9.6E+08	5.7E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		3.65E-06	3.0E+01	8.2E+06			3.0E+01		1.34E-03	1.28E-03	3.0E+01	2.3E+04	7.59E-10	7.28E-10	3.0E+01	4.1E+10	2.3E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	3.65E-06	5.0E-02	1.4E+04			5.0E-02		1.61E-04	1.54E-04	6.0E-03	3.9E+01	7.59E-10	7.28E-10	6.0E-03	8.2E+06	3.9E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	3.65E-06	5.0E-02	1.4E+04			5.0E-02		1.13E-04	1.08E-04	6.0E-03	5.5E+01	7.59E-10	7.28E-10	6.0E-03	8.2E+06	5.5E+01
VOC	Vinyl Chloride	75-01-4	A	3.65E-06	3.0E-03	8.2E+02			3.0E-03		1.40E-03	1.34E-03	1.0E-01	7.5E+01	7.59E-10	7.28E-10	1.0E-01	1.4E+08	6.8E+01
VOC	Xylenes (total)	1330-20-7	ID	3.65E-06	2.0E-01	5.5E+04			2.0E-01		2.84E-04	2.72E-04	1.0E-01	3.7E+02	7.59E-10	7.28E-10	1.0E-01	1.4E+08	3.6E+02
SVOC	Acenaphthene	83-32-9		3.65E-06	6.0E-02	1.6E+04	1.30E-01	1.50E-06	6.0E-02	4.0E+04	7.69E-06	7.37E-06	2.1E-01	2.8E+04	7.59E-10	7.28E-10	2.1E-01	2.9E+08	8.3E+03
SVOC	Acenaphthylene	208-96-8	D	3.65E-06	3.0E-02	8.2E+03	1.30E-01	1.50E-06	3.0E-02	2.0E+04	6.62E-06	6.34E-06	1.1E-01	1.7E+04	7.59E-10	7.28E-10	1.1E-01	1.4E+08	4.3E+03
SVOC	Acetophenone	98-86-2	D	3.65E-06	1.0E-01	2.7E+04	1.00E-01	1.15E-06	1.0E-01	8.7E+04	3.06E-05	2.94E-05	3.5E-01	1.2E+04	7.59E-10	7.28E-10	3.5E-01	4.8E+08	7.6E+03
SVOC	Anthracene	120-12-7	D	3.65E-06	3.0E-01	8.2E+04	1.30E-01	1.50E-06	3.0E-01	2.0E+05	2.15E-06	2.06E-06			7.59E-10	7.28E-10			5.8E+04
SVOC	Atrazine	1912-24-9	C	3.65E-06	3.5E-02	9.6E+03	1.00E-01	1.15E-06	3.5E-02	3.0E+04	7.13E-07	6.84E-07	1.2E-01	1.8E+05	7.59E-10	7.28E-10	1.2E-01	1.7E+08	7.0E+03
SVOC	Benzaldehyde	100-52-7		3.65E-06	1.0E-01	2.7E+04	1.00E-01	1.15E-06	1.0E-01	8.7E+04	4.62E-05	4.43E-05	3.5E-01	7.9E+03	7.59E-10	7.28E-10	3.5E-01	4.8E+08	5.7E+03

Attachment G9: Risk-Based Noncancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	3.65E-06			1.30E-01	1.50E-06			1.68E-07	1.61E-07			7.59E-10	7.28E-10			
SVOC	Benzo(a)pyrene	50-32-8	B2	3.65E-06			1.30E-01	1.50E-06			5.79E-08	5.55E-08			7.59E-10	7.28E-10			
SVOC	Benzo(b)fluoranthene	205-99-2	B2	3.65E-06			1.30E-01	1.50E-06			3.62E-07	3.47E-07			7.59E-10	7.28E-10			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3.65E-06	3.0E-02	8.2E+03	1.30E-01	1.50E-06	3.0E-02	2.0E+04	5.20E-09	4.99E-09	1.1E-01	2.1E+07	7.59E-10	7.28E-10	1.1E-01	1.4E+08	5.8E+03
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3.65E-06			1.30E-01	1.50E-06			3.32E-08	3.18E-08			7.59E-10	7.28E-10			
SVOC	Biphenyl	92-52-4	D	3.65E-06	5.0E-02	1.4E+04	1.00E-01	1.15E-06	5.0E-02	4.3E+04	8.63E-06	8.28E-06	1.8E-01	2.1E+04	7.59E-10	7.28E-10	1.8E-01	2.4E+08	7.0E+03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3.65E-06			1.00E-01	1.15E-06			4.20E-06	4.02E-06			7.59E-10	7.28E-10			
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3.65E-06			1.00E-01	1.15E-06			4.56E-05	4.37E-05			7.59E-10	7.28E-10			
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	3.65E-06	2.0E-02	5.5E+03	1.00E-01	1.15E-06	2.0E-02	1.7E+04	4.73E-09	4.54E-09	7.0E-02	1.5E+07	7.59E-10	7.28E-10	7.0E-02	9.6E+07	4.2E+03
SVOC	Butylbenzylphthalate	85-68-7	C	3.65E-06	2.0E-01	5.5E+04	1.00E-01	1.15E-06	2.0E-01	1.7E+05	1.65E-07	1.58E-07	7.0E-01	4.4E+06	7.59E-10	7.28E-10	7.0E-01	9.6E+08	4.1E+04
SVOC	Caprolactam	105-60-2		3.65E-06	5.0E-01	1.4E+05	1.00E-01	1.15E-06	5.0E-01	4.3E+05	3.39E-06	3.25E-06	1.8E+00	5.4E+05	7.59E-10	7.28E-10	1.8E+00	2.4E+09	8.7E+04
SVOC	Carbazole	86-74-8	B2	3.65E-06			1.00E-01	1.15E-06			2.64E-07	2.53E-07			7.59E-10	7.28E-10			
SVOC	4-Chloro-3-methylphenol	59-50-7		3.65E-06			1.00E-01	1.15E-06			1.27E-06	1.22E-06			7.59E-10	7.28E-10			
SVOC	2-Chloronaphthalene	91-58-7		3.65E-06	8.0E-02	2.2E+04	1.00E-01	1.15E-06	8.0E-02	6.9E+04	9.42E-06	9.03E-06	2.8E-01	3.1E+04	7.59E-10	7.28E-10	2.8E-01	3.8E+08	1.1E+04
SVOC	2-Chlorophenol	95-57-8		3.65E-06	5.0E-03	1.4E+03	1.00E-01	1.15E-06	5.0E-03	4.3E+03	5.55E-05	5.32E-05	1.8E-02	3.3E+02	7.59E-10	7.28E-10	1.8E-02	2.4E+07	2.5E+02
SVOC	Chrysene	218-01-9	B2	3.65E-06			1.30E-01	1.50E-06			6.16E-07	5.91E-07			7.59E-10	7.28E-10			
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	3.65E-06			1.30E-01	1.50E-06			6.63E-09	6.36E-09			7.59E-10	7.28E-10			
SVOC	Dibenzofuran	132-64-9	D	3.65E-06	2.0E-03	5.5E+02	1.00E-01	1.15E-06	2.0E-03	1.7E+03	9.72E-07	9.32E-07	7.0E-03	7.5E+03	7.59E-10	7.28E-10	7.0E-03	9.6E+06	3.9E+02
SVOC	2,4-Dichlorophenol	120-83-2		3.65E-06	3.0E-03	8.2E+02	1.00E-01	1.15E-06	3.0E-03	2.6E+03	6.57E-06	6.30E-06	1.1E-02	1.7E+03	7.59E-10	7.28E-10	1.1E-02	1.4E+07	4.5E+02
SVOC	Diethylphthalate	84-66-2	D	3.65E-06	8.0E-01	2.2E+05	1.00E-01	1.15E-06	8.0E-01	6.9E+05	1.73E-06	1.66E-06	2.8E+00	1.7E+06	7.59E-10	7.28E-10	2.8E+00	3.8E+09	1.5E+05
SVOC	2,4-Dimethylphenol	105-67-9		3.65E-06	2.0E-02	5.5E+03	1.00E-01	1.15E-06	2.0E-02	1.7E+04	5.80E-06	5.56E-06	7.0E-02	1.3E+04	7.59E-10	7.28E-10	7.0E-02	9.6E+07	3.1E+03
SVOC	Dimethylphthalate	131-11-3	D	3.65E-06			1.00E-01	1.15E-06			2.47E-06	2.37E-06			7.59E-10	7.28E-10			
SVOC	Di-n-butylphthalate	84-74-2	D	3.65E-06	1.0E-01	2.7E+04	1.00E-01	1.15E-06	1.0E-01	8.7E+04	8.14E-08	7.80E-08			7.59E-10	7.28E-10			2.1E+04
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3.65E-06	1.0E-04	2.7E+01	1.00E-01	1.15E-06	1.0E-04	8.7E+01	2.57E-06	2.47E-06	3.5E-04	1.4E+02	7.59E-10	7.28E-10	3.5E-04	4.8E+05	1.8E+01
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3.65E-06	2.0E-03	5.5E+02	1.00E-01	1.15E-06	2.0E-03	1.7E+03	3.47E-06	3.32E-06			7.59E-10	7.28E-10			4.2E+02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3.65E-06	1.0E-03	2.7E+02	1.00E-01	1.15E-06	1.0E-03	8.7E+02	4.40E-06	4.22E-06	3.5E-03	8.3E+02	7.59E-10	7.28E-10	3.5E-03	4.8E+06	1.7E+02
SVOC	Di-n-octylphthalate	117-84-0		3.65E-06	4.0E-02	1.1E+04	1.00E-01	1.15E-06	4.0E-02	3.5E+04	2.80E-08	2.68E-08			7.59E-10	7.28E-10			8.3E+03
SVOC	Fluoranthene	206-44-0	D	3.65E-06	4.0E-02	1.1E+04	1.30E-01	1.50E-06	4.0E-02	2.7E+04	5.42E-07	5.20E-07	1.4E-01	2.7E+05	7.59E-10	7.28E-10	1.4E-01	1.9E+08	7.5E+03
SVOC	Fluorene	86-73-7	D	3.65E-06	4.0E-02	1.1E+04	1.30E-01	1.50E-06	4.0E-02	2.7E+04	3.30E-06	3.16E-06	1.4E-01	4.4E+04	7.59E-10	7.28E-10	1.4E-01	1.9E+08	6.6E+03
SVOC	Formaldehyde	50-00-0	B1	3.65E-06	2.0E-01	5.5E+04			2.0E-01						7.59E-10	7.28E-10			
SVOC	Hexachlorobutadiene	87-68-3	C	3.65E-06	2.0E-04	5.5E+01	1.00E-01	1.15E-06	2.0E-04	1.7E+02	2.35E-05	2.26E-05			7.59E-10	7.28E-10			4.2E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	3.65E-06	6.0E-03	1.6E+03	1.00E-01	1.15E-06	6.0E-03	5.2E+03	1.19E-05	1.14E-05	2.0E-04	1.8E+01	7.59E-10	7.28E-10	2.0E-04	2.7E+05	1.7E+01
SVOC	Hexachloroethane	67-72-1	C	3.65E-06	1.0E-03	2.7E+02	1.00E-01	1.15E-06	1.0E-03	8.7E+02	1.87E-05	1.80E-05			7.59E-10	7.28E-10			2.1E+02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.65E-07			1.30E-01	1.50E-07			2.49E-09	2.38E-09			7.59E-11	7.28E-11			
SVOC	Isophorone	78-59-1	C	3.65E-06	2.0E-01	5.5E+04	1.00E-01	1.15E-06	2.0E-01	1.7E+05	1.96E-05	1.88E-05			7.59E-10	7.28E-10			4.2E+04
SVOC	2-Methylnaphthalene	91-57-6	ID	3.65E-06	4.0E-03	1.1E+03	1.00E-01	1.15E-06	4.0E-03	3.5E+03	1.61E-05	1.54E-05	3.0E-03	1.9E+02	7.59E-10	7.28E-10	3.0E-03	4.1E+06	1.6E+02
SVOC	Methylphenol (total)	1319-77-3		3.65E-06	5.0E-02	1.4E+04	1.00E-01	1.15E-06	5.0E-02	4.3E+04	6.40E-06	6.13E-06			7.59E-10	7.28E-10			1.0E+04
SVOC	Naphthalene	91-20-3	C	3.65E-06	2.0E-02	5.5E+03	1.30E-01	1.50E-06	2.0E-02	1.3E+04	3.01E-05	2.89E-05	3.0E-03	1.0E+02	7.59E-10	7.28E-10	3.0E-03	4.1E+06	1.0E+02
SVOC	2-Nitroaniline	88-74-4		3.65E-06	3.0E-03	8.2E+02	1.00E-01	1.15E-06	3.0E-03	2.6E+03	3.31E-06	3.18E-06	2.0E-04	6.3E+01	7.59E-10	7.28E-10	2.0E-04	2.7E+05	5.7E+01
SVOC	Nitrobenzene	98-95-3	D	3.65E-06	5.0E-04	1.4E+02	1.00E-01	1.15E-06	5.0E-04	4.3E+02	3.67E-05	3.52E-05	2.0E-03	5.7E+01	7.59E-10	7.28E-10	2.0E-03	2.7E+06	3.7E+01
SVOC	2-Nitrophenol	88-75-5		3.65E-06			1.00E-01	1.15E-06			2.02E-05	1.94E-05			7.59E-10	7.28E-10			
SVOC	4-Nitrophenol	100-02-7		3.65E-06			1.00E-01	1.15E-06			1.66E-06	1.60E-06			7.59E-10	7.28E-10			
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	3.65E-06	2.0E-02	5.5E+03	1.00E-01	1.15E-06	2.0E-02	1.7E+04	2.80E-06	2.68E-06			7.59E-10	7.28E-10			4.2E+03
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3.65E-06			1.00E-01	1.15E-06			1.31E-05	1.26E-05			7.59E-10	7.28E-10			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3.65E-06	4.0E-02	1.1E+04	1.00E-01	1.15E-06	4.0E-02	3.5E+04	4.03E-05	3.87E-05			7.59E-10	7.28E-10			8.3E+03
SVOC	Pentachlorophenol	87-86-5	B2	3.65E-06	3.0E-02	8.2E+03	2.50E-01	2.88E-06	3.0E-02	1.0E+04	6.52E-07	6.25E-07	1.1E-01	1.7E+05	7.59E-10	7.28E-10	1.1E-01	1.4E+08	4.5E+03
SVOC	Phenanthrene	85-01-8	D	3.65E-06	3.0E-02	8.2E+03	1.30E-01	1.50E-06	3.0E-02	2.0E+04	1.53E-06	1.47E-06	1.1E-01	7.2E+04	7.59E-10	7.28E-10	1.1E-01	1.4E+08	5.4E+03
SVOC	Phenol	108-95-2	ID	3.65E-06	3.0E-01	8.2E+04	1.00E-01	1.15E-06	3.0E-01	2.6E+05	6.74E-06	6.46E-06			7.59E-10	7.28E-10			6.2E+04
SVOC	Pyrene	129-00-0	D	3.65E-06	3.0E-02	8.2E+03	1.30E-01	1.50E-06	3.0E-02	2.0E+04	4.31E-07	4.13E-07	1.1E-01	2.5E+05	7.59E-10	7.28E-10	1.1E-01	1.4E+08	5.7E+03

Attachment G9: Risk-Based Noncancer Criteria for Exposure of Residents to Soil
GMC: NAO Flint Operations Site, Flint, Michigan

				Soil Ingestion			Soil Dermal Contact				Soil Vapor Inhalation				Soil Particulate Inhalation				
Chem Group	Chemical	CASRN	Cancer Class	ADD (mg/kg/d)	RfD_{oral} (mg/kg/d)	RBC (mg/kg)	ABS_{derm}	ADD (mg/kg/d)	RfD_{derm} (mg/kg/d)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	C_{air} (mg/m^3)	Dose (mg/m^3)	RfC (mg/m^3)	RBC (mg/kg)	Noncancer RBC (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		3.65E-06	1.0E-01	2.7E+04	1.00E-01	1.15E-06	1.0E-01	8.7E+04	2.28E-06	2.18E-06			7.59E-10	7.28E-10			2.1E+04
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3.65E-06	1.0E-04	2.7E+01	1.00E-01	1.15E-06	1.0E-04	8.7E+01	6.33E-06	6.07E-06			7.59E-10	7.28E-10			2.1E+01
PCB	PCBs (total)	1336-36-3	B2	3.65E-06	2.0E-05	5.5E+00	1.40E-01	1.61E-06	2.0E-05	1.2E+01	1.03E-06	9.89E-07			7.59E-10	7.28E-10			3.8E+00
INORG	Antimony	7440-36-0		3.65E-06	4.0E-04	1.1E+02			6.0E-05				1.4E-03		7.59E-10	7.28E-10	1.4E-03	1.9E+06	1.1E+02
INORG	Arsenic	7440-38-2	A	3.65E-06	3.0E-04	8.2E+01	3.00E-02	3.46E-07	3.0E-04	8.7E+02					7.59E-10	7.28E-10			7.5E+01
INORG	Barium	7440-39-3	D	3.65E-06	7.0E-02	1.9E+04			4.9E-03						7.59E-10	7.28E-10			
INORG	Beryllium	7440-41-7	B1	3.65E-06	2.0E-03	5.5E+02			1.4E-05				2.0E-05		7.59E-10	7.28E-10	2.0E-05	2.7E+04	5.4E+02
INORG	Cadmium	7440-43-9	B1	3.65E-06	1.0E-03	2.7E+02	1.00E-03	1.15E-08	2.5E-05	2.2E+03			2.0E-04		7.59E-10	7.28E-10	2.0E-04	2.7E+05	2.4E+02
INORG	Chromium (total)	7440-47-3		3.65E-06	3.0E-03	8.2E+02			7.5E-05				1.0E-04		7.59E-10	7.28E-10	1.0E-04	1.4E+05	8.2E+02
INORG	Chromium III	16065-83-1	D	3.65E-06	1.5E+00	4.1E+05			2.0E-02				5.3E+00		7.59E-10	7.28E-10	5.3E+00	7.2E+09	4.1E+05
INORG	Chromium VI	18540-29-9	A	3.65E-06	3.0E-03	8.2E+02			7.5E-05				1.0E-04		7.59E-10	7.28E-10	1.0E-04	1.4E+05	8.2E+02
INORG	Cobalt	7440-48-4	B1	3.65E-06	2.0E-02	5.5E+03			2.0E-02				2.0E-05		7.59E-10	7.28E-10	2.0E-05	2.7E+04	4.6E+03
INORG	Copper	7440-50-8	D	3.65E-06	4.0E-02	1.1E+04			4.0E-02				1.4E-01		7.59E-10	7.28E-10	1.4E-01	1.9E+08	1.1E+04
INORG	Cyanide (total)	57-12-5	D	3.65E-06	2.0E-02	5.5E+03			2.0E-02				7.0E-02		7.59E-10	7.28E-10	7.0E-02	9.6E+07	5.5E+03
INORG	Fluoride	16984-48-8		3.65E-06											7.59E-10	7.28E-10			
INORG	Lead	7439-92-1	B2	3.65E-06											7.59E-10	7.28E-10			
INORG	Manganese	7439-96-5	D	3.65E-06	1.4E-01	3.8E+04			8.4E-03				5.0E-05		7.59E-10	7.28E-10	5.0E-05	6.9E+04	2.5E+04
INORG	Mercury	7439-97-6	D	3.65E-06	3.0E-04	8.2E+01			3.0E-04		5.31E-06	5.09E-06	3.0E-04	5.9E+01	7.59E-10	7.28E-10	3.0E-04	4.1E+05	3.4E+01
INORG	Nickel	7440-02-0	A	3.65E-06	2.0E-02	5.5E+03			8.0E-04						7.59E-10	7.28E-10			
INORG	Selenium	7782-49-2	D	3.65E-06	5.0E-03	1.4E+03			5.0E-03				1.8E-02		7.59E-10	7.28E-10	1.8E-02	2.4E+07	1.4E+03
INORG	Silver	7440-22-4	D	3.65E-06	5.0E-03	1.4E+03			2.0E-04				1.0E-05		7.59E-10	7.28E-10	1.0E-05	1.4E+04	1.2E+03
INORG	Thallium	7440-28-0		3.65E-06	7.0E-05	1.9E+01			7.0E-05				2.5E-04		7.59E-10	7.28E-10	2.5E-04	3.4E+05	1.9E+01
INORG	Vanadium	7440-62-2		3.65E-06	7.0E-03	1.9E+03			1.8E-04				2.5E-02		7.59E-10	7.28E-10	2.5E-02	3.4E+07	1.9E+03
INORG	Zinc	7440-66-6	D	3.65E-06	3.0E-01	8.2E+04			3.0E-01				1.1E+00		7.59E-10	7.28E-10	1.1E+00	1.4E+09	8.2E+04

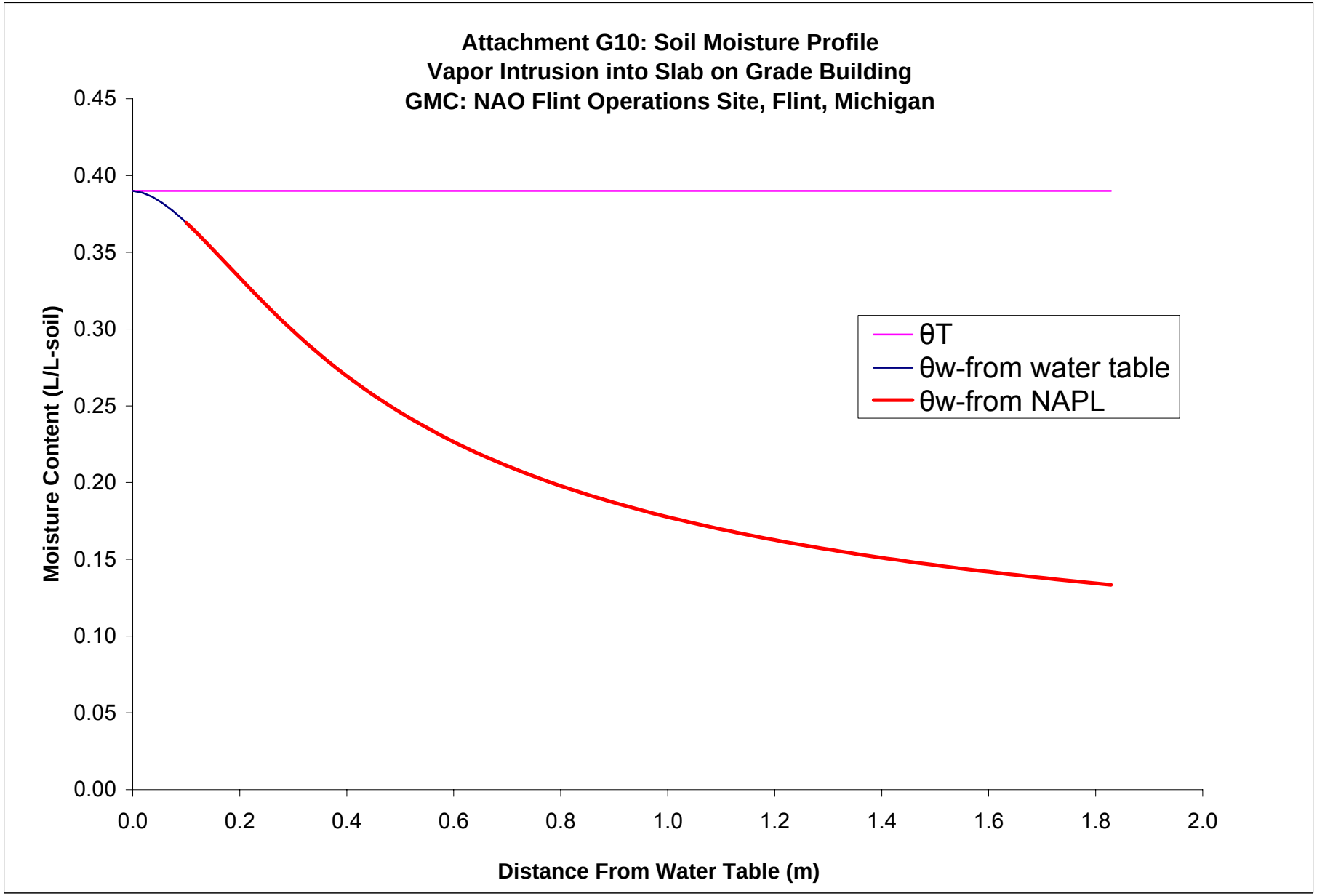
Notes:

Target hazard index of 1

C/Q based on the annual maximum exposure for a 1/2 acre source area = 14.53 kg/m3 per (kg/m2-s)

PM10 flux modeled based on average wind speed in Flint

Attachment G10
Exposure of Residents via Vapor Intrusion
from Soil, Groundwater, and LNAPL


Attachment G10: Soil Moisture Profile
Vapor Intrusion into Slab on Grade Building
GMC: NAO Flint Operations Site, Flint, Michigan
Moisture Content (L/L-soil)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Distance From Water Table (m)
θT
θw-from water table
θw-from NAPL

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
VOC	Acetone	67-64-1	1.07E+00	9.85E-05	7.95E-04	7.17E-02	7.17E-02	2.03E-05	5.81E-01	1.16E-03	9.15E+00	6.73E-04	2.03E-05	1.86E-04
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.14E-01	5.01E-02	5.01E-02	2.03E-05	5.82E+01	1.16E-01	5.19E+02	1.19E-05	1.19E-05	6.16E-03
VOC	Bromodichloromethane	75-27-4	2.57E-01	9.16E-05	3.28E-02	1.70E-02	1.70E-02	2.00E-05	5.51E+01	1.10E-01	1.63E+02	3.77E-05	2.00E-05	3.27E-03
VOC	2-Butanone	78-93-3	6.98E-01	8.47E-05	1.14E-03	4.67E-02	4.67E-02	2.03E-05	2.00E+00	3.99E-03	1.27E+01	4.84E-04	2.03E-05	2.58E-04
VOC	Carbon Disulfide	75-15-0	8.99E-01	8.64E-05	6.20E-01	5.92E-02	5.92E-02	2.03E-05	4.59E+01	9.19E-02	2.27E+03	2.72E-06	2.72E-06	6.16E-03
VOC	Carbon Tetrachloride	56-23-5	6.74E-01	7.60E-05	6.25E-01	4.44E-02	4.44E-02	2.03E-05	1.74E+02	3.48E-01	1.18E+03	5.23E-06	5.23E-06	6.16E-03
VOC	Chlorobenzene	108-90-7	6.31E-01	7.52E-05	7.60E-02	4.16E-02	4.16E-02	2.03E-05	2.20E+02	4.41E-01	1.41E+02	4.36E-05	2.03E-05	2.86E-03
VOC	Chloroethane	75-00-3	2.34E+00	9.94E-05	1.80E-01	1.54E-01	1.54E-01	2.04E-05	1.62E+01	3.25E-02	1.23E+03	4.99E-06	4.99E-06	6.16E-03
VOC	Chloroform	67-66-3	8.99E-01	8.64E-05	7.50E-02	5.92E-02	5.92E-02	2.03E-05	3.97E+01	7.94E-02	4.25E+02	1.45E-05	1.45E-05	6.16E-03
VOC	Chloromethane	74-87-3	1.09E+00	5.62E-05	1.80E-01	7.17E-02	7.17E-02	2.03E-05	3.97E+01	7.94E-02	9.34E+02	6.60E-06	6.60E-06	6.16E-03
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	2.66E-01	3.70E-02	3.70E-02	2.02E-05	7.05E+02	1.41E+00	1.73E+02	3.56E-05	2.02E-05	3.50E-03
VOC	Cyclohexane	110-82-7	7.25E-01	7.86E-05	3.98E+00	4.78E-02	4.78E-02	2.03E-05	6.35E+02	1.27E+00	2.02E+03	3.05E-06	3.05E-06	6.16E-03
VOC	Dibromochloromethane	124-48-1	1.69E-01	9.07E-05	1.61E-02	1.12E-02	1.12E-02	1.98E-05	6.26E+01	1.25E-01	7.52E+01	8.19E-05	1.98E-05	1.49E-03
VOC	1,2-Dichlorobenzene	95-50-1	5.96E-01	6.83E-05	3.90E-02	3.93E-02	3.93E-02	2.03E-05	6.23E+02	1.25E+00	2.91E+01	2.12E-04	2.03E-05	5.90E-04
VOC	1,3-Dichlorobenzene	541-73-1	5.98E-01	6.79E-05	6.33E-02	3.94E-02	3.94E-02	2.03E-05	5.69E+02	1.14E+00	5.14E+01	1.20E-04	2.03E-05	1.04E-03
VOC	1,4-Dichlorobenzene	106-46-7	5.96E-01	6.83E-05	4.98E-02	3.93E-02	3.93E-02	2.03E-05	6.12E+02	1.22E+00	3.78E+01	1.63E-04	2.03E-05	7.66E-04
VOC	Dichlorodifluoromethane	75-71-8	6.91E-01	6.91E-05	7.01E+00	4.55E-02	4.55E-02	2.03E-05	6.15E+01	1.23E-01	5.41E+03	1.14E-06	1.14E-06	6.16E-03
VOC	1,1-Dichloroethane	75-34-3	6.41E-01	9.07E-05	1.15E-01	4.22E-02	4.22E-02	2.03E-05	3.13E+01	6.27E-02	6.92E+02	8.90E-06	8.90E-06	6.16E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.01E-02	5.92E-02	5.92E-02	2.03E-05	1.75E+01	3.50E-02	1.62E+02	3.80E-05	2.03E-05	3.29E-03
VOC	1,1-Dichloroethene	75-35-4	7.78E-01	8.99E-05	5.35E-01	5.12E-02	5.12E-02	2.03E-05	5.82E+01	1.16E-01	1.88E+03	3.28E-06	3.28E-06	6.16E-03
VOC	cis-1,2-Dichloroethene	156-59-2	6.36E-01	9.76E-05	8.35E-02	4.19E-02	4.19E-02	2.03E-05	3.56E+01	7.12E-02	4.92E+02	1.25E-05	1.25E-05	6.16E-03
VOC	trans-1,2-Dichloroethene	156-60-5	6.11E-01	1.03E-04	1.93E-01	4.02E-02	4.02E-02	2.03E-05	5.22E+01	1.04E-01	8.76E+02	7.04E-06	7.04E-06	6.16E-03
VOC	1,2-Dichloropropane	78-87-5	6.76E-01	7.54E-05	5.75E-02	4.45E-02	4.45E-02	2.03E-05	4.35E+01	8.70E-02	3.17E+02	1.94E-05	1.94E-05	6.16E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	1.62E-01	4.27E-02	4.27E-02	2.03E-05	3.67E+02	7.35E-01	1.91E+02	3.22E-05	2.03E-05	3.87E-03
VOC	2-Hexanone	591-78-6			3.58E-02				1.48E+01	2.97E-02	2.96E+02	2.08E-05	2.08E-05	6.16E-03
VOC	Methyl Acetate	79-20-9	8.27E-01	9.50E-05	1.85E-03	5.49E-02	5.49E-02	2.03E-05	1.66E+00	3.33E-03	2.08E+01	2.96E-04	2.03E-05	4.22E-04
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.20E-02	4.90E-02	4.90E-02	2.03E-05	1.15E+01	2.30E-02	1.09E+02	5.67E-05	2.03E-05	2.20E-03
VOC	4-Methyl-2-pentanone	108-10-1	6.48E-01	6.74E-05	2.82E-03	4.29E-02	4.29E-02	2.03E-05	1.05E+01	2.10E-02	2.64E+01	2.34E-04	2.03E-05	5.34E-04
VOC	Methylcyclohexane	108-87-2	6.35E-01	7.36E-05	8.78E+00	4.18E-02	4.18E-02	2.03E-05	2.66E+02	5.33E-01	4.43E+03	1.39E-06	1.39E-06	6.16E-03
VOC	Methylene Chloride	75-09-2	8.73E-01	1.01E-04	4.49E-02	5.75E-02	5.75E-02	2.03E-05	1.17E+01	2.34E-02	3.87E+02	1.59E-05	1.59E-05	6.16E-03
VOC	Styrene	100-42-5	6.13E-01	6.91E-05	5.65E-02	4.04E-02	4.04E-02	2.03E-05	7.77E+02	1.55E+00	3.43E+01	1.80E-04	2.03E-05	6.95E-04
VOC	Tetrachloroethene	127-18-4	6.22E-01	7.08E-05	3.77E-01	4.10E-02	4.10E-02	2.03E-05	1.56E+02	3.12E-01	8.27E+02	7.45E-06	7.45E-06	6.16E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.36E-01	4.95E-02	4.95E-02	2.03E-05	1.80E+02	3.61E-01	2.91E+02	2.12E-05	2.03E-05	5.91E-03
VOC	1,2,4-Trichlorobenzene	120-82-1	2.59E-01	7.11E-05	2.91E-02	1.71E-02	1.71E-02	2.00E-05	1.79E+03	3.59E+00	7.91E+00	7.79E-04	2.00E-05	1.58E-04
VOC	1,1,1-Trichloroethane	71-55-6	6.74E-01	7.60E-05	3.53E-01	4.44E-02	4.44E-02	2.03E-05	1.10E+02	2.20E-01	9.77E+02	6.30E-06	6.30E-06	6.16E-03
VOC	1,1,2-Trichloroethane	79-00-5	6.74E-01	7.60E-05	1.87E-02	4.44E-02	4.44E-02	2.03E-05	5.03E+01	1.01E-01	9.89E+01	6.23E-05	2.03E-05	2.00E-03
VOC	Trichloroethene	79-01-6	6.83E-01	7.86E-05	2.11E-01	4.50E-02	4.50E-02	2.03E-05	1.68E+02	3.35E-01	4.65E+02	1.32E-05	1.32E-05	6.16E-03
VOC	Trichlorofluoromethane	75-69-4	7.52E-01	8.38E-05	1.98E+00	4.95E-02	4.95E-02	2.03E-05	1.21E+02	2.42E-01	3.12E+03	1.97E-06	1.97E-06	6.16E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroet	76-13-1	6.74E-01	7.08E-05	9.83E+00	4.44E-02	4.44E-02	2.03E-05	3.81E+02	7.62E-01	4.14E+03	1.49E-06	1.49E-06	6.16E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.26E-01	3.45E-02	3.45E-02	2.02E-05	8.97E+02	1.79E+00	6.63E+01	9.30E-05	2.02E-05	1.34E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.20E-01	3.43E-02	3.43E-02	2.02E-05	1.76E+03	3.52E+00	3.31E+01	1.86E-04	2.02E-05	6.71E-04
VOC	Vinyl Chloride	75-01-4	9.16E-01	1.06E-04	5.55E-01	6.03E-02	6.03E-02	2.03E-05	1.85E+01	3.69E-02	2.66E+03	2.32E-06	2.32E-06	6.16E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	1.38E-01	4.44E-02	4.44E-02	2.03E-05	3.86E+02	7.71E-01	1.57E+02	3.92E-05	2.03E-05	3.19E-03
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.18E-03	2.42E-02	2.42E-02	2.01E-05	7.14E+03	1.43E+01	2.21E-01	2.78E-02	2.01E-05	4.46E-06
SVOC	Acenaphthylene	208-96-8	3.88E-01	6.03E-05	2.31E-03	2.58E-02	2.58E-02	2.02E-05	7.47E+03	1.49E+01	1.54E-01	4.01E-02	2.02E-05	3.10E-06
SVOC	Acetophenone	98-86-2	6.91E-01	6.91E-05	2.19E-04	4.84E-02	4.84E-02	2.03E-05	3.58E+01	7.15E-02	1.39E+00	4.43E-03	2.03E-05	2.82E-05
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.34E-03	1.89E-02	1.89E-02	2.01E-05	2.97E+04	5.94E+01	2.24E-02	2.75E-01	2.01E-05	4.50E-07
SVOC	Atrazine	1912-24-9	2.24E-01	5.76E-05	1.25E-07	4.20E+00	4.20E+00	5.63E-05	3.68E+02	7.36E-01	1.52E-04	4.05E+01	5.63E-05	8.55E-09

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
SVOC	Benzaldehyde	100-52-7	6.23E-01	7.84E-05	4.86E-04	4.25E-02	4.25E-02	2.03E-05	2.85E+01	5.70E-02	3.41E+00	1.81E-03	2.03E-05	6.91E-05
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	6.85E-05	3.93E-02	3.93E-02	2.03E-05	4.01E+05	8.02E+02	8.54E-05	7.22E+01	2.03E-05	1.73E-09
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	2.32E-05	5.49E-02	5.49E-02	2.03E-05	1.01E+06	2.03E+03	1.14E-05	5.40E+02	2.03E-05	2.32E-10
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	2.28E-03	1.31E-02	1.31E-02	1.99E-05	1.24E+06	2.49E+03	9.14E-04	6.74E+00	1.99E-05	1.82E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	2.88E-06	1.55E-01	1.55E-01	2.04E-05	1.28E+07	2.56E+04	1.13E-07	5.48E+04	2.04E-05	2.29E-12
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.70E-05	3.85E-02	3.85E-02	2.03E-05	1.24E+06	2.49E+03	6.83E-06	9.02E+02	2.03E-05	1.38E-10
SVOC	Biphenyl	92-52-4	3.49E-01	7.04E-05	6.13E-03	2.31E-02	2.31E-02	2.01E-05	1.05E+04	2.10E+01	2.91E-01	2.12E-02	2.01E-05	5.86E-06
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.77E-01	7.31E-05	3.47E-06	2.16E-01	2.16E-01	2.04E-05	1.73E+01	3.47E-02	2.89E-02	2.13E-01	2.04E-05	5.90E-07
SVOC	bis(2-Chloroethyl) ether	111-44-4	5.98E-01	6.51E-05	3.69E-04	4.10E-02	4.10E-02	2.03E-05	1.55E+01	3.10E-02	3.16E+00	1.95E-03	2.03E-05	6.41E-05
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.03E-01	3.16E-05	2.09E-06	1.57E-01	1.57E-01	2.04E-05	1.50E+07	3.00E+04	6.97E-08	8.84E+04	2.04E-05	1.42E-12
SVOC	Butylbenzylphthalate	85-68-7	1.50E-01	4.17E-05	2.59E-05	2.45E-02	2.45E-02	2.01E-05	5.73E+04	1.15E+02	2.25E-04	2.73E+01	2.01E-05	4.54E-09
SVOC	Caprolactam	105-60-2	5.98E-01	7.77E-05	1.03E-07	6.88E+00	6.88E+00	8.49E-05	6.51E-01	1.30E-03	1.19E-03	5.20E+00	8.49E-05	1.01E-07
SVOC	Carbazole	86-74-8	3.37E-01	6.07E-05	3.13E-07	1.78E+00	1.78E+00	3.12E-05	3.38E+03	6.77E+00	4.57E-05	1.35E+02	3.12E-05	1.43E-09
SVOC	4-Chloro-3-methylphenol	59-50-7	5.24E-01	8.22E-05	8.15E-06	1.26E-01	1.26E-01	2.04E-05	1.12E+03	2.23E+00	3.52E-03	1.75E+00	2.04E-05	7.17E-08
SVOC	2-Chloronaphthalene	91-58-7	4.25E-01	7.59E-05	6.42E-03	2.81E-02	2.81E-02	2.02E-05	1.12E+04	2.25E+01	2.85E-01	2.16E-02	2.02E-05	5.75E-06
SVOC	2-Chlorophenol	95-57-8	4.33E-01	8.17E-05	8.00E-03	2.86E-02	2.86E-02	2.02E-05	3.88E+02	7.76E-01	9.27E+00	6.64E-04	2.02E-05	1.87E-04
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.94E-03	1.44E-02	1.44E-02	1.99E-05	4.01E+05	8.02E+02	2.42E-03	2.55E+00	1.99E-05	4.82E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	3.02E-07	1.36E+00	1.36E+00	2.72E-05	3.77E+06	7.54E+03	4.00E-08	1.54E+05	2.72E-05	1.09E-12
SVOC	Dibenzofuran	132-64-9	2.06E-01	5.18E-05	2.57E-04	1.54E-02	1.54E-02	2.00E-05	2.07E+04	4.14E+01	6.21E-03	9.92E-01	2.00E-05	1.24E-07
SVOC	2,4-Dichlorophenol	120-83-2	2.99E-01	7.58E-05	6.50E-05	3.03E-02	3.03E-02	2.02E-05	1.47E+02	2.94E-01	1.71E-01	3.60E-02	2.02E-05	3.46E-06
SVOC	Diethylphthalate	84-66-2	2.21E-01	5.49E-05	9.25E-06	6.84E-02	6.84E-02	2.03E-05	2.87E+02	5.74E-01	1.40E-02	4.39E-01	2.03E-05	2.85E-07
SVOC	2,4-Dimethylphenol	105-67-9	5.05E-01	7.51E-05	4.10E-05	4.99E-02	4.99E-02	2.03E-05	2.09E+02	4.18E-01	8.14E-02	7.57E-02	2.03E-05	1.65E-06
SVOC	Dimethylphthalate	131-11-3	4.91E-01	5.43E-05	2.15E-06	2.62E-01	2.62E-01	2.04E-05	6.89E+01	1.38E-01	9.60E-03	6.42E-01	2.04E-05	1.96E-07
SVOC	Di-n-butylphthalate	84-74-2	3.78E-01	6.79E-05	1.93E-08	3.20E+01	3.20E+01	3.55E-04	3.40E+04	6.81E+01	2.82E-07	2.18E+04	3.55E-04	1.00E-10
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.38E-01	5.97E-05	8.73E-06	7.78E-02	7.78E-02	2.03E-05	1.21E+02	2.43E-01	2.66E-02	2.32E-01	2.03E-05	5.41E-07
SVOC	2,4-Dinitrotoluene	121-14-2	1.75E+00	6.10E-05	1.90E-06	4.07E-01	4.07E-01	2.06E-05	9.46E+01	1.89E-01	6.91E-03	8.91E-01	2.06E-05	1.43E-07
SVOC	2,6-Dinitrotoluene	606-20-2	2.83E-01	6.27E-05	1.53E-05	5.58E-02	5.58E-02	2.03E-05	6.89E+01	1.38E-01	6.85E-02	9.00E-02	2.03E-05	1.39E-06
SVOC	Di-n-octylphthalate	117-84-0	1.30E-01	3.09E-05	1.37E-03	8.80E-03	8.80E-03	1.96E-05	8.38E+07	1.68E+05	8.17E-06	7.54E+02	1.96E-05	1.61E-10
SVOC	Fluoranthene	206-44-0	2.61E-01	5.49E-05	3.30E-04	1.87E-02	1.87E-02	2.01E-05	1.08E+05	2.16E+02	1.53E-03	4.03E+00	2.01E-05	3.06E-08
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.31E-03	2.11E-02	2.11E-02	2.01E-05	1.38E+04	2.75E+01	4.73E-02	1.30E-01	2.01E-05	9.50E-07
SVOC	Formaldehyde	50-00-0	1.56E+00	1.73E-04	6.95E-06	3.28E-01	3.28E-01	2.05E-05					2.05E-05	
SVOC	Hexachlorobutadiene	87-68-3	4.85E-01	5.32E-05	1.67E-01	3.19E-02	3.19E-02	2.02E-05	5.35E+04	1.07E+02	1.56E+00	3.95E-03	2.02E-05	3.15E-05
SVOC	Hexachlorocyclopentadiene	77-47-4	1.39E-01	6.23E-05	5.55E-01	9.16E-03	9.16E-03	1.97E-05	1.99E+05	3.98E+02	1.39E+00	4.42E-03	1.97E-05	2.74E-05
SVOC	Hexachloroethane	67-72-1	2.16E-02	5.88E-05	7.95E-02	1.43E-03	1.43E-03	1.63E-05	1.76E+03	3.52E+00	2.19E+01	2.81E-04	1.63E-05	3.59E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	3.28E-05	2.43E-02	2.43E-02	2.01E-05	3.45E+06	6.89E+03	4.76E-06	1.29E+03	2.01E-05	9.59E-11
SVOC	Isophorone	78-59-1	5.38E-01	5.84E-05	1.36E-04	3.94E-02	3.94E-02	2.03E-05	4.69E+01	9.38E-02	7.58E-01	8.13E-03	2.03E-05	1.54E-05
SVOC	2-Methylnaphthalene	91-57-6	4.18E-01	6.70E-05	1.06E-02	2.76E-02	2.76E-02	2.02E-05	6.23E+03	1.25E+01	8.43E-01	7.30E-03	2.02E-05	1.70E-05
SVOC	Methylphenol (total)	1319-77-3	6.39E-01	8.64E-05	1.77E-05	8.65E-02	8.65E-02	2.04E-05	8.45E+01	1.69E-01	6.94E-02	8.87E-02	2.04E-05	1.41E-06
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	9.90E-03	3.36E-02	3.36E-02	2.02E-05	2.01E+03	4.02E+00	2.41E+00	2.56E-03	2.02E-05	4.88E-05
SVOC	2-Nitroaniline	88-74-4	6.31E-01	6.91E-05	3.27E-06	2.34E-01	2.34E-01	2.04E-05	6.59E+01	1.32E-01	1.50E-02	4.10E-01	2.04E-05	3.07E-07
SVOC	Nitrobenzene	98-95-3	6.57E-01	7.43E-05	4.92E-04	4.46E-02	4.46E-02	2.03E-05	6.44E+01	1.29E-01	2.29E+00	2.69E-03	2.03E-05	4.65E-05
SVOC	2-Nitrophenol	88-75-5	4.66E-01	6.78E-05	1.94E-04	3.39E-02	3.39E-02	2.02E-05	5.75E+01	1.15E-01	9.64E-01	6.39E-03	2.02E-05	1.95E-05
SVOC	4-Nitrophenol	100-02-7	5.40E-01	8.30E-05	8.48E-09	8.89E+01	8.89E+01	9.67E-04	7.55E+01	1.51E-01	3.59E-05	1.72E+02	9.67E-04	3.47E-08
SVOC	N-Nitrosodiphenylamine	86-30-6	2.70E-01	5.49E-05	1.03E-04	2.26E-02	2.26E-02	2.01E-05	1.29E+03	2.58E+00	3.85E-02	1.60E-01	2.01E-05	7.74E-07
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.71E-01	7.06E-05	4.62E-05	4.49E-02	4.49E-02	2.03E-05	2.40E+01	4.80E-02	3.45E-01	1.78E-02	2.03E-05	7.01E-06
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	5.20E-01	5.54E-05	2.39E-03	3.45E-02	3.45E-02	2.02E-05	2.56E+02	5.12E-01	4.00E+00	1.54E-03	2.02E-05	8.08E-05
SVOC	Pentachlorophenol	87-86-5	4.84E-01	5.27E-05	5.00E-07	9.88E-01	9.88E-01	2.39E-05	5.92E+02	1.18E+00	3.94E-04	1.56E+01	2.39E-05	9.43E-09
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	4.76E-04	2.26E-02	2.26E-02	2.01E-05	2.42E+04	4.85E+01	9.81E-03	6.28E-01	2.01E-05	1.97E-07

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Subsurface Soil
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞ (unitless)	K_{oc} (L/kg)	K_d (L/kg)	$C_{s, vap}$ (kg-soil/m^3)	α_{ML} (unitless)	α (unitless)	C_{bldg} (kg-soil/m^3)
SVOC	Phenol	108-95-2	7.08E-01	7.86E-05	8.15E-06	1.34E-01	1.34E-01	2.04E-05	2.88E+01	5.76E-02	5.69E-02	1.08E-01	2.04E-05	1.16E-06
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.26E-04	1.80E-02	1.80E-02	2.00E-05	1.06E+05	2.11E+02	1.07E-03	5.77E+00	2.00E-05	2.14E-08
SVOC	2,4,5-Trichlorophenol	95-95-4	2.51E-01	6.07E-05	8.90E-05	2.28E-02	2.28E-02	2.01E-05	1.60E+03	3.19E+00	2.71E-02	2.27E-01	2.01E-05	5.46E-07
SVOC	2,4,6-Trichlorophenol	88-06-2	2.75E-01	5.40E-05	1.60E-04	2.12E-02	2.12E-02	2.01E-05	3.81E+02	7.62E-01	1.88E-01	3.27E-02	2.01E-05	3.78E-06
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	4.09E-02	1.15E-02	1.15E-02	1.98E-05	2.45E+06	4.91E+03	8.33E-03	7.40E-01	1.98E-05	1.65E-07
INORG	Antimony	7440-36-0								4.50E+01				
INORG	Arsenic	7440-38-2								2.90E+01				
INORG	Barium	7440-39-3								4.10E+01				
INORG	Beryllium	7440-41-7								7.90E+02				
INORG	Cadmium	7440-43-9								7.50E+01				
INORG	Chromium (total)	7440-47-3								1.90E+01				
INORG	Chromium III	16065-83-1								1.80E+06				
INORG	Chromium VI	18540-29-9								1.90E+01				
INORG	Cobalt	7440-48-4								4.50E+01				
INORG	Copper	7440-50-8								3.50E+01				
INORG	Cyanide (total)	57-12-5								9.90E+00				
INORG	Fluoride	16984-48-8												
INORG	Lead	7439-92-1								9.00E+02				
INORG	Manganese	7439-96-5								6.50E+01				
INORG	Mercury	7439-97-6	2.65E-01	5.44E-05	1.45E-01	1.75E-02	1.75E-02	2.00E-05		1.00E+03	1.45E-01	4.25E-02	2.00E-05	2.91E-06
INORG	Nickel	7440-02-0								6.50E+01				
INORG	Selenium	7782-49-2								5.00E+00				
INORG	Silver	7440-22-4								8.30E+00				
INORG	Thallium	7440-28-0								7.10E+01				
INORG	Vanadium	7440-62-2								1.00E+03				
INORG	Zinc	7440-66-6								6.20E+01				
Notes:	**Soil and Building Characteristics**													
	SCS Soil texture class			Loamy Sand										
	Bulk density	kg/L	ρ_b	1.62										
	Total porosity	L/L-soil	θ	0.390										
	Water-filled porosity	L/L-soil	θ_w	0.139										
	Air-filled porosity	L/L-soil	θ_a	0.251										
	Organic carbon fraction	unitless	f_{oc}	0.002										
	Residual saturation	L/L-soil	θ_r	0.0490										
	Hydraulic conductivity	cm/s	K	1.2E-03										
	Dynamic viscosity of water	g/cm-s	μ	0.01307										
	Density of water	g/cm^3	ρ_w	1.0										
	Gravitational acceleration	cm/s^2	g	980.7										
	Intrinsic permeability	cm^2	k	1.62E-08										
	Relative saturation	unitless	S_e	0.263										
	van Genuchten N	unitless	N	1.746										
	van Genuchten M	unitless	M	0.427										
	Relative air permeability	unitless	k_{rg}	0.826										
	Permeability to vapor	cm^2	k_v	1.34E-08										

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Subsurface Soil GMC: NAO Flint Operations Site, Flint, Michigan														
Chem Group	**Chemical**	**CASRN**	**D_{air}** (m^2/d)	**D_{water}** (m^2/d)	**H** (unitless)	**D_{crack}** (m^2/d)	**D_{eff}^T** (m^2/d)	**α_∞** (unitless)	**K_{oc}** (L/kg)	**K_d** (L/kg)	**$C_{s, vap}$** (kg-soil/m^3)	**α_{ML}** (unitless)	**α** (unitless)	**C_{bldg}** (kg-soil/m^3)
	Distance from building foundation to source	m	**L_T**	0.15										
	Bldg foundation thickness	m	**L_{crack}**	0.15										
	Bldg foundation length	m		10.56										
	Bldg foundation width	m		10.56										
	Bldg occupied height	m		4.88										
	Bldg occupied volume	m^3		544.19										
	Occupied depth below ground	m		0.0										
	Bldg area for vapor intrusion	m^2	**A_B**	111.5										
	Ratio of A_{crack} to A_B		**η**	2E-04										
	Area of cracks	m^2	**A_{crack}**	2.11E-02										
	Air exchange rate	$hour^{-1}$	**ac/h**	1.0										
	Building ventilation rate	m^3/d	**Q_{bldg}**	1.31E+04										
	Pressure difference between outdoors-indoors	kg/m-s^2	**ΔP**	1.0										
	Air viscosity	kg/m-s	**μ**	1.8E-05										
	Crack length (bldg perimeter)	m	**X_{crack}**	42.24										
	Crack depth below ground	m	**Z_{crack}**	0.15										
	Crack radius	m	**r_{crack}**	5E-04										
	Soil gas flow rate into bldg	m^3/d	**Q_{soil}**	2.67E-01										
	Averaging period	s	**T**	9.46E+08										
	Contaminant thickness	m	**ΔH**	4.88										

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
VOC	Acetone	67-64-1	ID	1.86E-04		
VOC	Benzene	71-43-2	A	6.16E-03	7.8E-03	5.1E-01
VOC	Bromodichloromethane	75-27-4	B2	3.27E-03	1.8E-02	4.2E-01
VOC	2-Butanone	78-93-3	ID	2.58E-04		
VOC	Carbon Disulfide	75-15-0		6.16E-03		
VOC	Carbon Tetrachloride	56-23-5	B2	6.16E-03	1.5E-02	2.6E-01
VOC	Chlorobenzene	108-90-7	D	2.86E-03		
VOC	Chloroethane	75-00-3		6.16E-03		
VOC	Chloroform	67-66-3	B2	6.16E-03	2.3E-02	1.7E-01
VOC	Chloromethane	74-87-3	D	6.16E-03		
VOC	Cumene	98-82-8	D	3.50E-03		
VOC	Cyclohexane	110-82-7	ID	6.16E-03		
VOC	Dibromochloromethane	124-48-1	C	1.49E-03	2.4E-02	6.8E-01
VOC	1,2-Dichlorobenzene	95-50-1	D	5.90E-04		
VOC	1,3-Dichlorobenzene	541-73-1	D	1.04E-03		
VOC	1,4-Dichlorobenzene	106-46-7	C	7.66E-04	6.3E-03	5.1E+00
VOC	Dichlorodifluoromethane	75-71-8		6.16E-03		
VOC	1,1-Dichloroethane	75-34-3	C	6.16E-03		
VOC	1,2-Dichloroethane	107-06-2	B2	3.29E-03	2.6E-02	2.8E-01
VOC	1,1-Dichloroethene	75-35-4	C	6.16E-03		
VOC	cis-1,2-Dichloroethene	156-59-2	D	6.16E-03		
VOC	trans-1,2-Dichloroethene	156-60-5		6.16E-03		
VOC	1,2-Dichloropropane	78-87-5	B2	6.16E-03		
VOC	Ethyl Benzene	100-41-4	D	3.87E-03		
VOC	2-Hexanone	591-78-6		6.16E-03		
VOC	Methyl Acetate	79-20-9		4.22E-04		
VOC	Methyl tert-butyl ether	1634-04-4		2.20E-03		
VOC	4-Methyl-2-pentanone	108-10-1	ID	5.34E-04		
VOC	Methylcyclohexane	108-87-2		6.16E-03		
VOC	Methylene Chloride	75-09-2	B2	6.16E-03	4.7E-04	8.4E+00
VOC	Styrene	100-42-5		6.95E-04		
VOC	Tetrachloroethene	127-18-4	C-B2	6.16E-03	3.1E-03	1.3E+00
VOC	Toluene	108-88-3	D	5.91E-03		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.58E-04		
VOC	1,1,1-Trichloroethane	71-55-6	D	6.16E-03		
VOC	1,1,2-Trichloroethane	79-00-5	C	2.00E-03	1.6E-02	7.6E-01
VOC	Trichloroethene	79-01-6	C-B2	6.16E-03	1.7E-03	2.3E+00
VOC	Trichlorofluoromethane	75-69-4		6.16E-03		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6.16E-03		
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.34E-03		
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	6.71E-04		
VOC	Vinyl Chloride	75-01-4	A	6.16E-03	8.8E-03	4.5E-01
VOC	Xylenes (total)	1330-20-7	ID	3.19E-03		
SVOC	Acenaphthene	83-32-9		4.46E-06		
SVOC	Acenaphthylene	208-96-8	D	3.10E-06		
SVOC	Acetophenone	98-86-2	D	2.82E-05		
SVOC	Anthracene	120-12-7	D	4.50E-07		
SVOC	Atrazine	1912-24-9	C	8.55E-09	6.3E-02	4.5E+04

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
SVOC	Benzaldehyde	100-52-7		6.91E-05		
SVOC	Benzo(a)anthracene	56-55-3	B2	1.73E-09	8.9E-02	1.6E+05
SVOC	Benzo(a)pyrene	50-32-8	B2	2.32E-10	8.9E-01	1.2E+05
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.82E-08	8.9E-02	1.5E+04
SVOC	Benzo(g,h,i)perylene	191-24-2	D	2.29E-12		
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.38E-10	8.9E-03	2.0E+07
SVOC	Biphenyl	92-52-4	D	5.86E-06		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	5.90E-07		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6.41E-05	3.3E-01	1.1E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.42E-12	4.0E-03	4.3E+09
SVOC	Butylbenzylphthalate	85-68-7	C	4.54E-09	5.4E-04	9.9E+06
SVOC	Caprolactam	105-60-2		1.01E-07		
SVOC	Carbazole	86-74-8	B2	1.43E-09	5.7E-03	3.0E+06
SVOC	4-Chloro-3-methylphenol	59-50-7		7.17E-08		
SVOC	2-Chloronaphthalene	91-58-7		5.75E-06		
SVOC	2-Chlorophenol	95-57-8		1.87E-04		
SVOC	Chrysene	218-01-9	B2	4.82E-08	8.9E-04	5.7E+05
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.09E-12	8.9E-01	2.5E+07
SVOC	Dibenzofuran	132-64-9	D	1.24E-07		
SVOC	2,4-Dichlorophenol	120-83-2		3.46E-06		
SVOC	Diethylphthalate	84-66-2	D	2.85E-07		
SVOC	2,4-Dimethylphenol	105-67-9		1.65E-06		
SVOC	Dimethylphthalate	131-11-3	D	1.96E-07		
SVOC	Di-n-butylphthalate	84-74-2	D	1.00E-10		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		5.41E-07		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.43E-07		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.39E-06	1.9E-01	9.0E+01
SVOC	Di-n-octylphthalate	117-84-0		1.61E-10		
SVOC	Fluoranthene	206-44-0	D	3.06E-08		
SVOC	Fluorene	86-73-7	D	9.50E-07		
SVOC	Formaldehyde	50-00-0	B1		1.3E-02	
SVOC	Hexachlorobutadiene	87-68-3	C	3.15E-05	2.2E-02	3.5E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	2.74E-05		
SVOC	Hexachloroethane	67-72-1	C	3.59E-04	4.0E-03	1.7E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	9.59E-11	8.9E-02	2.9E+06
SVOC	Isophorone	78-59-1	C	1.54E-05		
SVOC	2-Methylnaphthalene	91-57-6	ID	1.70E-05		
SVOC	Methylphenol (total)	1319-77-3		1.41E-06		
SVOC	Naphthalene	91-20-3	C	4.88E-05		
SVOC	2-Nitroaniline	88-74-4		3.07E-07		
SVOC	Nitrobenzene	98-95-3	D	4.65E-05		
SVOC	2-Nitrophenol	88-75-5		1.95E-05		
SVOC	4-Nitrophenol	100-02-7		3.47E-08		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	7.74E-07		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	7.01E-06	2.0E+00	1.7E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	8.08E-05	1.0E-02	3.0E+01
SVOC	Pentachlorophenol	87-86-5	B2	9.43E-09	3.4E-02	7.5E+04
SVOC	Phenanthrene	85-01-8	D	1.97E-07		

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/kg)
SVOC	Phenol	108-95-2	ID	1.16E-06		
SVOC	Pyrene	129-00-0	D	2.14E-08		
SVOC	2,4,5-Trichlorophenol	95-95-4		5.46E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3.78E-06	3.1E-03	2.1E+03
PCB	PCBs (total)	1336-36-3	B2	1.65E-07	5.7E-01	2.6E+02
INORG	Antimony	7440-36-0				
INORG	Arsenic	7440-38-2	A		4.3E+00	
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.4E+00	
INORG	Cadmium	7440-43-9	B1		1.8E+00	
INORG	Chromium (total)	7440-47-3			1.2E+01	
INORG	Chromium III	16065-83-1	D			
INORG	Chromium VI	18540-29-9	A		1.2E+01	
INORG	Cobalt	7440-48-4	B1		2.8E+00	
INORG	Copper	7440-50-8	D			
INORG	Cyanide (total)	57-12-5	D			
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D			
INORG	Mercury	7439-97-6	D	2.91E-06		
INORG	Nickel	7440-02-0	A		2.4E-01	
INORG	Selenium	7782-49-2	D			
INORG	Silver	7440-22-4	D			
INORG	Thallium	7440-28-0				
INORG	Vanadium	7440-62-2				
INORG	Zinc	7440-66-6	D			
Note:						
Target cancer risk of 1E-05						

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air} (mg/m^3)**	**RfC (mg/m^3)**	**RBC (mg/kg)**
VOC	Acetone	67-64-1	ID	1.86E-04	3.2E+00	1.8E+04
VOC	Benzene	71-43-2	A	6.16E-03	3.0E-02	5.1E+00
VOC	Bromodichloromethane	75-27-4	B2	3.27E-03	7.0E-02	2.2E+01
VOC	2-Butanone	78-93-3	ID	2.58E-04	5.0E+00	2.0E+04
VOC	Carbon Disulfide	75-15-0		6.16E-03	7.0E-01	1.2E+02
VOC	Carbon Tetrachloride	56-23-5	B2	6.16E-03		
VOC	Chlorobenzene	108-90-7	D	2.86E-03	6.0E-02	2.2E+01
VOC	Chloroethane	75-00-3		6.16E-03	1.0E+01	1.7E+03
VOC	Chloroform	67-66-3	B2	6.16E-03	5.0E-02	8.5E+00
VOC	Chloromethane	74-87-3	D	6.16E-03	9.0E-02	1.5E+01
VOC	Cumene	98-82-8	D	3.50E-03	4.0E-01	1.2E+02
VOC	Cyclohexane	110-82-7	ID	6.16E-03	6.0E+00	1.0E+03
VOC	Dibromochloromethane	124-48-1	C	1.49E-03	7.0E-02	4.9E+01
VOC	1,2-Dichlorobenzene	95-50-1	D	5.90E-04	2.0E-01	3.5E+02
VOC	1,3-Dichlorobenzene	541-73-1	D	1.04E-03	1.4E-01	1.4E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	7.66E-04	8.0E-01	1.1E+03
VOC	Dichlorodifluoromethane	75-71-8		6.16E-03	2.0E-01	3.4E+01
VOC	1,1-Dichloroethane	75-34-3	C	6.16E-03	5.0E-01	8.5E+01
VOC	1,2-Dichloroethane	107-06-2	B2	3.29E-03	5.0E-03	1.6E+00
VOC	1,1-Dichloroethene	75-35-4	C	6.16E-03	2.0E-01	3.4E+01
VOC	cis-1,2-Dichloroethene	156-59-2	D	6.16E-03	3.5E-02	5.9E+00
VOC	trans-1,2-Dichloroethene	156-60-5		6.16E-03	6.0E-02	1.0E+01
VOC	1,2-Dichloropropane	78-87-5	B2	6.16E-03	4.0E-03	6.8E-01
VOC	Ethyl Benzene	100-41-4	D	3.87E-03	1.0E+00	2.7E+02
VOC	2-Hexanone	591-78-6		6.16E-03	5.0E-03	8.5E-01
VOC	Methyl Acetate	79-20-9		4.22E-04	3.5E+00	8.6E+03
VOC	Methyl tert-butyl ether	1634-04-4		2.20E-03	3.0E+00	1.4E+03
VOC	4-Methyl-2-pentanone	108-10-1	ID	5.34E-04	3.0E+00	5.9E+03
VOC	Methylcyclohexane	108-87-2		6.16E-03	3.0E+00	5.1E+02
VOC	Methylene Chloride	75-09-2	B2	6.16E-03	3.0E+00	5.1E+02
VOC	Styrene	100-42-5		6.95E-04	1.0E+00	1.5E+03
VOC	Tetrachloroethene	127-18-4	C-B2	6.16E-03	4.0E-01	6.8E+01
VOC	Toluene	108-88-3	D	5.91E-03	5.0E+00	8.8E+02
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1.58E-04	2.0E-01	1.3E+03
VOC	1,1,1-Trichloroethane	71-55-6	D	6.16E-03	2.2E+00	3.7E+02
VOC	1,1,2-Trichloroethane	79-00-5	C	2.00E-03		
VOC	Trichloroethene	79-01-6	C-B2	6.16E-03		
VOC	Trichlorofluoromethane	75-69-4		6.16E-03	7.0E-01	1.2E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6.16E-03	3.0E+01	5.1E+03
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.34E-03	6.0E-03	4.7E+00
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	6.71E-04	6.0E-03	9.3E+00
VOC	Vinyl Chloride	75-01-4	A	6.16E-03	1.0E-01	1.7E+01
VOC	Xylenes (total)	1330-20-7	ID	3.19E-03	1.0E-01	3.3E+01
SVOC	Acenaphthene	83-32-9		4.46E-06	2.1E-01	4.9E+04
SVOC	Acenaphthylene	208-96-8	D	3.10E-06	1.1E-01	3.5E+04
SVOC	Acetophenone	98-86-2	D	2.82E-05	3.5E-01	1.3E+04
SVOC	Anthracene	120-12-7	D	4.50E-07		
SVOC	Atrazine	1912-24-9	C	8.55E-09	1.2E-01	1.5E+07
SVOC	Benzaldehyde	100-52-7		6.91E-05	3.5E-01	5.3E+03

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/kg)
SVOC	Benzo(a)anthracene	56-55-3	B2	1.73E-09		
SVOC	Benzo(a)pyrene	50-32-8	B2	2.32E-10		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.82E-08		
SVOC	Benzo(g,h,i)perylene	191-24-2	D	2.29E-12	1.1E-01	4.8E+10
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.38E-10		
SVOC	Biphenyl	92-52-4	D	5.86E-06	1.8E-01	3.1E+04
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	5.90E-07		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6.41E-05		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.42E-12	7.0E-02	5.1E+10
SVOC	Butylbenzylphthalate	85-68-7	C	4.54E-09	7.0E-01	1.6E+08
SVOC	Caprolactam	105-60-2		1.01E-07	1.8E+00	1.8E+07
SVOC	Carbazole	86-74-8	B2	1.43E-09		
SVOC	4-Chloro-3-methylphenol	59-50-7		7.17E-08		
SVOC	2-Chloronaphthalene	91-58-7		5.75E-06	2.8E-01	5.1E+04
SVOC	2-Chlorophenol	95-57-8		1.87E-04	1.8E-02	9.7E+01
SVOC	Chrysene	218-01-9	B2	4.82E-08		
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.09E-12		
SVOC	Dibenzofuran	132-64-9	D	1.24E-07	7.0E-03	5.9E+04
SVOC	2,4-Dichlorophenol	120-83-2		3.46E-06	1.1E-02	3.2E+03
SVOC	Diethylphthalate	84-66-2	D	2.85E-07	2.8E+00	1.0E+07
SVOC	2,4-Dimethylphenol	105-67-9		1.65E-06	7.0E-02	4.4E+04
SVOC	Dimethylphthalate	131-11-3	D	1.96E-07		
SVOC	Di-n-butylphthalate	84-74-2	D	1.00E-10		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		5.41E-07	3.5E-04	6.8E+02
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1.43E-07		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1.39E-06	3.5E-03	2.6E+03
SVOC	Di-n-octylphthalate	117-84-0		1.61E-10		
SVOC	Fluoranthene	206-44-0	D	3.06E-08	1.4E-01	4.8E+06
SVOC	Fluorene	86-73-7	D	9.50E-07	1.4E-01	1.5E+05
SVOC	Formaldehyde	50-00-0	B1			
SVOC	Hexachlorobutadiene	87-68-3	C	3.15E-05		
SVOC	Hexachlorocyclopentadiene	77-47-4	E	2.74E-05	2.0E-04	7.6E+00
SVOC	Hexachloroethane	67-72-1	C	3.59E-04		
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	9.59E-11		
SVOC	Isophorone	78-59-1	C	1.54E-05		
SVOC	2-Methylnaphthalene	91-57-6	ID	1.70E-05	3.0E-03	1.8E+02
SVOC	Methylphenol (total)	1319-77-3		1.41E-06		
SVOC	Naphthalene	91-20-3	C	4.88E-05	3.0E-03	6.4E+01
SVOC	2-Nitroaniline	88-74-4		3.07E-07	2.0E-04	6.8E+02
SVOC	Nitrobenzene	98-95-3	D	4.65E-05	2.0E-03	4.5E+01
SVOC	2-Nitrophenol	88-75-5		1.95E-05		
SVOC	4-Nitrophenol	100-02-7		3.47E-08		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	7.74E-07		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	7.01E-06		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	8.08E-05		
SVOC	Pentachlorophenol	87-86-5	B2	9.43E-09	1.1E-01	1.2E+07
SVOC	Phenanthrene	85-01-8	D	1.97E-07	1.1E-01	5.5E+05
SVOC	Phenol	108-95-2	ID	1.16E-06		
SVOC	Pyrene	129-00-0	D	2.14E-08	1.1E-01	5.1E+06

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Soil Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/kg)
SVOC	2,4,5-Trichlorophenol	95-95-4		5.46E-07		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3.78E-06		
PCB	PCBs (total)	1336-36-3	B2	1.65E-07		
INORG	Antimony	7440-36-0			1.4E-03	
INORG	Arsenic	7440-38-2	A			
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.0E-05	
INORG	Cadmium	7440-43-9	B1		2.0E-04	
INORG	Chromium (total)	7440-47-3			1.0E-04	
INORG	Chromium III	16065-83-1	D		5.3E+00	
INORG	Chromium VI	18540-29-9	A		1.0E-04	
INORG	Cobalt	7440-48-4	B1		2.0E-05	
INORG	Copper	7440-50-8	D		1.4E-01	
INORG	Cyanide (total)	57-12-5	D		7.0E-02	
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D		5.0E-05	
INORG	Mercury	7439-97-6	D	2.91E-06	3.0E-04	1.1E+02
INORG	Nickel	7440-02-0	A			
INORG	Selenium	7782-49-2	D		1.8E-02	
INORG	Silver	7440-22-4	D		1.0E-05	
INORG	Thallium	7440-28-0			2.5E-04	
INORG	Vanadium	7440-62-2			2.5E-02	
INORG	Zinc	7440-66-6	D		1.1E+00	
Note:						
Target hazard quotient of 1						

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
VOC	Acetone	67-64-1	1.07E+00	9.85E-05	7.95E-04	7.17E-02	3.12E-02	1.81E-05	1.44E-05
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.14E-01	5.01E-02	1.52E-03	5.61E-06	6.39E-04
VOC	Bromodichloromethane	75-27-4	2.57E-01	9.16E-05	3.28E-02	1.70E-02	2.36E-03	7.57E-06	2.48E-04
VOC	2-Butanone	78-93-3	6.98E-01	8.47E-05	1.14E-03	4.67E-02	1.96E-02	1.70E-05	1.94E-05
VOC	Carbon Disulfide	75-15-0	8.99E-01	8.64E-05	6.20E-01	5.92E-02	4.68E-04	2.13E-06	1.32E-03
VOC	Carbon Tetrachloride	56-23-5	6.74E-01	7.60E-05	6.25E-01	4.44E-02	3.94E-04	1.82E-06	1.14E-03
VOC	Chlorobenzene	108-90-7	6.31E-01	7.52E-05	7.60E-02	4.16E-02	1.74E-03	6.18E-06	4.70E-04
VOC	Chloroethane	75-00-3	2.34E+00	9.94E-05	1.80E-01	1.54E-01	1.67E-03	6.00E-06	1.08E-03
VOC	Chloroform	67-66-3	8.99E-01	8.64E-05	7.50E-02	5.92E-02	2.17E-03	7.16E-06	5.37E-04
VOC	Chloromethane	74-87-3	1.09E+00	5.62E-05	1.80E-01	7.17E-02	8.98E-04	3.73E-06	6.73E-04
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	2.66E-01	3.70E-02	6.04E-04	2.67E-06	7.10E-04
VOC	Cyclohexane	110-82-7	7.25E-01	7.86E-05	3.98E+00	4.78E-02	9.88E-05	4.91E-07	1.96E-03
VOC	Dibromochloromethane	124-48-1	1.69E-01	9.07E-05	1.61E-02	1.12E-02	2.80E-03	8.39E-06	1.35E-04
VOC	1,2-Dichlorobenzene	95-50-1	5.96E-01	6.83E-05	3.90E-02	3.93E-02	2.49E-03	7.83E-06	3.05E-04
VOC	1,3-Dichlorobenzene	541-73-1	5.98E-01	6.79E-05	6.33E-02	3.94E-02	1.81E-03	6.34E-06	4.02E-04
VOC	1,4-Dichlorobenzene	106-46-7	5.96E-01	6.83E-05	4.98E-02	3.93E-02	2.13E-03	7.07E-06	3.52E-04
VOC	Dichlorodifluoromethane	75-71-8	6.91E-01	6.91E-05	7.01E+00	4.55E-02	5.68E-05	2.85E-07	2.00E-03
VOC	1,1-Dichloroethane	75-34-3	6.41E-01	9.07E-05	1.15E-01	4.22E-02	1.50E-03	5.56E-06	6.40E-04
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.01E-02	5.92E-02	5.08E-03	1.14E-05	2.29E-04
VOC	1,1-Dichloroethene	75-35-4	7.78E-01	8.99E-05	5.35E-01	5.12E-02	5.20E-04	2.34E-06	1.25E-03
VOC	cis-1,2-Dichloroethene	156-59-2	6.36E-01	9.76E-05	8.35E-02	4.19E-02	1.96E-03	6.69E-06	5.59E-04
VOC	trans-1,2-Dichloroethene	156-60-5	6.11E-01	1.03E-04	1.93E-01	4.02E-02	1.13E-03	4.48E-06	8.63E-04
VOC	1,2-Dichloropropane	78-87-5	6.76E-01	7.54E-05	5.75E-02	4.45E-02	2.16E-03	7.14E-06	4.10E-04
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	1.62E-01	4.27E-02	9.64E-04	3.96E-06	6.39E-04
VOC	2-Hexanone	591-78-6			3.58E-02				
VOC	Methyl Acetate	79-20-9	8.27E-01	9.50E-05	1.85E-03	5.49E-02	1.83E-02	1.68E-05	3.11E-05
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.20E-02	4.90E-02	6.44E-03	1.26E-05	1.51E-04
VOC	4-Methyl-2-pentanone	108-10-1	6.48E-01	6.74E-05	2.82E-03	4.29E-02	1.12E-02	1.51E-05	4.25E-05
VOC	Methylcyclohexane	108-87-2	6.35E-01	7.36E-05	8.78E+00	4.18E-02	4.91E-05	2.47E-07	2.16E-03
VOC	Methylene Chloride	75-09-2	8.73E-01	1.01E-04	4.49E-02	5.75E-02	3.36E-03	9.30E-06	4.18E-04
VOC	Styrene	100-42-5	6.13E-01	6.91E-05	5.65E-02	4.04E-02	1.99E-03	6.77E-06	3.83E-04
VOC	Tetrachloroethene	127-18-4	6.22E-01	7.08E-05	3.77E-01	4.10E-02	5.34E-04	2.40E-06	9.04E-04
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.36E-01	4.95E-02	1.22E-03	4.76E-06	6.47E-04

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
VOC	1,2,4-Trichlorobenzene	120-82-1	2.59E-01	7.11E-05	2.91E-02	1.71E-02	2.20E-03	7.23E-06	2.10E-04
VOC	1,1,1-Trichloroethane	71-55-6	6.74E-01	7.60E-05	3.53E-01	4.44E-02	6.04E-04	2.67E-06	9.41E-04
VOC	1,1,2-Trichloroethane	79-00-5	6.74E-01	7.60E-05	1.87E-02	4.44E-02	4.40E-03	1.07E-05	2.00E-04
VOC	Trichloroethene	79-01-6	6.83E-01	7.86E-05	2.11E-01	4.50E-02	9.02E-04	3.75E-06	7.91E-04
VOC	Trichlorofluoromethane	75-69-4	7.52E-01	8.38E-05	1.98E+00	4.95E-02	1.80E-04	8.78E-07	1.74E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.74E-01	7.08E-05	9.83E+00	4.44E-02	4.41E-05	2.22E-07	2.18E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.26E-01	3.45E-02	1.09E-03	4.36E-06	5.49E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.20E-01	3.43E-02	1.20E-03	4.69E-06	5.64E-04
VOC	Vinyl Chloride	75-01-4	9.16E-01	1.06E-04	5.55E-01	6.03E-02	5.98E-04	2.65E-06	1.47E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	1.38E-01	4.44E-02	1.18E-03	4.65E-06	6.41E-04
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.18E-03	2.42E-02	7.77E-03	1.35E-05	4.28E-05
SVOC	Acenaphthylene	208-96-8	3.88E-01	6.03E-05	2.31E-03	2.58E-02	8.90E-03	1.41E-05	3.25E-05
SVOC	Acetophenone	98-86-2	6.91E-01	6.91E-05	2.19E-04	4.84E-02	3.61E-02	1.84E-05	4.02E-06
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.34E-03	1.89E-02	9.82E-03	1.45E-05	1.94E-05
SVOC	Atrazine	1912-24-9	2.24E-01	5.76E-05	1.25E-07	4.20E+00	1.07E+01	5.62E-05	7.02E-09
SVOC	Benzaldehyde	100-52-7	6.23E-01	7.84E-05	4.86E-04	4.25E-02	2.55E-02	1.77E-05	8.59E-06
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	6.85E-05	3.93E-02	5.37E-02	1.90E-05	1.30E-06
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	2.32E-05	5.49E-02	1.05E-01	1.97E-05	4.56E-07
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	2.28E-03	1.31E-02	5.53E-03	1.18E-05	2.69E-05
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	2.88E-06	1.55E-01	3.80E-01	2.02E-05	5.83E-08
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.70E-05	3.85E-02	8.03E-02	1.95E-05	3.31E-07
SVOC	Biphenyl	92-52-4	3.49E-01	7.04E-05	6.13E-03	2.31E-02	5.73E-03	1.20E-05	7.36E-05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	3.77E-01	7.31E-05	3.47E-06	2.16E-01	5.17E-01	2.03E-05	7.05E-08
SVOC	bis(2-Chloroethyl) ether	111-44-4	5.98E-01	6.51E-05	3.69E-04	4.10E-02	2.59E-02	1.77E-05	6.53E-06
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.03E-01	3.16E-05	2.09E-06	1.57E-01	3.74E-01	2.02E-05	4.23E-08
SVOC	Butylbenzylphthalate	85-68-7	1.50E-01	4.17E-05	2.59E-05	2.45E-02	4.86E-02	1.89E-05	4.88E-07
SVOC	Caprolactam	105-60-2	5.98E-01	7.77E-05	1.03E-07	6.88E+00	1.75E+01	8.48E-05	8.73E-09
SVOC	Carbazole	86-74-8	3.37E-01	6.07E-05	3.13E-07	1.78E+00	4.51E+00	3.12E-05	9.76E-09
SVOC	4-Chloro-3-methylphenol	59-50-7	5.24E-01	8.22E-05	8.15E-06	1.26E-01	2.74E-01	2.01E-05	1.64E-07
SVOC	2-Chloronaphthalene	91-58-7	4.25E-01	7.59E-05	6.42E-03	2.81E-02	6.42E-03	1.26E-05	8.07E-05
SVOC	2-Chlorophenol	95-57-8	4.33E-01	8.17E-05	8.00E-03	2.86E-02	6.02E-03	1.23E-05	9.81E-05
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.94E-03	1.44E-02	6.54E-03	1.27E-05	2.46E-05
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	3.02E-07	1.36E+00	3.44E+00	2.71E-05	8.18E-09

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
SVOC	Dibenzofuran	132-64-9	2.06E-01	5.18E-05	2.57E-04	1.54E-02	1.51E-02	1.62E-05	4.16E-06
SVOC	2,4-Dichlorophenol	120-83-2	2.99E-01	7.58E-05	6.50E-05	3.03E-02	4.69E-02	1.88E-05	1.22E-06
SVOC	Diethylphthalate	84-66-2	2.21E-01	5.49E-05	9.25E-06	6.84E-02	1.55E-01	1.99E-05	1.84E-07
SVOC	2,4-Dimethylphenol	105-67-9	5.05E-01	7.51E-05	4.10E-05	4.99E-02	7.56E-02	1.94E-05	7.96E-07
SVOC	Dimethylphthalate	131-11-3	4.91E-01	5.43E-05	2.15E-06	2.62E-01	6.25E-01	2.03E-05	4.36E-08
SVOC	Di-n-butylphthalate	84-74-2	3.78E-01	6.79E-05	1.93E-08	3.20E+01	8.16E+01	3.55E-04	6.84E-09
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	2.38E-01	5.97E-05	8.73E-06	7.78E-02	1.77E-01	2.00E-05	1.74E-07
SVOC	2,4-Dinitrotoluene	121-14-2	1.75E+00	6.10E-05	1.90E-06	4.07E-01	8.78E-01	2.05E-05	3.90E-08
SVOC	2,6-Dinitrotoluene	606-20-2	2.83E-01	6.27E-05	1.53E-05	5.58E-02	1.16E-01	1.98E-05	3.02E-07
SVOC	Di-n-octylphthalate	117-84-0	1.30E-01	3.09E-05	1.37E-03	8.80E-03	4.51E-03	1.08E-05	1.48E-05
SVOC	Fluoranthene	206-44-0	2.61E-01	5.49E-05	3.30E-04	1.87E-02	1.58E-02	1.63E-05	5.38E-06
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.31E-03	2.11E-02	1.07E-02	1.48E-05	1.94E-05
SVOC	Formaldehyde	50-00-0	1.56E+00	1.73E-04	6.95E-06	3.28E-01	6.95E-01	2.04E-05	1.42E-07
SVOC	Hexachlorobutadiene	87-68-3	4.85E-01	5.32E-05	1.67E-01	3.19E-02	7.32E-04	3.15E-06	5.26E-04
SVOC	Hexachlorocyclopentadiene	77-47-4	1.39E-01	6.23E-05	5.55E-01	9.16E-03	2.43E-04	1.17E-06	6.47E-04
SVOC	Hexachloroethane	67-72-1	2.16E-02	5.88E-05	7.95E-02	1.43E-03	3.61E-04	1.69E-06	1.34E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	3.28E-05	2.43E-02	4.66E-02	1.88E-05	6.17E-07
SVOC	Isophorone	78-59-1	5.38E-01	5.84E-05	1.36E-04	3.94E-02	3.60E-02	1.84E-05	2.50E-06
SVOC	2-Methylnaphthalene	91-57-6	4.18E-01	6.70E-05	1.06E-02	2.76E-02	4.61E-03	1.09E-05	1.16E-04
SVOC	Methylphenol (total)	1319-77-3	6.39E-01	8.64E-05	1.77E-05	8.65E-02	1.59E-01	1.99E-05	3.52E-07
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	9.90E-03	3.36E-02	5.14E-03	1.15E-05	1.14E-04
SVOC	2-Nitroaniline	88-74-4	6.31E-01	6.91E-05	3.27E-06	2.34E-01	5.39E-01	2.03E-05	6.63E-08
SVOC	Nitrobenzene	98-95-3	6.57E-01	7.43E-05	4.92E-04	4.46E-02	2.56E-02	1.77E-05	8.69E-06
SVOC	2-Nitrophenol	88-75-5	4.66E-01	6.78E-05	1.94E-04	3.39E-02	3.03E-02	1.81E-05	3.49E-06
SVOC	4-Nitrophenol	100-02-7	5.40E-01	8.30E-05	8.48E-09	8.89E+01	2.26E+02	9.66E-04	8.20E-09
SVOC	N-Nitrosodiphenylamine	86-30-6	2.70E-01	5.49E-05	1.03E-04	2.26E-02	2.84E-02	1.79E-05	1.84E-06
SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.71E-01	7.06E-05	4.62E-05	4.49E-02	6.59E-02	1.93E-05	8.89E-07
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	5.20E-01	5.54E-05	2.39E-03	3.45E-02	9.87E-03	1.45E-05	3.47E-05
SVOC	Pentachlorophenol	87-86-5	4.84E-01	5.27E-05	5.00E-07	9.88E-01	2.48E+00	2.39E-05	1.20E-08
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	4.76E-04	2.26E-02	1.63E-02	1.64E-05	7.81E-06
SVOC	Phenol	108-95-2	7.08E-01	7.86E-05	8.15E-06	1.34E-01	2.77E-01	2.02E-05	1.64E-07
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.26E-04	1.80E-02	1.89E-02	1.69E-05	3.80E-06
SVOC	2,4,5-Trichlorophenol	95-95-4	2.51E-01	6.07E-05	8.90E-05	2.28E-02	3.16E-02	1.81E-05	1.61E-06

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Groundwater
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞	C_{bldg} (L-water/m^3)
SVOC	2,4,6-Trichlorophenol	88-06-2	2.75E-01	5.40E-05	1.60E-04	2.12E-02	2.26E-02	1.74E-05	2.77E-06
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	4.09E-02	1.15E-02	1.14E-03	4.53E-06	1.85E-04
INORG	Antimony	7440-36-0							
INORG	Arsenic	7440-38-2							
INORG	Barium	7440-39-3							
INORG	Beryllium	7440-41-7							
INORG	Cadmium	7440-43-9							
INORG	Chromium (total)	7440-47-3							
INORG	Chromium III	16065-83-1							
INORG	Chromium VI	18540-29-9							
INORG	Cobalt	7440-48-4							
INORG	Copper	7440-50-8							
INORG	Cyanide (total)	57-12-5							
INORG	Fluoride	16984-48-8							
INORG	Lead	7439-92-1							
INORG	Manganese	7439-96-5							
INORG	Mercury	7439-97-6	2.65E-01	5.44E-05	1.45E-01	1.75E-02	6.84E-04	2.97E-06	4.31E-04
INORG	Nickel	7440-02-0							
INORG	Selenium	7782-49-2							
INORG	Silver	7440-22-4							
INORG	Thallium	7440-28-0							
INORG	Vanadium	7440-62-2							
INORG	Zinc	7440-66-6							
Notes:	**Crack Soil and Building Characteristics**								
	SCS Soil texture class	Loamy Sand							
	Bulk density	kg/L	ρ_b	1.62					
	Total porosity	L/L-soil	θ	0.390					
	Water-filled porosity	L/L-soil	θ_w	0.139					
	Air-filled porosity	L/L-soil	θ_a	0.251					
	Residual saturation	L/L-soil	θ_r	0.049					

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from Groundwater GMC: NAO Flint Operations Site, Flint, Michigan									
Chem Group	**Chemical**	**CASRN**	**D_{air}** (m^2/d)	**D_{water}** (m^2/d)	**H** (unitless)	**D_{crack}** (m^2/d)	**D_{eff}^T** (m^2/d)	**α_∞**	**C_{bldg}** (L-water/m^3)
	Hydraulic conductivity	cm/s	**K**	1.2E-03					
	Dynamic viscosity of water	g/cm-s	**μ**	0.01307					
	Density of water	g/cm^3	**ρ_w**	1.0					
	Gravitational acceleration	cm/s^2	**g**	980.7					
	Intrinsic permeability	cm^2	**k**	1.6E-08					
	Relative saturation	unitless	**S_e**	0.263					
	van Genuchten N	unitless	**N**	1.746					
	van Genuchten M	unitless	**M**	0.427					
	Relative air permeability	unitless	**k_{rg}**	0.826					
	Permeability to vapor	cm^2	**k_v**	1.3E-08					
	Distance from building foundation to source	m	**L_T**	1.68					
	Bldg foundation thickness	m	**L_{crack}**	0.15					
	Bldg foundation length	m		10.56					
	Bldg foundation width	m		10.56					
	Bldg occupied height	m		4.88					
	Bldg occupied volume	m^3		544.19					
	Occupied depth below ground	m		0.0					
	Bldg area for vapor intrusion	m^2	**A_B**	111.5					
	Ratio of A_{crack} to A_B		**η**	2E-04					
	Area of cracks	m^2	**A_{crack}**	2.11E-02					
	Air exchange rate	$hour^{-1}$	**ac/h**	1.0					
	Building ventilation rate	m^3/d	**Q_{bldg}**	1.31E+04					
	Pressure difference between outdoors-indoors	$kg/m\text{-}s^2$	**ΔP**	1.0					
	Air viscosity	kg/m-s	**μ**	1.8E-05					
	Crack length (bldg perimeter)	m	**X_{crack}**	42.24					
	Crack depth below ground	m	**Z_{crack}**	0.15					
	Crack radius	m	**r_{crack}**	5E-04					
	Soil gas flow rate into bldg	m^3/d	**Q_{soil}**	2.67E-01					

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Groundwater Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
VOC	Acetone	67-64-1	ID	1.44E-05		
VOC	Benzene	71-43-2	A	6.39E-04	7.8E-03	4.9E+00
VOC	Bromodichloromethane	75-27-4	B2	2.48E-04	1.8E-02	5.5E+00
VOC	2-Butanone	78-93-3	ID	1.94E-05		
VOC	Carbon Disulfide	75-15-0		1.32E-03		
VOC	Carbon Tetrachloride	56-23-5	B2	1.14E-03	1.5E-02	1.4E+00
VOC	Chlorobenzene	108-90-7	D	4.70E-04		
VOC	Chloroethane	75-00-3		1.08E-03		
VOC	Chloroform	67-66-3	B2	5.37E-04	2.3E-02	2.0E+00
VOC	Chloromethane	74-87-3	D	6.73E-04		
VOC	Cumene	98-82-8	D	7.10E-04		
VOC	Cyclohexane	110-82-7	ID	1.96E-03		
VOC	Dibromochloromethane	124-48-1	C	1.35E-04	2.4E-02	7.5E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	3.05E-04		
VOC	1,3-Dichlorobenzene	541-73-1	D	4.02E-04		
VOC	1,4-Dichlorobenzene	106-46-7	C	3.52E-04	6.3E-03	1.1E+01
VOC	Dichlorodifluoromethane	75-71-8		2.00E-03		
VOC	1,1-Dichloroethane	75-34-3	C	6.40E-04		
VOC	1,2-Dichloroethane	107-06-2	B2	2.29E-04	2.6E-02	4.1E+00
VOC	1,1-Dichloroethene	75-35-4	C	1.25E-03		
VOC	cis-1,2-Dichloroethene	156-59-2	D	5.59E-04		
VOC	trans-1,2-Dichloroethene	156-60-5		8.63E-04		
VOC	1,2-Dichloropropane	78-87-5	B2	4.10E-04		
VOC	Ethyl Benzene	100-41-4	D	6.39E-04		
VOC	2-Hexanone	591-78-6				
VOC	Methyl Acetate	79-20-9		3.11E-05		
VOC	Methyl tert-butyl ether	1634-04-4		1.51E-04		
VOC	4-Methyl-2-pentanone	108-10-1	ID	4.25E-05		
VOC	Methylcyclohexane	108-87-2		2.16E-03		
VOC	Methylene Chloride	75-09-2	B2	4.18E-04	4.7E-04	1.2E+02
VOC	Styrene	100-42-5		3.83E-04		
VOC	Tetrachloroethene	127-18-4	C-B2	9.04E-04	3.1E-03	8.8E+00
VOC	Toluene	108-88-3	D	6.47E-04		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	2.10E-04		
VOC	1,1,1-Trichloroethane	71-55-6	D	9.41E-04		
VOC	1,1,2-Trichloroethane	79-00-5	C	2.00E-04	1.6E-02	7.6E+00
VOC	Trichloroethene	79-01-6	C-B2	7.91E-04	1.7E-03	1.8E+01
VOC	Trichlorofluoromethane	75-69-4		1.74E-03		
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.18E-03		
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	5.49E-04		
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	5.64E-04		
VOC	Vinyl Chloride	75-01-4	A	1.47E-03	8.8E-03	1.9E+00
VOC	Xylenes (total)	1330-20-7	ID	6.41E-04		
SVOC	Acenaphthene	83-32-9		4.28E-05		
SVOC	Acenaphthylene	208-96-8	D	3.25E-05		
SVOC	Acetophenone	98-86-2	D	4.02E-06		
SVOC	Anthracene	120-12-7	D	1.94E-05		
SVOC	Atrazine	1912-24-9	C	7.02E-09	6.3E-02	5.5E+04

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Groundwater Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
SVOC	Benzaldehyde	100-52-7		8.59E-06		
SVOC	Benzo(a)anthracene	56-55-3	B2	1.30E-06	8.9E-02	2.1E+02
SVOC	Benzo(a)pyrene	50-32-8	B2	4.56E-07	8.9E-01	6.0E+01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	2.69E-05	8.9E-02	1.0E+01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	5.83E-08		
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3.31E-07	8.9E-03	8.3E+03
SVOC	Biphenyl	92-52-4	D	7.36E-05		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	7.05E-08		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6.53E-06	3.3E-01	1.1E+01
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	4.23E-08	4.0E-03	1.4E+05
SVOC	Butylbenzylphthalate	85-68-7	C	4.88E-07	5.4E-04	9.2E+04
SVOC	Caprolactam	105-60-2		8.73E-09		
SVOC	Carbazole	86-74-8	B2	9.76E-09	5.7E-03	4.4E+05
SVOC	4-Chloro-3-methylphenol	59-50-7		1.64E-07		
SVOC	2-Chloronaphthalene	91-58-7		8.07E-05		
SVOC	2-Chlorophenol	95-57-8		9.81E-05		
SVOC	Chrysene	218-01-9	B2	2.46E-05	8.9E-04	1.1E+03
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	8.18E-09	8.9E-01	3.4E+03
SVOC	Dibenzofuran	132-64-9	D	4.16E-06		
SVOC	2,4-Dichlorophenol	120-83-2		1.22E-06		
SVOC	Diethylphthalate	84-66-2	D	1.84E-07		
SVOC	2,4-Dimethylphenol	105-67-9		7.96E-07		
SVOC	Dimethylphthalate	131-11-3	D	4.36E-08		
SVOC	Di-n-butylphthalate	84-74-2	D	6.84E-09		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.74E-07		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3.90E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3.02E-07	1.9E-01	4.1E+02
SVOC	Di-n-octylphthalate	117-84-0		1.48E-05		
SVOC	Fluoranthene	206-44-0	D	5.38E-06		
SVOC	Fluorene	86-73-7	D	1.94E-05		
SVOC	Formaldehyde	50-00-0	B1	1.42E-07	1.3E-02	1.3E+04
SVOC	Hexachlorobutadiene	87-68-3	C	5.26E-04	2.2E-02	2.1E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6.47E-04		
SVOC	Hexachloroethane	67-72-1	C	1.34E-04	4.0E-03	4.5E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	6.17E-07	8.9E-02	4.5E+02
SVOC	Isophorone	78-59-1	C	2.50E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	1.16E-04		
SVOC	Methylphenol (total)	1319-77-3		3.52E-07		
SVOC	Naphthalene	91-20-3	C	1.14E-04		
SVOC	2-Nitroaniline	88-74-4		6.63E-08		

Attachment G10: Risk-Based Cancer Criteria for Resident Exposure to Groundwater Vapor Intrusion (Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**URF** (m^3/mg)	**RBC** (mg/l)
SVOC	Nitrobenzene	98-95-3	D	8.69E-06		
SVOC	2-Nitrophenol	88-75-5		3.49E-06		
SVOC	4-Nitrophenol	100-02-7		8.20E-09		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.84E-06		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	8.89E-07	2.0E+00	1.4E+01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3.47E-05	1.0E-02	7.0E+01
SVOC	Pentachlorophenol	87-86-5	B2	1.20E-08	3.4E-02	5.9E+04
SVOC	Phenanthrene	85-01-8	D	7.81E-06		
SVOC	Phenol	108-95-2	ID	1.64E-07		
SVOC	Pyrene	129-00-0	D	3.80E-06		
SVOC	2,4,5-Trichlorophenol	95-95-4		1.61E-06		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2.77E-06	3.1E-03	2.8E+03
PCB	PCBs (total)	1336-36-3	B2	1.85E-04	5.7E-01	2.3E-01
INORG	Antimony	7440-36-0				
INORG	Arsenic	7440-38-2	A		4.3E+00	
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.4E+00	
INORG	Cadmium	7440-43-9	B1		1.8E+00	
INORG	Chromium (total)	7440-47-3			1.2E+01	
INORG	Chromium III	16065-83-1	D			
INORG	Chromium VI	18540-29-9	A		1.2E+01	
INORG	Cobalt	7440-48-4	B1		2.8E+00	
INORG	Copper	7440-50-8	D			
INORG	Cyanide (total)	57-12-5	D			
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D			
INORG	Mercury	7439-97-6	D	4.31E-04		
INORG	Nickel	7440-02-0	A		2.4E-01	
INORG	Selenium	7782-49-2	D			
INORG	Silver	7440-22-4	D			
INORG	Thallium	7440-28-0				
INORG	Vanadium	7440-62-2				
INORG	Zinc	7440-66-6	D			
Note:						
Target cancer risk of 1E-05						

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Groundwater Vapor Intrusion
(Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
VOC	Acetone	67-64-1	ID	1.44E-05	3.2E+00	2.3E+05
VOC	Benzene	71-43-2	A	6.39E-04	3.0E-02	4.9E+01
VOC	Bromodichloromethane	75-27-4	B2	2.48E-04	7.0E-02	2.9E+02
VOC	2-Butanone	78-93-3	ID	1.94E-05	5.0E+00	2.7E+05
VOC	Carbon Disulfide	75-15-0		1.32E-03	7.0E-01	5.5E+02
VOC	Carbon Tetrachloride	56-23-5	B2	1.14E-03		
VOC	Chlorobenzene	108-90-7	D	4.70E-04	6.0E-02	1.3E+02
VOC	Chloroethane	75-00-3		1.08E-03	1.0E+01	9.6E+03
VOC	Chloroform	67-66-3	B2	5.37E-04	5.0E-02	9.7E+01
VOC	Chloromethane	74-87-3	D	6.73E-04	9.0E-02	1.4E+02
VOC	Cumene	98-82-8	D	7.10E-04	4.0E-01	5.9E+02
VOC	Cyclohexane	110-82-7	ID	1.96E-03	6.0E+00	3.2E+03
VOC	Dibromochloromethane	124-48-1	C	1.35E-04	7.0E-02	5.4E+02
VOC	1,2-Dichlorobenzene	95-50-1	D	3.05E-04	2.0E-01	6.8E+02
VOC	1,3-Dichlorobenzene	541-73-1	D	4.02E-04	1.4E-01	3.6E+02
VOC	1,4-Dichlorobenzene	106-46-7	C	3.52E-04	8.0E-01	2.4E+03
VOC	Dichlorodifluoromethane	75-71-8		2.00E-03	2.0E-01	1.0E+02
VOC	1,1-Dichloroethane	75-34-3	C	6.40E-04	5.0E-01	8.2E+02
VOC	1,2-Dichloroethane	107-06-2	B2	2.29E-04	5.0E-03	2.3E+01
VOC	1,1-Dichloroethene	75-35-4	C	1.25E-03	2.0E-01	1.7E+02
VOC	cis-1,2-Dichloroethene	156-59-2	D	5.59E-04	3.5E-02	6.5E+01
VOC	trans-1,2-Dichloroethene	156-60-5		8.63E-04	6.0E-02	7.2E+01
VOC	1,2-Dichloropropane	78-87-5	B2	4.10E-04	4.0E-03	1.0E+01
VOC	Ethyl Benzene	100-41-4	D	6.39E-04	1.0E+00	1.6E+03
VOC	2-Hexanone	591-78-6			5.0E-03	
VOC	Methyl Acetate	79-20-9		3.11E-05	3.5E+00	1.2E+05
VOC	Methyl tert-butyl ether	1634-04-4		1.51E-04	3.0E+00	2.1E+04
VOC	4-Methyl-2-pentanone	108-10-1	ID	4.25E-05	3.0E+00	7.4E+04
VOC	Methylcyclohexane	108-87-2		2.16E-03	3.0E+00	1.4E+03
VOC	Methylene Chloride	75-09-2	B2	4.18E-04	3.0E+00	7.5E+03
VOC	Styrene	100-42-5		3.83E-04	1.0E+00	2.7E+03
VOC	Tetrachloroethene	127-18-4	C-B2	9.04E-04	4.0E-01	4.6E+02
VOC	Toluene	108-88-3	D	6.47E-04	5.0E+00	8.1E+03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	2.10E-04	2.0E-01	9.9E+02
VOC	1,1,1-Trichloroethane	71-55-6	D	9.41E-04	2.2E+00	2.4E+03
VOC	1,1,2-Trichloroethane	79-00-5	C	2.00E-04		
VOC	Trichloroethene	79-01-6	C-B2	7.91E-04		
VOC	Trichlorofluoromethane	75-69-4		1.74E-03	7.0E-01	4.2E+02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.18E-03	3.0E+01	1.4E+04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	5.49E-04	6.0E-03	1.1E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	5.64E-04	6.0E-03	1.1E+01
VOC	Vinyl Chloride	75-01-4	A	1.47E-03	1.0E-01	7.1E+01
VOC	Xylenes (total)	1330-20-7	ID	6.41E-04	1.0E-01	1.6E+02
SVOC	Acenaphthene	83-32-9		4.28E-05	2.1E-01	5.1E+03
SVOC	Acenaphthylene	208-96-8	D	3.25E-05	1.1E-01	3.4E+03
SVOC	Acetophenone	98-86-2	D	4.02E-06	3.5E-01	9.1E+04
SVOC	Anthracene	120-12-7	D	1.94E-05		

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Groundwater Vapor Intrusion
(Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
SVOC	Atrazine	1912-24-9	C	7.02E-09	1.2E-01	1.8E+07
SVOC	Benzaldehyde	100-52-7		8.59E-06	3.5E-01	4.2E+04
SVOC	Benzo(a)anthracene	56-55-3	B2	1.30E-06		
SVOC	Benzo(a)pyrene	50-32-8	B2	4.56E-07		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	2.69E-05		
SVOC	Benzo(g,h,i)perylene	191-24-2	D	5.83E-08	1.1E-01	1.9E+06
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3.31E-07		
SVOC	Biphenyl	92-52-4	D	7.36E-05	1.8E-01	2.5E+03
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	7.05E-08		
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6.53E-06		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	4.23E-08	7.0E-02	1.7E+06
SVOC	Butylbenzylphthalate	85-68-7	C	4.88E-07	7.0E-01	1.5E+06
SVOC	Caprolactam	105-60-2		8.73E-09	1.8E+00	2.1E+08
SVOC	Carbazole	86-74-8	B2	9.76E-09		
SVOC	4-Chloro-3-methylphenol	59-50-7		1.64E-07		
SVOC	2-Chloronaphthalene	91-58-7		8.07E-05	2.8E-01	3.6E+03
SVOC	2-Chlorophenol	95-57-8		9.81E-05	1.8E-02	1.9E+02
SVOC	Chrysene	218-01-9	B2	2.46E-05		
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	8.18E-09		
SVOC	Dibenzofuran	132-64-9	D	4.16E-06	7.0E-03	1.8E+03
SVOC	2,4-Dichlorophenol	120-83-2		1.22E-06	1.1E-02	8.9E+03
SVOC	Diethylphthalate	84-66-2	D	1.84E-07	2.8E+00	1.6E+07
SVOC	2,4-Dimethylphenol	105-67-9		7.96E-07	7.0E-02	9.2E+04
SVOC	Dimethylphthalate	131-11-3	D	4.36E-08		
SVOC	Di-n-butylphthalate	84-74-2	D	6.84E-09		
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1.74E-07	3.5E-04	2.1E+03
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3.90E-08		
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3.02E-07	3.5E-03	1.2E+04
SVOC	Di-n-octylphthalate	117-84-0		1.48E-05		
SVOC	Fluoranthene	206-44-0	D	5.38E-06	1.4E-01	2.7E+04
SVOC	Fluorene	86-73-7	D	1.94E-05	1.4E-01	7.5E+03
SVOC	Formaldehyde	50-00-0	B1	1.42E-07		
SVOC	Hexachlorobutadiene	87-68-3	C	5.26E-04		
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6.47E-04	2.0E-04	3.2E-01
SVOC	Hexachloroethane	67-72-1	C	1.34E-04		
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	6.17E-07		
SVOC	Isophorone	78-59-1	C	2.50E-06		
SVOC	2-Methylnaphthalene	91-57-6	ID	1.16E-04	3.0E-03	2.7E+01
SVOC	Methylphenol (total)	1319-77-3		3.52E-07		
SVOC	Naphthalene	91-20-3	C	1.14E-04	3.0E-03	2.8E+01
SVOC	2-Nitroaniline	88-74-4		6.63E-08	2.0E-04	3.1E+03
SVOC	Nitrobenzene	98-95-3	D	8.69E-06	2.0E-03	2.4E+02
SVOC	2-Nitrophenol	88-75-5		3.49E-06		
SVOC	4-Nitrophenol	100-02-7		8.20E-09		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1.84E-06		
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	8.89E-07		
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3.47E-05		

Attachment G10: Risk-Based Noncancer Criteria for Resident Exposure to Groundwater Vapor Intrusion
(Residential Slab on Grade Building)
GMC: NAO Flint Operations Site, Flint, Michigan

				Vapor Inhalation		
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{air}** (mg/m^3)	**RfC** (mg/m^3)	**RBC** (mg/l)
SVOC	Pentachlorophenol	87-86-5	B2	1.20E-08	1.1E-01	9.2E+06
SVOC	Phenanthrene	85-01-8	D	7.81E-06	1.1E-01	1.4E+04
SVOC	Phenol	108-95-2	ID	1.64E-07		
SVOC	Pyrene	129-00-0	D	3.80E-06	1.1E-01	2.9E+04
SVOC	2,4,5-Trichlorophenol	95-95-4		1.61E-06		
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2.77E-06		
PCB	PCBs (total)	1336-36-3	B2	1.85E-04		
INORG	Antimony	7440-36-0			1.4E-03	
INORG	Arsenic	7440-38-2	A			
INORG	Barium	7440-39-3	D			
INORG	Beryllium	7440-41-7	B1		2.0E-05	
INORG	Cadmium	7440-43-9	B1		2.0E-04	
INORG	Chromium (total)	7440-47-3			1.0E-04	
INORG	Chromium III	16065-83-1	D		5.3E+00	
INORG	Chromium VI	18540-29-9	A		1.0E-04	
INORG	Cobalt	7440-48-4	B1		2.0E-05	
INORG	Copper	7440-50-8	D		1.4E-01	
INORG	Cyanide (total)	57-12-5	D		7.0E-02	
INORG	Fluoride	16984-48-8				
INORG	Lead	7439-92-1	B2			
INORG	Manganese	7439-96-5	D		5.0E-05	
INORG	Mercury	7439-97-6	D	4.31E-04	3.0E-04	7.3E-01
INORG	Nickel	7440-02-0	A			
INORG	Selenium	7782-49-2	D		1.8E-02	
INORG	Silver	7440-22-4	D		1.0E-05	
INORG	Thallium	7440-28-0			2.5E-04	
INORG	Vanadium	7440-62-2			2.5E-02	
INORG	Zinc	7440-66-6	D		1.1E+00	
Note:						
Target hazard quotient of 1						

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from NAPL at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞
VOC	Acetone	67-64-1	2.30E+02	1.07E+00	7.95E-04	2.72E+01	2.71E+01	3.04E-04
VOC	Benzene	71-43-2	9.50E+01	7.60E-01	1.14E-01	8.75E+00	7.44E+00	1.06E-04
VOC	2-Butanone	78-93-3	9.53E+01	6.98E-01	1.14E-03	1.15E+01	1.16E+01	1.35E-04
VOC	Carbon Disulfide	75-15-0	3.59E+02	8.99E-01	6.20E-01	3.30E+01	2.80E+01	3.66E-04
VOC	Chloroethane	75-00-3	1.01E+03	2.34E+00	1.80E-01	9.26E+01	7.86E+01	1.01E-03
VOC	Chloromethane	74-87-3	4.30E+03	1.09E+00	1.80E-01	3.95E+02	3.35E+02	4.24E-03
VOC	Cumene	98-82-8	4.50E+00	5.62E-01	2.66E-01	4.23E-01	3.65E-01	2.20E-05
VOC	Cyclohexane	110-82-7	9.69E+01	7.25E-01	3.98E+00	8.90E+00	7.54E+00	1.07E-04
VOC	1,2-Dichlorobenzene	95-50-1	1.36E+00	5.96E-01	3.90E-02	1.94E-01	2.09E-01	2.17E-05
VOC	Dichlorodifluoromethane	75-71-8	4.85E+03	6.91E-01	7.01E+00	4.45E+02	3.77E+02	4.78E-03
VOC	1,1-Dichloroethane	75-34-3	2.27E+02	6.41E-01	1.15E-01	2.09E+01	1.77E+01	2.36E-04
VOC	cis-1,2-Dichloroethene	156-59-2	2.03E+02	6.36E-01	8.35E-02	1.87E+01	1.58E+01	2.12E-04
VOC	Ethyl Benzene	100-41-4	9.60E+00	6.48E-01	1.62E-01	9.00E-01	7.76E-01	2.44E-05
VOC	Methyl Acetate	79-20-9	2.16E+02	8.27E-01	1.85E-03	2.19E+01	2.00E+01	2.46E-04
VOC	4-Methyl-2-pentanone	108-10-1	1.99E+01	6.48E-01	2.82E-03	2.86E+00	3.09E+00	4.30E-05
VOC	Methylcyclohexane	108-87-2	4.30E+01	6.35E-01	8.78E+00	3.95E+00	3.35E+00	5.44E-05
VOC	Methylene Chloride	75-09-2	4.33E+02	8.73E-01	4.49E-02	3.99E+01	3.39E+01	4.40E-04
VOC	Tetrachloroethene	127-18-4	1.86E+01	6.22E-01	3.77E-01	1.71E+00	1.46E+00	3.15E-05
VOC	Toluene	108-88-3	2.84E+01	7.52E-01	1.36E-01	2.63E+00	2.25E+00	4.07E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	4.31E-01	2.59E-01	2.91E-02	7.96E-02	9.24E-02	2.13E-05
VOC	1,1,1-Trichloroethane	71-55-6	1.24E+02	6.74E-01	3.53E-01	1.14E+01	9.65E+00	1.34E-04
VOC	1,1,2-Trichloroethane	79-00-5	2.33E+01	6.74E-01	1.87E-02	2.30E+00	2.06E+00	3.73E-05
VOC	Trichloroethene	79-01-6	7.35E+01	6.83E-01	2.11E-01	6.76E+00	5.74E+00	8.42E-05
VOC	Trichlorofluoromethane	75-69-4	8.03E+02	7.52E-01	1.98E+00	7.37E+01	6.25E+01	8.04E-04
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	3.32E+02	6.74E-01	9.83E+00	3.05E+01	2.58E+01	3.39E-04
VOC	Vinyl Chloride	75-01-4	2.98E+03	9.16E-01	5.55E-01	2.74E+02	2.32E+02	2.95E-03
VOC	Xylenes (total)	1330-20-7	7.99E+00	6.74E-01	1.38E-01	7.55E-01	6.57E-01	2.34E-05
SVOC	Acenaphthene	83-32-9	2.50E-03	3.64E-01	3.18E-03	5.15E-01	7.26E-01	2.23E-05
SVOC	Benzo(a)anthracene	56-55-3	1.05E-07	4.41E-01	6.85E-05	2.89E+01	4.08E+01	3.22E-04
SVOC	Benzo(a)pyrene	50-32-8	5.49E-09	3.72E-01	2.32E-05	7.22E+01	1.02E+02	7.87E-04
SVOC	Benzo(b)fluoranthene	205-99-2	5.00E-07	1.95E-01	2.28E-03	3.86E-01	5.45E-01	2.19E-05
SVOC	Benzo(k)fluoranthene	207-08-9	2.00E-09	1.95E-01	1.70E-05	5.16E+01	7.29E+01	5.67E-04
SVOC	Biphenyl	92-52-4	9.64E-03	3.49E-01	6.13E-03	2.57E-01	3.62E-01	2.18E-05
SVOC	bis(2-Chloroethoxy)methane	111-91-1	1.40E-04	3.77E-01	3.47E-06	4.87E+02	6.88E+02	5.23E-03
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6.45E-06	3.03E-01	2.09E-06	6.52E+02	9.21E+02	6.99E-03
SVOC	Butylbenzylphthalate	85-68-7	8.25E-06	1.50E-01	2.59E-05	2.61E+01	3.69E+01	2.93E-04
SVOC	Chrysene	218-01-9	6.23E-09	2.14E-01	1.94E-03	4.97E-01	7.01E-01	2.22E-05
SVOC	2,4-Dinitrotoluene	121-14-2	1.47E-04	1.75E+00	1.90E-06	4.15E+03	5.86E+03	4.28E-02
SVOC	Di-n-octylphthalate	117-84-0	2.60E-06	1.30E-01	1.37E-03	4.28E-01	6.04E-01	2.20E-05
SVOC	Fluoranthene	206-44-0	7.80E-06	2.61E-01	3.30E-04	3.55E+00	5.02E+00	5.03E-05
SVOC	Fluorene	86-73-7	6.33E-04	3.14E-01	1.31E-03	1.08E+00	1.52E+00	2.58E-05
SVOC	2-Methylnaphthalene	91-57-6	5.50E-02	4.18E-01	1.06E-02	1.83E-01	2.55E-01	2.17E-05
SVOC	Naphthalene	91-20-3	8.50E-02	5.10E-01	9.90E-03	2.39E-01	3.34E-01	2.18E-05
SVOC	Phenanthrene	85-01-8	1.12E-04	3.24E-01	4.76E-04	3.06E+00	4.32E+00	4.51E-05
SVOC	Pyrene	129-00-0	4.59E-06	2.35E-01	2.26E-04	4.69E+00	6.61E+00	6.22E-05
PCB	PCBs (total)	1336-36-3	7.71E-05	1.75E-01	4.09E-02	1.92E-02	2.71E-02	1.98E-05
INORG	Antimony	7440-36-0						
INORG	Arsenic	7440-38-2						
INORG	Barium	7440-39-3						
INORG	Beryllium	7440-41-7						
INORG	Cadmium	7440-43-9						
INORG	Chromium (total)	7440-47-3						
INORG	Cobalt	7440-48-4						
INORG	Copper	7440-50-8						
INORG	Cyanide (total)	57-12-5						

Attachment G10: Vapor Intrusion into Residential Slab on Grade Building from NAPL at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

Chem Group	Chemical	CASRN	D_{air} (m^2/d)	D_{water} (m^2/d)	H (unitless)	D_{crack} (m^2/d)	D_{eff}^T (m^2/d)	α_∞
INORG	Lead	7439-92-1						
INORG	Manganese	7439-96-5						
INORG	Mercury	7439-97-6	1.96E-03	2.65E-01	1.45E-01	8.40E-03	1.18E-02	1.76E-05
INORG	Nickel	7440-02-0						
INORG	Selenium	7782-49-2						
INORG	Silver	7440-22-4						
INORG	Thallium	7440-28-0						
INORG	Vanadium	7440-62-2						
INORG	Zinc	7440-66-6						
Notes:	**Crack Soil and Building Characteristics**							
	SCS Soil texture class		Loamy Sand					
	Bulk density	kg/L	ρ_b	1.62				
	Total porosity	L/L-soil	θ	0.390				
	Water-filled porosity	L/L-soil	θ_w	0.112				
	Air-filled porosity	L/L-soil	θ_a	0.278				
	Residual saturation	L/L-soil	θ_r	0.049				
	Hydraulic conductivity	cm/s	**K**	1.2E-03				
	Dynamic viscosity of water	g/cm-s	μ	0.01307				
	Density of water	g/cm^3	ρ_w	1.0				
	Gravitational acceleration	cm/s^2	**g**	980.7				
	Intrinsic permeability	cm^2	**k**	1.6E-08				
	Relative saturation	unitless	S_e	0.186				
	van Genuchten N	unitless	**N**	1.746				
	van Genuchten M	unitless	**M**	0.427				
	Relative air permeability	unitless	k_{rg}	0.887				
	Permeability to vapor	cm^2	k_v	1.4E-08				
	Distance from building foundation to source	m	L_T	1.15				
	Bldg foundation thickness	m	L_{crack}	0.15				
	Bldg foundation length	m		10.56				
	Bldg foundation width	m		10.56				
	Bldg occupied height	m		4.88				
	Bldg occupied volume	m^3		544.19				
	Occupied depth below ground	m		0.0				
	Bldg area for vapor intrusion	m^2	A_B	111.5				
	Ratio of A_{crack} to A_B		η	2E-04				
	Area of cracks	m^2	A_{crack}	2.11E-02				
	Air exchange rate	$hour^{-1}$	**ac/h**	1.0				
	Building ventilation rate	m^3/d	Q_{bldg}	1.31E+04				
	Pressure difference between outdoors indoors	kg/m-s^2	ΔP	1.0				
	Air viscosity	kg/m-s	μ	1.8E-05				
	Crack length (bldg perimeter)	m	X_{crack}	42.24				
	Crack depth below ground	m	Z_{crack}	0.15				
	Crack radius	m	r_{crack}	5E-04				
	Soil gas flow rate into bldg	m^3/d	Q_{soil}	2.87E-01				

Attachment G10: Risk Calculations for Residential Exposure to LNAPL via Vapor Intrusion at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

								LNAPL Indoor Vapor Inhalation							
Chem Group	**Chemical**	**CASRN**	**Carc Class**	C_{LNAPL} (mg/kg)	**VP** (mmHg)	**v*** (mg/m^3)	α_∞	$C_{indoor\ air}$ (mg/m^3)	**URF** (m^3/mg)	**Risk**		**RfC** (mg/m^3)	**HQ**		**Occupational Air Concentration Limit** (mg/m^3)	**Ratio**
VOC	Acetone	67-64-1	ID		2.30E+02		3.04E-04					3.2E+00			1.8E+03	
VOC	Benzene	71-43-2	A	9.30E+02	9.50E+01	1.48E+03	1.06E-04	1.56E-01	7.8E-03	5E-04		3.0E-02	5E+00		3.2E+00	5E-02
VOC	2-Butanone	78-93-3	ID		9.53E+01		1.35E-04					5.0E+00			5.9E+02	
VOC	Carbon Disulfide	75-15-0			3.59E+02		3.66E-04					7.0E-01			1.2E+01	
VOC	Chloroethane	75-00-3			1.01E+03		1.01E-03					1.0E+01			2.6E+03	
VOC	Chloromethane	74-87-3	D		4.30E+03		4.24E-03					9.0E-02			1.0E+02	
VOC	Cumene	98-82-8	D	7.90E+02	4.50E+00	5.94E+01	2.20E-05	1.31E-03				4.0E-01	3E-03		2.5E+02	5E-06
VOC	Cyclohexane	110-82-7	ID	1.00E+04	9.69E+01	1.62E+04	1.07E-04	1.73E+00				6.0E+00	3E-01		1.1E+03	2E-03
VOC	1,2-Dichlorobenzene	95-50-1	D		1.36E+00		2.17E-05					2.0E-01			1.5E+02	
VOC	Dichlorodifluoromethane	75-71-8			4.85E+03		4.78E-03					2.0E-01			5.0E+03	
VOC	1,1-Dichloroethane	75-34-3	C		2.27E+02		2.36E-04					5.0E-01			4.0E+02	
VOC	cis-1,2-Dichloroethene	156-59-2	D		2.03E+02		2.12E-04					3.5E-02			7.9E+02	
VOC	Ethyl Benzene	100-41-4	D	2.20E+03	9.60E+00	3.53E+02	2.44E-05	8.62E-03				1.0E+00	8E-03		4.4E+02	2E-05
VOC	Methyl Acetate	79-20-9			2.16E+02		2.46E-04					3.5E+00			6.1E+02	
VOC	4-Methyl-2-pentanone	108-10-1	ID		1.99E+01		4.30E-05					3.0E+00			4.1E+02	
VOC	Methylcyclohexane	108-87-2		2.60E+04	4.30E+01	1.87E+04	5.44E-05	1.02E+00				3.0E+00	3E-01		2.0E+03	5E-04
VOC	Methylene Chloride	75-09-2	B2		4.33E+02		4.40E-04		4.7E-04			3.0E+00			8.7E+01	
VOC	Tetrachloroethene	127-18-4	C-B2		1.86E+01		3.15E-05		3.1E-03			4.0E-01			1.7E+02	
VOC	Toluene	108-88-3	D	4.20E+03	2.84E+01	1.99E+03	4.07E-05	8.11E-02				5.0E+00	2E-02		3.8E+02	2E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D		4.31E-01		2.13E-05					2.0E-01				
VOC	1,1,1-Trichloroethane	71-55-6	D		1.24E+02		1.34E-04					2.2E+00			1.9E+03	
VOC	1,1,2-Trichloroethane	79-00-5	C		2.33E+01		3.73E-05		1.6E-02						4.5E+01	
VOC	Trichloroethene	79-01-6	C-B2		7.35E+01		8.42E-05		1.7E-03						2.7E+02	
VOC	Trichlorofluoromethane	75-69-4			8.03E+02		8.04E-04					7.0E-01			5.6E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1			3.32E+02		3.39E-04					3.0E+01			7.6E+03	
VOC	Vinyl Chloride	75-01-4	A		2.98E+03		2.95E-03		8.8E-03			1.0E-01			2.5E+00	
VOC	Xylenes (total)	1330-20-7	ID	1.02E+04	7.99E+00	1.36E+03	2.34E-05	3.19E-02				1.0E-01	3E-01		4.4E+02	7E-05
SVOC	Acenaphthene	83-32-9			2.50E-03		2.23E-05					2.1E-01				
SVOC	Benzo(a)anthracene	56-55-3	B2		1.05E-07		3.22E-04		8.9E-02							
SVOC	Benzo(a)pyrene	50-32-8	B2		5.49E-09		7.87E-04		8.9E-01							
SVOC	Benzo(b)fluoranthene	205-99-2	B2		5.00E-07		2.19E-05		8.9E-02							
SVOC	Benzo(k)fluoranthene	207-08-9	B2		2.00E-09		5.67E-04		8.9E-03							
SVOC	Biphenyl	92-52-4	D		9.64E-03		2.18E-05					1.8E-01			1.0E+00	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D		1.40E-04		5.23E-03									
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2		6.45E-06		6.99E-03		4.0E-03			7.0E-02			5.0E+00	
SVOC	Butylbenzylphthalate	85-68-7	C		8.25E-06		2.93E-04		5.4E-04			7.0E-01				
SVOC	Chrysene	218-01-9	B2		6.23E-09		2.22E-05		8.9E-04							
SVOC	2,4-Dinitrotoluene	121-14-2	B2		1.47E-04		4.28E-02									
SVOC	Di-n-octylphthalate	117-84-0			2.60E-06		2.20E-05									
SVOC	Fluoranthene	206-44-0	D		7.80E-06		5.03E-05					1.4E-01				
SVOC	Fluorene	86-73-7	D		6.33E-04		2.58E-05					1.4E-01				
SVOC	2-Methylnaphthalene	91-57-6	ID	5.60E+02	5.50E-02	5.15E-01	2.17E-05	1.12E-05				3.0E-03	4E-03			

Attachment G10: Risk Calculations for Residential Exposure to LNAPL via Vapor Intrusion at AOI 09-B
GMC: NAO Flint Operations Site, Flint, Michigan

								LNAPL Indoor Vapor Inhalation								
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**C_{LNAPL}** (mg/kg)	**VP** (mmHg)	**v*** (mg/m^3)	**α_∞**	**$C_{indoor\ air}$** (mg/m^3)	**URF** (m^3/mg)	**Risk**		**RfC** (mg/m^3)	**HQ**		**Occupational Air Concentration Limit** (mg/m^3)	**Ratio**
SVOC	Naphthalene	91-20-3	C	8.30E+02	8.50E-02	1.18E+00	2.18E-05	2.57E-05				3.0E-03	8E-03		5.0E+01	5E-07
SVOC	Phenanthrene	85-01-8	D		1.12E-04		4.51E-05					1.1E-01				
SVOC	Pyrene	129-00-0	D		4.59E-06		6.22E-05					1.1E-01				
PCB	PCBs (total)	1336-36-3	B2		7.71E-05		1.98E-05		5.7E-01						5.0E-01	
INORG	Antimony	7440-36-0										1.4E-03			5.0E-01	
INORG	Arsenic	7440-38-2	A	3.60E+00					4.3E+00						5.0E-01	
INORG	Barium	7440-39-3	D	6.60E-01											5.0E-01	
INORG	Beryllium	7440-41-7	B1						2.4E+00			2.0E-05			2.0E-03	
INORG	Cadmium	7440-43-9	B1	7.00E-03					1.8E+00			2.0E-04			5.0E-03	
INORG	Chromium (total)	7440-47-3		6.40E-01					1.2E+01			1.0E-04			1.0E+00	
INORG	Cobalt	7440-48-4	B1						2.8E+00			2.0E-05			5.0E-02	
INORG	Copper	7440-50-8	D	9.60E-01								1.4E-01			1.0E+00	
INORG	Cyanide (total)	57-12-5	D									7.0E-02			5.0E+00	
INORG	Lead	7439-92-1	B2	2.30E+02											5.0E-02	
INORG	Manganese	7439-96-5	D	6.00E-02								5.0E-05			2.0E-01	
INORG	Mercury	7439-97-6	D		1.96E-03		1.76E-05					3.0E-04			5.0E-02	
INORG	Nickel	7440-02-0	A	1.90E+00					2.4E-01						1.0E+00	
INORG	Selenium	7782-49-2	D	4.10E+00								1.8E-02			2.0E-01	
INORG	Silver	7440-22-4	D									1.0E-05			1.0E-02	
INORG	Thallium	7440-28-0										2.5E-04			1.0E-01	
INORG	Vanadium	7440-62-2		1.70E-01								2.5E-02				
INORG	Zinc	7440-66-6	D	4.70E-01								1.1E+00				
									Cumulative Risk:	**5E-04**		**Cumulative HI:**	**6E+00**		**Sum of ratios:**	**5E-02**

Attachment G11

Exposure of Recreational Users to Surface Water

Attachment G11: Estimated Surface Water Concetrations Resulting from Outfall Discharge
GMC: NAO Flint Operations Site, Flint, Michigan

	Mass Loading (g/day)[1]							
Constituent	Outfall 002 (2-20)	Outfall 003 (3-15)	Outfall 003 (3-65)	Outfall 003 (combined)	Outfall 004 (4-8)	Outfall 005 (5-5)	Outfall 011 (11-3)	Sum of Outfalls
1,1,1-trichloroethane	6.0E-03						4.4E-02	5.0E-02
1,1-dicholorethane	2.5E-02	1.0E+00		1.0E+00				1.0E+00
chloroethane	1.8E-02				5.2E-02			7.0E-02
cis-1,2-dichloroethene	6.2E-01	5.2E-01	1.0E+00	1.5E+00	2.2E-01	1.2E-01		2.5E+00
trans-1,2-dichlorethene	2.6E-02		2.0E-01	2.0E-01				2.3E-01
tricholorethene	1.9E-02	1.3E+00	8.9E-02	1.3E+00	3.4E-01	3.3E-01	5.2E-02	2.1E+00
vinyl chloride	8.0E-01	3.6E-01	1.4E+00	1.7E+00	4.2E-01			2.9E+00
PCBs				4.6E+00	3.2E-02			4.7E+00

	Estimated Concentration (ug/L) in River Resulting from Outfall Discharge[2]							
Constituent	Outfall 002 (2-20)	Outfall 003 (3-15)	Outfall 003 (3-65)	Outfall 003 (combined)	Outfall 004 (4-8)	Outfall 005 (5-5)	Outfall 011 (11-3)	Sum of Outfalls
1,1,1-trichloroethane	2.7E-05						2.0E-04	**2.3E-04**
1,1-dicholorethane	1.1E-04	4.7E-03		4.7E-03				**4.8E-03**
chloroethane	8.2E-05				2.4E-04			**3.2E-04**
cis-1,2-dichloroethene	2.8E-03	2.4E-03	4.6E-03	7.0E-03	9.9E-04	5.4E-04		**1.1E-02**
trans-1,2-dichlorethene	1.2E-04		9.1E-04	9.1E-04				**1.0E-03**
tricholorethene	8.7E-05	5.7E-03	4.1E-04	6.1E-03	1.5E-03	1.5E-03	2.4E-04	**9.5E-03**
vinyl chloride	3.7E-03	1.7E-03	6.2E-03	7.8E-03	1.9E-03			**1.3E-02**
PCBs[3]				2.5E-02				**2.5E-02**

Notes:

1. Estimates from mass loading data collected during RFI investigation, except for PCBs from Outfall 003, which is calculated from the effluent quality data from March 1998 to March 1999. (Source: MDEQ Discharge Permit No. MI0001597, September 25, 2002)

2. The mixing zone calculation is based on 25% of the harmonic mean river flow rate of 358 ft^3/s for the Flint River from 1970 to 2000 (Source: USGS Station 04148500 Flint River Near Flint, MI), except for the PCB concentration estimate at Outfall 003, which is based on a harmonic mean flow rate of 300 ft3/s. (Source: MDEQ Discharge Permit No. MI0001597, September 25, 2002).

3. The Michigan Water Quality Standard and Federal AWQC for PCBs are below the analytical Target Detection Limit (TDL) of 0.2 ug/L.

Attachment G11: Estimated Surface Water Concentrations Resulting from Groundwater Migration to Flint River
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chemical	CASRN	Conc (mg/L)	MDL (mg/L)	Total Distance of GSI Locations Along River (ft)	Area of Groundwater Discharge (ft^2)	Q_{gw} Max (ft^3/d)	C_{sw} Max (mg/L)
RFI-09-13	Xylenes (total)	1330-20-7	5.80E-02	2.65E-04	2.9E+03	2.6E+04	3.1E+03	2.35E-05
RFI-09-13	Benzene	71-43-2	1.21E+00	1.07E-04	2.9E+03	2.6E+04	3.1E+03	4.90E-04
RFI-17-02-ULF	Selenium	7782-49-2	7.30E-03	3.80E-04	2.9E+03	2.6E+04	3.1E+03	2.96E-06
RFI-17-02	Silver	7440-22-4	4.50E-04	8.00E-05	2.9E+03	2.6E+04	3.1E+03	1.82E-07
RFI-84-06R	Cyanide (total)	57-12-5	7.10E-02	2.00E-03	2.9E+03	2.6E+04	3.1E+03	2.87E-05
RFI-94-02R	Trichloroethene	79-01-6	9.50E-01	1.49E-03	2.9E+03	2.6E+04	3.1E+03	3.85E-04
RFI-84-02	bis(2-Ethylhexyl)phthalate[1]	117-81-7	5.77E-01	4.50E-03	2.9E+03	2.6E+04	3.1E+03	2.34E-04
RFI-94-01	Di-n-butylphthalate[1]	84-74-2	1.28E-02	1.40E-03	2.9E+03	2.6E+04	3.1E+03	5.18E-06
RFI-17-02	3,3'-Dichlorobenzidine[2]	91-94-1		8.00E-03	2.9E+03	2.6E+04	3.1E+03	3.24E-06
RFI-84-06R	Mercury[3]	7439-97-6		1.20E-04	2.9E+03	2.6E+04	3.1E+03	4.86E-08

Notes:		
Depth of Flint River (ft)	9	Source: USGS Station 04147500 Flint River Near Otisville, MI
Harmonic Mean Flow (ft^3/s)	358	Source: USGS Station 04148500 Flint River Near Flint, MI
Q_{sw} (ft^3/day)	3.09E+07	
i	0.02	Hydraulic Gradient
K_h (ft/day)	6	Horizontal Hydraulic Conductivity (max)
Mixing Zone Factor	0.25	Source: MDEQ Water Quality Standards Part 4 R 323.1082(2)

1. Bis(2-Ethylhexyl)phthalate and Di-n-butylphthalate were detected in borehole water at concentrations that exceed the MDEQ GSI screening criteria, and thus included in the list.
2. The detection limit for 3,3'-Dichlorobenzidine exceeds the MDEQ GSI screening criteria. This chemical was not detected in any matrix at the Site.
3. The detection limit for Mercury is above the MDEQ GSI criteria, thus the maximum detection limit is used as the estimated concentration.

Attachment G12
Incremental Risk and HQ Summary

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
02-A	SVOC	Benzo(a)pyrene	50-32-8	5.29E-02	5.29E-02		1E-12		4E-12		3E-09		9E-07		2E-07		2E-08	
02-A	SVOC	Benzo(k)fluoranthene	207-08-9	4.64E-02	4.64E-02		8E-15		2E-14		3E-11		7E-09		2E-09		1E-10	
02-A	INORG	Antimony	7440-36-0	4.70E-01	3.84E-01							4E-05		4E-03		5E-04		2E-03
02-A	INORG	Arsenic	7440-38-2	7.50E+00														
02-A	INORG	Barium	7440-39-3	1.60E+02	6.43E+01													
02-A	INORG	Beryllium	7440-41-7	1.90E+00	1.31E+00						9E-10	2E-04	1E-09	2E-03	6E-10	4E-04	2E-09	4E-03
02-A	INORG	Cadmium	7440-43-9	1.00E+00	4.12E-01						2E-10	2E-05	2E-10	2E-03	1E-10	3E-04	4E-10	9E-04
02-A	INORG	Chromium (total)	7440-47-3	1.80E+01														
02-A	INORG	Cobalt	7440-48-4	9.00E+00	1.95E+00						2E-09	2E-04	2E-09	4E-04	1E-09	1E-04	3E-09	4E-03
02-A	INORG	Copper	7440-50-8	9.70E+02	9.42E+02							9E-04		9E-02		1E-02		5E-02
02-A	INORG	Cyanide (total)	57-12-5	1.00E+00	1.00E+00							2E-06		2E-04		2E-05		1E-04
02-A	INORG	Lead	7439-92-1	7.70E+02	7.70E+02													
02-A	INORG	Manganese	7439-96-5	4.60E+02														
02-A	INORG	Mercury	7439-97-6	4.56E-02														
02-A	INORG	Nickel	7440-02-0	4.50E+01	2.50E+01						2E-09		2E-09		1E-09		3E-09	
02-A	INORG	Selenium	7782-49-2	6.20E-01	1.01E-01							8E-07		7E-05		1E-05		4E-05
02-A	INORG	Silver	7440-22-4	4.20E-01	2.32E-01							5E-05		2E-04		3E-05		9E-04
02-A	INORG	Thallium	7440-28-0	2.20E-01	2.35E-02							1E-05		1E-03		2E-04		7E-04
02-A	INORG	Vanadium	7440-62-2	2.40E+01														
02-A	INORG	Zinc	7440-66-6	2.20E+02	1.10E+02							1E-05		1E-03		2E-04		7E-04
02-B	VOC	Acetone	67-64-1	6.00E-01	6.00E-01	3E-08		1E-05		3E-05		4E-07		2E-05		2E-05		1E-04
02-B	VOC	Benzene	71-43-2	9.00E-03	9.00E-03	2E-05	1E-07	1E-03	2E-07	2E-03	1E-10	3E-06	2E-08	2E-04	1E-08	1E-04	4E-09	6E-04
02-B	VOC	Ethyl Benzene	100-41-4	5.00E-02	5.00E-02	2E-07		7E-05		2E-04		3E-07		2E-05		1E-05		1E-04
02-B	VOC	Methyl Acetate	79-20-9	3.00E-01	3.00E-01	1E-07		1E-05		3E-05		2E-07		1E-05		1E-05		9E-06
02-B	VOC	Methylcyclohexane	108-87-2	7.00E-02	7.00E-02	3E-07		1E-04		1E-04		6E-07		3E-05		2E-05		2E-04
02-B	VOC	Toluene	108-88-3	1.36E+00	1.36E+00	1E-05		6E-04		2E-03		3E-06		2E-04		9E-05		8E-04
02-B	VOC	1,1,1-Trichloroethane	71-55-6	2.00E-02	2.00E-02	8E-08		5E-05		5E-05		1E-07		7E-06		5E-06		5E-06
02-B	VOC	Trichloroethene	79-01-6	2.00E-02	2.00E-02	4E-07	4E-08		9E-08		4E-11		7E-09		5E-09		2E-09	
02-B	VOC	Xylenes (total)	1330-20-7	2.20E-01	2.20E-01	9E-07		3E-03		7E-03		1E-05		6E-04		5E-04		4E-03
02-B	SVOC	Acenaphthene	83-32-9	5.00E-01	5.00E-01			4E-06		1E-05		8E-07		6E-05		2E-05		2E-05
02-B	SVOC	Acenaphthylene	208-96-8	2.00E-02	2.00E-02			2E-07		6E-07		6E-08		5E-06		2E-06		1E-06
02-B	SVOC	Anthracene	120-12-7	4.00E-01	4.00E-01							7E-08		7E-06		2E-06		4E-07
02-B	SVOC	Benzo(a)anthracene	56-55-3	7.00E-01	7.00E-01		1E-11		4E-11		4E-09		1E-06		2E-07		2E-08	
02-B	SVOC	Benzo(a)pyrene	50-32-8	9.00E-01	9.00E-01		2E-11		8E-11		5E-08		1E-05		3E-06		3E-07	
02-B	SVOC	Benzo(b)fluoranthene	205-99-2	9.00E-01	9.00E-01		2E-10		6E-10		5E-09		1E-06		3E-07		3E-08	
02-B	SVOC	Benzo(g,h,i)perylene	191-24-2	6.00E-01	6.00E-01			5E-12		1E-11		1E-06		1E-04		3E-05		6E-06
02-B	SVOC	Benzo(k)fluoranthene	207-08-9	7.00E-01	7.00E-01		1E-13		4E-13		4E-10		1E-07		2E-08		2E-09	
02-B	SVOC	Biphenyl	92-52-4	9.00E-02	9.00E-02	3E-07		1E-06		3E-06		2E-07		1E-05		5E-06		4E-05
02-B	SVOC	Carbazole	86-74-8	1.00E-01	1.00E-01		1E-13		3E-13		2E-11		4E-09		9E-10		9E-11	
02-B	SVOC	Chrysene	218-01-9	1.30E+00	1.30E+00		8E-12		2E-11		8E-11		2E-08		5E-09		5E-10	
02-B	SVOC	Dibenzofuran	132-64-9	3.00E-01	3.00E-01			2E-06		5E-06		9E-06		8E-04		2E-04		7E-04
02-B	SVOC	Fluoranthene	206-44-0	1.90E+00	1.90E+00			2E-07		4E-07		3E-06		3E-04		7E-05		2E-05
02-B	SVOC	Fluorene	86-73-7	5.00E-01	5.00E-01			1E-06		3E-06		9E-07		8E-05		3E-05		1E-05
02-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	6.00E-01	6.00E-01		7E-13		2E-12		4E-09		1E-06		2E-07		2E-08	
02-B	SVOC	2-Methylnaphthalene	91-57-6	3.00E-01	3.00E-01			6E-04		2E-03		3E-05		2E-03		1E-03		1E-02
02-B	SVOC	Naphthalene	91-20-3	2.00E-01	2.00E-01	1E-07		1E-03		3E-03		4E-05		2E-03		2E-03		1E-02
02-B	SVOC	Phenanthrene	85-01-8	2.00E+00	2.00E+00			1E-06		4E-06		4E-06		4E-04		1E-04		4E-05
02-B	SVOC	Pyrene	129-00-0	1.40E+00	1.40E+00			1E-07		3E-07		3E-06		2E-04		7E-05		2E-05
02-B	INORG	Antimony	7440-36-0	1.45E+00	1.36E+00							1E-04		1E-02		2E-03		7E-03
02-B	INORG	Arsenic	7440-38-2	1.00E+01	1.88E+00						2E-08	3E-04	5E-06	3E-02	7E-07	4E-03	9E-08	8E-04
02-B	INORG	Barium	7440-39-3	3.67E+02	2.71E+02													
02-B	INORG	Beryllium	7440-41-7	2.40E+00	1.81E+00						1E-09	2E-04	1E-09	3E-03	8E-10	5E-04	2E-09	5E-03
02-B	INORG	Cadmium	7440-43-9	1.57E+00	9.82E-01						5E-10	5E-05	6E-10	4E-03	3E-10	7E-04	9E-10	2E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
02-B	INORG	Chromium (total)	7440-47-3	3.10E+01														
02-B	INORG	Cobalt	7440-48-4	1.61E+01	9.05E+00						7E-09	9E-04	8E-09	2E-03	5E-09	5E-04	1E-08	2E-02
02-B	INORG	Copper	7440-50-8	1.42E+02	1.14E+02							1E-04		1E-02		1E-03		6E-03
02-B	INORG	Cyanide (total)	57-12-5	8.50E-02	8.50E-02							2E-07		2E-05		2E-06		8E-06
02-B	INORG	Lead	7439-92-1	8.79E+02	8.79E+02													
02-B	INORG	Manganese	7439-96-5	9.40E+02	4.63E+02							2E-02		2E-02		6E-03		3E-01
02-B	INORG	Mercury	7439-97-6	1.41E+00	1.36E+00	4E-05		5E-03		1E-02		6E-04		4E-02		2E-02		2E-01
02-B	INORG	Nickel	7440-02-0	5.10E+01	3.10E+01						2E-09		2E-09		1E-09		4E-09	
02-B	INORG	Selenium	7782-49-2	8.70E-01	3.51E-01							3E-06		3E-04		3E-05		1E-04
02-B	INORG	Silver	7440-22-4	2.40E-01	5.23E-02							1E-05		4E-05		8E-06		2E-04
02-B	INORG	Thallium	7440-28-0	1.65E+00	1.45E+00							8E-04		8E-02		1E-02		4E-02
02-B	INORG	Vanadium	7440-62-2	5.20E+01	2.71E+01							2E-04		1E-02		2E-03		8E-03
02-B	INORG	Zinc	7440-66-6	4.12E+02	3.02E+02							4E-05		4E-03		5E-04		2E-03
02-C	SVOC	Chrysene	218-01-9	4.22E-02	4.22E-02		2E-13		7E-13		3E-12		7E-10		2E-10		1E-11	
02-C	SVOC	Fluoranthene	206-44-0	5.59E-02	5.59E-02			5E-09		1E-08		8E-08		7E-06		2E-06		5E-07
02-C	SVOC	Phenanthrene	85-01-8	4.06E-02	4.06E-02			3E-08		7E-08		9E-08		8E-06		2E-06		8E-07
02-C	INORG	Antimony	7440-36-0	2.50E-01	1.64E-01							2E-05		1E-03		2E-04		8E-04
02-C	INORG	Arsenic	7440-38-2	8.20E+00	7.69E-02						8E-10	1E-05	2E-07	1E-03	3E-08	2E-04	4E-09	3E-05
02-C	INORG	Barium	7440-39-3	1.20E+02	2.43E+01													
02-C	INORG	Beryllium	7440-41-7	2.90E+00	2.31E+00						2E-09	3E-04	2E-09	4E-03	1E-09	6E-04	3E-09	6E-03
02-C	INORG	Cadmium	7440-43-9	3.10E-01														
02-C	INORG	Chromium (total)	7440-47-3	3.90E+02	3.58E+02						1E-06	1E-02	1E-06	4E-01	8E-07	6E-02	2E-06	2E-01
02-C	INORG	Chromium III	16065-83-1	2.26E+01	2.26E+01							6E-07		6E-05		7E-06		3E-05
02-C	INORG	Cobalt	7440-48-4	1.00E+01	2.95E+00						2E-09	3E-04	3E-09	6E-04	2E-09	1E-04	4E-09	5E-03
02-C	INORG	Copper	7440-50-8	1.50E+02	1.22E+02							1E-04		1E-02		1E-03		6E-03
02-C	INORG	Cyanide (total)	57-12-5	3.60E-02	3.60E-02							7E-08		7E-06		9E-07		4E-06
02-C	INORG	Lead	7439-92-1	2.00E+03	2.00E+03													
02-C	INORG	Manganese	7439-96-5	3.90E+02														
02-C	INORG	Mercury	7439-97-6	4.99E-02														
02-C	INORG	Nickel	7440-02-0	4.40E+01	2.40E+01						2E-09		2E-09		1E-09		3E-09	
02-C	INORG	Selenium	7782-49-2	8.40E-01	3.21E-01							3E-06		2E-04		3E-05		1E-04
02-C	INORG	Silver	7440-22-4	3.90E-01	2.02E-01							4E-05		2E-04		3E-05		8E-04
02-C	INORG	Thallium	7440-28-0	2.80E-01	8.35E-02							5E-05		4E-03		6E-04		2E-03
02-C	INORG	Vanadium	7440-62-2	3.30E+01	8.13E+00							5E-05		4E-03		6E-04		2E-03
02-C	INORG	Zinc	7440-66-6	1.10E+02														
02-D	VOC	Methyl Acetate	79-20-9	1.20E-01	1.20E-01	5E-08		5E-06		1E-05		1E-07		5E-06		4E-06		4E-06
02-D	VOC	Xylenes (total)	1330-20-7	6.85E-02	6.85E-02	3E-07		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
02-D	SVOC	Acenaphthene	83-32-9	8.00E-01	8.00E-01			6E-06		2E-05		1E-06		1E-04		4E-05		2E-05
02-D	SVOC	Acenaphthylene	208-96-8	1.10E-01	1.10E-01			1E-06		3E-06		3E-07		3E-05		1E-05		6E-06
02-D	SVOC	Anthracene	120-12-7	1.40E+00	1.40E+00							3E-07		2E-05		6E-06		1E-06
02-D	SVOC	Benzo(a)anthracene	56-55-3	4.40E+00	4.40E+00		9E-11		3E-10		3E-08		7E-06		2E-06		1E-07	
02-D	SVOC	Benzo(a)pyrene	50-32-8	5.14E+00	5.14E+00		1E-10		4E-10		3E-07		8E-05		2E-05		2E-06	
02-D	SVOC	Benzo(b)fluoranthene	205-99-2	7.50E+00	7.50E+00		2E-09		5E-09		4E-08		1E-05		3E-06		2E-07	
02-D	SVOC	Benzo(g,h,i)perylene	191-24-2	2.00E+00	2.00E+00			2E-11		4E-11		4E-06		3E-04		9E-05		2E-05
02-D	SVOC	Benzo(k)fluoranthene	207-08-9	3.60E+00	3.60E+00		6E-13		2E-12		2E-09		6E-07		1E-07		1E-08	
02-D	SVOC	Carbazole	86-74-8	1.10E+00	1.10E+00		1E-12		4E-12		2E-10		5E-08		9E-09		1E-09	
02-D	SVOC	Chrysene	218-01-9	5.21E+00	5.21E+00		3E-11		9E-11		3E-10		9E-08		2E-08		2E-09	
02-D	SVOC	Dibenz(a,h)anthracene	53-70-3	6.60E-01	6.60E-01		8E-14		3E-13		4E-08		1E-05		2E-06		2E-07	
02-D	SVOC	Dibenzofuran	132-64-9	3.00E-01	3.00E-01			2E-06		5E-06		9E-06		8E-04		2E-04		7E-04
02-D	SVOC	Diethylphthalate	84-66-2	5.78E-02	5.78E-02	2E-09		2E-09		6E-09		4E-09		4E-07		1E-07		4E-08
02-D	SVOC	Fluoranthene	206-44-0	1.37E+01	1.37E+01			1E-06		3E-06		2E-05		2E-03		5E-04		1E-04
02-D	SVOC	Fluorene	86-73-7	6.20E-01	6.20E-01			2E-06		4E-06		1E-06		9E-05		3E-05		1E-05
02-D	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.10E+00	2.10E+00		2E-12		7E-12		1E-08		3E-06		7E-07		6E-08	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
02-D	SVOC	Naphthalene	91-20-3	1.50E-01	1.50E-01	8E-08		9E-04		2E-03		3E-05		1E-03		1E-03		1E-02
02-D	SVOC	Phenanthrene	85-01-8	7.38E+00	7.38E+00			5E-06		1E-05		2E-05		1E-03		4E-04		1E-04
02-D	SVOC	Pyrene	129-00-0	1.11E+01	1.11E+01			9E-07		2E-06		2E-05		2E-03		5E-04		1E-04
02-D	INORG	Antimony	7440-36-0	1.50E-01	6.36E-02							6E-06		6E-04		8E-05		3E-04
02-D	INORG	Arsenic	7440-38-2	8.40E+00	2.77E-01						3E-09	4E-05	7E-07	4E-03	1E-07	6E-04	1E-08	1E-04
02-D	INORG	Barium	7440-39-3	5.30E+01														
02-D	INORG	Beryllium	7440-41-7	4.70E-01														
02-D	INORG	Cadmium	7440-43-9	3.00E-01														
02-D	INORG	Chromium (total)	7440-47-3	1.90E+01														
02-D	INORG	Cobalt	7440-48-4	7.30E+00	2.46E-01						2E-10	3E-05	2E-10	5E-05	1E-10	1E-05	3E-10	4E-04
02-D	INORG	Copper	7440-50-8	4.10E+01	1.25E+01							1E-05		1E-03		2E-04		6E-04
02-D	INORG	Cyanide (total)	57-12-5	2.70E-01	2.70E-01							5E-07		5E-05		7E-06		3E-05
02-D	INORG	Lead	7439-92-1	4.20E+01	4.20E+01													
02-D	INORG	Manganese	7439-96-5	3.70E+02														
02-D	INORG	Mercury	7439-97-6	9.07E-02	3.83E-02	1E-06		1E-04		4E-04		2E-05		1E-03		6E-04		5E-03
02-D	INORG	Nickel	7440-02-0	1.80E+01														
02-D	INORG	Selenium	7782-49-2	6.70E-01	1.51E-01							1E-06		1E-04		1E-05		6E-05
02-D	INORG	Silver	7440-22-4	1.70E-01														
02-D	INORG	Vanadium	7440-62-2	2.50E+01	1.29E-01							7E-07		7E-05		9E-06		4E-05
02-D	INORG	Zinc	7440-66-6	6.60E+01														
02-E	VOC	Acetone	67-64-1	1.70E-01	1.70E-01	1E-08		4E-06		1E-05		1E-07		7E-06		5E-06		4E-05
02-E	VOC	Benzene	71-43-2	4.80E-02	4.80E-02	9E-05	5E-07	6E-03	9E-07	9E-03	6E-10	2E-05	9E-08	9E-04	6E-08	7E-04	2E-08	3E-03
02-E	VOC	2-Butanone	78-93-3	8.80E-02	8.80E-02	2E-08		2E-06		4E-06		4E-08		2E-06		1E-06		1E-05
02-E	VOC	Cumene	98-82-8	3.80E-02	3.80E-02	3E-07		1E-04		3E-04		5E-07		3E-05		2E-05		2E-04
02-E	VOC	Cyclohexane	110-82-7	1.10E-01	1.10E-01	8E-07		9E-05		1E-04		3E-07		2E-05		1E-05		1E-04
02-E	VOC	Ethyl Benzene	100-41-4	1.40E-01	1.40E-01	7E-07		2E-04		5E-04		8E-07		5E-05		3E-05		3E-04
02-E	VOC	Methyl Acetate	79-20-9	2.30E-01	2.30E-01	9E-08		1E-05		3E-05		2E-07		1E-05		7E-06		7E-06
02-E	VOC	Methylcyclohexane	108-87-2	3.80E-01	3.80E-01	1E-06		6E-04		7E-04		3E-06		2E-04		1E-04		1E-03
02-E	VOC	Toluene	108-88-3	3.70E-01	3.70E-01	3E-06		2E-04		4E-04		7E-07		5E-05		3E-05		2E-04
02-E	VOC	Xylenes (total)	1330-20-7	1.02E+00	1.02E+00	4E-06		1E-02		3E-02		5E-05		3E-03		2E-03		2E-02
02-E	SVOC	Anthracene	120-12-7	5.11E-02	5.11E-02							1E-08		9E-07		2E-07		5E-08
02-E	SVOC	Benzo(a)anthracene	56-55-3	7.89E-02	7.89E-02		2E-12		5E-12		5E-10		1E-07		3E-08		2E-09	
02-E	SVOC	Benzo(a)pyrene	50-32-8	6.34E-01	6.34E-01		2E-11		5E-11		4E-08		1E-05		2E-06		2E-07	
02-E	SVOC	Benzo(b)fluoranthene	205-99-2	5.65E-02	5.65E-02		1E-11		4E-11		3E-10		9E-08		2E-08		2E-09	
02-E	SVOC	Benzo(k)fluoranthene	207-08-9	4.53E-02	4.53E-02		7E-15		2E-14		3E-11		7E-09		2E-09		1E-10	
02-E	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.43E+00	1.43E+00	2E-13	1E-15	1E-11	3E-15	3E-11	2E-10	4E-06	4E-08	3E-04	8E-09	8E-05	7E-10	2E-04
02-E	SVOC	Chrysene	218-01-9	9.03E-02	9.03E-02		5E-13		2E-12		5E-12		1E-09		3E-10		3E-11	
02-E	SVOC	Dibenzofuran	132-64-9	8.30E-02	8.30E-02			6E-07		1E-06		2E-06		2E-04		6E-05		2E-04
02-E	SVOC	Di-n-butylphthalate	84-74-2	6.98E-02	6.98E-02	8E-13						4E-08		3E-06		8E-07		2E-07
02-E	SVOC	Fluoranthene	206-44-0	1.35E-01	1.35E-01			1E-08		3E-08		2E-07		2E-05		5E-06		1E-06
02-E	SVOC	Naphthalene	91-20-3	1.10E-01	1.10E-01	6E-08		7E-04		2E-03		2E-05		1E-03		8E-04		8E-03
02-E	SVOC	Phenanthrene	85-01-8	3.89E-01	3.89E-01			3E-07		7E-07		8E-07		7E-05		2E-05		8E-06
02-E	SVOC	Pyrene	129-00-0	1.39E-01	1.39E-01			1E-08		3E-08		3E-07		2E-05		7E-06		2E-06
02-E	INORG	Antimony	7440-36-0	4.50E-01	3.64E-01							4E-05		3E-03		4E-04		2E-03
02-E	INORG	Arsenic	7440-38-2	6.80E+00														
02-E	INORG	Barium	7440-39-3	8.80E+01														
02-E	INORG	Beryllium	7440-41-7	3.30E+00	2.71E+00						2E-09	3E-04	2E-09	5E-03	1E-09	7E-04	3E-09	7E-03
02-E	INORG	Cadmium	7440-43-9	3.90E-01														
02-E	INORG	Chromium (total)	7440-47-3	1.10E+01														
02-E	INORG	Cobalt	7440-48-4	8.20E+00	1.15E+00						9E-10	1E-04	1E-09	3E-04	6E-10	6E-05	2E-09	2E-03
02-E	INORG	Copper	7440-50-8	6.40E+02	6.12E+02							6E-04		6E-02		7E-03		3E-02
02-E	INORG	Cyanide (total)	57-12-5	4.80E-01	4.80E-01							1E-06		9E-05		1E-05		5E-05
02-E	INORG	Lead	7439-92-1	1.20E+02	1.20E+02													

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
02-E	INORG	Manganese	7439-96-5	3.40E+02														
02-E	INORG	Mercury	7439-97-6	4.25E-02														
02-E	INORG	Nickel	7440-02-0	3.70E+01	1.70E+01						1E-09		1E-09		8E-10		2E-09	
02-E	INORG	Selenium	7782-49-2	5.70E-01	5.06E-02							4E-07		4E-05		5E-06		2E-05
02-E	INORG	Silver	7440-22-4	3.50E-01	1.62E-01							3E-05		1E-04		2E-05		6E-04
02-E	INORG	Thallium	7440-28-0	2.10E-01	1.35E-02							8E-06		7E-04		9E-05		4E-04
02-E	INORG	Vanadium	7440-62-2	2.40E+01														
02-E	INORG	Zinc	7440-66-6	1.40E+02	2.95E+01							4E-06		4E-04		5E-05		2E-04
02-F	VOC	Acetone	67-64-1	1.80E-01	1.80E-01	1E-08		4E-06		1E-05		1E-07		7E-06		5E-06		4E-05
02-F	VOC	Carbon Disulfide	75-15-0	9.30E-02	9.30E-02	6E-05		7E-04		8E-04		3E-06		2E-04		1E-04		1E-03
02-F	VOC	Methyl Acetate	79-20-9	1.90E-01	1.90E-01	7E-08		9E-06		2E-05		2E-07		8E-06		6E-06		6E-06
02-F	VOC	Xylenes (total)	1330-20-7	1.02E-01	1.02E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
02-F	SVOC	Anthracene	120-12-7	2.64E-01	2.64E-01							5E-08		5E-06		1E-06		2E-07
02-F	SVOC	Benzo(a)anthracene	56-55-3	4.21E-02	4.21E-02		9E-13		3E-12		2E-10		7E-08		1E-08		1E-09	
02-F	SVOC	Benzo(a)pyrene	50-32-8	4.67E-02	4.67E-02		1E-12		4E-12		3E-09		8E-07		2E-07		1E-08	
02-F	SVOC	Benzo(b)fluoranthene	205-99-2	4.59E-02	4.59E-02		1E-11		3E-11		3E-10		7E-08		2E-08		1E-09	
02-F	SVOC	Benzo(k)fluoranthene	207-08-9	4.13E-02	4.13E-02		7E-15		2E-14		2E-11		7E-09		1E-09		1E-10	
02-F	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.82E-01	2.82E-01	4E-14	2E-16	2E-12	7E-16	5E-12	3E-11	7E-07	8E-09	7E-05	2E-09	2E-05	1E-10	4E-05
02-F	SVOC	Chrysene	218-01-9	2.84E-01	2.84E-01		2E-12		5E-12		2E-11		5E-09		1E-09		1E-10	
02-F	SVOC	Fluoranthene	206-44-0	6.62E-01	6.62E-01			5E-08		1E-07		1E-06		9E-05		2E-05		6E-06
02-F	SVOC	Fluorene	86-73-7	4.32E-01	4.32E-01			1E-06		3E-06		8E-07		7E-05		2E-05		1E-05
02-F	SVOC	2-Methylnaphthalene	91-57-6	8.64E-02	8.64E-02			2E-04		5E-04		9E-06		5E-04		4E-04		3E-03
02-F	SVOC	Naphthalene	91-20-3	3.23E-01	3.23E-01	2E-07		2E-03		5E-03		6E-05		3E-03		2E-03		2E-02
02-F	SVOC	Phenanthrene	85-01-8	1.63E+00	1.63E+00			1E-06		3E-06		3E-06		3E-04		9E-05		3E-05
02-F	SVOC	Pyrene	129-00-0	8.81E-01	8.81E-01			7E-08		2E-07		2E-06		2E-04		4E-05		1E-05
02-F	INORG	Arsenic	7440-38-2	8.50E+00	3.77E-01						4E-09	5E-05	1E-06	5E-03	1E-07	9E-04	2E-08	2E-04
02-F	INORG	Barium	7440-39-3	1.50E+02	5.43E+01													
02-F	INORG	Beryllium	7440-41-7	1.20E+00	6.10E-01						4E-10	7E-05	5E-10	1E-03	3E-10	2E-04	7E-10	2E-03
02-F	INORG	Cadmium	7440-43-9	3.10E-01														
02-F	INORG	Chromium (total)	7440-47-3	4.30E+01	1.10E+01						4E-08	4E-04	4E-08	1E-02	2E-08	2E-03	6E-08	5E-03
02-F	INORG	Cobalt	7440-48-4	2.10E+01	1.39E+01						1E-08	1E-03	1E-08	3E-03	7E-09	7E-04	2E-08	3E-02
02-F	INORG	Copper	7440-50-8	4.40E+01	1.55E+01							2E-05		1E-03		2E-04		8E-04
02-F	INORG	Cyanide (total)	57-12-5	1.90E-01	1.90E-01							4E-07		3E-05		5E-06		2E-05
02-F	INORG	Lead	7439-92-1	3.90E+01	3.90E+01													
02-F	INORG	Manganese	7439-96-5	7.10E+02	2.33E+02							1E-02		9E-03		3E-03		2E-01
02-F	INORG	Mercury	7439-97-6	3.61E-02														
02-F	INORG	Nickel	7440-02-0	4.60E+01	2.60E+01						2E-09		2E-09		1E-09		3E-09	
02-F	INORG	Selenium	7782-49-2	5.70E-02														
02-F	INORG	Silver	7440-22-4	2.20E-01	3.23E-02							7E-06		3E-05		5E-06		1E-04
02-F	INORG	Thallium	7440-28-0	2.20E-01	2.35E-02							1E-05		1E-03		2E-04		7E-04
02-F	INORG	Vanadium	7440-62-2	4.70E+01	2.21E+01							1E-04		1E-02		2E-03		6E-03
02-F	INORG	Zinc	7440-66-6	6.50E+01														
03-1	VOC	Benzene	71-43-2	5.30E-02	5.30E-02	1E-04	6E-07	7E-03	1E-06	1E-02	6E-10	2E-05	1E-07	1E-03	7E-08	8E-04	2E-08	4E-03
03-1	VOC	2-Butanone	78-93-3	6.60E-02	6.60E-02	2E-08		1E-06		3E-06		3E-08		2E-06		1E-06		1E-05
03-1	VOC	Carbon Disulfide	75-15-0	3.00E-02	3.00E-02	2E-05		2E-04		3E-04		1E-06		5E-05		4E-05		4E-04
03-1	VOC	Cyclohexane	110-82-7	5.50E-02	5.50E-02	4E-07		5E-05		5E-05		2E-07		9E-06		7E-06		6E-05
03-1	VOC	1,4-Dichlorobenzene	106-46-7	1.30E-01	1.30E-01	1E-07	8E-08	5E-05	3E-07	1E-04	3E-10	5E-07	5E-08	4E-05	3E-08	2E-05	1E-08	6E-05
03-1	VOC	1,1-Dichloroethane	75-34-3	8.40E-02	8.40E-02	2E-06		9E-04		1E-03		2E-06		1E-04		8E-05		8E-05
03-1	VOC	Methyl Acetate	79-20-9	8.80E-02	8.80E-02	3E-08		4E-06		1E-05		7E-08		4E-06		3E-06		3E-06
03-1	VOC	Methylcyclohexane	108-87-2	1.40E-01	1.40E-01	5E-07		2E-04		3E-04		1E-06		6E-05		5E-05		4E-04
03-1	VOC	Methylene Chloride	75-09-2	4.00E-02	4.00E-02	2E-06	2E-08	4E-05	5E-08	8E-05	3E-11	2E-07	5E-09	1E-05	3E-09	6E-06	1E-09	6E-05
03-1	VOC	Toluene	108-88-3	8.40E-02	8.40E-02	7E-07		4E-05		1E-04		2E-07		1E-05		6E-06		5E-05
03-1	VOC	1,1,1-Trichloroethane	71-55-6	1.00E+00	1.00E+00	4E-06		2E-03		3E-03		6E-06		3E-04		2E-04		2E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
03-1	VOC	Trichloroethene	79-01-6	8.40E-01	8.40E-01	2E-05	2E-06		4E-06		2E-09		3E-07		2E-07		7E-08	
03-1	VOC	Xylenes (total)	1330-20-7	1.42E-01	1.42E-01	6E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03
03-1	SVOC	Anthracene	120-12-7	1.39E+00	1.39E+00							3E-07		2E-05		6E-06		1E-06
03-1	SVOC	Benzo(a)anthracene	56-55-3	8.44E+00	8.44E+00		2E-10		5E-10		5E-08		1E-05		3E-06		3E-07	
03-1	SVOC	Benzo(a)pyrene	50-32-8	1.31E+01	1.31E+01		4E-10		1E-09		8E-07		2E-04		5E-05		4E-06	
03-1	SVOC	Benzo(b)fluoranthene	205-99-2	1.96E+01	1.96E+01		4E-09		1E-08		1E-07		3E-05		7E-06		6E-07	
03-1	SVOC	Benzo(g,h,i)perylene	191-24-2	6.72E+00	6.72E+00			6E-11		1E-10		1E-05		1E-03		3E-04		6E-05
03-1	SVOC	Benzo(k)fluoranthene	207-08-9	8.91E+00	8.91E+00		1E-12		4E-12		5E-09		1E-06		3E-07		3E-08	
03-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.95E-01	5.95E-01	9E-14	5E-16	5E-12	1E-15	1E-11	6E-11	2E-06	2E-08	1E-04	3E-09	3E-05	3E-10	8E-05
03-1	SVOC	Butylbenzylphthalate	85-68-7	1.00E+00	1.00E+00		3E-13	2E-09	1E-12	6E-09	1E-11	3E-07	4E-09	2E-05	8E-10	6E-06	8E-11	1E-06
03-1	SVOC	Carbazole	86-74-8	6.17E-01	6.17E-01		7E-13		2E-12		1E-10		3E-08		5E-09		6E-10	
03-1	SVOC	Chrysene	218-01-9	1.14E+01	1.14E+01		7E-11		2E-10		7E-10		2E-07		4E-08		4E-09	
03-1	SVOC	Dibenz(a,h)anthracene	53-70-3	5.12E-01	5.12E-01		7E-14		2E-13		3E-08		8E-06		2E-06		1E-07	
03-1	SVOC	Dibenzofuran	132-64-9	1.04E-01	1.04E-01			7E-07		2E-06		3E-06		3E-04		7E-05		2E-04
03-1	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	6.22E-01	6.22E-01	9E-07		4E-04		9E-04		4E-04		3E-02		1E-02		5E-02
03-1	SVOC	Fluoranthene	206-44-0	1.09E+01	1.09E+01			9E-07		2E-06		2E-05		1E-03		4E-04		1E-04
03-1	SVOC	Fluorene	86-73-7	1.60E-01	1.60E-01			4E-07		1E-06		3E-07		2E-05		8E-06		4E-06
03-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	6.24E+00	6.24E+00		7E-12		2E-11		4E-08		1E-05		2E-06		2E-07	
03-1	SVOC	2-Methylnaphthalene	91-57-6	1.47E-01	1.47E-01			3E-04		8E-04		2E-05		9E-04		6E-04		6E-03
03-1	SVOC	Naphthalene	91-20-3	4.89E-01	4.89E-01	3E-07		3E-03		8E-03		9E-05		5E-03		4E-03		3E-02
03-1	SVOC	N-Nitroso-di-n-propylamine	621-64-7	7.25E-01	7.25E-01		1E-06		4E-06		9E-08		2E-05		7E-06		2E-06	
03-1	SVOC	Phenanthrene	85-01-8	3.71E+00	3.71E+00			3E-06		7E-06		8E-06		7E-04		2E-04		7E-05
03-1	SVOC	Phenol	108-95-2	2.42E-01	2.42E-01	8E-09						4E-08		4E-06		9E-07		2E-06
03-1	SVOC	Pyrene	129-00-0	1.27E+01	1.27E+01			1E-06		2E-06		2E-05		2E-03		6E-04		2E-04
03-1	PCB	PCBs (total)	1336-36-3	2.70E-01	2.70E-01	5E-08	3E-09		1E-08		5E-09	8E-04	1E-06	7E-02	3E-07	2E-02	4E-08	2E-02
03-1	INORG	Antimony	7440-36-0	7.20E-01	6.34E-01							6E-05		6E-03		8E-04		3E-03
03-1	INORG	Arsenic	7440-38-2	6.80E+00														
03-1	INORG	Barium	7440-39-3	5.80E+02	4.84E+02													
03-1	INORG	Beryllium	7440-41-7	1.30E+00	7.10E-01						5E-10	9E-05	5E-10	1E-03	3E-10	2E-04	8E-10	2E-03
03-1	INORG	Cadmium	7440-43-9	3.80E+00	3.21E+00						2E-09	2E-04	2E-09	1E-02	1E-09	2E-03	3E-09	7E-03
03-1	INORG	Chromium (total)	7440-47-3	1.60E+02	1.28E+02						5E-07	4E-03	5E-07	2E-01	3E-07	2E-02	8E-07	6E-02
03-1	INORG	Cobalt	7440-48-4	8.00E+00	9.46E-01						8E-10	1E-04	8E-10	2E-04	5E-10	5E-05	1E-09	2E-03
03-1	INORG	Copper	7440-50-8	2.30E+03	2.27E+03							2E-03		2E-01		3E-02		1E-01
03-1	INORG	Cyanide (total)	57-12-5	9.20E-02	9.20E-02							2E-07		2E-05		2E-06		9E-06
03-1	INORG	Lead	7439-92-1	7.00E+02	7.00E+02													
03-1	INORG	Manganese	7439-96-5	4.70E+03	4.22E+03							2E-01		2E-01		6E-02		3E+00
03-1	INORG	Mercury	7439-97-6	4.67E-01	4.15E-01	1E-05		2E-03		4E-03		2E-04		1E-02		6E-03		5E-02
03-1	INORG	Nickel	7440-02-0	7.20E+01	5.20E+01						4E-09		4E-09		2E-09		6E-09	
03-1	INORG	Selenium	7782-49-2	1.30E+00	7.81E-01							6E-06		6E-04		8E-05		3E-04
03-1	INORG	Silver	7440-22-4	1.10E+00	9.12E-01							2E-04		7E-04		1E-04		3E-03
03-1	INORG	Thallium	7440-28-0	1.80E-01														
03-1	INORG	Vanadium	7440-62-2	2.10E+01														
03-1	INORG	Zinc	7440-66-6	5.50E+02	4.40E+02							6E-05		5E-03		7E-04		3E-03
04-A	VOC	2-Butanone	78-93-3	3.10E-02	3.10E-02	7E-09		6E-07		2E-06		1E-08		8E-07		5E-07		5E-06
04-A	VOC	1,1-Dichloroethane	75-34-3	5.10E-01	5.10E-01	9E-06		5E-03		6E-03		1E-05		6E-04		5E-04		5E-04
04-A	VOC	cis-1,2-Dichloroethene	156-59-2	8.10E-02	8.10E-02	6E-07		9E-03		1E-02		2E-05		1E-03		9E-04		9E-04
04-A	VOC	trans-1,2-Dichloroethene	156-60-5	2.60E-02	2.60E-02	2E-07		2E-03		3E-03		5E-06		3E-04		2E-04		2E-03
04-A	VOC	Methyl Acetate	79-20-9	7.80E-02	7.80E-02	3E-08		4E-06		9E-06		6E-08		3E-06		3E-06		2E-06
04-A	VOC	1,1,1-Trichloroethane	71-55-6	1.50E-01	1.50E-01	6E-07		3E-04		4E-04		9E-07		5E-05		4E-05		4E-05
04-A	VOC	Trichloroethene	79-01-6	2.80E-01	2.80E-01	5E-06	6E-07		1E-06		6E-10		1E-07		6E-08		2E-08	
04-A	SVOC	Anthracene	120-12-7	2.61E-01	2.61E-01							5E-08		4E-06		1E-06		2E-07
04-A	SVOC	Benzo(a)anthracene	56-55-3	1.47E+00	1.47E+00		3E-11		9E-11		9E-09		2E-06		5E-07		5E-08	
04-A	SVOC	Benzo(a)pyrene	50-32-8	1.50E+00	1.50E+00		4E-11		1E-10		9E-08		2E-05		5E-06		4E-07	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
04-A	SVOC	Benzo(b)fluoranthene	205-99-2	1.40E+00	1.40E+00		3E-10		9E-10		8E-09		2E-06		5E-07		5E-08	
04-A	SVOC	Benzo(g,h,i)perylene	191-24-2	1.87E+00	1.87E+00			2E-11		4E-11		4E-06		3E-04		8E-05		2E-05
04-A	SVOC	Benzo(k)fluoranthene	207-08-9	1.44E+00	1.44E+00		2E-13		7E-13		8E-10		2E-07		5E-08		4E-09	
04-A	SVOC	Chrysene	218-01-9	1.85E+00	1.85E+00		1E-11		3E-11		1E-10		3E-08		7E-09		6E-10	
04-A	SVOC	Fluoranthene	206-44-0	3.46E+00	3.46E+00			3E-07		7E-07		5E-06		5E-04		1E-04		3E-05
04-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.41E+00	1.41E+00		2E-12		5E-12		8E-09		2E-06		5E-07		4E-08	
04-A	SVOC	Phenanthrene	85-01-8	1.37E+00	1.37E+00			1E-06		2E-06		3E-06		3E-04		8E-05		3E-05
04-A	SVOC	Pyrene	129-00-0	3.79E+00	3.79E+00			3E-07		7E-07		7E-06		7E-04		2E-04		5E-05
04-A	INORG	Arsenic	7440-38-2	2.90E+00														
04-A	INORG	Barium	7440-39-3	8.70E+01														
04-A	INORG	Beryllium	7440-41-7	1.20E-01														
04-A	INORG	Cadmium	7440-43-9	1.80E-01														
04-A	INORG	Chromium (total)	7440-47-3	3.30E+01	1.04E+00						4E-09	4E-05	4E-09	1E-03	2E-09	2E-04	6E-09	5E-04
04-A	INORG	Cobalt	7440-48-4	2.70E+00														
04-A	INORG	Copper	7440-50-8	9.00E+01	6.15E+01							6E-05		6E-03		8E-04		3E-03
04-A	INORG	Cyanide (total)	57-12-5	7.30E-02	7.30E-02							1E-07		1E-05		2E-06		7E-06
04-A	INORG	Lead	7439-92-1	3.20E+01	3.20E+01													
04-A	INORG	Manganese	7439-96-5	2.50E+02														
04-A	INORG	Mercury	7439-97-6	1.86E-02														
04-A	INORG	Nickel	7440-02-0	7.00E+01	5.00E+01						4E-09		4E-09		2E-09		6E-09	
04-A	INORG	Silver	7440-22-4	1.30E-01														
04-A	INORG	Vanadium	7440-62-2	7.20E+00														
04-A	INORG	Zinc	7440-66-6	5.00E+01														
04-B	VOC	2-Butanone	78-93-3	3.50E-02	3.50E-02	8E-09		7E-07		2E-06		2E-08		9E-07		6E-07		5E-06
04-B	VOC	Methyl Acetate	79-20-9	4.80E-01	4.80E-01	2E-07		2E-05		6E-05		4E-07		2E-05		2E-05		1E-05
04-B	VOC	Methylcyclohexane	108-87-2	4.40E-02	4.40E-02	2E-07		7E-05		9E-05		4E-07		2E-05		1E-05		1E-04
04-B	VOC	Trichloroethene	79-01-6	4.60E-02	4.60E-02	9E-07	1E-07		2E-07		1E-10		2E-08		1E-08		4E-09	
04-B	SVOC	Acenaphthene	83-32-9	9.94E-02	9.94E-02			8E-07		2E-06		2E-07		1E-05		5E-06		3E-06
04-B	SVOC	Anthracene	120-12-7	4.23E-01	4.23E-01							8E-08		7E-06		2E-06		4E-07
04-B	SVOC	Benzo(a)anthracene	56-55-3	7.00E-01	7.00E-01		1E-11		4E-11		4E-09		1E-06		2E-07		2E-08	
04-B	SVOC	Benzo(a)pyrene	50-32-8	5.97E-01	5.97E-01		2E-11		5E-11		4E-08		1E-05		2E-06		2E-07	
04-B	SVOC	Benzo(b)fluoranthene	205-99-2	4.46E-01	4.46E-01		1E-10		3E-10		3E-09		7E-07		2E-07		1E-08	
04-B	SVOC	Benzo(g,h,i)perylene	191-24-2	6.77E-01	6.77E-01			6E-12		1E-11		1E-06		1E-04		3E-05		6E-06
04-B	SVOC	Benzo(k)fluoranthene	207-08-9	4.35E-01	4.35E-01		7E-14		2E-13		3E-10		7E-08		2E-08		1E-09	
04-B	SVOC	Biphenyl	92-52-4	5.00E-02	5.00E-02	2E-07		6E-07		2E-06		1E-07		7E-06		3E-06		2E-05
04-B	SVOC	Carbazole	86-74-8	1.14E-01	1.14E-01		1E-13		4E-13		2E-11		5E-09		1E-09		1E-10	
04-B	SVOC	Chrysene	218-01-9	6.97E-01	6.97E-01		4E-12		1E-11		4E-11		1E-08		3E-09		2E-10	
04-B	SVOC	Dibenzofuran	132-64-9	1.72E-01	1.72E-01			1E-06		3E-06		5E-06		4E-04		1E-04		4E-04
04-B	SVOC	Fluoranthene	206-44-0	1.69E+00	1.69E+00			1E-07		4E-07		3E-06		2E-04		6E-05		2E-05
04-B	SVOC	Fluorene	86-73-7	1.02E-01	1.02E-01			3E-07		7E-07		2E-07		2E-05		5E-06		2E-06
04-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.16E-01	5.16E-01		6E-13		2E-12		3E-09		8E-07		2E-07		2E-08	
04-B	SVOC	2-Methylnaphthalene	91-57-6	1.41E-01	1.41E-01			3E-04		8E-04		2E-05		9E-04		6E-04		5E-03
04-B	SVOC	Naphthalene	91-20-3	1.41E-01	1.41E-01	8E-08		9E-04		2E-03		3E-05		1E-03		1E-03		1E-02
04-B	SVOC	Phenanthrene	85-01-8	1.56E+00	1.56E+00			1E-06		3E-06		3E-06		3E-04		9E-05		3E-05
04-B	SVOC	Pyrene	129-00-0	1.68E+00	1.68E+00			1E-07		3E-07		3E-06		3E-04		8E-05		2E-05
04-B	INORG	Antimony	7440-36-0	4.20E-01	3.34E-01							3E-05		3E-03		4E-04		2E-03
04-B	INORG	Arsenic	7440-38-2	7.00E+00														
04-B	INORG	Barium	7440-39-3	7.70E+01														
04-B	INORG	Beryllium	7440-41-7	5.00E-01														
04-B	INORG	Cadmium	7440-43-9	3.50E-01														
04-B	INORG	Chromium (total)	7440-47-3	1.60E+01														
04-B	INORG	Cobalt	7440-48-4	1.00E+01	2.95E+00						2E-09	3E-04	3E-09	6E-04	2E-09	1E-04	4E-09	5E-03
04-B	INORG	Copper	7440-50-8	6.50E+01	3.65E+01							4E-05		3E-03		4E-04		2E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
04-B	INORG	Cyanide (total)	57-12-5	5.50E+00	5.50E+00							1E-05		1E-03		1E-04		5E-04
04-B	INORG	Lead	7439-92-1	5.20E+01	5.20E+01													
04-B	INORG	Manganese	7439-96-5	6.50E+02	1.73E+02							7E-03		7E-03		2E-03		1E-01
04-B	INORG	Mercury	7439-97-6	2.77E-02														
04-B	INORG	Nickel	7440-02-0	3.60E+01	1.60E+01						1E-09		1E-09		7E-10		2E-09	
04-B	INORG	Silver	7440-22-4	1.20E-01														
04-B	INORG	Thallium	7440-28-0	4.50E-01	2.53E-01							1E-04		1E-02		2E-03		7E-03
04-B	INORG	Vanadium	7440-62-2	1.80E+01														
04-B	INORG	Zinc	7440-66-6	5.40E+01														
04-C	VOC	Methyl Acetate	79-20-9	3.00E-01	3.00E-01	1E-07		1E-05		3E-05		2E-07		1E-05		1E-05		9E-06
04-C	VOC	Methylene Chloride	75-09-2	3.40E-02	3.40E-02	2E-06	2E-08	3E-05	4E-08	7E-05	3E-11	1E-07	4E-09	9E-06	3E-09	5E-06	1E-09	5E-05
04-C	VOC	Trichloroethene	79-01-6	1.10E-01	1.10E-01	2E-06	2E-07		5E-07		2E-10		4E-08		3E-08		9E-09	
04-C	SVOC	Benzo(a)anthracene	56-55-3	7.06E-02	7.06E-02		1E-12		4E-12		4E-10		1E-07		2E-08		2E-09	
04-C	SVOC	Benzo(a)pyrene	50-32-8	3.97E-02	3.97E-02		1E-12		3E-12		2E-09		6E-07		1E-07		1E-08	
04-C	SVOC	Benzo(b)fluoranthene	205-99-2	6.65E-02	6.65E-02		1E-11		4E-11		4E-10		1E-07		2E-08		2E-09	
04-C	SVOC	Benzo(k)fluoranthene	207-08-9	5.46E-02	5.46E-02		9E-15		3E-14		3E-11		9E-09		2E-09		2E-10	
04-C	SVOC	Butylbenzylphthalate	85-68-7	8.87E-02	8.87E-02		3E-14	2E-10	9E-14	6E-10	1E-12	2E-08	4E-10	2E-06	7E-11	5E-07	7E-12	1E-07
04-C	SVOC	Chrysene	218-01-9	9.12E-02	9.12E-02		5E-13		2E-12		5E-12		1E-09		3E-10		3E-11	
04-C	SVOC	Fluoranthene	206-44-0	1.74E-01	1.74E-01			1E-08		4E-08		3E-07		2E-05		6E-06		2E-06
04-C	SVOC	Phenanthrene	85-01-8	1.15E-01	1.15E-01			8E-08		2E-07		2E-07		2E-05		6E-06		2E-06
04-C	SVOC	Pyrene	129-00-0	1.44E-01	1.44E-01			1E-08		3E-08		3E-07		3E-05		7E-06		2E-06
04-C	PCB	PCBs (total)	1336-36-3	1.41E-01	1.41E-01	3E-08	2E-09		5E-09		3E-09	4E-04	7E-07	4E-02	2E-07	1E-02	2E-08	8E-03
04-C	INORG	Arsenic	7440-38-2	4.10E+00														
04-C	INORG	Barium	7440-39-3	1.80E+01														
04-C	INORG	Beryllium	7440-41-7	2.80E-01														
04-C	INORG	Cadmium	7440-43-9	1.90E-01														
04-C	INORG	Chromium (total)	7440-47-3	2.10E+01														
04-C	INORG	Cobalt	7440-48-4	3.50E+00														
04-C	INORG	Copper	7440-50-8	2.40E+01														
04-C	INORG	Lead	7439-92-1	8.70E+00	8.70E+00													
04-C	INORG	Manganese	7439-96-5	2.60E+02														
04-C	INORG	Mercury	7439-97-6	2.42E-02														
04-C	INORG	Nickel	7440-02-0	1.30E+01														
04-C	INORG	Silver	7440-22-4	1.30E-01														
04-C	INORG	Thallium	7440-28-0	1.40E-01														
04-C	INORG	Vanadium	7440-62-2	7.50E+00														
04-C	INORG	Zinc	7440-66-6	3.30E+01														
05-1	VOC	Acetone	67-64-1	3.90E-01	3.90E-01	2E-08		9E-06		2E-05		3E-07		2E-05		1E-05		9E-05
05-1	VOC	2-Butanone	78-93-3	4.90E-02	4.90E-02	1E-08		1E-06		2E-06		2E-08		1E-06		8E-07		7E-06
05-1	VOC	Cyclohexane	110-82-7	3.30E-02	3.30E-02	2E-07		3E-05		3E-05		1E-07		5E-06		4E-06		4E-05
05-1	VOC	cis-1,2-Dichloroethene	156-59-2	2.00E-01	2.00E-01	1E-06		2E-02		3E-02		6E-05		3E-03		2E-03		2E-03
05-1	VOC	Methyl Acetate	79-20-9	1.00E-01	1.00E-01	4E-08		5E-06		1E-05		8E-08		4E-06		3E-06		3E-06
05-1	VOC	Methylcyclohexane	108-87-2	8.00E-02	8.00E-02	3E-07		1E-04		2E-04		6E-07		3E-05		3E-05		2E-04
05-1	VOC	Methylene Chloride	75-09-2	3.20E-02	3.20E-02	2E-06	2E-08	3E-05	4E-08	6E-05	2E-11	1E-07	4E-09	8E-06	2E-09	5E-06	9E-10	5E-05
05-1	VOC	Toluene	108-88-3	4.30E-02	4.30E-02	4E-07		2E-05		5E-05		8E-08		5E-06		3E-06		3E-05
05-1	VOC	Trichloroethene	79-01-6	1.90E+00	1.90E+00	4E-05	4E-06		8E-06		4E-09		7E-07		4E-07		2E-07	
05-1	VOC	Xylenes (total)	1330-20-7	7.30E-02	7.30E-02	3E-07		9E-04		2E-03		4E-06		2E-04		2E-04		1E-03
05-1	SVOC	Acenaphthene	83-32-9	3.21E-01	3.21E-01			3E-06		7E-06		5E-07		4E-05		2E-05		1E-05
05-1	SVOC	Acenaphthylene	208-96-8	9.35E-02	9.35E-02			1E-06		3E-06		3E-07		2E-05		9E-06		5E-06
05-1	SVOC	Acetophenone	98-86-2	4.35E-02	4.35E-02	1E-08		1E-06		3E-06		9E-08		6E-06		3E-06		3E-06
05-1	SVOC	Anthracene	120-12-7	9.13E-01	9.13E-01							2E-07		2E-05		4E-06		9E-07
05-1	SVOC	Benzo(a)anthracene	56-55-3	2.47E+00	2.47E+00		5E-11		2E-10		1E-08		4E-06		9E-07		8E-08	
05-1	SVOC	Benzo(a)pyrene	50-32-8	2.06E+00	2.06E+00		6E-11		2E-10		1E-07		3E-05		7E-06		6E-07	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
05-1	SVOC	Benzo(b)fluoranthene	205-99-2	2.57E+00	2.57E+00		6E-10		2E-09		2E-08		4E-06		9E-07		8E-08	
05-1	SVOC	Benzo(g,h,i)perylene	191-24-2	1.03E+00	1.03E+00			8E-12		2E-11		2E-06		2E-04		5E-05		1E-05
05-1	SVOC	Benzo(k)fluoranthene	207-08-9	2.97E+00	2.97E+00		5E-13		1E-12		2E-09		5E-07		1E-07		9E-09	
05-1	SVOC	Biphenyl	92-52-4	1.80E-01	1.80E-01	6E-07		2E-06		6E-06		3E-07		3E-05		1E-05		7E-05
05-1	SVOC	Butylbenzylphthalate	85-68-7	4.81E-02	4.81E-02		2E-14	1E-10	5E-14	3E-10	7E-13	1E-08	2E-10	1E-06	4E-11	3E-07	4E-12	7E-08
05-1	SVOC	Carbazole	86-74-8	1.38E+00	1.38E+00		2E-12		5E-12		2E-10		6E-08		1E-08		1E-09	
05-1	SVOC	2-Chloronaphthalene	91-58-7	9.86E-02	9.86E-02			8E-07		2E-06		1E-07		9E-06		4E-06		3E-05
05-1	SVOC	Chrysene	218-01-9	2.69E+00	2.69E+00		2E-11		5E-11		2E-10		4E-08		1E-08		9E-10	
05-1	SVOC	Dibenzofuran	132-64-9	1.96E-01	1.96E-01			1E-06		3E-06		6E-06		5E-04		1E-04		4E-04
05-1	SVOC	Diethylphthalate	84-66-2	9.13E-02	9.13E-02	3E-09		3E-09		9E-09		7E-09		6E-07		2E-07		7E-08
05-1	SVOC	Di-n-butylphthalate	84-74-2	5.11E-02	5.11E-02	6E-13						3E-08		2E-06		6E-07		1E-07
05-1	SVOC	Fluoranthene	206-44-0	2.95E+00	2.95E+00			2E-07		6E-07		4E-06		4E-04		1E-04		3E-05
05-1	SVOC	Fluorene	86-73-7	4.58E-01	4.58E-01			1E-06		3E-06		8E-07		7E-05		2E-05		1E-05
05-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	9.19E-01	9.19E-01		1E-12		3E-12		5E-09		1E-06		3E-07		3E-08	
05-1	SVOC	2-Methylnaphthalene	91-57-6	5.46E-01	5.46E-01			1E-03		3E-03		6E-05		3E-03		2E-03		2E-02
05-1	SVOC	Naphthalene	91-20-3	3.13E-01	3.13E-01	2E-07		2E-03		5E-03		6E-05		3E-03		2E-03		2E-02
05-1	SVOC	Phenanthrene	85-01-8	3.42E+00	3.42E+00			2E-06		6E-06		7E-06		6E-04		2E-04		7E-05
05-1	SVOC	Pyrene	129-00-0	4.99E+00	4.99E+00			4E-07		1E-06		1E-05		9E-04		2E-04		6E-05
05-1	PCB	PCBs (total)	1336-36-3	7.19E-01	7.19E-01	1E-07	9E-09		3E-08		1E-08	2E-03	3E-06	2E-01	8E-07	5E-02	1E-07	4E-02
05-1	INORG	Antimony	7440-36-0	2.70E-01	1.84E-01							2E-05		2E-03		2E-04		9E-04
05-1	INORG	Arsenic	7440-38-2	1.20E+01	3.88E+00						4E-08	6E-04	1E-05	5E-02	1E-06	9E-03	2E-07	2E-03
05-1	INORG	Barium	7440-39-3	1.70E+02	7.43E+01													
05-1	INORG	Beryllium	7440-41-7	1.00E+00	4.10E-01						3E-10	5E-05	3E-10	8E-04	2E-10	1E-04	5E-10	1E-03
05-1	INORG	Cadmium	7440-43-9	7.70E-01	1.82E-01						1E-10	1E-05	1E-10	8E-04	6E-11	1E-04	2E-10	4E-04
05-1	INORG	Chromium (total)	7440-47-3	7.60E+01	4.40E+01						2E-07	1E-03	2E-07	5E-02	1E-07	7E-03	3E-07	2E-02
05-1	INORG	Cobalt	7440-48-4	6.50E+00														
05-1	INORG	Copper	7440-50-8	2.10E+04	2.10E+04							2E-02		2E+00		3E-01		1E+00
05-1	INORG	Cyanide (total)	57-12-5	2.70E-01	2.70E-01							5E-07		5E-05		7E-06		3E-05
05-1	INORG	Lead	7439-92-1	3.10E+03	3.10E+03													
05-1	INORG	Manganese	7439-96-5	2.40E+03	1.92E+03							8E-02		8E-02		3E-02		1E+00
05-1	INORG	Mercury	7439-97-6	1.40E+00	1.35E+00	4E-05		5E-03		1E-02		6E-04		4E-02		2E-02		2E-01
05-1	INORG	Nickel	7440-02-0	8.90E+01	6.90E+01						5E-09		5E-09		3E-09		8E-09	
05-1	INORG	Selenium	7782-49-2	5.30E-01	1.06E-02							8E-08		8E-06		1E-06		4E-06
05-1	INORG	Silver	7440-22-4	9.80E+00	9.61E+00							2E-03		8E-03		1E-03		4E-02
05-1	INORG	Thallium	7440-28-0	1.40E-01														
05-1	INORG	Vanadium	7440-62-2	3.10E+01	6.13E+00							3E-05		3E-03		4E-04		2E-03
05-1	INORG	Zinc	7440-66-6	1.80E+02	6.95E+01							9E-06		8E-04		1E-04		5E-04
05-2	VOC	Acetone	67-64-1	3.60E-01	3.60E-01	2E-08		8E-06		2E-05		2E-07		1E-05		1E-05		8E-05
05-2	VOC	Xylenes (total)	1330-20-7	1.08E-01	1.08E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
05-2	SVOC	Benzo(a)anthracene	56-55-3	2.01E-01	2.01E-01		4E-12		1E-11		1E-09		3E-07		7E-08		6E-09	
05-2	SVOC	Benzo(a)pyrene	50-32-8	2.64E-01	2.64E-01		7E-12		2E-11		2E-08		4E-06		9E-07		8E-08	
05-2	SVOC	Benzo(b)fluoranthene	205-99-2	2.08E-01	2.08E-01		5E-11		1E-10		1E-09		3E-07		7E-08		7E-09	
05-2	SVOC	Benzo(g,h,i)perylene	191-24-2	3.68E-01	3.68E-01			3E-12		8E-12		7E-07		6E-05		2E-05		3E-06
05-2	SVOC	Benzo(k)fluoranthene	207-08-9	2.91E-01	2.91E-01		5E-14		1E-13		2E-10		5E-08		1E-08		9E-10	
05-2	SVOC	Chrysene	218-01-9	2.12E-01	2.12E-01		1E-12		4E-12		1E-11		3E-09		8E-10		7E-11	
05-2	SVOC	Fluoranthene	206-44-0	2.76E-01	2.76E-01			2E-08		6E-08		4E-07		4E-05		1E-05		3E-06
05-2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.70E-01	2.70E-01		3E-13		9E-13		2E-09		4E-07		9E-08		8E-09	
05-2	SVOC	Phenanthrene	85-01-8	4.85E-02	4.85E-02			3E-08		9E-08		1E-07		9E-06		3E-06		9E-07
05-2	SVOC	Pyrene	129-00-0	4.48E-01	4.48E-01			3E-08		9E-08		9E-07		8E-05		2E-05		5E-06
05-2	INORG	Arsenic	7440-38-2	7.55E+00														
05-2	INORG	Barium	7440-39-3	4.41E+01														
05-2	INORG	Beryllium	7440-41-7	1.60E-01														
05-2	INORG	Cadmium	7440-43-9	1.44E-01														

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
05-2	INORG	Chromium (total)	7440-47-3	1.34E+01														
05-2	INORG	Cobalt	7440-48-4	2.70E+00														
05-2	INORG	Copper	7440-50-8	5.10E+00														
05-2	INORG	Cyanide (total)	57-12-5	4.70E-02	4.70E-02							9E-08		9E-06		1E-06		5E-06
05-2	INORG	Lead	7439-92-1	7.13E+00	7.13E+00													
05-2	INORG	Manganese	7439-96-5	1.50E+02														
05-2	INORG	Mercury	7439-97-6	4.28E-02														
05-2	INORG	Nickel	7440-02-0	5.90E+00														
05-2	INORG	Selenium	7782-49-2	2.60E-01														
05-2	INORG	Silver	7440-22-4	2.70E-02														
05-2	INORG	Thallium	7440-28-0	4.90E-02														
05-2	INORG	Vanadium	7440-62-2	1.10E+01														
05-2	INORG	Zinc	7440-66-6	2.70E+01														
05-3	VOC	Acetone	67-64-1	3.50E-01	3.50E-01	2E-08		8E-06		2E-05		2E-07		1E-05		1E-05		8E-05
05-3	VOC	2-Butanone	78-93-3	2.90E-02	2.90E-02	7E-09		6E-07		1E-06		1E-08		8E-07		5E-07		4E-06
05-3	VOC	Cyclohexane	110-82-7	3.70E-02	3.70E-02	3E-07		3E-05		4E-05		1E-07		6E-06		5E-06		4E-05
05-3	VOC	Methyl Acetate	79-20-9	5.20E-02	5.20E-02	2E-08		2E-06		6E-06		4E-08		2E-06		2E-06		2E-06
05-3	VOC	Methylcyclohexane	108-87-2	8.60E-02	8.60E-02	3E-07		1E-04		2E-04		7E-07		4E-05		3E-05		3E-04
05-3	VOC	1,1,1-Trichloroethane	71-55-6	2.30E+00	2.30E+00	9E-06		5E-03		6E-03		1E-05		8E-04		6E-04		5E-04
05-3	VOC	Trichloroethene	79-01-6	2.30E-01	2.30E-01	4E-06	5E-07		1E-06		5E-10		8E-08		5E-08		2E-08	
05-3	VOC	Xylenes (total)	1330-20-7	1.23E-01	1.23E-01	5E-07		1E-03		4E-03		6E-06		3E-04		3E-04		2E-03
05-3	SVOC	Benzo(a)anthracene	56-55-3	2.60E-01	2.60E-01		5E-12		2E-11		2E-09		4E-07		9E-08		8E-09	
05-3	SVOC	Benzo(a)pyrene	50-32-8	2.80E-01	2.80E-01		8E-12		2E-11		2E-08		5E-06		1E-06		8E-08	
05-3	SVOC	Benzo(b)fluoranthene	205-99-2	4.15E-01	4.15E-01		9E-11		3E-10		2E-09		7E-07		1E-07		1E-08	
05-3	SVOC	Benzo(g,h,i)perylene	191-24-2	7.50E-02	7.50E-02			6E-13		2E-12		1E-07		1E-05		3E-06		7E-07
05-3	SVOC	Benzo(k)fluoranthene	207-08-9	2.79E-01	2.79E-01		5E-14		1E-13		2E-10		5E-08		1E-08		8E-10	
05-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.30E-01	2.30E-01	4E-14	2E-16	2E-12	5E-16	4E-12	2E-11	6E-07	7E-09	6E-05	1E-09	1E-05	1E-10	3E-05
05-3	SVOC	Butylbenzylphthalate	85-68-7	7.67E-02	7.67E-02		3E-14	2E-10	8E-14	5E-10	1E-12	2E-08	3E-10	2E-06	6E-11	4E-07	6E-12	1E-07
05-3	SVOC	Chrysene	218-01-9	2.80E-01	2.80E-01		2E-12		5E-12		2E-11		5E-09		1E-09		1E-10	
05-3	SVOC	Di-n-butylphthalate	84-74-2	9.60E-02	9.60E-02	1E-12						5E-08		5E-06		1E-06		2E-07
05-3	SVOC	Fluoranthene	206-44-0	5.80E-01	5.80E-01			5E-08		1E-07		9E-07		8E-05		2E-05		6E-06
05-3	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	9.64E-02	9.64E-02		1E-13		3E-13		6E-10		2E-07		3E-08		3E-09	
05-3	SVOC	Naphthalene	91-20-3	5.60E-02	5.60E-02	3E-08		3E-04		9E-04		1E-05		6E-04		4E-04		4E-03
05-3	SVOC	Phenanthrene	85-01-8	5.00E-01	5.00E-01			4E-07		9E-07		1E-06		9E-05		3E-05		1E-05
05-3	SVOC	Pyrene	129-00-0	5.30E-01	5.30E-01			4E-08		1E-07		1E-06		9E-05		3E-05		6E-06
05-3	PCB	PCBs (total)	1336-36-3	1.69E-01	1.69E-01	3E-08	2E-09		7E-09		3E-09	5E-04	8E-07	4E-02	2E-07	1E-02	2E-08	1E-02
05-3	INORG	Antimony	7440-36-0	1.10E-01	2.36E-02							2E-06		2E-04		3E-05		1E-04
05-3	INORG	Arsenic	7440-38-2	1.07E+01	2.58E+00						3E-08	4E-04	7E-06	3E-02	9E-07	6E-03	1E-07	1E-03
05-3	INORG	Barium	7440-39-3	7.65E+01														
05-3	INORG	Beryllium	7440-41-7	3.20E-01														
05-3	INORG	Cadmium	7440-43-9	4.50E-01														
05-3	INORG	Chromium (total)	7440-47-3	3.60E+01	4.04E+00						1E-08	1E-04	2E-08	5E-03	9E-09	7E-04	2E-08	2E-03
05-3	INORG	Cobalt	7440-48-4	4.60E+00														
05-3	INORG	Copper	7440-50-8	1.50E+02	1.22E+02							1E-04		1E-02		1E-03		6E-03
05-3	INORG	Cyanide (total)	57-12-5	1.80E-02	1.80E-02							4E-08		3E-06		4E-07		2E-06
05-3	INORG	Lead	7439-92-1	4.00E+02	4.00E+02													
05-3	INORG	Manganese	7439-96-5	6.00E+02	1.23E+02							5E-03		5E-03		2E-03		9E-02
05-3	INORG	Mercury	7439-97-6	5.69E-02	4.53E-03	1E-07		2E-05		4E-05		2E-06		1E-04		7E-05		6E-04
05-3	INORG	Nickel	7440-02-0	2.10E+01	1.04E+00						7E-11		8E-11		5E-11		1E-10	
05-3	INORG	Selenium	7782-49-2	1.96E-01														
05-3	INORG	Silver	7440-22-4	2.60E-01	7.23E-02							2E-05		6E-05		1E-05		3E-04
05-3	INORG	Thallium	7440-28-0	1.20E-01														
05-3	INORG	Vanadium	7440-62-2	1.70E+01														

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
05-3	INORG	Zinc	7440-66-6	6.10E+01														
05-4	VOC	Acetone	67-64-1	3.20E-01	3.20E-01	2E-08		7E-06		2E-05		2E-07		1E-05		9E-06		7E-05
05-4	VOC	cis-1,2-Dichloroethene	156-59-2	4.80E-02	4.80E-02	3E-07		5E-03		8E-03		1E-05		7E-04		6E-04		5E-04
05-4	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	4.40E-01	4.40E-01	7E-14	3E-16	3E-12	1E-15	9E-12	5E-11	1E-06	1E-08	1E-04	2E-09	2E-05	2E-10	6E-05
05-4	INORG	Arsenic	7440-38-2	1.04E+01	2.28E+00						2E-08	3E-04	6E-06	3E-02	8E-07	5E-03	1E-07	1E-03
05-4	INORG	Barium	7440-39-3	4.75E+01														
05-4	INORG	Cadmium	7440-43-9	2.21E-01														
05-4	INORG	Chromium (total)	7440-47-3	1.14E+01														
05-4	INORG	Lead	7439-92-1	1.08E+01	1.08E+01													
05-4	INORG	Selenium	7782-49-2	1.87E-01														
05-5	VOC	Acetone	67-64-1	4.00E-01	4.00E-01	2E-08		9E-06		2E-05		3E-07		2E-05		1E-05		9E-05
05-5	VOC	Benzene	71-43-2	4.30E-02	4.30E-02	8E-05	5E-07	6E-03	8E-07	8E-03	5E-10	2E-05	8E-08	8E-04	5E-08	6E-04	2E-08	3E-03
05-5	VOC	2-Butanone	78-93-3	3.70E-02	3.70E-02	9E-09		7E-07		2E-06		2E-08		1E-06		6E-07		6E-06
05-5	VOC	Cyclohexane	110-82-7	1.40E-01	1.40E-01	1E-06		1E-04		1E-04		4E-07		2E-05		2E-05		2E-04
05-5	VOC	Ethyl Benzene	100-41-4	3.00E-02	3.00E-02	1E-07		4E-05		1E-04		2E-07		1E-05		7E-06		6E-05
05-5	VOC	Methyl Acetate	79-20-9	4.40E-02	4.40E-02	2E-08		2E-06		5E-06		4E-08		2E-06		1E-06		1E-06
05-5	VOC	Methylcyclohexane	108-87-2	2.60E-01	2.60E-01	1E-06		4E-04		5E-04		2E-06		1E-04		9E-05		8E-04
05-5	VOC	Methylene Chloride	75-09-2	3.50E-02	3.50E-02	2E-06	2E-08	3E-05	4E-08	7E-05	3E-11	1E-07	4E-09	9E-06	3E-09	6E-06	1E-09	5E-05
05-5	VOC	Toluene	108-88-3	2.60E-01	2.60E-01	2E-06		1E-04		3E-04		5E-07		3E-05		2E-05		2E-04
05-5	VOC	Trichloroethene	79-01-6	5.70E-01	5.70E-01	1E-05	1E-06		2E-06		1E-09		2E-07		1E-07		5E-08	
05-5	VOC	Xylenes (total)	1330-20-7	2.94E-01	2.94E-01	1E-06		4E-03		9E-03		1E-05		8E-04		6E-04		6E-03
05-5	SVOC	Atrazine	1912-24-9	5.09E-02	5.09E-02	5E-11	4E-12	1E-09	1E-11	3E-09	9E-11	8E-08	2E-08	7E-06	5E-09	2E-06	7E-10	6E-06
05-5	SVOC	Benzo(a)anthracene	56-55-3	5.54E-02	5.54E-02		1E-12		3E-12		3E-10		9E-08		2E-08		2E-09	
05-5	SVOC	Benzo(b)fluoranthene	205-99-2	6.95E-02	6.95E-02		2E-11		5E-11		4E-10		1E-07		2E-08		2E-09	
05-5	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.30E-01	5.30E-01	8E-14	4E-16	4E-12	1E-15	1E-11	6E-11	1E-06	2E-08	1E-04	3E-09	3E-05	3E-10	7E-05
05-5	SVOC	Chrysene	218-01-9	2.19E-01	2.19E-01		1E-12		4E-12		1E-11		4E-09		8E-10		8E-11	
05-5	SVOC	Fluoranthene	206-44-0	2.10E-01	2.10E-01			2E-08		4E-08		3E-07		3E-05		8E-06		2E-06
05-5	SVOC	Fluorene	86-73-7	1.46E-01	1.46E-01			4E-07		1E-06		3E-07		2E-05		7E-06		3E-06
05-5	SVOC	2-Methylnaphthalene	91-57-6	1.22E-01	1.22E-01			3E-04		7E-04		1E-05		8E-04		5E-04		5E-03
05-5	SVOC	Naphthalene	91-20-3	5.44E-02	5.44E-02	3E-08		3E-04		8E-04		1E-05		5E-04		4E-04		4E-03
05-5	SVOC	Pentachlorophenol	87-86-5	2.80E-01	2.80E-01	3E-09	1E-11	9E-09	4E-11	2E-08	4E-10	7E-07	1E-07	6E-05	3E-08	2E-05	2E-09	5E-05
05-5	SVOC	Phenanthrene	85-01-8	5.60E+00	5.60E+00			4E-06		1E-05		1E-05		1E-03		3E-04		1E-04
05-5	SVOC	Pyrene	129-00-0	4.77E-01	4.77E-01			4E-08		9E-08		9E-07		8E-05		2E-05		6E-06
05-5	PCB	PCBs (total)	1336-36-3	1.66E-01	1.66E-01	3E-08	2E-09		6E-09		3E-09	5E-04	8E-07	4E-02	2E-07	1E-02	2E-08	9E-03
05-5	INORG	Arsenic	7440-38-2	6.90E+00														
05-5	INORG	Barium	7440-39-3	7.30E+01														
05-5	INORG	Beryllium	7440-41-7	5.50E-01														
05-5	INORG	Cadmium	7440-43-9	3.01E-01														
05-5	INORG	Chromium (total)	7440-47-3	4.50E+01	1.30E+01						5E-08	4E-04	5E-08	2E-02	3E-08	2E-03	8E-08	6E-03
05-5	INORG	Cobalt	7440-48-4	7.60E+00	5.46E-01						4E-10	6E-05	5E-10	1E-04	3E-10	3E-05	7E-10	1E-03
05-5	INORG	Copper	7440-50-8	1.60E+01														
05-5	INORG	Cyanide (total)	57-12-5	7.80E-02	7.80E-02							2E-07		1E-05		2E-06		8E-06
05-5	INORG	Lead	7439-92-1	5.70E+01	5.70E+01													
05-5	INORG	Manganese	7439-96-5	1.20E+03	7.23E+02							3E-02		3E-02		1E-02		5E-01
05-5	INORG	Mercury	7439-97-6	6.57E-02	1.33E-02	4E-07		5E-05		1E-04		6E-06		4E-04		2E-04		2E-03
05-5	INORG	Nickel	7440-02-0	1.80E+01														
05-5	INORG	Selenium	7782-49-2	2.96E-01														
05-5	INORG	Silver	7440-22-4	3.37E-01	1.49E-01							3E-05		1E-04		2E-05		6E-04
05-5	INORG	Thallium	7440-28-0	1.30E-01														
05-5	INORG	Vanadium	7440-62-2	1.90E+01														
05-5	INORG	Zinc	7440-66-6	6.10E+01														
05-6	VOC	Acetone	67-64-1	8.90E-02	8.90E-02	5E-09		2E-06		5E-06		6E-08		3E-06		2E-06		2E-05
05-6	VOC	2-Butanone	78-93-3	8.10E-02	8.10E-02	2E-08		2E-06		4E-06		4E-08		2E-06		1E-06		1E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
05-6	VOC	Cyclohexane	110-82-7	3.60E-02	3.60E-02	3E-07		3E-05		4E-05		1E-07		6E-06		5E-06		4E-05
05-6	VOC	Methyl Acetate	79-20-9	5.60E-01	5.60E-01	2E-07		3E-05		6E-05		4E-07		2E-05		2E-05		2E-05
05-6	VOC	4-Methyl-2-pentanone	108-10-1	6.30E-02	6.30E-02	5E-08		4E-06		1E-05		5E-08		3E-06		2E-06		2E-05
05-6	VOC	Methylcyclohexane	108-87-2	6.80E-02	6.80E-02	3E-07		1E-04		1E-04		5E-07		3E-05		2E-05		2E-04
05-6	VOC	Methylene Chloride	75-09-2	5.80E-02	5.80E-02	3E-06	3E-08	6E-05	7E-08	1E-04	4E-11	2E-07	7E-09	1E-05	4E-09	9E-06	2E-09	8E-05
05-6	VOC	Toluene	108-88-3	4.00E-02	4.00E-02	3E-07		2E-05		5E-05		8E-08		5E-06		3E-06		2E-05
05-6	VOC	Trichloroethene	79-01-6	1.60E-01	1.60E-01	3E-06	3E-07		7E-07		4E-10		6E-08		4E-08		1E-08	
05-6	VOC	Xylenes (total)	1330-20-7	6.20E-02	6.20E-02	2E-07		7E-04		2E-03		3E-06		2E-04		1E-04		1E-03
05-6	SVOC	Acenaphthene	83-32-9	1.40E-01	1.40E-01			1E-06		3E-06		2E-07		2E-05		7E-06		4E-06
05-6	SVOC	Acenaphthylene	208-96-8	1.97E-01	1.97E-01			2E-06		6E-06		6E-07		5E-05		2E-05		1E-05
05-6	SVOC	Anthracene	120-12-7	2.47E-01	2.47E-01							5E-08		4E-06		1E-06		2E-07
05-6	SVOC	Benzaldehyde	100-52-7	8.93E-02	8.93E-02			7E-06		2E-05		3E-07		2E-05		1E-05		8E-05
05-6	SVOC	Benzo(a)anthracene	56-55-3	1.58E+00	1.58E+00		3E-11		1E-10		9E-09		3E-06		6E-07		5E-08	
05-6	SVOC	Benzo(a)pyrene	50-32-8	1.82E+00	1.82E+00		5E-11		2E-10		1E-07		3E-05		6E-06		5E-07	
05-6	SVOC	Benzo(b)fluoranthene	205-99-2	1.80E+00	1.80E+00		4E-10		1E-09		1E-08		3E-06		6E-07		6E-08	
05-6	SVOC	Benzo(g,h,i)perylene	191-24-2	1.49E+00	1.49E+00			1E-11		3E-11		3E-06		3E-04		7E-05		1E-05
05-6	SVOC	Benzo(k)fluoranthene	207-08-9	1.89E+00	1.89E+00		3E-13		1E-12		1E-09		3E-07		7E-08		6E-09	
05-6	SVOC	Biphenyl	92-52-4	4.12E-01	4.12E-01	1E-06		5E-06		1E-05		8E-07		6E-05		2E-05		2E-04
05-6	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	7.06E-01	7.06E-01	1E-13	5E-16	5E-12	2E-15	1E-11	7E-11	2E-06	2E-08	2E-04	4E-09	4E-05	4E-10	9E-05
05-6	SVOC	Butylbenzylphthalate	85-68-7	4.33E-02	4.33E-02		1E-14	1E-10	4E-14	3E-10	6E-13	1E-08	2E-10	1E-06	3E-11	3E-07	3E-12	6E-08
05-6	SVOC	Carbazole	86-74-8	2.61E-01	2.61E-01		3E-13		9E-13		4E-11		1E-08		2E-09		2E-10	
05-6	SVOC	Chrysene	218-01-9	2.05E+00	2.05E+00		1E-11		4E-11		1E-10		3E-08		7E-09		7E-10	
05-6	SVOC	Dibenzofuran	132-64-9	1.56E-01	1.56E-01			1E-06		3E-06		4E-06		4E-04		1E-04		4E-04
05-6	SVOC	Diethylphthalate	84-66-2	1.53E-01	1.53E-01	5E-09		6E-09		1E-08		1E-08		1E-06		3E-07		1E-07
05-6	SVOC	Fluoranthene	206-44-0	3.24E+00	3.24E+00			3E-07		7E-07		5E-06		4E-04		1E-04		3E-05
05-6	SVOC	Fluorene	86-73-7	1.66E-01	1.66E-01			4E-07		1E-06		3E-07		3E-05		8E-06		4E-06
05-6	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	9.95E-01	9.95E-01		1E-12		3E-12		6E-09		2E-06		3E-07		3E-08	
05-6	SVOC	2-Methylnaphthalene	91-57-6	6.84E-01	6.84E-01			1E-03		4E-03		8E-05		4E-03		3E-03		3E-02
05-6	SVOC	Methylphenol (total)	1319-77-3	1.23E-01	1.23E-01	4E-09						1E-07		1E-05		3E-06		6E-07
05-6	SVOC	Naphthalene	91-20-3	4.71E-01	4.71E-01	3E-07		3E-03		7E-03		9E-05		5E-03		4E-03		3E-02
05-6	SVOC	Pentachlorophenol	87-86-5	1.03E-01	1.03E-01	1E-09	4E-12	3E-09	1E-11	9E-09	1E-10	3E-07	4E-08	2E-05	1E-08	8E-06	9E-10	2E-05
05-6	SVOC	Phenanthrene	85-01-8	3.18E+00	3.18E+00			2E-06		6E-06		7E-06		6E-04		2E-04		6E-05
05-6	SVOC	Pyrene	129-00-0	5.18E+00	5.18E+00			4E-07		1E-06		1E-05		9E-04		2E-04		6E-05
05-6	PCB	PCBs (total)	1336-36-3	3.99E-01	3.99E-01	7E-08	5E-09		2E-08		7E-09	1E-03	2E-06	1E-01	5E-07	3E-02	6E-08	2E-02
05-6	INORG	Antimony	7440-36-0	3.60E-02														
05-6	INORG	Arsenic	7440-38-2	9.50E+00	1.38E+00						1E-08	2E-04	4E-06	2E-02	5E-07	3E-03	7E-08	6E-04
05-6	INORG	Barium	7440-39-3	3.30E+02	2.34E+02													
05-6	INORG	Beryllium	7440-41-7	1.60E+00	1.01E+00						7E-10	1E-04	8E-10	2E-03	4E-10	3E-04	1E-09	3E-03
05-6	INORG	Cadmium	7440-43-9	5.10E-01														
05-6	INORG	Chromium (total)	7440-47-3	5.60E+01	2.40E+01						8E-08	8E-04	9E-08	3E-02	5E-08	4E-03	1E-07	1E-02
05-6	INORG	Cobalt	7440-48-4	7.20E+00	1.46E-01						1E-10	2E-05	1E-10	3E-05	8E-11	7E-06	2E-10	3E-04
05-6	INORG	Copper	7440-50-8	9.30E+01	6.45E+01							6E-05		6E-03		8E-04		3E-03
05-6	INORG	Cyanide (total)	57-12-5	1.60E-01	1.60E-01							3E-07		3E-05		4E-06		2E-05
05-6	INORG	Lead	7439-92-1	3.50E+03	3.50E+03													
05-6	INORG	Manganese	7439-96-5	4.40E+02														
05-6	INORG	Mercury	7439-97-6	8.07E-02	2.83E-02	9E-07		1E-04		3E-04		1E-05		8E-04		4E-04		4E-03
05-6	INORG	Nickel	7440-02-0	2.80E+01	8.04E+00						6E-10		6E-10		4E-10		9E-10	
05-6	INORG	Selenium	7782-49-2	3.00E-01														
05-6	INORG	Silver	7440-22-4	2.20E-01	3.23E-02							7E-06		3E-05		5E-06		1E-04
05-6	INORG	Thallium	7440-28-0	1.90E-01														
05-6	INORG	Vanadium	7440-62-2	2.30E+01														
05-6	INORG	Zinc	7440-66-6	1.90E+02	7.95E+01							1E-05		1E-03		1E-04		5E-04
07-1	VOC	Acetone	67-64-1	1.30E-01	1.30E-01	7E-09		3E-06		7E-06		9E-08		5E-06		4E-06		3E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
07-1	VOC	Benzene	71-43-2	2.00E-01	2.00E-01	4E-04	2E-06	3E-02	4E-06	4E-02	2E-09	7E-05	4E-07	4E-03	2E-07	3E-03	9E-08	1E-02
07-1	VOC	2-Butanone	78-93-3	2.00E-01	2.00E-01	5E-08		4E-06		1E-05		9E-08		5E-06		3E-06		3E-05
07-1	VOC	Cumene	98-82-8	1.20E-01	1.20E-01	9E-07		4E-04		1E-03		1E-06		8E-05		6E-05		6E-04
07-1	VOC	Cyclohexane	110-82-7	8.60E-01	8.60E-01	6E-06		7E-04		8E-04		3E-06		1E-04		1E-04		1E-03
07-1	VOC	Ethyl Benzene	100-41-4	3.50E-01	3.50E-01	2E-06		5E-04		1E-03		2E-06		1E-04		8E-05		8E-04
07-1	VOC	Methyl Acetate	79-20-9	3.10E-01	3.10E-01	1E-07		1E-05		4E-05		2E-07		1E-05		1E-05		9E-06
07-1	VOC	Methylcyclohexane	108-87-2	2.50E+00	2.50E+00	9E-06		4E-03		5E-03		2E-05		1E-03		8E-04		8E-03
07-1	VOC	Methylene Chloride	75-09-2	1.00E-01	1.00E-01	5E-06	5E-08	1E-04	1E-07	2E-04	8E-11	4E-07	1E-08	3E-05	8E-09	2E-05	3E-09	1E-04
07-1	VOC	Toluene	108-88-3	1.10E+00	1.10E+00	1E-05		5E-04		1E-03		2E-06		1E-04		8E-05		6E-04
07-1	VOC	Xylenes (total)	1330-20-7	2.50E+00	2.50E+00	1E-05		3E-02		8E-02		1E-04		7E-03		5E-03		5E-02
07-1	SVOC	Acenaphthene	83-32-9	1.16E+00	1.16E+00			9E-06		2E-05		2E-06		1E-04		6E-05		4E-05
07-1	SVOC	Anthracene	120-12-7	2.31E+00	2.31E+00							4E-07		4E-05		1E-05		2E-06
07-1	SVOC	Benzo(a)anthracene	56-55-3	4.07E+00	4.07E+00		8E-11		3E-10		2E-08		7E-06		1E-06		1E-07	
07-1	SVOC	Benzo(a)pyrene	50-32-8	4.04E+00	4.04E+00		1E-10		3E-10		2E-07		7E-05		1E-05		1E-06	
07-1	SVOC	Benzo(b)fluoranthene	205-99-2	3.94E+00	3.94E+00		9E-10		3E-09		2E-08		6E-06		1E-06		1E-07	
07-1	SVOC	Benzo(g,h,i)perylene	191-24-2	2.48E+00	2.48E+00			2E-11		5E-11		5E-06		4E-04		1E-04		2E-05
07-1	SVOC	Benzo(k)fluoranthene	207-08-9	3.59E+00	3.59E+00		6E-13		2E-12		2E-09		6E-07		1E-07		1E-08	
07-1	SVOC	Biphenyl	92-52-4	1.15E-01	1.15E-01	4E-07		1E-06		4E-06		2E-07		2E-05		7E-06		5E-05
07-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	9.65E-01	9.65E-01	2E-13	7E-16	7E-12	2E-15	2E-11	1E-10	3E-06	3E-08	2E-04	5E-09	5E-05	5E-10	1E-04
07-1	SVOC	Butylbenzylphthalate	85-68-7	9.54E-02	9.54E-02		3E-14	2E-10	1E-13	6E-10	1E-12	3E-08	4E-10	2E-06	8E-11	6E-07	8E-12	1E-07
07-1	SVOC	Carbazole	86-74-8	1.16E+00	1.16E+00		1E-12		4E-12		2E-10		5E-08		1E-08		1E-09	
07-1	SVOC	Chrysene	218-01-9	4.03E+00	4.03E+00		2E-11		7E-11		2E-10		7E-08		1E-08		1E-09	
07-1	SVOC	Dibenz(a,h)anthracene	53-70-3	1.64E-01	1.64E-01		2E-14		6E-14		1E-08		3E-06		6E-07		5E-08	
07-1	SVOC	Dibenzofuran	132-64-9	7.24E-01	7.24E-01			5E-06		1E-05		2E-05		2E-03		5E-04		2E-03
07-1	SVOC	Fluoranthene	206-44-0	6.56E+00	6.56E+00			5E-07		1E-06		1E-05		9E-04		2E-04		6E-05
07-1	SVOC	Fluorene	86-73-7	1.00E+00	1.00E+00			3E-06		7E-06		2E-06		2E-04		5E-05		2E-05
07-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.09E+00	2.09E+00		2E-12		7E-12		1E-08		3E-06		7E-07		6E-08	
07-1	SVOC	2-Methylnaphthalene	91-57-6	6.08E-01	6.08E-01			1E-03		3E-03		7E-05		4E-03		3E-03		2E-02
07-1	SVOC	Naphthalene	91-20-3	3.74E-01	3.74E-01	2E-07		2E-03		6E-03		7E-05		4E-03		3E-03		3E-02
07-1	SVOC	Phenanthrene	85-01-8	6.68E+00	6.68E+00			5E-06		1E-05		1E-05		1E-03		4E-04		1E-04
07-1	SVOC	Pyrene	129-00-0	7.86E+00	7.86E+00			6E-07		2E-06		2E-05		1E-03		4E-04		1E-04
07-1	INORG	Antimony	7440-36-0	2.00E-01	1.14E-01							1E-05		1E-03		1E-04		6E-04
07-1	INORG	Arsenic	7440-38-2	1.80E+01	9.88E+00						1E-07	1E-03	3E-05	1E-01	4E-06	2E-02	5E-07	4E-03
07-1	INORG	Barium	7440-39-3	1.60E+02	6.43E+01													
07-1	INORG	Beryllium	7440-41-7	1.10E+00	5.10E-01						4E-10	6E-05	4E-10	1E-03	2E-10	1E-04	6E-10	1E-03
07-1	INORG	Cadmium	7440-43-9	8.30E-01	2.42E-01						1E-10	1E-05	1E-10	1E-03	8E-11	2E-04	2E-10	5E-04
07-1	INORG	Chromium (total)	7440-47-3	4.50E+01	1.30E+01						5E-08	4E-04	5E-08	2E-02	3E-08	2E-03	8E-08	6E-03
07-1	INORG	Cobalt	7440-48-4	2.80E+01	2.09E+01						2E-08	2E-03	2E-08	5E-03	1E-08	1E-03	3E-08	4E-02
07-1	INORG	Copper	7440-50-8	3.80E+01	9.54E+00							9E-06		9E-04		1E-04		5E-04
07-1	INORG	Cyanide (total)	57-12-5	2.90E+00	2.90E+00							6E-06		5E-04		7E-05		3E-04
07-1	INORG	Lead	7439-92-1	2.00E+02	2.00E+02													
07-1	INORG	Manganese	7439-96-5	9.00E+02	4.23E+02							2E-02		2E-02		6E-03		3E-01
07-1	INORG	Mercury	7439-97-6	9.60E-02	4.36E-02	1E-06		2E-04		4E-04		2E-05		1E-03		7E-04		6E-03
07-1	INORG	Nickel	7440-02-0	3.70E+01	1.70E+01						1E-09		1E-09		8E-10		2E-09	
07-1	INORG	Selenium	7782-49-2	1.50E+00	9.81E-01							8E-06		7E-04		1E-04		4E-04
07-1	INORG	Silver	7440-22-4	2.20E-01	3.23E-02							7E-06		3E-05		5E-06		1E-04
07-1	INORG	Thallium	7440-28-0	3.40E-01	1.43E-01							8E-05		7E-03		1E-03		4E-03
07-1	INORG	Vanadium	7440-62-2	4.80E+01	2.31E+01							1E-04		1E-02		2E-03		6E-03
07-1	INORG	Zinc	7440-66-6	2.00E+02	8.95E+01							1E-05		1E-03		1E-04		6E-04
07-2	SVOC	Benzo(a)anthracene	56-55-3	3.91E-02	3.91E-02		8E-13		2E-12		2E-10		6E-08		1E-08		1E-09	
07-2	SVOC	Benzo(a)pyrene	50-32-8	3.77E-02	3.77E-02		1E-12		3E-12		2E-09		6E-07		1E-07		1E-08	
07-2	SVOC	Benzo(b)fluoranthene	205-99-2	1.28E-01	1.28E-01		3E-11		8E-11		8E-10		2E-07		5E-08		4E-09	
07-2	SVOC	Benzo(k)fluoranthene	207-08-9	1.30E-01	1.30E-01		2E-14		7E-14		8E-11		2E-08		5E-09		4E-10	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
07-2	SVOC	Chrysene	218-01-9	4.22E-02	4.22E-02		2E-13		7E-13		3E-12		7E-10		2E-10		1E-11	
07-2	SVOC	Fluoranthene	206-44-0	5.96E-02	5.96E-02			5E-09		1E-08		9E-08		8E-06		2E-06		6E-07
07-2	SVOC	Phenanthrene	85-01-8	3.91E-02	3.91E-02			3E-08		7E-08		8E-08		7E-06		2E-06		8E-07
07-2	SVOC	Pyrene	129-00-0	6.76E-02	6.76E-02			5E-09		1E-08		1E-07		1E-05		3E-06		8E-07
07-2	INORG	Antimony	7440-36-0	1.30E-01	4.36E-02							4E-06		4E-04		5E-05		2E-04
07-2	INORG	Arsenic	7440-38-2	5.70E+00														
07-2	INORG	Barium	7440-39-3	2.10E+01														
07-2	INORG	Beryllium	7440-41-7	1.80E-01														
07-2	INORG	Cadmium	7440-43-9	2.20E-01														
07-2	INORG	Chromium (total)	7440-47-3	9.60E+00														
07-2	INORG	Cobalt	7440-48-4	3.30E+00														
07-2	INORG	Copper	7440-50-8	1.00E+01														
07-2	INORG	Cyanide (total)	57-12-5	8.00E-02	8.00E-02							2E-07		1E-05		2E-06		8E-06
07-2	INORG	Lead	7439-92-1	1.40E+01	1.40E+01													
07-2	INORG	Manganese	7439-96-5	2.90E+02														
07-2	INORG	Nickel	7440-02-0	1.30E+01														
07-2	INORG	Selenium	7782-49-2	4.40E-01														
07-2	INORG	Thallium	7440-28-0	1.30E-01														
07-2	INORG	Vanadium	7440-62-2	1.20E+01														
07-2	INORG	Zinc	7440-66-6	4.00E+01														
07-3	VOC	2-Butanone	78-93-3	2.60E-02	2.60E-02	6E-09		5E-07		1E-06		1E-08		7E-07		4E-07		4E-06
07-3	VOC	Methyl Acetate	79-20-9	5.30E-02	5.30E-02	2E-08		2E-06		6E-06		4E-08		2E-06		2E-06		2E-06
07-3	VOC	Methylcyclohexane	108-87-2	8.30E-02	8.30E-02	3E-07		1E-04		2E-04		7E-07		4E-05		3E-05		3E-04
07-3	VOC	Tetrachloroethene	127-18-4	2.30E-01	2.30E-01	1E-05	1E-06	3E-03	2E-06	3E-03	1E-09	7E-06	2E-07	4E-04	1E-07	3E-04	4E-08	3E-03
07-3	VOC	Xylenes (total)	1330-20-7	5.90E-02	5.90E-02	2E-07		7E-04		2E-03		3E-06		2E-04		1E-04		1E-03
07-3	SVOC	Acetophenone	98-86-2	2.99E-02	2.99E-02	9E-09		9E-07		2E-06		6E-08		4E-06		2E-06		2E-06
07-3	SVOC	Benzo(a)anthracene	56-55-3	4.24E-02	4.24E-02		9E-13		3E-12		3E-10		7E-08		1E-08		1E-09	
07-3	SVOC	Benzo(a)pyrene	50-32-8	4.75E-02	4.75E-02		1E-12		4E-12		3E-09		8E-07		2E-07		1E-08	
07-3	SVOC	Benzo(b)fluoranthene	205-99-2	4.89E-02	4.89E-02		1E-11		3E-11		3E-10		8E-08		2E-08		2E-09	
07-3	SVOC	Benzo(k)fluoranthene	207-08-9	5.99E-02	5.99E-02		1E-14		3E-14		4E-11		1E-08		2E-09		2E-10	
07-3	SVOC	Biphenyl	92-52-4	1.78E-01	1.78E-01	6E-07		2E-06		6E-06		3E-07		3E-05		1E-05		7E-05
07-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.79E-02	5.79E-02	9E-15	4E-17	4E-13	1E-16	1E-12	6E-12	2E-07	2E-09	1E-05	3E-10	3E-06	3E-11	8E-06
07-3	SVOC	Chrysene	218-01-9	5.72E-02	5.72E-02		3E-13		1E-12		3E-12		9E-10		2E-10		2E-11	
07-3	SVOC	2,4-Dichlorophenol	120-83-2	3.41E-02	3.41E-02			4E-06		1E-05		1E-06		8E-05		3E-05		2E-04
07-3	SVOC	Diethylphthalate	84-66-2	1.36E+00	1.36E+00	4E-08		5E-08		1E-07		1E-07		9E-06		3E-06		1E-06
07-3	SVOC	2,4-Dimethylphenol	105-67-9	2.99E-02	2.99E-02			3E-07		7E-07		1E-07		1E-05		4E-06		2E-06
07-3	SVOC	Fluoranthene	206-44-0	1.04E-01	1.04E-01			9E-09		2E-08		2E-07		1E-05		4E-06		1E-06
07-3	SVOC	Methylphenol (total)	1319-77-3	2.51E-01	2.51E-01	9E-09						3E-07		2E-05		6E-06		1E-06
07-3	SVOC	Naphthalene	91-20-3	2.29E-02	2.29E-02	1E-08		1E-04		4E-04		4E-06		2E-04		2E-04		2E-03
07-3	SVOC	2-Nitrophenol	88-75-5	2.87E-02	2.87E-02													
07-3	SVOC	Phenanthrene	85-01-8	4.75E-02	4.75E-02			3E-08		9E-08		1E-07		9E-06		3E-06		9E-07
07-3	SVOC	Pyrene	129-00-0	8.75E-02	8.75E-02			7E-09		2E-08		2E-07		2E-05		4E-06		1E-06
07-3	PCB	PCBs (total)	1336-36-3	8.10E-02	8.10E-02	1E-08	1E-09		3E-09		1E-09	2E-04	4E-07	2E-02	9E-08	6E-03	1E-08	5E-03
07-3	INORG	Antimony	7440-36-0	1.40E-01	5.36E-02							5E-06		5E-04		7E-05		3E-04
07-3	INORG	Arsenic	7440-38-2	2.80E+01	1.99E+01						2E-07	3E-03	5E-05	3E-01	7E-06	5E-02	1E-06	9E-03
07-3	INORG	Barium	7440-39-3	5.60E+01														
07-3	INORG	Beryllium	7440-41-7	3.50E-01														
07-3	INORG	Cadmium	7440-43-9	3.50E-01														
07-3	INORG	Chromium (total)	7440-47-3	2.70E+01														
07-3	INORG	Cobalt	7440-48-4	5.30E+00														
07-3	INORG	Copper	7440-50-8	1.30E+01														
07-3	INORG	Cyanide (total)	57-12-5	3.90E-02	3.90E-02							8E-08		7E-06		1E-06		4E-06
07-3	INORG	Lead	7439-92-1	3.60E+01	3.60E+01													

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
07-3	INORG	Manganese	7439-96-5	7.30E+02	2.53E+02							1E-02		1E-02		4E-03		2E-01
07-3	INORG	Mercury	7439-97-6	3.58E-02														
07-3	INORG	Nickel	7440-02-0	1.30E+01														
07-3	INORG	Selenium	7782-49-2	5.00E-01														
07-3	INORG	Silver	7440-22-4	1.10E-01														
07-3	INORG	Thallium	7440-28-0	1.20E-01														
07-3	INORG	Vanadium	7440-62-2	2.30E+01														
07-3	INORG	Zinc	7440-66-6	5.60E+01														
09-A	VOC	Acetone	67-64-1	2.90E-01	2.90E-01	2E-08		6E-06		2E-05		2E-07		1E-05		8E-06		7E-05
09-A	VOC	Benzene	71-43-2	1.20E-01	1.20E-01	2E-04	1E-06	2E-02	2E-06	2E-02	1E-09	4E-05	2E-07	2E-03	1E-07	2E-03	5E-08	8E-03
09-A	VOC	2-Butanone	78-93-3	7.20E-02	7.20E-02	2E-08		1E-06		4E-06		3E-08		2E-06		1E-06		1E-05
09-A	VOC	Carbon Tetrachloride	56-23-5	2.40E-01	2.40E-01	1E-04	7E-06		9E-06		7E-09		1E-06		8E-07		3E-07	
09-A	VOC	Chlorobenzene	108-90-7	1.70E-02	1.70E-02	8E-08		3E-04		8E-04		1E-06		7E-05		6E-05		5E-04
09-A	VOC	Chloroform	67-66-3	7.90E-02	7.90E-02	4E-05	2E-06	5E-03	5E-06	9E-03	3E-09	2E-05	4E-07	9E-04	3E-07	7E-04	1E-07	7E-03
09-A	VOC	Chloromethane	74-87-3	3.30E-02	3.30E-02	2E-06		2E-03		2E-03		6E-06		3E-04		3E-04		2E-03
09-A	VOC	Cumene	98-82-8	1.90E-01	1.90E-01	1E-06		6E-04		2E-03		2E-06		1E-04		1E-04		9E-04
09-A	VOC	Cyclohexane	110-82-7	2.10E-01	2.10E-01	1E-06		2E-04		2E-04		6E-07		3E-05		3E-05		2E-04
09-A	VOC	1,2-Dichlorobenzene	95-50-1	8.60E-03	8.60E-03	2E-08		1E-05		2E-05		9E-08		5E-06		4E-06		4E-06
09-A	VOC	1,3-Dichlorobenzene	541-73-1	4.40E-01	4.40E-01			1E-03		3E-03		9E-06		5E-04		4E-04		3E-03
09-A	VOC	1,4-Dichlorobenzene	106-46-7	7.10E-01	7.10E-01	7E-07	5E-07	3E-04	1E-06	7E-04	2E-09	3E-06	3E-07	2E-04	2E-07	1E-04	6E-08	3E-04
09-A	VOC	1,2-Dichloroethane	107-06-2	1.50E-02	1.50E-02	7E-06	2E-07	4E-03	5E-07	9E-03	4E-10	2E-05	6E-08	1E-03	4E-08	9E-04	2E-08	8E-03
09-A	VOC	cis-1,2-Dichloroethene	156-59-2	1.10E-01	1.10E-01	8E-07		1E-02		2E-02		3E-05		2E-03		1E-03		1E-03
09-A	VOC	trans-1,2-Dichloroethene	156-60-5	9.10E-03	9.10E-03	8E-08		8E-04		9E-04		2E-06		1E-04		8E-05		7E-04
09-A	VOC	Ethyl Benzene	100-41-4	3.10E-01	3.10E-01	2E-06		5E-04		1E-03		2E-06		1E-04		7E-05		7E-04
09-A	VOC	Methyl Acetate	79-20-9	4.00E-01	4.00E-01	2E-07		2E-05		5E-05		3E-07		2E-05		1E-05		1E-05
09-A	VOC	Methylcyclohexane	108-87-2	1.56E+00	1.56E+00	6E-06		3E-03		3E-03		1E-05		7E-04		5E-04		5E-03
09-A	VOC	Methylene Chloride	75-09-2	9.80E-02	9.80E-02	5E-06	5E-08	1E-04	1E-07	2E-04	8E-11	4E-07	1E-08	2E-05	8E-09	2E-05	3E-09	1E-04
09-A	VOC	Tetrachloroethene	127-18-4	3.20E-01	3.20E-01	1E-05	2E-06	4E-03	2E-06	5E-03	2E-09	1E-05	3E-07	6E-04	2E-07	4E-04	6E-08	4E-03
09-A	VOC	Toluene	108-88-3	7.50E-01	7.50E-01	6E-06		3E-04		8E-04		1E-06		9E-05		5E-05		4E-04
09-A	VOC	1,2,4-Trichlorobenzene	120-82-1	3.90E+00	3.90E+00			1E-03		3E-03		3E-05		2E-03		8E-04		1E-03
09-A	VOC	1,1,1-Trichloroethane	71-55-6	4.40E-01	4.40E-01	2E-06		1E-03		1E-03		3E-06		1E-04		1E-04		1E-04
09-A	VOC	Trichloroethene	79-01-6	2.22E+00	2.22E+00	4E-05	5E-06		1E-05		5E-09		8E-07		5E-07		2E-07	
09-A	VOC	Trichlorofluoromethane	75-69-4	2.60E-02	2.60E-02	3E-08		2E-04		2E-04		9E-07		5E-05		4E-05		3E-05
09-A	VOC	Vinyl Chloride	75-01-4	4.70E-02	4.70E-02	1E-04	7E-07	2E-03	1E-06	3E-03	2E-09	1E-05	3E-07	7E-04	2E-07	5E-04	6E-08	5E-03
09-A	VOC	Xylenes (total)	1330-20-7	2.10E+00	2.10E+00	8E-06		3E-02		6E-02		1E-04		6E-03		4E-03		4E-02
09-A	SVOC	Acenaphthene	83-32-9	2.31E+00	2.31E+00			2E-05		5E-05		4E-06		3E-04		1E-04		7E-05
09-A	SVOC	Acenaphthylene	208-96-8	1.11E-01	1.11E-01			1E-06		3E-06		3E-07		3E-05		1E-05		6E-06
09-A	SVOC	Anthracene	120-12-7	1.58E+01	1.58E+01							3E-06		3E-04		7E-05		1E-05
09-A	SVOC	Benzo(a)anthracene	56-55-3	5.02E+01	5.02E+01		1E-09		3E-09		3E-07		8E-05		2E-05		2E-06	
09-A	SVOC	Benzo(a)pyrene	50-32-8	5.65E+01	5.65E+01		2E-09		5E-09		3E-06		9E-04		2E-04		2E-05	
09-A	SVOC	Benzo(b)fluoranthene	205-99-2	5.69E+01	5.69E+01		1E-08		4E-08		3E-07		9E-05		2E-05		2E-06	
09-A	SVOC	Benzo(g,h,i)perylene	191-24-2	2.05E+01	2.05E+01			2E-10		4E-10		4E-05		4E-03		9E-04		2E-04
09-A	SVOC	Benzo(k)fluoranthene	207-08-9	5.25E+01	5.25E+01		9E-12		3E-11		3E-08		8E-06		2E-06		2E-07	
09-A	SVOC	Biphenyl	92-52-4	7.56E-02	7.56E-02	2E-07		1E-06		2E-06		1E-07		1E-05		5E-06		3E-05
09-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.31E+00	1.31E+00	2E-13	1E-15	1E-11	3E-15	3E-11	1E-10	3E-06	4E-08	3E-04	7E-09	7E-05	7E-10	2E-04
09-A	SVOC	Butylbenzylphthalate	85-68-7	7.00E-01	7.00E-01		2E-13	2E-09	7E-13	4E-09	1E-11	2E-07	3E-09	2E-05	6E-10	4E-06	6E-11	1E-06
09-A	SVOC	Carbazole	86-74-8	2.25E+00	2.25E+00		2E-12		8E-12		3E-10		9E-08		2E-08		2E-09	
09-A	SVOC	Chrysene	218-01-9	4.94E+01	4.94E+01		3E-10		9E-10		3E-09		8E-07		2E-07		2E-08	
09-A	SVOC	Dibenz(a,h)anthracene	53-70-3	1.10E+01	1.10E+01		1E-12		4E-12		6E-07		2E-04		4E-05		3E-06	
09-A	SVOC	Dibenzofuran	132-64-9	4.55E-01	4.55E-01			3E-06		8E-06		1E-05		1E-03		3E-04		1E-03
09-A	SVOC	Di-n-butylphthalate	84-74-2	5.00E-02	5.00E-02	5E-13						3E-08		2E-06		6E-07		1E-07
09-A	SVOC	Fluoranthene	206-44-0	1.10E+02	1.10E+02			9E-06		2E-05		2E-04		1E-02		4E-03		1E-03
09-A	SVOC	Fluorene	86-73-7	3.06E+00	3.06E+00			8E-06		2E-05		6E-06		5E-04		2E-04		7E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
09-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.22E+01	2.22E+01		3E-11		8E-11		1E-07		4E-05		8E-06		7E-07	
09-A	SVOC	2-Methylnaphthalene	91-57-6	3.64E-01	3.64E-01			8E-04		2E-03		4E-05		2E-03		2E-03		1E-02
09-A	SVOC	Naphthalene	91-20-3	2.65E-01	2.65E-01	1E-07		2E-03		4E-03		5E-05		3E-03		2E-03		2E-02
09-A	SVOC	Phenanthrene	85-01-8	4.55E+01	4.55E+01			3E-05		8E-05		1E-04		8E-03		3E-03		9E-04
09-A	SVOC	Pyrene	129-00-0	1.09E+02	1.09E+02			8E-06		2E-05		2E-04		2E-02		5E-03		1E-03
09-A	PCB	PCBs (total)	1336-36-3	8.16E+00	8.16E+00	1E-06	1E-07		3E-07		1E-07	2E-02	4E-05	2E+00	9E-06	6E-01	1E-06	5E-01
09-A	INORG	Antimony	7440-36-0	8.54E+00	8.45E+00							8E-04		8E-02		1E-02		4E-02
09-A	INORG	Arsenic	7440-38-2	1.04E+01	2.28E+00						2E-08	3E-04	6E-06	3E-02	8E-07	5E-03	1E-07	1E-03
09-A	INORG	Barium	7440-39-3	2.70E+02	1.74E+02													
09-A	INORG	Beryllium	7440-41-7	1.20E+00	6.10E-01						4E-10	7E-05	5E-10	1E-03	3E-10	2E-04	7E-10	2E-03
09-A	INORG	Cadmium	7440-43-9	5.70E+00	5.11E+00						3E-09	3E-04	3E-09	2E-02	2E-09	4E-03	5E-09	1E-02
09-A	INORG	Chromium (total)	7440-47-3	9.90E+01	6.70E+01						2E-07	2E-03	3E-07	8E-02	1E-07	1E-02	4E-07	3E-02
09-A	INORG	Cobalt	7440-48-4	1.20E+01	4.95E+00						4E-09	5E-04	4E-09	1E-03	3E-09	2E-04	7E-09	9E-03
09-A	INORG	Copper	7440-50-8	2.50E+03	2.47E+03							2E-03		2E-01		3E-02		1E-01
09-A	INORG	Cyanide (total)	57-12-5	2.60E+00	2.60E+00							5E-06		5E-04		6E-05		3E-04
09-A	INORG	Lead	7439-92-1	1.20E+05	1.20E+05													
09-A	INORG	Manganese	7439-96-5	8.30E+03	7.82E+03							3E-01		3E-01		1E-01		5E+00
09-A	INORG	Mercury	7439-97-6	2.30E+00	2.25E+00	7E-05		8E-03		2E-02		1E-03		7E-02		3E-02		3E-01
09-A	INORG	Nickel	7440-02-0	4.00E+01	2.00E+01						1E-09		1E-09		9E-10		2E-09	
09-A	INORG	Selenium	7782-49-2	9.90E-01	4.71E-01							4E-06		3E-04		5E-05		2E-04
09-A	INORG	Silver	7440-22-4	6.70E+00	6.51E+00							1E-03		5E-03		1E-03		2E-02
09-A	INORG	Thallium	7440-28-0	3.11E+00	2.91E+00							2E-03		2E-01		2E-02		8E-02
09-A	INORG	Vanadium	7440-62-2	2.50E+01	1.29E-01							7E-07		7E-05		9E-06		4E-05
09-A	INORG	Zinc	7440-66-6	1.60E+03	1.49E+03							2E-04		2E-02		2E-03		1E-02
09-B	VOC	Acetone	67-64-1	7.40E-02	7.40E-02	4E-09		2E-06		4E-06		5E-08		3E-06		2E-06		2E-05
09-B	VOC	Benzene	71-43-2	5.50E-01	5.50E-01	1E-03	6E-06	7E-02	1E-05	1E-01	7E-09	2E-04	1E-06	1E-02	7E-07	8E-03	3E-07	4E-02
09-B	VOC	2-Butanone	78-93-3	4.90E-02	4.90E-02	1E-08		1E-06		2E-06		2E-08		1E-06		8E-07		7E-06
09-B	VOC	Chloromethane	74-87-3	3.60E-02	3.60E-02	3E-06		2E-03		2E-03		7E-06		4E-04		3E-04		3E-03
09-B	VOC	Cumene	98-82-8	8.20E-01	8.20E-01	6E-06		3E-03		7E-03		1E-05		6E-04		4E-04		4E-03
09-B	VOC	Cyclohexane	110-82-7	1.30E+01	1.30E+01	9E-05		1E-02		1E-02		4E-05		2E-03		2E-03		2E-02
09-B	VOC	1,2-Dichloroethane	107-06-2	2.20E-02	2.20E-02	1E-05	3E-07	5E-03	8E-07	1E-02	6E-10	3E-05	1E-07	2E-03	6E-08	1E-03	2E-08	1E-02
09-B	VOC	cis-1,2-Dichloroethene	156-59-2	2.60E-02	2.60E-02	2E-07		3E-03		4E-03		7E-06		4E-04		3E-04		3E-04
09-B	VOC	Ethyl Benzene	100-41-4	1.00E+00	1.00E+00	5E-06		1E-03		4E-03		6E-06		3E-04		2E-04		2E-03
09-B	VOC	Methyl Acetate	79-20-9	2.00E-01	2.00E-01	8E-08		9E-06		2E-05		2E-07		9E-06		6E-06		6E-06
09-B	VOC	4-Methyl-2-pentanone	108-10-1	6.30E-02	6.30E-02	5E-08		4E-06		1E-05		5E-08		3E-06		2E-06		2E-05
09-B	VOC	Methylcyclohexane	108-87-2	3.70E+01	3.70E+01	1E-04		6E-02		7E-02		3E-04		2E-02		1E-02		1E-01
09-B	VOC	Methylene Chloride	75-09-2	1.30E-01	1.30E-01	6E-06	6E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	3E-05	1E-08	2E-05	4E-09	2E-04
09-B	VOC	Tetrachloroethene	127-18-4	4.40E-02	4.40E-02	2E-06	2E-07	6E-04	3E-07	6E-04	2E-10	1E-06	4E-08	8E-05	2E-08	5E-05	9E-09	5E-04
09-B	VOC	Toluene	108-88-3	7.00E-01	7.00E-01	6E-06		3E-04		8E-04		1E-06		9E-05		5E-05		4E-04
09-B	VOC	1,2,4-Trichlorobenzene	120-82-1	4.10E-02	4.10E-02			1E-05		3E-05		3E-07		2E-05		8E-06		1E-05
09-B	VOC	Trichloroethene	79-01-6	2.30E-01	2.30E-01	4E-06	5E-07		1E-06		5E-10		8E-08		5E-08		2E-08	
09-B	VOC	Trichlorofluoromethane	75-69-4	2.80E-02	2.80E-02	4E-08		2E-04		2E-04		9E-07		5E-05		4E-05		4E-05
09-B	VOC	Xylenes (total)	1330-20-7	2.23E+00	2.23E+00	9E-06		3E-02		7E-02		1E-04		6E-03		5E-03		4E-02
09-B	SVOC	Acenaphthene	83-32-9	3.48E+00	3.48E+00			3E-05		7E-05		6E-06		4E-04		2E-04		1E-04
09-B	SVOC	Acenaphthylene	208-96-8	1.87E-01	1.87E-01			2E-06		5E-06		6E-07		4E-05		2E-05		1E-05
09-B	SVOC	Anthracene	120-12-7	9.80E+00	9.80E+00							2E-06		2E-04		4E-05		9E-06
09-B	SVOC	Benzo(a)anthracene	56-55-3	1.41E+01	1.41E+01		3E-10		9E-10		8E-08		2E-05		5E-06		4E-07	
09-B	SVOC	Benzo(a)pyrene	50-32-8	1.33E+01	1.33E+01		4E-10		1E-09		8E-07		2E-04		5E-05		4E-06	
09-B	SVOC	Benzo(b)fluoranthene	205-99-2	1.19E+01	1.19E+01		3E-09		8E-09		7E-08		2E-05		4E-06		4E-07	
09-B	SVOC	Benzo(g,h,i)perylene	191-24-2	8.71E+00	8.71E+00			7E-11		2E-10		2E-05		1E-03		4E-04		8E-05
09-B	SVOC	Benzo(k)fluoranthene	207-08-9	1.22E+01	1.22E+01		2E-12		6E-12		7E-09		2E-06		4E-07		4E-08	
09-B	SVOC	Biphenyl	92-52-4	1.96E-01	1.96E-01	6E-07		2E-06		6E-06		4E-07		3E-05		1E-05		8E-05
09-B	SVOC	bis(2-Chloroethyl) ether	111-44-4	3.07E-02	3.07E-02	4E-08	9E-08		3E-07		1E-09		3E-07		1E-07		5E-08	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
09-B	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.80E-01	1.80E-01	3E-14	1E-16	1E-12	4E-16	4E-12	2E-11	5E-07	5E-09	4E-05	1E-09	1E-05	9E-11	2E-05
09-B	SVOC	Butylbenzylphthalate	85-68-7	1.08E+00	1.08E+00		4E-13	3E-09	1E-12	7E-09	2E-11	3E-07	4E-09	3E-05	9E-10	6E-06	9E-11	2E-06
09-B	SVOC	Carbazole	86-74-8	4.56E+00	4.56E+00		5E-12		2E-11		7E-10		2E-07		4E-08		4E-09	
09-B	SVOC	Chrysene	218-01-9	1.41E+01	1.41E+01		8E-11		2E-10		8E-10		2E-07		5E-08		5E-09	
09-B	SVOC	Dibenz(a,h)anthracene	53-70-3	1.91E+00	1.91E+00		2E-13		8E-13		1E-07		3E-05		7E-06		6E-07	
09-B	SVOC	Dibenzofuran	132-64-9	3.36E+00	3.36E+00			2E-05		6E-05		1E-04		9E-03		2E-03		8E-03
09-B	SVOC	Diethylphthalate	84-66-2	1.21E-01	1.21E-01	4E-09		5E-09		1E-08		9E-09		8E-07		2E-07		9E-08
09-B	SVOC	Di-n-butylphthalate	84-74-2	5.99E-02	5.99E-02	7E-13						3E-08		3E-06		7E-07		2E-07
09-B	SVOC	Fluoranthene	206-44-0	3.36E+01	3.36E+01			3E-06		7E-06		5E-05		4E-03		1E-03		3E-04
09-B	SVOC	Fluorene	86-73-7	5.31E+00	5.31E+00			1E-05		3E-05		1E-05		8E-04		3E-04		1E-04
09-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	7.83E+00	7.83E+00		9E-12		3E-11		5E-08		1E-05		3E-06		2E-07	
09-B	SVOC	Isophorone	78-59-1	5.03E-02	5.03E-02	2E-08					4E-13	1E-08	1E-10	1E-06	2E-11	3E-07	2E-12	7E-08
09-B	SVOC	2-Methylnaphthalene	91-57-6	2.21E+00	2.21E+00			5E-03		1E-02		2E-04		1E-02		1E-02		8E-02
09-B	SVOC	Naphthalene	91-20-3	4.49E+00	4.49E+00	2E-06		3E-02		7E-02		8E-04		4E-02		3E-02		3E-01
09-B	SVOC	Phenanthrene	85-01-8	3.52E+01	3.52E+01			2E-05		6E-05		8E-05		7E-03		2E-03		7E-04
09-B	SVOC	Pyrene	129-00-0	2.82E+01	2.82E+01			2E-06		6E-06		6E-05		5E-03		1E-03		3E-04
09-B	PCB	PCBs (total)	1336-36-3	1.05E+01	1.05E+01	2E-06	1E-07		4E-07		2E-07	3E-02	5E-05	3E+00	1E-05	7E-01	1E-06	6E-01
09-B	INORG	Antimony	7440-36-0	1.20E+00	1.11E+00							1E-04		1E-02		1E-03		5E-03
09-B	INORG	Arsenic	7440-38-2	1.40E+01	5.88E+00						6E-08	8E-04	2E-05	8E-02	2E-06	1E-02	3E-07	3E-03
09-B	INORG	Barium	7440-39-3	1.70E+02	7.43E+01													
09-B	INORG	Beryllium	7440-41-7	3.30E+00	2.71E+00						2E-09	3E-04	2E-09	5E-03	1E-09	7E-04	3E-09	7E-03
09-B	INORG	Cadmium	7440-43-9	2.60E+00	2.01E+00						1E-09	1E-04	1E-09	8E-03	7E-10	2E-03	2E-09	5E-03
09-B	INORG	Chromium (total)	7440-47-3	1.80E+02	1.48E+02						5E-07	5E-03	6E-07	2E-01	3E-07	2E-02	9E-07	7E-02
09-B	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
09-B	INORG	Copper	7440-50-8	4.10E+02	3.82E+02							4E-04		3E-02		5E-03		2E-02
09-B	INORG	Cyanide (total)	57-12-5	8.40E-01	8.40E-01							2E-06		2E-04		2E-05		8E-05
09-B	INORG	Lead	7439-92-1	1.20E+03	1.20E+03													
09-B	INORG	Manganese	7439-96-5	1.80E+03	1.32E+03							5E-02		5E-02		2E-02		9E-01
09-B	INORG	Mercury	7439-97-6	2.77E+00	2.72E+00	9E-05		1E-02		3E-02		1E-03		8E-02		4E-02		4E-01
09-B	INORG	Nickel	7440-02-0	8.70E+01	6.70E+01						5E-09		5E-09		3E-09		8E-09	
09-B	INORG	Selenium	7782-49-2	8.20E-01	3.01E-01							2E-06		2E-04		3E-05		1E-04
09-B	INORG	Silver	7440-22-4	1.50E+00	1.31E+00							3E-04		1E-03		2E-04		5E-03
09-B	INORG	Thallium	7440-28-0	7.90E-01	5.93E-01							3E-04		3E-02		4E-03		2E-02
09-B	INORG	Vanadium	7440-62-2	3.70E+01	1.21E+01							7E-05		6E-03		8E-04		3E-03
09-B	INORG	Zinc	7440-66-6	1.50E+02	3.95E+01							5E-06		5E-04		6E-05		3E-04
10-1	VOC	Benzene	71-43-2	8.30E-02	8.30E-02	2E-04	9E-07	1E-02	2E-06	2E-02	1E-09	3E-05	2E-07	2E-03	1E-07	1E-03	4E-08	6E-03
10-1	VOC	2-Butanone	78-93-3	4.50E-02	4.50E-02	1E-08		9E-07		2E-06		2E-08		1E-06		8E-07		7E-06
10-1	VOC	Carbon Disulfide	75-15-0	3.80E-02	3.80E-02	2E-05		3E-04		3E-04		1E-06		7E-05		5E-05		5E-04
10-1	VOC	Chloroethane	75-00-3	3.70E-01	3.70E-01	1E-06		2E-04		2E-04		1E-06		6E-05		5E-05		4E-04
10-1	VOC	Chloromethane	74-87-3	1.00E-01	1.00E-01	7E-06		6E-03		7E-03		2E-05		1E-03		8E-04		7E-03
10-1	VOC	Cumene	98-82-8	8.10E-02	8.10E-02	6E-07		3E-04		7E-04		1E-06		6E-05		4E-05		4E-04
10-1	VOC	Cyclohexane	110-82-7	3.50E-01	3.50E-01	2E-06		3E-04		3E-04		1E-06		6E-05		4E-05		4E-04
10-1	VOC	1,1-Dichloroethane	75-34-3	6.00E-01	6.00E-01	1E-05		6E-03		7E-03		1E-05		8E-04		6E-04		5E-04
10-1	VOC	Ethyl Benzene	100-41-4	1.80E-01	1.80E-01	9E-07		3E-04		7E-04		1E-06		6E-05		4E-05		4E-04
10-1	VOC	Methyl Acetate	79-20-9	3.10E-01	3.10E-01	1E-07		1E-05		4E-05		2E-07		1E-05		1E-05		9E-06
10-1	VOC	Methylcyclohexane	108-87-2	1.40E+00	1.40E+00	5E-06		2E-03		3E-03		1E-05		6E-04		5E-04		4E-03
10-1	VOC	Methylene Chloride	75-09-2	3.60E-02	3.60E-02	2E-06	2E-08	4E-05	4E-08	7E-05	3E-11	2E-07	5E-09	9E-06	3E-09	6E-06	1E-09	5E-05
10-1	VOC	Toluene	108-88-3	6.50E-01	6.50E-01	6E-06		3E-04		7E-04		1E-06		8E-05		4E-05		4E-04
10-1	VOC	1,1,1-Trichloroethane	71-55-6	1.20E-01	1.20E-01	5E-07		3E-04		3E-04		7E-07		4E-05		3E-05		3E-05
10-1	VOC	Xylenes (total)	1330-20-7	1.32E+00	1.32E+00	5E-06		2E-02		4E-02		7E-05		4E-03		3E-03		3E-02
10-1	SVOC	Acenaphthene	83-32-9	8.91E-01	8.91E-01			7E-06		2E-05		1E-06		1E-04		4E-05		3E-05
10-1	SVOC	Acetophenone	98-86-2	2.43E-01	2.43E-01	8E-08		7E-06		2E-05		5E-07		3E-05		2E-05		2E-05
10-1	SVOC	Anthracene	120-12-7	4.84E-01	4.84E-01							9E-08		8E-06		2E-06		5E-07

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
10-1	SVOC	Benzo(a)anthracene	56-55-3	1.51E+00	1.51E+00		3E-11		1E-10		9E-09		2E-06		5E-07		5E-08	
10-1	SVOC	Benzo(a)pyrene	50-32-8	1.23E-01	1.23E-01		3E-12		1E-11		7E-09		2E-06		4E-07		4E-08	
10-1	SVOC	Benzo(b)fluoranthene	205-99-2	1.68E+00	1.68E+00		4E-10		1E-09		1E-08		3E-06		6E-07		5E-08	
10-1	SVOC	Benzo(k)fluoranthene	207-08-9	9.23E-01	9.23E-01		2E-13		5E-13		5E-10		1E-07		3E-08		3E-09	
10-1	SVOC	Chrysene	218-01-9	2.16E+00	2.16E+00		1E-11		4E-11		1E-10		4E-08		8E-09		7E-10	
10-1	SVOC	Dibenz(a,h)anthracene	53-70-3	1.92E-01	1.92E-01		2E-14		8E-14		1E-08		3E-06		7E-07		6E-08	
10-1	SVOC	Diethylphthalate	84-66-2	7.59E-02	7.59E-02	2E-09		3E-09		7E-09		6E-09		5E-07		1E-07		6E-08
10-1	SVOC	Fluoranthene	206-44-0	2.97E+00	2.97E+00			2E-07		6E-07		4E-06		4E-04		1E-04		3E-05
10-1	SVOC	Fluorene	86-73-7	1.07E+00	1.07E+00			3E-06		7E-06		2E-06		2E-04		5E-05		3E-05
10-1	SVOC	2-Methylnaphthalene	91-57-6	3.69E-01	3.69E-01			8E-04		2E-03		4E-05		2E-03		2E-03		1E-02
10-1	SVOC	Naphthalene	91-20-3	2.17E-01	2.17E-01	1E-07		1E-03		3E-03		4E-05		2E-03		2E-03		2E-02
10-1	SVOC	Phenanthrene	85-01-8	1.80E+00	1.80E+00			1E-06		3E-06		4E-06		3E-04		1E-04		4E-05
10-1	SVOC	Pyrene	129-00-0	9.13E+00	9.13E+00			7E-07		2E-06		2E-05		2E-03		4E-04		1E-04
10-1	PCB	PCBs (total)	1336-36-3	3.40E-01	3.40E-01	6E-08	4E-09		1E-08		6E-09	1E-03	2E-06	9E-02	4E-07	2E-02	5E-08	2E-02
10-1	INORG	Antimony	7440-36-0	3.30E-01	2.44E-01							2E-05		2E-03		3E-04		1E-03
10-1	INORG	Arsenic	7440-38-2	4.00E+01	3.19E+01						3E-07	5E-03	8E-05	4E-01	1E-05	7E-02	2E-06	1E-02
10-1	INORG	Barium	7440-39-3	2.80E+02	1.84E+02													
10-1	INORG	Beryllium	7440-41-7	8.70E-01	2.80E-01						2E-10	3E-05	2E-10	5E-04	1E-10	8E-05	3E-10	8E-04
10-1	INORG	Cadmium	7440-43-9	7.50E-01	1.62E-01						9E-11	9E-06	9E-11	7E-04	5E-11	1E-04	1E-10	4E-04
10-1	INORG	Chromium (total)	7440-47-3	7.50E+02	7.18E+02						3E-06	2E-02	3E-06	9E-01	2E-06	1E-01	4E-06	3E-01
10-1	INORG	Cobalt	7440-48-4	3.80E+01	3.09E+01						3E-08	3E-03	3E-08	7E-03	2E-08	2E-03	4E-08	6E-02
10-1	INORG	Copper	7440-50-8	6.90E+02	6.62E+02							7E-04		6E-02		8E-03		3E-02
10-1	INORG	Cyanide (total)	57-12-5	1.20E+00	1.20E+00							2E-06		2E-04		3E-05		1E-04
10-1	INORG	Lead	7439-92-1	3.80E+02	3.80E+02													
10-1	INORG	Manganese	7439-96-5	3.00E+03	2.52E+03							1E-01		1E-01		4E-02		2E+00
10-1	INORG	Mercury	7439-97-6	1.46E-01	9.36E-02	3E-06		3E-04		9E-04		4E-05		3E-03		1E-03		1E-02
10-1	INORG	Nickel	7440-02-0	3.40E+02	3.20E+02						2E-08		2E-08		1E-08		4E-08	
10-1	INORG	Selenium	7782-49-2	6.80E-01	1.61E-01							1E-06		1E-04		2E-05		6E-05
10-1	INORG	Silver	7440-22-4	3.20E-01	1.32E-01							3E-05		1E-04		2E-05		5E-04
10-1	INORG	Thallium	7440-28-0	1.60E-01														
10-1	INORG	Vanadium	7440-62-2	4.40E+01	1.91E+01							1E-04		1E-02		1E-03		5E-03
10-1	INORG	Zinc	7440-66-6	1.10E+02														
10-2	VOC	Acetone	67-64-1	1.50E-01	1.50E-01	9E-09		3E-06		8E-06		1E-07		6E-06		4E-06		3E-05
10-2	VOC	Benzene	71-43-2	9.10E-02	9.10E-02	2E-04	1E-06	1E-02	2E-06	2E-02	1E-09	3E-05	2E-07	2E-03	1E-07	1E-03	4E-08	6E-03
10-2	VOC	2-Butanone	78-93-3	5.50E-02	5.50E-02	1E-08		1E-06		3E-06		2E-08		1E-06		9E-07		8E-06
10-2	VOC	Chloromethane	74-87-3	6.60E-02	6.60E-02	5E-06		4E-03		4E-03		1E-05		7E-04		5E-04		5E-03
10-2	VOC	Cumene	98-82-8	6.90E-02	6.90E-02	5E-07		2E-04		6E-04		9E-07		5E-05		4E-05		3E-04
10-2	VOC	Cyclohexane	110-82-7	2.60E-01	2.60E-01	2E-06		2E-04		3E-04		8E-07		4E-05		3E-05		3E-04
10-2	VOC	1,4-Dichlorobenzene	106-46-7	3.30E-02	3.30E-02	3E-08	2E-08	1E-05	7E-08	3E-05	7E-11	1E-07	1E-08	9E-06	7E-09	5E-06	3E-09	1E-05
10-2	VOC	1,1-Dichloroethane	75-34-3	2.90E+00	2.90E+00	5E-05		3E-02		3E-02		7E-05		4E-03		3E-03		3E-03
10-2	VOC	cis-1,2-Dichloroethene	156-59-2	2.10E+00	2.10E+00	1E-05		2E-01		4E-01		6E-04		3E-02		2E-02		2E-02
10-2	VOC	trans-1,2-Dichloroethene	156-60-5	3.80E-02	3.80E-02	4E-07		3E-03		4E-03		8E-06		4E-04		3E-04		3E-03
10-2	VOC	Ethyl Benzene	100-41-4	1.20E-01	1.20E-01	6E-07		2E-04		4E-04		7E-07		4E-05		3E-05		3E-04
10-2	VOC	Methyl Acetate	79-20-9	3.00E+00	3.00E+00	1E-06		1E-04		3E-04		2E-06		1E-04		1E-04		9E-05
10-2	VOC	Methylcyclohexane	108-87-2	8.80E-01	8.80E-01	3E-06		1E-03		2E-03		7E-06		4E-04		3E-04		3E-03
10-2	VOC	Methylene Chloride	75-09-2	2.80E-02	2.80E-02	1E-06	1E-08	3E-05	3E-08	6E-05	2E-11	1E-07	4E-09	7E-06	2E-09	4E-06	8E-10	4E-05
10-2	VOC	Tetrachloroethene	127-18-4	9.10E-02	9.10E-02	4E-06	5E-07	1E-03	7E-07	1E-03	5E-10	3E-06	8E-08	2E-04	5E-08	1E-04	2E-08	1E-03
10-2	VOC	Toluene	108-88-3	5.30E-01	5.30E-01	5E-06		2E-04		6E-04		1E-06		7E-05		4E-05		3E-04
10-2	VOC	1,1,1-Trichloroethane	71-55-6	1.50E-01	1.50E-01	6E-07		3E-04		4E-04		9E-07		5E-05		4E-05		4E-05
10-2	VOC	Trichloroethene	79-01-6	2.60E+00	2.60E+00	5E-05	6E-06		1E-05		6E-09		1E-06		6E-07		2E-07	
10-2	VOC	Xylenes (total)	1330-20-7	9.60E-01	9.60E-01	4E-06		1E-02		3E-02		5E-05		3E-03		2E-03		2E-02
10-2	SVOC	Acenaphthene	83-32-9	2.37E+00	2.37E+00			2E-05		5E-05		4E-06		3E-04		1E-04		7E-05
10-2	SVOC	Anthracene	120-12-7	2.96E+00	2.96E+00							6E-07		5E-05		1E-05		3E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
10-2	SVOC	Benzo(a)anthracene	56-55-3	6.99E+00	6.99E+00		1E-10		4E-10		4E-08		1E-05		2E-06		2E-07	
10-2	SVOC	Benzo(a)pyrene	50-32-8	7.89E+00	7.89E+00		2E-10		7E-10		5E-07		1E-04		3E-05		2E-06	
10-2	SVOC	Benzo(b)fluoranthene	205-99-2	7.53E+00	7.53E+00		2E-09		5E-09		4E-08		1E-05		3E-06		2E-07	
10-2	SVOC	Benzo(g,h,i)perylene	191-24-2	7.88E+00	7.88E+00			6E-11		2E-10		1E-05		1E-03		3E-04		7E-05
10-2	SVOC	Benzo(k)fluoranthene	207-08-9	6.44E+00	6.44E+00		1E-12		3E-12		4E-09		1E-06		2E-07		2E-08	
10-2	SVOC	Biphenyl	92-52-4	3.18E-01	3.18E-01	1E-06		4E-06		1E-05		6E-07		5E-05		2E-05		1E-04
10-2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.41E+00	1.41E+00	2E-13	1E-15	1E-11	3E-15	3E-11	1E-10	4E-06	4E-08	3E-04	8E-09	8E-05	7E-10	2E-04
10-2	SVOC	Butylbenzylphthalate	85-68-7	7.62E-01	7.62E-01		3E-13	2E-09	8E-13	5E-09	1E-11	2E-07	3E-09	2E-05	6E-10	4E-06	6E-11	1E-06
10-2	SVOC	Caprolactam	105-60-2	1.52E+00	1.52E+00	2E-08		3E-08		8E-08		2E-07		2E-05		6E-06		3E-05
10-2	SVOC	Carbazole	86-74-8	9.39E-01	9.39E-01		1E-12		3E-12		1E-10		4E-08		8E-09		8E-10	
10-2	SVOC	Chrysene	218-01-9	6.99E+00	6.99E+00		4E-11		1E-10		4E-10		1E-07		3E-08		2E-09	
10-2	SVOC	Dibenzofuran	132-64-9	1.97E+00	1.97E+00			1E-05		3E-05		6E-05		5E-03		1E-03		4E-03
10-2	SVOC	Diethylphthalate	84-66-2	5.79E-02	5.79E-02	2E-09		2E-09		6E-09		4E-09		4E-07		1E-07		4E-08
10-2	SVOC	Di-n-butylphthalate	84-74-2	3.00E-01	3.00E-01	3E-12						2E-07		1E-05		3E-06		8E-07
10-2	SVOC	Di-n-octylphthalate	117-84-0	1.57E-01	1.57E-01							2E-07		2E-05		4E-06		1E-06
10-2	SVOC	Fluoranthene	206-44-0	1.20E+01	1.20E+01			1E-06		3E-06		2E-05		2E-03		4E-04		1E-04
10-2	SVOC	Fluorene	86-73-7	2.20E+00	2.20E+00			6E-06		1E-05		4E-06		3E-04		1E-04		5E-05
10-2	SVOC	Hexachlorocyclopentadiene	77-47-4	1.45E-01	1.45E-01	2E-05		8E-03		2E-02		2E-04		8E-03		7E-03		2E-02
10-2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.94E+00	5.94E+00		7E-12		2E-11		3E-08		1E-05		2E-06		2E-07	
10-2	SVOC	2-Methylnaphthalene	91-57-6	7.80E-01	7.80E-01			2E-03		4E-03		9E-05		5E-03		3E-03		3E-02
10-2	SVOC	Naphthalene	91-20-3	9.34E-01	9.34E-01	5E-07		6E-03		1E-02		2E-04		9E-03		7E-03		7E-02
10-2	SVOC	N-Nitrosodiphenylamine	86-30-6	8.73E-01	8.73E-01						3E-11	2E-06	9E-09	2E-04	2E-09	5E-05	2E-10	1E-04
10-2	SVOC	N-Nitroso-di-n-propylamine	621-64-7	3.89E-01	3.89E-01		7E-07		2E-06		5E-08		1E-05		4E-06		1E-06	
10-2	SVOC	Phenanthrene	85-01-8	1.63E+01	1.63E+01			1E-05		3E-05		3E-05		3E-03		9E-04		3E-04
10-2	SVOC	Pyrene	129-00-0	2.69E+01	2.69E+01			2E-06		5E-06		5E-05		5E-03		1E-03		3E-04
10-2	PCB	PCBs (total)	1336-36-3	4.80E+00	4.80E+00	9E-07	6E-08		2E-07		9E-08	1E-02	2E-05	1E+00	6E-06	3E-01	7E-07	3E-01
10-2	INORG	Antimony	7440-36-0	4.60E-01	3.74E-01							4E-05		3E-03		5E-04		2E-03
10-2	INORG	Arsenic	7440-38-2	2.00E+01	1.19E+01						1E-07	2E-03	3E-05	2E-01	4E-06	3E-02	6E-07	5E-03
10-2	INORG	Barium	7440-39-3	2.60E+02	1.64E+02													
10-2	INORG	Beryllium	7440-41-7	1.90E+00	1.31E+00						9E-10	2E-04	1E-09	2E-03	6E-10	4E-04	2E-09	4E-03
10-2	INORG	Cadmium	7440-43-9	9.00E-01	3.12E-01						2E-10	2E-05	2E-10	1E-03	1E-10	2E-04	3E-10	7E-04
10-2	INORG	Chromium (total)	7440-47-3	1.00E+02	6.80E+01						2E-07	2E-03	3E-07	8E-02	2E-07	1E-02	4E-07	3E-02
10-2	INORG	Cobalt	7440-48-4	1.20E+01	4.95E+00						4E-09	5E-04	4E-09	1E-03	3E-09	2E-04	7E-09	9E-03
10-2	INORG	Copper	7440-50-8	8.50E+01	5.65E+01							6E-05		5E-03		7E-04		3E-03
10-2	INORG	Cyanide (total)	57-12-5	2.00E+00	2.00E+00							4E-06		4E-04		5E-05		2E-04
10-2	INORG	Lead	7439-92-1	1.57E+02	1.57E+02													
10-2	INORG	Manganese	7439-96-5	1.80E+03	1.32E+03							5E-02		5E-02		2E-02		9E-01
10-2	INORG	Mercury	7439-97-6	1.68E-01	1.16E-01	4E-06		4E-04		1E-03		5E-05		3E-03		2E-03		2E-02
10-2	INORG	Nickel	7440-02-0	3.90E+01	1.90E+01						1E-09		1E-09		8E-10		2E-09	
10-2	INORG	Selenium	7782-49-2	7.10E-01	1.91E-01							2E-06		1E-04		2E-05		7E-05
10-2	INORG	Silver	7440-22-4	4.10E-01	2.22E-01							5E-05		2E-04		3E-05		8E-04
10-2	INORG	Thallium	7440-28-0	2.20E-01	2.35E-02							1E-05		1E-03		2E-04		7E-04
10-2	INORG	Vanadium	7440-62-2	3.20E+01	7.13E+00							4E-05		4E-03		5E-04		2E-03
10-2	INORG	Zinc	7440-66-6	1.60E+02	4.95E+01							7E-06		6E-04		8E-05		3E-04
10-3	VOC	Acetone	67-64-1	4.10E-01	4.10E-01	2E-08		9E-06		2E-05		3E-07		2E-05		1E-05		9E-05
10-3	VOC	Benzene	71-43-2	1.20E-01	1.20E-01	2E-04	1E-06	2E-02	2E-06	2E-02	1E-09	4E-05	2E-07	2E-03	1E-07	2E-03	5E-08	8E-03
10-3	VOC	2-Butanone	78-93-3	4.50E-01	4.50E-01	1E-07		9E-06		2E-05		2E-07		1E-05		8E-06		7E-05
10-3	VOC	Cumene	98-82-8	5.90E-01	5.90E-01	5E-06		2E-03		5E-03		7E-06		4E-04		3E-04		3E-03
10-3	VOC	Cyclohexane	110-82-7	2.80E+00	2.80E+00	2E-05		2E-03		3E-03		8E-06		5E-04		4E-04		3E-03
10-3	VOC	1,1-Dichloroethane	75-34-3	3.20E-01	3.20E-01	6E-06		3E-03		4E-03		7E-06		4E-04		3E-04		3E-04
10-3	VOC	1,1-Dichloroethene	75-35-4	7.70E-02	7.70E-02	3E-05		2E-03		2E-03		7E-06		4E-04		3E-04		3E-03
10-3	VOC	Ethyl Benzene	100-41-4	5.90E-01	5.90E-01	3E-06		9E-04		2E-03		3E-06		2E-04		1E-04		1E-03
10-3	VOC	Methyl Acetate	79-20-9	1.10E-01	1.10E-01	4E-08		5E-06		1E-05		9E-08		5E-06		4E-06		3E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
10-3	VOC	Methylcyclohexane	108-87-2	1.40E+01	1.40E+01	5E-05		2E-02		3E-02		1E-04		6E-03		5E-03		4E-02
10-3	VOC	Methylene Chloride	75-09-2	5.50E-02	5.50E-02	3E-06	3E-08	5E-05	7E-08	1E-04	4E-11	2E-07	7E-09	1E-05	4E-09	9E-06	2E-09	8E-05
10-3	VOC	Tetrachloroethene	127-18-4	5.00E-02	5.00E-02	2E-06	3E-07	6E-04	4E-07	7E-04	3E-10	2E-06	4E-08	9E-05	3E-08	6E-05	1E-08	6E-04
10-3	VOC	Toluene	108-88-3	1.40E+00	1.40E+00	1E-05		6E-04		2E-03		3E-06		2E-04		1E-04		8E-04
10-3	VOC	1,1,1-Trichloroethane	71-55-6	2.70E+00	2.70E+00	1E-05		6E-03		7E-03		2E-05		9E-04		7E-04		6E-04
10-3	VOC	Trichloroethene	79-01-6	3.40E-01	3.40E-01	7E-06	7E-07		1E-06		8E-10		1E-07		8E-08		3E-08	
10-3	VOC	Xylenes (total)	1330-20-7	5.50E+00	5.50E+00	2E-05		7E-02		2E-01		3E-04		2E-02		1E-02		1E-01
10-3	SVOC	Acenaphthene	83-32-9	1.08E-01	1.08E-01			9E-07		2E-06		2E-07		1E-05		5E-06		3E-06
10-3	SVOC	Acenaphthylene	208-96-8	4.85E-01	4.85E-01			5E-06		1E-05		1E-06		1E-04		4E-05		3E-05
10-3	SVOC	Anthracene	120-12-7	4.01E-01	4.01E-01							7E-08		7E-06		2E-06		4E-07
10-3	SVOC	Benzaldehyde	100-52-7	1.05E-01	1.05E-01			8E-06		2E-05		3E-07		2E-05		1E-05		1E-04
10-3	SVOC	Benzo(a)anthracene	56-55-3	1.95E+00	1.95E+00		4E-11		1E-10		1E-08		3E-06		7E-07		6E-08	
10-3	SVOC	Benzo(a)pyrene	50-32-8	2.75E+00	2.75E+00		8E-11		2E-10		2E-07		4E-05		1E-05		8E-07	
10-3	SVOC	Benzo(b)fluoranthene	205-99-2	3.64E+00	3.64E+00		8E-10		2E-09		2E-08		6E-06		1E-06		1E-07	
10-3	SVOC	Benzo(g,h,i)perylene	191-24-2	1.74E+00	1.74E+00			1E-11		4E-11		3E-06		3E-04		8E-05		2E-05
10-3	SVOC	Benzo(k)fluoranthene	207-08-9	3.76E+00	3.76E+00		6E-13		2E-12		2E-09		6E-07		1E-07		1E-08	
10-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	7.76E-02	7.76E-02	1E-14	6E-17	6E-13	2E-16	2E-12	8E-12	2E-07	2E-09	2E-05	4E-10	4E-06	4E-11	1E-05
10-3	SVOC	Butylbenzylphthalate	85-68-7	1.08E+00	1.08E+00		4E-13	3E-09	1E-12	7E-09	2E-11	3E-07	4E-09	3E-05	9E-10	6E-06	9E-11	2E-06
10-3	SVOC	Carbazole	86-74-8	2.84E-01	2.84E-01		3E-13		1E-12		4E-11		1E-08		2E-09		3E-10	
10-3	SVOC	Chrysene	218-01-9	2.77E+00	2.77E+00		2E-11		5E-11		2E-10		5E-08		1E-08		1E-09	
10-3	SVOC	Dibenzofuran	132-64-9	3.30E-01	3.30E-01			2E-06		6E-06		1E-05		8E-04		2E-04		8E-04
10-3	SVOC	Diethylphthalate	84-66-2	7.49E-02	7.49E-02	2E-09		3E-09		7E-09		6E-09		5E-07		1E-07		6E-08
10-3	SVOC	Fluoranthene	206-44-0	3.86E+00	3.86E+00			3E-07		8E-07		6E-06		5E-04		1E-04		4E-05
10-3	SVOC	Fluorene	86-73-7	1.33E-01	1.33E-01			3E-07		9E-07		2E-07		2E-05		7E-06		3E-06
10-3	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.42E+00	1.42E+00		2E-12		5E-12		8E-09		2E-06		5E-07		4E-08	
10-3	SVOC	2-Methylnaphthalene	91-57-6	1.11E+00	1.11E+00			2E-03		6E-03		1E-04		7E-03		5E-03		4E-02
10-3	SVOC	Naphthalene	91-20-3	8.02E-01	8.02E-01	4E-07		5E-03		1E-02		1E-04		8E-03		6E-03		6E-02
10-3	SVOC	Phenanthrene	85-01-8	1.72E+00	1.72E+00			1E-06		3E-06		4E-06		3E-04		9E-05		3E-05
10-3	SVOC	Pyrene	129-00-0	4.17E+00	4.17E+00			3E-07		8E-07		8E-06		7E-04		2E-04		5E-05
10-3	PCB	PCBs (total)	1336-36-3	4.48E-01	4.48E-01	8E-08	6E-09		2E-08		8E-09	1E-03	2E-06	1E-01	5E-07	3E-02	6E-08	3E-02
10-3	INORG	Antimony	7440-36-0	1.40E-01	5.36E-02							5E-06		5E-04		7E-05		3E-04
10-3	INORG	Arsenic	7440-38-2	1.00E+01	1.88E+00						2E-08	3E-04	5E-06	3E-02	7E-07	4E-03	9E-08	8E-04
10-3	INORG	Barium	7440-39-3	1.30E+02	3.43E+01													
10-3	INORG	Beryllium	7440-41-7	1.40E+00	8.10E-01						6E-10	1E-04	6E-10	2E-03	4E-10	2E-04	1E-09	2E-03
10-3	INORG	Cadmium	7440-43-9	7.50E-01	1.62E-01						9E-11	9E-06	9E-11	7E-04	5E-11	1E-04	1E-10	4E-04
10-3	INORG	Chromium (total)	7440-47-3	9.80E+01	6.60E+01						2E-07	2E-03	2E-07	8E-02	1E-07	1E-02	4E-07	3E-02
10-3	INORG	Cobalt	7440-48-4	7.70E+00	6.46E-01						5E-10	7E-05	6E-10	1E-04	3E-10	3E-05	9E-10	1E-03
10-3	INORG	Copper	7440-50-8	1.20E+02	9.15E+01							9E-05		8E-03		1E-03		5E-03
10-3	INORG	Cyanide (total)	57-12-5	2.60E-01	2.60E-01							5E-07		5E-05		6E-06		3E-05
10-3	INORG	Lead	7439-92-1	1.60E+02	1.60E+02													
10-3	INORG	Manganese	7439-96-5	2.50E+03	2.02E+03							8E-02		8E-02		3E-02		1E+00
10-3	INORG	Mercury	7439-97-6	1.35E-01	8.26E-02	3E-06		3E-04		8E-04		4E-05		2E-03		1E-03		1E-02
10-3	INORG	Nickel	7440-02-0	2.10E+01	1.04E+00						7E-11		8E-11		5E-11		1E-10	
10-3	INORG	Selenium	7782-49-2	8.70E-01	3.51E-01							3E-06		3E-04		3E-05		1E-04
10-3	INORG	Silver	7440-22-4	4.00E-01	2.12E-01							5E-05		2E-04		3E-05		8E-04
10-3	INORG	Thallium	7440-28-0	1.60E-01														
10-3	INORG	Vanadium	7440-62-2	2.20E+01														
10-3	INORG	Zinc	7440-66-6	1.50E+03	1.39E+03							2E-04		2E-02		2E-03		9E-03
10-4	INORG	Arsenic	7440-38-2	4.40E+00														
10-4	INORG	Barium	7440-39-3	9.30E+00														
10-4	INORG	Beryllium	7440-41-7	1.00E-01														
10-4	INORG	Cadmium	7440-43-9	1.30E-01														
10-4	INORG	Chromium (total)	7440-47-3	5.90E+00														

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
10-4	INORG	Cobalt	7440-48-4	2.50E+00														
10-4	INORG	Copper	7440-50-8	7.40E+00														
10-4	INORG	Lead	7439-92-1	6.00E+00	6.00E+00													
10-4	INORG	Manganese	7439-96-5	1.30E+02														
10-4	INORG	Mercury	7439-97-6	1.94E-02														
10-4	INORG	Nickel	7440-02-0	6.90E+00														
10-4	INORG	Selenium	7782-49-2	2.40E-01														
10-4	INORG	Silver	7440-22-4	3.60E-02														
10-4	INORG	Thallium	7440-28-0	5.90E-02														
10-4	INORG	Vanadium	7440-62-2	9.80E+00														
10-4	INORG	Zinc	7440-66-6	2.80E+01														
12-A	VOC	Acetone	67-64-1	1.70E-01	1.70E-01	1E-08		4E-06		1E-05		1E-07		7E-06		5E-06		4E-05
12-A	VOC	Benzene	71-43-2	4.30E-02	4.30E-02	8E-05	5E-07	6E-03	8E-07	8E-03	5E-10	2E-05	8E-08	8E-04	5E-08	6E-04	2E-08	3E-03
12-A	VOC	2-Butanone	78-93-3	8.80E-02	8.80E-02	2E-08		2E-06		4E-06		4E-08		2E-06		1E-06		1E-05
12-A	VOC	Chloromethane	74-87-3	2.80E-02	2.80E-02	2E-06		2E-03		2E-03		5E-06		3E-04		2E-04		2E-03
12-A	VOC	Cumene	98-82-8	1.70E-01	1.70E-01	1E-06		6E-04		1E-03		2E-06		1E-04		9E-05		8E-04
12-A	VOC	Cyclohexane	110-82-7	1.20E-01	1.20E-01	8E-07		1E-04		1E-04		4E-07		2E-05		2E-05		1E-04
12-A	VOC	Dichlorodifluoromethane	75-71-8	9.40E-01	9.40E-01	1E-06		2E-02		3E-02		1E-04		7E-03		5E-03		5E-03
12-A	VOC	1,2-Dichloroethane	107-06-2	1.50E-02	1.50E-02	7E-06	2E-07	4E-03	5E-07	9E-03	4E-10	2E-05	6E-08	1E-03	4E-08	9E-04	2E-08	8E-03
12-A	VOC	cis-1,2-Dichloroethene	156-59-2	9.30E-02	9.30E-02	6E-07		1E-02		2E-02		3E-05		1E-03		1E-03		1E-03
12-A	VOC	Ethyl Benzene	100-41-4	3.90E-01	3.90E-01	2E-06		6E-04		1E-03		2E-06		1E-04		9E-05		8E-04
12-A	VOC	Methyl Acetate	79-20-9	2.30E+00	2.30E+00	9E-07		1E-04		3E-04		2E-06		1E-04		7E-05		7E-05
12-A	VOC	Methylcyclohexane	108-87-2	6.50E-01	6.50E-01	2E-06		1E-03		1E-03		5E-06		3E-04		2E-04		2E-03
12-A	VOC	Methylene Chloride	75-09-2	1.20E-01	1.20E-01	6E-06	6E-08	1E-04	1E-07	2E-04	9E-11	5E-07	2E-08	3E-05	9E-09	2E-05	3E-09	2E-04
12-A	VOC	Styrene	100-42-5	6.70E-01	6.70E-01	1E-06		2E-04		4E-04		2E-06		9E-05		6E-05		2E-04
12-A	VOC	Tetrachloroethene	127-18-4	4.00E-01	4.00E-01	2E-05	2E-06	5E-03	3E-06	6E-03	2E-09	1E-05	3E-07	8E-04	2E-07	5E-04	8E-08	4E-03
12-A	VOC	Toluene	108-88-3	2.80E-01	2.80E-01	2E-06		1E-04		3E-04		6E-07		4E-05		2E-05		2E-04
12-A	VOC	1,1,1-Trichloroethane	71-55-6	2.40E-01	2.40E-01	9E-07		6E-04		6E-04		1E-06		8E-05		6E-05		6E-05
12-A	VOC	Trichloroethene	79-01-6	5.60E-02	5.60E-02	1E-06	1E-07		2E-07		1E-10		2E-08		1E-08		5E-09	
12-A	VOC	Xylenes (total)	1330-20-7	7.70E+00	7.70E+00	3E-05		9E-02		2E-01		4E-04		2E-02		2E-02		2E-01
12-A	SVOC	Acenaphthene	83-32-9	3.26E+00	3.26E+00			3E-05		7E-05		5E-06		4E-04		2E-04		1E-04
12-A	SVOC	Acenaphthylene	208-96-8	7.41E-02	7.41E-02			8E-07		2E-06		2E-07		2E-05		7E-06		4E-06
12-A	SVOC	Anthracene	120-12-7	1.27E+00	1.27E+00							2E-07		2E-05		6E-06		1E-06
12-A	SVOC	Benzo(a)anthracene	56-55-3	2.98E+00	2.98E+00		6E-11		2E-10		2E-08		5E-06		1E-06		9E-08	
12-A	SVOC	Benzo(a)pyrene	50-32-8	2.95E+00	2.95E+00		8E-11		2E-10		2E-07		5E-05		1E-05		9E-07	
12-A	SVOC	Benzo(b)fluoranthene	205-99-2	3.76E+00	3.76E+00		8E-10		2E-09		2E-08		6E-06		1E-06		1E-07	
12-A	SVOC	Benzo(g,h,i)perylene	191-24-2	8.87E-01	8.87E-01			7E-12		2E-11		2E-06		2E-04		4E-05		8E-06
12-A	SVOC	Benzo(k)fluoranthene	207-08-9	2.49E+00	2.49E+00		4E-13		1E-12		1E-09		4E-07		9E-08		7E-09	
12-A	SVOC	Biphenyl	92-52-4	6.13E-01	6.13E-01	2E-06		8E-06		2E-05		1E-06		9E-05		4E-05		2E-04
12-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.10E-01	5.10E-01	8E-14	4E-16	4E-12	1E-15	1E-11	5E-11	1E-06	1E-08	1E-04	3E-09	3E-05	3E-10	7E-05
12-A	SVOC	Butylbenzylphthalate	85-68-7	1.27E+01	1.27E+01		4E-12	3E-08	1E-11	8E-08	2E-10	3E-06	5E-08	3E-04	1E-08	7E-05	1E-09	2E-05
12-A	SVOC	Carbazole	86-74-8	1.13E+00	1.13E+00		1E-12		4E-12		2E-10		5E-08		1E-08		1E-09	
12-A	SVOC	Chrysene	218-01-9	3.82E+00	3.82E+00		2E-11		7E-11		2E-10		6E-08		1E-08		1E-09	
12-A	SVOC	Dibenz(a,h)anthracene	53-70-3	5.45E-01	5.45E-01		7E-14		2E-13		3E-08		9E-06		2E-06		2E-07	
12-A	SVOC	Dibenzofuran	132-64-9	1.83E+00	1.83E+00			1E-05		3E-05		5E-05		5E-03		1E-03		4E-03
12-A	SVOC	Diethylphthalate	84-66-2	6.85E-02	6.85E-02	2E-09		3E-09		7E-09		5E-09		5E-07		1E-07		5E-08
12-A	SVOC	2,4-Dinitrotoluene	121-14-2	7.47E-02	7.47E-02						4E-10	2E-06	1E-07	2E-04	2E-08	4E-05	2E-09	1E-04
12-A	SVOC	Fluoranthene	206-44-0	8.19E+00	8.19E+00			7E-07		2E-06		1E-05		1E-03		3E-04		8E-05
12-A	SVOC	Fluorene	86-73-7	1.90E+00	1.90E+00			5E-06		1E-05		3E-06		3E-04		1E-04		4E-05
12-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	9.91E-01	9.91E-01		1E-12		3E-12		6E-09		2E-06		3E-07		3E-08	
12-A	SVOC	2-Methylnaphthalene	91-57-6	5.84E+00	5.84E+00			1E-02		3E-02		6E-04		4E-02		3E-02		2E-01
12-A	SVOC	Naphthalene	91-20-3	2.88E+00	2.88E+00	2E-06		2E-02		4E-02		5E-04		3E-02		2E-02		2E-01
12-A	SVOC	Phenanthrene	85-01-8	1.23E+01	1.23E+01			9E-06		2E-05		3E-05		2E-03		7E-04		2E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
12-A	SVOC	Pyrene	129-00-0	7.24E+00	7.24E+00			6E-07		1E-06		1E-05		1E-03		3E-04		9E-05
12-A	PCB	PCBs (total)	1336-36-3	2.23E-01	2.23E-01	4E-08	3E-09		9E-09		4E-09	6E-04	1E-06	6E-02	3E-07	2E-02	3E-08	1E-02
12-A	INORG	Antimony	7440-36-0	1.90E+02	1.90E+02							2E-02		2E+00		2E-01		9E-01
12-A	INORG	Arsenic	7440-38-2	2.20E+01	1.39E+01						1E-07	2E-03	4E-05	2E-01	5E-06	3E-02	7E-07	6E-03
12-A	INORG	Barium	7440-39-3	1.00E+03	9.04E+02													
12-A	INORG	Beryllium	7440-41-7	6.90E+00	6.31E+00						4E-09	8E-04	5E-09	1E-02	3E-09	2E-03	7E-09	2E-02
12-A	INORG	Cadmium	7440-43-9	7.50E+00	6.91E+00						4E-09	4E-04	4E-09	3E-02	2E-09	5E-03	6E-09	2E-02
12-A	INORG	Chromium (total)	7440-47-3	3.60E+02	3.28E+02						1E-06	1E-02	1E-06	4E-01	7E-07	6E-02	2E-06	1E-01
12-A	INORG	Cobalt	7440-48-4	1.70E+01	9.95E+00						8E-09	1E-03	9E-09	2E-03	5E-09	5E-04	1E-08	2E-02
12-A	INORG	Copper	7440-50-8	7.20E+02	6.92E+02							7E-04		6E-02		8E-03		3E-02
12-A	INORG	Cyanide (total)	57-12-5	2.00E+00	2.00E+00							4E-06		4E-04		5E-05		2E-04
12-A	INORG	Lead	7439-92-1	1.10E+04	1.10E+04													
12-A	INORG	Manganese	7439-96-5	2.20E+03	1.72E+03							7E-02		7E-02		2E-02		1E+00
12-A	INORG	Mercury	7439-97-6	7.84E+00	7.79E+00	3E-04		3E-02		7E-02		4E-03		2E-01		1E-01		1E+00
12-A	INORG	Nickel	7440-02-0	8.80E+01	6.80E+01						5E-09		5E-09		3E-09		8E-09	
12-A	INORG	Selenium	7782-49-2	6.40E-01	1.21E-01							1E-06		9E-05		1E-05		5E-05
12-A	INORG	Silver	7440-22-4	9.10E-01	7.22E-01							2E-04		6E-04		1E-04		3E-03
12-A	INORG	Thallium	7440-28-0	3.10E-01	1.13E-01							6E-05		6E-03		8E-04		3E-03
12-A	INORG	Vanadium	7440-62-2	1.00E+02	7.51E+01							4E-04		4E-02		5E-03		2E-02
12-A	INORG	Zinc	7440-66-6	3.20E+02	2.10E+02							3E-05		3E-03		3E-04		1E-03
12-B	VOC	Acetone	67-64-1	8.60E-02	8.60E-02	5E-09		2E-06		5E-06		6E-08		3E-06		2E-06		2E-05
12-B	VOC	Methyl Acetate	79-20-9	1.20E-02	1.20E-02	5E-09		5E-07		1E-06		1E-08		5E-07		4E-07		4E-07
12-B	VOC	Methylcyclohexane	108-87-2	1.50E-01	1.50E-01	6E-07		3E-04		3E-04		1E-06		6E-05		5E-05		5E-04
12-B	VOC	Methylene Chloride	75-09-2	1.50E-01	1.50E-01	7E-06	7E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	4E-05	1E-08	2E-05	4E-09	2E-04
12-B	VOC	Toluene	108-88-3	3.90E-02	3.90E-02	3E-07		2E-05		4E-05		8E-08		5E-06		3E-06		2E-05
12-B	VOC	Xylenes (total)	1330-20-7	1.12E-01	1.12E-01	5E-07		1E-03		3E-03		6E-06		3E-04		2E-04		2E-03
12-B	SVOC	Acenaphthene	83-32-9	6.69E-02	6.69E-02			5E-07		1E-06		1E-07		8E-06		3E-06		2E-06
12-B	SVOC	Anthracene	120-12-7	2.95E-01	2.95E-01							5E-08		5E-06		1E-06		3E-07
12-B	SVOC	Benzo(a)anthracene	56-55-3	1.18E-01	1.18E-01		2E-12		7E-12		7E-10		2E-07		4E-08		4E-09	
12-B	SVOC	Benzo(a)pyrene	50-32-8	1.31E-01	1.31E-01		4E-12		1E-11		8E-09		2E-06		5E-07		4E-08	
12-B	SVOC	Benzo(b)fluoranthene	205-99-2	2.16E-01	2.16E-01		5E-11		1E-10		1E-09		4E-07		8E-08		7E-09	
12-B	SVOC	Benzo(g,h,i)perylene	191-24-2	6.87E-02	6.87E-02			6E-13		1E-12		1E-07		1E-05		3E-06		6E-07
12-B	SVOC	Benzo(k)fluoranthene	207-08-9	1.25E-01	1.25E-01		2E-14		6E-14		7E-11		2E-08		4E-09		4E-10	
12-B	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	8.49E-02	8.49E-02	1E-14	6E-17	6E-13	2E-16	2E-12	9E-12	2E-07	2E-09	2E-05	5E-10	5E-06	4E-11	1E-05
12-B	SVOC	Chrysene	218-01-9	1.73E-01	1.73E-01		1E-12		3E-12		1E-11		3E-09		6E-10		6E-11	
12-B	SVOC	Dibenzofuran	132-64-9	1.17E-01	1.17E-01			8E-07		2E-06		3E-06		3E-04		8E-05		3E-04
12-B	SVOC	Diethylphthalate	84-66-2	3.14E-02	3.14E-02	1E-09		1E-09		3E-09		2E-09		2E-07		6E-08		2E-08
12-B	SVOC	Fluoranthene	206-44-0	5.83E-01	5.83E-01			5E-08		1E-07		9E-07		8E-05		2E-05		6E-06
12-B	SVOC	Fluorene	86-73-7	8.12E-01	8.12E-01			2E-06		5E-06		1E-06		1E-04		4E-05		2E-05
12-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	8.25E-02	8.25E-02		9E-14		3E-13		5E-10		1E-07		3E-08		2E-09	
12-B	SVOC	2-Methylnaphthalene	91-57-6	3.52E+00	3.52E+00			8E-03		2E-02		4E-04		2E-02		2E-02		1E-01
12-B	SVOC	Naphthalene	91-20-3	4.41E-01	4.41E-01	2E-07		3E-03		7E-03		8E-05		4E-03		3E-03		3E-02
12-B	SVOC	Phenanthrene	85-01-8	1.97E+00	1.97E+00			1E-06		4E-06		4E-06		4E-04		1E-04		4E-05
12-B	SVOC	Pyrene	129-00-0	5.93E-01	5.93E-01			5E-08		1E-07		1E-06		1E-04		3E-05		7E-06
12-B	INORG	Antimony	7440-36-0	3.70E-01	2.84E-01							3E-05		3E-03		3E-04		1E-03
12-B	INORG	Arsenic	7440-38-2	9.90E+00	1.78E+00						2E-08	3E-04	5E-06	2E-02	7E-07	4E-03	9E-08	8E-04
12-B	INORG	Barium	7440-39-3	1.00E+02	4.31E+00													
12-B	INORG	Beryllium	7440-41-7	6.20E-01	3.00E-02						2E-11	4E-06	2E-11	6E-05	1E-11	8E-06	4E-11	8E-05
12-B	INORG	Cadmium	7440-43-9	1.60E+00	1.01E+00						5E-10	6E-05	6E-10	4E-03	3E-10	8E-04	9E-10	2E-03
12-B	INORG	Chromium (total)	7440-47-3	9.10E+01	5.90E+01						2E-07	2E-03	2E-07	7E-02	1E-07	1E-02	3E-07	3E-02
12-B	INORG	Cobalt	7440-48-4	1.00E+01	2.95E+00						2E-09	3E-04	3E-09	6E-04	2E-09	1E-04	4E-09	5E-03
12-B	INORG	Copper	7440-50-8	4.20E+02	3.92E+02							4E-04		4E-02		5E-03		2E-02
12-B	INORG	Cyanide (total)	57-12-5	3.90E-02	3.90E-02							8E-08		7E-06		1E-06		4E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
12-B	INORG	Lead	7439-92-1	6.20E+02	6.20E+02													
12-B	INORG	Manganese	7439-96-5	1.90E+03	1.42E+03							6E-02		6E-02		2E-02		1E+00
12-B	INORG	Mercury	7439-97-6	6.90E-02	1.66E-02	5E-07		6E-05		2E-04		8E-06		5E-04		2E-04		2E-03
12-B	INORG	Nickel	7440-02-0	9.20E+01	7.20E+01						5E-09		5E-09		3E-09		8E-09	
12-B	INORG	Selenium	7782-49-2	9.30E-01	4.11E-01							3E-06		3E-04		4E-05		2E-04
12-B	INORG	Silver	7440-22-4	1.40E-01														
12-B	INORG	Thallium	7440-28-0	3.60E-01	1.63E-01							9E-05		9E-03		1E-03		5E-03
12-B	INORG	Vanadium	7440-62-2	4.60E+01	2.11E+01							1E-04		1E-02		1E-03		6E-03
12-B	INORG	Zinc	7440-66-6	3.20E+02	2.10E+02							3E-05		3E-03		3E-04		1E-03
12-C	VOC	Acetone	67-64-1	9.60E-02	9.60E-02	5E-09		2E-06		5E-06		7E-08		4E-06		3E-06		2E-05
12-C	VOC	1,2-Dichloroethane	107-06-2	1.60E-02	1.60E-02	7E-06	2E-07	4E-03	6E-07	1E-02	4E-10	2E-05	7E-08	1E-03	4E-08	9E-04	2E-08	9E-03
12-C	VOC	Methyl Acetate	79-20-9	2.50E-02	2.50E-02	9E-09		1E-06		3E-06		2E-08		1E-06		8E-07		7E-07
12-C	INORG	Arsenic	7440-38-2	5.10E+00														
12-C	INORG	Barium	7440-39-3	5.80E+01														
12-C	INORG	Beryllium	7440-41-7	4.70E-01														
12-C	INORG	Cadmium	7440-43-9	1.80E-01														
12-C	INORG	Chromium (total)	7440-47-3	1.20E+01														
12-C	INORG	Cobalt	7440-48-4	4.30E+00														
12-C	INORG	Copper	7440-50-8	1.10E+01														
12-C	INORG	Cyanide (total)	57-12-5	2.30E-02	2.30E-02							5E-08		4E-06		6E-07		2E-06
12-C	INORG	Lead	7439-92-1	6.20E+00	6.20E+00													
12-C	INORG	Manganese	7439-96-5	2.10E+02														
12-C	INORG	Mercury	7439-97-6	6.76E-02	1.52E-02	5E-07		6E-05		1E-04		7E-06		4E-04		2E-04		2E-03
12-C	INORG	Nickel	7440-02-0	1.40E+01														
12-C	INORG	Selenium	7782-49-2	7.20E-01	2.01E-01							2E-06		1E-04		2E-05		8E-05
12-C	INORG	Silver	7440-22-4	5.80E-02														
12-C	INORG	Thallium	7440-28-0	1.60E-01														
12-C	INORG	Vanadium	7440-62-2	1.70E+01														
12-C	INORG	Zinc	7440-66-6	2.40E+01														
12-D	VOC	Methylcyclohexane	108-87-2	1.80E-02	1.80E-02	7E-08		3E-05		4E-05		1E-07		8E-06		6E-06		6E-05
12-D	VOC	Tetrachloroethene	127-18-4	9.00E-02	9.00E-02	4E-06	5E-07	1E-03	7E-07	1E-03	5E-10	3E-06	8E-08	2E-04	5E-08	1E-04	2E-08	1E-03
12-D	VOC	Xylenes (total)	1330-20-7	5.45E-02	5.45E-02	2E-07		7E-04		2E-03		3E-06		1E-04		1E-04		1E-03
12-D	SVOC	Anthracene	120-12-7	5.45E-02	5.45E-02							1E-08		9E-07		2E-07		5E-08
12-D	SVOC	Benzo(a)anthracene	56-55-3	2.23E-01	2.23E-01		5E-12		1E-11		1E-09		4E-07		8E-08		7E-09	
12-D	SVOC	Benzo(a)pyrene	50-32-8	2.62E-01	2.62E-01		7E-12		2E-11		2E-08		4E-06		9E-07		8E-08	
12-D	SVOC	Benzo(b)fluoranthene	205-99-2	3.61E-01	3.61E-01		8E-11		2E-10		2E-09		6E-07		1E-07		1E-08	
12-D	SVOC	Benzo(g,h,i)perylene	191-24-2	2.17E-01	2.17E-01			2E-12		5E-12		4E-07		4E-05		1E-05		2E-06
12-D	SVOC	Benzo(k)fluoranthene	207-08-9	2.97E-01	2.97E-01		5E-14		1E-13		2E-10		5E-08		1E-08		9E-10	
12-D	SVOC	Chrysene	218-01-9	2.49E-01	2.49E-01		1E-12		4E-12		1E-11		4E-09		9E-10		9E-11	
12-D	SVOC	Fluoranthene	206-44-0	2.56E-01	2.56E-01			2E-08		5E-08		4E-07		3E-05		9E-06		2E-06
12-D	SVOC	Phenanthrene	85-01-8	1.75E-01	1.75E-01			1E-07		3E-07		4E-07		3E-05		1E-05		3E-06
12-D	SVOC	Pyrene	129-00-0	9.63E-01	9.63E-01			7E-08		2E-07		2E-06		2E-04		5E-05		1E-05
12-D	INORG	Arsenic	7440-38-2	8.90E+00	7.77E-01						8E-09	1E-04	2E-06	1E-02	3E-07	2E-03	4E-08	3E-04
12-D	INORG	Barium	7440-39-3	8.80E+01														
12-D	INORG	Beryllium	7440-41-7	6.70E-01	8.00E-02						6E-11	1E-05	6E-11	1E-04	4E-11	2E-05	9E-11	2E-04
12-D	INORG	Cadmium	7440-43-9	2.50E-01														
12-D	INORG	Chromium (total)	7440-47-3	2.00E+01														
12-D	INORG	Cobalt	7440-48-4	9.70E+00	2.65E+00						2E-09	3E-04	2E-09	6E-04	1E-09	1E-04	4E-09	5E-03
12-D	INORG	Copper	7440-50-8	1.70E+01														
12-D	INORG	Lead	7439-92-1	2.00E+01	2.00E+01													
12-D	INORG	Manganese	7439-96-5	7.40E+02	2.63E+02							1E-02		1E-02		4E-03		2E-01
12-D	INORG	Mercury	7439-97-6	2.08E-02														
12-D	INORG	Nickel	7440-02-0	2.60E+01	6.04E+00						4E-10		5E-10		3E-10		7E-10	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
12-D	INORG	Silver	7440-22-4	9.60E-02														
12-D	INORG	Thallium	7440-28-0	2.30E-01	3.35E-02							2E-05		2E-03		2E-04		9E-04
12-D	INORG	Vanadium	7440-62-2	3.10E+01	6.13E+00							3E-05		3E-03		4E-04		2E-03
12-D	INORG	Zinc	7440-66-6	5.40E+01														
16-A	VOC	1,2-Dichloroethane	107-06-2	1.20E-02	1.20E-02	5E-06	1E-07	3E-03	4E-07	8E-03	3E-10	2E-05	5E-08	9E-04	3E-08	7E-04	1E-08	7E-03
16-A	VOC	Methyl Acetate	79-20-9	7.10E-02	7.10E-02	3E-08		3E-06		8E-06		6E-08		3E-06		2E-06		2E-06
16-A	VOC	Methylene Chloride	75-09-2	1.70E-02	1.70E-02	8E-07	8E-09	2E-05	2E-08	3E-05	1E-11	7E-08	2E-09	4E-06	1E-09	3E-06	5E-10	2E-05
16-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	4.17E-01	4.17E-01	6E-14	3E-16	3E-12	1E-15	8E-12	4E-11	1E-06	1E-08	1E-04	2E-09	2E-05	2E-10	5E-05
16-A	INORG	Arsenic	7440-38-2	1.70E+01	8.88E+00						9E-08	1E-03	2E-05	1E-01	3E-06	2E-02	4E-07	4E-03
16-A	INORG	Barium	7440-39-3	9.20E+01														
16-A	INORG	Beryllium	7440-41-7	6.00E-01	1.00E-02						7E-12	1E-06	7E-12	2E-05	4E-12	3E-06	1E-11	3E-05
16-A	INORG	Cadmium	7440-43-9	5.70E-01														
16-A	INORG	Chromium (total)	7440-47-3	1.40E+01														
16-A	INORG	Cobalt	7440-48-4	1.30E+01	5.95E+00						5E-09	6E-04	5E-09	1E-03	3E-09	3E-04	8E-09	1E-02
16-A	INORG	Copper	7440-50-8	1.60E+01														
16-A	INORG	Cyanide (total)	57-12-5	1.00E-01	1.00E-01							2E-07		2E-05		2E-06		1E-05
16-A	INORG	Lead	7439-92-1	1.10E+01	1.10E+01													
16-A	INORG	Manganese	7439-96-5	5.40E+02	6.25E+01							3E-03		3E-03		9E-04		4E-02
16-A	INORG	Mercury	7439-97-6	3.30E-02														
16-A	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
16-A	INORG	Selenium	7782-49-2	5.00E-01														
16-A	INORG	Silver	7440-22-4	7.20E-01	5.32E-01							1E-04		4E-04		8E-05		2E-03
16-A	INORG	Thallium	7440-28-0	1.80E-01														
16-A	INORG	Vanadium	7440-62-2	2.20E+01														
16-A	INORG	Zinc	7440-66-6	4.20E+01														
16-B	VOC	Ethyl Benzene	100-41-4	1.20E-02	1.20E-02	6E-08		2E-05		4E-05		7E-08		4E-06		3E-06		3E-05
16-B	VOC	Methylcyclohexane	108-87-2	8.80E-02	8.80E-02	3E-07		1E-04		2E-04		7E-07		4E-05		3E-05		3E-04
16-B	VOC	Methylene Chloride	75-09-2	9.70E-02	9.70E-02	5E-06	5E-08	1E-04	1E-07	2E-04	7E-11	4E-07	1E-08	2E-05	7E-09	2E-05	3E-09	1E-04
16-B	VOC	Tetrachloroethene	127-18-4	4.10E-02	4.10E-02	2E-06	2E-07	5E-04	3E-07	6E-04	2E-10	1E-06	4E-08	8E-05	2E-08	5E-05	8E-09	5E-04
16-B	VOC	Toluene	108-88-3	2.30E-02	2.30E-02	2E-07		1E-05		3E-05		5E-08		3E-06		2E-06		1E-05
16-B	VOC	Xylenes (total)	1330-20-7	1.03E-01	1.03E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
16-B	SVOC	Fluoranthene	206-44-0	4.02E-02	4.02E-02			3E-09		8E-09		6E-08		5E-06		1E-06		4E-07
16-B	SVOC	Phenanthrene	85-01-8	3.95E-02	3.95E-02			3E-08		7E-08		8E-08		7E-06		2E-06		8E-07
16-B	INORG	Antimony	7440-36-0	1.80E-01	9.36E-02							9E-06		9E-04		1E-04		5E-04
16-B	INORG	Arsenic	7440-38-2	6.60E+00														
16-B	INORG	Barium	7440-39-3	1.20E+02	2.43E+01													
16-B	INORG	Beryllium	7440-41-7	1.10E+00	5.10E-01						4E-10	6E-05	4E-10	1E-03	2E-10	1E-04	6E-10	1E-03
16-B	INORG	Cadmium	7440-43-9	1.80E-01														
16-B	INORG	Chromium (total)	7440-47-3	3.10E+01														
16-B	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
16-B	INORG	Copper	7440-50-8	1.80E+01														
16-B	INORG	Cyanide (total)	57-12-5	1.30E-02	1.30E-02							3E-08		2E-06		3E-07		1E-06
16-B	INORG	Lead	7439-92-1	1.30E+01	1.30E+01													
16-B	INORG	Manganese	7439-96-5	2.90E+02														
16-B	INORG	Mercury	7439-97-6	2.91E-02														
16-B	INORG	Nickel	7440-02-0	3.50E+01	1.50E+01						1E-09		1E-09		7E-10		2E-09	
16-B	INORG	Silver	7440-22-4	1.40E-01														
16-B	INORG	Thallium	7440-28-0	5.10E-01	3.13E-01							2E-04		2E-02		2E-03		9E-03
16-B	INORG	Vanadium	7440-62-2	4.50E+01	2.01E+01							1E-04		1E-02		1E-03		6E-03
16-B	INORG	Zinc	7440-66-6	6.50E+01														
16-C	VOC	Acetone	67-64-1	5.50E-02	5.50E-02	3E-09		1E-06		3E-06		4E-08		2E-06		2E-06		1E-05
16-C	VOC	Benzene	71-43-2	8.60E-01	8.60E-01	2E-03	9E-06	1E-01	2E-05	2E-01	1E-08	3E-04	2E-06	2E-02	1E-06	1E-02	4E-07	6E-02
16-C	VOC	2-Butanone	78-93-3	4.50E-02	4.50E-02	1E-08		9E-07		2E-06		2E-08		1E-06		8E-07		7E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
16-C	VOC	Cumene	98-82-8	4.90E-02	4.90E-02	4E-07		2E-04		4E-04		6E-07		3E-05		2E-05		2E-04
16-C	VOC	Cyclohexane	110-82-7	5.30E-02	5.30E-02	4E-07		4E-05		5E-05		2E-07		9E-06		7E-06		6E-05
16-C	VOC	1,1-Dichloroethane	75-34-3	1.60E-02	1.60E-02	3E-07		2E-04		2E-04		4E-07		2E-05		2E-05		1E-05
16-C	VOC	cis-1,2-Dichloroethene	156-59-2	1.40E+00	1.40E+00	1E-05		2E-01		2E-01		4E-04		2E-02		2E-02		2E-02
16-C	VOC	Ethyl Benzene	100-41-4	7.00E-01	7.00E-01	3E-06		1E-03		3E-03		4E-06		2E-04		2E-04		2E-03
16-C	VOC	Methyl Acetate	79-20-9	3.90E-01	3.90E-01	1E-07		2E-05		5E-05		3E-07		2E-05		1E-05		1E-05
16-C	VOC	Methylcyclohexane	108-87-2	2.20E-01	2.20E-01	8E-07		4E-04		4E-04		2E-06		9E-05		7E-05		7E-04
16-C	VOC	Methylene Chloride	75-09-2	1.70E-01	1.70E-01	8E-06	8E-08	2E-04	2E-07	3E-04	1E-10	7E-07	2E-08	4E-05	1E-08	3E-05	5E-09	2E-04
16-C	VOC	Tetrachloroethene	127-18-4	2.10E-02	2.10E-02	9E-07	1E-07	3E-04	2E-07	3E-04	1E-10	7E-07	2E-08	4E-05	1E-08	3E-05	4E-09	2E-04
16-C	VOC	Toluene	108-88-3	1.20E+00	1.20E+00	1E-05		5E-04		1E-03		2E-06		2E-04		8E-05		7E-04
16-C	VOC	Trichloroethene	79-01-6	1.70E-01	1.70E-01	3E-06	4E-07		7E-07		4E-10		6E-08		4E-08		1E-08	
16-C	VOC	1,2,4-Trimethylbenzene	95-63-6	6.50E-01	6.50E-01	4E-06		5E-02		1E-01		3E-04		2E-02		1E-02		1E-02
16-C	VOC	1,3,5-Trimethylbenzene	108-67-8	4.70E-01	4.70E-01	1E-06		2E-02		5E-02		2E-04		9E-03		7E-03		6E-03
16-C	VOC	Vinyl Chloride	75-01-4	1.60E-01	1.60E-01	5E-04	3E-06	8E-03	4E-06	9E-03	6E-09	4E-05	1E-06	2E-03	6E-07	2E-03	2E-07	2E-02
16-C	VOC	Xylenes (total)	1330-20-7	3.06E+00	3.06E+00	1E-05		4E-02		9E-02		2E-04		8E-03		7E-03		6E-02
16-C	SVOC	Acenaphthene	83-32-9	9.99E-01	9.99E-01			8E-06		2E-05		2E-06		1E-04		5E-05		3E-05
16-C	SVOC	Acetophenone	98-86-2	2.62E-01	2.62E-01	8E-08		8E-06		2E-05		5E-07		3E-05		2E-05		2E-05
16-C	SVOC	Anthracene	120-12-7	3.48E+00	3.48E+00							6E-07		6E-05		2E-05		3E-06
16-C	SVOC	Benzo(a)anthracene	56-55-3	5.92E+00	5.92E+00		1E-10		4E-10		3E-08		1E-05		2E-06		2E-07	
16-C	SVOC	Benzo(a)pyrene	50-32-8	5.18E+00	5.18E+00		1E-10		4E-10		3E-07		8E-05		2E-05		2E-06	
16-C	SVOC	Benzo(b)fluoranthene	205-99-2	5.53E+00	5.53E+00		1E-09		4E-09		3E-08		9E-06		2E-06		2E-07	
16-C	SVOC	Benzo(g,h,i)perylene	191-24-2	2.08E+00	2.08E+00			2E-11		4E-11		4E-06		4E-04		9E-05		2E-05
16-C	SVOC	Benzo(k)fluoranthene	207-08-9	5.29E+00	5.29E+00		9E-13		3E-12		3E-09		9E-07		2E-07		2E-08	
16-C	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6.14E-01	6.14E-01	1E-13	5E-16	5E-12	1E-15	1E-11	6E-11	2E-06	2E-08	1E-04	3E-09	3E-05	3E-10	8E-05
16-C	SVOC	Butylbenzylphthalate	85-68-7	1.64E-01	1.64E-01		5E-14	4E-10	2E-13	1E-09	2E-12	4E-08	6E-10	4E-06	1E-10	1E-06	1E-11	2E-07
16-C	SVOC	Carbazole	86-74-8	1.68E+00	1.68E+00		2E-12		6E-12		3E-10		7E-08		1E-08		2E-09	
16-C	SVOC	Chrysene	218-01-9	6.40E+00	6.40E+00		4E-11		1E-10		4E-10		1E-07		2E-08		2E-09	
16-C	SVOC	Dibenz(a,h)anthracene	53-70-3	8.05E-01	8.05E-01		1E-13		3E-13		5E-08		1E-05		3E-06		2E-07	
16-C	SVOC	Dibenzofuran	132-64-9	6.78E-01	6.78E-01			5E-06		1E-05		2E-05		2E-03		5E-04		2E-03
16-C	SVOC	Diethylphthalate	84-66-2	1.65E-01	1.65E-01	5E-09		6E-09		2E-08		1E-08		1E-06		3E-07		1E-07
16-C	SVOC	Fluoranthene	206-44-0	1.52E+01	1.52E+01			1E-06		3E-06		2E-05		2E-03		5E-04		1E-04
16-C	SVOC	Fluorene	86-73-7	1.17E+00	1.17E+00			3E-06		8E-06		2E-06		2E-04		6E-05		3E-05
16-C	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.24E+00	2.24E+00		3E-12		8E-12		1E-08		4E-06		8E-07		7E-08	
16-C	SVOC	2-Methylnaphthalene	91-57-6	1.23E+00	1.23E+00			3E-03		7E-03		1E-04		8E-03		5E-03		5E-02
16-C	SVOC	Naphthalene	91-20-3	3.70E-01	3.70E-01	2E-07		2E-03		6E-03		7E-05		4E-03		3E-03		3E-02
16-C	SVOC	Nitrobenzene	98-95-3	2.16E-02	2.16E-02	1E-07		2E-04		5E-04		9E-06		6E-04		3E-04		3E-04
16-C	SVOC	Phenanthrene	85-01-8	1.09E+01	1.09E+01			8E-06		2E-05		2E-05		2E-03		6E-04		2E-04
16-C	SVOC	Pyrene	129-00-0	1.32E+01	1.32E+01			1E-06		3E-06		3E-05		2E-03		6E-04		2E-04
16-C	PCB	PCBs (total)	1336-36-3	1.17E+00	1.17E+00	2E-07	1E-08		5E-08		2E-08	3E-03	6E-06	3E-01	1E-06	8E-02	2E-07	7E-02
16-C	INORG	Antimony	7440-36-0	1.60E-01	7.36E-02							7E-06		7E-04		9E-05		4E-04
16-C	INORG	Arsenic	7440-38-2	1.40E+01	5.88E+00						6E-08	8E-04	2E-05	8E-02	2E-06	1E-02	3E-07	3E-03
16-C	INORG	Barium	7440-39-3	1.20E+02	2.43E+01													
16-C	INORG	Beryllium	7440-41-7	3.20E+00	2.61E+00						2E-09	3E-04	2E-09	5E-03	1E-09	7E-04	3E-09	7E-03
16-C	INORG	Cadmium	7440-43-9	1.30E+00	7.12E-01						4E-10	4E-05	4E-10	3E-03	2E-10	5E-04	6E-10	2E-03
16-C	INORG	Chromium (total)	7440-47-3	7.10E+01	3.90E+01						1E-07	1E-03	1E-07	5E-02	9E-08	7E-03	2E-07	2E-02
16-C	INORG	Cobalt	7440-48-4	1.30E+01	5.95E+00						5E-09	6E-04	5E-09	1E-03	3E-09	3E-04	8E-09	1E-02
16-C	INORG	Copper	7440-50-8	1.10E+02	8.15E+01							8E-05		7E-03		1E-03		4E-03
16-C	INORG	Cyanide (total)	57-12-5	5.50E-01	5.50E-01							1E-06		1E-04		1E-05		5E-05
16-C	INORG	Lead	7439-92-1	2.50E+02	2.50E+02													
16-C	INORG	Manganese	7439-96-5	1.30E+03	8.23E+02							3E-02		3E-02		1E-02		6E-01
16-C	INORG	Mercury	7439-97-6	2.61E-01	2.09E-01	7E-06		8E-04		2E-03		9E-05		6E-03		3E-03		3E-02
16-C	INORG	Nickel	7440-02-0	7.90E+01	5.90E+01						4E-09		4E-09		3E-09		7E-09	
16-C	INORG	Selenium	7782-49-2	8.60E-01	3.41E-01							3E-06		2E-04		3E-05		1E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
16-C	INORG	Silver	7440-22-4	2.30E+00	2.11E+00							5E-04		2E-03		3E-04		8E-03
16-C	INORG	Thallium	7440-28-0	3.60E-01	1.63E-01							9E-05		9E-03		1E-03		5E-03
16-C	INORG	Vanadium	7440-62-2	3.00E+01	5.13E+00							3E-05		3E-03		4E-04		1E-03
16-C	INORG	Zinc	7440-66-6	1.50E+02	3.95E+01							5E-06		5E-04		6E-05		3E-04
16-D	VOC	1,2-Dichloroethane	107-06-2	9.40E-03	9.40E-03	4E-06	1E-07	2E-03	3E-07	6E-03	2E-10	1E-05	4E-08	7E-04	3E-08	6E-04	1E-08	5E-03
16-D	VOC	Methyl Acetate	79-20-9	7.00E-02	7.00E-02	3E-08		3E-06		8E-06		6E-08		3E-06		2E-06		2E-06
16-D	VOC	Methylene Chloride	75-09-2	1.70E-02	1.70E-02	8E-07	8E-09	2E-05	2E-08	3E-05	1E-11	7E-08	2E-09	4E-06	1E-09	3E-06	5E-10	2E-05
16-D	VOC	Xylenes (total)	1330-20-7	6.55E-02	6.55E-02	3E-07		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
16-D	SVOC	Butylbenzylphthalate	85-68-7	1.28E-01	1.28E-01		4E-14	3E-10	1E-13	8E-10	2E-12	3E-08	5E-10	3E-06	1E-10	7E-07	1E-11	2E-07
16-D	SVOC	Fluoranthene	206-44-0	5.27E-02	5.27E-02			4E-09		1E-08		8E-08		7E-06		2E-06		5E-07
16-D	SVOC	Phenanthrene	85-01-8	3.58E-02	3.58E-02			3E-08		6E-08		8E-08		7E-06		2E-06		7E-07
16-D	SVOC	Pyrene	129-00-0	4.60E-02	4.60E-02			4E-09		9E-09		9E-08		8E-06		2E-06		6E-07
16-D	INORG	Arsenic	7440-38-2	6.60E+00														
16-D	INORG	Barium	7440-39-3	5.90E+01														
16-D	INORG	Beryllium	7440-41-7	4.90E-01														
16-D	INORG	Cadmium	7440-43-9	1.60E-01														
16-D	INORG	Chromium (total)	7440-47-3	2.30E+01														
16-D	INORG	Cobalt	7440-48-4	8.90E+00	1.85E+00						2E-09	2E-04	2E-09	4E-04	1E-09	9E-05	3E-09	3E-03
16-D	INORG	Copper	7440-50-8	1.50E+01														
16-D	INORG	Cyanide (total)	57-12-5	2.80E-02	2.80E-02							6E-08		5E-06		7E-07		3E-06
16-D	INORG	Lead	7439-92-1	9.40E+00	9.40E+00													
16-D	INORG	Manganese	7439-96-5	5.90E+02	1.13E+02							5E-03		5E-03		2E-03		8E-02
16-D	INORG	Mercury	7439-97-6	3.22E-02														
16-D	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
16-D	INORG	Silver	7440-22-4	5.70E-02														
16-D	INORG	Thallium	7440-28-0	7.00E-01	5.03E-01							3E-04		3E-02		4E-03		1E-02
16-D	INORG	Vanadium	7440-62-2	2.40E+01														
16-D	INORG	Zinc	7440-66-6	3.80E+01														
17-A	VOC	Acetone	67-64-1	2.80E-01	2.80E-01	2E-08		6E-06		2E-05		2E-07		1E-05		8E-06		6E-05
17-A	VOC	Benzene	71-43-2	8.20E-02	8.20E-02	1E-04	9E-07	1E-02	2E-06	2E-02	1E-09	3E-05	2E-07	2E-03	1E-07	1E-03	4E-08	6E-03
17-A	VOC	Bromodichloromethane	75-27-4	1.20E-02	1.20E-02		9E-08	2E-04	3E-07	5E-04	1E-10	6E-07	2E-08	3E-05	1E-08	3E-05	4E-09	2E-04
17-A	VOC	2-Butanone	78-93-3	1.70E-01	1.70E-01	4E-08		3E-06		8E-06		8E-08		5E-06		3E-06		3E-05
17-A	VOC	Chloromethane	74-87-3	5.00E-02	5.00E-02	4E-06		3E-03		3E-03		9E-06		5E-04		4E-04		4E-03
17-A	VOC	Cumene	98-82-8	2.50E-01	2.50E-01	2E-06		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
17-A	VOC	Cyclohexane	110-82-7	9.20E-01	9.20E-01	6E-06		8E-04		9E-04		3E-06		1E-04		1E-04		1E-03
17-A	VOC	1,2-Dichloroethane	107-06-2	1.10E-02	1.10E-02	5E-06	1E-07	3E-03	4E-07	7E-03	3E-10	2E-05	5E-08	8E-04	3E-08	6E-04	1E-08	6E-03
17-A	VOC	Ethyl Benzene	100-41-4	4.00E-01	4.00E-01	2E-06		6E-04		1E-03		2E-06		1E-04		9E-05		9E-04
17-A	VOC	2-Hexanone	591-78-6	1.90E-02	1.90E-02	7E-06		2E-02		2E-02		3E-08		2E-06		2E-07		1E-06
17-A	VOC	Methyl Acetate	79-20-9	4.30E-01	4.30E-01	2E-07		2E-05		5E-05		3E-07		2E-05		1E-05		1E-05
17-A	VOC	4-Methyl-2-pentanone	108-10-1	6.40E-02	6.40E-02	5E-08		4E-06		1E-05		5E-08		3E-06		2E-06		2E-05
17-A	VOC	Methylcyclohexane	108-87-2	3.30E+00	3.30E+00	1E-05		6E-03		6E-03		3E-05		1E-03		1E-03		1E-02
17-A	VOC	Methylene Chloride	75-09-2	1.50E-01	1.50E-01	7E-06	7E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	4E-05	1E-08	2E-05	4E-09	2E-04
17-A	VOC	Styrene	100-42-5	1.80E-02	1.80E-02	3E-08		5E-06		1E-05		4E-08		2E-06		2E-06		5E-06
17-A	VOC	Tetrachloroethene	127-18-4	1.00E-02	1.00E-02	4E-07	6E-08	1E-04	8E-08	1E-04	5E-11	3E-07	9E-09	2E-05	5E-09	1E-05	2E-09	1E-04
17-A	VOC	Toluene	108-88-3	2.90E+00	2.90E+00	3E-05		1E-03		3E-03		6E-06		4E-04		2E-04		2E-03
17-A	VOC	Trichlorofluoromethane	75-69-4	4.70E-02	4.70E-02	6E-08		3E-04		4E-04		2E-06		8E-05		6E-05		6E-05
17-A	VOC	Xylenes (total)	1330-20-7	3.60E+00	3.60E+00	1E-05		4E-02		1E-01		2E-04		1E-02		8E-03		7E-02
17-A	SVOC	Acenaphthylene	208-96-8	6.50E-02	6.50E-02			7E-07		2E-06		2E-07		2E-05		6E-06		3E-06
17-A	SVOC	Acetophenone	98-86-2	5.08E-02	5.08E-02	2E-08		2E-06		4E-06		1E-07		7E-06		4E-06		3E-06
17-A	SVOC	Anthracene	120-12-7	6.13E-02	6.13E-02							1E-08		1E-06		3E-07		6E-08
17-A	SVOC	Benzo(a)anthracene	56-55-3	1.95E-01	1.95E-01		4E-12		1E-11		1E-09		3E-07		7E-08		6E-09	
17-A	SVOC	Benzo(a)pyrene	50-32-8	2.93E-01	2.93E-01		8E-12		2E-11		2E-08		5E-06		1E-06		9E-08	
17-A	SVOC	Benzo(b)fluoranthene	205-99-2	5.26E-01	5.26E-01		1E-10		3E-10		3E-09		9E-07		2E-07		2E-08	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
17-A	SVOC	Benzo(g,h,i)perylene	191-24-2	1.79E-01	1.79E-01			1E-12		4E-12		3E-07		3E-05		8E-06		2E-06
17-A	SVOC	Benzo(k)fluoranthene	207-08-9	3.20E-01	3.20E-01		5E-14		2E-13		2E-10		5E-08		1E-08		9E-10	
17-A	SVOC	Butylbenzylphthalate	85-68-7	2.40E-01	2.40E-01		8E-14	6E-10	2E-13	1E-09	3E-12	6E-08	9E-10	6E-06	2E-10	1E-06	2E-11	4E-07
17-A	SVOC	Carbazole	86-74-8	4.07E-02	4.07E-02		4E-14		1E-13		6E-12		2E-09		3E-10		4E-11	
17-A	SVOC	Chrysene	218-01-9	2.56E-01	2.56E-01		1E-12		4E-12		2E-11		4E-09		9E-10		9E-11	
17-A	SVOC	Dibenzofuran	132-64-9	2.80E-01	2.80E-01			2E-06		5E-06		8E-06		7E-04		2E-04		6E-04
17-A	SVOC	Di-n-butylphthalate	84-74-2	5.05E-02	5.05E-02	6E-13						3E-08		2E-06		6E-07		1E-07
17-A	SVOC	Fluoranthene	206-44-0	3.25E-01	3.25E-01			3E-08		7E-08		5E-07		4E-05		1E-05		3E-06
17-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.90E-01	1.90E-01		2E-13		7E-13		1E-09		3E-07		7E-08		6E-09	
17-A	SVOC	2-Methylnaphthalene	91-57-6	8.45E-01	8.45E-01			2E-03		5E-03		9E-05		5E-03		4E-03		3E-02
17-A	SVOC	Naphthalene	91-20-3	5.82E-01	5.82E-01	3E-07		4E-03		9E-03		1E-04		6E-03		4E-03		4E-02
17-A	SVOC	Phenanthrene	85-01-8	5.43E-01	5.43E-01			4E-07		1E-06		1E-06		1E-04		3E-05		1E-05
17-A	SVOC	Pyrene	129-00-0	5.67E-01	5.67E-01			4E-08		1E-07		1E-06		1E-04		3E-05		7E-06
17-A	PCB	PCBs (total)	1336-36-3	2.82E-01	2.82E-01	5E-08	4E-09		1E-08		5E-09	8E-04	1E-06	7E-02	3E-07	2E-02	4E-08	2E-02
17-A	INORG	Antimony	7440-36-0	4.00E-01	3.14E-01							3E-05		3E-03		4E-04		2E-03
17-A	INORG	Arsenic	7440-38-2	1.40E+01	5.88E+00						6E-08	8E-04	2E-05	8E-02	2E-06	1E-02	3E-07	3E-03
17-A	INORG	Barium	7440-39-3	1.60E+02	6.43E+01													
17-A	INORG	Beryllium	7440-41-7	2.10E+00	1.51E+00						1E-09	2E-04	1E-09	3E-03	7E-10	4E-04	2E-09	4E-03
17-A	INORG	Cadmium	7440-43-9	3.10E-01														
17-A	INORG	Chromium (total)	7440-47-3	3.10E+01														
17-A	INORG	Cobalt	7440-48-4	8.30E+00	1.25E+00						1E-09	1E-04	1E-09	3E-04	6E-10	6E-05	2E-09	2E-03
17-A	INORG	Copper	7440-50-8	1.30E+02	1.02E+02							1E-04		9E-03		1E-03		5E-03
17-A	INORG	Cyanide (total)	57-12-5	2.80E-01	2.80E-01							6E-07		5E-05		7E-06		3E-05
17-A	INORG	Lead	7439-92-1	2.70E+02	2.70E+02													
17-A	INORG	Manganese	7439-96-5	4.90E+02	1.25E+01							5E-04		5E-04		2E-04		9E-03
17-A	INORG	Mercury	7439-97-6	1.63E-01	1.11E-01	4E-06		4E-04		1E-03		5E-05		3E-03		2E-03		1E-02
17-A	INORG	Nickel	7440-02-0	3.40E+01	1.40E+01						1E-09		1E-09		6E-10		2E-09	
17-A	INORG	Selenium	7782-49-2	1.10E+00	5.81E-01							5E-06		4E-04		6E-05		2E-04
17-A	INORG	Silver	7440-22-4	1.50E-01														
17-A	INORG	Thallium	7440-28-0	3.10E-01	1.13E-01							6E-05		6E-03		8E-04		3E-03
17-A	INORG	Vanadium	7440-62-2	3.10E+01	6.13E+00							3E-05		3E-03		4E-04		2E-03
17-A	INORG	Zinc	7440-66-6	9.30E+01														
21-1	VOC	2-Butanone	78-93-3	7.80E-02	7.80E-02	2E-08		2E-06		4E-06		3E-08		2E-06		1E-06		1E-05
21-1	VOC	Cumene	98-82-8	4.10E-02	4.10E-02	3E-07		1E-04		3E-04		5E-07		3E-05		2E-05		2E-04
21-1	VOC	Cyclohexane	110-82-7	2.80E-01	2.80E-01	2E-06		2E-04		3E-04		8E-07		5E-05		4E-05		3E-04
21-1	VOC	Ethyl Benzene	100-41-4	5.30E-02	5.30E-02	3E-07		8E-05		2E-04		3E-07		2E-05		1E-05		1E-04
21-1	VOC	2-Hexanone	591-78-6	2.90E-02	2.90E-02	1E-05		3E-02		3E-02		4E-08		3E-06		4E-07		2E-06
21-1	VOC	Methyl Acetate	79-20-9	8.00E-01	8.00E-01	3E-07		4E-05		9E-05		6E-07		4E-05		3E-05		2E-05
21-1	VOC	Methylcyclohexane	108-87-2	8.00E-01	8.00E-01	3E-06		1E-03		2E-03		6E-06		3E-04		3E-04		2E-03
21-1	VOC	Methylene Chloride	75-09-2	3.40E-02	3.40E-02	2E-06	2E-08	3E-05	4E-08	7E-05	3E-11	1E-07	4E-09	9E-06	3E-09	5E-06	1E-09	5E-05
21-1	VOC	Tetrachloroethene	127-18-4	3.50E-02	3.50E-02	2E-06	2E-07	4E-04	3E-07	5E-04	2E-10	1E-06	3E-08	7E-05	2E-08	4E-05	7E-09	4E-04
21-1	VOC	Toluene	108-88-3	1.20E-01	1.20E-01	1E-06		5E-05		1E-04		2E-07		2E-05		8E-06		7E-05
21-1	VOC	Trichloroethene	79-01-6	4.00E-02	4.00E-02	8E-07	9E-08		2E-07		9E-11		1E-08		9E-09		3E-09	
21-1	VOC	Xylenes (total)	1330-20-7	5.50E-01	5.50E-01	2E-06		7E-03		2E-02		3E-05		2E-03		1E-03		1E-02
21-1	SVOC	Acenaphthene	83-32-9	7.40E-02	7.40E-02			6E-07		2E-06		1E-07		9E-06		4E-06		2E-06
21-1	SVOC	Anthracene	120-12-7	2.67E-01	2.67E-01							5E-08		5E-06		1E-06		2E-07
21-1	SVOC	Benzo(a)anthracene	56-55-3	4.94E-01	4.94E-01		1E-11		3E-11		3E-09		8E-07		2E-07		2E-08	
21-1	SVOC	Benzo(a)pyrene	50-32-8	5.24E-01	5.24E-01		1E-11		4E-11		3E-08		8E-06		2E-06		2E-07	
21-1	SVOC	Benzo(b)fluoranthene	205-99-2	5.24E-01	5.24E-01		1E-10		3E-10		3E-09		9E-07		2E-07		2E-08	
21-1	SVOC	Benzo(g,h,i)perylene	191-24-2	2.30E-01	2.30E-01			2E-12		5E-12		4E-07		4E-05		1E-05		2E-06
21-1	SVOC	Benzo(k)fluoranthene	207-08-9	4.97E-01	4.97E-01		8E-14		3E-13		3E-10		8E-08		2E-08		1E-09	
21-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6.41E-02	6.41E-02	1E-14	5E-17	5E-13	1E-16	1E-12	7E-12	2E-07	2E-09	2E-05	4E-10	4E-06	3E-11	8E-06
21-1	SVOC	Carbazole	86-74-8	8.46E-02	8.46E-02		9E-14		3E-13		1E-11		4E-09		7E-10		8E-11	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
21-1	SVOC	Chrysene	218-01-9	5.36E-01	5.36E-01		3E-12		9E-12		3E-11		9E-09		2E-09		2E-10	
21-1	SVOC	Dibenzofuran	132-64-9	5.83E-02	5.83E-02			4E-07		1E-06		2E-06		1E-04		4E-05		1E-04
21-1	SVOC	Fluoranthene	206-44-0	8.43E-01	8.43E-01			7E-08		2E-07		1E-06		1E-04		3E-05		8E-06
21-1	SVOC	Fluorene	86-73-7	1.16E-01	1.16E-01			3E-07		8E-07		2E-07		2E-05		6E-06		3E-06
21-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.17E-01	2.17E-01		2E-13		8E-13		1E-09		3E-07		8E-08		6E-09	
21-1	SVOC	2-Methylnaphthalene	91-57-6	2.09E-01	2.09E-01			4E-04		1E-03		2E-05		1E-03		9E-04		8E-03
21-1	SVOC	Naphthalene	91-20-3	1.04E-01	1.04E-01	6E-08		6E-04		2E-03		2E-05		1E-03		8E-04		7E-03
21-1	SVOC	Phenanthrene	85-01-8	1.02E+00	1.02E+00			7E-07		2E-06		2E-06		2E-04		6E-05		2E-05
21-1	SVOC	Pyrene	129-00-0	1.51E+00	1.51E+00			1E-07		3E-07		3E-06		3E-04		7E-05		2E-05
21-1	PCB	PCBs (total)	1336-36-3	9.10E-02	9.10E-02	2E-08	1E-09		4E-09		2E-09	3E-04	4E-07	2E-02	1E-07	6E-03	1E-08	5E-03
21-1	INORG	Antimony	7440-36-0	5.20E-01	4.34E-01							4E-05		4E-03		5E-04		2E-03
21-1	INORG	Arsenic	7440-38-2	2.10E+01	1.29E+01						1E-07	2E-03	3E-05	2E-01	5E-06	3E-02	6E-07	6E-03
21-1	INORG	Barium	7440-39-3	8.20E+01														
21-1	INORG	Beryllium	7440-41-7	1.20E+00	6.10E-01						4E-10	7E-05	5E-10	1E-03	3E-10	2E-04	7E-10	2E-03
21-1	INORG	Cadmium	7440-43-9	2.30E+00	1.71E+00						9E-10	9E-05	1E-09	7E-03	6E-10	1E-03	2E-09	4E-03
21-1	INORG	Chromium (total)	7440-47-3	4.20E+01	1.00E+01						4E-08	3E-04	4E-08	1E-02	2E-08	2E-03	6E-08	4E-03
21-1	INORG	Cobalt	7440-48-4	9.50E+00	2.45E+00						2E-09	3E-04	2E-09	5E-04	1E-09	1E-04	3E-09	4E-03
21-1	INORG	Copper	7440-50-8	5.50E+01	2.65E+01							3E-05		2E-03		3E-04		1E-03
21-1	INORG	Cyanide (total)	57-12-5	3.80E-01	3.80E-01							8E-07		7E-05		9E-06		4E-05
21-1	INORG	Lead	7439-92-1	1.40E+02	1.40E+02													
21-1	INORG	Manganese	7439-96-5	1.40E+03	9.23E+02							4E-02		4E-02		1E-02		6E-01
21-1	INORG	Mercury	7439-97-6	2.10E-01	1.58E-01	5E-06		6E-04		1E-03		7E-05		5E-03		2E-03		2E-02
21-1	INORG	Nickel	7440-02-0	3.90E+01	1.90E+01						1E-09		1E-09		8E-10		2E-09	
21-1	INORG	Selenium	7782-49-2	7.40E-01	2.21E-01							2E-06		2E-04		2E-05		9E-05
21-1	INORG	Silver	7440-22-4	1.50E-01														
21-1	INORG	Thallium	7440-28-0	3.50E-01	1.53E-01							9E-05		8E-03		1E-03		4E-03
21-1	INORG	Vanadium	7440-62-2	3.90E+01	1.41E+01							8E-05		7E-03		1E-03		4E-03
21-1	INORG	Zinc	7440-66-6	5.90E+01														
23-A	VOC	Benzene	71-43-2	8.60E-03	8.60E-03	2E-05	9E-08	1E-03	2E-07	2E-03	1E-10	3E-06	2E-08	2E-04	1E-08	1E-04	4E-09	6E-04
23-A	VOC	Cyclohexane	110-82-7	3.40E-02	3.40E-02	2E-07		3E-05		3E-05		1E-07		5E-06		4E-06		4E-05
23-A	VOC	Ethyl Benzene	100-41-4	1.50E-02	1.50E-02	7E-08		2E-05		6E-05		9E-08		5E-06		4E-06		3E-05
23-A	VOC	Methyl Acetate	79-20-9	5.60E-01	5.60E-01	2E-07		3E-05		6E-05		4E-07		2E-05		2E-05		2E-05
23-A	VOC	Methylcyclohexane	108-87-2	1.20E-01	1.20E-01	4E-07		2E-04		2E-04		1E-06		5E-05		4E-05		4E-04
23-A	VOC	Methylene Chloride	75-09-2	1.30E-02	1.30E-02	6E-07	6E-09	1E-05	2E-08	3E-05	1E-11	6E-08	2E-09	3E-06	1E-09	2E-06	4E-10	2E-05
23-A	VOC	Tetrachloroethene	127-18-4	1.10E-02	1.10E-02	5E-07	6E-08	1E-04	9E-08	2E-04	6E-11	4E-07	1E-08	2E-05	6E-09	1E-05	2E-09	1E-04
23-A	VOC	Trichloroethene	79-01-6	8.00E-02	8.00E-02	2E-06	2E-07		3E-07		2E-10		3E-08		2E-08		7E-09	
23-A	VOC	Trichlorofluoromethane	75-69-4	1.00E-02	1.00E-02	1E-08		7E-05		8E-05		3E-07		2E-05		1E-05		1E-05
23-A	VOC	Xylenes (total)	1330-20-7	1.06E-01	1.06E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
23-A	SVOC	Anthracene	120-12-7	7.81E-02	7.81E-02							1E-08		1E-06		3E-07		7E-08
23-A	SVOC	Benzo(a)anthracene	56-55-3	3.59E-01	3.59E-01		7E-12		2E-11		2E-09		6E-07		1E-07		1E-08	
23-A	SVOC	Benzo(a)pyrene	50-32-8	3.68E-01	3.68E-01		1E-11		3E-11		2E-08		6E-06		1E-06		1E-07	
23-A	SVOC	Benzo(b)fluoranthene	205-99-2	3.34E-01	3.34E-01		7E-11		2E-10		2E-09		5E-07		1E-07		1E-08	
23-A	SVOC	Benzo(g,h,i)perylene	191-24-2	2.79E-01	2.79E-01			2E-12		6E-12		5E-07		5E-05		1E-05		3E-06
23-A	SVOC	Benzo(k)fluoranthene	207-08-9	3.03E-01	3.03E-01		5E-14		2E-13		2E-10		5E-08		1E-08		9E-10	
23-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.99E+00	1.99E+00	3E-13	2E-15	2E-11	5E-15	4E-11	2E-10	5E-06	6E-08	5E-04	1E-08	1E-04	1E-09	3E-04
23-A	SVOC	Carbazole	86-74-8	4.27E-02	4.27E-02		5E-14		1E-13		7E-12		2E-09		4E-10		4E-11	
23-A	SVOC	Chrysene	218-01-9	3.84E-01	3.84E-01		2E-12		7E-12		2E-11		6E-09		1E-09		1E-10	
23-A	SVOC	Dibenz(a,h)anthracene	53-70-3	9.52E-02	9.52E-02		1E-14		4E-14		6E-09		2E-06		3E-07		3E-08	
23-A	SVOC	Diethylphthalate	84-66-2	7.92E-02	7.92E-02	2E-09		3E-09		8E-09		6E-09		5E-07		1E-07		6E-08
23-A	SVOC	Di-n-butylphthalate	84-74-2	1.40E-01	1.40E-01	2E-12						7E-08		7E-06		2E-06		4E-07
23-A	SVOC	Fluoranthene	206-44-0	6.76E-01	6.76E-01			6E-08		1E-07		1E-06		9E-05		2E-05		7E-06
23-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.28E-01	2.28E-01		3E-13		8E-13		1E-09		4E-07		8E-08		7E-09	
23-A	SVOC	Naphthalene	91-20-3	5.31E-02	5.31E-02	3E-08		3E-04		8E-04		1E-05		5E-04		4E-04		4E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
23-A	SVOC	Phenanthrene	85-01-8	4.43E-01	4.43E-01			3E-07		8E-07		9E-07		8E-05		2E-05		9E-06
23-A	SVOC	Pyrene	129-00-0	9.74E-01	9.74E-01			8E-08		2E-07		2E-06		2E-04		5E-05		1E-05
23-A	INORG	Antimony	7440-36-0	2.10E-01	1.24E-01							1E-05		1E-03		2E-04		6E-04
23-A	INORG	Arsenic	7440-38-2	4.90E+00														
23-A	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
23-A	INORG	Beryllium	7440-41-7	7.50E-01	1.60E-01						1E-10	2E-05	1E-10	3E-04	7E-11	4E-05	2E-10	4E-04
23-A	INORG	Cadmium	7440-43-9	3.20E-01														
23-A	INORG	Chromium (total)	7440-47-3	1.40E+01														
23-A	INORG	Cobalt	7440-48-4	5.10E+00														
23-A	INORG	Copper	7440-50-8	9.00E+01	6.15E+01							6E-05		6E-03		8E-04		3E-03
23-A	INORG	Cyanide (total)	57-12-5	6.30E-02	6.30E-02							1E-07		1E-05		2E-06		6E-06
23-A	INORG	Lead	7439-92-1	7.70E+01	7.70E+01													
23-A	INORG	Manganese	7439-96-5	4.90E+02	1.25E+01							5E-04		5E-04		2E-04		9E-03
23-A	INORG	Mercury	7439-97-6	1.48E-01	9.56E-02	3E-06		4E-04		9E-04		4E-05		3E-03		1E-03		1E-02
23-A	INORG	Nickel	7440-02-0	1.80E+01														
23-A	INORG	Silver	7440-22-4	1.40E-01														
23-A	INORG	Thallium	7440-28-0	1.20E-01														
23-A	INORG	Vanadium	7440-62-2	1.80E+01														
23-A	INORG	Zinc	7440-66-6	9.50E+01														
29-A	VOC	Methyl Acetate	79-20-9	1.00E-01	1.00E-01	4E-08		5E-06		1E-05		8E-08		4E-06		3E-06		3E-06
29-A	VOC	Methylcyclohexane	108-87-2	4.50E-02	4.50E-02	2E-07		8E-05		9E-05		4E-07		2E-05		2E-05		1E-04
29-A	VOC	Xylenes (total)	1330-20-7	5.55E-02	5.55E-02	2E-07		7E-04		2E-03		3E-06		2E-04		1E-04		1E-03
29-A	SVOC	Anthracene	120-12-7	6.07E-02	6.07E-02							1E-08		1E-06		3E-07		6E-08
29-A	SVOC	Benzo(a)anthracene	56-55-3	2.64E-01	2.64E-01		5E-12		2E-11		2E-09		4E-07		9E-08		8E-09	
29-A	SVOC	Benzo(a)pyrene	50-32-8	2.34E-01	2.34E-01		6E-12		2E-11		1E-08		4E-06		8E-07		7E-08	
29-A	SVOC	Benzo(b)fluoranthene	205-99-2	2.87E-01	2.87E-01		6E-11		2E-10		2E-09		5E-07		1E-07		9E-09	
29-A	SVOC	Benzo(g,h,i)perylene	191-24-2	1.75E-01	1.75E-01			1E-12		4E-12		3E-07		3E-05		8E-06		2E-06
29-A	SVOC	Benzo(k)fluoranthene	207-08-9	2.45E-01	2.45E-01		4E-14		1E-13		1E-10		4E-08		9E-09		7E-10	
29-A	SVOC	Chrysene	218-01-9	2.88E-01	2.88E-01		2E-12		5E-12		2E-11		5E-09		1E-09		1E-10	
29-A	SVOC	Fluoranthene	206-44-0	4.51E-01	4.51E-01			4E-08		9E-08		7E-07		6E-05		2E-05		4E-06
29-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.59E-01	1.59E-01		2E-13		6E-13		9E-10		3E-07		6E-08		5E-09	
29-A	SVOC	Phenanthrene	85-01-8	2.98E-01	2.98E-01			2E-07		5E-07		6E-07		6E-05		2E-05		6E-06
29-A	SVOC	Pyrene	129-00-0	5.55E-01	5.55E-01			4E-08		1E-07		1E-06		1E-04		3E-05		7E-06
29-A	INORG	Arsenic	7440-38-2	8.10E+00														
29-A	INORG	Barium	7440-39-3	4.00E+02	3.04E+02													
29-A	INORG	Beryllium	7440-41-7	1.50E+00	9.10E-01						6E-10	1E-04	7E-10	2E-03	4E-10	2E-04	1E-09	2E-03
29-A	INORG	Cadmium	7440-43-9	1.20E+00	6.12E-01						3E-10	3E-05	3E-10	3E-03	2E-10	5E-04	5E-10	1E-03
29-A	INORG	Chromium (total)	7440-47-3	2.10E+02	1.78E+02						6E-07	6E-03	7E-07	2E-01	4E-07	3E-02	1E-06	8E-02
29-A	INORG	Cobalt	7440-48-4	3.90E+01	3.19E+01						3E-08	3E-03	3E-08	7E-03	2E-08	2E-03	4E-08	6E-02
29-A	INORG	Copper	7440-50-8	6.00E+02	5.72E+02							6E-04		5E-02		7E-03		3E-02
29-A	INORG	Lead	7439-92-1	1.50E+03	1.50E+03													
29-A	INORG	Manganese	7439-96-5	4.40E+02														
29-A	INORG	Mercury	7439-97-6	2.20E-01	1.68E-01	5E-06		6E-04		2E-03		8E-05		5E-03		2E-03		2E-02
29-A	INORG	Nickel	7440-02-0	5.00E+01	3.00E+01						2E-09		2E-09		1E-09		4E-09	
29-A	INORG	Selenium	7782-49-2	7.10E-01	1.91E-01							2E-06		1E-04		2E-05		7E-05
29-A	INORG	Silver	7440-22-4	2.30E-01	4.23E-02							9E-06		3E-05		6E-06		2E-04
29-A	INORG	Vanadium	7440-62-2	6.60E+01	4.11E+01							2E-04		2E-02		3E-03		1E-02
29-A	INORG	Zinc	7440-66-6	7.40E+02	6.30E+02							8E-05		8E-03		1E-03		4E-03
36-1	VOC	Acetone	67-64-1	3.10E-01	3.10E-01	2E-08		7E-06		2E-05		2E-07		1E-05		9E-06		7E-05
36-1	VOC	Benzene	71-43-2	2.40E+02	2.40E+02	4E-01	3E-03	3E+01	5E-03	5E+01	3E-06	9E-02	5E-04	5E+00	3E-04	4E+00	1E-04	2E+01
36-1	VOC	2-Butanone	78-93-3	6.20E-02	6.20E-02	1E-08		1E-06		3E-06		3E-08		2E-06		1E-06		9E-06
36-1	VOC	Chlorobenzene	108-90-7	2.00E+00	2.00E+00	9E-06		4E-02		9E-02		2E-04		9E-03		7E-03		6E-02
36-1	VOC	Chloromethane	74-87-3	5.60E-02	5.60E-02	4E-06		3E-03		4E-03		1E-05		6E-04		4E-04		4E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
36-1	VOC	Cumene	98-82-8	1.40E+00	1.40E+00	1E-05		5E-03		1E-02		2E-05		1E-03		7E-04		7E-03
36-1	VOC	Cyclohexane	110-82-7	1.00E-01	1.00E-01	7E-07		8E-05		1E-04		3E-07		2E-05		1E-05		1E-04
36-1	VOC	1,4-Dichlorobenzene	106-46-7	4.00E-02	4.00E-02	4E-08	3E-08	1E-05	8E-08	4E-05	9E-11	2E-07	1E-08	1E-05	9E-09	6E-06	3E-09	2E-05
36-1	VOC	1,1-Dichloroethane	75-34-3	1.60E+00	1.60E+00	3E-05		2E-02		2E-02		4E-05		2E-03		2E-03		1E-03
36-1	VOC	1,1-Dichloroethene	75-35-4	1.40E-01	1.40E-01	5E-05		4E-03		4E-03		1E-05		7E-04		6E-04		5E-03
36-1	VOC	cis-1,2-Dichloroethene	156-59-2	3.10E+00	3.10E+00	2E-05		3E-01		5E-01		9E-04		5E-02		4E-02		3E-02
36-1	VOC	trans-1,2-Dichloroethene	156-60-5	1.10E-01	1.10E-01	1E-06		9E-03		1E-02		2E-05		1E-03		9E-04		9E-03
36-1	VOC	Ethyl Benzene	100-41-4	6.80E+02	6.80E+02	3E-03		1E+00		3E+00		4E-03		2E-01		2E-01		1E+00
36-1	VOC	Methyl Acetate	79-20-9	3.40E-01	3.40E-01	1E-07		2E-05		4E-05		3E-07		2E-05		1E-05		1E-05
36-1	VOC	4-Methyl-2-pentanone	108-10-1	8.50E-01	8.50E-01	6E-07		6E-05		1E-04		7E-07		4E-05		3E-05		3E-04
36-1	VOC	Methylcyclohexane	108-87-2	1.00E+00	1.00E+00	4E-06		2E-03		2E-03		8E-06		4E-04		3E-04		3E-03
36-1	VOC	Methylene Chloride	75-09-2	1.50E-01	1.50E-01	7E-06	7E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	4E-05	1E-08	2E-05	4E-09	2E-04
36-1	VOC	Tetrachloroethene	127-18-4	1.54E+00	1.54E+00	7E-05	9E-06	2E-02	1E-05	2E-02	8E-09	5E-05	1E-06	3E-03	8E-07	2E-03	3E-07	2E-02
36-1	VOC	Toluene	108-88-3	4.10E+03	4.10E+03	4E-02		2E+00		5E+00		8E-03		5E-01		3E-01		2E+00
36-1	VOC	1,1,1-Trichloroethane	71-55-6	1.50E-01	1.50E-01	6E-07		3E-04		4E-04		9E-07		5E-05		4E-05		4E-05
36-1	VOC	Trichloroethene	79-01-6	1.50E+00	1.50E+00	3E-05	3E-06		6E-06		3E-09		5E-07		3E-07		1E-07	
36-1	VOC	Vinyl Chloride	75-01-4	3.60E-02	3.60E-02	1E-04	6E-07	2E-03	8E-07	2E-03	1E-09	9E-06	3E-07	5E-04	1E-07	4E-04	5E-08	4E-03
36-1	VOC	Xylenes (total)	1330-20-7	2.48E+03	2.48E+03	1E-02		3E+01		8E+01		1E-01		7E+00		5E+00		5E+01
36-1	SVOC	Acenaphthene	83-32-9	4.60E+00	4.60E+00			4E-05		9E-05		7E-06		6E-04		2E-04		1E-04
36-1	SVOC	Acenaphthylene	208-96-8	7.00E-01	7.00E-01			8E-06		2E-05		2E-06		2E-04		6E-05		4E-05
36-1	SVOC	Anthracene	120-12-7	1.30E+00	1.30E+00							2E-07		2E-05		6E-06		1E-06
36-1	SVOC	Benzaldehyde	100-52-7	2.17E-01	2.17E-01			2E-05		4E-05		6E-07		4E-05		2E-05		2E-04
36-1	SVOC	Benzo(a)anthracene	56-55-3	6.98E+00	6.98E+00		1E-10		4E-10		4E-08		1E-05		2E-06		2E-07	
36-1	SVOC	Benzo(a)pyrene	50-32-8	6.16E+00	6.16E+00		2E-10		5E-10		4E-07		1E-04		2E-05		2E-06	
36-1	SVOC	Benzo(b)fluoranthene	205-99-2	6.21E+00	6.21E+00		1E-09		4E-09		4E-08		1E-05		2E-06		2E-07	
36-1	SVOC	Benzo(g,h,i)perylene	191-24-2	6.88E+00	6.88E+00			6E-11		1E-10		1E-05		1E-03		3E-04		6E-05
36-1	SVOC	Benzo(k)fluoranthene	207-08-9	4.00E+00	4.00E+00		7E-13		2E-12		2E-09		6E-07		1E-07		1E-08	
36-1	SVOC	Biphenyl	92-52-4	3.50E+00	3.50E+00	1E-05		4E-05		1E-04		7E-06		5E-04		2E-04		1E-03
36-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.30E+00	2.30E+00	4E-13	2E-15	2E-11	5E-15	4E-11	2E-10	6E-06	7E-08	6E-04	1E-08	1E-04	1E-09	3E-04
36-1	SVOC	Butylbenzylphthalate	85-68-7	1.97E+02	1.97E+02		7E-11	5E-07	2E-10	1E-06	3E-09	5E-05	8E-07	5E-03	2E-07	1E-03	2E-08	3E-04
36-1	SVOC	Carbazole	86-74-8	2.49E+00	2.49E+00		3E-12		8E-12		4E-10		1E-07		2E-08		2E-09	
36-1	SVOC	Chrysene	218-01-9	6.95E+00	6.95E+00		4E-11		1E-10		4E-10		1E-07		3E-08		2E-09	
36-1	SVOC	Dibenz(a,h)anthracene	53-70-3	1.10E+00	1.10E+00		1E-13		4E-13		6E-08		2E-05		4E-06		3E-07	
36-1	SVOC	Dibenzofuran	132-64-9	1.50E+00	1.50E+00			1E-05		3E-05		4E-05		4E-03		1E-03		3E-03
36-1	SVOC	Diethylphthalate	84-66-2	8.79E-02	8.79E-02	3E-09		3E-09		9E-09		7E-09		6E-07		2E-07		7E-08
36-1	SVOC	Dimethylphthalate	131-11-3	3.00E-01	3.00E-01	6E-09												8E-08
36-1	SVOC	Di-n-butylphthalate	84-74-2	6.18E-01	6.18E-01	7E-12						3E-07		3E-05		7E-06		2E-06
36-1	SVOC	Di-n-octylphthalate	117-84-0	2.47E-01	2.47E-01							3E-07		3E-05		7E-06		2E-06
36-1	SVOC	Fluoranthene	206-44-0	1.25E+01	1.25E+01			1E-06		3E-06		2E-05		2E-03		5E-04		1E-04
36-1	SVOC	Fluorene	86-73-7	6.70E+00	6.70E+00			2E-05		4E-05		1E-05		1E-03		3E-04		2E-04
36-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	6.80E+00	6.80E+00		8E-12		2E-11		4E-08		1E-05		2E-06		2E-07	
36-1	SVOC	2-Methylnaphthalene	91-57-6	9.60E+01	9.60E+01			2E-01		5E-01		1E-02		6E-01		4E-01		4E+00
36-1	SVOC	Methylphenol (total)	1319-77-3	1.13E+00	1.13E+00	4E-08						1E-06		1E-04		3E-05		6E-06
36-1	SVOC	Naphthalene	91-20-3	4.38E+01	4.38E+01	2E-05		3E-01		7E-01		8E-03		4E-01		3E-01		3E+00
36-1	SVOC	N-Nitroso-di-n-propylamine	621-64-7	4.49E-01	4.49E-01		8E-07		3E-06		5E-08		1E-05		4E-06		1E-06	
36-1	SVOC	Pentachlorophenol	87-86-5	7.21E+00	7.21E+00	7E-08	3E-10	2E-07	1E-09	6E-07	9E-09	2E-05	2E-06	2E-03	7E-07	5E-04	6E-08	1E-03
36-1	SVOC	Phenanthrene	85-01-8	1.81E+01	1.81E+01			1E-05		3E-05		4E-05		3E-03		1E-03		4E-04
36-1	SVOC	Pyrene	129-00-0	1.75E+01	1.75E+01			1E-06		3E-06		3E-05		3E-03		8E-04		2E-04
36-1	SVOC	2,4,5-Trichlorophenol	95-95-4	1.14E+00	1.14E+00							6E-07		5E-05		1E-05		3E-06
36-1	SVOC	2,4,6-Trichlorophenol	88-06-2	2.43E-01	2.43E-01		4E-10		1E-09		3E-11	1E-04	7E-09	1E-02	2E-09	3E-03	6E-10	6E-03
36-1	PCB	PCBs (total)	1336-36-3	8.76E+00	8.76E+00	2E-06	1E-07		3E-07		2E-07	3E-02	4E-05	2E+00	1E-05	6E-01	1E-06	5E-01
36-1	INORG	Antimony	7440-36-0	1.07E+00	9.84E-01							1E-04		9E-03		1E-03		5E-03
36-1	INORG	Arsenic	7440-38-2	3.90E+01	3.09E+01						3E-07	4E-03	8E-05	4E-01	1E-05	7E-02	1E-06	1E-02

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36-1	INORG	Barium	7440-39-3	4.76E+02	3.80E+02													
36-1	INORG	Beryllium	7440-41-7	8.60E-01	2.70E-01						2E-10	3E-05	2E-10	5E-04	1E-10	7E-05	3E-10	7E-04
36-1	INORG	Cadmium	7440-43-9	2.08E+00	1.49E+00						8E-10	8E-05	8E-10	6E-03	5E-10	1E-03	1E-09	3E-03
36-1	INORG	Chromium (total)	7440-47-3	4.10E+02	3.78E+02						1E-06	1E-02	1E-06	5E-01	8E-07	6E-02	2E-06	2E-01
36-1	INORG	Cobalt	7440-48-4	8.50E+01	7.79E+01						6E-08	8E-03	7E-08	2E-02	4E-08	4E-03	1E-07	1E-01
36-1	INORG	Copper	7440-50-8	3.47E+02	3.19E+02							3E-04		3E-02		4E-03		2E-02
36-1	INORG	Cyanide (total)	57-12-5	1.00E-01	1.00E-01							2E-07		2E-05		2E-06		1E-05
36-1	INORG	Lead	7439-92-1	5.45E+02	5.45E+02													
36-1	INORG	Manganese	7439-96-5	6.73E+03	6.25E+03							3E-01		3E-01		9E-02		4E+00
36-1	INORG	Mercury	7439-97-6	1.19E+00	1.14E+00	4E-05		4E-03		1E-02		5E-04		3E-02		2E-02		1E-01
36-1	INORG	Nickel	7440-02-0	1.30E+02	1.10E+02						8E-09		8E-09		5E-09		1E-08	
36-1	INORG	Selenium	7782-49-2	7.10E-01	1.91E-01							2E-06		1E-04		2E-05		7E-05
36-1	INORG	Silver	7440-22-4	3.00E+00	2.81E+00							6E-04		2E-03		4E-04		1E-02
36-1	INORG	Thallium	7440-28-0	5.40E-01	3.43E-01							2E-04		2E-02		2E-03		1E-02
36-1	INORG	Vanadium	7440-62-2	3.40E+01	9.13E+00							5E-05		5E-03		6E-04		3E-03
36-1	INORG	Zinc	7440-66-6	3.65E+02	2.55E+02							3E-05		3E-03		4E-04		2E-03
36-2	VOC	Acetone	67-64-1	2.00E-01	2.00E-01	1E-08		4E-06		1E-05		1E-07		8E-06		6E-06		5E-05
36-2	VOC	2-Butanone	78-93-3	2.80E-02	2.80E-02	7E-09		5E-07		1E-06		1E-08		7E-07		5E-07		4E-06
36-2	VOC	Carbon Disulfide	75-15-0	2.70E-02	2.70E-02	2E-05		2E-04		2E-04		9E-07		5E-05		4E-05		3E-04
36-2	VOC	Methyl Acetate	79-20-9	1.10E-01	1.10E-01	4E-08		5E-06		1E-05		9E-08		5E-06		4E-06		3E-06
36-2	VOC	Methylcyclohexane	108-87-2	8.00E-02	8.00E-02	3E-07		1E-04		2E-04		6E-07		3E-05		3E-05		2E-04
36-2	VOC	Methylene Chloride	75-09-2	8.10E-02	8.10E-02	4E-06	4E-08	8E-05	1E-07	2E-04	6E-11	3E-07	1E-08	2E-05	6E-09	1E-05	2E-09	1E-04
36-2	VOC	Xylenes (total)	1330-20-7	6.40E-02	6.40E-02	3E-07		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
36-2	SVOC	Benzo(a)anthracene	56-55-3	9.32E-02	9.32E-02		2E-12		6E-12		5E-10		2E-07		3E-08		3E-09	
36-2	SVOC	Benzo(a)pyrene	50-32-8	9.04E-02	9.04E-02		2E-12		8E-12		5E-09		1E-06		3E-07		3E-08	
36-2	SVOC	Benzo(b)fluoranthene	205-99-2	9.32E-02	9.32E-02		2E-11		6E-11		6E-10		2E-07		3E-08		3E-09	
36-2	SVOC	Benzo(g,h,i)perylene	191-24-2	5.48E-02	5.48E-02			4E-13		1E-12		1E-07		9E-06		2E-06		5E-07
36-2	SVOC	Benzo(k)fluoranthene	207-08-9	8.79E-02	8.79E-02		1E-14		4E-14		5E-11		1E-08		3E-09		3E-10	
36-2	SVOC	Chrysene	218-01-9	1.05E+00	1.05E+00		6E-12		2E-11		6E-11		2E-08		4E-09		4E-10	
36-2	SVOC	Fluoranthene	206-44-0	1.38E-01	1.38E-01			1E-08		3E-08		2E-07		2E-05		5E-06		1E-06
36-2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.12E-02	5.12E-02		6E-14		2E-13		3E-10		8E-08		2E-08		2E-09	
36-2	SVOC	Phenanthrene	85-01-8	5.80E-02	5.80E-02			4E-08		1E-07		1E-07		1E-05		3E-06		1E-06
36-2	SVOC	Pyrene	129-00-0	1.21E+00	1.21E+00			9E-08		2E-07		2E-06		2E-04		6E-05		1E-05
36-2	INORG	Antimony	7440-36-0	3.80E-02														
36-2	INORG	Arsenic	7440-38-2	5.80E+00														
36-2	INORG	Barium	7440-39-3	3.20E+01														
36-2	INORG	Beryllium	7440-41-7	2.80E-01														
36-2	INORG	Cadmium	7440-43-9	1.70E-01														
36-2	INORG	Chromium (total)	7440-47-3	4.50E+02	4.18E+02						1E-06	1E-02	2E-06	5E-01	9E-07	7E-02	2E-06	2E-01
36-2	INORG	Chromium III	16065-83-1	2.20E+02	2.20E+02							6E-06		5E-04		7E-05		3E-04
36-2	INORG	Chromium VI	18540-29-9	3.40E-01	3.40E-01						1E-09	1E-05	1E-09	4E-04	8E-10	6E-05	2E-09	1E-04
36-2	INORG	Cobalt	7440-48-4	9.60E+00	2.55E+00						2E-09	3E-04	2E-09	6E-04	1E-09	1E-04	3E-09	5E-03
36-2	INORG	Copper	7440-50-8	9.30E+01	6.45E+01							6E-05		6E-03		8E-04		3E-03
36-2	INORG	Cyanide (total)	57-12-5	8.20E-02	8.20E-02							2E-07		1E-05		2E-06		8E-06
36-2	INORG	Lead	7439-92-1	4.00E+01	4.00E+01													
36-2	INORG	Manganese	7439-96-5	1.10E+03	6.23E+02							3E-02		3E-02		9E-03		4E-01
36-2	INORG	Mercury	7439-97-6	3.25E-02														
36-2	INORG	Nickel	7440-02-0	4.70E+01	2.70E+01						2E-09		2E-09		1E-09		3E-09	
36-2	INORG	Selenium	7782-49-2	1.90E-01														
36-2	INORG	Silver	7440-22-4	1.50E-01														
36-2	INORG	Thallium	7440-28-0	1.60E-01														
36-2	INORG	Vanadium	7440-62-2	1.20E+02	9.51E+01							5E-04		5E-02		7E-03		3E-02
36-2	INORG	Zinc	7440-66-6	5.50E+01														

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
36-3	VOC	Benzene	71-43-2	1.90E+00	1.90E+00	3E-03	2E-05	3E-01	4E-05	4E-01	2E-08	7E-04	4E-06	4E-02	2E-06	3E-02	9E-07	1E-01
36-3	VOC	2-Butanone	78-93-3	3.30E-02	3.30E-02	8E-09		6E-07		2E-06		1E-08		9E-07		6E-07		5E-06
36-3	VOC	Cumene	98-82-8	3.00E+00	3.00E+00	2E-05		1E-02		3E-02		4E-05		2E-03		2E-03		1E-02
36-3	VOC	Cyclohexane	110-82-7	4.10E-02	4.10E-02	3E-07		3E-05		4E-05		1E-07		7E-06		5E-06		5E-05
36-3	VOC	Ethyl Benzene	100-41-4	2.50E+01	2.50E+01	1E-04		4E-02		9E-02		1E-04		8E-03		6E-03		5E-02
36-3	VOC	Methyl Acetate	79-20-9	2.10E-01	2.10E-01	8E-08		1E-05		2E-05		2E-07		9E-06		7E-06		6E-06
36-3	VOC	Methylcyclohexane	108-87-2	1.50E+01	1.50E+01	6E-05		3E-02		3E-02		1E-04		6E-03		5E-03		5E-02
36-3	VOC	Methylene Chloride	75-09-2	6.40E-02	6.40E-02	3E-06	3E-08	6E-05	8E-08	1E-04	5E-11	3E-07	8E-09	2E-05	5E-09	1E-05	2E-09	9E-05
36-3	VOC	Toluene	108-88-3	2.90E+01	2.90E+01	3E-04		1E-02		3E-02		6E-05		4E-03		2E-03		2E-02
36-3	VOC	Xylenes (total)	1330-20-7	8.70E+01	8.70E+01	4E-04		1E+00		3E+00		4E-03		2E-01		2E-01		2E+00
36-3	SVOC	Anthracene	120-12-7	4.08E-02	4.08E-02							8E-09		7E-07		2E-07		4E-08
36-3	SVOC	Benzaldehyde	100-52-7	1.17E-01	1.17E-01			9E-06		2E-05		3E-07		2E-05		1E-05		1E-04
36-3	SVOC	Benzo(a)anthracene	56-55-3	7.38E-02	7.38E-02		2E-12		5E-12		4E-10		1E-07		3E-08		2E-09	
36-3	SVOC	Benzo(a)pyrene	50-32-8	1.04E-01	1.04E-01		3E-12		9E-12		6E-09		2E-06		4E-07		3E-08	
36-3	SVOC	Benzo(b)fluoranthene	205-99-2	1.21E-01	1.21E-01		3E-11		8E-11		7E-10		2E-07		4E-08		4E-09	
36-3	SVOC	Benzo(g,h,i)perylene	191-24-2	9.50E-02	9.50E-02			8E-13		2E-12		2E-07		2E-05		4E-06		9E-07
36-3	SVOC	Benzo(k)fluoranthene	207-08-9	1.03E-01	1.03E-01		2E-14		5E-14		6E-11		2E-08		4E-09		3E-10	
36-3	SVOC	Biphenyl	92-52-4	8.85E-02	8.85E-02	3E-07		1E-06		3E-06		2E-07		1E-05		5E-06		4E-05
36-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.07E-01	2.07E-01	3E-14	2E-16	2E-12	5E-16	4E-12	2E-11	5E-07	6E-09	5E-05	1E-09	1E-05	1E-10	3E-05
36-3	SVOC	Butylbenzylphthalate	85-68-7	1.55E-01	1.55E-01		5E-14	4E-10	2E-13	1E-09	2E-12	4E-08	6E-10	4E-06	1E-10	9E-07	1E-11	2E-07
36-3	SVOC	Chrysene	218-01-9	9.61E-02	9.61E-02		6E-13		2E-12		6E-12		2E-09		3E-10		3E-11	
36-3	SVOC	Diethylphthalate	84-66-2	1.37E-01	1.37E-01	4E-09		5E-09		1E-08		1E-08		9E-07		3E-07		1E-07
36-3	SVOC	Fluoranthene	206-44-0	1.29E-01	1.29E-01			1E-08		3E-08		2E-07		2E-05		5E-06		1E-06
36-3	SVOC	Fluorene	86-73-7	1.05E-01	1.05E-01			3E-07		7E-07		2E-07		2E-05		5E-06		2E-06
36-3	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	7.13E-02	7.13E-02		8E-14		2E-13		4E-10		1E-07		2E-08		2E-09	
36-3	SVOC	2-Methylnaphthalene	91-57-6	3.37E+00	3.37E+00			7E-03		2E-02		4E-04		2E-02		1E-02		1E-01
36-3	SVOC	Naphthalene	91-20-3	3.77E+00	3.77E+00	2E-06		2E-02		6E-02		7E-04		4E-02		3E-02		3E-01
36-3	SVOC	Phenanthrene	85-01-8	1.56E-01	1.56E-01			1E-07		3E-07		3E-07		3E-05		9E-06		3E-06
36-3	SVOC	Pyrene	129-00-0	2.63E-01	2.63E-01			2E-08		5E-08		5E-07		5E-05		1E-05		3E-06
36-3	INORG	Antimony	7440-36-0	4.40E-01	3.54E-01							4E-05		3E-03		4E-04		2E-03
36-3	INORG	Arsenic	7440-38-2	5.70E+00														
36-3	INORG	Barium	7440-39-3	5.20E+01														
36-3	INORG	Beryllium	7440-41-7	2.60E-01														
36-3	INORG	Cadmium	7440-43-9	7.50E-01	1.62E-01						9E-11	9E-06	9E-11	7E-04	5E-11	1E-04	1E-10	4E-04
36-3	INORG	Chromium (total)	7440-47-3	1.90E+01														
36-3	INORG	Cobalt	7440-48-4	4.30E+00														
36-3	INORG	Copper	7440-50-8	3.90E+02	3.62E+02							4E-04		3E-02		4E-03		2E-02
36-3	INORG	Cyanide (total)	57-12-5	4.20E-01	4.20E-01							8E-07		8E-05		1E-05		4E-05
36-3	INORG	Lead	7439-92-1	4.70E+01	4.70E+01													
36-3	INORG	Manganese	7439-96-5	4.30E+02														
36-3	INORG	Mercury	7439-97-6	4.78E-02														
36-3	INORG	Nickel	7440-02-0	1.60E+01														
36-3	INORG	Selenium	7782-49-2	4.20E-01														
36-3	INORG	Silver	7440-22-4	3.10E-01	1.22E-01							3E-05		1E-04		2E-05		5E-04
36-3	INORG	Thallium	7440-28-0	9.00E-02														
36-3	INORG	Vanadium	7440-62-2	1.60E+01														
36-3	INORG	Zinc	7440-66-6	1.40E+02	2.95E+01							4E-06		4E-04		5E-05		2E-04
36-4	VOC	1,1-Dichloroethane	75-34-3	1.40E+00	1.40E+00	3E-05		1E-02		2E-02		3E-05		2E-03		1E-03		1E-03
36-4	VOC	1,1,1-Trichloroethane	71-55-6	3.50E-01	3.50E-01	1E-06		8E-04		9E-04		2E-06		1E-04		9E-05		8E-05
36-4	SVOC	Di-n-octylphthalate	117-84-0	1.89E-01	1.89E-01							2E-07		2E-05		5E-06		1E-06
36-4	INORG	Arsenic	7440-38-2	7.70E+00														
36-4	INORG	Barium	7440-39-3	3.80E+01														
36-4	INORG	Cadmium	7440-43-9	2.30E-01														

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
36-4	INORG	Chromium (total)	7440-47-3	6.70E+01	3.50E+01						1E-07	1E-03	1E-07	4E-02	8E-08	6E-03	2E-07	2E-02
36-4	INORG	Lead	7439-92-1	2.90E+01	2.90E+01													
36-4	INORG	Selenium	7782-49-2	3.30E-01														
36-4	INORG	Silver	7440-22-4	6.60E-01	4.72E-01							1E-04		4E-04		7E-05		2E-03
36-5	VOC	Methyl Acetate	79-20-9	8.00E-02	8.00E-02	3E-08		4E-06		9E-06		6E-08		4E-06		3E-06		2E-06
36-5	VOC	Methylcyclohexane	108-87-2	1.30E-01	1.30E-01	5E-07		2E-04		3E-04		1E-06		6E-05		4E-05		4E-04
36-5	VOC	Toluene	108-88-3	3.30E-02	3.30E-02	3E-07		1E-05		4E-05		7E-08		4E-06		2E-06		2E-05
36-5	VOC	Trichloroethene	79-01-6	3.00E-02	3.00E-02	6E-07	6E-08		1E-07		7E-11		1E-08		7E-09		3E-09	
36-5	VOC	Xylenes (total)	1330-20-7	8.20E-02	8.20E-02	3E-07		1E-03		3E-03		4E-06		2E-04		2E-04		2E-03
36-5	SVOC	Acenaphthene	83-32-9	1.60E-01	1.60E-01			1E-06		3E-06		3E-07		2E-05		8E-06		5E-06
36-5	SVOC	Acenaphthylene	208-96-8	2.85E-01	2.85E-01			3E-06		8E-06		9E-07		7E-05		3E-05		2E-05
36-5	SVOC	Anthracene	120-12-7	7.06E-01	7.06E-01							1E-07		1E-05		3E-06		7E-07
36-5	SVOC	Benzo(a)anthracene	56-55-3	2.58E+00	2.58E+00		5E-11		2E-10		2E-08		4E-06		9E-07		8E-08	
36-5	SVOC	Benzo(a)pyrene	50-32-8	2.81E+00	2.81E+00		8E-11		2E-10		2E-07		5E-05		1E-05		8E-07	
36-5	SVOC	Benzo(b)fluoranthene	205-99-2	3.29E+00	3.29E+00		7E-10		2E-09		2E-08		5E-06		1E-06		1E-07	
36-5	SVOC	Benzo(g,h,i)perylene	191-24-2	1.42E+00	1.42E+00			1E-11		3E-11		3E-06		2E-04		6E-05		1E-05
36-5	SVOC	Benzo(k)fluoranthene	207-08-9	2.53E+00	2.53E+00		4E-13		1E-12		1E-09		4E-07		9E-08		7E-09	
36-5	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	8.75E+00	8.75E+00	1E-12	7E-15	7E-11	2E-14	2E-10	9E-10	2E-05	3E-07	2E-03	5E-08	5E-04	5E-09	1E-03
36-5	SVOC	Butylbenzylphthalate	85-68-7	5.94E+00	5.94E+00		2E-12	1E-08	6E-12	4E-08	9E-11	2E-06	2E-08	1E-04	5E-09	3E-05	5E-10	9E-06
36-5	SVOC	Carbazole	86-74-8	1.33E-01	1.33E-01		1E-13		4E-13		2E-11		6E-09		1E-09		1E-10	
36-5	SVOC	Chrysene	218-01-9	2.66E+00	2.66E+00		2E-11		5E-11		2E-10		4E-08		1E-08		9E-10	
36-5	SVOC	Diethylphthalate	84-66-2	1.48E-01	1.48E-01	5E-09		6E-09		1E-08		1E-08		1E-06		3E-07		1E-07
36-5	SVOC	Di-n-butylphthalate	84-74-2	1.58E-01	1.58E-01	2E-12						8E-08		8E-06		2E-06		4E-07
36-5	SVOC	Fluoranthene	206-44-0	3.77E+00	3.77E+00			3E-07		8E-07		6E-06		5E-04		1E-04		4E-05
36-5	SVOC	Fluorene	86-73-7	4.16E-01	4.16E-01			1E-06		3E-06		8E-07		6E-05		2E-05		1E-05
36-5	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.30E+00	1.30E+00		1E-12		5E-12		8E-09		2E-06		5E-07		4E-08	
36-5	SVOC	2-Methylnaphthalene	91-57-6	2.09E-01	2.09E-01			4E-04		1E-03		2E-05		1E-03		9E-04		8E-03
36-5	SVOC	Naphthalene	91-20-3	1.14E-01	1.14E-01	6E-08		7E-04		2E-03		2E-05		1E-03		9E-04		8E-03
36-5	SVOC	Phenanthrene	85-01-8	2.71E+00	2.71E+00			2E-06		5E-06		6E-06		5E-04		1E-04		5E-05
36-5	SVOC	Pyrene	129-00-0	3.93E+00	3.93E+00			3E-07		8E-07		8E-06		7E-04		2E-04		5E-05
36-5	PCB	PCBs (total)	1336-36-3	8.80E-02	8.80E-02	2E-08	1E-09		3E-09		2E-09	3E-04	4E-07	2E-02	1E-07	6E-03	1E-08	5E-03
36-5	INORG	Antimony	7440-36-0	1.60E-01	7.36E-02							7E-06		7E-04		9E-05		4E-04
36-5	INORG	Arsenic	7440-38-2	5.80E+00														
36-5	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
36-5	INORG	Beryllium	7440-41-7	3.80E-01														
36-5	INORG	Cadmium	7440-43-9	1.40E+00	8.12E-01						4E-10	4E-05	5E-10	3E-03	3E-10	6E-04	7E-10	2E-03
36-5	INORG	Chromium (total)	7440-47-3	8.10E+01	4.90E+01						2E-07	2E-03	2E-07	6E-02	1E-07	8E-03	3E-07	2E-02
36-5	INORG	Cobalt	7440-48-4	4.20E+00														
36-5	INORG	Copper	7440-50-8	1.00E+02	7.15E+01							7E-05		7E-03		9E-04		4E-03
36-5	INORG	Cyanide (total)	57-12-5	5.00E-01	5.00E-01							1E-06		9E-05		1E-05		5E-05
36-5	INORG	Lead	7439-92-1	1.20E+02	1.20E+02													
36-5	INORG	Manganese	7439-96-5	7.50E+02	2.73E+02							1E-02		1E-02		4E-03		2E-01
36-5	INORG	Mercury	7439-97-6	1.06E-01	5.36E-02	2E-06		2E-04		5E-04		2E-05		2E-03		8E-04		7E-03
36-5	INORG	Nickel	7440-02-0	3.10E+01	1.10E+01						8E-10		8E-10		5E-10		1E-09	
36-5	INORG	Selenium	7782-49-2	8.80E-01	3.61E-01							3E-06		3E-04		4E-05		1E-04
36-5	INORG	Silver	7440-22-4	3.10E-01	1.22E-01							3E-05		1E-04		2E-05		5E-04
36-5	INORG	Thallium	7440-28-0	2.00E-01	3.46E-03							2E-06		2E-04		2E-05		1E-04
36-5	INORG	Vanadium	7440-62-2	2.00E+01														
36-5	INORG	Zinc	7440-66-6	1.80E+02	6.95E+01							9E-06		8E-04		1E-04		5E-04
38-1	VOC	2-Butanone	78-93-3	3.10E-02	3.10E-02	7E-09		6E-07		2E-06		1E-08		8E-07		5E-07		5E-06
38-1	VOC	Chloromethane	74-87-3	3.10E-02	3.10E-02	2E-06		2E-03		2E-03		6E-06		3E-04		2E-04		2E-03
38-1	VOC	Cumene	98-82-8	3.50E-02	3.50E-02	3E-07		1E-04		3E-04		4E-07		2E-05		2E-05		2E-04
38-1	VOC	Ethyl Benzene	100-41-4	1.80E-01	1.80E-01	9E-07		3E-04		7E-04		1E-06		6E-05		4E-05		4E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
38-1	VOC	Methyl Acetate	79-20-9	6.90E-02	6.90E-02	3E-08		3E-06		8E-06		6E-08		3E-06		2E-06		2E-06
38-1	VOC	Methylcyclohexane	108-87-2	2.90E-02	2.90E-02	1E-07		5E-05		6E-05		2E-07		1E-05		1E-05		9E-05
38-1	VOC	Methylene Chloride	75-09-2	9.40E-02	9.40E-02	5E-06	5E-08	9E-05	1E-07	2E-04	7E-11	4E-07	1E-08	2E-05	7E-09	1E-05	3E-09	1E-04
38-1	VOC	Toluene	108-88-3	3.10E-02	3.10E-02	3E-07		1E-05		4E-05		6E-08		4E-06		2E-06		2E-05
38-1	VOC	1,2,4-Trichlorobenzene	120-82-1	3.10E-02	3.10E-02			9E-06		2E-05		2E-07		2E-05		6E-06		1E-05
38-1	VOC	Trichloroethene	79-01-6	7.10E-02	7.10E-02	1E-06	2E-07		3E-07		2E-10		3E-08		2E-08		6E-09	
38-1	VOC	Xylenes (total)	1330-20-7	1.39E-01	1.39E-01	6E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03
38-1	SVOC	Acenaphthene	83-32-9	1.55E-01	1.55E-01			1E-06		3E-06		2E-07		2E-05		8E-06		5E-06
38-1	SVOC	Anthracene	120-12-7	2.18E-01	2.18E-01							4E-08		4E-06		1E-06		2E-07
38-1	SVOC	Benzo(a)anthracene	56-55-3	7.37E-01	7.37E-01		2E-11		5E-11		4E-09		1E-06		3E-07		2E-08	
38-1	SVOC	Benzo(a)pyrene	50-32-8	7.45E-01	7.45E-01		2E-11		6E-11		4E-08		1E-05		3E-06		2E-07	
38-1	SVOC	Benzo(b)fluoranthene	205-99-2	8.69E-01	8.69E-01		2E-10		6E-10		5E-09		1E-06		3E-07		3E-08	
38-1	SVOC	Benzo(g,h,i)perylene	191-24-2	5.13E-01	5.13E-01			4E-12		1E-11		1E-06		9E-05		2E-05		5E-06
38-1	SVOC	Benzo(k)fluoranthene	207-08-9	8.43E-01	8.43E-01		1E-13		4E-13		5E-10		1E-07		3E-08		2E-09	
38-1	SVOC	Biphenyl	92-52-4	4.69E-02	4.69E-02	2E-07		6E-07		2E-06		9E-08		7E-06		3E-06		2E-05
38-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.26E-01	3.26E-01	5E-14	2E-16	2E-12	8E-16	6E-12	3E-11	9E-07	9E-09	8E-05	2E-09	2E-05	2E-10	4E-05
38-1	SVOC	Butylbenzylphthalate	85-68-7	1.19E-01	1.19E-01		4E-14	3E-10	1E-13	7E-10	2E-12	3E-08	5E-10	3E-06	9E-11	7E-07	9E-12	2E-07
38-1	SVOC	Carbazole	86-74-8	1.07E-01	1.07E-01		1E-13		4E-13		2E-11		4E-09		9E-10		1E-10	
38-1	SVOC	Chrysene	218-01-9	8.38E-01	8.38E-01		5E-12		1E-11		5E-11		1E-08		3E-09		3E-10	
38-1	SVOC	Dibenzofuran	132-64-9	1.75E-01	1.75E-01			1E-06		3E-06		5E-06		4E-04		1E-04		4E-04
38-1	SVOC	Diethylphthalate	84-66-2	1.50E-01	1.50E-01	5E-09		6E-09		1E-08		1E-08		1E-06		3E-07		1E-07
38-1	SVOC	Di-n-butylphthalate	84-74-2	3.29E-01	3.29E-01	4E-12						2E-07		2E-05		4E-06		9E-07
38-1	SVOC	Fluoranthene	206-44-0	1.33E+00	1.33E+00			1E-07		3E-07		2E-06		2E-04		5E-05		1E-05
38-1	SVOC	Fluorene	86-73-7	9.20E-02	9.20E-02			2E-07		6E-07		2E-07		1E-05		5E-06		2E-06
38-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.89E-01	4.89E-01		6E-13		2E-12		3E-09		8E-07		2E-07		1E-08	
38-1	SVOC	2-Methylnaphthalene	91-57-6	2.51E-01	2.51E-01			5E-04		1E-03		3E-05		2E-03		1E-03		1E-02
38-1	SVOC	Naphthalene	91-20-3	2.01E-01	2.01E-01	1E-07		1E-03		3E-03		4E-05		2E-03		2E-03		1E-02
38-1	SVOC	Phenanthrene	85-01-8	1.13E+00	1.13E+00			8E-07		2E-06		2E-06		2E-04		6E-05		2E-05
38-1	SVOC	Pyrene	129-00-0	1.91E+00	1.91E+00			1E-07		4E-07		4E-06		3E-04		9E-05		2E-05
38-1	PCB	PCBs (total)	1336-36-3	7.75E-02	7.75E-02	1E-08	1E-09		3E-09		1E-09	2E-04	4E-07	2E-02	9E-08	5E-03	1E-08	4E-03
38-1	INORG	Antimony	7440-36-0	3.70E-01	2.84E-01							3E-05		3E-03		3E-04		1E-03
38-1	INORG	Arsenic	7440-38-2	6.40E+00														
38-1	INORG	Barium	7440-39-3	6.20E+01														
38-1	INORG	Beryllium	7440-41-7	6.60E-01	7.00E-02						5E-11	9E-06	5E-11	1E-04	3E-11	2E-05	8E-11	2E-04
38-1	INORG	Cadmium	7440-43-9	7.60E-01	1.72E-01						9E-11	9E-06	1E-10	7E-04	6E-11	1E-04	2E-10	4E-04
38-1	INORG	Chromium (total)	7440-47-3	2.80E+01														
38-1	INORG	Cobalt	7440-48-4	6.00E+00														
38-1	INORG	Copper	7440-50-8	2.40E+01														
38-1	INORG	Cyanide (total)	57-12-5	1.20E-01	1.20E-01							2E-07		2E-05		3E-06		1E-05
38-1	INORG	Lead	7439-92-1	2.40E+01	2.40E+01													
38-1	INORG	Manganese	7439-96-5	6.20E+02	1.43E+02							6E-03		6E-03		2E-03		1E-01
38-1	INORG	Mercury	7439-97-6	5.43E-02	1.93E-03	6E-08		7E-06		2E-05		9E-07		6E-05		3E-05		3E-04
38-1	INORG	Nickel	7440-02-0	1.80E+01														
38-1	INORG	Selenium	7782-49-2	4.20E-01														
38-1	INORG	Silver	7440-22-4	3.40E-01	1.52E-01							3E-05		1E-04		2E-05		6E-04
38-1	INORG	Thallium	7440-28-0	2.10E-01	1.35E-02							8E-06		7E-04		9E-05		4E-04
38-1	INORG	Vanadium	7440-62-2	2.50E+01	1.29E-01							7E-07		7E-05		9E-06		4E-05
38-1	INORG	Zinc	7440-66-6	6.30E+01														
40-A	VOC	Acetone	67-64-1	3.50E-01	3.50E-01	2E-08		8E-06		2E-05		2E-07		1E-05		1E-05		8E-05
40-A	VOC	Benzene	71-43-2	9.10E-01	9.10E-01	2E-03	1E-05	1E-01	2E-05	2E-01	1E-08	3E-04	2E-06	2E-02	1E-06	1E-02	4E-07	6E-02
40-A	VOC	2-Butanone	78-93-3	1.10E-01	1.10E-01	3E-08		2E-06		5E-06		5E-08		3E-06		2E-06		2E-05
40-A	VOC	Chloromethane	74-87-3	4.40E-02	4.40E-02	3E-06		2E-03		3E-03		8E-06		4E-04		3E-04		3E-03
40-A	VOC	Cumene	98-82-8	6.90E-01	6.90E-01	5E-06		2E-03		6E-03		9E-06		5E-04		4E-04		3E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
40-A	VOC	Cyclohexane	110-82-7	2.00E+00	2.00E+00	1E-05		2E-03		2E-03		6E-06		3E-04		3E-04		2E-03
40-A	VOC	1,2-Dichloroethane	107-06-2	1.40E-02	1.40E-02	6E-06	2E-07	3E-03	5E-07	9E-03	4E-10	2E-05	6E-08	1E-03	4E-08	8E-04	1E-08	8E-03
40-A	VOC	cis-1,2-Dichloroethene	156-59-2	9.00E-02	9.00E-02	6E-07		1E-02		2E-02		3E-05		1E-03		1E-03		1E-03
40-A	VOC	Ethyl Benzene	100-41-4	3.90E+00	3.90E+00	2E-05		6E-03		1E-02		2E-05		1E-03		9E-04		8E-03
40-A	VOC	Methyl Acetate	79-20-9	1.00E+00	1.00E+00	4E-07		5E-05		1E-04		8E-07		4E-05		3E-05		3E-05
40-A	VOC	Methylcyclohexane	108-87-2	1.00E+01	1.00E+01	4E-05		2E-02		2E-02		8E-05		4E-03		3E-03		3E-02
40-A	VOC	Methylene Chloride	75-09-2	1.70E-01	1.70E-01	8E-06	8E-08	2E-04	2E-07	3E-04	1E-10	7E-07	2E-08	4E-05	1E-08	3E-05	5E-09	2E-04
40-A	VOC	Styrene	100-42-5	3.60E-02	3.60E-02	6E-08		9E-06		2E-05		9E-08		5E-06		3E-06		1E-05
40-A	VOC	Toluene	108-88-3	4.00E-01	4.00E-01	3E-06		2E-04		5E-04		8E-07		5E-05		3E-05		2E-04
40-A	VOC	1,1,1-Trichloroethane	71-55-6	1.50E-01	1.50E-01	6E-07		3E-04		4E-04		9E-07		5E-05		4E-05		4E-05
40-A	VOC	Trichloroethene	79-01-6	3.20E-01	3.20E-01	6E-06	7E-07		1E-06		7E-10		1E-07		7E-08		3E-08	
40-A	VOC	Trichlorofluoromethane	75-69-4	9.00E-02	9.00E-02	1E-07		7E-04		8E-04		3E-06		2E-04		1E-04		1E-04
40-A	VOC	Xylenes (total)	1330-20-7	1.33E+01	1.33E+01	5E-05		2E-01		4E-01		7E-04		4E-02		3E-02		3E-01
40-A	SVOC	Acenaphthene	83-32-9	7.69E+00	7.69E+00			6E-05		2E-04		1E-05		9E-04		4E-04		2E-04
40-A	SVOC	Acenaphthylene	208-96-8	5.15E-01	5.15E-01			6E-06		1E-05		2E-06		1E-04		5E-05		3E-05
40-A	SVOC	Anthracene	120-12-7	1.59E+01	1.59E+01							3E-06		3E-04		7E-05		1E-05
40-A	SVOC	Benzo(a)anthracene	56-55-3	3.71E+01	3.71E+01		8E-10		2E-09		2E-07		6E-05		1E-05		1E-06	
40-A	SVOC	Benzo(a)pyrene	50-32-8	3.58E+01	3.58E+01		1E-09		3E-09		2E-06		6E-04		1E-04		1E-05	
40-A	SVOC	Benzo(b)fluoranthene	205-99-2	3.61E+01	3.61E+01		8E-09		2E-08		2E-07		6E-05		1E-05		1E-06	
40-A	SVOC	Benzo(g,h,i)perylene	191-24-2	2.30E+01	2.30E+01			2E-10		5E-10		4E-05		4E-03		1E-03		2E-04
40-A	SVOC	Benzo(k)fluoranthene	207-08-9	3.72E+01	3.72E+01		6E-12		2E-11		2E-08		6E-06		1E-06		1E-07	
40-A	SVOC	Biphenyl	92-52-4	5.43E-02	5.43E-02	2E-07		7E-07		2E-06		1E-07		8E-06		3E-06		2E-05
40-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2.20E+00	2.20E+00	3E-13	2E-15	2E-11	5E-15	4E-11	2E-10	6E-06	6E-08	5E-04	1E-08	1E-04	1E-09	3E-04
40-A	SVOC	Butylbenzylphthalate	85-68-7	4.17E+00	4.17E+00		1E-12	1E-08	4E-12	3E-08	6E-11	1E-06	2E-08	1E-04	3E-09	2E-05	3E-10	6E-06
40-A	SVOC	Carbazole	86-74-8	1.07E+01	1.07E+01		1E-11		4E-11		2E-09		4E-07		9E-08		1E-08	
40-A	SVOC	Chrysene	218-01-9	3.79E+01	3.79E+01		2E-10		7E-10		2E-09		6E-07		1E-07		1E-08	
40-A	SVOC	Dibenzofuran	132-64-9	4.93E+00	4.93E+00			3E-05		8E-05		1E-04		1E-02		3E-03		1E-02
40-A	SVOC	Diethylphthalate	84-66-2	1.98E-01	1.98E-01	6E-09		8E-09		2E-08		2E-08		1E-06		4E-07		1E-07
40-A	SVOC	Di-n-butylphthalate	84-74-2	6.06E-02	6.06E-02	7E-13						3E-08		3E-06		7E-07		2E-07
40-A	SVOC	Fluoranthene	206-44-0	1.05E+02	1.05E+02			9E-06		2E-05		2E-04		1E-02		4E-03		1E-03
40-A	SVOC	Fluorene	86-73-7	7.10E+00	7.10E+00			2E-05		5E-05		1E-05		1E-03		4E-04		2E-04
40-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.08E+01	2.08E+01		2E-11		7E-11		1E-07		3E-05		7E-06		6E-07	
40-A	SVOC	2-Methylnaphthalene	91-57-6	1.94E+00	1.94E+00			4E-03		1E-02		2E-04		1E-02		8E-03		7E-02
40-A	SVOC	Naphthalene	91-20-3	3.54E+00	3.54E+00	2E-06		2E-02		6E-02		6E-04		4E-02		3E-02		2E-01
40-A	SVOC	N-Nitrosodiphenylamine	86-30-6	9.61E-02	9.61E-02						4E-12	3E-07	1E-09	2E-05	2E-10	5E-06	2E-11	1E-05
40-A	SVOC	Phenanthrene	85-01-8	7.71E+01	7.71E+01			5E-05		1E-04		2E-04		1E-02		4E-03		2E-03
40-A	SVOC	Pyrene	129-00-0	8.88E+01	8.88E+01			7E-06		2E-05		2E-04		2E-02		4E-03		1E-03
40-A	PCB	PCBs (total)	1336-36-3	1.16E+00	1.16E+00	2E-07	1E-08		5E-08		2E-08	3E-03	6E-06	3E-01	1E-06	8E-02	2E-07	7E-02
40-A	INORG	Antimony	7440-36-0	3.80E-01	2.94E-01							3E-05		3E-03		4E-04		1E-03
40-A	INORG	Arsenic	7440-38-2	1.30E+01	4.88E+00						5E-08	7E-04	1E-05	7E-02	2E-06	1E-02	2E-07	2E-03
40-A	INORG	Barium	7440-39-3	2.90E+02	1.94E+02													
40-A	INORG	Beryllium	7440-41-7	5.70E+00	5.11E+00						4E-09	6E-04	4E-09	1E-02	2E-09	1E-03	6E-09	1E-02
40-A	INORG	Cadmium	7440-43-9	2.00E+00	1.41E+00						7E-10	8E-05	8E-10	6E-03	5E-10	1E-03	1E-09	3E-03
40-A	INORG	Chromium (total)	7440-47-3	7.90E+01	4.70E+01						2E-07	2E-03	2E-07	6E-02	1E-07	8E-03	3E-07	2E-02
40-A	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
40-A	INORG	Copper	7440-50-8	8.10E+01	5.25E+01							5E-05		5E-03		6E-04		3E-03
40-A	INORG	Cyanide (total)	57-12-5	2.60E+00	2.60E+00							5E-06		5E-04		6E-05		3E-04
40-A	INORG	Lead	7439-92-1	4.90E+02	4.90E+02													
40-A	INORG	Manganese	7439-96-5	7.60E+02	2.83E+02							1E-02		1E-02		4E-03		2E-01
40-A	INORG	Mercury	7439-97-6	3.65E-01	3.13E-01	1E-05		1E-03		3E-03		1E-04		9E-03		5E-03		4E-02
40-A	INORG	Nickel	7440-02-0	3.00E+01	1.00E+01						7E-10		8E-10		4E-10		1E-09	
40-A	INORG	Selenium	7782-49-2	7.80E-01	2.61E-01							2E-06		2E-04		3E-05		1E-04
40-A	INORG	Silver	7440-22-4	4.70E-01	2.82E-01							6E-05		2E-04		4E-05		1E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
40-A	INORG	Thallium	7440-28-0	5.30E-01	3.33E-01							2E-04		2E-02		2E-03		9E-03
40-A	INORG	Vanadium	7440-62-2	1.50E+02	1.25E+02							7E-04		7E-02		9E-03		4E-02
40-A	INORG	Zinc	7440-66-6	7.60E+02	6.50E+02							9E-05		8E-03		1E-03		4E-03
40-B	VOC	Chloromethane	74-87-3	3.40E-02	3.40E-02	2E-06		2E-03		2E-03		6E-06		3E-04		3E-04		2E-03
40-B	VOC	Methyl Acetate	79-20-9	1.90E-01	1.90E-01	7E-08		9E-06		2E-05		2E-07		8E-06		6E-06		6E-06
40-B	VOC	Methylcyclohexane	108-87-2	4.80E-02	4.80E-02	2E-07		8E-05		9E-05		4E-07		2E-05		2E-05		1E-04
40-B	VOC	Methylene Chloride	75-09-2	3.10E-02	3.10E-02	2E-06	2E-08	3E-05	4E-08	6E-05	2E-11	1E-07	4E-09	8E-06	2E-09	5E-06	9E-10	4E-05
40-B	VOC	Tetrachloroethene	127-18-4	6.10E-02	6.10E-02	3E-06	3E-07	8E-04	5E-07	9E-04	3E-10	2E-06	5E-08	1E-04	3E-08	8E-05	1E-08	7E-04
40-B	VOC	Trichloroethene	79-01-6	1.50E-01	1.50E-01	3E-06	3E-07		6E-07		3E-10		5E-08		3E-08		1E-08	
40-B	SVOC	Acenaphthene	83-32-9	4.33E-02	4.33E-02			3E-07		9E-07		7E-08		5E-06		2E-06		1E-06
40-B	SVOC	Anthracene	120-12-7	1.71E-01	1.71E-01							3E-08		3E-06		8E-07		2E-07
40-B	SVOC	Benzo(a)anthracene	56-55-3	6.15E-01	6.15E-01		1E-11		4E-11		4E-09		1E-06		2E-07		2E-08	
40-B	SVOC	Benzo(a)pyrene	50-32-8	6.17E-01	6.17E-01		2E-11		5E-11		4E-08		1E-05		2E-06		2E-07	
40-B	SVOC	Benzo(b)fluoranthene	205-99-2	9.09E-01	9.09E-01		2E-10		6E-10		5E-09		1E-06		3E-07		3E-08	
40-B	SVOC	Benzo(g,h,i)perylene	191-24-2	1.39E+00	1.39E+00			1E-11		3E-11		3E-06		2E-04		6E-05		1E-05
40-B	SVOC	Benzo(k)fluoranthene	207-08-9	6.86E-01	6.86E-01		1E-13		3E-13		4E-10		1E-07		2E-08		2E-09	
40-B	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.68E-01	1.68E-01	3E-14	1E-16	1E-12	4E-16	3E-12	2E-11	4E-07	5E-09	4E-05	1E-09	1E-05	9E-11	2E-05
40-B	SVOC	Carbazole	86-74-8	6.46E-02	6.46E-02		7E-14		2E-13		1E-11		3E-09		5E-10		6E-11	
40-B	SVOC	Chrysene	218-01-9	7.14E-01	7.14E-01		4E-12		1E-11		4E-11		1E-08		3E-09		2E-10	
40-B	SVOC	Dibenz(a,h)anthracene	53-70-3	9.62E-02	9.62E-02		1E-14		4E-14		6E-09		2E-06		3E-07		3E-08	
40-B	SVOC	Dibenzofuran	132-64-9	4.22E-02	4.22E-02			3E-07		7E-07		1E-06		1E-04		3E-05		1E-04
40-B	SVOC	Fluoranthene	206-44-0	1.06E+00	1.06E+00			9E-08		2E-07		2E-06		1E-04		4E-05		1E-05
40-B	SVOC	Fluorene	86-73-7	2.84E-01	2.84E-01			7E-07		2E-06		5E-07		4E-05		1E-05		7E-06
40-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.09E+00	1.09E+00		1E-12		4E-12		6E-09		2E-06		4E-07		3E-08	
40-B	SVOC	Naphthalene	91-20-3	4.22E-02	4.22E-02	2E-08		3E-04		7E-04		8E-06		4E-04		3E-04		3E-03
40-B	SVOC	Phenanthrene	85-01-8	1.67E+00	1.67E+00			1E-06		3E-06		4E-06		3E-04		9E-05		3E-05
40-B	SVOC	Pyrene	129-00-0	1.04E+00	1.04E+00			8E-08		2E-07		2E-06		2E-04		5E-05		1E-05
40-B	PCB	PCBs (total)	1336-36-3	9.55E-02	9.55E-02	2E-08	1E-09		4E-09		2E-09	3E-04	5E-07	3E-02	1E-07	7E-03	1E-08	5E-03
40-B	INORG	Antimony	7440-36-0	1.50E-01	6.36E-02							6E-06		6E-04		8E-05		3E-04
40-B	INORG	Arsenic	7440-38-2	9.10E+00	9.77E-01						1E-08	1E-04	3E-06	1E-02	4E-07	2E-03	5E-08	4E-04
40-B	INORG	Barium	7440-39-3	6.10E+01														
40-B	INORG	Beryllium	7440-41-7	3.30E+00	2.71E+00						2E-09	3E-04	2E-09	5E-03	1E-09	7E-04	3E-09	7E-03
40-B	INORG	Cadmium	7440-43-9	2.80E-01														
40-B	INORG	Chromium (total)	7440-47-3	1.70E+01														
40-B	INORG	Cobalt	7440-48-4	5.80E+00														
40-B	INORG	Copper	7440-50-8	1.50E+01														
40-B	INORG	Cyanide (total)	57-12-5	1.40E-01	1.40E-01							3E-07		3E-05		3E-06		1E-05
40-B	INORG	Lead	7439-92-1	1.20E+01	1.20E+01													
40-B	INORG	Manganese	7439-96-5	4.40E+02														
40-B	INORG	Nickel	7440-02-0	1.60E+01														
40-B	INORG	Selenium	7782-49-2	2.30E-01														
40-B	INORG	Silver	7440-22-4	1.90E-01	2.28E-03							5E-07		2E-06		3E-07		9E-06
40-B	INORG	Thallium	7440-28-0	2.30E-01	3.35E-02							2E-05		2E-03		2E-04		9E-04
40-B	INORG	Vanadium	7440-62-2	2.60E+01	1.13E+00							6E-06		6E-04		8E-05		3E-04
40-B	INORG	Zinc	7440-66-6	3.50E+01														
40-C	VOC	Benzene	71-43-2	1.30E-01	1.30E-01	2E-04	1E-06	2E-02	3E-06	3E-02	2E-09	5E-05	3E-07	3E-03	2E-07	2E-03	6E-08	9E-03
40-C	VOC	2-Butanone	78-93-3	5.00E-02	5.00E-02	1E-08		1E-06		2E-06		2E-08		1E-06		8E-07		8E-06
40-C	VOC	Cumene	98-82-8	6.20E-02	6.20E-02	5E-07		2E-04		5E-04		8E-07		4E-05		3E-05		3E-04
40-C	VOC	Cyclohexane	110-82-7	2.60E-01	2.60E-01	2E-06		2E-04		3E-04		8E-07		4E-05		3E-05		3E-04
40-C	VOC	Ethyl Benzene	100-41-4	1.20E-01	1.20E-01	6E-07		2E-04		4E-04		7E-07		4E-05		3E-05		3E-04
40-C	VOC	Methylcyclohexane	108-87-2	7.70E-01	7.70E-01	3E-06		1E-03		2E-03		6E-06		3E-04		3E-04		2E-03
40-C	VOC	Methylene Chloride	75-09-2	4.50E-02	4.50E-02	2E-06	2E-08	4E-05	5E-08	9E-05	3E-11	2E-07	6E-09	1E-05	3E-09	7E-06	1E-09	6E-05
40-C	VOC	Toluene	108-88-3	5.80E-01	5.80E-01	5E-06		3E-04		7E-04		1E-06		7E-05		4E-05		3E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
40-C	VOC	Trichloroethene	79-01-6	3.20E-01	3.20E-01	6E-06	7E-07		1E-06		7E-10		1E-07		7E-08		3E-08	
40-C	VOC	Xylenes (total)	1330-20-7	8.00E-01	8.00E-01	3E-06		1E-02		2E-02		4E-05		2E-03		2E-03		2E-02
40-C	SVOC	Anthracene	120-12-7	7.34E-02	7.34E-02							1E-08		1E-06		3E-07		7E-08
40-C	SVOC	Benzo(a)anthracene	56-55-3	1.38E-01	1.38E-01		3E-12		9E-12		8E-10		2E-07		5E-08		4E-09	
40-C	SVOC	Benzo(a)pyrene	50-32-8	1.29E-01	1.29E-01		4E-12		1E-11		8E-09		2E-06		4E-07		4E-08	
40-C	SVOC	Benzo(b)fluoranthene	205-99-2	1.23E-01	1.23E-01		3E-11		8E-11		7E-10		2E-07		4E-08		4E-09	
40-C	SVOC	Benzo(g,h,i)perylene	191-24-2	6.88E-02	6.88E-02			6E-13		1E-12		1E-07		1E-05		3E-06		6E-07
40-C	SVOC	Benzo(k)fluoranthene	207-08-9	9.72E-02	9.72E-02		2E-14		5E-14		6E-11		2E-08		3E-09		3E-10	
40-C	SVOC	Chrysene	218-01-9	1.46E-01	1.46E-01		8E-13		3E-12		9E-12		2E-09		5E-10		5E-11	
40-C	SVOC	Fluoranthene	206-44-0	3.87E-01	3.87E-01			3E-08		8E-08		6E-07		5E-05		1E-05		4E-06
40-C	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	6.35E-02	6.35E-02		7E-14		2E-13		4E-10		1E-07		2E-08		2E-09	
40-C	SVOC	Phenanthrene	85-01-8	3.96E-01	3.96E-01			3E-07		7E-07		8E-07		7E-05		2E-05		8E-06
40-C	SVOC	Pyrene	129-00-0	3.60E-01	3.60E-01			3E-08		7E-08		7E-07		6E-05		2E-05		4E-06
40-C	INORG	Antimony	7440-36-0	8.20E-02														
40-C	INORG	Arsenic	7440-38-2	9.50E+00	1.38E+00						1E-08	2E-04	4E-06	2E-02	5E-07	3E-03	7E-08	6E-04
40-C	INORG	Barium	7440-39-3	1.70E+02	7.43E+01													
40-C	INORG	Beryllium	7440-41-7	2.30E+00	1.71E+00						1E-09	2E-04	1E-09	3E-03	8E-10	5E-04	2E-09	5E-03
40-C	INORG	Cadmium	7440-43-9	4.50E-01														
40-C	INORG	Chromium (total)	7440-47-3	1.50E+01														
40-C	INORG	Cobalt	7440-48-4	6.70E+00														
40-C	INORG	Copper	7440-50-8	9.90E+00														
40-C	INORG	Lead	7439-92-1	1.30E+01	1.30E+01													
40-C	INORG	Manganese	7439-96-5	1.20E+03	7.23E+02							3E-02		3E-02		1E-02		5E-01
40-C	INORG	Mercury	7439-97-6	7.92E-02	2.68E-02	9E-07		1E-04		2E-04		1E-05		8E-04		4E-04		3E-03
40-C	INORG	Nickel	7440-02-0	1.50E+01														
40-C	INORG	Selenium	7782-49-2	3.00E-01														
40-C	INORG	Silver	7440-22-4	1.30E-01														
40-C	INORG	Thallium	7440-28-0	1.90E-01														
40-C	INORG	Vanadium	7440-62-2	2.70E+01	2.13E+00							1E-05		1E-03		1E-04		6E-04
40-C	INORG	Zinc	7440-66-6	4.70E+01														
40-D	VOC	Acetone	67-64-1	2.50E-01	2.50E-01	1E-08		6E-06		1E-05		2E-07		1E-05		7E-06		6E-05
40-D	VOC	2-Butanone	78-93-3	5.40E-02	5.40E-02	1E-08		1E-06		3E-06		2E-08		1E-06		9E-07		8E-06
40-D	VOC	Cyclohexane	110-82-7	6.50E-02	6.50E-02	5E-07		5E-05		6E-05		2E-07		1E-05		8E-06		8E-05
40-D	VOC	cis-1,2-Dichloroethene	156-59-2	7.10E-02	7.10E-02	5E-07		8E-03		1E-02		2E-05		1E-03		8E-04		8E-04
40-D	VOC	Ethyl Benzene	100-41-4	2.80E-02	2.80E-02	1E-07		4E-05		1E-04		2E-07		9E-06		7E-06		6E-05
40-D	VOC	Methyl Acetate	79-20-9	2.80E-01	2.80E-01	1E-07		1E-05		3E-05		2E-07		1E-05		9E-06		8E-06
40-D	VOC	Methylcyclohexane	108-87-2	1.90E-01	1.90E-01	7E-07		3E-04		4E-04		2E-06		8E-05		6E-05		6E-04
40-D	VOC	Toluene	108-88-3	1.20E-01	1.20E-01	1E-06		5E-05		1E-04		2E-07		2E-05		8E-06		7E-05
40-D	VOC	Trichloroethene	79-01-6	1.30E+00	1.30E+00	2E-05	3E-06		6E-06		3E-09		5E-07		3E-07		1E-07	
40-D	VOC	Xylenes (total)	1330-20-7	1.93E-01	1.93E-01	8E-07		2E-03		6E-03		1E-05		5E-04		4E-04		4E-03
40-D	SVOC	Acenaphthylene	208-96-8	4.08E-02	4.08E-02			5E-07		1E-06		1E-07		9E-06		4E-06		2E-06
40-D	SVOC	Anthracene	120-12-7	3.52E-02	3.52E-02							7E-09		6E-07		2E-07		3E-08
40-D	SVOC	Benzo(a)anthracene	56-55-3	1.54E-01	1.54E-01		3E-12		1E-11		9E-10		2E-07		5E-08		5E-09	
40-D	SVOC	Benzo(a)pyrene	50-32-8	2.23E-01	2.23E-01		6E-12		2E-11		1E-08		4E-06		8E-07		7E-08	
40-D	SVOC	Benzo(b)fluoranthene	205-99-2	2.60E-01	2.60E-01		6E-11		2E-10		2E-09		4E-07		9E-08		8E-09	
40-D	SVOC	Benzo(g,h,i)perylene	191-24-2	1.22E-01	1.22E-01			1E-12		3E-12		2E-07		2E-05		5E-06		1E-06
40-D	SVOC	Benzo(k)fluoranthene	207-08-9	2.32E-01	2.32E-01		4E-14		1E-13		1E-10		4E-08		8E-09		7E-10	
40-D	SVOC	Butylbenzylphthalate	85-68-7	1.13E-01	1.13E-01		4E-14	3E-10	1E-13	7E-10	2E-12	3E-08	4E-10	3E-06	9E-11	7E-07	9E-12	2E-07
40-D	SVOC	Chrysene	218-01-9	1.79E-01	1.79E-01		1E-12		3E-12		1E-11		3E-09		6E-10		6E-11	
40-D	SVOC	Diethylphthalate	84-66-2	5.39E-02	5.39E-02	2E-09		2E-09		5E-09		4E-09		4E-07		1E-07		4E-08
40-D	SVOC	Di-n-butylphthalate	84-74-2	5.65E-02	5.65E-02	6E-13						3E-08		3E-06		6E-07		1E-07
40-D	SVOC	Fluoranthene	206-44-0	2.62E-01	2.62E-01			2E-08		5E-08		4E-07		3E-05		9E-06		3E-06
40-D	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.31E-01	1.31E-01		1E-13		5E-13		8E-10		2E-07		5E-08		4E-09	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
40-D	SVOC	Phenanthrene	85-01-8	1.70E-01	1.70E-01			1E-07		3E-07		4E-07		3E-05		9E-06		3E-06
40-D	SVOC	Pyrene	129-00-0	2.65E-01	2.65E-01			2E-08		5E-08		5E-07		5E-05		1E-05		3E-06
40-D	PCB	PCBs (total)	1336-36-3	1.39E-01	1.39E-01	3E-08	2E-09		5E-09		3E-09	4E-04	7E-07	4E-02	2E-07	1E-02	2E-08	8E-03
40-D	INORG	Arsenic	7440-38-2	9.30E+00	1.18E+00						1E-08	2E-04	3E-06	2E-02	4E-07	3E-03	6E-08	5E-04
40-D	INORG	Barium	7440-39-3	7.00E+01														
40-D	INORG	Beryllium	7440-41-7	8.60E-01	2.70E-01						2E-10	3E-05	2E-10	5E-04	1E-10	7E-05	3E-10	7E-04
40-D	INORG	Cadmium	7440-43-9	4.50E-01														
40-D	INORG	Chromium (total)	7440-47-3	1.60E+01														
40-D	INORG	Cobalt	7440-48-4	5.90E+00														
40-D	INORG	Copper	7440-50-8	6.30E+01	3.45E+01							3E-05		3E-03		4E-04		2E-03
40-D	INORG	Cyanide (total)	57-12-5	1.80E+00	1.80E+00							4E-06		3E-04		4E-05		2E-04
40-D	INORG	Lead	7439-92-1	2.90E+01	2.90E+01													
40-D	INORG	Manganese	7439-96-5	4.80E+02	2.50E+00							1E-04		1E-04		3E-05		2E-03
40-D	INORG	Mercury	7439-97-6	4.20E-02														
40-D	INORG	Nickel	7440-02-0	1.60E+01														
40-D	INORG	Selenium	7782-49-2	1.90E+00	1.38E+00							1E-05		1E-03		1E-04		5E-04
40-D	INORG	Silver	7440-22-4	2.60E-01	7.23E-02							2E-05		6E-05		1E-05		3E-04
40-D	INORG	Thallium	7440-28-0	9.10E-01	7.13E-01							4E-04		4E-02		5E-03		2E-02
40-D	INORG	Vanadium	7440-62-2	2.30E+01														
40-D	INORG	Zinc	7440-66-6	8.50E+01														
44-A	VOC	Acetone	67-64-1	1.50E-01	1.50E-01	9E-09		3E-06		8E-06		1E-07		6E-06		4E-06		3E-05
44-A	VOC	2-Butanone	78-93-3	4.80E-02	4.80E-02	1E-08		9E-07		2E-06		2E-08		1E-06		8E-07		7E-06
44-A	VOC	Chloromethane	74-87-3	3.60E-02	3.60E-02	3E-06		2E-03		2E-03		7E-06		4E-04		3E-04		3E-03
44-A	VOC	Cyclohexane	110-82-7	8.30E-03	8.30E-03	6E-08		7E-06		8E-06		2E-08		1E-06		1E-06		1E-05
44-A	VOC	1,2-Dichloroethane	107-06-2	9.00E-03	9.00E-03	4E-06	1E-07	2E-03	3E-07	6E-03	2E-10	1E-05	4E-08	7E-04	2E-08	5E-04	9E-09	5E-03
44-A	VOC	cis-1,2-Dichloroethene	156-59-2	2.60E-02	2.60E-02	2E-07		3E-03		4E-03		7E-06		4E-04		3E-04		3E-04
44-A	VOC	Ethyl Benzene	100-41-4	1.00E-02	1.00E-02	5E-08		1E-05		4E-05		6E-08		3E-06		2E-06		2E-05
44-A	VOC	Methyl Acetate	79-20-9	1.20E+01	1.20E+01	5E-06		5E-04		1E-03		1E-05		5E-04		4E-04		4E-04
44-A	VOC	4-Methyl-2-pentanone	108-10-1	4.70E-02	4.70E-02	3E-08		3E-06		8E-06		4E-08		2E-06		2E-06		2E-05
44-A	VOC	Methylcyclohexane	108-87-2	3.10E-02	3.10E-02	1E-07		5E-05		6E-05		2E-07		1E-05		1E-05		1E-04
44-A	VOC	Trichloroethene	79-01-6	7.50E-02	7.50E-02	1E-06	2E-07		3E-07		2E-10		3E-08		2E-08		6E-09	
44-A	VOC	Trichlorofluoromethane	75-69-4	3.60E-02	3.60E-02	5E-08		3E-04		3E-04		1E-06		6E-05		5E-05		5E-05
44-A	VOC	Xylenes (total)	1330-20-7	6.00E-02	6.00E-02	2E-07		7E-04		2E-03		3E-06		2E-04		1E-04		1E-03
44-A	SVOC	Anthracene	120-12-7	3.71E-01	3.71E-01							7E-08		6E-06		2E-06		3E-07
44-A	SVOC	Benzo(a)anthracene	56-55-3	1.18E+00	1.18E+00		2E-11		7E-11		7E-09		2E-06		4E-07		4E-08	
44-A	SVOC	Benzo(a)pyrene	50-32-8	1.23E+00	1.23E+00		3E-11		1E-10		7E-08		2E-05		4E-06		4E-07	
44-A	SVOC	Benzo(b)fluoranthene	205-99-2	1.31E+00	1.31E+00		3E-10		9E-10		8E-09		2E-06		5E-07		4E-08	
44-A	SVOC	Benzo(g,h,i)perylene	191-24-2	3.74E-01	3.74E-01			3E-12		8E-12		7E-07		6E-05		2E-05		4E-06
44-A	SVOC	Benzo(k)fluoranthene	207-08-9	1.26E+00	1.26E+00		2E-13		6E-13		7E-10		2E-07		4E-08		4E-09	
44-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	4.05E-01	4.05E-01	6E-14	3E-16	3E-12	9E-16	8E-12	4E-11	1E-06	1E-08	1E-04	2E-09	2E-05	2E-10	5E-05
44-A	SVOC	Butylbenzylphthalate	85-68-7	4.44E+00	4.44E+00		1E-12	1E-08	5E-12	3E-08	6E-11	1E-06	2E-08	1E-04	4E-09	3E-05	4E-10	7E-06
44-A	SVOC	Chrysene	218-01-9	1.24E+00	1.24E+00		7E-12		2E-11		7E-11		2E-08		4E-09		4E-10	
44-A	SVOC	Dibenz(a,h)anthracene	53-70-3	5.60E-02	5.60E-02		7E-15		2E-14		3E-09		9E-07		2E-07		2E-08	
44-A	SVOC	Di-n-octylphthalate	117-84-0	1.28E-01	1.28E-01							2E-07		2E-05		4E-06		8E-07
44-A	SVOC	Fluoranthene	206-44-0	2.73E+00	2.73E+00			2E-07		6E-07		4E-06		4E-04		1E-04		3E-05
44-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.56E-01	4.56E-01		5E-13		2E-12		3E-09		7E-07		2E-07		1E-08	
44-A	SVOC	Phenanthrene	85-01-8	1.63E+00	1.63E+00			1E-06		3E-06		3E-06		3E-04		9E-05		3E-05
44-A	SVOC	Pyrene	129-00-0	2.70E+00	2.70E+00			2E-07		5E-07		5E-06		5E-04		1E-04		3E-05
44-A	PCB	PCBs (total)	1336-36-3	5.90E-01	5.90E-01	1E-07	8E-09		2E-08		1E-08	2E-03	3E-06	2E-01	7E-07	4E-02	8E-08	3E-02
44-A	INORG	Antimony	7440-36-0	3.40E-01	2.54E-01							3E-05		2E-03		3E-04		1E-03
44-A	INORG	Arsenic	7440-38-2	9.90E+00	1.78E+00						2E-08	3E-04	5E-06	2E-02	7E-07	4E-03	9E-08	8E-04
44-A	INORG	Barium	7440-39-3	1.60E+02	6.43E+01													
44-A	INORG	Beryllium	7440-41-7	1.80E+00	1.21E+00						9E-10	1E-04	9E-10	2E-03	5E-10	3E-04	1E-09	3E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
44-A	INORG	Cadmium	7440-43-9	6.80E-01	9.23E-02						5E-11	5E-06	5E-11	4E-04	3E-11	7E-05	8E-11	2E-04
44-A	INORG	Chromium (total)	7440-47-3	2.10E+02	1.78E+02						6E-07	6E-03	7E-07	2E-01	4E-07	3E-02	1E-06	8E-02
44-A	INORG	Cobalt	7440-48-4	7.10E+00	4.62E-02						4E-11	5E-06	4E-11	1E-05	2E-11	2E-06	6E-11	8E-05
44-A	INORG	Copper	7440-50-8	7.80E+01	4.95E+01							5E-05		5E-03		6E-04		2E-03
44-A	INORG	Cyanide (total)	57-12-5	2.90E+01	2.90E+01							6E-05		5E-03		7E-04		3E-03
44-A	INORG	Lead	7439-92-1	6.80E+01	6.80E+01													
44-A	INORG	Manganese	7439-96-5	5.00E+03	4.52E+03							2E-01		2E-01		6E-02		3E+00
44-A	INORG	Mercury	7439-97-6	1.03E-01	5.06E-02	2E-06		2E-04		5E-04		2E-05		1E-03		8E-04		7E-03
44-A	INORG	Nickel	7440-02-0	4.40E+01	2.40E+01						2E-09		2E-09		1E-09		3E-09	
44-A	INORG	Selenium	7782-49-2	7.30E-01	2.11E-01							2E-06		2E-04		2E-05		8E-05
44-A	INORG	Silver	7440-22-4	6.40E-01	4.52E-01							1E-04		4E-04		7E-05		2E-03
44-A	INORG	Thallium	7440-28-0	1.90E-01														
44-A	INORG	Vanadium	7440-62-2	2.70E+01	2.13E+00							1E-05		1E-03		1E-04		6E-04
44-A	INORG	Zinc	7440-66-6	1.50E+03	1.39E+03							2E-04		2E-02		2E-03		9E-03
55-1	VOC	Acetone	67-64-1	5.10E-01	5.10E-01	3E-08		1E-05		3E-05		4E-07		2E-05		1E-05		1E-04
55-1	VOC	Cyclohexane	110-82-7	3.80E-02	3.80E-02	3E-07		3E-05		4E-05		1E-07		6E-06		5E-06		4E-05
55-1	VOC	1,1-Dichloroethane	75-34-3	9.40E-02	9.40E-02	2E-06		1E-03		1E-03		2E-06		1E-04		9E-05		8E-05
55-1	VOC	cis-1,2-Dichloroethene	156-59-2	2.50E-01	2.50E-01	2E-06		3E-02		4E-02		7E-05		4E-03		3E-03		3E-03
55-1	VOC	Ethyl Benzene	100-41-4	8.30E-02	8.30E-02	4E-07		1E-04		3E-04		5E-07		3E-05		2E-05		2E-04
55-1	VOC	Methyl Acetate	79-20-9	1.10E-01	1.10E-01	4E-08		5E-06		1E-05		9E-08		5E-06		4E-06		3E-06
55-1	VOC	4-Methyl-2-pentanone	108-10-1	4.90E-02	4.90E-02	4E-08		3E-06		8E-06		4E-08		2E-06		2E-06		2E-05
55-1	VOC	Methylcyclohexane	108-87-2	1.20E-01	1.20E-01	4E-07		2E-04		2E-04		1E-06		5E-05		4E-05		4E-04
55-1	VOC	Methylene Chloride	75-09-2	2.40E-01	2.40E-01	1E-05	1E-07	2E-04	3E-07	5E-04	2E-10	1E-06	3E-08	6E-05	2E-08	4E-05	7E-09	3E-04
55-1	VOC	Toluene	108-88-3	8.50E-02	8.50E-02	7E-07		4E-05		1E-04		2E-07		1E-05		6E-06		5E-05
55-1	VOC	1,1,1-Trichloroethane	71-55-6	6.60E-02	6.60E-02	3E-07		2E-04		2E-04		4E-07		2E-05		2E-05		2E-05
55-1	VOC	Trichloroethene	79-01-6	3.60E-01	3.60E-01	7E-06	8E-07		2E-06		8E-10		1E-07		8E-08		3E-08	
55-1	VOC	Xylenes (total)	1330-20-7	6.10E-01	6.10E-01	2E-06		7E-03		2E-02		3E-05		2E-03		1E-03		1E-02
55-1	SVOC	Acenaphthene	83-32-9	1.70E-01	1.70E-01			1E-06		3E-06		3E-07		2E-05		8E-06		5E-06
55-1	SVOC	Acenaphthylene	208-96-8	1.94E-01	1.94E-01			2E-06		5E-06		6E-07		5E-05		2E-05		1E-05
55-1	SVOC	Acetophenone	98-86-2	4.15E-02	4.15E-02	1E-08		1E-06		3E-06		9E-08		5E-06		3E-06		3E-06
55-1	SVOC	Anthracene	120-12-7	3.37E-01	3.37E-01							6E-08		6E-06		1E-06		3E-07
55-1	SVOC	Atrazine	1912-24-9	8.20E-02	8.20E-02	8E-11	6E-12	2E-09	2E-11	5E-09	1E-10	1E-07	4E-08	1E-05	8E-09	3E-06	1E-09	9E-06
55-1	SVOC	Benzaldehyde	100-52-7	7.15E-02	7.15E-02			5E-06		1E-05		2E-07		1E-05		8E-06		7E-05
55-1	SVOC	Benzo(a)anthracene	56-55-3	1.38E+00	1.38E+00		3E-11		9E-11		8E-09		2E-06		5E-07		4E-08	
55-1	SVOC	Benzo(a)pyrene	50-32-8	1.43E+00	1.43E+00		4E-11		1E-10		8E-08		2E-05		5E-06		4E-07	
55-1	SVOC	Benzo(b)fluoranthene	205-99-2	1.57E+00	1.57E+00		3E-10		1E-09		9E-09		3E-06		6E-07		5E-08	
55-1	SVOC	Benzo(g,h,i)perylene	191-24-2	7.53E-01	7.53E-01			6E-12		2E-11		1E-06		1E-04		3E-05		7E-06
55-1	SVOC	Benzo(k)fluoranthene	207-08-9	1.35E+00	1.35E+00		2E-13		7E-13		8E-10		2E-07		5E-08		4E-09	
55-1	SVOC	Biphenyl	92-52-4	3.10E-01	3.10E-01	1E-06		4E-06		1E-05		6E-07		4E-05		2E-05		1E-04
55-1	SVOC	bis(2-Chloroethoxy)methane	111-91-1	2.19E-02	2.19E-02													
55-1	SVOC	bis(2-Chloroethyl) ether	111-44-4	2.52E-02	2.52E-02	3E-08	7E-08		2E-07		1E-09		2E-07		1E-07		4E-08	
55-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	9.92E-01	9.92E-01	2E-13	8E-16	8E-12	2E-15	2E-11	1E-10	3E-06	3E-08	2E-04	6E-09	6E-05	5E-10	1E-04
55-1	SVOC	Butylbenzylphthalate	85-68-7	7.25E-01	7.25E-01		2E-13	2E-09	7E-13	5E-09	1E-11	2E-07	3E-09	2E-05	6E-10	4E-06	6E-11	1E-06
55-1	SVOC	Carbazole	86-74-8	2.83E-01	2.83E-01		3E-13		9E-13		4E-11		1E-08		2E-09		3E-10	
55-1	SVOC	2-Chloronaphthalene	91-58-7	2.16E-02	2.16E-02			2E-07		4E-07		3E-08		2E-06		9E-07		6E-06
55-1	SVOC	Chrysene	218-01-9	1.58E+00	1.58E+00		9E-12		3E-11		9E-11		3E-08		6E-09		5E-10	
55-1	SVOC	Dibenz(a,h)anthracene	53-70-3	3.47E-01	3.47E-01		4E-14		1E-13		2E-08		6E-06		1E-06		1E-07	
55-1	SVOC	Dibenzofuran	132-64-9	1.55E-01	1.55E-01			1E-06		3E-06		4E-06		4E-04		1E-04		4E-04
55-1	SVOC	2,4-Dichlorophenol	120-83-2	4.39E-02	4.39E-02			5E-06		1E-05		1E-06		1E-04		4E-05		2E-04
55-1	SVOC	2,4-Dimethylphenol	105-67-9	3.91E-02	3.91E-02			3E-07		9E-07		2E-07		1E-05		5E-06		3E-06
55-1	SVOC	Dimethylphthalate	131-11-3	5.93E-02	5.93E-02	1E-09												2E-08
55-1	SVOC	Di-n-butylphthalate	84-74-2	3.59E-02	3.59E-02	4E-13						2E-08		2E-06		4E-07		9E-08
55-1	SVOC	Fluoranthene	206-44-0	2.07E+00	2.07E+00			2E-07		4E-07		3E-06		3E-04		7E-05		2E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
55-1	SVOC	Fluorene	86-73-7	1.84E-01	1.84E-01			5E-07		1E-06		3E-07		3E-05		9E-06		4E-06
55-1	SVOC	Hexachlorobutadiene	87-68-3	2.61E-02	2.61E-02	2E-05	2E-09		7E-09		5E-11	7E-06	1E-08	6E-04	4E-09	1E-04	1E-09	1E-04
55-1	SVOC	Hexachloroethane	67-72-1	2.09E-02	2.09E-02	5E-07	4E-09		1E-08		6E-12	1E-06	1E-09	1E-04	5E-10	2E-05	2E-10	5E-06
55-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	7.15E-01	7.15E-01		8E-13		2E-12		4E-09		1E-06		2E-07		2E-08	
55-1	SVOC	Isophorone	78-59-1	2.16E-02	2.16E-02	8E-09					2E-13	6E-09	4E-11	5E-07	8E-12	1E-07	8E-13	3E-08
55-1	SVOC	2-Methylnaphthalene	91-57-6	1.50E-01	1.50E-01			3E-04		8E-04		2E-05		1E-03		6E-04		6E-03
55-1	SVOC	Methylphenol (total)	1319-77-3	1.32E-01	1.32E-01	5E-09						1E-07		1E-05		3E-06		7E-07
55-1	SVOC	Naphthalene	91-20-3	1.15E-01	1.15E-01	6E-08		7E-04		2E-03		2E-05		1E-03		9E-04		8E-03
55-1	SVOC	Nitrobenzene	98-95-3	3.24E-02	3.24E-02	2E-07		3E-04		7E-04		1E-05		9E-04		5E-04		4E-04
55-1	SVOC	2-Nitrophenol	88-75-5	4.78E-02	4.78E-02													
55-1	SVOC	Phenanthrene	85-01-8	2.25E+00	2.25E+00			2E-06		4E-06		5E-06		4E-04		1E-04		4E-05
55-1	SVOC	Phenol	108-95-2	1.00E+00	1.00E+00	3E-08						2E-07		2E-05		4E-06		9E-06
55-1	SVOC	Pyrene	129-00-0	7.06E+00	7.06E+00			5E-07		1E-06		1E-05		1E-03		3E-04		9E-05
55-1	SVOC	2,4,5-Trichlorophenol	95-95-4	2.16E-02	2.16E-02							1E-08		1E-06		2E-07		6E-08
55-1	SVOC	2,4,6-Trichlorophenol	88-06-2	2.58E-02	2.58E-02		4E-11		1E-10		3E-12	1E-05	8E-10	1E-03	3E-10	3E-04	6E-11	7E-04
55-1	PCB	PCBs (total)	1336-36-3	1.43E+00	1.43E+00	3E-07	2E-08		6E-08		3E-08	4E-03	7E-06	4E-01	2E-06	1E-01	2E-07	8E-02
55-1	INORG	Antimony	7440-36-0	1.10E+00	1.01E+00							1E-04		9E-03		1E-03		5E-03
55-1	INORG	Arsenic	7440-38-2	8.30E+00	1.77E-01						2E-09	3E-05	5E-07	2E-03	6E-08	4E-04	9E-09	8E-05
55-1	INORG	Barium	7440-39-3	9.20E+01														
55-1	INORG	Beryllium	7440-41-7	3.20E+01	3.14E+01						2E-08	4E-03	2E-08	6E-02	1E-08	8E-03	4E-08	8E-02
55-1	INORG	Cadmium	7440-43-9	8.30E-01	2.42E-01						1E-10	1E-05	1E-10	1E-03	8E-11	2E-04	2E-10	5E-04
55-1	INORG	Chromium (total)	7440-47-3	6.60E+01	3.40E+01						1E-07	1E-03	1E-07	4E-02	8E-08	6E-03	2E-07	1E-02
55-1	INORG	Cobalt	7440-48-4	7.50E+00	4.46E-01						4E-10	5E-05	4E-10	1E-04	2E-10	2E-05	6E-10	8E-04
55-1	INORG	Copper	7440-50-8	8.10E+01	5.25E+01							5E-05		5E-03		6E-04		3E-03
55-1	INORG	Cyanide (total)	57-12-5	6.30E+00	6.30E+00							1E-05		1E-03		2E-04		6E-04
55-1	INORG	Lead	7439-92-1	1.80E+02	1.80E+02													
55-1	INORG	Manganese	7439-96-5	1.50E+03	1.02E+03							4E-02		4E-02		1E-02		7E-01
55-1	INORG	Mercury	7439-97-6	1.11E-01	5.86E-02	2E-06		2E-04		5E-04		3E-05		2E-03		9E-04		8E-03
55-1	INORG	Nickel	7440-02-0	3.30E+01	1.30E+01						9E-10		1E-09		6E-10		2E-09	
55-1	INORG	Selenium	7782-49-2	1.60E+00	1.08E+00							9E-06		8E-04		1E-04		4E-04
55-1	INORG	Silver	7440-22-4	2.80E-01	9.23E-02							2E-05		7E-05		1E-05		4E-04
55-1	INORG	Thallium	7440-28-0	4.20E-01	2.23E-01							1E-04		1E-02		2E-03		6E-03
55-1	INORG	Vanadium	7440-62-2	2.70E+01	2.13E+00							1E-05		1E-03		1E-04		6E-04
55-1	INORG	Zinc	7440-66-6	1.50E+02	3.95E+01							5E-06		5E-04		6E-05		3E-04
65-1	VOC	Methyl Acetate	79-20-9	4.00E-01	4.00E-01	2E-07		2E-05		5E-05		3E-07		2E-05		1E-05		1E-05
65-1	VOC	Methylcyclohexane	108-87-2	7.80E-02	7.80E-02	3E-07		1E-04		2E-04		6E-07		3E-05		3E-05		2E-04
65-1	VOC	Trichloroethene	79-01-6	4.40E-02	4.40E-02	8E-07	9E-08		2E-07		1E-10		2E-08		1E-08		4E-09	
65-1	SVOC	Benzo(a)anthracene	56-55-3	4.01E-02	4.01E-02		8E-13		3E-12		2E-10		6E-08		1E-08		1E-09	
65-1	SVOC	Benzo(a)pyrene	50-32-8	5.53E-02	5.53E-02		2E-12		5E-12		3E-09		9E-07		2E-07		2E-08	
65-1	SVOC	Benzo(b)fluoranthene	205-99-2	6.69E-02	6.69E-02		1E-11		4E-11		4E-10		1E-07		2E-08		2E-09	
65-1	SVOC	Benzo(k)fluoranthene	207-08-9	7.63E-02	7.63E-02		1E-14		4E-14		4E-11		1E-08		3E-09		2E-10	
65-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.87E-02	5.87E-02	9E-15	4E-17	4E-13	1E-16	1E-12	6E-12	2E-07	2E-09	1E-05	3E-10	3E-06	3E-11	8E-06
65-1	SVOC	Chrysene	218-01-9	5.46E-02	5.46E-02		3E-13		1E-12		3E-12		9E-10		2E-10		2E-11	
65-1	SVOC	Diethylphthalate	84-66-2	6.04E-02	6.04E-02	2E-09		2E-09		6E-09		5E-09		4E-07		1E-07		5E-08
65-1	SVOC	Fluoranthene	206-44-0	6.22E-02	6.22E-02			5E-09		1E-08		9E-08		8E-06		2E-06		6E-07
65-1	SVOC	Pyrene	129-00-0	7.09E-02	7.09E-02			5E-09		1E-08		1E-07		1E-05		3E-06		9E-07
65-1	INORG	Antimony	7440-36-0	7.00E-02														
65-1	INORG	Arsenic	7440-38-2	3.70E+00														
65-1	INORG	Barium	7440-39-3	3.20E+01														
65-1	INORG	Beryllium	7440-41-7	2.00E-01														
65-1	INORG	Cadmium	7440-43-9	1.20E-01														
65-1	INORG	Chromium (total)	7440-47-3	1.00E+01														
65-1	INORG	Cobalt	7440-48-4	3.80E+00														

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GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
65-1	INORG	Copper	7440-50-8	9.00E+00														
65-1	INORG	Lead	7439-92-1	1.20E+01	1.20E+01													
65-1	INORG	Manganese	7439-96-5	2.30E+02														
65-1	INORG	Mercury	7439-97-6	3.26E-02														
65-1	INORG	Nickel	7440-02-0	8.10E+00														
65-1	INORG	Selenium	7782-49-2	1.90E-01														
65-1	INORG	Silver	7440-22-4	2.00E-02														
65-1	INORG	Thallium	7440-28-0	1.00E-01														
65-1	INORG	Vanadium	7440-62-2	1.40E+01														
65-1	INORG	Zinc	7440-66-6	3.20E+01														
81-1	VOC	Benzene	71-43-2	1.30E-01	1.30E-01	2E-04	1E-06	2E-02	3E-06	3E-02	2E-09	5E-05	3E-07	3E-03	2E-07	2E-03	6E-08	9E-03
81-1	VOC	2-Butanone	78-93-3	4.50E-02	4.50E-02	1E-08		9E-07		2E-06		2E-08		1E-06		8E-07		7E-06
81-1	VOC	Cumene	98-82-8	4.50E-02	4.50E-02	4E-07		1E-04		4E-04		6E-07		3E-05		2E-05		2E-04
81-1	VOC	Cyclohexane	110-82-7	8.90E-02	8.90E-02	6E-07		8E-05		9E-05		3E-07		1E-05		1E-05		1E-04
81-1	VOC	cis-1,2-Dichloroethene	156-59-2	9.90E-01	9.90E-01	7E-06		1E-01		2E-01		3E-04		1E-02		1E-02		1E-02
81-1	VOC	Ethyl Benzene	100-41-4	6.60E-02	6.60E-02	3E-07		1E-04		2E-04		4E-07		2E-05		2E-05		1E-04
81-1	VOC	Methyl Acetate	79-20-9	3.70E-01	3.70E-01	1E-07		2E-05		4E-05		3E-07		2E-05		1E-05		1E-05
81-1	VOC	Methylcyclohexane	108-87-2	2.50E-01	2.50E-01	9E-07		4E-04		5E-04		2E-06		1E-04		8E-05		8E-04
81-1	VOC	Tetrachloroethene	127-18-4	4.10E-02	4.10E-02	2E-06	2E-07	5E-04	3E-07	6E-04	2E-10	1E-06	4E-08	8E-05	2E-08	5E-05	8E-09	5E-04
81-1	VOC	Toluene	108-88-3	1.00E-01	1.00E-01	9E-07		4E-05		1E-04		2E-07		1E-05		7E-06		6E-05
81-1	VOC	Vinyl Chloride	75-01-4	2.90E-02	2.90E-02	9E-05	5E-07	1E-03	6E-07	2E-03	1E-09	8E-06	2E-07	4E-04	1E-07	3E-04	4E-08	3E-03
81-1	VOC	Xylenes (total)	1330-20-7	1.30E-01	1.30E-01	5E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03
81-1	SVOC	Acenaphthene	83-32-9	8.60E-02	8.60E-02			7E-07		2E-06		1E-07		1E-05		4E-06		3E-06
81-1	SVOC	Anthracene	120-12-7	3.66E-01	3.66E-01							7E-08		6E-06		2E-06		3E-07
81-1	SVOC	Benzo(a)anthracene	56-55-3	3.62E+00	3.62E+00		7E-11		2E-10		2E-08		6E-06		1E-06		1E-07	
81-1	SVOC	Benzo(a)pyrene	50-32-8	3.89E+00	3.89E+00		1E-10		3E-10		2E-07		6E-05		1E-05		1E-06	
81-1	SVOC	Benzo(b)fluoranthene	205-99-2	2.70E+00	2.70E+00		6E-10		2E-09		2E-08		4E-06		1E-06		9E-08	
81-1	SVOC	Benzo(g,h,i)perylene	191-24-2	4.06E+00	4.06E+00			3E-11		9E-11		8E-06		7E-04		2E-04		4E-05
81-1	SVOC	Benzo(k)fluoranthene	207-08-9	2.67E+00	2.67E+00		4E-13		1E-12		2E-09		4E-07		9E-08		8E-09	
81-1	SVOC	Biphenyl	92-52-4	1.28E-01	1.28E-01	4E-07		2E-06		4E-06		2E-07		2E-05		8E-06		5E-05
81-1	SVOC	Carbazole	86-74-8	9.52E-02	9.52E-02		1E-13		3E-13		1E-11		4E-09		8E-10		9E-11	
81-1	SVOC	Chrysene	218-01-9	4.11E+00	4.11E+00		2E-11		7E-11		2E-10		7E-08		1E-08		1E-09	
81-1	SVOC	Dibenzofuran	132-64-9	1.70E-01	1.70E-01			1E-06		3E-06		5E-06		4E-04		1E-04		4E-04
81-1	SVOC	Fluoranthene	206-44-0	2.36E+00	2.36E+00			2E-07		5E-07		3E-06		3E-04		9E-05		2E-05
81-1	SVOC	Fluorene	86-73-7	9.04E-02	9.04E-02			2E-07		6E-07		2E-07		1E-05		5E-06		2E-06
81-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.02E+00	3.02E+00		3E-12		1E-11		2E-08		5E-06		1E-06		9E-08	
81-1	SVOC	2-Methylnaphthalene	91-57-6	9.34E-01	9.34E-01			2E-03		5E-03		1E-04		6E-03		4E-03		4E-02
81-1	SVOC	Naphthalene	91-20-3	5.85E-01	5.85E-01	3E-07		4E-03		9E-03		1E-04		6E-03		4E-03		4E-02
81-1	SVOC	Phenanthrene	85-01-8	1.42E+00	1.42E+00			1E-06		3E-06		3E-06		3E-04		8E-05		3E-05
81-1	SVOC	Pyrene	129-00-0	9.99E+00	9.99E+00			8E-07		2E-06		2E-05		2E-03		5E-04		1E-04
81-1	INORG	Antimony	7440-36-0	2.70E-01	1.84E-01							2E-05		2E-03		2E-04		9E-04
81-1	INORG	Arsenic	7440-38-2	1.90E+01	1.09E+01						1E-07	2E-03	3E-05	1E-01	4E-06	2E-02	5E-07	5E-03
81-1	INORG	Barium	7440-39-3	2.00E+03	1.90E+03													
81-1	INORG	Beryllium	7440-41-7	6.30E+00	5.71E+00						4E-09	7E-04	4E-09	1E-02	3E-09	2E-03	7E-09	2E-02
81-1	INORG	Cadmium	7440-43-9	1.90E+01	1.84E+01						1E-08	1E-03	1E-08	8E-02	6E-09	1E-02	2E-08	4E-02
81-1	INORG	Chromium (total)	7440-47-3	2.30E+02	1.98E+02						7E-07	7E-03	7E-07	2E-01	4E-07	3E-02	1E-06	9E-02
81-1	INORG	Cobalt	7440-48-4	4.40E+01	3.69E+01						3E-08	4E-03	3E-08	8E-03	2E-08	2E-03	5E-08	7E-02
81-1	INORG	Copper	7440-50-8	8.30E+03	8.27E+03							8E-03		8E-01		1E-01		4E-01
81-1	INORG	Cyanide (total)	57-12-5	6.90E-01	6.90E-01							1E-06		1E-04		2E-05		7E-05
81-1	INORG	Lead	7439-92-1	6.90E+04	6.90E+04													
81-1	INORG	Manganese	7439-96-5	1.30E+03	8.23E+02							3E-02		3E-02		1E-02		6E-01
81-1	INORG	Mercury	7439-97-6	9.14E-01	8.62E-01	3E-05		3E-03		8E-03		4E-04		3E-02		1E-02		1E-01
81-1	INORG	Nickel	7440-02-0	1.70E+02	1.50E+02						1E-08		1E-08		7E-09		2E-08	

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81-1	INORG	Selenium	7782-49-2	2.70E+00	2.18E+00							2E-05		2E-03		2E-04		9E-04
81-1	INORG	Silver	7440-22-4	3.90E+00	3.71E+00							8E-04		3E-03		6E-04		1E-02
81-1	INORG	Thallium	7440-28-0	2.70E-01	7.35E-02							4E-05		4E-03		5E-04		2E-03
81-1	INORG	Vanadium	7440-62-2	3.80E+01	1.31E+01							7E-05		7E-03		9E-04		4E-03
81-1	INORG	Zinc	7440-66-6	5.80E+03	5.69E+03							8E-04		7E-02		9E-03		4E-02
81-2	VOC	Acetone	67-64-1	1.70E+00	1.70E+00	1E-07		4E-05		1E-04		1E-06		7E-05		5E-05		4E-04
81-2	VOC	Benzene	71-43-2	5.60E-01	5.60E-01	1E-03	6E-06	7E-02	1E-05	1E-01	7E-09	2E-04	1E-06	1E-02	7E-07	8E-03	3E-07	4E-02
81-2	VOC	2-Butanone	78-93-3	1.10E+00	1.10E+00	3E-07		2E-05		5E-05		5E-07		3E-05		2E-05		2E-04
81-2	VOC	Carbon Disulfide	75-15-0	3.90E-02	3.90E-02	2E-05		3E-04		3E-04		1E-06		7E-05		5E-05		5E-04
81-2	VOC	Chlorobenzene	108-90-7	5.40E-02	5.40E-02	2E-07		1E-03		2E-03		4E-06		2E-04		2E-04		2E-03
81-2	VOC	Chloroform	67-66-3	7.30E-02	7.30E-02	4E-05	2E-06	5E-03	4E-06	9E-03	3E-09	2E-05	4E-07	9E-04	3E-07	7E-04	1E-07	6E-03
81-2	VOC	Chloromethane	74-87-3	2.20E-01	2.20E-01	2E-05		1E-02		1E-02		4E-05		2E-03		2E-03		2E-02
81-2	VOC	Cumene	98-82-8	6.60E+00	6.60E+00	5E-05		2E-02		6E-02		8E-05		4E-03		3E-03		3E-02
81-2	VOC	Cyclohexane	110-82-7	3.80E+00	3.80E+00	3E-05		3E-03		4E-03		1E-05		6E-04		5E-04		4E-03
81-2	VOC	Dichlorodifluoromethane	75-71-8	4.40E-01	4.40E-01	7E-07		1E-02		1E-02		6E-05		3E-03		3E-03		2E-03
81-2	VOC	1,1-Dichloroethane	75-34-3	7.00E+03	7.00E+03	1E-01		7E+01		8E+01		2E-01		9E+00		7E+00		6E+00
81-2	VOC	1,1-Dichloroethene	75-35-4	1.00E+01	1.00E+01	4E-03		3E-01		3E-01		1E-03		5E-02		4E-02		4E-01
81-2	VOC	cis-1,2-Dichloroethene	156-59-2	1.20E-01	1.20E-01	8E-07		1E-02		2E-02		3E-05		2E-03		1E-03		1E-03
81-2	VOC	trans-1,2-Dichloroethene	156-60-5	9.30E-02	9.30E-02	9E-07		8E-03		9E-03		2E-05		1E-03		8E-04		7E-03
81-2	VOC	Ethyl Benzene	100-41-4	1.30E+00	1.30E+00	6E-06		2E-03		5E-03		8E-06		4E-04		3E-04		3E-03
81-2	VOC	2-Hexanone	591-78-6	7.00E-02	7.00E-02	3E-05		7E-02		8E-02		1E-07		6E-06		9E-07		4E-06
81-2	VOC	Methyl Acetate	79-20-9	3.30E-01	3.30E-01	1E-07		1E-05		4E-05		3E-07		1E-05		1E-05		1E-05
81-2	VOC	Methylcyclohexane	108-87-2	1.10E+01	1.10E+01	4E-05		2E-02		2E-02		9E-05		5E-03		4E-03		3E-02
81-2	VOC	Methylene Chloride	75-09-2	1.20E+00	1.20E+00	6E-05	6E-07	1E-03	1E-06	2E-03	9E-10	5E-06	2E-07	3E-04	9E-08	2E-04	3E-08	2E-03
81-2	VOC	Tetrachloroethene	127-18-4	1.00E-01	1.00E-01	4E-06	6E-07	1E-03	8E-07	1E-03	5E-10	3E-06	9E-08	2E-04	5E-08	1E-04	2E-08	1E-03
81-2	VOC	Toluene	108-88-3	4.40E+00	4.40E+00	4E-05		2E-03		5E-03		9E-06		6E-04		3E-04		3E-03
81-2	VOC	1,2,4-Trichlorobenzene	120-82-1	2.80E-02	2.80E-02			8E-06		2E-05		2E-07		2E-05		5E-06		9E-06
81-2	VOC	1,1,1-Trichloroethane	71-55-6	4.70E+04	4.70E+04	2E-01		1E+02		1E+02		3E-01		2E+01		1E+01		1E+01
81-2	VOC	1,1,2-Trichloroethane	79-00-5	1.30E-01	1.30E-01	3E-06	6E-07		2E-06		1E-09		2E-07		1E-07		5E-08	
81-2	VOC	Trichloroethene	79-01-6	4.00E+00	4.00E+00	8E-05	9E-06		2E-05		9E-09		1E-06		9E-07		3E-07	
81-2	VOC	Trichlorofluoromethane	75-69-4	3.00E-01	3.00E-01	4E-07		2E-03		3E-03		1E-05		5E-04		4E-04		4E-04
81-2	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.40E+04	6.40E+04	6E-02		1E+01		1E+01		5E-02		3E+00		2E+00		2E+01
81-2	VOC	Vinyl Chloride	75-01-4	5.00E-01	5.00E-01	1E-03	8E-06	3E-02	1E-05	3E-02	2E-08	1E-04	4E-06	7E-03	2E-06	5E-03	6E-07	5E-02
81-2	VOC	Xylenes (total)	1330-20-7	9.10E+00	9.10E+00	4E-05		1E-01		3E-01		5E-04		2E-02		2E-02		2E-01
81-2	SVOC	Acenaphthene	83-32-9	9.50E-01	9.50E-01			8E-06		2E-05		2E-06		1E-04		5E-05		3E-05
81-2	SVOC	Acenaphthylene	208-96-8	4.25E-02	4.25E-02			5E-07		1E-06		1E-07		1E-05		4E-06		2E-06
81-2	SVOC	Anthracene	120-12-7	1.57E+00	1.57E+00							3E-07		3E-05		7E-06		1E-06
81-2	SVOC	Benzaldehyde	100-52-7	1.41E-01	1.41E-01			1E-05		3E-05		4E-07		2E-05		2E-05		1E-04
81-2	SVOC	Benzo(a)anthracene	56-55-3	3.27E+00	3.27E+00		7E-11		2E-10		2E-08		5E-06		1E-06		1E-07	
81-2	SVOC	Benzo(a)pyrene	50-32-8	3.36E+00	3.36E+00		9E-11		3E-10		2E-07		5E-05		1E-05		1E-06	
81-2	SVOC	Benzo(b)fluoranthene	205-99-2	3.15E+00	3.15E+00		7E-10		2E-09		2E-08		5E-06		1E-06		1E-07	
81-2	SVOC	Benzo(g,h,i)perylene	191-24-2	1.96E+00	1.96E+00			2E-11		4E-11		4E-06		3E-04		9E-05		2E-05
81-2	SVOC	Benzo(k)fluoranthene	207-08-9	3.27E+00	3.27E+00		5E-13		2E-12		2E-09		5E-07		1E-07		1E-08	
81-2	SVOC	Biphenyl	92-52-4	1.83E-01	1.83E-01	6E-07		2E-06		6E-06		4E-07		3E-05		1E-05		7E-05
81-2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.34E-01	5.34E-01	8E-14	4E-16	4E-12	1E-15	1E-11	6E-11	1E-06	2E-08	1E-04	3E-09	3E-05	3E-10	7E-05
81-2	SVOC	Butylbenzylphthalate	85-68-7	1.14E-01	1.14E-01		4E-14	3E-10	1E-13	7E-10	2E-12	3E-08	5E-10	3E-06	9E-11	7E-07	9E-12	2E-07
81-2	SVOC	Caprolactam	105-60-2	1.56E-01	1.56E-01	2E-09		3E-09		9E-09		2E-08		2E-06		6E-07		3E-06
81-2	SVOC	Carbazole	86-74-8	9.41E-01	9.41E-01		1E-12		3E-12		1E-10		4E-08		8E-09		8E-10	
81-2	SVOC	Chrysene	218-01-9	3.33E+00	3.33E+00		2E-11		6E-11		2E-10		5E-08		1E-08		1E-09	
81-2	SVOC	Dibenz(a,h)anthracene	53-70-3	7.65E-01	7.65E-01		1E-13		3E-13		4E-08		1E-05		3E-06		2E-07	
81-2	SVOC	Dibenzofuran	132-64-9	5.95E-01	5.95E-01			4E-06		1E-05		2E-05		2E-03		4E-04		1E-03
81-2	SVOC	2,4-Dimethylphenol	105-67-9	1.51E-01	1.51E-01			1E-06		3E-06		6E-07		5E-05		2E-05		1E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
81-2	SVOC	Di-n-butylphthalate	84-74-2	6.11E-01	6.11E-01	7E-12						3E-07		3E-05		7E-06		2E-06
81-2	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	4.30E-01	4.30E-01	6E-07		2E-04		6E-04		3E-04		2E-02		7E-03		3E-02
81-2	SVOC	Fluoranthene	206-44-0	4.25E+00	4.25E+00			4E-07		9E-07		6E-06		6E-04		2E-04		4E-05
81-2	SVOC	Fluorene	86-73-7	5.97E-01	5.97E-01			2E-06		4E-06		1E-06		9E-05		3E-05		1E-05
81-2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.62E+00	1.62E+00		2E-12		6E-12		1E-08		3E-06		6E-07		5E-08	
81-2	SVOC	2-Methylnaphthalene	91-57-6	1.17E+01	1.17E+01			3E-02		6E-02		1E-03		7E-02		5E-02		4E-01
81-2	SVOC	Naphthalene	91-20-3	7.77E+00	7.77E+00	4E-06		5E-02		1E-01		1E-03		8E-02		6E-02		5E-01
81-2	SVOC	Phenanthrene	85-01-8	3.75E+00	3.75E+00			3E-06		7E-06		8E-06		7E-04		2E-04		7E-05
81-2	SVOC	Pyrene	129-00-0	7.14E+00	7.14E+00			6E-07		1E-06		1E-05		1E-03		3E-04		9E-05
81-2	PCB	PCBs (total)	1336-36-3	5.37E+00	5.37E+00	1E-06	7E-08		2E-07		1E-07	2E-02	3E-05	1E+00	6E-06	4E-01	8E-07	3E-01
81-2	INORG	Antimony	7440-36-0	2.00E-01	1.14E-01							1E-05		1E-03		1E-04		6E-04
81-2	INORG	Arsenic	7440-38-2	5.60E+01	4.79E+01						5E-07	7E-03	1E-04	6E-01	2E-05	1E-01	2E-06	2E-02
81-2	INORG	Barium	7440-39-3	5.60E+02	4.64E+02													
81-2	INORG	Beryllium	7440-41-7	1.10E+01	1.04E+01						7E-09	1E-03	8E-09	2E-02	5E-09	3E-03	1E-08	3E-02
81-2	INORG	Cadmium	7440-43-9	2.10E+00	1.51E+00						8E-10	8E-05	8E-10	6E-03	5E-10	1E-03	1E-09	3E-03
81-2	INORG	Chromium (total)	7440-47-3	2.70E+02	2.38E+02						8E-07	8E-03	9E-07	3E-01	5E-07	4E-02	1E-06	1E-01
81-2	INORG	Chromium III	16065-83-1	1.60E+01	1.60E+01							4E-07		4E-05		5E-06		2E-05
81-2	INORG	Cobalt	7440-48-4	4.30E+01	3.59E+01						3E-08	4E-03	3E-08	8E-03	2E-08	2E-03	5E-08	7E-02
81-2	INORG	Copper	7440-50-8	9.90E+02	9.62E+02							1E-03		9E-02		1E-02		5E-02
81-2	INORG	Cyanide (total)	57-12-5	7.00E-01	7.00E-01							1E-06		1E-04		2E-05		7E-05
81-2	INORG	Lead	7439-92-1	3.10E+03	3.10E+03													
81-2	INORG	Manganese	7439-96-5	1.80E+03	1.32E+03							5E-02		5E-02		2E-02		9E-01
81-2	INORG	Mercury	7439-97-6	3.72E-01	3.20E-01	1E-05		1E-03		3E-03		1E-04		9E-03		5E-03		4E-02
81-2	INORG	Nickel	7440-02-0	1.10E+02	9.00E+01						6E-09		7E-09		4E-09		1E-08	
81-2	INORG	Selenium	7782-49-2	5.40E+00	4.88E+00							4E-05		4E-03		5E-04		2E-03
81-2	INORG	Silver	7440-22-4	6.70E-01	4.82E-01							1E-04		4E-04		7E-05		2E-03
81-2	INORG	Thallium	7440-28-0	1.10E+00	9.03E-01							5E-04		5E-02		6E-03		3E-02
81-2	INORG	Vanadium	7440-62-2	4.30E+01	1.81E+01							1E-04		9E-03		1E-03		5E-03
81-2	INORG	Zinc	7440-66-6	1.50E+03	1.39E+03							2E-04		2E-02		2E-03		9E-03
81-3	VOC	Acetone	67-64-1	7.30E-01	7.30E-01	4E-08		2E-05		4E-05		5E-07		3E-05		2E-05		2E-04
81-3	VOC	Benzene	71-43-2	1.90E-01	1.90E-01	3E-04	2E-06	3E-02	4E-06	4E-02	2E-09	7E-05	4E-07	4E-03	2E-07	3E-03	9E-08	1E-02
81-3	VOC	2-Butanone	78-93-3	2.40E-01	2.40E-01	6E-08		5E-06		1E-05		1E-07		6E-06		4E-06		4E-05
81-3	VOC	Cumene	98-82-8	1.50E-01	1.50E-01	1E-06		5E-04		1E-03		2E-06		1E-04		8E-05		7E-04
81-3	VOC	Cyclohexane	110-82-7	1.00E+00	1.00E+00	7E-06		8E-04		1E-03		3E-06		2E-04		1E-04		1E-03
81-3	VOC	cis-1,2-Dichloroethene	156-59-2	3.80E-01	3.80E-01	3E-06		4E-02		6E-02		1E-04		6E-03		4E-03		4E-03
81-3	VOC	trans-1,2-Dichloroethene	156-60-5	3.00E-02	3.00E-02	3E-07		3E-03		3E-03		6E-06		3E-04		3E-04		2E-03
81-3	VOC	Ethyl Benzene	100-41-4	4.10E-01	4.10E-01	2E-06		6E-04		2E-03		2E-06		1E-04		1E-04		9E-04
81-3	VOC	Methyl Acetate	79-20-9	1.00E+00	1.00E+00	4E-07		5E-05		1E-04		8E-07		4E-05		3E-05		3E-05
81-3	VOC	Methylcyclohexane	108-87-2	4.30E+00	4.30E+00	2E-05		7E-03		8E-03		3E-05		2E-03		1E-03		1E-02
81-3	VOC	Methylene Chloride	75-09-2	1.60E-01	1.60E-01	8E-06	8E-08	2E-04	2E-07	3E-04	1E-10	7E-07	2E-08	4E-05	1E-08	3E-05	5E-09	2E-04
81-3	VOC	Tetrachloroethene	127-18-4	2.48E+00	2.48E+00	1E-04	1E-05	3E-02	2E-05	4E-02	1E-08	8E-05	2E-06	5E-03	1E-06	3E-03	5E-07	3E-02
81-3	VOC	Toluene	108-88-3	1.20E+00	1.20E+00	1E-05		5E-04		1E-03		2E-06		2E-04		8E-05		7E-04
81-3	VOC	1,1,1-Trichloroethane	71-55-6	7.10E-01	7.10E-01	3E-06		2E-03		2E-03		4E-06		2E-04		2E-04		2E-04
81-3	VOC	Trichloroethene	79-01-6	7.35E+00	7.35E+00	1E-04	2E-05		3E-05		2E-08		3E-06		2E-06		6E-07	
81-3	VOC	Vinyl Chloride	75-01-4	2.90E-02	2.90E-02	9E-05	5E-07	1E-03	6E-07	2E-03	1E-09	8E-06	2E-07	4E-04	1E-07	3E-04	4E-08	3E-03
81-3	VOC	Xylenes (total)	1330-20-7	3.10E+00	3.10E+00	1E-05		4E-02		9E-02		2E-04		8E-03		7E-03		6E-02
81-3	SVOC	Acenaphthene	83-32-9	6.07E+00	6.07E+00			5E-05		1E-04		1E-05		7E-04		3E-04		2E-04
81-3	SVOC	Acenaphthylene	208-96-8	2.12E+00	2.12E+00			2E-05		6E-05		6E-06		5E-04		2E-04		1E-04
81-3	SVOC	Acetophenone	98-86-2	3.66E-01	3.66E-01	1E-07		1E-05		3E-05		8E-07		5E-05		3E-05		2E-05
81-3	SVOC	Anthracene	120-12-7	1.26E+01	1.26E+01							2E-06		2E-04		6E-05		1E-05
81-3	SVOC	Benzo(a)anthracene	56-55-3	5.32E+00	5.32E+00		1E-10		3E-10		3E-08		9E-06		2E-06		2E-07	
81-3	SVOC	Benzo(a)pyrene	50-32-8	4.57E+00	4.57E+00		1E-10		4E-10		3E-07		7E-05		2E-05		1E-06	
81-3	SVOC	Benzo(b)fluoranthene	205-99-2	6.14E+00	6.14E+00		1E-09		4E-09		4E-08		1E-05		2E-06		2E-07	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
81-3	SVOC	Benzo(g,h,i)perylene	191-24-2	2.63E+00	2.63E+00			2E-11		6E-11		5E-06		5E-04		1E-04		2E-05
81-3	SVOC	Benzo(k)fluoranthene	207-08-9	3.40E+00	3.40E+00		6E-13		2E-12		2E-09		5E-07		1E-07		1E-08	
81-3	SVOC	Biphenyl	92-52-4	1.84E+00	1.84E+00	6E-06		2E-05		6E-05		4E-06		3E-04		1E-04		7E-04
81-3	SVOC	bis(2-Chloroethyl) ether	111-44-4	2.40E-02	2.40E-02	3E-08	7E-08		2E-07		1E-09		2E-07		1E-07		4E-08	
81-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.06E-01	1.06E-01	2E-14	8E-17	8E-13	2E-16	2E-12	1E-11	3E-07	3E-09	3E-05	6E-10	6E-06	6E-11	1E-05
81-3	SVOC	Butylbenzylphthalate	85-68-7	7.27E-01	7.27E-01		2E-13	2E-09	7E-13	5E-09	1E-11	2E-07	3E-09	2E-05	6E-10	4E-06	6E-11	1E-06
81-3	SVOC	Carbazole	86-74-8	8.57E+00	8.57E+00		9E-12		3E-11		1E-09		4E-07		7E-08		8E-09	
81-3	SVOC	Chrysene	218-01-9	5.36E+00	5.36E+00		3E-11		9E-11		3E-10		9E-08		2E-08		2E-09	
81-3	SVOC	Dibenz(a,h)anthracene	53-70-3	9.26E-01	9.26E-01		1E-13		4E-13		5E-08		1E-05		3E-06		3E-07	
81-3	SVOC	Dibenzofuran	132-64-9	5.66E+00	5.66E+00			4E-05		1E-04		2E-04		1E-02		4E-03		1E-02
81-3	SVOC	Diethylphthalate	84-66-2	5.53E-02	5.53E-02	2E-09		2E-09		5E-09		4E-09		4E-07		1E-07		4E-08
81-3	SVOC	Di-n-butylphthalate	84-74-2	6.00E-02	6.00E-02	7E-13						3E-08		3E-06		7E-07		2E-07
81-3	SVOC	Fluoranthene	206-44-0	2.11E+01	2.11E+01			2E-06		4E-06		3E-05		3E-03		8E-04		2E-04
81-3	SVOC	Fluorene	86-73-7	9.87E+00	9.87E+00			3E-05		6E-05		2E-05		1E-03		5E-04		2E-04
81-3	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.51E+00	2.51E+00		3E-12		9E-12		1E-08		4E-06		9E-07		7E-08	
81-3	SVOC	2-Methylnaphthalene	91-57-6	3.81E+00	3.81E+00			8E-03		2E-02		4E-04		2E-02		2E-02		1E-01
81-3	SVOC	Naphthalene	91-20-3	1.54E+00	1.54E+00	8E-07		9E-03		2E-02		3E-04		2E-02		1E-02		1E-01
81-3	SVOC	Phenanthrene	85-01-8	4.21E+01	4.21E+01			3E-05		8E-05		9E-05		8E-03		2E-03		8E-04
81-3	SVOC	Pyrene	129-00-0	1.78E+01	1.78E+01			1E-06		3E-06		3E-05		3E-03		8E-04		2E-04
81-3	PCB	PCBs (total)	1336-36-3	7.28E-01	7.28E-01	1E-07	9E-09		3E-08		1E-08	2E-03	3E-06	2E-01	8E-07	5E-02	1E-07	4E-02
81-3	INORG	Antimony	7440-36-0	1.20E+00	1.11E+00							1E-04		1E-02		1E-03		5E-03
81-3	INORG	Arsenic	7440-38-2	1.00E+01	1.88E+00						2E-08	3E-04	5E-06	3E-02	7E-07	4E-03	9E-08	8E-04
81-3	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
81-3	INORG	Beryllium	7440-41-7	1.40E+00	8.10E-01						6E-10	1E-04	6E-10	2E-03	4E-10	2E-04	1E-09	2E-03
81-3	INORG	Cadmium	7440-43-9	1.10E+00	5.12E-01						3E-10	3E-05	3E-10	2E-03	2E-10	4E-04	5E-10	1E-03
81-3	INORG	Chromium (total)	7440-47-3	4.20E+01	1.00E+01						4E-08	3E-04	4E-08	1E-02	2E-08	2E-03	6E-08	4E-03
81-3	INORG	Chromium III	16065-83-1	7.19E+00	7.19E+00							2E-07		2E-05		2E-06		9E-06
81-3	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
81-3	INORG	Copper	7440-50-8	8.10E+01	5.25E+01							5E-05		5E-03		6E-04		3E-03
81-3	INORG	Cyanide (total)	57-12-5	1.40E-01	1.40E-01							3E-07		3E-05		3E-06		1E-05
81-3	INORG	Lead	7439-92-1	2.00E+02	2.00E+02													
81-3	INORG	Manganese	7439-96-5	1.00E+03	5.23E+02							2E-02		2E-02		7E-03		4E-01
81-3	INORG	Mercury	7439-97-6	4.12E-01	3.60E-01	1E-05		1E-03		3E-03		2E-04		1E-02		5E-03		5E-02
81-3	INORG	Nickel	7440-02-0	2.80E+01	8.04E+00						6E-10		6E-10		4E-10		9E-10	
81-3	INORG	Selenium	7782-49-2	2.20E+00	1.68E+00							1E-05		1E-03		2E-04		7E-04
81-3	INORG	Silver	7440-22-4	7.80E-01	5.92E-01							1E-04		5E-04		9E-05		2E-03
81-3	INORG	Thallium	7440-28-0	1.70E-01														
81-3	INORG	Vanadium	7440-62-2	2.90E+01	4.13E+00							2E-05		2E-03		3E-04		1E-03
81-3	INORG	Zinc	7440-66-6	2.82E+02	1.72E+02							2E-05		2E-03		3E-04		1E-03
81-4	VOC	Methyl Acetate	79-20-9	2.40E-01	2.40E-01	9E-08		1E-05		3E-05		2E-07		1E-05		8E-06		7E-06
81-4	VOC	Methylcyclohexane	108-87-2	6.10E-02	6.10E-02	2E-07		1E-04		1E-04		5E-07		3E-05		2E-05		2E-04
81-4	VOC	Tetrachloroethene	127-18-4	4.90E-02	4.90E-02	2E-06	3E-07	6E-04	4E-07	7E-04	3E-10	2E-06	4E-08	9E-05	3E-08	6E-05	9E-09	5E-04
81-4	SVOC	Anthracene	120-12-7	2.62E-01	2.62E-01							5E-08		4E-06		1E-06		2E-07
81-4	SVOC	Benzo(a)anthracene	56-55-3	1.83E+00	1.83E+00		4E-11		1E-10		1E-08		3E-06		6E-07		6E-08	
81-4	SVOC	Benzo(a)pyrene	50-32-8	1.24E+00	1.24E+00		3E-11		1E-10		7E-08		2E-05		4E-06		4E-07	
81-4	SVOC	Benzo(b)fluoranthene	205-99-2	1.32E+00	1.32E+00		3E-10		9E-10		8E-09		2E-06		5E-07		4E-08	
81-4	SVOC	Benzo(g,h,i)perylene	191-24-2	4.73E-01	4.73E-01			4E-12		1E-11		9E-07		8E-05		2E-05		4E-06
81-4	SVOC	Benzo(k)fluoranthene	207-08-9	1.50E+00	1.50E+00		2E-13		8E-13		9E-10		2E-07		5E-08		4E-09	
81-4	SVOC	Carbazole	86-74-8	7.53E-02	7.53E-02		8E-14		3E-13		1E-11		3E-09		6E-10		7E-11	
81-4	SVOC	Chrysene	218-01-9	1.77E+00	1.77E+00		1E-11		3E-11		1E-10		3E-08		6E-09		6E-10	
81-4	SVOC	Dibenz(a,h)anthracene	53-70-3	2.62E-01	2.62E-01		3E-14		1E-13		2E-08		4E-06		9E-07		8E-08	
81-4	SVOC	Diethylphthalate	84-66-2	6.97E-02	6.97E-02	2E-09		3E-09		7E-09		5E-09		5E-07		1E-07		5E-08
81-4	SVOC	Fluoranthene	206-44-0	3.05E+00	3.05E+00			3E-07		6E-07		5E-06		4E-04		1E-04		3E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
81-4	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.28E-01	4.28E-01		5E-13		1E-12		3E-09		7E-07		1E-07		1E-08	
81-4	SVOC	Phenanthrene	85-01-8	7.02E-01	7.02E-01			5E-07		1E-06		2E-06		1E-04		4E-05		1E-05
81-4	SVOC	Pyrene	129-00-0	4.92E+00	4.92E+00			4E-07		1E-06		1E-05		9E-04		2E-04		6E-05
81-4	INORG	Arsenic	7440-38-2	4.40E+00														
81-4	INORG	Barium	7440-39-3	5.20E+01														
81-4	INORG	Beryllium	7440-41-7	3.00E-01														
81-4	INORG	Cadmium	7440-43-9	3.60E-01														
81-4	INORG	Chromium (total)	7440-47-3	1.60E+01														
81-4	INORG	Cobalt	7440-48-4	3.30E+00														
81-4	INORG	Copper	7440-50-8	1.00E+01														
81-4	INORG	Cyanide (total)	57-12-5	3.40E-01	3.40E-01							7E-07		6E-05		8E-06		3E-05
81-4	INORG	Lead	7439-92-1	1.30E+01	1.30E+01													
81-4	INORG	Manganese	7439-96-5	3.50E+02														
81-4	INORG	Mercury	7439-97-6	7.24E-02	2.00E-02	6E-07		7E-05		2E-04		9E-06		6E-04		3E-04		3E-03
81-4	INORG	Nickel	7440-02-0	8.90E+00														
81-4	INORG	Selenium	7782-49-2	3.80E-01														
81-4	INORG	Thallium	7440-28-0	8.20E-02														
81-4	INORG	Vanadium	7440-62-2	1.50E+01														
81-4	INORG	Zinc	7440-66-6	5.00E+01														
81-5	VOC	2-Butanone	78-93-3	2.90E-02	2.90E-02	7E-09		6E-07		1E-06		1E-08		8E-07		5E-07		4E-06
81-5	VOC	Cyclohexane	110-82-7	6.70E-02	6.70E-02	5E-07		6E-05		7E-05		2E-07		1E-05		8E-06		8E-05
81-5	VOC	Methyl Acetate	79-20-9	1.40E-01	1.40E-01	5E-08		6E-06		2E-05		1E-07		6E-06		5E-06		4E-06
81-5	VOC	Methylcyclohexane	108-87-2	1.30E-01	1.30E-01	5E-07		2E-04		3E-04		1E-06		6E-05		4E-05		4E-04
81-5	VOC	Methylene Chloride	75-09-2	1.40E-01	1.40E-01	7E-06	7E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	4E-05	1E-08	2E-05	4E-09	2E-04
81-5	VOC	Tetrachloroethene	127-18-4	1.30E-01	1.30E-01	6E-06	7E-07	2E-03	1E-06	2E-03	7E-10	4E-06	1E-07	2E-04	7E-08	2E-04	3E-08	1E-03
81-5	VOC	Toluene	108-88-3	6.40E-02	6.40E-02	6E-07		3E-05		7E-05		1E-07		8E-06		4E-06		4E-05
81-5	VOC	1,1,1-Trichloroethane	71-55-6	2.90E-02	2.90E-02	1E-07		7E-05		8E-05		2E-07		9E-06		7E-06		7E-06
81-5	VOC	Trichloroethene	79-01-6	5.60E-02	5.60E-02	1E-06	1E-07		2E-07		1E-10		2E-08		1E-08		5E-09	
81-5	VOC	Trichlorofluoromethane	75-69-4	3.20E-02	3.20E-02	4E-08		2E-04		3E-04		1E-06		6E-05		4E-05		4E-05
81-5	VOC	Xylenes (total)	1330-20-7	1.31E-01	1.31E-01	5E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03
81-5	SVOC	Acenaphthene	83-32-9	5.70E-02	5.70E-02			5E-07		1E-06		9E-08		7E-06		3E-06		2E-06
81-5	SVOC	Anthracene	120-12-7	1.58E-01	1.58E-01							3E-08		3E-06		7E-07		1E-07
81-5	SVOC	Benzo(a)anthracene	56-55-3	5.30E-01	5.30E-01		1E-11		3E-11		3E-09		9E-07		2E-07		2E-08	
81-5	SVOC	Benzo(a)pyrene	50-32-8	6.21E-01	6.21E-01		2E-11		5E-11		4E-08		1E-05		2E-06		2E-07	
81-5	SVOC	Benzo(b)fluoranthene	205-99-2	5.70E-01	5.70E-01		1E-10		4E-10		3E-09		9E-07		2E-07		2E-08	
81-5	SVOC	Benzo(g,h,i)perylene	191-24-2	3.35E-01	3.35E-01			3E-12		7E-12		6E-07		6E-05		1E-05		3E-06
81-5	SVOC	Benzo(k)fluoranthene	207-08-9	5.98E-01	5.98E-01		1E-13		3E-13		4E-10		1E-07		2E-08		2E-09	
81-5	SVOC	Carbazole	86-74-8	6.09E-02	6.09E-02		7E-14		2E-13		9E-12		3E-09		5E-10		5E-11	
81-5	SVOC	Chrysene	218-01-9	5.63E-01	5.63E-01		3E-12		1E-11		3E-11		9E-09		2E-09		2E-10	
81-5	SVOC	Fluoranthene	206-44-0	9.83E-01	9.83E-01			8E-08		2E-07		1E-06		1E-04		4E-05		1E-05
81-5	SVOC	Fluorene	86-73-7	5.03E-02	5.03E-02			1E-07		3E-07		9E-08		8E-06		3E-06		1E-06
81-5	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.93E-01	2.93E-01		3E-13		1E-12		2E-09		5E-07		1E-07		9E-09	
81-5	SVOC	Phenanthrene	85-01-8	5.68E-01	5.68E-01			4E-07		1E-06		1E-06		1E-04		3E-05		1E-05
81-5	SVOC	Pyrene	129-00-0	1.40E+00	1.40E+00			1E-07		3E-07		3E-06		2E-04		7E-05		2E-05
81-5	PCB	PCBs (total)	1336-36-3	8.40E-02	8.40E-02	2E-08	1E-09		3E-09		2E-09	2E-04	4E-07	2E-02	1E-07	6E-03	1E-08	5E-03
81-5	INORG	Antimony	7440-36-0	1.50E-01	6.36E-02							6E-06		6E-04		8E-05		3E-04
81-5	INORG	Arsenic	7440-38-2	4.70E+00														
81-5	INORG	Barium	7440-39-3	5.10E+01														
81-5	INORG	Beryllium	7440-41-7	4.10E-01														
81-5	INORG	Cadmium	7440-43-9	7.20E-01	1.32E-01						7E-11	7E-06	7E-11	5E-04	4E-11	1E-04	1E-10	3E-04
81-5	INORG	Chromium (total)	7440-47-3	2.50E+01														
81-5	INORG	Cobalt	7440-48-4	3.20E+00														
81-5	INORG	Copper	7440-50-8	4.30E+02	4.02E+02							4E-04		4E-02		5E-03		2E-02

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
81-5	INORG	Cyanide (total)	57-12-5	7.40E-02	7.40E-02							1E-07		1E-05		2E-06		7E-06
81-5	INORG	Lead	7439-92-1	3.60E+02	3.60E+02													
81-5	INORG	Manganese	7439-96-5	9.40E+02	4.63E+02							2E-02		2E-02		6E-03		3E-01
81-5	INORG	Mercury	7439-97-6	6.79E-01	6.27E-01	2E-05		2E-03		6E-03		3E-04		2E-02		9E-03		8E-02
81-5	INORG	Nickel	7440-02-0	1.40E+01														
81-5	INORG	Selenium	7782-49-2	3.90E-01														
81-5	INORG	Silver	7440-22-4	1.80E-01														
81-5	INORG	Thallium	7440-28-0	7.70E-02														
81-5	INORG	Vanadium	7440-62-2	1.40E+01														
81-5	INORG	Zinc	7440-66-6	1.20E+02	9.51E+00							1E-06		1E-04		2E-05		6E-05
83/84-1	VOC	Benzene	71-43-2	1.10E+00	1.10E+00	2E-03	1E-05	1E-01	2E-05	2E-01	1E-08	4E-04	2E-06	2E-02	1E-06	2E-02	5E-07	8E-02
83/84-1	VOC	1,1-Dichloroethane	75-34-3	5.00E-02	5.00E-02	9E-07		5E-04		6E-04		1E-06		6E-05		5E-05		4E-05
83/84-1	VOC	Ethyl Benzene	100-41-4	4.30E-01	4.30E-01	2E-06		6E-04		2E-03		3E-06		1E-04		1E-04		9E-04
83/84-1	VOC	Methylcyclohexane	108-87-2	3.10E-02	3.10E-02	1E-07		5E-05		6E-05		2E-07		1E-05		1E-05		1E-04
83/84-1	VOC	Toluene	108-88-3	6.80E-01	6.80E-01	6E-06		3E-04		8E-04		1E-06		9E-05		5E-05		4E-04
83/84-1	VOC	Trichloroethene	79-01-6	8.30E-02	8.30E-02	2E-06	2E-07		4E-07		2E-10		3E-08		2E-08		7E-09	
83/84-1	VOC	Xylenes (total)	1330-20-7	1.06E+00	1.06E+00	4E-06		1E-02		3E-02		5E-05		3E-03		2E-03		2E-02
83/84-1	SVOC	Acetophenone	98-86-2	6.88E-02	6.88E-02	2E-08		2E-06		5E-06		1E-07		9E-06		5E-06		4E-06
83/84-1	SVOC	Benzo(a)anthracene	56-55-3	3.88E-02	3.88E-02		8E-13		2E-12		2E-10		6E-08		1E-08		1E-09	
83/84-1	SVOC	Benzo(a)pyrene	50-32-8	4.08E-02	4.08E-02		1E-12		3E-12		2E-09		7E-07		1E-07		1E-08	
83/84-1	SVOC	Chrysene	218-01-9	5.04E-02	5.04E-02		3E-13		9E-13		3E-12		8E-10		2E-10		2E-11	
83/84-1	SVOC	2,4-Dimethylphenol	105-67-9	1.53E-01	1.53E-01			1E-06		3E-06		6E-07		5E-05		2E-05		1E-05
83/84-1	SVOC	Fluoranthene	206-44-0	6.46E-02	6.46E-02			5E-09		1E-08		1E-07		9E-06		2E-06		6E-07
83/84-1	SVOC	Isophorone	78-59-1	8.82E-01	8.82E-01	3E-07					6E-12	2E-07	2E-09	2E-05	3E-10	5E-06	3E-11	1E-06
83/84-1	SVOC	Phenanthrene	85-01-8	6.58E-02	6.58E-02			5E-08		1E-07		1E-07		1E-05		4E-06		1E-06
83/84-1	SVOC	Pyrene	129-00-0	5.92E-02	5.92E-02			5E-09		1E-08		1E-07		1E-05		3E-06		7E-07
83/84-1	INORG	Arsenic	7440-38-2	7.40E+00														
83/84-1	INORG	Barium	7440-39-3	6.10E+01														
83/84-1	INORG	Beryllium	7440-41-7	1.10E+00	5.10E-01						4E-10	6E-05	4E-10	1E-03	2E-10	1E-04	6E-10	1E-03
83/84-1	INORG	Cadmium	7440-43-9	1.60E-01														
83/84-1	INORG	Chromium (total)	7440-47-3	1.70E+01														
83/84-1	INORG	Cobalt	7440-48-4	8.00E+00	9.46E-01						8E-10	1E-04	8E-10	2E-04	5E-10	5E-05	1E-09	2E-03
83/84-1	INORG	Copper	7440-50-8	3.20E+01	3.54E+00							4E-06		3E-04		4E-05		2E-04
83/84-1	INORG	Cyanide (total)	57-12-5	1.60E-01	1.60E-01							3E-07		3E-05		4E-06		2E-05
83/84-1	INORG	Lead	7439-92-1	5.00E+01	5.00E+01													
83/84-1	INORG	Manganese	7439-96-5	4.60E+02														
83/84-1	INORG	Mercury	7439-97-6	4.04E-02														
83/84-1	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
83/84-1	INORG	Selenium	7782-49-2	2.80E-01														
83/84-1	INORG	Silver	7440-22-4	1.64E+00	1.45E+00							3E-04		1E-03		2E-04		6E-03
83/84-1	INORG	Thallium	7440-28-0	2.10E-01	1.35E-02							8E-06		7E-04		9E-05		4E-04
83/84-1	INORG	Vanadium	7440-62-2	2.50E+01	1.29E-01							7E-07		7E-05		9E-06		4E-05
83/84-1	INORG	Zinc	7440-66-6	4.00E+01														
83/84-2	VOC	Acetone	67-64-1	4.60E-01	4.60E-01	3E-08		1E-05		3E-05		3E-07		2E-05		1E-05		1E-04
83/84-2	VOC	Benzene	71-43-2	1.40E+00	1.40E+00	3E-03	2E-05	2E-01	3E-05	3E-01	2E-08	5E-04	3E-06	3E-02	2E-06	2E-02	6E-07	1E-01
83/84-2	VOC	2-Butanone	78-93-3	2.70E-01	2.70E-01	6E-08		5E-06		1E-05		1E-07		7E-06		5E-06		4E-05
83/84-2	VOC	Cumene	98-82-8	6.30E-01	6.30E-01	5E-06		2E-03		5E-03		8E-06		4E-04		3E-04		3E-03
83/84-2	VOC	Cyclohexane	110-82-7	4.50E-01	4.50E-01	3E-06		4E-04		4E-04		1E-06		7E-05		6E-05		5E-04
83/84-2	VOC	1,1-Dichloroethane	75-34-3	1.40E-01	1.40E-01	3E-06		1E-03		2E-03		3E-06		2E-04		1E-04		1E-04
83/84-2	VOC	cis-1,2-Dichloroethene	156-59-2	8.30E-02	8.30E-02	6E-07		9E-03		1E-02		2E-05		1E-03		1E-03		9E-04
83/84-2	VOC	Ethyl Benzene	100-41-4	6.10E-01	6.10E-01	3E-06		9E-04		2E-03		4E-06		2E-04		1E-04		1E-03
83/84-2	VOC	Methyl Acetate	79-20-9	7.20E-01	7.20E-01	3E-07		3E-05		8E-05		6E-07		3E-05		2E-05		2E-05
83/84-2	VOC	Methylcyclohexane	108-87-2	2.00E+00	2.00E+00	7E-06		3E-03		4E-03		2E-05		9E-04		7E-04		6E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
83/84-2	VOC	Methylene Chloride	75-09-2	3.40E-02	3.40E-02	2E-06	2E-08	3E-05	4E-08	7E-05	3E-11	1E-07	4E-09	9E-06	3E-09	5E-06	1E-09	5E-05
83/84-2	VOC	Toluene	108-88-3	4.50E-01	4.50E-01	4E-06		2E-04		5E-04		9E-07		6E-05		3E-05		3E-04
83/84-2	VOC	Trichloroethene	79-01-6	8.20E-02	8.20E-02	2E-06	2E-07		4E-07		2E-10		3E-08		2E-08		7E-09	
83/84-2	VOC	Xylenes (total)	1330-20-7	4.80E+00	4.80E+00	2E-05		6E-02		1E-01		2E-04		1E-02		1E-02		1E-01
83/84-2	SVOC	Acenaphthene	83-32-9	2.39E+01	2.39E+01			2E-04		5E-04		4E-05		3E-03		1E-03		7E-04
83/84-2	SVOC	Acenaphthylene	208-96-8	1.95E-01	1.95E-01			2E-06		6E-06		6E-07		5E-05		2E-05		1E-05
83/84-2	SVOC	Anthracene	120-12-7	6.12E+01	6.12E+01							1E-05		1E-03		3E-04		6E-05
83/84-2	SVOC	Benzo(a)anthracene	56-55-3	8.12E+01	8.12E+01		2E-09		5E-09		5E-07		1E-04		3E-05		2E-06	
83/84-2	SVOC	Benzo(a)pyrene	50-32-8	6.61E+01	6.61E+01		2E-09		6E-09		4E-06		1E-03		2E-04		2E-05	
83/84-2	SVOC	Benzo(b)fluoranthene	205-99-2	6.29E+01	6.29E+01		1E-08		4E-08		4E-07		1E-04		2E-05		2E-06	
83/84-2	SVOC	Benzo(g,h,i)perylene	191-24-2	2.78E+01	2.78E+01			2E-10		6E-10		5E-05		5E-03		1E-03		3E-04
83/84-2	SVOC	Benzo(k)fluoranthene	207-08-9	5.86E+01	5.86E+01		1E-11		3E-11		3E-08		9E-06		2E-06		2E-07	
83/84-2	SVOC	Biphenyl	92-52-4	7.13E-01	7.13E-01	2E-06		9E-06		2E-05		1E-06		1E-04		4E-05		3E-04
83/84-2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.74E+00	1.74E+00	3E-13	1E-15	1E-11	4E-15	3E-11	2E-10	5E-06	5E-08	4E-04	1E-08	1E-04	9E-10	2E-04
83/84-2	SVOC	Butylbenzylphthalate	85-68-7	4.72E+00	4.72E+00		2E-12	1E-08	5E-12	3E-08	7E-11	1E-06	2E-08	1E-04	4E-09	3E-05	4E-10	7E-06
83/84-2	SVOC	Caprolactam	105-60-2	1.71E-01	1.71E-01	2E-09		4E-09		9E-09		2E-08		2E-06		6E-07		3E-06
83/84-2	SVOC	Carbazole	86-74-8	3.99E+01	3.99E+01		4E-11		1E-10		6E-09		2E-06		3E-07		4E-08	
83/84-2	SVOC	Chrysene	218-01-9	8.48E+01	8.48E+01		5E-10		1E-09		5E-09		1E-06		3E-07		3E-08	
83/84-2	SVOC	Dibenz(a,h)anthracene	53-70-3	1.69E+01	1.69E+01		2E-12		7E-12		1E-06		3E-04		6E-05		5E-06	
83/84-2	SVOC	Dibenzofuran	132-64-9	1.67E+01	1.67E+01			1E-04		3E-04		5E-04		4E-02		1E-02		4E-02
83/84-2	SVOC	Diethylphthalate	84-66-2	5.97E-02	5.97E-02	2E-09		2E-09		6E-09		5E-09		4E-07		1E-07		5E-08
83/84-2	SVOC	Di-n-butylphthalate	84-74-2	3.43E+00	3.43E+00	4E-11						2E-06		2E-04		4E-05		9E-06
83/84-2	SVOC	Fluoranthene	206-44-0	1.78E+02	1.78E+02			1E-05		4E-05		3E-04		2E-02		6E-03		2E-03
83/84-2	SVOC	Fluorene	86-73-7	3.45E+01	3.45E+01			9E-05		2E-04		6E-05		5E-03		2E-03		8E-04
83/84-2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.91E+01	2.91E+01		3E-11		1E-10		2E-07		5E-05		1E-05		9E-07	
83/84-2	SVOC	2-Methylnaphthalene	91-57-6	4.14E+00	4.14E+00			9E-03		2E-02		5E-04		3E-02		2E-02		2E-01
83/84-2	SVOC	Naphthalene	91-20-3	4.79E+00	4.79E+00	3E-06		3E-02		7E-02		9E-04		5E-02		4E-02		3E-01
83/84-2	SVOC	Phenanthrene	85-01-8	1.92E+02	1.92E+02			1E-04		3E-04		4E-04		4E-02		1E-02		4E-03
83/84-2	SVOC	Pyrene	129-00-0	1.62E+02	1.62E+02			1E-05		3E-05		3E-04		3E-02		8E-03		2E-03
83/84-2	PCB	PCBs (total)	1336-36-3	3.79E-01	3.79E-01	7E-08	5E-09		1E-08		7E-09	1E-03	2E-06	1E-01	4E-07	3E-02	5E-08	2E-02
83/84-2	INORG	Antimony	7440-36-0	2.20E+01	2.19E+01							2E-03		2E-01		3E-02		1E-01
83/84-2	INORG	Arsenic	7440-38-2	4.70E+01	3.89E+01						4E-07	6E-03	1E-04	5E-01	1E-05	9E-02	2E-06	2E-02
83/84-2	INORG	Barium	7440-39-3	3.40E+03	3.30E+03													
83/84-2	INORG	Beryllium	7440-41-7	1.10E+01	1.04E+01						7E-09	1E-03	8E-09	2E-02	5E-09	3E-03	1E-08	3E-02
83/84-2	INORG	Cadmium	7440-43-9	2.40E+01	2.34E+01						1E-08	1E-03	1E-08	1E-01	8E-09	2E-02	2E-08	5E-02
83/84-2	INORG	Chromium (total)	7440-47-3	2.40E+03	2.37E+03						8E-06	8E-02	9E-06	3E+00	5E-06	4E-01	1E-05	1E+00
83/84-2	INORG	Cobalt	7440-48-4	2.10E+02	2.03E+02						2E-07	2E-02	2E-07	4E-02	1E-07	1E-02	3E-07	4E-01
83/84-2	INORG	Copper	7440-50-8	1.30E+04	1.30E+04							1E-02		1E+00		2E-01		6E-01
83/84-2	INORG	Cyanide (total)	57-12-5	3.20E+00	3.20E+00							6E-06		6E-04		8E-05		3E-04
83/84-2	INORG	Lead	7439-92-1	6.50E+03	6.50E+03													
83/84-2	INORG	Manganese	7439-96-5	3.50E+03	3.02E+03							1E-01		1E-01		4E-02		2E+00
83/84-2	INORG	Mercury	7439-97-6	1.13E+00	1.08E+00	3E-05		4E-03		1E-02		5E-04		3E-02		2E-02		1E-01
83/84-2	INORG	Nickel	7440-02-0	1.20E+02	1.00E+02						7E-09		7E-09		4E-09		1E-08	
83/84-2	INORG	Selenium	7782-49-2	3.60E+00	3.08E+00							2E-05		2E-03		3E-04		1E-03
83/84-2	INORG	Silver	7440-22-4	7.70E+00	7.51E+00							2E-03		6E-03		1E-03		3E-02
83/84-2	INORG	Thallium	7440-28-0	2.90E-01	9.35E-02							5E-05		5E-03		7E-04		3E-03
83/84-2	INORG	Vanadium	7440-62-2	3.90E+02	3.65E+02							2E-03		2E-01		3E-02		1E-01
83/84-2	INORG	Zinc	7440-66-6	2.90E+03	2.79E+03							4E-04		3E-02		5E-03		2E-02
83/84-3	VOC	Methyl Acetate	79-20-9	9.50E-02	9.50E-02	4E-08		4E-06		1E-05		8E-08		4E-06		3E-06		3E-06
83/84-3	VOC	4-Methyl-2-pentanone	108-10-1	3.40E+00	3.40E+00	2E-06		2E-04		6E-04		3E-06		2E-04		1E-04		1E-03
83/84-3	VOC	Methylcyclohexane	108-87-2	9.70E-02	9.70E-02	4E-07		2E-04		2E-04		8E-07		4E-05		3E-05		3E-04
83/84-3	VOC	Toluene	108-88-3	4.80E+00	4.80E+00	4E-05		2E-03		5E-03		9E-06		6E-04		3E-04		3E-03
83/84-3	VOC	Xylenes (total)	1330-20-7	1.32E-01	1.32E-01	5E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
83/84-3	SVOC	Acenaphthene	83-32-9	1.68E-01	1.68E-01			1E-06		3E-06		3E-07		2E-05		8E-06		5E-06
83/84-3	SVOC	Anthracene	120-12-7	1.06E+00	1.06E+00							2E-07		2E-05		5E-06		1E-06
83/84-3	SVOC	Benzaldehyde	100-52-7	8.70E-02	8.70E-02			6E-06		2E-05		3E-07		2E-05		1E-05		8E-05
83/84-3	SVOC	Benzo(a)anthracene	56-55-3	4.44E+00	4.44E+00		9E-11		3E-10		3E-08		7E-06		2E-06		1E-07	
83/84-3	SVOC	Benzo(a)pyrene	50-32-8	4.03E+00	4.03E+00		1E-10		3E-10		2E-07		7E-05		1E-05		1E-06	
83/84-3	SVOC	Benzo(b)fluoranthene	205-99-2	4.10E+00	4.10E+00		9E-10		3E-09		2E-08		7E-06		1E-06		1E-07	
83/84-3	SVOC	Benzo(g,h,i)perylene	191-24-2	1.55E+00	1.55E+00			1E-11		3E-11		3E-06		3E-04		7E-05		1E-05
83/84-3	SVOC	Benzo(k)fluoranthene	207-08-9	4.31E+00	4.31E+00		7E-13		2E-12		3E-09		7E-07		1E-07		1E-08	
83/84-3	SVOC	Carbazole	86-74-8	8.11E-01	8.11E-01		9E-13		3E-12		1E-10		3E-08		7E-09		7E-10	
83/84-3	SVOC	Chrysene	218-01-9	5.19E+00	5.19E+00		3E-11		9E-11		3E-10		8E-08		2E-08		2E-09	
83/84-3	SVOC	Dibenzofuran	132-64-9	1.56E-01	1.56E-01			1E-06		3E-06		4E-06		4E-04		1E-04		4E-04
83/84-3	SVOC	Diethylphthalate	84-66-2	5.59E-02	5.59E-02	2E-09		2E-09		5E-09		4E-09		4E-07		1E-07		4E-08
83/84-3	SVOC	Fluoranthene	206-44-0	6.20E+00	6.20E+00			5E-07		1E-06		9E-06		8E-04		2E-04		6E-05
83/84-3	SVOC	Fluorene	86-73-7	2.75E-01	2.75E-01			7E-07		2E-06		5E-07		4E-05		1E-05		6E-06
83/84-3	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.65E+00	1.65E+00		2E-12		6E-12		1E-08		3E-06		6E-07		5E-08	
83/84-3	SVOC	Naphthalene	91-20-3	5.16E-02	5.16E-02	3E-08		3E-04		8E-04		9E-06		5E-04		4E-04		4E-03
83/84-3	SVOC	Phenanthrene	85-01-8	4.40E+00	4.40E+00			3E-06		8E-06		9E-06		8E-04		2E-04		9E-05
83/84-3	SVOC	Pyrene	129-00-0	1.22E+01	1.22E+01			9E-07		2E-06		2E-05		2E-03		6E-04		1E-04
83/84-3	INORG	Arsenic	7440-38-2	5.70E+00														
83/84-3	INORG	Barium	7440-39-3	2.10E+02	1.14E+02													
83/84-3	INORG	Beryllium	7440-41-7	9.10E-01	3.20E-01						2E-10	4E-05	2E-10	6E-04	1E-10	9E-05	4E-10	9E-04
83/84-3	INORG	Cadmium	7440-43-9	9.20E-01	3.32E-01						2E-10	2E-05	2E-10	1E-03	1E-10	2E-04	3E-10	7E-04
83/84-3	INORG	Chromium (total)	7440-47-3	1.70E+01														
83/84-3	INORG	Cobalt	7440-48-4	4.50E+00														
83/84-3	INORG	Copper	7440-50-8	1.60E+02	1.32E+02							1E-04		1E-02		2E-03		6E-03
83/84-3	INORG	Cyanide (total)	57-12-5	3.20E-01	3.20E-01							6E-07		6E-05		8E-06		3E-05
83/84-3	INORG	Lead	7439-92-1	4.20E+04	4.20E+04													
83/84-3	INORG	Manganese	7439-96-5	2.00E+02														
83/84-3	INORG	Mercury	7439-97-6	5.12E+00	5.07E+00	2E-04		2E-02		5E-02		2E-03		1E-01		8E-02		7E-01
83/84-3	INORG	Nickel	7440-02-0	2.10E+01	1.04E+00						7E-11		8E-11		5E-11		1E-10	
83/84-3	INORG	Silver	7440-22-4	3.00E-01	1.12E-01							2E-05		9E-05		2E-05		4E-04
83/84-3	INORG	Thallium	7440-28-0	3.40E-01	1.43E-01							8E-05		7E-03		1E-03		4E-03
83/84-3	INORG	Vanadium	7440-62-2	1.40E+01														
83/84-3	INORG	Zinc	7440-66-6	1.90E+02	7.95E+01							1E-05		1E-03		1E-04		5E-04
83/84-4	VOC	Acetone	67-64-1	2.30E-01	2.30E-01	1E-08		5E-06		1E-05		2E-07		9E-06		6E-06		5E-05
83/84-4	VOC	Benzene	71-43-2	4.30E-02	4.30E-02	8E-05	5E-07	6E-03	8E-07	8E-03	5E-10	2E-05	8E-08	8E-04	5E-08	6E-04	2E-08	3E-03
83/84-4	VOC	2-Butanone	78-93-3	8.00E-02	8.00E-02	2E-08		2E-06		4E-06		4E-08		2E-06		1E-06		1E-05
83/84-4	VOC	Cumene	98-82-8	2.50E-01	2.50E-01	2E-06		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
83/84-4	VOC	Cyclohexane	110-82-7	1.30E-01	1.30E-01	9E-07		1E-04		1E-04		4E-07		2E-05		2E-05		2E-04
83/84-4	VOC	1,2-Dichlorobenzene	95-50-1	7.40E-02	7.40E-02	2E-07		8E-05		2E-04		8E-07		4E-05		3E-05		3E-05
83/84-4	VOC	cis-1,2-Dichloroethene	156-59-2	5.00E+00	5.00E+00	3E-05		5E-01		8E-01		1E-03		8E-02		6E-02		5E-02
83/84-4	VOC	trans-1,2-Dichloroethene	156-60-5	5.70E-01	5.70E-01	5E-06		5E-02		6E-02		1E-04		6E-03		5E-03		5E-02
83/84-4	VOC	Ethyl Benzene	100-41-4	1.90E-01	1.90E-01	9E-07		3E-04		7E-04		1E-06		6E-05		4E-05		4E-04
83/84-4	VOC	Methyl Acetate	79-20-9	6.30E-01	6.30E-01	2E-07		3E-05		7E-05		5E-07		3E-05		2E-05		2E-05
83/84-4	VOC	Methylcyclohexane	108-87-2	9.30E-01	9.30E-01	3E-06		2E-03		2E-03		7E-06		4E-04		3E-04		3E-03
83/84-4	VOC	Methylene Chloride	75-09-2	5.20E-02	5.20E-02	3E-06	3E-08	5E-05	6E-08	1E-04	4E-11	2E-07	7E-09	1E-05	4E-09	8E-06	1E-09	7E-05
83/84-4	VOC	Toluene	108-88-3	1.40E-01	1.40E-01	1E-06		6E-05		2E-04		3E-07		2E-05		1E-05		8E-05
83/84-4	VOC	Trichloroethene	79-01-6	8.30E-01	8.30E-01	2E-05	2E-06		4E-06		2E-09		3E-07		2E-07		7E-08	
83/84-4	VOC	Vinyl Chloride	75-01-4	2.30E-01	2.30E-01	7E-04	4E-06	1E-02	5E-06	1E-02	9E-09	6E-05	2E-06	3E-03	8E-07	2E-03	3E-07	2E-02
83/84-4	VOC	Xylenes (total)	1330-20-7	8.60E-01	8.60E-01	3E-06		1E-02		3E-02		4E-05		2E-03		2E-03		2E-02
83/84-4	SVOC	Acenaphthene	83-32-9	1.46E+00	1.46E+00			1E-05		3E-05		2E-06		2E-04		7E-05		4E-05
83/84-4	SVOC	Acetophenone	98-86-2	1.16E+00	1.16E+00	4E-07		4E-05		9E-05		2E-06		2E-04		9E-05		7E-05
83/84-4	SVOC	Anthracene	120-12-7	2.79E+00	2.79E+00							5E-07		5E-05		1E-05		3E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
83/84-4	SVOC	Benzo(a)anthracene	56-55-3	7.69E+00	7.69E+00		2E-10		5E-10		5E-08		1E-05		3E-06		2E-07	
83/84-4	SVOC	Benzo(a)pyrene	50-32-8	6.43E+00	6.43E+00		2E-10		5E-10		4E-07		1E-04		2E-05		2E-06	
83/84-4	SVOC	Benzo(b)fluoranthene	205-99-2	7.31E+00	7.31E+00		2E-09		5E-09		4E-08		1E-05		3E-06		2E-07	
83/84-4	SVOC	Benzo(g,h,i)perylene	191-24-2	2.20E+00	2.20E+00			2E-11		5E-11		4E-06		4E-04		1E-04		2E-05
83/84-4	SVOC	Benzo(k)fluoranthene	207-08-9	5.84E+00	5.84E+00		1E-12		3E-12		3E-09		9E-07		2E-07		2E-08	
83/84-4	SVOC	Biphenyl	92-52-4	1.36E-01	1.36E-01	4E-07		2E-06		4E-06		3E-07		2E-05		8E-06		5E-05
83/84-4	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.28E-01	5.28E-01	8E-14	4E-16	4E-12	1E-15	1E-11	6E-11	1E-06	2E-08	1E-04	3E-09	3E-05	3E-10	7E-05
83/84-4	SVOC	Butylbenzylphthalate	85-68-7	5.09E-01	5.09E-01		2E-13	1E-09	5E-13	3E-09	7E-12	1E-07	2E-09	1E-05	4E-10	3E-06	4E-11	7E-07
83/84-4	SVOC	Carbazole	86-74-8	2.97E+00	2.97E+00		3E-12		1E-11		5E-10		1E-07		3E-08		3E-09	
83/84-4	SVOC	Chrysene	218-01-9	7.23E+00	7.23E+00		4E-11		1E-10		4E-10		1E-07		3E-08		3E-09	
83/84-4	SVOC	Dibenz(a,h)anthracene	53-70-3	1.22E+00	1.22E+00		2E-13		5E-13		7E-08		2E-05		4E-06		4E-07	
83/84-4	SVOC	Dibenzofuran	132-64-9	9.59E-01	9.59E-01			6E-06		2E-05		3E-05		2E-03		6E-04		2E-03
83/84-4	SVOC	Di-n-butylphthalate	84-74-2	9.53E-02	9.53E-02	1E-12						5E-08		5E-06		1E-06		2E-07
83/84-4	SVOC	Fluoranthene	206-44-0	1.46E+01	1.46E+01			1E-06		3E-06		2E-05		2E-03		5E-04		1E-04
83/84-4	SVOC	Fluorene	86-73-7	1.75E+00	1.75E+00			4E-06		1E-05		3E-06		3E-04		9E-05		4E-05
83/84-4	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.06E+00	2.06E+00		2E-12		7E-12		1E-08		3E-06		7E-07		6E-08	
83/84-4	SVOC	2-Methylnaphthalene	91-57-6	5.05E+00	5.05E+00			1E-02		3E-02		6E-04		3E-02		2E-02		2E-01
83/84-4	SVOC	Naphthalene	91-20-3	1.83E+00	1.83E+00	1E-06		1E-02		3E-02		3E-04		2E-02		1E-02		1E-01
83/84-4	SVOC	Phenanthrene	85-01-8	1.19E+01	1.19E+01			8E-06		2E-05		3E-05		2E-03		7E-04		2E-04
83/84-4	SVOC	Pyrene	129-00-0	1.14E+01	1.14E+01			9E-07		2E-06		2E-05		2E-03		5E-04		1E-04
83/84-4	PCB	PCBs (total)	1336-36-3	8.50E-01	8.50E-01	2E-07	1E-08		3E-08		2E-08	2E-03	4E-06	2E-01	1E-06	6E-02	1E-07	5E-02
83/84-4	INORG	Antimony	7440-36-0	3.70E+00	3.61E+00							4E-04		3E-02		4E-03		2E-02
83/84-4	INORG	Arsenic	7440-38-2	1.60E+01	7.88E+00						8E-08	1E-03	2E-05	1E-01	3E-06	2E-02	4E-07	3E-03
83/84-4	INORG	Barium	7440-39-3	3.30E+02	2.34E+02													
83/84-4	INORG	Beryllium	7440-41-7	8.00E-01	2.10E-01						1E-10	3E-05	2E-10	4E-04	9E-11	6E-05	2E-10	6E-04
83/84-4	INORG	Cadmium	7440-43-9	6.30E+00	5.71E+00						3E-09	3E-04	3E-09	2E-02	2E-09	4E-03	5E-09	1E-02
83/84-4	INORG	Chromium (total)	7440-47-3	1.20E+02	8.80E+01						3E-07	3E-03	3E-07	1E-01	2E-07	1E-02	5E-07	4E-02
83/84-4	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
83/84-4	INORG	Copper	7440-50-8	2.20E+03	2.17E+03							2E-03		2E-01		3E-02		1E-01
83/84-4	INORG	Cyanide (total)	57-12-5	2.10E+01	2.10E+01							4E-05		4E-03		5E-04		2E-03
83/84-4	INORG	Lead	7439-92-1	8.40E+02	8.40E+02													
83/84-4	INORG	Manganese	7439-96-5	1.10E+03	6.23E+02							3E-02		3E-02		9E-03		4E-01
83/84-4	INORG	Mercury	7439-97-6	1.35E-01	8.26E-02	3E-06		3E-04		8E-04		4E-05		2E-03		1E-03		1E-02
83/84-4	INORG	Nickel	7440-02-0	6.90E+01	4.90E+01						3E-09		4E-09		2E-09		6E-09	
83/84-4	INORG	Selenium	7782-49-2	9.00E-01	3.81E-01							3E-06		3E-04		4E-05		1E-04
83/84-4	INORG	Silver	7440-22-4	7.30E+00	7.11E+00							2E-03		6E-03		1E-03		3E-02
83/84-4	INORG	Thallium	7440-28-0	2.70E-01	7.35E-02							4E-05		4E-03		5E-04		2E-03
83/84-4	INORG	Vanadium	7440-62-2	3.70E+01	1.21E+01							7E-05		6E-03		8E-04		3E-03
83/84-4	INORG	Zinc	7440-66-6	2.50E+02	1.40E+02							2E-05		2E-03		2E-04		9E-04
83/84-5	VOC	Xylenes (total)	1330-20-7	6.80E-02	6.80E-02	3E-07		8E-04		2E-03		3E-06		2E-04		1E-04		1E-03
83/84-5	SVOC	Acenaphthene	83-32-9	5.02E-01	5.02E-01			4E-06		1E-05		8E-07		6E-05		2E-05		2E-05
83/84-5	SVOC	Anthracene	120-12-7	6.75E-01	6.75E-01							1E-07		1E-05		3E-06		6E-07
83/84-5	SVOC	Benzo(a)anthracene	56-55-3	9.17E-01	9.17E-01		2E-11		6E-11		5E-09		1E-06		3E-07		3E-08	
83/84-5	SVOC	Benzo(a)pyrene	50-32-8	7.10E-01	7.10E-01		2E-11		6E-11		4E-08		1E-05		2E-06		2E-07	
83/84-5	SVOC	Benzo(b)fluoranthene	205-99-2	7.84E-01	7.84E-01		2E-10		5E-10		5E-09		1E-06		3E-07		3E-08	
83/84-5	SVOC	Benzo(g,h,i)perylene	191-24-2	5.59E-01	5.59E-01			5E-12		1E-11		1E-06		1E-04		2E-05		5E-06
83/84-5	SVOC	Benzo(k)fluoranthene	207-08-9	8.55E-01	8.55E-01		1E-13		4E-13		5E-10		1E-07		3E-08		3E-09	
83/84-5	SVOC	Chrysene	218-01-9	1.05E+00	1.05E+00		6E-12		2E-11		6E-11		2E-08		4E-09		4E-10	
83/84-5	SVOC	Dibenzofuran	132-64-9	4.20E-01	4.20E-01			3E-06		7E-06		1E-05		1E-03		3E-04		1E-03
83/84-5	SVOC	Fluoranthene	206-44-0	2.20E+00	2.20E+00			2E-07		5E-07		3E-06		3E-04		8E-05		2E-05
83/84-5	SVOC	Fluorene	86-73-7	8.15E-01	8.15E-01			2E-06		5E-06		1E-06		1E-04		4E-05		2E-05
83/84-5	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.37E-01	5.37E-01		6E-13		2E-12		3E-09		9E-07		2E-07		2E-08	
83/84-5	SVOC	Phenanthrene	85-01-8	3.07E+00	3.07E+00			2E-06		6E-06		7E-06		6E-04		2E-04		6E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
83/84-5	SVOC	Pyrene	129-00-0	3.36E+00	3.36E+00			3E-07		7E-07		7E-06		6E-04		2E-04		4E-05
83/84-5	INORG	Arsenic	7440-38-2	3.20E+00														
83/84-5	INORG	Barium	7440-39-3	4.20E+01														
83/84-5	INORG	Beryllium	7440-41-7	5.40E-01														
83/84-5	INORG	Cadmium	7440-43-9	1.50E-01														
83/84-5	INORG	Chromium (total)	7440-47-3	1.50E+01														
83/84-5	INORG	Cobalt	7440-48-4	7.10E+00	4.62E-02						4E-11	5E-06	4E-11	1E-05	2E-11	2E-06	6E-11	8E-05
83/84-5	INORG	Copper	7440-50-8	1.30E+01														
83/84-5	INORG	Lead	7439-92-1	1.30E+01	1.30E+01													
83/84-5	INORG	Manganese	7439-96-5	2.50E+02														
83/84-5	INORG	Mercury	7439-97-6	1.83E-02														
83/84-5	INORG	Nickel	7440-02-0	1.90E+01														
83/84-5	INORG	Selenium	7782-49-2	6.60E-01	1.41E-01							1E-06		1E-04		1E-05		6E-05
83/84-5	INORG	Silver	7440-22-4	8.10E-02														
83/84-5	INORG	Thallium	7440-28-0	2.10E-01	1.35E-02							8E-06		7E-04		9E-05		4E-04
83/84-5	INORG	Vanadium	7440-62-2	2.20E+01														
83/84-5	INORG	Zinc	7440-66-6	4.10E+01														
83/84-6	VOC	Trichloroethene	79-01-6	5.10E-02	5.10E-02	1E-06	1E-07		2E-07		1E-10		2E-08		1E-08		4E-09	
83/84-6	SVOC	Acenaphthene	83-32-9	2.20E+00	2.20E+00			2E-05		4E-05		4E-06		3E-04		1E-04		7E-05
83/84-6	SVOC	Anthracene	120-12-7	3.80E+00	3.80E+00							7E-07		7E-05		2E-05		4E-06
83/84-6	SVOC	Benzo(a)anthracene	56-55-3	7.90E+00	7.90E+00		2E-10		5E-10		5E-08		1E-05		3E-06		2E-07	
83/84-6	SVOC	Benzo(a)pyrene	50-32-8	8.30E+00	8.30E+00		2E-10		7E-10		5E-07		1E-04		3E-05		2E-06	
83/84-6	SVOC	Benzo(b)fluoranthene	205-99-2	7.80E+00	7.80E+00		2E-09		5E-09		5E-08		1E-05		3E-06		3E-07	
83/84-6	SVOC	Benzo(g,h,i)perylene	191-24-2	5.80E+00	5.80E+00			5E-11		1E-10		1E-05		1E-03		3E-04		5E-05
83/84-6	SVOC	Benzo(k)fluoranthene	207-08-9	7.30E+00	7.30E+00		1E-12		4E-12		4E-09		1E-06		3E-07		2E-08	
83/84-6	SVOC	Carbazole	86-74-8	2.00E+00	2.00E+00		2E-12		7E-12		3E-10		8E-08		2E-08		2E-09	
83/84-6	SVOC	Chrysene	218-01-9	8.70E+00	8.70E+00		5E-11		2E-10		5E-10		1E-07		3E-08		3E-09	
83/84-6	SVOC	Dibenz(a,h)anthracene	53-70-3	9.50E-01	9.50E-01		1E-13		4E-13		6E-08		2E-05		3E-06		3E-07	
83/84-6	SVOC	Fluoranthene	206-44-0	1.30E+01	1.30E+01			1E-06		3E-06		2E-05		2E-03		5E-04		1E-04
83/84-6	SVOC	Fluorene	86-73-7	1.60E+00	1.60E+00			4E-06		1E-05		3E-06		2E-04		8E-05		4E-05
83/84-6	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.40E+00	5.40E+00		6E-12		2E-11		3E-08		9E-06		2E-06		2E-07	
83/84-6	SVOC	Phenanthrene	85-01-8	1.10E+01	1.10E+01			8E-06		2E-05		2E-05		2E-03		6E-04		2E-04
83/84-6	SVOC	Pyrene	129-00-0	1.70E+01	1.70E+01			1E-06		3E-06		3E-05		3E-03		8E-04		2E-04
83/84-6	INORG	Arsenic	7440-38-2	5.72E+00														
83/84-6	INORG	Barium	7440-39-3	2.12E+02	1.16E+02													
83/84-6	INORG	Cadmium	7440-43-9	8.99E-02														
83/84-6	INORG	Chromium (total)	7440-47-3	1.49E+01														
83/84-6	INORG	Lead	7439-92-1	8.57E+02	8.57E+02													
83/84-6	INORG	Mercury	7439-97-6	9.58E-02	4.34E-02	1E-06		2E-04		4E-04		2E-05		1E-03		6E-04		6E-03
83/84-6	INORG	Selenium	7782-49-2	2.10E-01														
83/84-6	INORG	Silver	7440-22-4	4.78E+00	4.59E+00							1E-03		4E-03		7E-04		2E-02
83/84-7	VOC	Methyl Acetate	79-20-9	2.70E-01	2.70E-01	1E-07		1E-05		3E-05		2E-07		1E-05		9E-06		8E-06
83/84-7	VOC	Methylcyclohexane	108-87-2	3.00E-02	3.00E-02	1E-07		5E-05		6E-05		2E-07		1E-05		1E-05		9E-05
83/84-7	SVOC	Benzo(a)anthracene	56-55-3	8.34E-02	8.34E-02		2E-12		5E-12		5E-10		1E-07		3E-08		3E-09	
83/84-7	SVOC	Benzo(a)pyrene	50-32-8	8.09E-02	8.09E-02		2E-12		7E-12		5E-09		1E-06		3E-07		2E-08	
83/84-7	SVOC	Benzo(b)fluoranthene	205-99-2	1.19E-01	1.19E-01		3E-11		8E-11		7E-10		2E-07		4E-08		4E-09	
83/84-7	SVOC	Benzo(k)fluoranthene	207-08-9	9.48E-02	9.48E-02		2E-14		5E-14		6E-11		2E-08		3E-09		3E-10	
83/84-7	SVOC	Butylbenzylphthalate	85-68-7	1.21E+00	1.21E+00		4E-13	3E-09	1E-12	8E-09	2E-11	3E-07	5E-09	3E-05	1E-09	7E-06	1E-10	2E-06
83/84-7	SVOC	Chrysene	218-01-9	1.07E-01	1.07E-01		6E-13		2E-12		6E-12		2E-09		4E-10		4E-11	
83/84-7	SVOC	Diethylphthalate	84-66-2	8.49E-02	8.49E-02	3E-09		3E-09		8E-09		7E-09		6E-07		2E-07		6E-08
83/84-7	SVOC	Fluoranthene	206-44-0	1.50E-01	1.50E-01			1E-08		3E-08		2E-07		2E-05		5E-06		1E-06
83/84-7	SVOC	Phenanthrene	85-01-8	7.17E-02	7.17E-02			5E-08		1E-07		2E-07		1E-05		4E-06		1E-06
83/84-7	SVOC	Pyrene	129-00-0	2.37E-01	2.37E-01			2E-08		5E-08		5E-07		4E-05		1E-05		3E-06

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
83/84-7	PCB	PCBs (total)	1336-36-3	8.90E-02	8.90E-02	2E-08	1E-09		3E-09		2E-09	3E-04	4E-07	2E-02	1E-07	6E-03	1E-08	5E-03
83/84-7	INORG	Antimony	7440-36-0	4.60E-02														
83/84-7	INORG	Arsenic	7440-38-2	3.60E+00														
83/84-7	INORG	Barium	7440-39-3	3.20E+01														
83/84-7	INORG	Beryllium	7440-41-7	2.00E-01														
83/84-7	INORG	Cadmium	7440-43-9	2.60E-01														
83/84-7	INORG	Chromium (total)	7440-47-3	1.40E+01														
83/84-7	INORG	Cobalt	7440-48-4	2.40E+00														
83/84-7	INORG	Copper	7440-50-8	3.30E+01	4.54E+00							5E-06		4E-04		6E-05		2E-04
83/84-7	INORG	Cyanide (total)	57-12-5	3.30E-01	3.30E-01							7E-07		6E-05		8E-06		3E-05
83/84-7	INORG	Lead	7439-92-1	3.30E+01	3.30E+01													
83/84-7	INORG	Manganese	7439-96-5	1.90E+02														
83/84-7	INORG	Mercury	7439-97-6	2.58E-02														
83/84-7	INORG	Nickel	7440-02-0	1.80E+01														
83/84-7	INORG	Selenium	7782-49-2	2.90E-01														
83/84-7	INORG	Silver	7440-22-4	8.20E-02														
83/84-7	INORG	Thallium	7440-28-0	4.70E-02														
83/84-7	INORG	Vanadium	7440-62-2	1.10E+01														
83/84-7	INORG	Zinc	7440-66-6	4.30E+01														
84-A	VOC	Benzene	71-43-2	1.10E-02	1.10E-02	2E-05	1E-07	1E-03	2E-07	2E-03	1E-10	4E-06	2E-08	2E-04	1E-08	2E-04	5E-09	8E-04
84-A	VOC	Cumene	98-82-8	1.40E-02	1.40E-02	1E-07		5E-05		1E-04		2E-07		1E-05		7E-06		7E-05
84-A	VOC	Cyclohexane	110-82-7	3.40E-02	3.40E-02	2E-07		3E-05		3E-05		1E-07		5E-06		4E-06		4E-05
84-A	VOC	cis-1,2-Dichloroethene	156-59-2	4.70E-01	4.70E-01	3E-06		5E-02		8E-02		1E-04		7E-03		5E-03		5E-03
84-A	VOC	trans-1,2-Dichloroethene	156-60-5	2.00E-02	2.00E-02	2E-07		2E-03		2E-03		4E-06		2E-04		2E-04		2E-03
84-A	VOC	Ethyl Benzene	100-41-4	2.00E-02	2.00E-02	1E-07		3E-05		7E-05		1E-07		7E-06		5E-06		4E-05
84-A	VOC	Methyl Acetate	79-20-9	5.20E-01	5.20E-01	2E-07		2E-05		6E-05		4E-07		2E-05		2E-05		2E-05
84-A	VOC	Methylcyclohexane	108-87-2	1.60E-01	1.60E-01	6E-07		3E-04		3E-04		1E-06		7E-05		5E-05		5E-04
84-A	VOC	Methylene Chloride	75-09-2	1.30E-02	1.30E-02	6E-07	6E-09	1E-05	2E-08	3E-05	1E-11	6E-08	2E-09	3E-06	1E-09	2E-06	4E-10	2E-05
84-A	VOC	Toluene	108-88-3	4.80E-02	4.80E-02	4E-07		2E-05		5E-05		9E-08		6E-06		3E-06		3E-05
84-A	VOC	1,1,1-Trichloroethane	71-55-6	5.70E-02	5.70E-02	2E-07		1E-04		2E-04		3E-07		2E-05		1E-05		1E-05
84-A	VOC	Trichloroethene	79-01-6	1.00E+00	1.00E+00	2E-05	2E-06		4E-06		2E-09		4E-07		2E-07		8E-08	
84-A	VOC	Trichlorofluoromethane	75-69-4	1.10E-02	1.10E-02	1E-08		8E-05		9E-05		4E-07		2E-05		2E-05		1E-05
84-A	VOC	Xylenes (total)	1330-20-7	1.08E-01	1.08E-01	4E-07		1E-03		3E-03		6E-06		3E-04		2E-04		2E-03
84-A	SVOC	Acenaphthene	83-32-9	1.47E-01	1.47E-01			1E-06		3E-06		2E-07		2E-05		7E-06		4E-06
84-A	SVOC	Acenaphthylene	208-96-8	2.00E-02	2.00E-02			2E-07		6E-07		6E-08		5E-06		2E-06		1E-06
84-A	SVOC	Anthracene	120-12-7	4.95E-01	4.95E-01							9E-08		9E-06		2E-06		5E-07
84-A	SVOC	Benzo(a)anthracene	56-55-3	1.24E+00	1.24E+00		3E-11		8E-11		7E-09		2E-06		4E-07		4E-08	
84-A	SVOC	Benzo(a)pyrene	50-32-8	1.08E+00	1.08E+00		3E-11		9E-11		6E-08		2E-05		4E-06		3E-07	
84-A	SVOC	Benzo(b)fluoranthene	205-99-2	1.31E+00	1.31E+00		3E-10		9E-10		8E-09		2E-06		5E-07		4E-08	
84-A	SVOC	Benzo(g,h,i)perylene	191-24-2	4.76E-01	4.76E-01			4E-12		1E-11		9E-07		8E-05		2E-05		4E-06
84-A	SVOC	Benzo(k)fluoranthene	207-08-9	1.15E+00	1.15E+00		2E-13		6E-13		7E-10		2E-07		4E-08		3E-09	
84-A	SVOC	Biphenyl	92-52-4	3.00E-02	3.00E-02	1E-07		4E-07		1E-06		6E-08		4E-06		2E-06		1E-05
84-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	8.00E-02	8.00E-02	1E-14	6E-17	6E-13	2E-16	2E-12	8E-12	2E-07	2E-09	2E-05	5E-10	5E-06	4E-11	1E-05
84-A	SVOC	Butylbenzylphthalate	85-68-7	2.00E-02	2.00E-02		7E-15	5E-11	2E-14	1E-10	3E-13	5E-09	8E-11	5E-07	2E-11	1E-07	2E-12	3E-08
84-A	SVOC	Carbazole	86-74-8	2.58E-01	2.58E-01		3E-13		9E-13		4E-11		1E-08		2E-09		2E-10	
84-A	SVOC	Chrysene	218-01-9	1.33E+00	1.33E+00		8E-12		2E-11		8E-11		2E-08		5E-09		5E-10	
84-A	SVOC	Dibenzofuran	132-64-9	1.45E-01	1.45E-01			1E-06		2E-06		4E-06		4E-04		1E-04		3E-04
84-A	SVOC	Di-n-butylphthalate	84-74-2	8.89E-02	8.89E-02	1E-12						5E-08		4E-06		1E-06		2E-07
84-A	SVOC	Fluoranthene	206-44-0	2.95E+00	2.95E+00			2E-07		6E-07		4E-06		4E-04		1E-04		3E-05
84-A	SVOC	Fluorene	86-73-7	1.59E-01	1.59E-01			4E-07		1E-06		3E-07		2E-05		8E-06		4E-06
84-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.93E-01	4.93E-01		6E-13		2E-12		3E-09		8E-07		2E-07		1E-08	
84-A	SVOC	2-Methylnaphthalene	91-57-6	2.00E-02	2.00E-02			4E-05		1E-04		2E-06		1E-04		9E-05		8E-04
84-A	SVOC	Naphthalene	91-20-3	5.65E-02	5.65E-02	3E-08		3E-04		9E-04		1E-05		6E-04		4E-04		4E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
84-A	SVOC	Phenanthrene	85-01-8	2.39E+00	2.39E+00			2E-06		4E-06		5E-06		4E-04		1E-04		5E-05
84-A	SVOC	Pyrene	129-00-0	3.08E+00	3.08E+00			2E-07		6E-07		6E-06		5E-04		1E-04		4E-05
84-A	INORG	Antimony	7440-36-0	1.70E+00	1.61E+00							2E-04		1E-02		2E-03		8E-03
84-A	INORG	Arsenic	7440-38-2	1.20E+01	3.88E+00						4E-08	6E-04	1E-05	5E-02	1E-06	9E-03	2E-07	2E-03
84-A	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
84-A	INORG	Beryllium	7440-41-7	3.70E+00	3.11E+00						2E-09	4E-04	2E-09	6E-03	1E-09	8E-04	4E-09	8E-03
84-A	INORG	Cadmium	7440-43-9	1.40E+01	1.34E+01						7E-09	7E-04	8E-09	6E-02	4E-09	1E-02	1E-08	3E-02
84-A	INORG	Chromium (total)	7440-47-3	3.93E+01	7.34E+00						3E-08	2E-04	3E-08	9E-03	2E-08	1E-03	4E-08	3E-03
84-A	INORG	Cobalt	7440-48-4	9.00E+00	1.95E+00						2E-09	2E-04	2E-09	4E-04	1E-09	1E-04	3E-09	4E-03
84-A	INORG	Copper	7440-50-8	2.80E+02	2.52E+02							2E-04		2E-02		3E-03		1E-02
84-A	INORG	Cyanide (total)	57-12-5	6.50E-01	6.50E-01							1E-06		1E-04		2E-05		6E-05
84-A	INORG	Lead	7439-92-1	6.00E+02	6.00E+02													
84-A	INORG	Manganese	7439-96-5	4.20E+02														
84-A	INORG	Mercury	7439-97-6	5.48E-01	4.96E-01	2E-05		2E-03		5E-03		2E-04		1E-02		7E-03		6E-02
84-A	INORG	Nickel	7440-02-0	4.80E+01	2.80E+01						2E-09		2E-09		1E-09		3E-09	
84-A	INORG	Selenium	7782-49-2	1.20E+00	6.81E-01							5E-06		5E-04		7E-05		3E-04
84-A	INORG	Silver	7440-22-4	3.10E-01	1.22E-01							3E-05		1E-04		2E-05		5E-04
84-A	INORG	Thallium	7440-28-0	3.60E-01	1.63E-01							9E-05		9E-03		1E-03		5E-03
84-A	INORG	Vanadium	7440-62-2	2.30E+01														
84-A	INORG	Zinc	7440-66-6	1.00E+03	8.90E+02							1E-04		1E-02		1E-03		6E-03
84-B	SVOC	Benzo(a)anthracene	56-55-3	8.88E-02	8.88E-02		2E-12		6E-12		5E-10		1E-07		3E-08		3E-09	
84-B	SVOC	Benzo(a)pyrene	50-32-8	8.38E-02	8.38E-02		2E-12		7E-12		5E-09		1E-06		3E-07		2E-08	
84-B	SVOC	Benzo(b)fluoranthene	205-99-2	1.02E-01	1.02E-01		2E-11		7E-11		6E-10		2E-07		4E-08		3E-09	
84-B	SVOC	Benzo(k)fluoranthene	207-08-9	8.70E-02	8.70E-02		1E-14		4E-14		5E-11		1E-08		3E-09		3E-10	
84-B	SVOC	Chrysene	218-01-9	1.12E-01	1.12E-01		6E-13		2E-12		7E-12		2E-09		4E-10		4E-11	
84-B	SVOC	Diethylphthalate	84-66-2	9.27E-02	9.27E-02	3E-09		4E-09		9E-09		7E-09		6E-07		2E-07		7E-08
84-B	SVOC	Di-n-butylphthalate	84-74-2	8.02E-02	8.02E-02	9E-13						4E-08		4E-06		9E-07		2E-07
84-B	SVOC	Fluoranthene	206-44-0	1.78E-01	1.78E-01			1E-08		4E-08		3E-07		2E-05		6E-06		2E-06
84-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.35E-02	4.35E-02		5E-14		2E-13		3E-10		7E-08		2E-08		1E-09	
84-B	SVOC	Naphthalene	91-20-3	4.21E-02	4.21E-02	2E-08		3E-04		7E-04		8E-06		4E-04		3E-04		3E-03
84-B	SVOC	Phenanthrene	85-01-8	1.61E-01	1.61E-01			1E-07		3E-07		3E-07		3E-05		9E-06		3E-06
84-B	SVOC	Pyrene	129-00-0	2.04E-01	2.04E-01			2E-08		4E-08		4E-07		4E-05		1E-05		2E-06
84-B	INORG	Arsenic	7440-38-2	1.10E+01	2.88E+00						3E-08	4E-04	7E-06	4E-02	1E-06	7E-03	1E-07	1E-03
84-B	INORG	Barium	7440-39-3	7.50E+01														
84-B	INORG	Beryllium	7440-41-7	5.60E-01														
84-B	INORG	Cadmium	7440-43-9	1.90E-01														
84-B	INORG	Chromium (total)	7440-47-3	1.90E+01														
84-B	INORG	Cobalt	7440-48-4	9.30E+00	2.25E+00						2E-09	2E-04	2E-09	5E-04	1E-09	1E-04	3E-09	4E-03
84-B	INORG	Copper	7440-50-8	1.60E+01														
84-B	INORG	Cyanide (total)	57-12-5	5.30E-02	5.30E-02							1E-07		1E-05		1E-06		5E-06
84-B	INORG	Lead	7439-92-1	1.60E+01	1.60E+01													
84-B	INORG	Manganese	7439-96-5	4.20E+02														
84-B	INORG	Mercury	7439-97-6	3.56E-02														
84-B	INORG	Nickel	7440-02-0	2.40E+01	4.04E+00						3E-10		3E-10		2E-10		5E-10	
84-B	INORG	Silver	7440-22-4	9.90E-02														
84-B	INORG	Thallium	7440-28-0	2.00E-01	3.46E-03							2E-06		2E-04		2E-05		1E-04
84-B	INORG	Vanadium	7440-62-2	2.70E+01	2.13E+00							1E-05		1E-03		1E-04		6E-04
84-B	INORG	Zinc	7440-66-6	5.20E+01														
84-C	VOC	Methylcyclohexane	108-87-2	4.00E-02	4.00E-02	1E-07		7E-05		8E-05		3E-07		2E-05		1E-05		1E-04
84-C	SVOC	Benzo(a)anthracene	56-55-3	1.13E-01	1.13E-01		2E-12		7E-12		7E-10		2E-07		4E-08		3E-09	
84-C	SVOC	Benzo(a)pyrene	50-32-8	1.24E-01	1.24E-01		3E-12		1E-11		7E-09		2E-06		4E-07		4E-08	
84-C	SVOC	Benzo(b)fluoranthene	205-99-2	1.08E-01	1.08E-01		2E-11		7E-11		6E-10		2E-07		4E-08		3E-09	
84-C	SVOC	Benzo(g,h,i)perylene	191-24-2	9.24E-02	9.24E-02			8E-13		2E-12		2E-07		2E-05		4E-06		9E-07

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
84-C	SVOC	Benzo(k)fluoranthene	207-08-9	1.23E-01	1.23E-01		2E-14		6E-14		7E-11		2E-08		4E-09		4E-10	
84-C	SVOC	Chrysene	218-01-9	1.32E-01	1.32E-01		8E-13		2E-12		8E-12		2E-09		5E-10		5E-11	
84-C	SVOC	Diethylphthalate	84-66-2	5.97E-02	5.97E-02	2E-09		2E-09		6E-09		5E-09		4E-07		1E-07		5E-08
84-C	SVOC	Di-n-butylphthalate	84-74-2	7.20E-02	7.20E-02	8E-13						4E-08		3E-06		8E-07		2E-07
84-C	SVOC	Fluoranthene	206-44-0	2.21E-01	2.21E-01			2E-08		5E-08		3E-07		3E-05		8E-06		2E-06
84-C	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	8.29E-02	8.29E-02		9E-14		3E-13		5E-10		1E-07		3E-08		2E-09	
84-C	SVOC	Phenanthrene	85-01-8	1.43E-01	1.43E-01			1E-07		3E-07		3E-07		3E-05		8E-06		3E-06
84-C	SVOC	Pyrene	129-00-0	2.10E-01	2.10E-01			2E-08		4E-08		4E-07		4E-05		1E-05		3E-06
84-C	INORG	Antimony	7440-36-0	6.20E-01	5.34E-01							5E-05		5E-03		7E-04		3E-03
84-C	INORG	Arsenic	7440-38-2	1.90E+01	1.09E+01						1E-07	2E-03	3E-05	1E-01	4E-06	2E-02	5E-07	5E-03
84-C	INORG	Barium	7440-39-3	8.30E+01														
84-C	INORG	Beryllium	7440-41-7	8.80E-01	2.90E-01						2E-10	4E-05	2E-10	5E-04	1E-10	8E-05	3E-10	8E-04
84-C	INORG	Cadmium	7440-43-9	6.30E-01	4.23E-02						2E-11	2E-06	2E-11	2E-04	1E-11	3E-05	4E-11	1E-04
84-C	INORG	Chromium (total)	7440-47-3	1.90E+01														
84-C	INORG	Cobalt	7440-48-4	8.90E+00	1.85E+00						2E-09	2E-04	2E-09	4E-04	1E-09	9E-05	3E-09	3E-03
84-C	INORG	Copper	7440-50-8	2.60E+01														
84-C	INORG	Cyanide (total)	57-12-5	7.10E-02	7.10E-02							1E-07		1E-05		2E-06		7E-06
84-C	INORG	Lead	7439-92-1	1.40E+02	1.40E+02													
84-C	INORG	Manganese	7439-96-5	3.30E+02														
84-C	INORG	Mercury	7439-97-6	6.61E-02	1.37E-02	4E-07		5E-05		1E-04		6E-06		4E-04		2E-04		2E-03
84-C	INORG	Nickel	7440-02-0	2.00E+01	4.06E-02						3E-12		3E-12		2E-12		5E-12	
84-C	INORG	Selenium	7782-49-2	1.00E+00	4.81E-01							4E-06		4E-04		5E-05		2E-04
84-C	INORG	Silver	7440-22-4	1.80E-01														
84-C	INORG	Thallium	7440-28-0	1.20E+00	1.00E+00							6E-04		5E-02		7E-03		3E-02
84-C	INORG	Vanadium	7440-62-2	2.80E+01	3.13E+00							2E-05		2E-03		2E-04		9E-04
84-C	INORG	Zinc	7440-66-6	8.40E+01														
84-D	VOC	Acetone	67-64-1	5.70E-02	5.70E-02	3E-09		1E-06		3E-06		4E-08		2E-06		2E-06		1E-05
84-D	VOC	Benzene	71-43-2	3.00E-02	3.00E-02	5E-05	3E-07	4E-03	6E-07	6E-03	4E-10	1E-05	6E-08	6E-04	4E-08	4E-04	1E-08	2E-03
84-D	VOC	Chloromethane	74-87-3	2.40E-02	2.40E-02	2E-06		1E-03		2E-03		5E-06		2E-04		2E-04		2E-03
84-D	VOC	Cumene	98-82-8	2.00E-02	2.00E-02	2E-07		7E-05		2E-04		2E-07		1E-05		1E-05		9E-05
84-D	VOC	Cyclohexane	110-82-7	7.00E-02	7.00E-02	5E-07		6E-05		7E-05		2E-07		1E-05		9E-06		8E-05
84-D	VOC	1,1-Dichloroethane	75-34-3	6.80E-03	6.80E-03	1E-07		7E-05		8E-05		2E-07		9E-06		7E-06		6E-06
84-D	VOC	cis-1,2-Dichloroethene	156-59-2	2.60E-01	2.60E-01	2E-06		3E-02		4E-02		7E-05		4E-03		3E-03		3E-03
84-D	VOC	trans-1,2-Dichloroethene	156-60-5	4.00E-02	4.00E-02	4E-07		3E-03		4E-03		8E-06		4E-04		3E-04		3E-03
84-D	VOC	Ethyl Benzene	100-41-4	3.00E-02	3.00E-02	1E-07		4E-05		1E-04		2E-07		1E-05		7E-06		6E-05
84-D	VOC	Methylcyclohexane	108-87-2	1.90E-01	1.90E-01	7E-07		3E-04		4E-04		2E-06		8E-05		6E-05		6E-04
84-D	VOC	Styrene	100-42-5	2.00E-02	2.00E-02	4E-08		5E-06		1E-05		5E-08		3E-06		2E-06		6E-06
84-D	VOC	Tetrachloroethene	127-18-4	3.00E-02	3.00E-02	1E-06	2E-07	4E-04	2E-07	4E-04	2E-10	1E-06	3E-08	6E-05	2E-08	4E-05	6E-09	3E-04
84-D	VOC	Toluene	108-88-3	1.20E-01	1.20E-01	1E-06		5E-05		1E-04		2E-07		2E-05		8E-06		7E-05
84-D	VOC	Trichloroethene	79-01-6	4.10E+00	4.10E+00	8E-05	9E-06		2E-05		9E-09		2E-06		9E-07		3E-07	
84-D	VOC	Xylenes (total)	1330-20-7	2.10E-01	2.10E-01	8E-07		3E-03		6E-03		1E-05		6E-04		4E-04		4E-03
84-D	SVOC	Acenaphthene	83-32-9	5.00E-02	5.00E-02			4E-07		1E-06		8E-08		6E-06		2E-06		2E-06
84-D	SVOC	Anthracene	120-12-7	1.00E-01	1.00E-01							2E-08		2E-06		4E-07		9E-08
84-D	SVOC	Benzo(a)anthracene	56-55-3	2.00E-01	2.00E-01		4E-12		1E-11		1E-09		3E-07		7E-08		6E-09	
84-D	SVOC	Benzo(a)pyrene	50-32-8	1.00E-01	1.00E-01		3E-12		8E-12		6E-09		2E-06		3E-07		3E-08	
84-D	SVOC	Benzo(b)fluoranthene	205-99-2	1.00E-01	1.00E-01		2E-11		7E-11		6E-10		2E-07		4E-08		3E-09	
84-D	SVOC	Benzo(g,h,i)perylene	191-24-2	3.00E-01	3.00E-01			2E-12		6E-12		6E-07		5E-05		1E-05		3E-06
84-D	SVOC	Benzo(k)fluoranthene	207-08-9	2.00E-01	2.00E-01		3E-14		1E-13		1E-10		3E-08		7E-09		6E-10	
84-D	SVOC	Carbazole	86-74-8	7.00E-02	7.00E-02		8E-14		2E-13		1E-11		3E-09		6E-10		6E-11	
84-D	SVOC	Chrysene	218-01-9	2.00E-01	2.00E-01		1E-12		4E-12		1E-11		3E-09		7E-10		7E-11	
84-D	SVOC	Dibenz(a,h)anthracene	53-70-3	2.00E-01	2.00E-01		3E-14		8E-14		1E-08		3E-06		7E-07		6E-08	
84-D	SVOC	Dibenzofuran	132-64-9	6.00E-02	6.00E-02			4E-07		1E-06		2E-06		2E-04		4E-05		1E-04
84-D	SVOC	Diethylphthalate	84-66-2	2.00E-02	2.00E-02	6E-10		8E-10		2E-09		2E-09		1E-07		4E-08		2E-08

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
84-D	SVOC	Di-n-butylphthalate	84-74-2	3.00E-02	3.00E-02	3E-13						2E-08		1E-06		3E-07		8E-08
84-D	SVOC	Fluoranthene	206-44-0	4.60E-01	4.60E-01			4E-08		1E-07		7E-07		6E-05		2E-05		4E-06
84-D	SVOC	Fluorene	86-73-7	7.00E-02	7.00E-02			2E-07		5E-07		1E-07		1E-05		4E-06		2E-06
84-D	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.00E-01	3.00E-01		3E-13		1E-12		2E-09		5E-07		1E-07		9E-09	
84-D	SVOC	2-Methylnaphthalene	91-57-6	4.00E-02	4.00E-02			9E-05		2E-04		4E-06		3E-04		2E-04		2E-03
84-D	SVOC	Naphthalene	91-20-3	5.00E-02	5.00E-02	3E-08		3E-04		8E-04		9E-06		5E-04		4E-04		4E-03
84-D	SVOC	Phenanthrene	85-01-8	5.40E-01	5.40E-01			4E-07		1E-06		1E-06		1E-04		3E-05		1E-05
84-D	SVOC	Pyrene	129-00-0	3.60E-01	3.60E-01			3E-08		7E-08		7E-07		6E-05		2E-05		4E-06
84-D	INORG	Antimony	7440-36-0	4.70E-01	3.84E-01							4E-05		4E-03		5E-04		2E-03
84-D	INORG	Arsenic	7440-38-2	1.10E+01	2.88E+00						3E-08	4E-04	7E-06	4E-02	1E-06	7E-03	1E-07	1E-03
84-D	INORG	Barium	7440-39-3	9.80E+01	2.31E+00													
84-D	INORG	Beryllium	7440-41-7	7.80E-01	1.90E-01						1E-10	2E-05	1E-10	4E-04	8E-11	5E-05	2E-10	5E-04
84-D	INORG	Cadmium	7440-43-9	5.40E-01														
84-D	INORG	Chromium (total)	7440-47-3	5.00E+01	1.80E+01						6E-08	6E-04	7E-08	2E-02	4E-08	3E-03	1E-07	8E-03
84-D	INORG	Cobalt	7440-48-4	1.10E+01	3.95E+00						3E-09	4E-04	3E-09	9E-04	2E-09	2E-04	5E-09	7E-03
84-D	INORG	Copper	7440-50-8	7.70E+01	4.85E+01							5E-05		4E-03		6E-04		2E-03
84-D	INORG	Cyanide (total)	57-12-5	5.60E-02	5.60E-02							1E-07		1E-05		1E-06		6E-06
84-D	INORG	Lead	7439-92-1	1.70E+02	1.70E+02													
84-D	INORG	Manganese	7439-96-5	7.80E+02	3.03E+02							1E-02		1E-02		4E-03		2E-01
84-D	INORG	Mercury	7439-97-6	1.34E-01	8.16E-02	3E-06		3E-04		8E-04		4E-05		2E-03		1E-03		1E-02
84-D	INORG	Nickel	7440-02-0	3.70E+01	1.70E+01						1E-09		1E-09		8E-10		2E-09	
84-D	INORG	Selenium	7782-49-2	9.20E-01	4.01E-01							3E-06		3E-04		4E-05		2E-04
84-D	INORG	Silver	7440-22-4	2.20E-01	3.23E-02							7E-06		3E-05		5E-06		1E-04
84-D	INORG	Thallium	7440-28-0	2.50E-01	5.35E-02							3E-05		3E-03		4E-04		2E-03
84-D	INORG	Vanadium	7440-62-2	3.80E+01	1.31E+01							7E-05		7E-03		9E-04		4E-03
84-D	INORG	Zinc	7440-66-6	9.60E+01														
85-1	VOC	Benzene	71-43-2	4.20E-02	4.20E-02	8E-05	5E-07	6E-03	8E-07	8E-03	5E-10	2E-05	8E-08	8E-04	5E-08	6E-04	2E-08	3E-03
85-1	VOC	2-Butanone	78-93-3	4.50E-02	4.50E-02	1E-08		9E-07		2E-06		2E-08		1E-06		8E-07		7E-06
85-1	VOC	Cumene	98-82-8	6.40E-01	6.40E-01	5E-06		2E-03		5E-03		8E-06		4E-04		3E-04		3E-03
85-1	VOC	Cyclohexane	110-82-7	9.90E+00	9.90E+00	7E-05		8E-03		1E-02		3E-05		2E-03		1E-03		1E-02
85-1	VOC	Ethyl Benzene	100-41-4	5.50E+00	5.50E+00	3E-05		8E-03		2E-02		3E-05		2E-03		1E-03		1E-02
85-1	VOC	Methyl Acetate	79-20-9	8.80E-02	8.80E-02	3E-08		4E-06		1E-05		7E-08		4E-06		3E-06		3E-06
85-1	VOC	Methylcyclohexane	108-87-2	7.00E+00	7.00E+00	3E-05		1E-02		1E-02		6E-05		3E-03		2E-03		2E-02
85-1	VOC	Methylene Chloride	75-09-2	9.00E-02	9.00E-02	4E-06	4E-08	9E-05	1E-07	2E-04	7E-11	4E-07	1E-08	2E-05	7E-09	1E-05	3E-09	1E-04
85-1	VOC	Tetrachloroethene	127-18-4	2.20E+00	2.20E+00	1E-04	1E-05	3E-02	2E-05	3E-02	1E-08	7E-05	2E-06	4E-03	1E-06	3E-03	4E-07	2E-02
85-1	VOC	1,1,1-Trichloroethane	71-55-6	2.90E-01	2.90E-01	1E-06		7E-04		8E-04		2E-06		9E-05		7E-05		7E-05
85-1	VOC	Trichloroethene	79-01-6	2.80E+00	2.80E+00	5E-05	6E-06		1E-05		6E-09		1E-06		6E-07		2E-07	
85-1	VOC	Xylenes (total)	1330-20-7	1.30E+01	1.30E+01	5E-05		2E-01		4E-01		7E-04		4E-02		3E-02		3E-01
85-1	SVOC	Anthracene	120-12-7	4.13E-02	4.13E-02							8E-09		7E-07		2E-07		4E-08
85-1	SVOC	Benzo(a)anthracene	56-55-3	1.49E-01	1.49E-01		3E-12		9E-12		9E-10		2E-07		5E-08		5E-09	
85-1	SVOC	Benzo(a)pyrene	50-32-8	1.50E-01	1.50E-01		4E-12		1E-11		9E-09		2E-06		5E-07		4E-08	
85-1	SVOC	Benzo(b)fluoranthene	205-99-2	2.85E-01	2.85E-01		6E-11		2E-10		2E-09		5E-07		1E-07		9E-09	
85-1	SVOC	Benzo(g,h,i)perylene	191-24-2	5.94E-02	5.94E-02			5E-13		1E-12		1E-07		1E-05		3E-06		6E-07
85-1	SVOC	Benzo(k)fluoranthene	207-08-9	1.63E-01	1.63E-01		3E-14		8E-14		1E-10		3E-08		6E-09		5E-10	
85-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.82E-01	1.82E-01	3E-14	1E-16	1E-12	4E-16	4E-12	2E-11	5E-07	5E-09	4E-05	1E-09	1E-05	1E-10	2E-05
85-1	SVOC	Butylbenzylphthalate	85-68-7	5.62E-02	5.62E-02		2E-14	1E-10	6E-14	3E-10	8E-13	2E-08	2E-10	1E-06	4E-11	3E-07	4E-12	8E-08
85-1	SVOC	Caprolactam	105-60-2	6.82E-02	6.82E-02	8E-10		1E-09		4E-09		1E-08		8E-07		3E-07		1E-06
85-1	SVOC	Chrysene	218-01-9	1.70E-01	1.70E-01		1E-12		3E-12		1E-11		3E-09		6E-10		6E-11	
85-1	SVOC	Dibenzofuran	132-64-9	4.92E-02	4.92E-02			3E-07		8E-07		1E-06		1E-04		3E-05		1E-04
85-1	SVOC	Diethylphthalate	84-66-2	1.68E-01	1.68E-01	5E-09		6E-09		2E-08		1E-08		1E-06		3E-07		1E-07
85-1	SVOC	Di-n-butylphthalate	84-74-2	1.03E-01	1.03E-01	1E-12						5E-08		5E-06		1E-06		3E-07
85-1	SVOC	Fluoranthene	206-44-0	1.96E-01	1.96E-01			2E-08		4E-08		3E-07		3E-05		7E-06		2E-06
85-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.63E-02	4.63E-02		5E-14		2E-13		3E-10		7E-08		2E-08		1E-09	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
85-1	SVOC	2-Methylnaphthalene	91-57-6	8.23E-01	8.23E-01			2E-03		4E-03		9E-05		5E-03		4E-03		3E-02
85-1	SVOC	Naphthalene	91-20-3	5.74E-01	5.74E-01	3E-07		4E-03		9E-03		1E-04		6E-03		4E-03		4E-02
85-1	SVOC	Phenanthrene	85-01-8	2.86E-01	2.86E-01			2E-07		5E-07		6E-07		5E-05		2E-05		6E-06
85-1	SVOC	Pyrene	129-00-0	4.24E-01	4.24E-01			3E-08		8E-08		8E-07		7E-05		2E-05		5E-06
85-1	PCB	PCBs (total)	1336-36-3	8.55E-02	8.55E-02	2E-08	1E-09		3E-09		2E-09	2E-04	4E-07	2E-02	1E-07	6E-03	1E-08	5E-03
85-1	INORG	Antimony	7440-36-0	1.40E-01	5.36E-02							5E-06		5E-04		7E-05		3E-04
85-1	INORG	Arsenic	7440-38-2	8.70E+00	5.77E-01						6E-09	8E-05	1E-06	8E-03	2E-07	1E-03	3E-08	2E-04
85-1	INORG	Barium	7440-39-3	8.00E+01														
85-1	INORG	Beryllium	7440-41-7	1.00E+00	4.10E-01						3E-10	5E-05	3E-10	8E-04	2E-10	1E-04	5E-10	1E-03
85-1	INORG	Cadmium	7440-43-9	2.50E-01														
85-1	INORG	Chromium (total)	7440-47-3	2.00E+01														
85-1	INORG	Cobalt	7440-48-4	1.00E+01	2.95E+00						2E-09	3E-04	3E-09	6E-04	2E-09	1E-04	4E-09	5E-03
85-1	INORG	Copper	7440-50-8	4.50E+01	1.65E+01							2E-05		2E-03		2E-04		8E-04
85-1	INORG	Cyanide (total)	57-12-5	1.60E-01	1.60E-01							3E-07		3E-05		4E-06		2E-05
85-1	INORG	Lead	7439-92-1	8.50E+01	8.50E+01													
85-1	INORG	Manganese	7439-96-5	4.90E+02	1.25E+01							5E-04		5E-04		2E-04		9E-03
85-1	INORG	Mercury	7439-97-6	2.45E-01	1.93E-01	6E-06		7E-04		2E-03		9E-05		6E-03		3E-03		3E-02
85-1	INORG	Nickel	7440-02-0	2.60E+01	6.04E+00						4E-10		5E-10		3E-10		7E-10	
85-1	INORG	Selenium	7782-49-2	2.90E-01														
85-1	INORG	Silver	7440-22-4	1.90E-01	2.28E-03							5E-07		2E-06		3E-07		9E-06
85-1	INORG	Thallium	7440-28-0	3.60E-01	1.63E-01							9E-05		9E-03		1E-03		5E-03
85-1	INORG	Vanadium	7440-62-2	3.10E+01	6.13E+00							3E-05		3E-03		4E-04		2E-03
85-1	INORG	Zinc	7440-66-6	5.60E+01														
86-1	VOC	Benzene	71-43-2	1.00E-01	1.00E-01	2E-04	1E-06	1E-02	2E-06	2E-02	1E-09	4E-05	2E-07	2E-03	1E-07	1E-03	5E-08	7E-03
86-1	VOC	Chloroethane	75-00-3	1.80E-01	1.80E-01	5E-07		9E-05		1E-04		5E-07		3E-05		2E-05		2E-04
86-1	VOC	Chloromethane	74-87-3	9.90E-02	9.90E-02	7E-06		6E-03		6E-03		2E-05		1E-03		8E-04		7E-03
86-1	VOC	Cumene	98-82-8	1.40E-01	1.40E-01	1E-06		5E-04		1E-03		2E-06		1E-04		7E-05		7E-04
86-1	VOC	Cyclohexane	110-82-7	4.80E-02	4.80E-02	3E-07		4E-05		5E-05		1E-07		8E-06		6E-06		6E-05
86-1	VOC	1,1-Dichloroethane	75-34-3	9.80E-02	9.80E-02	2E-06		1E-03		1E-03		2E-06		1E-04		9E-05		9E-05
86-1	VOC	cis-1,2-Dichloroethene	156-59-2	9.70E-02	9.70E-02	7E-07		1E-02		2E-02		3E-05		1E-03		1E-03		1E-03
86-1	VOC	Ethyl Benzene	100-41-4	1.80E-01	1.80E-01	9E-07		3E-04		7E-04		1E-06		6E-05		4E-05		4E-04
86-1	VOC	Methyl Acetate	79-20-9	6.30E-01	6.30E-01	2E-07		3E-05		7E-05		5E-07		3E-05		2E-05		2E-05
86-1	VOC	4-Methyl-2-pentanone	108-10-1	2.40E-01	2.40E-01	2E-07		2E-05		4E-05		2E-07		1E-05		8E-06		8E-05
86-1	VOC	Methylcyclohexane	108-87-2	1.50E+00	1.50E+00	6E-06		3E-03		3E-03		1E-05		6E-04		5E-04		5E-03
86-1	VOC	Methylene Chloride	75-09-2	1.10E+00	1.10E+00	5E-05	5E-07	1E-03	1E-06	2E-03	8E-10	5E-06	1E-07	3E-04	8E-08	2E-04	3E-08	2E-03
86-1	VOC	Tetrachloroethene	127-18-4	1.80E-01	1.80E-01	8E-06	1E-06	2E-03	1E-06	3E-03	9E-10	6E-06	2E-07	3E-04	9E-08	2E-04	3E-08	2E-03
86-1	VOC	Toluene	108-88-3	6.70E-01	6.70E-01	6E-06		3E-04		8E-04		1E-06		8E-05		5E-05		4E-04
86-1	VOC	1,1,1-Trichloroethane	71-55-6	1.50E+00	1.50E+00	6E-06		3E-03		4E-03		9E-06		5E-04		4E-04		4E-04
86-1	VOC	Trichloroethene	79-01-6	5.50E+00	5.50E+00	1E-04	1E-05		2E-05		1E-08		2E-06		1E-06		5E-07	
86-1	VOC	Trichlorofluoromethane	75-69-4	1.10E-02	1.10E-02	1E-08		8E-05		9E-05		4E-07		2E-05		2E-05		1E-05
86-1	VOC	Xylenes (total)	1330-20-7	1.48E+00	1.48E+00	6E-06		2E-02		5E-02		8E-05		4E-03		3E-03		3E-02
86-1	SVOC	Acenaphthene	83-32-9	3.96E-02	3.96E-02			3E-07		8E-07		6E-08		5E-06		2E-06		1E-06
86-1	SVOC	Acenaphthylene	208-96-8	6.14E-01	6.14E-01			7E-06		2E-05		2E-06		1E-04		6E-05		3E-05
86-1	SVOC	Anthracene	120-12-7	2.89E-01	2.89E-01							5E-08		5E-06		1E-06		3E-07
86-1	SVOC	Benzo(a)anthracene	56-55-3	2.45E+00	2.45E+00		5E-11		2E-10		1E-08		4E-06		9E-07		8E-08	
86-1	SVOC	Benzo(a)pyrene	50-32-8	3.85E+00	3.85E+00		1E-10		3E-10		2E-07		6E-05		1E-05		1E-06	
86-1	SVOC	Benzo(b)fluoranthene	205-99-2	4.34E+00	4.34E+00		9E-10		3E-09		3E-08		7E-06		2E-06		1E-07	
86-1	SVOC	Benzo(g,h,i)perylene	191-24-2	4.51E+00	4.51E+00			4E-11		9E-11		9E-06		8E-04		2E-04		4E-05
86-1	SVOC	Benzo(k)fluoranthene	207-08-9	3.50E+00	3.50E+00		6E-13		2E-12		2E-09		6E-07		1E-07		1E-08	
86-1	SVOC	Biphenyl	92-52-4	1.90E-01	1.90E-01	6E-07		2E-06		6E-06		4E-07		3E-05		1E-05		8E-05
86-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	4.74E-01	4.74E-01	7E-14	4E-16	4E-12	1E-15	9E-12	5E-11	1E-06	1E-08	1E-04	3E-09	3E-05	2E-10	6E-05
86-1	SVOC	Butylbenzylphthalate	85-68-7	3.78E-01	3.78E-01		1E-13	9E-10	4E-13	2E-09	5E-12	1E-07	1E-09	9E-06	3E-10	2E-06	3E-11	6E-07
86-1	SVOC	Carbazole	86-74-8	1.38E-01	1.38E-01		2E-13		5E-13		2E-11		6E-09		1E-09		1E-10	

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
86-1	SVOC	Chrysene	218-01-9	2.95E+00	2.95E+00		2E-11		5E-11		2E-10		5E-08		1E-08		1E-09	
86-1	SVOC	Dibenz(a,h)anthracene	53-70-3	1.33E+00	1.33E+00		2E-13		5E-13		8E-08		2E-05		5E-06		4E-07	
86-1	SVOC	Dibenzofuran	132-64-9	2.31E-01	2.31E-01			2E-06		4E-06		7E-06		6E-04		2E-04		5E-04
86-1	SVOC	Diethylphthalate	84-66-2	1.77E-01	1.77E-01	6E-09		7E-09		2E-08		1E-08		1E-06		3E-07		1E-07
86-1	SVOC	Fluoranthene	206-44-0	2.21E+00	2.21E+00			2E-07		5E-07		3E-06		3E-04		8E-05		2E-05
86-1	SVOC	Fluorene	86-73-7	5.68E-02	5.68E-02			1E-07		4E-07		1E-07		9E-06		3E-06		1E-06
86-1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.02E+00	4.02E+00		5E-12		1E-11		2E-08		6E-06		1E-06		1E-07	
86-1	SVOC	2-Methylnaphthalene	91-57-6	7.35E+00	7.35E+00			2E-02		4E-02		8E-04		5E-02		3E-02		3E-01
86-1	SVOC	Naphthalene	91-20-3	1.85E+00	1.85E+00	1E-06		1E-02		3E-02		3E-04		2E-02		1E-02		1E-01
86-1	SVOC	Phenanthrene	85-01-8	1.03E+00	1.03E+00			7E-07		2E-06		2E-06		2E-04		6E-05		2E-05
86-1	SVOC	Pyrene	129-00-0	5.00E+00	5.00E+00			4E-07		1E-06		1E-05		9E-04		2E-04		6E-05
86-1	PCB	PCBs (total)	1336-36-3	3.79E+00	3.79E+00	7E-07	5E-08		1E-07		7E-08	1E-02	2E-05	1E+00	4E-06	3E-01	5E-07	2E-01
86-1	INORG	Antimony	7440-36-0	1.10E+00	1.01E+00							1E-04		9E-03		1E-03		5E-03
86-1	INORG	Arsenic	7440-38-2	1.90E+02	1.82E+02						2E-06	3E-02	5E-04	2E+00	7E-05	4E-01	9E-06	8E-02
86-1	INORG	Barium	7440-39-3	2.00E+02	1.04E+02													
86-1	INORG	Beryllium	7440-41-7	1.60E+00	1.01E+00						7E-10	1E-04	8E-10	2E-03	4E-10	3E-04	1E-09	3E-03
86-1	INORG	Cadmium	7440-43-9	4.40E+00	3.81E+00						2E-09	2E-04	2E-09	2E-02	1E-09	3E-03	3E-09	9E-03
86-1	INORG	Chromium (total)	7440-47-3	3.80E+01	6.04E+00						2E-08	2E-04	2E-08	7E-03	1E-08	1E-03	4E-08	3E-03
86-1	INORG	Cobalt	7440-48-4	7.40E+01	6.69E+01						6E-08	7E-03	6E-08	1E-02	3E-08	3E-03	9E-08	1E-01
86-1	INORG	Copper	7440-50-8	4.60E+02	4.32E+02							4E-04		4E-02		5E-03		2E-02
86-1	INORG	Cyanide (total)	57-12-5	3.60E-01	3.60E-01							7E-07		7E-05		9E-06		4E-05
86-1	INORG	Lead	7439-92-1	6.30E+02	6.30E+02													
86-1	INORG	Manganese	7439-96-5	3.20E+03	2.72E+03							1E-01		1E-01		4E-02		2E+00
86-1	INORG	Mercury	7439-97-6	3.83E-01	3.31E-01	1E-05		1E-03		3E-03		2E-04		1E-02		5E-03		4E-02
86-1	INORG	Nickel	7440-02-0	1.50E+02	1.30E+02						9E-09		1E-08		6E-09		2E-08	
86-1	INORG	Selenium	7782-49-2	4.80E+00	4.28E+00							3E-05		3E-03		4E-04		2E-03
86-1	INORG	Silver	7440-22-4	6.20E-01	4.32E-01							9E-05		3E-04		6E-05		2E-03
86-1	INORG	Thallium	7440-28-0	5.70E-01	3.73E-01							2E-04		2E-02		3E-03		1E-02
86-1	INORG	Vanadium	7440-62-2	4.80E+01	2.31E+01							1E-04		1E-02		2E-03		6E-03
86-1	INORG	Zinc	7440-66-6	5.40E+02	4.30E+02							6E-05		5E-03		7E-04		3E-03
94-A	VOC	Methyl Acetate	79-20-9	4.50E-02	4.50E-02	2E-08		2E-06		5E-06		4E-08		2E-06		1E-06		1E-06
94-A	VOC	Methylcyclohexane	108-87-2	3.30E-02	3.30E-02	1E-07		6E-05		6E-05		3E-07		1E-05		1E-05		1E-04
94-A	VOC	Xylenes (total)	1330-20-7	1.04E-01	1.04E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
94-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.02E-01	1.02E-01	2E-14	8E-17	8E-13	2E-16	2E-12	1E-11	3E-07	3E-09	2E-05	6E-10	6E-06	5E-11	1E-05
94-A	INORG	Antimony	7440-36-0	5.20E-02														
94-A	INORG	Arsenic	7440-38-2	1.60E+01	7.88E+00						8E-08	1E-03	2E-05	1E-01	3E-06	2E-02	4E-07	3E-03
94-A	INORG	Barium	7440-39-3	6.90E+01														
94-A	INORG	Beryllium	7440-41-7	6.00E-01	1.00E-02						7E-12	1E-06	7E-12	2E-05	4E-12	3E-06	1E-11	3E-05
94-A	INORG	Cadmium	7440-43-9	6.50E-01	6.23E-02						3E-11	3E-06	3E-11	3E-04	2E-11	5E-05	5E-11	1E-04
94-A	INORG	Chromium (total)	7440-47-3	2.00E+01														
94-A	INORG	Cobalt	7440-48-4	7.90E+00	8.46E-01						7E-10	9E-05	7E-10	2E-04	4E-10	4E-05	1E-09	2E-03
94-A	INORG	Copper	7440-50-8	2.60E+01														
94-A	INORG	Lead	7439-92-1	1.60E+01	1.60E+01													
94-A	INORG	Manganese	7439-96-5	1.30E+03	8.23E+02							3E-02		3E-02		1E-02		6E-01
94-A	INORG	Mercury	7439-97-6	3.26E-02														
94-A	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
94-A	INORG	Selenium	7782-49-2	1.10E+00	5.81E-01							5E-06		4E-04		6E-05		2E-04
94-A	INORG	Silver	7440-22-4	1.70E-01														
94-A	INORG	Thallium	7440-28-0	1.80E-01														
94-A	INORG	Vanadium	7440-62-2	5.20E+01	2.71E+01							2E-04		1E-02		2E-03		8E-03
94-A	INORG	Zinc	7440-66-6	7.50E+01														
94-B	VOC	Methylcyclohexane	108-87-2	9.00E-03	9.00E-03	3E-08		2E-05		2E-05		7E-08		4E-06		3E-06		3E-05
94-B	VOC	Toluene	108-88-3	9.80E-02	9.80E-02	8E-07		4E-05		1E-04		2E-07		1E-05		7E-06		6E-05

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
94-B	SVOC	Anthracene	120-12-7	5.26E-02	5.26E-02							1E-08		9E-07		2E-07		5E-08
94-B	SVOC	Benzo(a)anthracene	56-55-3	2.09E-01	2.09E-01		4E-12		1E-11		1E-09		3E-07		7E-08		6E-09	
94-B	SVOC	Benzo(a)pyrene	50-32-8	2.27E-01	2.27E-01		6E-12		2E-11		1E-08		4E-06		8E-07		7E-08	
94-B	SVOC	Benzo(b)fluoranthene	205-99-2	2.31E-01	2.31E-01		5E-11		2E-10		1E-09		4E-07		8E-08		7E-09	
94-B	SVOC	Benzo(g,h,i)perylene	191-24-2	1.07E-01	1.07E-01			9E-13		2E-12		2E-07		2E-05		5E-06		1E-06
94-B	SVOC	Benzo(k)fluoranthene	207-08-9	2.53E-01	2.53E-01		4E-14		1E-13		1E-10		4E-08		9E-09		7E-10	
94-B	SVOC	Butylbenzylphthalate	85-68-7	5.41E-02	5.41E-02		2E-14	1E-10	5E-14	3E-10	8E-13	1E-08	2E-10	1E-06	4E-11	3E-07	4E-12	8E-08
94-B	SVOC	Chrysene	218-01-9	2.36E-01	2.36E-01		1E-12		4E-12		1E-11		4E-09		9E-10		8E-11	
94-B	SVOC	Diethylphthalate	84-66-2	6.02E-02	6.02E-02	2E-09		2E-09		6E-09		5E-09		4E-07		1E-07		5E-08
94-B	SVOC	Fluoranthene	206-44-0	4.71E-01	4.71E-01			4E-08		1E-07		7E-07		6E-05		2E-05		5E-06
94-B	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.12E-01	1.12E-01		1E-13		4E-13		7E-10		2E-07		4E-08		3E-09	
94-B	SVOC	2-Methylnaphthalene	91-57-6	1.00E-02	1.00E-02			2E-05		5E-05		1E-06		6E-05		4E-05		4E-04
94-B	SVOC	Phenanthrene	85-01-8	2.64E-01	2.64E-01			2E-07		5E-07		6E-07		5E-05		1E-05		5E-06
94-B	SVOC	Pyrene	129-00-0	4.89E-01	4.89E-01			4E-08		1E-07		1E-06		9E-05		2E-05		6E-06
94-B	INORG	Antimony	7440-36-0	1.40E-01	5.36E-02							5E-06		5E-04		7E-05		3E-04
94-B	INORG	Arsenic	7440-38-2	8.20E+00	7.69E-02						8E-10	1E-05	2E-07	1E-03	3E-08	2E-04	4E-09	3E-05
94-B	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
94-B	INORG	Beryllium	7440-41-7	5.40E-01														
94-B	INORG	Cadmium	7440-43-9	7.00E-01	1.12E-01						6E-11	6E-06	6E-11	5E-04	4E-11	8E-05	1E-10	3E-04
94-B	INORG	Chromium (total)	7440-47-3	2.00E+01														
94-B	INORG	Cobalt	7440-48-4	8.00E+00	9.46E-01						8E-10	1E-04	8E-10	2E-04	5E-10	5E-05	1E-09	2E-03
94-B	INORG	Copper	7440-50-8	2.90E+01	5.38E-01							5E-07		5E-05		7E-06		3E-05
94-B	INORG	Cyanide (total)	57-12-5	9.90E-02	9.90E-02							2E-07		2E-05		2E-06		1E-05
94-B	INORG	Lead	7439-92-1	1.10E+02	1.10E+02													
94-B	INORG	Manganese	7439-96-5	4.60E+02														
94-B	INORG	Mercury	7439-97-6	1.12E-01	5.96E-02	2E-06		2E-04		6E-04		3E-05		2E-03		9E-04		8E-03
94-B	INORG	Nickel	7440-02-0	2.30E+01	3.04E+00						2E-10		2E-10		1E-10		4E-10	
94-B	INORG	Selenium	7782-49-2	6.20E-01	1.01E-01							8E-07		7E-05		1E-05		4E-05
94-B	INORG	Silver	7440-22-4	2.00E-01	1.23E-02							3E-06		1E-05		2E-06		5E-05
94-B	INORG	Thallium	7440-28-0	1.60E-01														
94-B	INORG	Vanadium	7440-62-2	2.60E+01	1.13E+00							6E-06		6E-04		8E-05		3E-04
94-B	INORG	Zinc	7440-66-6	1.60E+02	4.95E+01							7E-06		6E-04		8E-05		3E-04
94-C	VOC	Cyclohexane	110-82-7	2.10E-02	2.10E-02	1E-07		2E-05		2E-05		6E-08		3E-06		3E-06		2E-05
94-C	VOC	Ethyl Benzene	100-41-4	2.10E-02	2.10E-02	1E-07		3E-05		8E-05		1E-07		7E-06		5E-06		5E-05
94-C	VOC	Methylcyclohexane	108-87-2	7.80E-02	7.80E-02	3E-07		1E-04		2E-04		6E-07		3E-05		3E-05		2E-04
94-C	VOC	Methylene Chloride	75-09-2	5.20E-02	5.20E-02	3E-06	3E-08	5E-05	6E-08	1E-04	4E-11	2E-07	7E-09	1E-05	4E-09	8E-06	1E-09	7E-05
94-C	VOC	Xylenes (total)	1330-20-7	1.05E-01	1.05E-01	4E-07		1E-03		3E-03		5E-06		3E-04		2E-04		2E-03
94-C	SVOC	Acenaphthene	83-32-9	2.42E-02	2.42E-02			2E-07		5E-07		4E-08		3E-06		1E-06		7E-07
94-C	SVOC	Anthracene	120-12-7	7.51E-02	7.51E-02							1E-08		1E-06		3E-07		7E-08
94-C	SVOC	Benzaldehyde	100-52-7	9.68E-02	9.68E-02			7E-06		2E-05		3E-07		2E-05		1E-05		9E-05
94-C	SVOC	Benzo(a)anthracene	56-55-3	2.52E-01	2.52E-01		5E-12		2E-11		1E-09		4E-07		9E-08		8E-09	
94-C	SVOC	Benzo(a)pyrene	50-32-8	1.83E-01	1.83E-01		5E-12		2E-11		1E-08		3E-06		6E-07		5E-08	
94-C	SVOC	Benzo(b)fluoranthene	205-99-2	2.61E-01	2.61E-01		6E-11		2E-10		2E-09		4E-07		9E-08		8E-09	
94-C	SVOC	Benzo(g,h,i)perylene	191-24-2	5.25E-02	5.25E-02			4E-13		1E-12		1E-07		9E-06		2E-06		5E-07
94-C	SVOC	Benzo(k)fluoranthene	207-08-9	1.90E-01	1.90E-01		3E-14		1E-13		1E-10		3E-08		7E-09		6E-10	
94-C	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	8.61E-02	8.61E-02	1E-14	7E-17	7E-13	2E-16	2E-12	9E-12	2E-07	2E-09	2E-05	5E-10	5E-06	5E-11	1E-05
94-C	SVOC	Chrysene	218-01-9	2.68E-01	2.68E-01		2E-12		5E-12		2E-11		4E-09		1E-09		9E-11	
94-C	SVOC	Dibenzofuran	132-64-9	1.20E-01	1.20E-01			8E-07		2E-06		3E-06		3E-04		8E-05		3E-04
94-C	SVOC	Di-n-butylphthalate	84-74-2	1.52E-01	1.52E-01	2E-12						8E-08		7E-06		2E-06		4E-07
94-C	SVOC	Fluoranthene	206-44-0	4.23E-01	4.23E-01			4E-08		9E-08		6E-07		6E-05		2E-05		4E-06
94-C	SVOC	Fluorene	86-73-7	6.48E-02	6.48E-02			2E-07		4E-07		1E-07		1E-05		3E-06		2E-06
94-C	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.48E-02	3.48E-02		4E-14		1E-13		2E-10		6E-08		1E-08		1E-09	
94-C	SVOC	2-Methylnaphthalene	91-57-6	3.82E-01	3.82E-01			8E-04		2E-03		4E-05		2E-03		2E-03		1E-02

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
94-C	SVOC	Naphthalene	91-20-3	1.90E-01	1.90E-01	1E-07		1E-03		3E-03		3E-05		2E-03		1E-03		1E-02
94-C	SVOC	Phenanthrene	85-01-8	4.57E-01	4.57E-01			3E-07		8E-07		1E-06		8E-05		3E-05		9E-06
94-C	SVOC	Pyrene	129-00-0	5.70E-01	5.70E-01			4E-08		1E-07		1E-06		1E-04		3E-05		7E-06
94-C	INORG	Antimony	7440-36-0	1.60E-01	7.36E-02							7E-06		7E-04		9E-05		4E-04
94-C	INORG	Arsenic	7440-38-2	8.20E+00	7.69E-02						8E-10	1E-05	2E-07	1E-03	3E-08	2E-04	4E-09	3E-05
94-C	INORG	Barium	7440-39-3	7.10E+01														
94-C	INORG	Beryllium	7440-41-7	9.10E-01	3.20E-01						2E-10	4E-05	2E-10	6E-04	1E-10	9E-05	4E-10	9E-04
94-C	INORG	Cadmium	7440-43-9	9.60E-01	3.72E-01						2E-10	2E-05	2E-10	2E-03	1E-10	3E-04	3E-10	8E-04
94-C	INORG	Chromium (total)	7440-47-3	4.40E+01	1.20E+01						4E-08	4E-04	5E-08	1E-02	3E-08	2E-03	7E-08	5E-03
94-C	INORG	Cobalt	7440-48-4	7.60E+00	5.46E-01						4E-10	6E-05	5E-10	1E-04	3E-10	3E-05	7E-10	1E-03
94-C	INORG	Copper	7440-50-8	9.20E+01	6.35E+01							6E-05		6E-03		8E-04		3E-03
94-C	INORG	Cyanide (total)	57-12-5	4.00E-02	4.00E-02							8E-08		7E-06		1E-06		4E-06
94-C	INORG	Lead	7439-92-1	1.50E+02	1.50E+02													
94-C	INORG	Manganese	7439-96-5	7.20E+02	2.43E+02							1E-02		1E-02		3E-03		2E-01
94-C	INORG	Mercury	7439-97-6	1.03E-01	5.06E-02	2E-06		2E-04		5E-04		2E-05		1E-03		8E-04		7E-03
94-C	INORG	Nickel	7440-02-0	3.80E+01	1.80E+01						1E-09		1E-09		8E-10		2E-09	
94-C	INORG	Selenium	7782-49-2	8.60E-01	3.41E-01							3E-06		2E-04		3E-05		1E-04
94-C	INORG	Silver	7440-22-4	1.80E-01														
94-C	INORG	Thallium	7440-28-0	7.30E-01	5.33E-01							3E-04		3E-02		4E-03		1E-02
94-C	INORG	Vanadium	7440-62-2	2.20E+01														
94-C	INORG	Zinc	7440-66-6	9.40E+01														
94-D	VOC	Trichloroethene	79-01-6	1.30E-01	1.30E-01	2E-06	3E-07		6E-07		3E-10		5E-08		3E-08		1E-08	
94-D	SVOC	Anthracene	120-12-7	5.10E-02	5.10E-02							1E-08		9E-07		2E-07		5E-08
94-D	SVOC	Benzo(a)anthracene	56-55-3	1.20E-01	1.20E-01		2E-12		8E-12		7E-10		2E-07		4E-08		4E-09	
94-D	SVOC	Benzo(a)pyrene	50-32-8	8.87E-02	8.87E-02		2E-12		7E-12		5E-09		1E-06		3E-07		3E-08	
94-D	SVOC	Benzo(b)fluoranthene	205-99-2	1.12E-01	1.12E-01		2E-11		7E-11		7E-10		2E-07		4E-08		4E-09	
94-D	SVOC	Benzo(k)fluoranthene	207-08-9	9.70E-02	9.70E-02		2E-14		5E-14		6E-11		2E-08		3E-09		3E-10	
94-D	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.28E-01	1.28E-01	2E-14	1E-16	1E-12	3E-16	2E-12	1E-11	3E-07	4E-09	3E-05	7E-10	7E-06	7E-11	2E-05
94-D	SVOC	Chrysene	218-01-9	1.43E-01	1.43E-01		8E-13		3E-12		9E-12		2E-09		5E-10		5E-11	
94-D	SVOC	Fluoranthene	206-44-0	2.67E-01	2.67E-01			2E-08		6E-08		4E-07		4E-05		1E-05		3E-06
94-D	SVOC	Phenanthrene	85-01-8	2.25E-01	2.25E-01			2E-07		4E-07		5E-07		4E-05		1E-05		4E-06
94-D	SVOC	Pyrene	129-00-0	2.53E-01	2.53E-01			2E-08		5E-08		5E-07		4E-05		1E-05		3E-06
94-D	INORG	Antimony	7440-36-0	2.40E-01	1.54E-01							2E-05		1E-03		2E-04		8E-04
94-D	INORG	Arsenic	7440-38-2	8.10E+00														
94-D	INORG	Barium	7440-39-3	9.90E+01	3.31E+00													
94-D	INORG	Beryllium	7440-41-7	5.30E-01														
94-D	INORG	Cadmium	7440-43-9	3.40E-01														
94-D	INORG	Chromium (total)	7440-47-3	2.80E+01														
94-D	INORG	Cobalt	7440-48-4	9.00E+00	1.95E+00						2E-09	2E-04	2E-09	4E-04	1E-09	1E-04	3E-09	4E-03
94-D	INORG	Copper	7440-50-8	2.70E+01														
94-D	INORG	Cyanide (total)	57-12-5	3.40E-02	3.40E-02							7E-08		6E-06		8E-07		3E-06
94-D	INORG	Lead	7439-92-1	1.60E+02	1.60E+02													
94-D	INORG	Manganese	7439-96-5	4.10E+02														
94-D	INORG	Mercury	7439-97-6	5.08E-02														
94-D	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
94-D	INORG	Silver	7440-22-4	3.30E-01	1.42E-01							3E-05		1E-04		2E-05		5E-04
94-D	INORG	Thallium	7440-28-0	2.20E-01	2.35E-02							1E-05		1E-03		2E-04		7E-04
94-D	INORG	Vanadium	7440-62-2	3.40E+01	9.13E+00							5E-05		5E-03		6E-04		3E-03
94-D	INORG	Zinc	7440-66-6	1.10E+02														
94-E	VOC	Cyclohexane	110-82-7	4.60E-02	4.60E-02	3E-07		4E-05		5E-05		1E-07		7E-06		6E-06		5E-05
94-E	VOC	Methylcyclohexane	108-87-2	1.20E-01	1.20E-01	4E-07		2E-04		2E-04		1E-06		5E-05		4E-05		4E-04
94-E	VOC	Toluene	108-88-3	1.20E-01	1.20E-01	1E-06		5E-05		1E-04		2E-07		2E-05		8E-06		7E-05
94-E	VOC	Xylenes (total)	1330-20-7	2.05E-01	2.05E-01	8E-07		2E-03		6E-03		1E-05		6E-04		4E-04		4E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
94-E	SVOC	Benzo(a)anthracene	56-55-3	8.99E-02	8.99E-02		2E-12		6E-12		5E-10		1E-07		3E-08		3E-09	
94-E	SVOC	Benzo(a)pyrene	50-32-8	8.39E-02	8.39E-02		2E-12		7E-12		5E-09		1E-06		3E-07		2E-08	
94-E	SVOC	Benzo(b)fluoranthene	205-99-2	1.20E-01	1.20E-01		3E-11		8E-11		7E-10		2E-07		4E-08		4E-09	
94-E	SVOC	Benzo(g,h,i)perylene	191-24-2	4.29E-02	4.29E-02			4E-13		9E-13		8E-08		7E-06		2E-06		4E-07
94-E	SVOC	Benzo(k)fluoranthene	207-08-9	6.53E-02	6.53E-02		1E-14		3E-14		4E-11		1E-08		2E-09		2E-10	
94-E	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.82E-02	5.82E-02	9E-15	4E-17	4E-13	1E-16	1E-12	6E-12	2E-07	2E-09	1E-05	3E-10	3E-06	3E-11	8E-06
94-E	SVOC	Chrysene	218-01-9	1.05E-01	1.05E-01		6E-13		2E-12		6E-12		2E-09		4E-10		4E-11	
94-E	SVOC	Diethylphthalate	84-66-2	5.46E-01	5.46E-01	2E-08		2E-08		5E-08		4E-08		4E-06		1E-06		4E-07
94-E	SVOC	Di-n-butylphthalate	84-74-2	6.90E-02	6.90E-02	8E-13						4E-08		3E-06		8E-07		2E-07
94-E	SVOC	Di-n-octylphthalate	117-84-0	5.34E-02	5.34E-02							7E-08		6E-06		2E-06		3E-07
94-E	SVOC	Fluoranthene	206-44-0	1.59E-01	1.59E-01			1E-08		3E-08		2E-07		2E-05		6E-06		2E-06
94-E	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	5.11E-02	5.11E-02		6E-14		2E-13		3E-10		8E-08		2E-08		2E-09	
94-E	SVOC	Pentachlorophenol	87-86-5	6.53E-02	6.53E-02	7E-10	3E-12	2E-09	9E-12	6E-09	8E-11	2E-07	2E-08	1E-05	6E-09	5E-06	5E-10	1E-05
94-E	SVOC	Phenanthrene	85-01-8	8.65E-02	8.65E-02			6E-08		2E-07		2E-07		2E-05		5E-06		2E-06
94-E	SVOC	Pyrene	129-00-0	1.78E-01	1.78E-01			1E-08		3E-08		3E-07		3E-05		8E-06		2E-06
94-E	INORG	Antimony	7440-36-0	1.80E-01	9.36E-02							9E-06		9E-04		1E-04		5E-04
94-E	INORG	Arsenic	7440-38-2	1.20E+01	3.88E+00						4E-08	6E-04	1E-05	5E-02	1E-06	9E-03	2E-07	2E-03
94-E	INORG	Barium	7440-39-3	7.00E+01														
94-E	INORG	Beryllium	7440-41-7	4.10E-01														
94-E	INORG	Cadmium	7440-43-9	4.00E-01														
94-E	INORG	Chromium (total)	7440-47-3	1.50E+01														
94-E	INORG	Cobalt	7440-48-4	6.00E+00														
94-E	INORG	Copper	7440-50-8	3.40E+01	5.54E+00							6E-06		5E-04		7E-05		3E-04
94-E	INORG	Cyanide (total)	57-12-5	4.20E-02	4.20E-02							8E-08		8E-06		1E-06		4E-06
94-E	INORG	Lead	7439-92-1	7.50E+01	7.50E+01													
94-E	INORG	Manganese	7439-96-5	3.80E+02														
94-E	INORG	Mercury	7439-97-6	1.06E-01	5.36E-02	2E-06		2E-04		5E-04		2E-05		2E-03		8E-04		7E-03
94-E	INORG	Nickel	7440-02-0	1.60E+01														
94-E	INORG	Selenium	7782-49-2	6.80E-01	1.61E-01							1E-06		1E-04		2E-05		6E-05
94-E	INORG	Silver	7440-22-4	1.50E-01														
94-E	INORG	Thallium	7440-28-0	2.30E-01	3.35E-02							2E-05		2E-03		2E-04		9E-04
94-E	INORG	Vanadium	7440-62-2	2.20E+01														
94-E	INORG	Zinc	7440-66-6	1.00E+02														
Aeration Lagoon	VOC	Acetone	67-64-1	4.80E-01	4.80E-01	3E-08		1E-05		3E-05		3E-07		2E-05		1E-05		1E-04
Aeration Lagoon	VOC	Methyl Acetate	79-20-9	2.60E-01	2.60E-01	1E-07		1E-05		3E-05		2E-07		1E-05		8E-06		8E-06
Aeration Lagoon	VOC	Methylcyclohexane	108-87-2	4.30E-02	4.30E-02	2E-07		7E-05		8E-05		3E-07		2E-05		1E-05		1E-04
Aeration Lagoon	VOC	Methylene Chloride	75-09-2	5.60E-02	5.60E-02	3E-06	3E-08	6E-05	7E-08	1E-04	4E-11	2E-07	7E-09	1E-05	4E-09	9E-06	2E-09	8E-05
Aeration Lagoon	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	8.60E-02	8.60E-02	8E-08		1E-05		2E-05		7E-08		4E-06		3E-06		3E-05
Aeration Lagoon	SVOC	Benzo(a)anthracene	56-55-3	8.16E-02	8.16E-02		2E-12		5E-12		5E-10		1E-07		3E-08		3E-09	
Aeration Lagoon	SVOC	Benzo(a)pyrene	50-32-8	8.14E-02	8.14E-02		2E-12		7E-12		5E-09		1E-06		3E-07		2E-08	
Aeration Lagoon	SVOC	Benzo(b)fluoranthene	205-99-2	1.15E-01	1.15E-01		3E-11		8E-11		7E-10		2E-07		4E-08		4E-09	
Aeration Lagoon	SVOC	Benzo(k)fluoranthene	207-08-9	1.22E-01	1.22E-01		2E-14		6E-14		7E-11		2E-08		4E-09		4E-10	
Aeration Lagoon	SVOC	Butylbenzylphthalate	85-68-7	8.63E-02	8.63E-02		3E-14	2E-10	9E-14	5E-10	1E-12	2E-08	3E-10	2E-06	7E-11	5E-07	7E-12	1E-07
Aeration Lagoon	SVOC	Chrysene	218-01-9	9.06E-02	9.06E-02		5E-13		2E-12		5E-12		1E-09		3E-10		3E-11	
Aeration Lagoon	SVOC	Fluoranthene	206-44-0	1.68E-01	1.68E-01			1E-08		4E-08		2E-07		2E-05		6E-06		2E-06
Aeration Lagoon	SVOC	Phenanthrene	85-01-8	8.33E-02	8.33E-02			6E-08		2E-07		2E-07		2E-05		5E-06		2E-06
Aeration Lagoon	SVOC	Pyrene	129-00-0	2.12E-01	2.12E-01			2E-08		4E-08		4E-07		4E-05		1E-05		3E-06
Aeration Lagoon	PCB	PCBs (total)	1336-36-3	8.88E-01	8.88E-01	2E-07	1E-08		3E-08		2E-08	3E-03	4E-06	2E-01	1E-06	6E-02	1E-07	5E-02
Aeration Lagoon	INORG	Antimony	7440-36-0	8.90E-02	2.64E-03							3E-07		2E-05		3E-06		1E-05
Aeration Lagoon	INORG	Arsenic	7440-38-2	2.10E+01	1.29E+01						1E-07	2E-03	3E-05	2E-01	5E-06	3E-02	6E-07	6E-03
Aeration Lagoon	INORG	Barium	7440-39-3	1.60E+02	6.43E+01													
Aeration Lagoon	INORG	Beryllium	7440-41-7	6.40E-01	5.00E-02						4E-11	6E-06	4E-11	9E-05	2E-11	1E-05	6E-11	1E-04

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
Aeration Lagoon	INORG	Cadmium	7440-43-9	7.30E-01	1.42E-01						8E-11	8E-06	8E-11	6E-04	5E-11	1E-04	1E-10	3E-04
Aeration Lagoon	INORG	Chromium (total)	7440-47-3	4.60E+01	1.40E+01						5E-08	5E-04	5E-08	2E-02	3E-08	2E-03	8E-08	6E-03
Aeration Lagoon	INORG	Cobalt	7440-48-4	7.60E+00	5.46E-01						4E-10	6E-05	5E-10	1E-04	3E-10	3E-05	7E-10	1E-03
Aeration Lagoon	INORG	Copper	7440-50-8	8.70E+01	5.85E+01							6E-05		5E-03		7E-04		3E-03
Aeration Lagoon	INORG	Cyanide (total)	57-12-5	8.90E-01	8.90E-01							2E-06		2E-04		2E-05		9E-05
Aeration Lagoon	INORG	Lead	7439-92-1	1.20E+02	1.20E+02													
Aeration Lagoon	INORG	Manganese	7439-96-5	1.30E+03	8.23E+02							3E-02		3E-02		1E-02		6E-01
Aeration Lagoon	INORG	Mercury	7439-97-6	9.06E-02	3.82E-02	1E-06		1E-04		4E-04		2E-05		1E-03		6E-04		5E-03
Aeration Lagoon	INORG	Nickel	7440-02-0	2.00E+01	4.06E-02						3E-12		3E-12		2E-12		5E-12	
Aeration Lagoon	INORG	Selenium	7782-49-2	1.10E+00	5.81E-01							5E-06		4E-04		6E-05		2E-04
Aeration Lagoon	INORG	Silver	7440-22-4	3.30E-01	1.42E-01							3E-05		1E-04		2E-05		5E-04
Aeration Lagoon	INORG	Thallium	7440-28-0	1.80E-01														
Aeration Lagoon	INORG	Vanadium	7440-62-2	3.60E+01	1.11E+01							6E-05		6E-03		8E-04		3E-03
Aeration Lagoon	INORG	Zinc	7440-66-6	1.70E+02	5.95E+01							8E-06		7E-04		1E-04		4E-04
BD01	VOC	Methyl Acetate	79-20-9	1.20E-01	1.20E-01	5E-08		5E-06		1E-05		1E-07		5E-06		4E-06		4E-06
BD01	VOC	Methylcyclohexane	108-87-2	6.40E-02	6.40E-02	2E-07		1E-04		1E-04		5E-07		3E-05		2E-05		2E-04
BD01	VOC	Methylene Chloride	75-09-2	1.30E-01	1.30E-01	6E-06	6E-08	1E-04	2E-07	3E-04	1E-10	6E-07	2E-08	3E-05	1E-08	2E-05	4E-09	2E-04
BD01	SVOC	Acenaphthene	83-32-9	4.94E-02	4.94E-02			4E-07		1E-06		8E-08		6E-06		2E-06		1E-06
BD01	SVOC	Anthracene	120-12-7	1.50E-01	1.50E-01							3E-08		3E-06		7E-07		1E-07
BD01	SVOC	Benzo(a)anthracene	56-55-3	3.93E-01	3.93E-01		8E-12		2E-11		2E-09		6E-07		1E-07		1E-08	
BD01	SVOC	Benzo(a)pyrene	50-32-8	4.16E-01	4.16E-01		1E-11		4E-11		2E-08		7E-06		1E-06		1E-07	
BD01	SVOC	Benzo(b)fluoranthene	205-99-2	4.50E-01	4.50E-01		1E-10		3E-10		3E-09		7E-07		2E-07		1E-08	
BD01	SVOC	Benzo(g,h,i)perylene	191-24-2	2.16E-01	2.16E-01			2E-12		5E-12		4E-07		4E-05		1E-05		2E-06
BD01	SVOC	Benzo(k)fluoranthene	207-08-9	4.29E-01	4.29E-01		7E-14		2E-13		3E-10		7E-08		1E-08		1E-09	
BD01	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.88E-01	3.88E-01	6E-14	3E-16	3E-12	9E-16	8E-12	4E-11	1E-06	1E-08	9E-05	2E-09	2E-05	2E-10	5E-05
BD01	SVOC	Butylbenzylphthalate	85-68-7	1.98E-01	1.98E-01		7E-14	5E-10	2E-13	1E-09	3E-12	5E-08	8E-10	5E-06	2E-10	1E-06	2E-11	3E-07
BD01	SVOC	Carbazole	86-74-8	6.40E-02	6.40E-02		7E-14		2E-13		1E-11		3E-09		5E-10		6E-11	
BD01	SVOC	Chrysene	218-01-9	4.46E-01	4.46E-01		3E-12		8E-12		3E-11		7E-09		2E-09		2E-10	
BD01	SVOC	Dibenz(a,h)anthracene	53-70-3	1.54E-01	1.54E-01		2E-14		6E-14		9E-09		2E-06		5E-07		5E-08	
BD01	SVOC	Dibenzofuran	132-64-9	4.66E-02	4.66E-02			3E-07		8E-07		1E-06		1E-04		3E-05		1E-04
BD01	SVOC	Fluoranthene	206-44-0	9.27E-01	9.27E-01			8E-08		2E-07		1E-06		1E-04		3E-05		9E-06
BD01	SVOC	Fluorene	86-73-7	6.40E-02	6.40E-02			2E-07		4E-07		1E-07		1E-05		3E-06		2E-06
BD01	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.02E-01	2.02E-01		2E-13		7E-13		1E-09		3E-07		7E-08		6E-09	
BD01	SVOC	Phenanthrene	85-01-8	7.42E-01	7.42E-01			5E-07		1E-06		2E-06		1E-04		4E-05		1E-05
BD01	SVOC	Pyrene	129-00-0	9.26E-01	9.26E-01			7E-08		2E-07		2E-06		2E-04		4E-05		1E-05
BD01	PCB	PCBs (total)	1336-36-3	7.90E-02	7.90E-02	1E-08	1E-09		3E-09		1E-09	2E-04	4E-07	2E-02	9E-08	6E-03	1E-08	5E-03
BD01	INORG	Antimony	7440-36-0	4.30E-02														
BD01	INORG	Arsenic	7440-38-2	7.20E+00														
BD01	INORG	Barium	7440-39-3	1.20E+02	2.43E+01													
BD01	INORG	Beryllium	7440-41-7	8.70E-01	2.80E-01						2E-10	3E-05	2E-10	5E-04	1E-10	8E-05	3E-10	8E-04
BD01	INORG	Cadmium	7440-43-9	4.40E-01														
BD01	INORG	Chromium (total)	7440-47-3	2.70E+01														
BD01	INORG	Cobalt	7440-48-4	1.90E+01	1.19E+01						1E-08	1E-03	1E-08	3E-03	6E-09	6E-04	2E-08	2E-02
BD01	INORG	Copper	7440-50-8	6.30E+02	6.02E+02							6E-04		5E-02		7E-03		3E-02
BD01	INORG	Cyanide (total)	57-12-5	1.10E-01	1.10E-01							2E-07		2E-05		3E-06		1E-05
BD01	INORG	Lead	7439-92-1	9.10E+01	9.10E+01													
BD01	INORG	Manganese	7439-96-5	5.60E+02	8.25E+01							3E-03		3E-03		1E-03		6E-02
BD01	INORG	Mercury	7439-97-6	7.22E-02	1.98E-02	6E-07		7E-05		2E-04		9E-06		6E-04		3E-04		3E-03
BD01	INORG	Nickel	7440-02-0	3.50E+01	1.50E+01						1E-09		1E-09		7E-10		2E-09	
BD01	INORG	Selenium	7782-49-2	5.00E-01														
BD01	INORG	Silver	7440-22-4	1.30E-01														
BD01	INORG	Thallium	7440-28-0	3.80E-01	1.83E-01							1E-04		1E-02		1E-03		5E-03
BD01	INORG	Vanadium	7440-62-2	3.60E+01	1.11E+01							6E-05		6E-03		8E-04		3E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
BD01	INORG	Zinc	7440-66-6	6.80E+01														
BG	INORG	Antimony	7440-36-0	1.10E-01	2.36E-02							2E-06		2E-04		3E-05		1E-04
BG	INORG	Arsenic	7440-38-2	1.00E+01	1.88E+00						2E-08	3E-04	5E-06	3E-02	7E-07	4E-03	9E-08	8E-04
BG	INORG	Barium	7440-39-3	1.50E+02	5.43E+01													
BG	INORG	Beryllium	7440-41-7	8.90E-01	3.00E-01						2E-10	4E-05	2E-10	6E-04	1E-10	8E-05	4E-10	8E-04
BG	INORG	Cadmium	7440-43-9	1.10E+00	5.12E-01						3E-10	3E-05	3E-10	2E-03	2E-10	4E-04	5E-10	1E-03
BG	INORG	Chromium (total)	7440-47-3	4.70E+01	1.50E+01						5E-08	5E-04	6E-08	2E-02	3E-08	3E-03	9E-08	7E-03
BG	INORG	Cobalt	7440-48-4	1.00E+01	2.95E+00						2E-09	3E-04	3E-09	6E-04	2E-09	1E-04	4E-09	5E-03
BG	INORG	Copper	7440-50-8	4.70E+01	1.85E+01							2E-05		2E-03		2E-04		9E-04
BG	INORG	Lead	7439-92-1	1.90E+02	1.90E+02													
BG	INORG	Manganese	7439-96-5	2.10E+03	1.62E+03							7E-02		7E-02		2E-02		1E+00
BG	INORG	Mercury	7439-97-6	9.40E-02	4.16E-02	1E-06		2E-04		4E-04		2E-05		1E-03		6E-04		5E-03
BG	INORG	Nickel	7440-02-0	2.20E+01	2.04E+00						1E-10		2E-10		9E-11		2E-10	
BG	INORG	Selenium	7782-49-2	4.20E-01														
BG	INORG	Silver	7440-22-4	2.60E-01	7.23E-02							2E-05		6E-05		1E-05		3E-04
BG	INORG	Thallium	7440-28-0	2.80E-01	8.35E-02							5E-05		4E-03		6E-04		2E-03
BG	INORG	Vanadium	7440-62-2	3.60E+01	1.11E+01							6E-05		6E-03		8E-04		3E-03
BG	INORG	Zinc	7440-66-6	7.20E+02	6.10E+02							8E-05		7E-03		1E-03		4E-03
Build 94 Parking Lot	VOC	Methyl Acetate	79-20-9	3.80E-02	3.80E-02	1E-08		2E-06		4E-06		3E-08		2E-06		1E-06		1E-06
Build 94 Parking Lot	VOC	Methylene Chloride	75-09-2	4.80E-02	4.80E-02	2E-06	2E-08	5E-05	6E-08	9E-05	4E-11	2E-07	6E-09	1E-05	4E-09	8E-06	1E-09	7E-05
Build 94 Parking Lot	SVOC	Benzo(g,h,i)perylene	191-24-2	6.23E-02	6.23E-02			5E-13		1E-12		1E-07		1E-05		3E-06		6E-07
Build 94 Parking Lot	SVOC	Diethylphthalate	84-66-2	9.36E-02	9.36E-02	3E-09		4E-09		9E-09		7E-09		6E-07		2E-07		7E-08
Build 94 Parking Lot	SVOC	Fluoranthene	206-44-0	5.59E-02	5.59E-02			5E-09		1E-08		8E-08		7E-06		2E-06		5E-07
Build 94 Parking Lot	SVOC	Formaldehyde	50-00-0	5.08E+00	5.08E+00						2E-11		2E-11		1E-11		3E-11	
Build 94 Parking Lot	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.37E-01	1.37E-01		2E-13		5E-13		8E-10		2E-07		5E-08		4E-09	
Build 94 Parking Lot	SVOC	Phenanthrene	85-01-8	4.49E-02	4.49E-02			3E-08		8E-08		1E-07		8E-06		2E-06		9E-07
Build 94 Parking Lot	SVOC	Pyrene	129-00-0	2.29E-01	2.29E-01			2E-08		4E-08		4E-07		4E-05		1E-05		3E-06
Build 94 Parking Lot	PCB	PCBs (total)	1336-36-3	7.20E+00	7.20E+00	1E-06	9E-08		3E-07		1E-07	2E-02	3E-05	2E+00	8E-06	5E-01	1E-06	4E-01
Build 94 Parking Lot	INORG	Antimony	7440-36-0	9.00E-01	8.14E-01							8E-05		7E-03		1E-03		4E-03
Build 94 Parking Lot	INORG	Arsenic	7440-38-2	1.00E+01	1.88E+00						2E-08	3E-04	5E-06	3E-02	7E-07	4E-03	9E-08	8E-04
Build 94 Parking Lot	INORG	Barium	7440-39-3	1.10E+02	1.43E+01													
Build 94 Parking Lot	INORG	Beryllium	7440-41-7	8.10E-01	2.20E-01						2E-10	3E-05	2E-10	4E-04	1E-10	6E-05	3E-10	6E-04
Build 94 Parking Lot	INORG	Cadmium	7440-43-9	7.00E-01	1.12E-01						6E-11	6E-06	6E-11	5E-04	4E-11	8E-05	1E-10	3E-04
Build 94 Parking Lot	INORG	Chromium (total)	7440-47-3	2.80E+01														
Build 94 Parking Lot	INORG	Cobalt	7440-48-4	1.40E+01	6.95E+00						6E-09	7E-04	6E-09	2E-03	4E-09	4E-04	1E-08	1E-02
Build 94 Parking Lot	INORG	Copper	7440-50-8	1.90E+01														
Build 94 Parking Lot	INORG	Cyanide (total)	57-12-5	1.40E-01	1.40E-01							3E-07		3E-05		3E-06		1E-05
Build 94 Parking Lot	INORG	Lead	7439-92-1	1.30E+02	1.30E+02													
Build 94 Parking Lot	INORG	Manganese	7439-96-5	4.10E+02														
Build 94 Parking Lot	INORG	Mercury	7439-97-6	9.12E-02	3.88E-02	1E-06		1E-04		4E-04		2E-05		1E-03		6E-04		5E-03
Build 94 Parking Lot	INORG	Nickel	7440-02-0	3.50E+01	1.50E+01						1E-09		1E-09		7E-10		2E-09	
Build 94 Parking Lot	INORG	Silver	7440-22-4	3.20E-01	1.32E-01							3E-05		1E-04		2E-05		5E-04
Build 94 Parking Lot	INORG	Thallium	7440-28-0	3.00E-01	1.03E-01							6E-05		5E-03		7E-04		3E-03
Build 94 Parking Lot	INORG	Vanadium	7440-62-2	4.50E+01	2.01E+01							1E-04		1E-02		1E-03		6E-03
Build 94 Parking Lot	INORG	Zinc	7440-66-6	1.90E+02	7.95E+01							1E-05		1E-03		1E-04		5E-04
Harriet Street	VOC	Acetone	67-64-1	2.30E+00	2.30E+00	1E-07		5E-05		1E-04		2E-06		9E-05		6E-05		5E-04
Harriet Street	VOC	Benzene	71-43-2	1.20E-01	1.20E-01	2E-04	1E-06	2E-02	2E-06	2E-02	1E-09	4E-05	2E-07	2E-03	1E-07	2E-03	5E-08	8E-03
Harriet Street	VOC	Cumene	98-82-8	6.30E-02	6.30E-02	5E-07		2E-04		5E-04		8E-07		4E-05		3E-05		3E-04
Harriet Street	VOC	Cyclohexane	110-82-7	2.30E-01	2.30E-01	2E-06		2E-04		2E-04		7E-07		4E-05		3E-05		3E-04
Harriet Street	VOC	Ethyl Benzene	100-41-4	4.80E+00	4.80E+00	2E-05		7E-03		2E-02		3E-05		2E-03		1E-03		1E-02
Harriet Street	VOC	Methyl Acetate	79-20-9	4.10E-02	4.10E-02	2E-08		2E-06		5E-06		3E-08		2E-06		1E-06		1E-06
Harriet Street	VOC	Methylcyclohexane	108-87-2	5.90E+01	5.90E+01	2E-04		1E-01		1E-01		5E-04		3E-02		2E-02		2E-01
Harriet Street	VOC	Methylene Chloride	75-09-2	2.00E+00	2.00E+00	1E-04	1E-06	2E-03	2E-06	4E-03	2E-09	8E-06	3E-07	5E-04	2E-07	3E-04	6E-08	3E-03

Attachment G12: Soil Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Exposure Conc (mg/kg)	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ	Maintenance Worker Soil Contact Risk	Maintenance Worker Soil Contact HQ	Resident Soil Contact Risk	Resident Soil Contact HQ	Routine Worker Soil Contact Risk	Routine Worker Soil Contact HQ	Redevelop-ment Construction Worker Soil Contact Risk	Redevelop-ment Construction Worker Soil Contact HQ
Harriet Street	VOC	Toluene	108-88-3	8.70E-02	8.70E-02	8E-07		4E-05		1E-04		2E-07		1E-05		6E-06		5E-05
Harriet Street	VOC	Trichloroethene	79-01-6	2.00E-01	2.00E-01	4E-06	4E-07		9E-07		4E-10		7E-08		5E-08		2E-08	
Harriet Street	VOC	Xylenes (total)	1330-20-7	1.90E+01	1.90E+01	8E-05		2E-01		6E-01		1E-03		5E-02		4E-02		4E-01
Harriet Street	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.46E-01	3.46E-01	5E-14	3E-16	3E-12	8E-16	7E-12	4E-11	9E-07	1E-08	8E-05	2E-09	2E-05	2E-10	5E-05
Harriet Street	SVOC	Diethylphthalate	84-66-2	6.09E-02	6.09E-02	2E-09		2E-09		6E-09		5E-09		4E-07		1E-07		5E-08
Harriet Street	SVOC	Di-n-butylphthalate	84-74-2	6.40E-02	6.40E-02	7E-13						3E-08		3E-06		7E-07		2E-07
Harriet Street	SVOC	2-Methylnaphthalene	91-57-6	5.65E+00	5.65E+00			1E-02		3E-02		6E-04		4E-02		2E-02		2E-01
Harriet Street	SVOC	Naphthalene	91-20-3	2.58E+00	2.58E+00	1E-06		2E-02		4E-02		5E-04		3E-02		2E-02		2E-01
Harriet Street	SVOC	Phenanthrene	85-01-8	3.50E-02	3.50E-02			2E-08		6E-08		8E-08		6E-06		2E-06		7E-07
Harriet Street	PCB	PCBs (total)	1336-36-3	5.00E+00	5.00E+00	9E-07	6E-08		2E-07		9E-08	1E-02	2E-05	1E+00	6E-06	3E-01	7E-07	3E-01
Harriet Street	INORG	Arsenic	7440-38-2	9.50E+00	1.38E+00						1E-08	2E-04	4E-06	2E-02	5E-07	3E-03	7E-08	6E-04
Harriet Street	INORG	Barium	7440-39-3	6.10E+01														
Harriet Street	INORG	Cadmium	7440-43-9	2.40E-01														
Harriet Street	INORG	Chromium (total)	7440-47-3	1.30E+01														
Harriet Street	INORG	Copper	7440-50-8	1.40E+01														
Harriet Street	INORG	Lead	7439-92-1	3.60E+01	3.60E+01													
Harriet Street	INORG	Mercury	7439-97-6	1.20E-01	6.76E-02	2E-06		2E-04		6E-04		3E-05		2E-03		1E-03		9E-03
Harriet Street	INORG	Selenium	7782-49-2	6.40E-01	1.21E-01							1E-06		9E-05		1E-05		5E-05
Harriet Street	INORG	Silver	7440-22-4	2.70E+00	2.51E+00							5E-04		2E-03		4E-04		1E-02
Harriet Street	INORG	Zinc	7440-66-6	9.80E+01														
FEP	VOC	Acetone	67-64-1	8.00E-01	8.00E-01	5E-08		2E-05		5E-05		6E-07		3E-05		2E-05		2E-04
FEP	VOC	Cumene	98-82-8	7.00E-02	7.00E-02	6E-07		2E-04		6E-04		9E-07		5E-05		4E-05		3E-04
FEP	VOC	cis-1,2-Dichloroethene	156-59-2	4.00E-02	4.00E-02	3E-07		4E-03		7E-03		1E-05		6E-04		5E-04		4E-04
FEP	VOC	Ethyl Benzene	100-41-4	4.00E-02	4.00E-02	2E-07		6E-05		1E-04		2E-07		1E-05		9E-06		9E-05
FEP	VOC	Methylcyclohexane	108-87-2	4.30E-01	4.30E-01	2E-06		7E-04		8E-04		3E-06		2E-04		1E-04		1E-03
FEP	VOC	Toluene	108-88-3	4.00E-02	4.00E-02	3E-07		2E-05		5E-05		8E-08		5E-06		3E-06		2E-05
FEP	VOC	Trichloroethene	79-01-6	1.00E-01	1.00E-01	2E-06	2E-07		4E-07		2E-10		4E-08		2E-08		8E-09	
FEP	VOC	Xylenes (total)	1330-20-7	1.40E-01	1.40E-01	6E-07		2E-03		4E-03		7E-06		4E-04		3E-04		3E-03
FEP	SVOC	Acenaphthene	83-32-9	3.00E+00	3.00E+00			2E-05		6E-05		5E-06		4E-04		1E-04		9E-05
FEP	SVOC	Anthracene	120-12-7	3.00E+00	3.00E+00							6E-07		5E-05		1E-05		3E-06
FEP	SVOC	Benzo(a)anthracene	56-55-3	5.00E+00	5.00E+00		1E-10		3E-10		3E-08		8E-06		2E-06		2E-07	
FEP	SVOC	Benzo(a)pyrene	50-32-8	4.00E+00	4.00E+00		1E-10		3E-10		2E-07		6E-05		1E-05		1E-06	
FEP	SVOC	Benzo(b)fluoranthene	205-99-2	5.00E+00	5.00E+00		1E-09		3E-09		3E-08		8E-06		2E-06		2E-07	
FEP	SVOC	Benzo(g,h,i)perylene	191-24-2	2.00E+00	2.00E+00			2E-11		4E-11		4E-06		3E-04		9E-05		2E-05
FEP	SVOC	Benzo(k)fluoranthene	207-08-9	3.00E+00	3.00E+00		5E-13		2E-12		2E-09		5E-07		1E-07		9E-09	
FEP	SVOC	Chrysene	218-01-9	6.00E+00	6.00E+00		3E-11		1E-10		4E-10		1E-07		2E-08		2E-09	
FEP	SVOC	Fluoranthene	206-44-0	1.20E+01	1.20E+01			1E-06		3E-06		2E-05		2E-03		4E-04		1E-04
FEP	SVOC	Fluorene	86-73-7	3.00E+00	3.00E+00			8E-06		2E-05		6E-06		5E-04		2E-04		7E-05
FEP	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.00E+00	2.00E+00		2E-12		7E-12		1E-08		3E-06		7E-07		6E-08	
FEP	SVOC	2-Methylnaphthalene	91-57-6	2.00E+00	2.00E+00			4E-03		1E-02		2E-04		1E-02		9E-03		8E-02
FEP	SVOC	Phenanthrene	85-01-8	1.10E+01	1.10E+01			8E-06		2E-05		2E-05		2E-03		6E-04		2E-04
FEP	SVOC	Pyrene	129-00-0	1.30E+01	1.30E+01			1E-06		3E-06		3E-05		2E-03		6E-04		2E-04

Notes:

Only detected chemicals in each area are shown.

Site-specific background concentrations of inorganics are subtracted to obtain the site-related exposure concentration.

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
02-B	VOC	Acetone	67-64-1	4.70E+01		7E-03		7E-03	2E-07		8E-05		2E-04
02-B	VOC	Benzene	71-43-2	2.00E-04	4E-10	1E-05	4E-11	7E-06	3E-08	2E-10	2E-06	4E-10	4E-06
02-B	VOC	2-Butanone	78-93-3	1.40E-01		2E-05		2E-05	3E-09		2E-07		5E-07
02-B	VOC	1,1-Dichloroethane	75-34-3	1.00E-03		3E-06		3E-07	1E-09		7E-07		1E-06
02-B	VOC	cis-1,2-Dichloroethene	156-59-2	8.00E-04		4E-05		4E-06	4E-10		7E-06		1E-05
02-B	VOC	Methyl Acetate	79-20-9	1.80E-01		4E-05		4E-06	5E-09		7E-07		2E-06
02-B	VOC	Trichloroethene	79-01-6	2.00E-04	8E-11	1E-06	8E-12	1E-06	5E-10	6E-11		1E-10	
02-B	INORG	Barium	7440-39-3	7.30E-02		2E-05		2E-05					
02-B	INORG	Chromium (total)	7440-47-3	7.00E-04		2E-05		4E-06					
02-B	INORG	Cobalt	7440-48-4	3.00E-04		4E-08		4E-08					
02-B	INORG	Copper	7440-50-8	1.90E-03		2E-07		2E-07					
02-B	INORG	Cyanide (total)	57-12-5	4.80E-03		8E-07		8E-07					
02-B	INORG	Manganese	7439-96-5	8.30E-02		1E-05		1E-05					
02-B	INORG	Nickel	7440-02-0	8.40E-03		4E-06		4E-06					
02-B	INORG	Vanadium	7440-62-2	2.70E-04		2E-06		2E-06					
02-B	INORG	Zinc	7440-66-6	6.60E-03		6E-08		6E-08					
02-E	PCB	PCBs (total)	1336-36-3	2.35E-04	2E-07	3E-02	2E-08	1E-02	7E-08	5E-09		1E-08	
02-E	INORG	Arsenic	7440-38-2	1.40E-03	1E-09	2E-05	1E-10	9E-07					
02-E	INORG	Barium	7440-39-3	3.30E-01		1E-04		1E-04					
02-E	INORG	Beryllium	7440-41-7	2.00E-04		2E-05		2E-05					
02-E	INORG	Cadmium	7440-43-9	1.10E-04		6E-06		6E-06					
02-E	INORG	Chromium (total)	7440-47-3	5.00E-03		2E-04		3E-05					
02-E	INORG	Cobalt	7440-48-4	6.40E-04		8E-08		8E-08					
02-E	INORG	Copper	7440-50-8	2.10E-02		2E-06		2E-06					
02-E	INORG	Cyanide (total)	57-12-5	1.70E-03		3E-07		3E-07					
02-E	INORG	Lead	7439-92-1	2.10E-03									
02-E	INORG	Manganese	7439-96-5	2.00E+00		3E-04		3E-04					
02-E	INORG	Nickel	7440-02-0	1.20E-02		5E-06		5E-06					
02-E	INORG	Selenium	7782-49-2	2.20E-03		1E-06		1E-06					
02-E	INORG	Thallium	7440-28-0	1.70E-04		8E-06		8E-06					
02-E	INORG	Vanadium	7440-62-2	2.70E-04		2E-06		2E-06					
02-E	INORG	Zinc	7440-66-6	6.40E-02		6E-07		6E-07					
02-F	PCB	PCBs (total)	1336-36-3	1.54E-04	1E-07	2E-02	1E-08	7E-03	5E-08	3E-09		7E-09	
02-F	INORG	Arsenic	7440-38-2	2.50E-03	2E-09	3E-05	2E-10	2E-06					
02-F	INORG	Barium	7440-39-3	1.80E-01		5E-05		5E-05					
02-F	INORG	Beryllium	7440-41-7	2.50E-03		2E-04		2E-04					
02-F	INORG	Cadmium	7440-43-9	4.40E-04		2E-05		2E-05					
02-F	INORG	Chromium (total)	7440-47-3	3.40E-03		1E-04		2E-05					
02-F	INORG	Cobalt	7440-48-4	4.00E-03		5E-07		5E-07					
02-F	INORG	Copper	7440-50-8	5.50E-03		4E-07		4E-07					
02-F	INORG	Cyanide (total)	57-12-5	1.50E-03		2E-07		2E-07					
02-F	INORG	Lead	7439-92-1	1.10E-03									
02-F	INORG	Manganese	7439-96-5	3.70E+00		6E-04		6E-04					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
02-F	INORG	Mercury	7439-97-6	1.47E-04		6E-04		6E-04	1E-06		1E-04		2E-04
02-F	INORG	Nickel	7440-02-0	2.70E-02		1E-05		1E-05					
02-F	INORG	Selenium	7782-49-2	2.30E-03		1E-06		1E-06					
02-F	INORG	Thallium	7440-28-0	5.20E-04		2E-05		2E-05					
02-F	INORG	Vanadium	7440-62-2	6.20E-04		5E-06		5E-06					
02-F	INORG	Zinc	7440-66-6	1.70E-02		2E-07		2E-07					
03-1	VOC	Acetone	67-64-1	8.00E-03		1E-06		1E-06	4E-11		1E-08		4E-08
03-1	VOC	Benzene	71-43-2	3.00E-03	7E-09	2E-04	7E-10	1E-04	5E-07	3E-09	4E-05	6E-09	6E-05
03-1	VOC	2-Butanone	78-93-3	1.20E-03		1E-07		1E-07	2E-11		2E-09		4E-09
03-1	VOC	Chloroethane	75-00-3	3.30E-03	2E-11	7E-07	2E-12	7E-07	1E-09		2E-07		3E-07
03-1	VOC	1,1-Dichloroethane	75-34-3	1.40E-03		5E-06		5E-07	2E-09		1E-06		2E-06
03-1	VOC	1,1-Dichloroethene	75-35-4	2.40E-03		2E-05		2E-05	1E-07		9E-06		1E-05
03-1	VOC	cis-1,2-Dichloroethene	156-59-2	4.20E-02		2E-03		2E-04	2E-08		4E-04		6E-04
03-1	VOC	trans-1,2-Dichloroethene	156-60-5	2.90E-03		8E-05		8E-05	3E-09		2E-05		4E-05
03-1	VOC	4-Methyl-2-pentanone	108-10-1	1.00E-03		3E-07		3E-07	6E-11		6E-09		1E-08
03-1	VOC	Methylcyclohexane	108-87-2	1.00E-03		5E-07		5E-07	1E-09		5E-07		7E-07
03-1	VOC	1,1,1-Trichloroethane	71-55-6	5.70E-04		4E-07		9E-08	3E-10		2E-07		2E-07
03-1	VOC	Trichloroethene	79-01-6	6.40E-02	3E-08	4E-04	3E-09	4E-04	2E-07	2E-08		4E-08	
03-1	VOC	Vinyl Chloride	75-01-4	9.10E-03	5E-08	2E-04	5E-09	2E-04	5E-06	3E-08	8E-05	5E-08	1E-04
03-1	SVOC	Acenaphthene	83-32-9	6.10E-04		4E-06		4E-07			6E-08		1E-07
03-1	SVOC	Acetophenone	98-86-2	7.90E-04		4E-07		4E-08	4E-11		4E-09		9E-09
03-1	SVOC	Benzaldehyde	100-52-7	1.26E-03		1E-06		1E-06			1E-08		3E-08
03-1	SVOC	Biphenyl	92-52-4	7.60E-04		8E-06		8E-06	4E-08		1E-07		3E-07
03-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.94E-03	2E-08	5E-04	2E-09	5E-04	2E-11	9E-14	9E-10	3E-13	2E-09
03-1	SVOC	Diethylphthalate	84-66-2	1.23E-03		3E-08		3E-09	3E-11		3E-11		8E-11
03-1	SVOC	Fluoranthene	206-44-0	1.26E-03		3E-05		3E-06			2E-08		5E-08
03-1	SVOC	Fluorene	86-73-7	6.20E-04		6E-06		6E-07			4E-08		8E-08
03-1	SVOC	2-Methylnaphthalene	91-57-6	8.42E-04		4E-04		4E-04			2E-05		3E-05
03-1	SVOC	Naphthalene	91-20-3	7.50E-04		3E-04		3E-04	1E-09		1E-05		3E-05
03-1	SVOC	Nitrobenzene	98-95-3	6.30E-04		1E-04		1E-05	6E-10		1E-06		3E-06
03-1	SVOC	Phenanthrene	85-01-8	8.42E-04		1E-05		1E-06			3E-08		6E-08
03-1	SVOC	Pyrene	129-00-0	8.44E-04		2E-05		2E-06			1E-08		3E-08
03-1	INORG	Antimony	7440-36-0	3.20E-03		8E-05		8E-05					
03-1	INORG	Arsenic	7440-38-2	9.00E-02	6E-08	1E-03	6E-09	6E-05					
03-1	INORG	Barium	7440-39-3	6.30E-01		2E-04		2E-04					
03-1	INORG	Beryllium	7440-41-7	4.30E-02		4E-03		4E-03					
03-1	INORG	Cadmium	7440-43-9	3.70E-03		2E-04		2E-04					
03-1	INORG	Chromium (total)	7440-47-3	7.00E-03		2E-04		4E-05					
03-1	INORG	Cobalt	7440-48-4	3.00E-03		4E-07		4E-07					
03-1	INORG	Copper	7440-50-8	2.20E-02		2E-06		2E-06					
03-1	INORG	Cyanide (total)	57-12-5	1.00E-01		2E-05		2E-05					
03-1	INORG	Lead	7439-92-1	1.30E-03									
03-1	INORG	Manganese	7439-96-5	1.50E+00		3E-04		3E-04					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
03-1	INORG	Nickel	7440-02-0	1.60E-02		7E-06		7E-06					
03-1	INORG	Selenium	7782-49-2	1.90E-01		1E-04		1E-04					
03-1	INORG	Silver	7440-22-4	2.10E-03		9E-06		9E-06					
03-1	INORG	Thallium	7440-28-0	1.90E-03		9E-05		9E-05					
03-1	INORG	Vanadium	7440-62-2	6.50E-03		5E-05		5E-05					
03-1	INORG	Zinc	7440-66-6	1.80E-01		2E-06		2E-06					
04-D	VOC	Benzene	71-43-2	2.80E-03	6E-09	2E-04	6E-10	1E-04	5E-07	3E-09	3E-05	6E-09	6E-05
04-D	VOC	2-Butanone	78-93-3	1.20E-03		1E-07		1E-07	2E-11		2E-09		4E-09
04-D	VOC	Dichlorodifluoromethane	75-71-8	3.20E-02		2E-04		2E-05	1E-08		2E-04		3E-04
04-D	VOC	Ethyl Benzene	100-41-4	2.40E-02		6E-05		6E-05	3E-08		9E-06		1E-05
04-D	VOC	4-Methyl-2-pentanone	108-10-1	4.40E-03		1E-06		1E-06	3E-10		3E-08		6E-08
04-D	VOC	Methylcyclohexane	108-87-2	5.10E-04		3E-07		3E-07	5E-10		2E-07		4E-07
04-D	VOC	Xylenes (total)	1330-20-7	3.32E-02		5E-04		5E-04	4E-08		1E-04		2E-04
04-D	PCB	PCBs (total)	1336-36-3	2.10E-04	1E-07	2E-02	1E-08	9E-03	7E-08	5E-09		9E-09	
04-D	INORG	Arsenic	7440-38-2	6.50E-03	5E-09	7E-05	5E-10	4E-06					
04-D	INORG	Barium	7440-39-3	7.20E-02		2E-05		2E-05					
04-D	INORG	Chromium (total)	7440-47-3	6.30E-04		2E-05		3E-06					
04-D	INORG	Cobalt	7440-48-4	5.00E-04		6E-08		6E-08					
04-D	INORG	Copper	7440-50-8	2.50E-02		2E-06		2E-06					
04-D	INORG	Cyanide (total)	57-12-5	3.80E-03		6E-07		6E-07					
04-D	INORG	Lead	7439-92-1	7.00E-04									
04-D	INORG	Manganese	7439-96-5	1.00E-01		2E-05		2E-05					
04-D	INORG	Nickel	7440-02-0	7.50E-03		3E-06		3E-06					
04-D	INORG	Selenium	7782-49-2	1.30E-02		8E-06		8E-06					
04-D	INORG	Vanadium	7440-62-2	4.40E-03		3E-05		3E-05					
04-D	INORG	Zinc	7440-66-6	2.60E-01		2E-06		2E-06					
05-1	VOC	Acetone	67-64-1	3.90E-03		6E-07		6E-07	2E-11		7E-09		2E-08
05-1	VOC	1,1-Dichloroethane	75-34-3	7.60E-04		3E-06		3E-07	1E-09		5E-07		9E-07
05-1	VOC	cis-1,2-Dichloroethene	156-59-2	1.20E-03		6E-05		6E-06	7E-10		1E-05		2E-05
05-1	VOC	Vinyl Chloride	75-01-4	1.10E-03	6E-09	3E-05	6E-10	3E-05	6E-07	3E-09	1E-05	6E-09	2E-05
05-1	SVOC	Diethylphthalate	84-66-2	1.23E-03		3E-08		3E-09	3E-11		3E-11		8E-11
05-1	INORG	Arsenic	7440-38-2	4.60E-02	3E-08	5E-04	3E-09	3E-05					
05-1	INORG	Barium	7440-39-3	9.30E-01		3E-04		3E-04					
05-1	INORG	Beryllium	7440-41-7	2.40E-04		2E-05		2E-05					
05-1	INORG	Cadmium	7440-43-9	1.40E-04		8E-06		8E-06					
05-1	INORG	Chromium (total)	7440-47-3	1.30E-03		5E-05		7E-06					
05-1	INORG	Cobalt	7440-48-4	6.10E-03		8E-07		8E-07					
05-1	INORG	Copper	7440-50-8	6.60E-03		5E-07		5E-07					
05-1	INORG	Cyanide (total)	57-12-5	2.00E-03		3E-07		3E-07					
05-1	INORG	Lead	7439-92-1	7.40E-04									
05-1	INORG	Manganese	7439-96-5	1.80E+00		3E-04		3E-04					
05-1	INORG	Mercury	7439-97-6	2.91E-04		1E-03		1E-03	2E-06		3E-04		4E-04
05-1	INORG	Nickel	7440-02-0	2.80E-02		1E-05		1E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
05-1	INORG	Selenium	7782-49-2	2.40E-03		2E-06		2E-06					
05-1	INORG	Thallium	7440-28-0	1.70E-04		8E-06		8E-06					
05-1	INORG	Zinc	7440-66-6	2.60E-02		2E-07		2E-07					
05-2	VOC	2-Butanone	78-93-3	5.90E-04		7E-08		7E-08	1E-11		9E-10		2E-09
05-2	VOC	Cumene	98-82-8	9.70E-04		5E-06		4E-06	3E-09		1E-06		2E-06
05-2	VOC	1,1-Dichloroethane	75-34-3	3.50E-03		1E-05		1E-06	5E-09		3E-06		4E-06
05-2	VOC	cis-1,2-Dichloroethene	156-59-2	1.40E-02		7E-04		7E-05	8E-09		1E-04		2E-04
05-2	VOC	trans-1,2-Dichloroethene	156-60-5	7.30E-04		2E-05		2E-05	7E-10		6E-06		1E-05
05-2	VOC	Ethyl Benzene	100-41-4	8.60E-04		2E-06		2E-06	1E-09		3E-07		5E-07
05-2	VOC	Methylene Chloride	75-09-2	6.00E-04	7E-11	4E-07	7E-12	4E-07	2E-09	2E-11	4E-08	5E-11	8E-08
05-2	VOC	Trichloroethene	79-01-6	9.50E-02	4E-08	6E-04	4E-09	6E-04	2E-07	3E-08		5E-08	
05-2	VOC	Vinyl Chloride	75-01-4	1.90E-02	1E-07	5E-04	1E-08	5E-04	1E-05	5E-08	2E-04	1E-07	3E-04
05-2	VOC	Xylenes (total)	1330-20-7	1.07E-03		2E-05		2E-05	1E-09		4E-06		7E-06
05-2	SVOC	Acenaphthene	83-32-9	1.21E-02		8E-05		8E-06			1E-06		2E-06
05-2	SVOC	Dibenzofuran	132-64-9	2.68E-03		5E-04		5E-04			7E-07		2E-06
05-2	SVOC	Naphthalene	91-20-3	1.41E-03		5E-04		5E-04	2E-09		2E-05		5E-05
05-2	INORG	Arsenic	7440-38-2	1.80E-02	1E-08	2E-04	1E-09	1E-05					
05-2	INORG	Barium	7440-39-3	2.60E-01		8E-05		8E-05					
05-2	INORG	Beryllium	7440-41-7	5.60E-03		5E-04		5E-04					
05-2	INORG	Cadmium	7440-43-9	3.40E-03		2E-04		2E-04					
05-2	INORG	Chromium (total)	7440-47-3	1.90E-02		7E-04		1E-04					
05-2	INORG	Cobalt	7440-48-4	9.60E-02		1E-05		1E-05					
05-2	INORG	Copper	7440-50-8	1.20E-02		1E-06		1E-06					
05-2	INORG	Cyanide (total)	57-12-5	2.60E-03		4E-07		4E-07					
05-2	INORG	Lead	7439-92-1	2.20E-03									
05-2	INORG	Manganese	7439-96-5	2.20E+00		4E-04		4E-04					
05-2	INORG	Nickel	7440-02-0	2.10E-01		9E-05		9E-05					
05-2	INORG	Selenium	7782-49-2	2.30E-03		1E-06		1E-06					
05-2	INORG	Silver	7440-22-4	4.20E-04		2E-06		2E-06					
05-2	INORG	Thallium	7440-28-0	8.70E-04		4E-05		4E-05					
05-2	INORG	Vanadium	7440-62-2	3.80E-03		3E-05		3E-05					
05-2	INORG	Zinc	7440-66-6	3.50E-02		3E-07		3E-07					
05-3	VOC	Carbon Disulfide	75-15-0	9.90E-04		3E-06		3E-06	1E-07		1E-06		2E-06
05-3	VOC	1,1-Dichloroethane	75-34-3	2.90E-03		1E-05		1E-06	4E-09		2E-06		4E-06
05-3	VOC	cis-1,2-Dichloroethene	156-59-2	9.00E-03		4E-04		4E-05	5E-09		8E-05		1E-04
05-3	VOC	trans-1,2-Dichloroethene	156-60-5	1.00E-03		3E-05		3E-05	9E-10		8E-06		1E-05
05-3	VOC	Toluene	108-88-3	5.30E-04		5E-07		2E-07	8E-10		4E-08		7E-08
05-3	VOC	1,1,1-Trichloroethane	71-55-6	1.10E-02		8E-06		2E-06	5E-09		3E-06		5E-06
05-3	VOC	Trichloroethene	79-01-6	2.90E-02	1E-08	2E-04	1E-09	2E-04	7E-08	8E-09		2E-08	
05-3	INORG	Antimony	7440-36-0	2.20E-03		6E-05		6E-05					
05-3	INORG	Arsenic	7440-38-2	8.40E-02	6E-08	9E-04	6E-09	5E-05					
05-3	INORG	Barium	7440-39-3	4.60E-01		1E-04		1E-04					
05-3	INORG	Cadmium	7440-43-9	3.10E-04		2E-05		2E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
05-3	INORG	Chromium (total)	7440-47-3	1.60E-03		6E-05		8E-06					
05-3	INORG	Cobalt	7440-48-4	4.40E-03		5E-07		5E-07					
05-3	INORG	Copper	7440-50-8	6.80E-03		6E-07		6E-07					
05-3	INORG	Cyanide (total)	57-12-5	7.90E-03		1E-06		1E-06					
05-3	INORG	Lead	7439-92-1	2.50E-03									
05-3	INORG	Manganese	7439-96-5	7.60E-01		1E-04		1E-04					
05-3	INORG	Nickel	7440-02-0	1.50E-02		6E-06		6E-06					
05-3	INORG	Selenium	7782-49-2	6.70E-03		4E-06		4E-06					
05-3	INORG	Thallium	7440-28-0	4.70E-04		2E-05		2E-05					
05-3	INORG	Zinc	7440-66-6	3.50E-02		3E-07		3E-07					
05-4	VOC	Acetone	67-64-1	6.90E-04		1E-07		1E-07	3E-12		1E-09		3E-09
05-4	INORG	Arsenic	7440-38-2	1.10E-03	8E-10	1E-05	8E-11	7E-07					
05-4	INORG	Barium	7440-39-3	2.00E-01		6E-05		6E-05					
05-4	INORG	Cobalt	7440-48-4	1.20E-03		1E-07		1E-07					
05-4	INORG	Copper	7440-50-8	5.60E-03		5E-07		5E-07					
05-4	INORG	Cyanide (total)	57-12-5	7.40E-03		1E-06		1E-06					
05-4	INORG	Manganese	7439-96-5	3.50E-01		6E-05		6E-05					
05-4	INORG	Nickel	7440-02-0	7.20E-03		3E-06		3E-06					
05-4	INORG	Selenium	7782-49-2	1.80E-03		1E-06		1E-06					
05-4	INORG	Zinc	7440-66-6	1.10E-02		1E-07		1E-07					
05-5	VOC	Acetone	67-64-1	1.90E-01		3E-05		3E-05	9E-10		3E-07		8E-07
05-5	VOC	1,1-Dichloroethane	75-34-3	1.40E-03		5E-06		5E-07	2E-09		1E-06		2E-06
05-5	VOC	cis-1,2-Dichloroethene	156-59-2	3.90E-03		2E-04		2E-05	2E-09		3E-05		6E-05
05-5	VOC	Methyl Acetate	79-20-9	8.00E-02		2E-05		2E-06	2E-09		3E-07		7E-07
05-5	VOC	Methylene Chloride	75-09-2	4.00E-04	5E-11	3E-07	5E-12	3E-07	1E-09	1E-11	3E-08	3E-11	5E-08
05-5	VOC	Toluene	108-88-3	2.00E-04		2E-07		8E-08	3E-10		1E-08		2E-08
05-5	VOC	Trichloroethene	79-01-6	8.00E-04	3E-10	5E-06	3E-11	5E-06	2E-09	2E-10		4E-10	
05-5	INORG	Arsenic	7440-38-2	7.00E-02	5E-08	8E-04	5E-09	5E-05					
05-5	INORG	Barium	7440-39-3	2.70E-01		8E-05		8E-05					
05-5	INORG	Cadmium	7440-43-9	3.10E-03		2E-04		2E-04					
05-5	INORG	Chromium (total)	7440-47-3	1.50E-03		5E-05		8E-06					
05-5	INORG	Cobalt	7440-48-4	9.90E-02		1E-05		1E-05					
05-5	INORG	Copper	7440-50-8	1.30E-02		1E-06		1E-06					
05-5	INORG	Cyanide (total)	57-12-5	2.40E-03		4E-07		4E-07					
05-5	INORG	Lead	7439-92-1	1.70E-03									
05-5	INORG	Manganese	7439-96-5	1.90E+00		3E-04		3E-04					
05-5	INORG	Mercury	7439-97-6	1.33E-04		5E-04		5E-04	1E-06		1E-04		2E-04
05-5	INORG	Nickel	7440-02-0	2.20E-01		9E-05		9E-05					
05-5	INORG	Selenium	7782-49-2	4.10E-03		3E-06		3E-06					
05-5	INORG	Silver	7440-22-4	2.80E-03		1E-05		1E-05					
05-5	INORG	Thallium	7440-28-0	6.30E-04		3E-05		3E-05					
05-5	INORG	Vanadium	7440-62-2	4.40E-04		3E-06		3E-06					
05-5	INORG	Zinc	7440-66-6	3.40E-02		3E-07		3E-07					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
05-6	VOC	Benzene	71-43-2	2.00E-04	4E-10	1E-05	4E-11	7E-06	3E-08	2E-10	2E-06	4E-10	4E-06
05-6	VOC	Carbon Disulfide	75-15-0	5.50E-04		2E-06		2E-06	6E-08		7E-07		1E-06
05-6	VOC	1,2-Dichloroethane	107-06-2	1.20E-03	7E-09	3E-04	7E-10	3E-04	5E-08	1E-09	3E-05	3E-09	5E-05
05-6	VOC	cis-1,2-Dichloroethene	156-59-2	8.10E-02		4E-03		4E-04	4E-08		7E-04		1E-03
05-6	VOC	trans-1,2-Dichloroethene	156-60-5	1.30E-03		4E-05		4E-05	1E-09		1E-05		2E-05
05-6	VOC	Ethyl Benzene	100-41-4	6.50E-04		2E-06		2E-06	8E-10		2E-07		4E-07
05-6	VOC	Methylene Chloride	75-09-2	4.00E-04	5E-11	3E-07	5E-12	3E-07	1E-09	1E-11	3E-08	3E-11	5E-08
05-6	VOC	Tetrachloroethene	127-18-4	6.40E-04	5E-10	4E-06	5E-11	2E-06	3E-09	4E-10	9E-07	7E-10	1E-06
05-6	VOC	Trichloroethene	79-01-6	2.50E-01	1E-07	2E-03	1E-08	2E-03	6E-07	7E-08		1E-07	
05-6	VOC	Vinyl Chloride	75-01-4	1.90E-02	1E-07	5E-04	1E-08	5E-04	1E-05	5E-08	2E-04	1E-07	3E-04
05-6	VOC	Xylenes (total)	1330-20-7	4.20E-03		7E-05		7E-05	5E-09		2E-05		3E-05
05-6	SVOC	Diethylphthalate	84-66-2	2.77E-03		6E-08		6E-09	6E-11		7E-11		2E-10
05-6	INORG	Antimony	7440-36-0	5.80E-04		2E-05		2E-05					
05-6	INORG	Arsenic	7440-38-2	1.70E-02	1E-08	2E-04	1E-09	1E-05					
05-6	INORG	Barium	7440-39-3	4.90E-01		1E-04		1E-04					
05-6	INORG	Beryllium	7440-41-7	1.20E-03		1E-04		1E-04					
05-6	INORG	Cadmium	7440-43-9	7.80E-04		4E-05		4E-05					
05-6	INORG	Chromium (total)	7440-47-3	1.90E-03		7E-05		1E-05					
05-6	INORG	Cobalt	7440-48-4	1.10E-02		1E-06		1E-06					
05-6	INORG	Copper	7440-50-8	1.10E-02		9E-07		9E-07					
05-6	INORG	Cyanide (total)	57-12-5	2.50E-02		4E-06		4E-06					
05-6	INORG	Lead	7439-92-1	2.30E-04									
05-6	INORG	Manganese	7439-96-5	3.10E+00		5E-04		5E-04					
05-6	INORG	Nickel	7440-02-0	3.40E-02		1E-05		1E-05					
05-6	INORG	Selenium	7782-49-2	4.00E-03		3E-06		3E-06					
05-6	INORG	Silver	7440-22-4	5.90E-04		3E-06		3E-06					
05-6	INORG	Thallium	7440-28-0	1.20E-03		6E-05		6E-05					
05-6	INORG	Zinc	7440-66-6	2.80E-02		3E-07		3E-07					
07-1	VOC	Acetone	67-64-1	8.10E-04		1E-07		1E-07	4E-12		1E-09		4E-09
07-1	VOC	cis-1,2-Dichloroethene	156-59-2	1.70E-02		8E-04		8E-05	9E-09		1E-04		3E-04
07-1	VOC	trans-1,2-Dichloroethene	156-60-5	1.20E-03		3E-05		3E-05	1E-09		1E-05		2E-05
07-1	VOC	Vinyl Chloride	75-01-4	3.30E-03	2E-08	8E-05	2E-09	8E-05	2E-06	9E-09	3E-05	2E-08	5E-05
07-1	INORG	Antimony	7440-36-0	2.80E-03		7E-05		7E-05					
07-1	INORG	Arsenic	7440-38-2	1.10E-03	8E-10	1E-05	8E-11	7E-07					
07-1	INORG	Barium	7440-39-3	7.30E-02		2E-05		2E-05					
07-1	INORG	Cadmium	7440-43-9	3.00E-04		2E-05		2E-05					
07-1	INORG	Chromium (total)	7440-47-3	6.60E-04		2E-05		3E-06					
07-1	INORG	Cobalt	7440-48-4	1.00E-03		1E-07		1E-07					
07-1	INORG	Copper	7440-50-8	1.10E-02		9E-07		9E-07					
07-1	INORG	Cyanide (total)	57-12-5	1.10E-03		2E-07		2E-07					
07-1	INORG	Lead	7439-92-1	6.20E-04									
07-1	INORG	Manganese	7439-96-5	3.70E-01		6E-05		6E-05					
07-1	INORG	Nickel	7440-02-0	2.00E-02		8E-06		8E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
07-1	INORG	Selenium	7782-49-2	1.10E-02		7E-06		7E-06					
07-1	INORG	Zinc	7440-66-6	1.30E-01		1E-06		1E-06					
07-3	VOC	Acetone	67-64-1	5.90E-04		9E-08		8E-08	3E-12		1E-09		3E-09
07-3	VOC	1,1-Dichloroethane	75-34-3	3.90E-03		1E-05		1E-06	5E-09		3E-06		5E-06
07-3	VOC	Tetrachloroethene	127-18-4	5.00E-04	4E-10	3E-06	4E-11	2E-06	2E-09	3E-10	7E-07	6E-10	1E-06
07-3	VOC	1,1,1-Trichloroethane	71-55-6	1.00E-03		7E-07		2E-07	4E-10		3E-07		4E-07
07-3	VOC	Xylenes (total)	1330-20-7	1.14E-03		2E-05		2E-05	1E-09		4E-06		7E-06
07-3	SVOC	Diethylphthalate	84-66-2	2.46E-03		5E-08		5E-09	5E-11		6E-11		2E-10
07-3	INORG	Arsenic	7440-38-2	2.80E-03	2E-09	3E-05	2E-10	2E-06					
07-3	INORG	Barium	7440-39-3	1.50E-01		4E-05		4E-05					
07-3	INORG	Beryllium	7440-41-7	1.30E-03		1E-04		1E-04					
07-3	INORG	Cadmium	7440-43-9	1.20E-04		6E-06		6E-06					
07-3	INORG	Chromium (total)	7440-47-3	2.00E-03		7E-05		1E-05					
07-3	INORG	Cobalt	7440-48-4	1.60E-03		2E-07		2E-07					
07-3	INORG	Copper	7440-50-8	5.80E-03		5E-07		5E-07					
07-3	INORG	Cyanide (total)	57-12-5	2.10E-03		3E-07		3E-07					
07-3	INORG	Lead	7439-92-1	3.20E-04									
07-3	INORG	Manganese	7439-96-5	5.30E-01		9E-05		9E-05					
07-3	INORG	Nickel	7440-02-0	1.50E-02		6E-06		6E-06					
07-3	INORG	Selenium	7782-49-2	1.60E-02		1E-05		1E-05					
07-3	INORG	Silver	7440-22-4	4.10E-04		2E-06		2E-06					
07-3	INORG	Thallium	7440-28-0	2.30E-04		1E-05		1E-05					
07-3	INORG	Zinc	7440-66-6	1.00E-01		9E-07		9E-07					
09-A	VOC	Acetone	67-64-1	6.90E-02		1E-05		1E-05	3E-10		1E-07		3E-07
09-A	VOC	Benzene	71-43-2	1.00E-03	2E-09	7E-05	2E-10	4E-05	2E-07	1E-09	1E-05	2E-09	2E-05
09-A	VOC	2-Butanone	78-93-3	1.10E-03		1E-07		1E-07	2E-11		2E-09		4E-09
09-A	VOC	Carbon Tetrachloride	56-23-5	3.00E-04	1E-09	1E-05	1E-10	1E-06	3E-08	1E-09		2E-09	
09-A	VOC	Chloroethane	75-00-3	2.10E-03	1E-11	5E-07	1E-12	5E-07	7E-10		1E-07		2E-07
09-A	VOC	Chloroform	67-66-3	3.00E-03	1E-08	9E-05	1E-09	9E-05	1E-07	7E-09	2E-05	2E-08	3E-05
09-A	VOC	Chloromethane	74-87-3	2.60E-03		6E-05		6E-05	1E-08		1E-05		2E-05
09-A	VOC	Cumene	98-82-8	3.60E-03		2E-05		1E-05	9E-09		4E-06		6E-06
09-A	VOC	Cyclohexane	110-82-7	3.40E-02		1E-05		1E-05	6E-08		7E-06		1E-05
09-A	VOC	1,1-Dichloroethane	75-34-3	3.50E-02		1E-04		1E-05	5E-08		3E-05		4E-05
09-A	VOC	1,1-Dichloroethene	75-35-4	4.00E-03		3E-05		3E-05	2E-07		2E-05		2E-05
09-A	VOC	cis-1,2-Dichloroethene	156-59-2	1.20E-02		6E-04		6E-05	7E-09		1E-04		2E-04
09-A	VOC	trans-1,2-Dichloroethene	156-60-5	5.00E-04		1E-05		1E-05	5E-10		4E-06		7E-06
09-A	VOC	Ethyl Benzene	100-41-4	5.70E-04		1E-06		1E-06	7E-10		2E-07		3E-07
09-A	VOC	Methyl Acetate	79-20-9	6.00E-03		1E-06		1E-07	2E-10		2E-08		5E-08
09-A	VOC	Methylcyclohexane	108-87-2	1.20E-01		7E-05		7E-05	1E-07		6E-05		8E-05
09-A	VOC	Toluene	108-88-3	2.00E-03		2E-06		8E-07	3E-09		1E-07		2E-07
09-A	VOC	1,1,1-Trichloroethane	71-55-6	2.58E-01		2E-04		4E-05	1E-07		7E-05		1E-04
09-A	VOC	Trichloroethene	79-01-6	1.84E-01	7E-08	1E-03	7E-09	1E-03	5E-07	5E-08		1E-07	
09-A	VOC	Trichlorofluoromethane	75-69-4	1.40E-02		3E-05		3E-06	4E-09		2E-05		3E-05

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
09-A	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.00E-04		2E-08		2E-08	1E-10		2E-08		3E-08
09-A	VOC	Vinyl Chloride	75-01-4	3.80E-03	2E-08	9E-05	2E-09	9E-05	2E-06	1E-08	3E-05	2E-08	5E-05
09-A	VOC	Xylenes (total)	1330-20-7	1.40E-03		2E-05		2E-05	2E-09		5E-06		9E-06
09-A	PCB	PCBs (total)	1336-36-3	1.45E-04	1E-07	2E-02	1E-08	6E-03	5E-08	3E-09		6E-09	
09-A	INORG	Antimony	7440-36-0	1.60E-02		4E-04		4E-04					
09-A	INORG	Arsenic	7440-38-2	9.80E-03	7E-09	1E-04	7E-10	6E-06					
09-A	INORG	Barium	7440-39-3	1.40E-01		4E-05		4E-05					
09-A	INORG	Cadmium	7440-43-9	2.80E-04		2E-05		2E-05					
09-A	INORG	Chromium (total)	7440-47-3	1.70E-02		6E-04		9E-05					
09-A	INORG	Cobalt	7440-48-4	1.20E-03		1E-07		1E-07					
09-A	INORG	Copper	7440-50-8	1.20E-03		1E-07		1E-07					
09-A	INORG	Cyanide (total)	57-12-5	4.40E-03		7E-07		7E-07					
09-A	INORG	Lead	7439-92-1	4.00E-03									
09-A	INORG	Manganese	7439-96-5	1.40E-01		2E-05		2E-05					
09-A	INORG	Nickel	7440-02-0	7.70E-03		3E-06		3E-06					
09-A	INORG	Selenium	7782-49-2	1.10E-02		7E-06		7E-06					
09-A	INORG	Vanadium	7440-62-2	4.20E-03		3E-05		3E-05					
09-A	INORG	Zinc	7440-66-6	8.00E-03		7E-08		7E-08					
09-B	VOC	Acetone	67-64-1	4.60E-01		7E-05		7E-05	2E-09		8E-07		2E-06
09-B	VOC	Benzene	71-43-2	1.21E+00	3E-06	8E-02	3E-07	4E-02	2E-04	1E-06	1E-02	2E-06	2E-02
09-B	VOC	2-Butanone	78-93-3	1.90E-01		2E-05		2E-05	4E-09		3E-07		7E-07
09-B	VOC	Carbon Disulfide	75-15-0	5.70E-04		2E-06		2E-06	6E-08		7E-07		1E-06
09-B	VOC	Chloroethane	75-00-3	6.10E-03	3E-11	1E-06	3E-12	1E-06	2E-09		4E-07		6E-07
09-B	VOC	Cumene	98-82-8	6.60E-02		3E-04		3E-04	2E-07		7E-05		1E-04
09-B	VOC	Cyclohexane	110-82-7	5.60E-01		2E-04		2E-04	1E-06		1E-04		2E-04
09-B	VOC	1,3-Dichlorobenzene	541-73-1	3.00E-04		3E-06		3E-06			5E-07		8E-07
09-B	VOC	Dichlorodifluoromethane	75-71-8	5.60E-03		4E-05		4E-06	2E-09		4E-05		5E-05
09-B	VOC	1,2-Dichloroethane	107-06-2	3.00E-03	2E-08	9E-04	2E-09	9E-04	1E-07	3E-09	6E-05	7E-09	1E-04
09-B	VOC	cis-1,2-Dichloroethene	156-59-2	6.90E-04		3E-05		3E-06	4E-10		6E-06		1E-05
09-B	VOC	Ethyl Benzene	100-41-4	1.00E+00		2E-03		2E-03	1E-06		4E-04		6E-04
09-B	VOC	2-Hexanone	591-78-6	2.40E-02		7E-03		7E-03					
09-B	VOC	Methyl tert-butyl ether	1634-04-4	7.10E-04		3E-07		3E-07	4E-10		2E-08		3E-08
09-B	VOC	4-Methyl-2-pentanone	108-10-1	6.60E-03		2E-06		2E-06	4E-10		4E-08		9E-08
09-B	VOC	Methylcyclohexane	108-87-2	4.00E-01		2E-04		2E-04	4E-07		2E-04		3E-04
09-B	VOC	Methylene Chloride	75-09-2	7.40E-03	9E-10	5E-06	9E-11	5E-06	3E-08	3E-10	5E-07	6E-10	1E-06
09-B	VOC	Toluene	108-88-3	5.40E-01		5E-04		2E-04	8E-07		4E-05		7E-05
09-B	VOC	Xylenes (total)	1330-20-7	1.69E+00		3E-02		3E-02	2E-06		6E-03		1E-02
09-B	SVOC	2,4-Dimethylphenol	105-67-9	2.94E-02		5E-05		5E-06			1E-07		3E-07
09-B	SVOC	2-Methylnaphthalene	91-57-6	1.05E-02		4E-03		4E-03			2E-04		4E-04
09-B	SVOC	Methylphenol (total)	1319-77-3	1.10E-02		4E-06		4E-07	1E-10				
09-B	SVOC	Naphthalene	91-20-3	6.36E-02		2E-02		2E-02	1E-07		1E-03		2E-03
09-B	SVOC	4-Nitrophenol	100-02-7	2.15E-03									

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
09-B	SVOC	Phenol	108-95-2	4.94E-03		2E-07		2E-07	2E-11				
09-B	PCB	PCBs (total)	1336-36-3	1.69E-03	1E-06	2E-01	1E-07	7E-02	5E-07	4E-08		7E-08	
09-B	INORG	Antimony	7440-36-0	6.80E-03		2E-04		2E-04					
09-B	INORG	Arsenic	7440-38-2	6.10E-02	4E-08	7E-04	4E-09	4E-05					
09-B	INORG	Barium	7440-39-3	1.40E+00		4E-04		4E-04					
09-B	INORG	Beryllium	7440-41-7	2.70E-03		3E-04		3E-04					
09-B	INORG	Cadmium	7440-43-9	1.00E-03		5E-05		5E-05					
09-B	INORG	Chromium (total)	7440-47-3	1.30E-02		5E-04		7E-05					
09-B	INORG	Cobalt	7440-48-4	2.20E-03		3E-07		3E-07					
09-B	INORG	Copper	7440-50-8	2.10E-02		2E-06		2E-06					
09-B	INORG	Cyanide (total)	57-12-5	7.90E-02		1E-05		1E-05					
09-B	INORG	Lead	7439-92-1	5.80E-03									
09-B	INORG	Manganese	7439-96-5	8.90E-01		1E-04		1E-04					
09-B	INORG	Mercury	7439-97-6	2.70E-04		1E-03		1E-03	2E-06		2E-04		4E-04
09-B	INORG	Nickel	7440-02-0	1.30E-02		5E-06		5E-06					
09-B	INORG	Selenium	7782-49-2	5.20E-02		3E-05		3E-05					
09-B	INORG	Silver	7440-22-4	6.80E-04		3E-06		3E-06					
09-B	INORG	Thallium	7440-28-0	1.60E-03		7E-05		7E-05					
09-B	INORG	Vanadium	7440-62-2	4.40E-03		3E-05		3E-05					
09-B	INORG	Zinc	7440-66-6	1.10E-01		1E-06		1E-06					
10-1	VOC	Acetone	67-64-1	8.10E-03		1E-06		1E-06	4E-11		1E-08		4E-08
10-1	VOC	Benzene	71-43-2	1.60E-03	4E-09	1E-04	4E-10	6E-05	3E-07	2E-09	2E-05	3E-09	3E-05
10-1	VOC	Chloroethane	75-00-3	1.70E-01	8E-10	4E-05	8E-11	4E-05	6E-08		1E-05		2E-05
10-1	VOC	1,1-Dichloroethane	75-34-3	6.90E-01		2E-03		2E-04	9E-07		5E-04		8E-04
10-1	VOC	1,2-Dichloroethane	107-06-2	3.20E-03	2E-08	9E-04	2E-09	9E-04	1E-07	3E-09	7E-05	8E-09	1E-04
10-1	VOC	1,1-Dichloroethene	75-35-4	1.30E-02		1E-04		1E-04	8E-07		5E-05		8E-05
10-1	VOC	cis-1,2-Dichloroethene	156-59-2	2.50E-01		1E-02		1E-03	1E-07		2E-03		4E-03
10-1	VOC	trans-1,2-Dichloroethene	156-60-5	5.20E-03		1E-04		1E-04	5E-09		4E-05		7E-05
10-1	VOC	Methylene Chloride	75-09-2	5.00E-04	6E-11	3E-07	6E-12	3E-07	2E-09	2E-11	3E-08	4E-11	7E-08
10-1	VOC	Toluene	108-88-3	9.20E-03		9E-06		4E-06	1E-08		7E-07		1E-06
10-1	VOC	1,1,1-Trichloroethane	71-55-6	2.10E-01		2E-04		3E-05	9E-08		6E-05		9E-05
10-1	VOC	1,1,2-Trichloroethane	79-00-5	3.30E-03	1E-08	1E-05	1E-09	1E-06	1E-08	2E-09		4E-09	
10-1	VOC	Trichloroethene	79-01-6	1.20E-03	5E-10	8E-06	5E-11	8E-06	3E-09	3E-10		7E-10	
10-1	VOC	Vinyl Chloride	75-01-4	3.20E-03	2E-08	8E-05	2E-09	8E-05	2E-06	9E-09	3E-05	2E-08	5E-05
10-1	VOC	Xylenes (total)	1330-20-7	1.30E-03		2E-05		2E-05	2E-09		5E-06		8E-06
10-1	SVOC	Diethylphthalate	84-66-2	1.64E-03		4E-08		4E-09	3E-11		4E-11		1E-10
10-1	INORG	Antimony	7440-36-0	3.50E-04		9E-06		9E-06					
10-1	INORG	Arsenic	7440-38-2	6.30E-03	4E-09	7E-05	4E-10	4E-06					
10-1	INORG	Barium	7440-39-3	3.30E+01		1E-02		1E-02					
10-1	INORG	Beryllium	7440-41-7	1.30E-04		1E-05		1E-05					
10-1	INORG	Cadmium	7440-43-9	5.40E-04		3E-05		3E-05					
10-1	INORG	Chromium (total)	7440-47-3	4.10E-03		1E-04		2E-05					
10-1	INORG	Cobalt	7440-48-4	5.10E-03		6E-07		6E-07					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
10-1	INORG	Copper	7440-50-8	3.10E-01		3E-05		3E-05					
10-1	INORG	Cyanide (total)	57-12-5	1.20E-02		2E-06		2E-06					
10-1	INORG	Lead	7439-92-1	8.80E-03									
10-1	INORG	Manganese	7439-96-5	2.00E+00		3E-04		3E-04					
10-1	INORG	Nickel	7440-02-0	3.00E-02		1E-05		1E-05					
10-1	INORG	Selenium	7782-49-2	4.10E-04		3E-07		3E-07					
10-1	INORG	Silver	7440-22-4	1.20E-04		5E-07		5E-07					
10-1	INORG	Zinc	7440-66-6	6.60E-01		6E-06		6E-06					
10-2	VOC	Acetone	67-64-1	4.10E-02		7E-06		6E-06	2E-10		7E-08		2E-07
10-2	VOC	Benzene	71-43-2	1.70E-02	4E-08	1E-03	4E-09	6E-04	3E-06	2E-08	2E-04	3E-08	3E-04
10-2	VOC	2-Butanone	78-93-3	6.80E-03		8E-07		8E-07	1E-10		1E-08		3E-08
10-2	VOC	Chloroethane	75-00-3	3.30E+00	2E-08	7E-04	2E-09	7E-04	1E-06		2E-04		3E-04
10-2	VOC	Chloroform	67-66-3	4.20E-03	2E-08	1E-04	2E-09	1E-04	2E-07	1E-08	2E-05	2E-08	4E-05
10-2	VOC	Cumene	98-82-8	3.40E-03		2E-05		1E-05	9E-09		4E-06		6E-06
10-2	VOC	1,1-Dichloroethane	75-34-3	1.10E+00		4E-03		4E-04	1E-06		8E-04		1E-03
10-2	VOC	1,2-Dichloroethane	107-06-2	1.50E-03	8E-09	4E-04	8E-10	4E-04	6E-08	1E-09	3E-05	4E-09	7E-05
10-2	VOC	1,1-Dichloroethene	75-35-4	1.10E-01		9E-04		9E-04	6E-06		4E-04		7E-04
10-2	VOC	cis-1,2-Dichloroethene	156-59-2	1.50E-01		7E-03		7E-04	8E-08		1E-03		2E-03
10-2	VOC	trans-1,2-Dichloroethene	156-60-5	1.00E-02		3E-04		3E-04	9E-09		8E-05		1E-04
10-2	VOC	Ethyl Benzene	100-41-4	6.20E-02		1E-04		1E-04	8E-08		2E-05		4E-05
10-2	VOC	2-Hexanone	591-78-6	6.70E-03		2E-03		2E-03					
10-2	VOC	Methyl tert-butyl ether	1634-04-4	1.20E-03		6E-07		6E-07	7E-10		3E-08		6E-08
10-2	VOC	4-Methyl-2-pentanone	108-10-1	9.80E-03		3E-06		3E-06	6E-10		6E-08		1E-07
10-2	VOC	Methylcyclohexane	108-87-2	7.20E-04		4E-07		4E-07	8E-10		4E-07		5E-07
10-2	VOC	Methylene Chloride	75-09-2	2.90E-02	3E-09	2E-05	3E-10	2E-05	1E-07	1E-09	2E-06	2E-09	4E-06
10-2	VOC	Toluene	108-88-3	9.60E-03		1E-05		4E-06	1E-08		7E-07		1E-06
10-2	VOC	1,1,1-Trichloroethane	71-55-6	5.80E-01		4E-04		9E-05	3E-07		2E-04		2E-04
10-2	VOC	1,1,2-Trichloroethane	79-00-5	5.50E-04	2E-09	2E-06	2E-10	2E-07	2E-09	3E-10		7E-10	
10-2	VOC	Trichloroethene	79-01-6	1.60E-01	6E-08	1E-03	6E-09	1E-03	4E-07	5E-08		9E-08	
10-2	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.20E-04		2E-08		2E-08	1E-10		3E-08		4E-08
10-2	VOC	Vinyl Chloride	75-01-4	6.00E-02	3E-07	1E-03	3E-08	1E-03	3E-05	2E-07	5E-04	3E-07	8E-04
10-2	VOC	Xylenes (total)	1330-20-7	2.34E-01		4E-03		4E-03	3E-07		9E-04		1E-03
10-2	SVOC	2,4-Dimethylphenol	105-67-9	2.46E-02		4E-05		4E-06			1E-07		3E-07
10-2	SVOC	Fluorene	86-73-7	1.18E-03		1E-05		1E-06			7E-08		2E-07
10-2	SVOC	Methylphenol (total)	1319-77-3	1.07E-02		3E-06		3E-07	9E-11				
10-2	INORG	Antimony	7440-36-0	2.60E-03		7E-05		7E-05					
10-2	INORG	Arsenic	7440-38-2	6.80E-02	5E-08	7E-04	5E-09	4E-05					
10-2	INORG	Barium	7440-39-3	1.10E+00		3E-04		3E-04					
10-2	INORG	Beryllium	7440-41-7	1.70E-03		2E-04		2E-04					
10-2	INORG	Cadmium	7440-43-9	4.40E-03		2E-04		2E-04					
10-2	INORG	Chromium (total)	7440-47-3	9.90E-03		3E-04		5E-05					
10-2	INORG	Cobalt	7440-48-4	1.10E-02		1E-06		1E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
10-2	INORG	Copper	7440-50-8	1.30E-02		1E-06		1E-06					
10-2	INORG	Cyanide (total)	57-12-5	2.80E-02		5E-06		5E-06					
10-2	INORG	Lead	7439-92-1	6.80E-03									
10-2	INORG	Manganese	7439-96-5	7.60E+00		1E-03		1E-03					
10-2	INORG	Mercury	7439-97-6	2.55E-04		1E-03		1E-03	2E-06		2E-04		4E-04
10-2	INORG	Nickel	7440-02-0	5.70E-02		2E-05		2E-05					
10-2	INORG	Selenium	7782-49-2	8.50E-03		6E-06		6E-06					
10-2	INORG	Silver	7440-22-4	3.00E-03		1E-05		1E-05					
10-2	INORG	Thallium	7440-28-0	4.20E-04		2E-05		2E-05					
10-2	INORG	Vanadium	7440-62-2	1.10E-02		8E-05		8E-05					
10-2	INORG	Zinc	7440-66-6	4.60E-02		4E-07		4E-07					
10-3	VOC	Acetone	67-64-1	2.10E-01		3E-05		3E-05	1E-09		4E-07		9E-07
10-3	VOC	Benzene	71-43-2	2.00E-03	4E-09	1E-04	4E-10	7E-05	3E-07	2E-09	2E-05	4E-09	4E-05
10-3	VOC	2-Butanone	78-93-3	3.20E-02		4E-06		4E-06	6E-10		5E-08		1E-07
10-3	VOC	Chloroethane	75-00-3	7.40E+00	4E-08	2E-03	4E-09	2E-03	2E-06		4E-04		8E-04
10-3	VOC	Chloroform	67-66-3	3.90E-03	2E-08	1E-04	2E-09	1E-04	2E-07	9E-09	2E-05	2E-08	4E-05
10-3	VOC	1,1-Dichloroethane	75-34-3	1.20E+01		4E-02		4E-03	2E-05		9E-03		1E-02
10-3	VOC	1,2-Dichloroethane	107-06-2	1.70E-02	9E-08	5E-03	9E-09	5E-03	7E-07	2E-08	4E-04	4E-08	7E-04
10-3	VOC	1,1-Dichloroethene	75-35-4	1.30E-01		1E-03		1E-03	8E-06		5E-04		8E-04
10-3	VOC	cis-1,2-Dichloroethene	156-59-2	3.00E-03		1E-04		1E-05	2E-09		3E-05		5E-05
10-3	VOC	trans-1,2-Dichloroethene	156-60-5	5.10E-03		1E-04		1E-04	5E-09		4E-05		7E-05
10-3	VOC	Methyl tert-butyl ether	1634-04-4	3.40E-03		2E-06		2E-06	2E-09		8E-08		2E-07
10-3	VOC	Methylene Chloride	75-09-2	5.00E-03	6E-10	3E-06	6E-11	3E-06	2E-08	2E-10	3E-07	4E-10	7E-07
10-3	VOC	1,1,1-Trichloroethane	71-55-6	2.40E+00		2E-03		4E-04	1E-06		6E-04		1E-03
10-3	VOC	1,1,2-Trichloroethane	79-00-5	4.40E-03	1E-08	2E-05	1E-09	2E-06	1E-08	2E-09		6E-09	
10-3	VOC	Vinyl Chloride	75-01-4	5.20E-01	3E-06	1E-02	3E-07	1E-02	3E-04	1E-06	5E-03	3E-06	7E-03
10-3	SVOC	Acenaphthene	83-32-9	6.63E-04		5E-06		5E-07			6E-08		1E-07
10-3	INORG	Antimony	7440-36-0	1.20E-03		3E-05		3E-05					
10-3	INORG	Arsenic	7440-38-2	2.80E-02	2E-08	3E-04	2E-09	2E-05					
10-3	INORG	Barium	7440-39-3	4.30E-01		1E-04		1E-04					
10-3	INORG	Beryllium	7440-41-7	4.20E-03		4E-04		4E-04					
10-3	INORG	Cadmium	7440-43-9	6.50E-04		3E-05		3E-05					
10-3	INORG	Chromium (total)	7440-47-3	4.00E-03		1E-04		2E-05					
10-3	INORG	Cobalt	7440-48-4	5.70E-03		7E-07		7E-07					
10-3	INORG	Copper	7440-50-8	1.50E-02		1E-06		1E-06					
10-3	INORG	Cyanide (total)	57-12-5	1.80E-02		3E-06		3E-06					
10-3	INORG	Lead	7439-92-1	4.90E-03									
10-3	INORG	Manganese	7439-96-5	1.90E+00		3E-04		3E-04					
10-3	INORG	Mercury	7439-97-6	1.23E-04		5E-04		5E-04	9E-07		1E-04		2E-04
10-3	INORG	Nickel	7440-02-0	2.00E-02		8E-06		8E-06					
10-3	INORG	Selenium	7782-49-2	8.80E-03		6E-06		6E-06					
10-3	INORG	Silver	7440-22-4	1.50E-03		6E-06		6E-06					
10-3	INORG	Thallium	7440-28-0	1.30E-04		6E-06		6E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
10-3	INORG	Vanadium	7440-62-2	7.50E-03		6E-05		6E-05					
10-3	INORG	Zinc	7440-66-6	3.90E-02		4E-07		4E-07					
10-4	VOC	Acetone	67-64-1	3.10E-03		5E-07		4E-07	1E-11		6E-09		1E-08
10-4	VOC	Benzene	71-43-2	6.10E-03	1E-08	4E-04	1E-09	2E-04	1E-06	6E-09	7E-05	1E-08	1E-04
10-4	VOC	2-Butanone	78-93-3	2.40E-03		3E-07		3E-07	5E-11		4E-09		9E-09
10-4	VOC	Chloroethane	75-00-3	3.90E-02	2E-10	9E-06	2E-11	9E-06	1E-08		2E-06		4E-06
10-4	VOC	Cyclohexane	110-82-7	1.30E-03		4E-07		4E-07	2E-09		3E-07		4E-07
10-4	VOC	1,1-Dichloroethane	75-34-3	2.30E-02		8E-05		8E-06	3E-08		2E-05		3E-05
10-4	VOC	1,1-Dichloroethene	75-35-4	5.70E-04		5E-06		5E-06	3E-08		2E-06		3E-06
10-4	VOC	cis-1,2-Dichloroethene	156-59-2	6.20E-04		3E-05		3E-06	3E-10		5E-06		9E-06
10-4	VOC	1,2,4-Trichlorobenzene	120-82-1	6.30E-04		1E-05		1E-05			4E-07		6E-07
10-4	VOC	1,1,1-Trichloroethane	71-55-6	2.00E-03		1E-06		3E-07	9E-10		5E-07		8E-07
10-4	VOC	Vinyl Chloride	75-01-4	2.30E-03	1E-08	6E-05	1E-09	6E-05	1E-06	7E-09	2E-05	1E-08	3E-05
10-4	SVOC	2-Methylnaphthalene	91-57-6	1.04E-03		4E-04		4E-04			2E-05		4E-05
10-4	INORG	Arsenic	7440-38-2	3.80E-02	3E-08	4E-04	3E-09	2E-05					
10-4	INORG	Barium	7440-39-3	1.80E+00		5E-04		5E-04					
10-4	INORG	Cadmium	7440-43-9	8.50E-04		5E-05		5E-05					
10-4	INORG	Chromium (total)	7440-47-3	6.50E-03		2E-04		3E-05					
10-4	INORG	Cobalt	7440-48-4	2.60E-03		3E-07		3E-07					
10-4	INORG	Copper	7440-50-8	1.40E-02		1E-06		1E-06					
10-4	INORG	Cyanide (total)	57-12-5	4.80E-02		8E-06		8E-06					
10-4	INORG	Lead	7439-92-1	1.10E-03									
10-4	INORG	Manganese	7439-96-5	7.30E-01		1E-04		1E-04					
10-4	INORG	Nickel	7440-02-0	2.00E-02		8E-06		8E-06					
10-4	INORG	Selenium	7782-49-2	2.10E-02		1E-05		1E-05					
10-4	INORG	Silver	7440-22-4	1.90E-03		8E-06		8E-06					
10-4	INORG	Thallium	7440-28-0	4.60E-05		2E-06		2E-06					
10-4	INORG	Vanadium	7440-62-2	2.70E-04		2E-06		2E-06					
10-4	INORG	Zinc	7440-66-6	5.30E-02		5E-07		5E-07					
12-A	VOC	Acetone	67-64-1	2.20E-01		3E-05		3E-05	1E-09		4E-07		1E-06
12-A	VOC	Benzene	71-43-2	2.70E-03	6E-09	2E-04	6E-10	1E-04	4E-07	3E-09	3E-05	6E-09	6E-05
12-A	VOC	2-Butanone	78-93-3	3.50E-02		4E-06		4E-06	7E-10		6E-08		1E-07
12-A	VOC	Cumene	98-82-8	3.80E-03		2E-05		2E-05	1E-08		4E-06		6E-06
12-A	VOC	Cyclohexane	110-82-7	1.50E-02		4E-06		4E-06	3E-08		3E-06		5E-06
12-A	VOC	Dichlorodifluoromethane	75-71-8	3.30E-02		2E-04		2E-05	1E-08		2E-04		3E-04
12-A	VOC	Ethyl Benzene	100-41-4	1.50E-03		4E-06		4E-06	2E-09		6E-07		9E-07
12-A	VOC	2-Hexanone	591-78-6	1.20E-03		4E-04		4E-04					
12-A	VOC	Methyl Acetate	79-20-9	2.30E-02		5E-06		5E-07	7E-10		8E-08		2E-07
12-A	VOC	4-Methyl-2-pentanone	108-10-1	8.90E-04		3E-07		3E-07	6E-11		5E-09		1E-08
12-A	VOC	Methylcyclohexane	108-87-2	1.10E-02		6E-06		6E-06	1E-08		5E-06		8E-06
12-A	VOC	Toluene	108-88-3	5.70E-03		6E-06		2E-06	8E-09		4E-07		7E-07
12-A	VOC	Trichlorofluoromethane	75-69-4	2.00E-03		4E-06		5E-07	6E-10		3E-06		5E-06
12-A	VOC	Xylenes (total)	1330-20-7	3.70E-03		6E-05		6E-05	5E-09		1E-05		2E-05

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
12-A	SVOC	Acenaphthene	83-32-9	3.00E-04		2E-06		2E-07			3E-08		6E-08
12-A	SVOC	Anthracene	120-12-7	2.00E-04		3E-07		3E-08					
12-A	SVOC	Biphenyl	92-52-4	1.00E-04		1E-06		1E-06	5E-09		2E-08		4E-08
12-A	SVOC	Carbazole	86-74-8	1.23E-03	4E-10		4E-11			9E-15		3E-14	
12-A	SVOC	Dibenzofuran	132-64-9	3.00E-04		6E-05		6E-05			7E-08		2E-07
12-A	SVOC	Fluorene	86-73-7	5.00E-04		5E-06		5E-07			3E-08		7E-08
12-A	SVOC	2-Methylnaphthalene	91-57-6	3.11E-03		1E-03		1E-03			6E-05		1E-04
12-A	SVOC	Methylphenol (total)	1319-77-3	6.64E-03		2E-06		2E-07	6E-11				
12-A	SVOC	Naphthalene	91-20-3	4.05E-02		2E-02		2E-02	6E-08		7E-04		1E-03
12-A	SVOC	Phenanthrene	85-01-8	8.53E-04		1E-05		1E-06			3E-08		6E-08
12-A	SVOC	Phenol	108-95-2	9.82E-03		3E-07		3E-07	5E-11				
12-A	INORG	Antimony	7440-36-0	4.30E-03		1E-04		1E-04					
12-A	INORG	Arsenic	7440-38-2	6.00E-02	4E-08	6E-04	4E-09	4E-05					
12-A	INORG	Barium	7440-39-3	6.10E-01		2E-04		2E-04					
12-A	INORG	Beryllium	7440-41-7	2.70E-01		3E-02		3E-02					
12-A	INORG	Cadmium	7440-43-9	6.70E-03		4E-04		4E-04					
12-A	INORG	Chromium (total)	7440-47-3	1.20E-01		4E-03		6E-04					
12-A	INORG	Cobalt	7440-48-4	4.60E-02		6E-06		6E-06					
12-A	INORG	Copper	7440-50-8	8.90E-02		7E-06		7E-06					
12-A	INORG	Cyanide (total)	57-12-5	2.40E-02		4E-06		4E-06					
12-A	INORG	Lead	7439-92-1	5.90E-02									
12-A	INORG	Manganese	7439-96-5	2.10E+00		4E-04		4E-04					
12-A	INORG	Mercury	7439-97-6	4.37E-05		2E-04		2E-04	3E-07		4E-05		6E-05
12-A	INORG	Nickel	7440-02-0	1.20E-01		5E-05		5E-05					
12-A	INORG	Selenium	7782-49-2	4.50E-03		3E-06		3E-06					
12-A	INORG	Silver	7440-22-4	4.40E-03		2E-05		2E-05					
12-A	INORG	Thallium	7440-28-0	3.60E-03		2E-04		2E-04					
12-A	INORG	Vanadium	7440-62-2	1.40E-01		1E-03		1E-03					
12-A	INORG	Zinc	7440-66-6	2.60E-01		2E-06		2E-06					
12-B	VOC	Acetone	67-64-1	7.80E-03		1E-06		1E-06	4E-11		1E-08		3E-08
12-B	VOC	2-Butanone	78-93-3	1.70E-03		2E-07		2E-07	3E-11		3E-09		6E-09
12-B	PCB	PCBs (total)	1336-36-3	1.01E-04	7E-08	1E-02	7E-09	4E-03	3E-08	2E-09		4E-09	
12-B	INORG	Antimony	7440-36-0	1.30E-03		3E-05		3E-05					
12-B	INORG	Arsenic	7440-38-2	1.00E-03	7E-10	1E-05	7E-11	6E-07					
12-B	INORG	Barium	7440-39-3	1.80E-01		5E-05		5E-05					
12-B	INORG	Cadmium	7440-43-9	2.00E-04		1E-05		1E-05					
12-B	INORG	Chromium (total)	7440-47-3	6.80E-04		2E-05		4E-06					
12-B	INORG	Cobalt	7440-48-4	1.10E-03		1E-07		1E-07					
12-B	INORG	Copper	7440-50-8	2.70E-02		2E-06		2E-06					
12-B	INORG	Lead	7439-92-1	6.00E-04									
12-B	INORG	Manganese	7439-96-5	7.40E-01		1E-04		1E-04					
12-B	INORG	Nickel	7440-02-0	1.70E-02		7E-06		7E-06					
12-B	INORG	Selenium	7782-49-2	2.00E-03		1E-06		1E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
12-B	INORG	Vanadium	7440-62-2	3.30E-04		2E-06		2E-06					
12-B	INORG	Zinc	7440-66-6	2.80E-02		3E-07		3E-07					
16-A	VOC	Acetone	67-64-1	6.30E-03		1E-06		9E-07	3E-11		1E-08		3E-08
16-A	VOC	1,1-Dichloroethane	75-34-3	1.80E-03		6E-06		6E-07	2E-09		1E-06		2E-06
16-A	SVOC	Benzaldehyde	100-52-7	1.11E-03		9E-07		9E-07			1E-08		3E-08
16-A	INORG	Arsenic	7440-38-2	7.30E-03	5E-09	8E-05	5E-10	5E-06					
16-A	INORG	Barium	7440-39-3	2.80E-01		8E-05		8E-05					
16-A	INORG	Chromium (total)	7440-47-3	7.10E-03		2E-04		4E-05					
16-A	INORG	Cobalt	7440-48-4	2.10E-03		3E-07		3E-07					
16-A	INORG	Copper	7440-50-8	5.50E-03		4E-07		4E-07					
16-A	INORG	Cyanide (total)	57-12-5	3.60E-03		6E-07		6E-07					
16-A	INORG	Manganese	7439-96-5	8.80E-01		1E-04		1E-04					
16-A	INORG	Nickel	7440-02-0	4.80E-02		2E-05		2E-05					
16-A	INORG	Selenium	7782-49-2	1.00E-02		6E-06		6E-06					
16-A	INORG	Silver	7440-22-4	2.90E-03		1E-05		1E-05					
16-A	INORG	Vanadium	7440-62-2	3.70E-03		3E-05		3E-05					
16-A	INORG	Zinc	7440-66-6	1.40E-02		1E-07		1E-07					
16-C	VOC	Acetone	67-64-1	1.60E-02		3E-06		2E-06	7E-11		3E-08		7E-08
16-C	VOC	Benzene	71-43-2	2.10E-01	5E-07	1E-02	5E-08	8E-03	3E-05	2E-07	2E-03	4E-07	4E-03
16-C	VOC	2-Butanone	78-93-3	4.10E-03		5E-07		5E-07	8E-11		6E-09		2E-08
16-C	VOC	Chlorobenzene	108-90-7	2.10E-02		6E-04		6E-04	2E-08		9E-05		2E-04
16-C	VOC	Chloromethane	74-87-3	5.30E-04		1E-05		1E-05	3E-09		2E-06		4E-06
16-C	VOC	Cumene	98-82-8	3.20E-03		2E-05		1E-05	8E-09		4E-06		5E-06
16-C	VOC	Cyclohexane	110-82-7	1.60E-02		5E-06		5E-06	3E-08		4E-06		5E-06
16-C	VOC	1,2-Dichlorobenzene	95-50-1	3.70E-03		3E-05		6E-06	6E-09		3E-06		5E-06
16-C	VOC	cis-1,2-Dichloroethene	156-59-2	9.00E-04		4E-05		4E-06	5E-10		8E-06		1E-05
16-C	VOC	Methylcyclohexane	108-87-2	9.50E-04		5E-07		5E-07	1E-09		5E-07		7E-07
16-C	VOC	Toluene	108-88-3	1.20E-03		1E-06		5E-07	2E-09		9E-08		1E-07
16-C	VOC	Trichloroethene	79-01-6	5.20E-04	2E-10	3E-06	2E-11	3E-06	1E-09	1E-10		3E-10	
16-C	VOC	Xylenes (total)	1330-20-7	1.03E-03		2E-05		2E-05	1E-09		4E-06		6E-06
16-C	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	4.46E-03	2E-08	6E-04	2E-09	6E-04	2E-11	1E-13	1E-09	3E-13	3E-09
16-C	SVOC	Diethylphthalate	84-66-2	3.91E-03		8E-08		8E-09	8E-11		1E-10		2E-10
16-C	INORG	Antimony	7440-36-0	3.20E-03		8E-05		8E-05					
16-C	INORG	Arsenic	7440-38-2	1.90E-02	1E-08	2E-04	1E-09	1E-05					
16-C	INORG	Barium	7440-39-3	4.00E-01		1E-04		1E-04					
16-C	INORG	Beryllium	7440-41-7	4.40E-02		4E-03		4E-03					
16-C	INORG	Cadmium	7440-43-9	3.20E-03		2E-04		2E-04					
16-C	INORG	Chromium (total)	7440-47-3	2.10E-02		7E-04		1E-04					
16-C	INORG	Cobalt	7440-48-4	3.70E-03		5E-07		5E-07					
16-C	INORG	Copper	7440-50-8	1.00E-01		8E-06		8E-06					
16-C	INORG	Cyanide (total)	57-12-5	6.20E-02		1E-05		1E-05					
16-C	INORG	Lead	7439-92-1	1.00E-03									
16-C	INORG	Manganese	7439-96-5	1.20E+00		2E-04		2E-04					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
16-C	INORG	Nickel	7440-02-0	2.80E-02		1E-05		1E-05					
16-C	INORG	Selenium	7782-49-2	1.80E-01		1E-04		1E-04					
16-C	INORG	Silver	7440-22-4	2.00E-03		9E-06		9E-06					
16-C	INORG	Thallium	7440-28-0	1.50E-03		7E-05		7E-05					
16-C	INORG	Vanadium	7440-62-2	6.60E-03		5E-05		5E-05					
16-C	INORG	Zinc	7440-66-6	4.90E-02		4E-07		4E-07					
17-A	VOC	1,1-Dichloroethane	75-34-3	2.00E-03		7E-06		7E-07	3E-09		1E-06		2E-06
17-A	VOC	Methyl tert-butyl ether	1634-04-4	3.00E-03		1E-06		1E-06	2E-09		7E-08		1E-07
17-A	INORG	Antimony	7440-36-0	4.30E-03		1E-04		1E-04					
17-A	INORG	Arsenic	7440-38-2	2.70E-02	2E-08	3E-04	2E-09	2E-05					
17-A	INORG	Barium	7440-39-3	1.40E-01		4E-05		4E-05					
17-A	INORG	Cadmium	7440-43-9	9.30E-05		5E-06		5E-06					
17-A	INORG	Chromium (total)	7440-47-3	2.60E-03		9E-05		1E-05					
17-A	INORG	Cobalt	7440-48-4	1.20E-03		1E-07		1E-07					
17-A	INORG	Copper	7440-50-8	6.30E-03		5E-07		5E-07					
17-A	INORG	Cyanide (total)	57-12-5	1.60E-03		3E-07		3E-07					
17-A	INORG	Lead	7439-92-1	2.00E-03									
17-A	INORG	Manganese	7439-96-5	8.50E-02		1E-05		1E-05					
17-A	INORG	Nickel	7440-02-0	7.90E-03		3E-06		3E-06					
17-A	INORG	Selenium	7782-49-2	7.30E-03		5E-06		5E-06					
17-A	INORG	Silver	7440-22-4	4.50E-04		2E-06		2E-06					
17-A	INORG	Thallium	7440-28-0	5.50E-05		3E-06		3E-06					
17-A	INORG	Vanadium	7440-62-2	3.80E-03		3E-05		3E-05					
17-A	INORG	Zinc	7440-66-6	2.90E-02		3E-07		3E-07					
21-1	VOC	Methylene Chloride	75-09-2	6.00E-04	7E-11	4E-07	7E-12	4E-07	2E-09	2E-11	4E-08	5E-11	8E-08
21-1	SVOC	Dibenz(a,h)anthracene	53-70-3	5.00E-04	2E-06		2E-07			5E-13		1E-12	
21-1	SVOC	Dibenzofuran	132-64-9	1.00E-04		2E-05		2E-05			2E-08		6E-08
21-1	SVOC	Fluorene	86-73-7	1.00E-04		1E-06		1E-07			6E-09		1E-08
21-1	SVOC	Phenanthrene	85-01-8	4.00E-04		6E-06		6E-07			1E-08		3E-08
21-1	INORG	Arsenic	7440-38-2	4.30E-03	3E-09	5E-05	3E-10	3E-06					
21-1	INORG	Barium	7440-39-3	7.10E-01		2E-04		2E-04					
21-1	INORG	Cadmium	7440-43-9	2.80E-03		2E-04		2E-04					
21-1	INORG	Chromium (total)	7440-47-3	3.70E-03		1E-04		2E-05					
21-1	INORG	Cobalt	7440-48-4	5.00E-03		6E-07		6E-07					
21-1	INORG	Copper	7440-50-8	5.10E-03		4E-07		4E-07					
21-1	INORG	Cyanide (total)	57-12-5	7.50E-03		1E-06		1E-06					
21-1	INORG	Lead	7439-92-1	3.50E-04									
21-1	INORG	Manganese	7439-96-5	1.64E+01		3E-03		3E-03					
21-1	INORG	Nickel	7440-02-0	2.10E-02		9E-06		9E-06					
21-1	INORG	Silver	7440-22-4	9.00E-05		4E-07		4E-07					
21-1	INORG	Thallium	7440-28-0	1.30E-04		6E-06		6E-06					
21-1	INORG	Zinc	7440-66-6	1.90E-02		2E-07		2E-07					
23-A	VOC	1,1,1-Trichloroethane	71-55-6	7.00E-04		5E-07		1E-07	3E-10		2E-07		3E-07

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
23-A	SVOC	Biphenyl	92-52-4	1.00E-04		1E-06		1E-06	5E-09		2E-08		4E-08
23-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	7.00E-04	4E-09	1E-04	4E-10	1E-04	3E-12	2E-14	2E-10	5E-14	4E-10
23-A	SVOC	2,4-Dichlorophenol	120-83-2	6.00E-04		1E-05		1E-05			3E-08		7E-08
23-A	SVOC	2,4-Dimethylphenol	105-67-9	1.00E-03		2E-06		2E-07			4E-09		1E-08
23-A	SVOC	Methylphenol (total)	1319-77-3	3.20E-03		1E-06		1E-07	3E-11				
23-A	SVOC	Naphthalene	91-20-3	1.00E-04		4E-05		4E-05	2E-10		2E-06		4E-06
23-A	SVOC	4-Nitrophenol	100-02-7	8.00E-03									
23-A	SVOC	Pentachlorophenol	87-86-5	3.00E-03	2E-08	5E-05	2E-09	5E-05	4E-11	2E-13	1E-10	5E-13	3E-10
23-A	SVOC	Phenanthrene	85-01-8	2.00E-04		3E-06		3E-07			6E-09		1E-08
23-A	SVOC	Phenol	108-95-2	1.00E-03		3E-08		3E-08	5E-12				
23-A	INORG	Arsenic	7440-38-2	2.30E-03	2E-09	2E-05	2E-10	1E-06					
23-A	INORG	Barium	7440-39-3	1.30E-01		4E-05		4E-05					
23-A	INORG	Chromium (total)	7440-47-3	1.30E-03		5E-05		7E-06					
23-A	INORG	Cobalt	7440-48-4	1.10E-03		1E-07		1E-07					
23-A	INORG	Copper	7440-50-8	1.60E-02		1E-06		1E-06					
23-A	INORG	Cyanide (total)	57-12-5	1.10E-02		2E-06		2E-06					
23-A	INORG	Manganese	7439-96-5	3.01E-01		5E-05		5E-05					
23-A	INORG	Nickel	7440-02-0	5.20E-03		2E-06		2E-06					
23-A	INORG	Selenium	7782-49-2	4.70E-03		3E-06		3E-06					
23-A	INORG	Vanadium	7440-62-2	9.00E-03		7E-05		7E-05					
23-A	INORG	Zinc	7440-66-6	1.20E-02		1E-07		1E-07					
36-1	VOC	Acetone	67-64-1	1.30E-02		2E-06		2E-06	6E-11		2E-08		6E-08
36-1	VOC	Benzene	71-43-2	3.60E-01	8E-07	2E-02	8E-08	1E-02	6E-05	4E-07	4E-03	7E-07	7E-03
36-1	VOC	2-Butanone	78-93-3	3.90E-03		5E-07		5E-07	8E-11		6E-09		1E-08
36-1	VOC	Carbon Disulfide	75-15-0	9.70E-04		3E-06		3E-06	1E-07		1E-06		2E-06
36-1	VOC	Chloroethane	75-00-3	1.10E+00	5E-09	2E-04	5E-10	2E-04	4E-07		7E-05		1E-04
36-1	VOC	Chloroform	67-66-3	1.20E-02	6E-08	4E-04	6E-09	4E-04	5E-07	3E-08	7E-05	6E-08	1E-04
36-1	VOC	Cumene	98-82-8	3.00E-03		1E-05		1E-05	8E-09		3E-06		5E-06
36-1	VOC	Cyclohexane	110-82-7	7.90E-04		2E-07		2E-07	1E-09		2E-07		2E-07
36-1	VOC	1,3-Dichlorobenzene	541-73-1	7.70E-04		8E-06		8E-06			1E-06		2E-06
36-1	VOC	1,1-Dichloroethane	75-34-3	1.30E+00		4E-03		4E-04	2E-06		9E-04		2E-03
36-1	VOC	1,2-Dichloroethane	107-06-2	9.30E-03	5E-08	3E-03	5E-09	3E-03	4E-07	9E-09	2E-04	2E-08	4E-04
36-1	VOC	1,1-Dichloroethene	75-35-4	1.20E-01		1E-03		1E-03	7E-06		5E-04		7E-04
36-1	VOC	cis-1,2-Dichloroethene	156-59-2	1.50E-01		7E-03		7E-04	8E-08		1E-03		2E-03
36-1	VOC	trans-1,2-Dichloroethene	156-60-5	6.40E-03		2E-04		2E-04	6E-09		5E-05		9E-05
36-1	VOC	Ethyl Benzene	100-41-4	4.00E-03		1E-05		1E-05	5E-09		2E-06		2E-06
36-1	VOC	2-Hexanone	591-78-6	1.60E-02		5E-03		5E-03					
36-1	VOC	Methyl tert-butyl ether	1634-04-4	1.50E-02		7E-06		7E-06	8E-09		3E-07		7E-07
36-1	VOC	Methylcyclohexane	108-87-2	1.00E-03		5E-07		5E-07	1E-09		5E-07		7E-07
36-1	VOC	Methylene Chloride	75-09-2	2.10E-03	3E-10	1E-06	3E-11	1E-06	7E-09	7E-11	1E-07	2E-10	3E-07
36-1	VOC	Tetrachloroethene	127-18-4	1.00E-03	8E-10	6E-06	8E-11	3E-06	5E-09	6E-10	1E-06	1E-09	2E-06
36-1	VOC	Toluene	108-88-3	2.60E-03		3E-06		1E-06	4E-09		2E-07		3E-07
36-1	VOC	1,1,1-Trichloroethane	71-55-6	9.50E-01		7E-04		2E-04	4E-07		3E-04		4E-04

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
36-1	VOC	1,1,2-Trichloroethane	79-00-5	5.00E-03	1E-08	2E-05	1E-09	2E-06	2E-08	3E-09		7E-09	
36-1	VOC	Trichloroethene	79-01-6	9.90E-02	4E-08	6E-04	4E-09	6E-04	3E-07	3E-08		5E-08	
36-1	VOC	Vinyl Chloride	75-01-4	1.98E-01	1E-06	5E-03	1E-07	5E-03	1E-04	6E-07	2E-03	1E-06	3E-03
36-1	VOC	Xylenes (total)	1330-20-7	1.10E-02		2E-04		2E-04	1E-08		4E-05		7E-05
36-1	SVOC	Benzo(a)pyrene	50-32-8	5.50E-04	1E-06		1E-07			3E-11		9E-11	
36-1	SVOC	Benzo(k)fluoranthene	207-08-9	7.20E-04	2E-08		2E-09			3E-13		9E-13	
36-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	9.80E-04	5E-09	1E-04	5E-10	1E-04	5E-12	2E-14	2E-10	7E-14	6E-10
36-1	SVOC	Diethylphthalate	84-66-2	1.19E-03		3E-08		3E-09	2E-11		3E-11		8E-11
36-1	INORG	Antimony	7440-36-0	1.40E-03		4E-05		4E-05					
36-1	INORG	Arsenic	7440-38-2	1.40E-01	1E-07	2E-03	1E-08	9E-05					
36-1	INORG	Barium	7440-39-3	8.40E-01		2E-04		2E-04					
36-1	INORG	Beryllium	7440-41-7	3.00E-02		3E-03		3E-03					
36-1	INORG	Cadmium	7440-43-9	2.10E-02		1E-03		1E-03					
36-1	INORG	Chromium (total)	7440-47-3	2.20E-01		8E-03		1E-03					
36-1	INORG	Cobalt	7440-48-4	1.40E-02		2E-06		2E-06					
36-1	INORG	Copper	7440-50-8	7.00E-02		6E-06		6E-06					
36-1	INORG	Cyanide (total)	57-12-5	1.10E-02		2E-06		2E-06					
36-1	INORG	Lead	7439-92-1	2.20E-02									
36-1	INORG	Manganese	7439-96-5	2.20E+00		4E-04		4E-04					
36-1	INORG	Mercury	7439-97-6	3.90E-04		1E-03		1E-03	3E-06		3E-04		5E-04
36-1	INORG	Nickel	7440-02-0	1.30E-01		5E-05		5E-05					
36-1	INORG	Selenium	7782-49-2	4.20E-03		3E-06		3E-06					
36-1	INORG	Silver	7440-22-4	1.70E-03		7E-06		7E-06					
36-1	INORG	Thallium	7440-28-0	1.30E-03		6E-05		6E-05					
36-1	INORG	Vanadium	7440-62-2	2.10E-01		2E-03		2E-03					
36-1	INORG	Zinc	7440-66-6	1.30E-01		1E-06		1E-06					
36-2	VOC	Acetone	67-64-1	4.80E-03		8E-07		7E-07	2E-11		9E-09		2E-08
36-2	VOC	Benzene	71-43-2	4.50E+00	1E-05	3E-01	1E-06	2E-01	7E-04	4E-06	5E-02	9E-06	9E-02
36-2	VOC	2-Butanone	78-93-3	2.60E-03		3E-07		3E-07	5E-11		4E-09		1E-08
36-2	VOC	Chloroethane	75-00-3	1.80E-01	9E-10	4E-05	9E-11	4E-05	6E-08		1E-05		2E-05
36-2	VOC	1,1-Dichloroethane	75-34-3	5.00E-01		2E-03		2E-04	7E-07		4E-04		6E-04
36-2	VOC	1,2-Dichloroethane	107-06-2	1.30E-02	7E-08	4E-03	7E-09	4E-03	5E-07	1E-08	3E-04	3E-08	6E-04
36-2	VOC	1,1-Dichloroethene	75-35-4	5.70E-03		5E-05		5E-05	3E-07		2E-05		3E-05
36-2	VOC	cis-1,2-Dichloroethene	156-59-2	2.80E-03		1E-04		1E-05	2E-09		2E-05		4E-05
36-2	VOC	trans-1,2-Dichloroethene	156-60-5	7.20E-04		2E-05		2E-05	7E-10		6E-06		1E-05
36-2	VOC	Methyl tert-butyl ether	1634-04-4	6.10E-03		3E-06		3E-06	3E-09		1E-07		3E-07
36-2	VOC	1,1,1-Trichloroethane	71-55-6	2.40E-01		2E-04		4E-05	1E-07		6E-05		1E-04
36-2	VOC	Trichloroethene	79-01-6	3.50E-02	1E-08	2E-04	1E-09	2E-04	9E-08	1E-08		2E-08	
36-2	VOC	Trichlorofluoromethane	75-69-4	3.20E-03		7E-06		8E-07	1E-09		5E-06		8E-06
36-2	VOC	Vinyl Chloride	75-01-4	8.10E-03	4E-08	2E-04	4E-09	2E-04	4E-06	2E-08	7E-05	4E-08	1E-04
36-2	INORG	Arsenic	7440-38-2	1.70E-01	1E-07	2E-03	1E-08	1E-04					
36-2	INORG	Barium	7440-39-3	8.30E-01		2E-04		2E-04					
36-2	INORG	Beryllium	7440-41-7	1.00E-03		9E-05		9E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
36-2	INORG	Cadmium	7440-43-9	1.70E-04		9E-06		9E-06					
36-2	INORG	Chromium (total)	7440-47-3	1.40E-03		5E-05		7E-06					
36-2	INORG	Cobalt	7440-48-4	6.10E-03		8E-07		8E-07					
36-2	INORG	Copper	7440-50-8	9.60E-03		8E-07		8E-07					
36-2	INORG	Cyanide (total)	57-12-5	1.60E-03		3E-07		3E-07					
36-2	INORG	Lead	7439-92-1	5.70E-04									
36-2	INORG	Manganese	7439-96-5	1.70E+00		3E-04		3E-04					
36-2	INORG	Nickel	7440-02-0	2.70E-02		1E-05		1E-05					
36-2	INORG	Selenium	7782-49-2	7.10E-03		5E-06		5E-06					
36-2	INORG	Thallium	7440-28-0	8.90E-05		4E-06		4E-06					
36-2	INORG	Zinc	7440-66-6	4.20E-02		4E-07		4E-07					
36-3	VOC	Acetone	67-64-1	8.50E-03		1E-06		1E-06	4E-11		2E-08		4E-08
36-3	VOC	Benzene	71-43-2	6.00E+00	1E-05	4E-01	1E-06	2E-01	1E-03	6E-06	7E-02	1E-05	1E-01
36-3	VOC	2-Butanone	78-93-3	3.80E-03		5E-07		5E-07	7E-11		6E-09		1E-08
36-3	VOC	Chloroethane	75-00-3	7.60E-04	4E-12	2E-07	4E-13	2E-07	3E-10		5E-08		8E-08
36-3	VOC	Cumene	98-82-8	3.70E-02		2E-04		1E-04	1E-07		4E-05		6E-05
36-3	VOC	Cyclohexane	110-82-7	4.40E-02		1E-05		1E-05	8E-08		1E-05		1E-05
36-3	VOC	1,1-Dichloroethane	75-34-3	2.10E-03		7E-06		7E-07	3E-09		2E-06		3E-06
36-3	VOC	1,2-Dichloroethane	107-06-2	1.10E-03	6E-09	3E-04	6E-10	3E-04	4E-08	1E-09	2E-05	3E-09	5E-05
36-3	VOC	Ethyl Benzene	100-41-4	1.30E+00		3E-03		3E-03	2E-06		5E-04		8E-04
36-3	VOC	Methylcyclohexane	108-87-2	1.50E-01		8E-05		8E-05	2E-07		7E-05		1E-04
36-3	VOC	Methylene Chloride	75-09-2	1.00E-02	1E-09	7E-06	1E-10	7E-06	3E-08	3E-10	7E-07	8E-10	1E-06
36-3	VOC	Toluene	108-88-3	2.00E+01		2E-02		8E-03	3E-05		1E-03		2E-03
36-3	VOC	1,1,1-Trichloroethane	71-55-6	2.10E-02		2E-05		3E-06	9E-09		6E-06		9E-06
36-3	VOC	Trichlorofluoromethane	75-69-4	2.60E-03		5E-06		6E-07	8E-10		4E-06		6E-06
36-3	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	2.10E-03		9E-08		9E-08	6E-10		1E-07		1E-07
36-3	VOC	Xylenes (total)	1330-20-7	5.00E+00		8E-02		8E-02	6E-06		2E-02		3E-02
36-3	SVOC	2,4-Dimethylphenol	105-67-9	9.67E-02		2E-04		2E-05			4E-07		1E-06
36-3	SVOC	Di-n-butylphthalate	84-74-2	1.95E-03		4E-06		4E-07	1E-12				
36-3	SVOC	Methylphenol (total)	1319-77-3	6.20E-02		2E-05		2E-06	5E-10				
36-3	SVOC	Naphthalene	91-20-3	1.08E-02		4E-03		4E-03	2E-08		2E-04		4E-04
36-3	INORG	Antimony	7440-36-0	2.20E-03		6E-05		6E-05					
36-3	INORG	Arsenic	7440-38-2	3.90E-02	3E-08	4E-04	3E-09	3E-05					
36-3	INORG	Barium	7440-39-3	8.10E-01		2E-04		2E-04					
36-3	INORG	Beryllium	7440-41-7	8.10E-03		8E-04		8E-04					
36-3	INORG	Cadmium	7440-43-9	3.10E-03		2E-04		2E-04					
36-3	INORG	Chromium (total)	7440-47-3	1.90E-01		7E-03		1E-03					
36-3	INORG	Cobalt	7440-48-4	4.20E-03		5E-07		5E-07					
36-3	INORG	Copper	7440-50-8	1.40E-02		1E-06		1E-06					
36-3	INORG	Cyanide (total)	57-12-5	1.60E-01		3E-05		3E-05					
36-3	INORG	Lead	7439-92-1	7.70E-04									
36-3	INORG	Manganese	7439-96-5	1.30E+00		2E-04		2E-04					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
36-3	INORG	Nickel	7440-02-0	2.70E-02		1E-05		1E-05					
36-3	INORG	Selenium	7782-49-2	1.90E-02		1E-05		1E-05					
36-3	INORG	Silver	7440-22-4	1.50E-03		6E-06		6E-06					
36-3	INORG	Thallium	7440-28-0	1.30E-04		6E-06		6E-06					
36-3	INORG	Vanadium	7440-62-2	3.80E-01		3E-03		3E-03					
36-3	INORG	Zinc	7440-66-6	9.10E-02		8E-07		8E-07					
36-4	VOC	1,1-Dichloroethane	75-34-3	2.40E-02		8E-05		8E-06	3E-08		2E-05		3E-05
36-4	VOC	cis-1,2-Dichloroethene	156-59-2	1.20E-02		6E-04		6E-05	7E-09		1E-04		2E-04
36-4	VOC	Tetrachloroethene	127-18-4	1.70E-03	1E-09	1E-05	1E-10	6E-06	8E-09	1E-09	2E-06	2E-09	4E-06
36-4	VOC	1,1,1-Trichloroethane	71-55-6	1.10E-02		8E-06		2E-06	5E-09		3E-06		5E-06
36-4	VOC	Trichloroethene	79-01-6	1.20E-03	5E-10	8E-06	5E-11	8E-06	3E-09	3E-10		7E-10	
36-4	INORG	Arsenic	7440-38-2	4.70E-03	3E-09	5E-05	3E-10	3E-06					
36-4	INORG	Barium	7440-39-3	6.10E-02		2E-05		2E-05					
36-4	INORG	Cobalt	7440-48-4	6.30E-04		8E-08		8E-08					
36-4	INORG	Copper	7440-50-8	4.00E-03		3E-07		3E-07					
36-4	INORG	Cyanide (total)	57-12-5	1.00E-03		2E-07		2E-07					
36-4	INORG	Manganese	7439-96-5	3.30E-01		6E-05		6E-05					
36-4	INORG	Nickel	7440-02-0	4.10E-03		2E-06		2E-06					
36-4	INORG	Selenium	7782-49-2	2.20E-03		1E-06		1E-06					
36-4	INORG	Zinc	7440-66-6	1.10E-02		1E-07		1E-07					
36-5	VOC	Acetone	67-64-1	7.80E-04		1E-07		1E-07	4E-12		1E-09		3E-09
36-5	VOC	Benzene	71-43-2	4.70E-03	1E-08	3E-04	1E-09	2E-04	8E-07	5E-09	6E-05	1E-08	1E-04
36-5	VOC	1,1-Dichloroethane	75-34-3	7.50E-03		2E-05		2E-06	1E-08		5E-06		9E-06
36-5	VOC	1,1-Dichloroethene	75-35-4	1.50E-03		1E-05		1E-05	9E-08		6E-06		9E-06
36-5	VOC	cis-1,2-Dichloroethene	156-59-2	6.10E-02		3E-03		3E-04	3E-08		5E-04		9E-04
36-5	VOC	trans-1,2-Dichloroethene	156-60-5	1.30E-02		4E-04		4E-04	1E-08		1E-04		2E-04
36-5	VOC	Methyl tert-butyl ether	1634-04-4	6.80E-04		3E-07		3E-07	4E-10		2E-08		3E-08
36-5	VOC	Tetrachloroethene	127-18-4	1.80E-03	1E-09	1E-05	1E-10	6E-06	9E-09	1E-09	3E-06	2E-09	4E-06
36-5	VOC	1,1,1-Trichloroethane	71-55-6	1.20E-02		9E-06		2E-06	5E-09		3E-06		5E-06
36-5	VOC	Trichloroethene	79-01-6	4.40E-02	2E-08	3E-04	2E-09	3E-04	1E-07	1E-08		2E-08	
36-5	VOC	Vinyl Chloride	75-01-4	1.40E-02	7E-08	3E-04	7E-09	3E-04	7E-06	4E-08	1E-04	7E-08	2E-04
36-5	SVOC	Diethylphthalate	84-66-2	1.68E-03		4E-08		4E-09	3E-11		4E-11		1E-10
36-5	SVOC	Di-n-butylphthalate	84-74-2	2.59E-03		6E-06		6E-07	2E-12				
36-5	INORG	Antimony	7440-36-0	7.00E-04		2E-05		2E-05					
36-5	INORG	Arsenic	7440-38-2	5.00E-02	3E-08	5E-04	3E-09	3E-05					
36-5	INORG	Barium	7440-39-3	6.60E-01		2E-04		2E-04					
36-5	INORG	Beryllium	7440-41-7	3.40E-04		3E-05		3E-05					
36-5	INORG	Cadmium	7440-43-9	7.20E-04		4E-05		4E-05					
36-5	INORG	Chromium (total)	7440-47-3	1.30E-02		5E-04		7E-05					
36-5	INORG	Cobalt	7440-48-4	7.30E-03		9E-07		9E-07					
36-5	INORG	Copper	7440-50-8	2.70E-02		2E-06		2E-06					
36-5	INORG	Cyanide (total)	57-12-5	2.90E-02		5E-06		5E-06					
36-5	INORG	Lead	7439-92-1	1.30E-03									

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GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
36-5	INORG	Manganese	7439-96-5	3.70E+00		6E-04		6E-04					
36-5	INORG	Nickel	7440-02-0	2.30E-02		1E-05		1E-05					
36-5	INORG	Selenium	7782-49-2	3.50E-02		2E-05		2E-05					
36-5	INORG	Silver	7440-22-4	1.50E-03		6E-06		6E-06					
36-5	INORG	Thallium	7440-28-0	2.40E-04		1E-05		1E-05					
36-5	INORG	Vanadium	7440-62-2	2.90E-03		2E-05		2E-05					
36-5	INORG	Zinc	7440-66-6	4.60E-02		4E-07		4E-07					
38-1	VOC	Acetone	67-64-1	9.00E-04		1E-07		1E-07	4E-12		2E-09		4E-09
38-1	VOC	1,1-Dichloroethane	75-34-3	5.90E-03		2E-05		2E-06	8E-09		4E-06		7E-06
38-1	VOC	Trichloroethene	79-01-6	2.70E-03	1E-09	2E-05	1E-10	2E-05	7E-09	8E-10		1E-09	
38-1	SVOC	Diethylphthalate	84-66-2	1.60E-03		3E-08		3E-09	3E-11		4E-11		1E-10
38-1	INORG	Antimony	7440-36-0	1.40E-03		4E-05		4E-05					
38-1	INORG	Arsenic	7440-38-2	7.20E-03	5E-09	8E-05	5E-10	5E-06					
38-1	INORG	Barium	7440-39-3	2.00E-01		6E-05		6E-05					
38-1	INORG	Beryllium	7440-41-7	3.20E-03		3E-04		3E-04					
38-1	INORG	Cadmium	7440-43-9	6.00E-04		3E-05		3E-05					
38-1	INORG	Chromium (total)	7440-47-3	4.90E-03		2E-04		3E-05					
38-1	INORG	Cobalt	7440-48-4	7.50E-03		9E-07		9E-07					
38-1	INORG	Copper	7440-50-8	7.50E-03		6E-07		6E-07					
38-1	INORG	Cyanide (total)	57-12-5	2.90E-03		5E-07		5E-07					
38-1	INORG	Lead	7439-92-1	6.50E-03									
38-1	INORG	Manganese	7439-96-5	1.70E+00		3E-04		3E-04					
38-1	INORG	Mercury	7439-97-6	1.26E-04		5E-04		5E-04	1E-06		1E-04		2E-04
38-1	INORG	Nickel	7440-02-0	3.50E-02		1E-05		1E-05					
38-1	INORG	Selenium	7782-49-2	2.50E-03		2E-06		2E-06					
38-1	INORG	Silver	7440-22-4	5.00E-04		2E-06		2E-06					
38-1	INORG	Thallium	7440-28-0	3.80E-03		2E-04		2E-04					
38-1	INORG	Vanadium	7440-62-2	4.50E-03		3E-05		3E-05					
38-1	INORG	Zinc	7440-66-6	1.10E-01		1E-06		1E-06					
40-A	VOC	Acetone	67-64-1	2.70E-02		4E-06		4E-06	1E-10		5E-08		1E-07
40-A	VOC	Benzene	71-43-2	5.50E+00	1E-05	4E-01	1E-06	2E-01	9E-04	5E-06	7E-02	1E-05	1E-01
40-A	VOC	2-Butanone	78-93-3	1.00E-02		1E-06		1E-06	2E-10		2E-08		4E-08
40-A	VOC	Chloroethane	75-00-3	1.40E-03	7E-12	3E-07	7E-13	3E-07	5E-10		8E-08		1E-07
40-A	VOC	Cumene	98-82-8	7.40E-02		4E-04		3E-04	2E-07		8E-05		1E-04
40-A	VOC	Cyclohexane	110-82-7	2.50E-01		7E-05		7E-05	5E-07		5E-05		8E-05
40-A	VOC	1,1-Dichloroethane	75-34-3	1.40E-03		5E-06		5E-07	2E-09		1E-06		2E-06
40-A	VOC	cis-1,2-Dichloroethene	156-59-2	2.50E-03		1E-04		1E-05	1E-09		2E-05		4E-05
40-A	VOC	Ethyl Benzene	100-41-4	8.00E-01		2E-03		2E-03	1E-06		3E-04		5E-04
40-A	VOC	2-Hexanone	591-78-6	7.90E-04		2E-04		2E-04					
40-A	VOC	Methyl tert-butyl ether	1634-04-4	1.40E-03		7E-07		7E-07	8E-10		3E-08		7E-08
40-A	VOC	4-Methyl-2-pentanone	108-10-1	6.30E-04		2E-07		2E-07	4E-11		4E-09		9E-09
40-A	VOC	Methylcyclohexane	108-87-2	1.80E-01		1E-04		1E-04	2E-07		9E-05		1E-04
40-A	VOC	Toluene	108-88-3	6.80E-02		7E-05		3E-05	1E-07		5E-06		8E-06

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Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
40-A	VOC	Trichloroethene	79-01-6	2.10E-03	8E-10	1E-05	8E-11	1E-05	5E-09	6E-10		1E-09	
40-A	VOC	Xylenes (total)	1330-20-7	2.43E+00		4E-02		4E-02	3E-06		9E-03		1E-02
40-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.32E-03	7E-09	2E-04	7E-10	2E-04	6E-12	3E-14	3E-10	9E-14	8E-10
40-A	SVOC	Diethylphthalate	84-66-2	1.51E-03		3E-08		3E-09	3E-11		4E-11		1E-10
40-A	SVOC	2,4-Dimethylphenol	105-67-9	2.34E-02		4E-05		4E-06			1E-07		3E-07
40-A	SVOC	2-Methylnaphthalene	91-57-6	5.32E-02		2E-02		2E-02			1E-03		2E-03
40-A	SVOC	Naphthalene	91-20-3	8.94E-02		3E-02		3E-02	1E-07		2E-03		3E-03
40-A	SVOC	Phenol	108-95-2	2.46E-02		8E-07		8E-07	1E-10				
40-A	PCB	PCBs (total)	1336-36-3	2.35E-04	2E-07	3E-02	2E-08	1E-02	7E-08	5E-09		1E-08	
40-A	INORG	Antimony	7440-36-0	3.30E-03		9E-05		9E-05					
40-A	INORG	Arsenic	7440-38-2	4.40E-01	3E-07	5E-03	3E-08	3E-04					
40-A	INORG	Barium	7440-39-3	6.70E-01		2E-04		2E-04					
40-A	INORG	Beryllium	7440-41-7	1.70E-01		2E-02		2E-02					
40-A	INORG	Cadmium	7440-43-9	2.00E-03		1E-04		1E-04					
40-A	INORG	Chromium (total)	7440-47-3	9.70E-03		3E-04		5E-05					
40-A	INORG	Cobalt	7440-48-4	4.00E-03		5E-07		5E-07					
40-A	INORG	Copper	7440-50-8	1.60E-02		1E-06		1E-06					
40-A	INORG	Cyanide (total)	57-12-5	4.40E-01		7E-05		7E-05					
40-A	INORG	Lead	7439-92-1	6.40E-03									
40-A	INORG	Manganese	7439-96-5	1.00E+00		2E-04		2E-04					
40-A	INORG	Mercury	7439-97-6	1.21E-04		5E-04		5E-04	9E-07		1E-04		2E-04
40-A	INORG	Nickel	7440-02-0	3.70E-02		2E-05		2E-05					
40-A	INORG	Selenium	7782-49-2	5.40E-03		4E-06		4E-06					
40-A	INORG	Silver	7440-22-4	1.60E-03		7E-06		7E-06					
40-A	INORG	Thallium	7440-28-0	9.90E-04		5E-05		5E-05					
40-A	INORG	Vanadium	7440-62-2	4.00E-03		3E-05		3E-05					
40-A	INORG	Zinc	7440-66-6	2.40E-02		2E-07		2E-07					
40-B	VOC	Acetone	67-64-1	1.40E-03		2E-07		2E-07	6E-12		3E-09		6E-09
40-B	VOC	1,1-Dichloroethane	75-34-3	6.70E-04		2E-06		2E-07	9E-10		5E-07		8E-07
40-B	VOC	cis-1,2-Dichloroethene	156-59-2	9.30E-02		4E-03		4E-04	5E-08		8E-04		1E-03
40-B	VOC	trans-1,2-Dichloroethene	156-60-5	3.30E-03		9E-05		9E-05	3E-09		3E-05		5E-05
40-B	VOC	Tetrachloroethene	127-18-4	6.90E-04	5E-10	4E-06	5E-11	2E-06	3E-09	4E-10	1E-06	8E-10	1E-06
40-B	VOC	Trichloroethene	79-01-6	1.00E-01	4E-08	6E-04	4E-09	6E-04	3E-07	3E-08		6E-08	
40-B	VOC	Vinyl Chloride	75-01-4	7.80E-03	4E-08	2E-04	4E-09	2E-04	4E-06	2E-08	7E-05	4E-08	1E-04
40-B	INORG	Barium	7440-39-3	3.50E-02		1E-05		1E-05					
40-B	INORG	Beryllium	7440-41-7	2.00E-03		2E-04		2E-04					
40-B	INORG	Chromium (total)	7440-47-3	5.10E-03		2E-04		3E-05					
40-B	INORG	Cobalt	7440-48-4	3.00E-04		4E-08		4E-08					
40-B	INORG	Copper	7440-50-8	1.50E-03		1E-07		1E-07					
40-B	INORG	Cyanide (total)	57-12-5	2.10E-03		3E-07		3E-07					
40-B	INORG	Manganese	7439-96-5	1.20E-02		2E-06		2E-06					
40-B	INORG	Nickel	7440-02-0	2.90E-03		1E-06		1E-06					
40-B	INORG	Vanadium	7440-62-2	1.70E-03		1E-05		1E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
40-C	VOC	Acetone	67-64-1	2.50E-03		4E-07		4E-07	1E-11		5E-09		1E-08
40-C	VOC	1,1-Dichloroethene	75-35-4	1.30E-03		1E-05		1E-05	8E-08		5E-06		8E-06
40-C	VOC	cis-1,2-Dichloroethene	156-59-2	1.00E-02		5E-04		5E-05	6E-09		9E-05		2E-04
40-C	VOC	trans-1,2-Dichloroethene	156-60-5	1.00E-03		3E-05		3E-05	9E-10		8E-06		1E-05
40-C	VOC	Trichloroethene	79-01-6	1.20E-01	5E-08	8E-04	5E-09	8E-04	3E-07	3E-08		7E-08	
40-C	VOC	Vinyl Chloride	75-01-4	3.00E-03	2E-08	7E-05	2E-09	7E-05	2E-06	9E-09	3E-05	2E-08	4E-05
40-C	SVOC	2,6-Dinitrotoluene	606-20-2	1.39E-03	2E-09	2E-05	2E-10	2E-06		1E-11	5E-08	3E-11	1E-07
40-C	INORG	Antimony	7440-36-0	1.10E-03		3E-05		3E-05					
40-C	INORG	Arsenic	7440-38-2	2.20E-03	2E-09	2E-05	2E-10	1E-06					
40-C	INORG	Barium	7440-39-3	9.60E-02		3E-05		3E-05					
40-C	INORG	Beryllium	7440-41-7	5.20E-03		5E-04		5E-04					
40-C	INORG	Cadmium	7440-43-9	2.90E-03		2E-04		2E-04					
40-C	INORG	Chromium (total)	7440-47-3	7.30E-03		3E-04		4E-05					
40-C	INORG	Cobalt	7440-48-4	2.20E-03		3E-07		3E-07					
40-C	INORG	Copper	7440-50-8	1.20E-02		1E-06		1E-06					
40-C	INORG	Lead	7439-92-1	6.50E-04									
40-C	INORG	Manganese	7439-96-5	1.00E+00		2E-04		2E-04					
40-C	INORG	Nickel	7440-02-0	1.30E-02		5E-06		5E-06					
40-C	INORG	Thallium	7440-28-0	5.00E-04		2E-05		2E-05					
40-C	INORG	Vanadium	7440-62-2	1.60E-03		1E-05		1E-05					
40-C	INORG	Zinc	7440-66-6	4.60E-02		4E-07		4E-07					
40-D	VOC	Acetone	67-64-1	7.60E-03		1E-06		1E-06	4E-11		1E-08		3E-08
40-D	VOC	Benzene	71-43-2	5.60E-04	1E-09	4E-05	1E-10	2E-05	9E-08	6E-10	7E-06	1E-09	1E-05
40-D	VOC	2-Butanone	78-93-3	4.60E-03		6E-07		5E-07	9E-11		7E-09		2E-08
40-D	VOC	1,1-Dichloroethane	75-34-3	1.40E-03		5E-06		5E-07	2E-09		1E-06		2E-06
40-D	VOC	cis-1,2-Dichloroethene	156-59-2	3.60E-02		2E-03		2E-04	2E-08		3E-04		6E-04
40-D	VOC	trans-1,2-Dichloroethene	156-60-5	2.10E-03		6E-05		6E-05	2E-09		2E-05		3E-05
40-D	VOC	Toluene	108-88-3	1.30E-03		1E-06		5E-07	2E-09		1E-07		2E-07
40-D	VOC	Trichloroethene	79-01-6	4.10E-03	2E-09	3E-05	2E-10	3E-05	1E-08	1E-09		2E-09	
40-D	VOC	Vinyl Chloride	75-01-4	5.80E-03	3E-08	1E-04	3E-09	1E-04	3E-06	2E-08	5E-05	3E-08	8E-05
40-D	VOC	Xylenes (total)	1330-20-7	1.45E-03		2E-05		2E-05	2E-09		5E-06		9E-06
40-D	PCB	PCBs (total)	1336-36-3	2.25E-04	2E-07	2E-02	2E-08	1E-02	7E-08	5E-09		1E-08	
40-D	INORG	Antimony	7440-36-0	2.00E-03		5E-05		5E-05					
40-D	INORG	Arsenic	7440-38-2	4.10E-02	3E-08	4E-04	3E-09	3E-05					
40-D	INORG	Barium	7440-39-3	4.70E-01		1E-04		1E-04					
40-D	INORG	Beryllium	7440-41-7	3.00E-03		3E-04		3E-04					
40-D	INORG	Cadmium	7440-43-9	7.10E-04		4E-05		4E-05					
40-D	INORG	Chromium (total)	7440-47-3	9.30E-03		3E-04		5E-05					
40-D	INORG	Cobalt	7440-48-4	3.00E-03		4E-07		4E-07					
40-D	INORG	Copper	7440-50-8	2.70E-02		2E-06		2E-06					
40-D	INORG	Cyanide (total)	57-12-5	2.40E-02		4E-06		4E-06					
40-D	INORG	Lead	7439-92-1	9.20E-03									
40-D	INORG	Manganese	7439-96-5	4.40E-01		7E-05		7E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
40-D	INORG	Mercury	7439-97-6	1.45E-04		5E-04		5E-04	1E-06		1E-04		2E-04
40-D	INORG	Nickel	7440-02-0	1.80E-02		8E-06		8E-06					
40-D	INORG	Selenium	7782-49-2	2.20E-03		1E-06		1E-06					
40-D	INORG	Silver	7440-22-4	6.80E-04		3E-06		3E-06					
40-D	INORG	Thallium	7440-28-0	8.10E-04		4E-05		4E-05					
40-D	INORG	Vanadium	7440-62-2	7.10E-03		5E-05		5E-05					
40-D	INORG	Zinc	7440-66-6	4.30E-02		4E-07		4E-07					
44-A	VOC	Acetone	67-64-1	6.00E-03		1E-06		9E-07	3E-11		1E-08		3E-08
44-A	VOC	4-Methyl-2-pentanone	108-10-1	5.50E-04		2E-07		2E-07	4E-11		3E-09		7E-09
44-A	SVOC	Diethylphthalate	84-66-2	1.49E-03		3E-08		3E-09	3E-11		4E-11		9E-11
44-A	PCB	PCBs (total)	1336-36-3	1.09E-03	7E-07	1E-01	7E-08	5E-02	3E-07	2E-08		5E-08	
44-A	INORG	Antimony	7440-36-0	4.20E-02		1E-03		1E-03					
44-A	INORG	Arsenic	7440-38-2	3.60E-02	3E-08	4E-04	3E-09	2E-05					
44-A	INORG	Barium	7440-39-3	2.90E-01		8E-05		8E-05					
44-A	INORG	Cadmium	7440-43-9	4.30E-03		2E-04		2E-04					
44-A	INORG	Chromium (total)	7440-47-3	3.80E-01		1E-02		2E-03					
44-A	INORG	Cobalt	7440-48-4	2.50E-02		3E-06		3E-06					
44-A	INORG	Copper	7440-50-8	2.20E-01		2E-05		2E-05					
44-A	INORG	Cyanide (total)	57-12-5	1.90E-02		3E-06		3E-06					
44-A	INORG	Lead	7439-92-1	7.50E-02									
44-A	INORG	Manganese	7439-96-5	4.30E-01		7E-05		7E-05					
44-A	INORG	Nickel	7440-02-0	5.10E-01		2E-04		2E-04					
44-A	INORG	Selenium	7782-49-2	5.20E-02		3E-05		3E-05					
44-A	INORG	Silver	7440-22-4	8.50E-05		4E-07		4E-07					
44-A	INORG	Thallium	7440-28-0	5.50E-05		3E-06		3E-06					
44-A	INORG	Vanadium	7440-62-2	7.40E-03		5E-05		5E-05					
44-A	INORG	Zinc	7440-66-6	6.20E-01		6E-06		6E-06					
55-1	VOC	Acetone	67-64-1	9.20E-03		1E-06		1E-06	4E-11		2E-08		4E-08
55-1	VOC	Benzene	71-43-2	1.80E-02	4E-08	1E-03	4E-09	7E-04	3E-06	2E-08	2E-04	4E-08	4E-04
55-1	VOC	Chloroethane	75-00-3	7.90E-02	4E-10	2E-05	4E-11	2E-05	3E-08		5E-06		8E-06
55-1	VOC	Chloroform	67-66-3	4.60E-03	2E-08	1E-04	2E-09	1E-04	2E-07	1E-08	3E-05	2E-08	5E-05
55-1	VOC	1,1-Dichloroethane	75-34-3	3.20E-02		1E-04		1E-05	4E-08		2E-05		4E-05
55-1	VOC	1,2-Dichloroethane	107-06-2	4.00E-04	2E-09	1E-04	2E-10	1E-04	2E-08	4E-10	9E-06	1E-09	2E-05
55-1	VOC	1,1-Dichloroethene	75-35-4	4.80E-04		4E-06		4E-06	3E-08		2E-06		3E-06
55-1	VOC	cis-1,2-Dichloroethene	156-59-2	8.20E-03		4E-04		4E-05	5E-09		7E-05		1E-04
55-1	VOC	trans-1,2-Dichloroethene	156-60-5	9.00E-03		3E-04		2E-04	8E-09		8E-05		1E-04
55-1	VOC	1,2-Dichloropropane	78-87-5	1.40E-01	2E-08	5E-02	2E-09	2E-02	1E-07		8E-03		1E-02
55-1	VOC	Methyl tert-butyl ether	1634-04-4	7.90E-04		4E-07		4E-07	4E-10		2E-08		4E-08
55-1	VOC	Methylene Chloride	75-09-2	5.30E-04	6E-11	4E-07	6E-12	4E-07	2E-09	2E-11	4E-08	4E-11	7E-08
55-1	VOC	Tetrachloroethene	127-18-4	5.90E-04	4E-10	3E-06	4E-11	2E-06	3E-09	4E-10	8E-07	7E-10	1E-06
55-1	VOC	1,1,1-Trichloroethane	71-55-6	3.50E-02		3E-05		6E-06	2E-08		9E-06		1E-05
55-1	VOC	Trichloroethene	79-01-6	1.07E-01	4E-08	7E-04	4E-09	7E-04	3E-07	3E-08		6E-08	
55-1	VOC	Vinyl Chloride	75-01-4	2.80E-02	1E-07	7E-04	1E-08	7E-04	1E-05	8E-08	3E-04	1E-07	4E-04

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
55-1	SVOC	bis(2-Chloroethyl) ether	111-44-4	2.60E-02	3E-07		3E-08		3E-09	8E-09		2E-08	
55-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.56E-03	9E-09	2E-04	9E-10	2E-04	7E-12	4E-14	4E-10	1E-13	9E-10
55-1	SVOC	Caprolactam	105-60-2	1.83E-03		9E-09		9E-09	2E-12		3E-12		9E-12
55-1	SVOC	Diethylphthalate	84-66-2	1.44E-03		3E-08		3E-09	3E-11		4E-11		9E-11
55-1	SVOC	4-Nitrophenol	100-02-7	1.22E-03									
55-1	INORG	Antimony	7440-36-0	1.30E-02		3E-04		3E-04					
55-1	INORG	Arsenic	7440-38-2	8.60E-02	6E-08	9E-04	6E-09	6E-05					
55-1	INORG	Barium	7440-39-3	5.10E-01		1E-04		1E-04					
55-1	INORG	Beryllium	7440-41-7	6.10E-01		6E-02		6E-02					
55-1	INORG	Cadmium	7440-43-9	1.60E-02		9E-04		9E-04					
55-1	INORG	Chromium (total)	7440-47-3	2.55E+01		9E-01		1E-01					
55-1	INORG	Cobalt	7440-48-4	5.80E-02		7E-06		7E-06					
55-1	INORG	Copper	7440-50-8	1.10E-01		9E-06		9E-06					
55-1	INORG	Cyanide (total)	57-12-5	1.10E+00		2E-04		2E-04					
55-1	INORG	Lead	7439-92-1	2.50E-02									
55-1	INORG	Manganese	7439-96-5	2.90E+00		5E-04		5E-04					
55-1	INORG	Mercury	7439-97-6	2.35E-04		9E-04		9E-04	2E-06		2E-04		3E-04
55-1	INORG	Nickel	7440-02-0	1.30E-01		5E-05		5E-05					
55-1	INORG	Selenium	7782-49-2	6.60E-03		4E-06		4E-06					
55-1	INORG	Silver	7440-22-4	9.60E-03		4E-05		4E-05					
55-1	INORG	Thallium	7440-28-0	4.10E-03		2E-04		2E-04					
55-1	INORG	Vanadium	7440-62-2	1.20E-02		9E-05		9E-05					
55-1	INORG	Zinc	7440-66-6	1.70E-01		2E-06		2E-06					
65-1	VOC	cis-1,2-Dichloroethene	156-59-2	4.90E-02		2E-03		2E-04	3E-08		4E-04		8E-04
65-1	VOC	trans-1,2-Dichloroethene	156-60-5	7.10E-04		2E-05		2E-05	7E-10		6E-06		1E-05
65-1	VOC	Tetrachloroethene	127-18-4	8.20E-04	6E-10	5E-06	6E-11	3E-06	4E-09	5E-10	1E-06	9E-10	2E-06
65-1	VOC	1,1,1-Trichloroethane	71-55-6	2.10E-03		2E-06		3E-07	9E-10		6E-07		9E-07
65-1	VOC	Trichloroethene	79-01-6	4.60E-02	2E-08	3E-04	2E-09	3E-04	1E-07	1E-08		3E-08	
65-1	INORG	Barium	7440-39-3	2.50E-01		7E-05		7E-05					
65-1	INORG	Cadmium	7440-43-9	8.30E-04		4E-05		4E-05					
65-1	INORG	Chromium (total)	7440-47-3	2.10E-03		7E-05		1E-05					
65-1	INORG	Cobalt	7440-48-4	4.60E-03		6E-07		6E-07					
65-1	INORG	Copper	7440-50-8	1.30E-02		1E-06		1E-06					
65-1	INORG	Cyanide (total)	57-12-5	4.00E-03		6E-07		6E-07					
65-1	INORG	Lead	7439-92-1	2.80E-04									
65-1	INORG	Manganese	7439-96-5	1.90E+00		3E-04		3E-04					
65-1	INORG	Nickel	7440-02-0	2.30E-02		1E-05		1E-05					
65-1	INORG	Selenium	7782-49-2	1.20E-03		8E-07		8E-07					
65-1	INORG	Thallium	7440-28-0	1.70E-04		8E-06		8E-06					
65-1	INORG	Vanadium	7440-62-2	5.60E-04		4E-06		4E-06					
65-1	INORG	Zinc	7440-66-6	1.40E-02		1E-07		1E-07					
81-1	VOC	Acetone	67-64-1	1.90E-03		3E-07		3E-07	9E-12		3E-09		8E-09
81-1	VOC	Cyclohexane	110-82-7	2.00E-03		6E-07		6E-07	4E-09		4E-07		6E-07

Attachment G12: Groundwater Incremental Risks
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Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
81-1	VOC	1,1-Dichloroethane	75-34-3	5.40E-04		2E-06		2E-07	7E-10		4E-07		7E-07
81-1	VOC	cis-1,2-Dichloroethene	156-59-2	2.90E-03		1E-04		1E-05	2E-09		2E-05		4E-05
81-1	VOC	4-Methyl-2-pentanone	108-10-1	1.60E-03		5E-07		5E-07	1E-10		1E-08		2E-08
81-1	VOC	Trichloroethene	79-01-6	1.90E-03	8E-10	1E-05	8E-11	1E-05	5E-09	5E-10		1E-09	
81-1	VOC	Vinyl Chloride	75-01-4	1.20E-02	6E-08	3E-04	6E-09	3E-04	6E-06	3E-08	1E-04	6E-08	2E-04
81-1	INORG	Antimony	7440-36-0	1.70E-03		4E-05		4E-05					
81-1	INORG	Arsenic	7440-38-2	9.10E-02	6E-08	1E-03	6E-09	6E-05					
81-1	INORG	Barium	7440-39-3	1.00E+00		3E-04		3E-04					
81-1	INORG	Cadmium	7440-43-9	1.30E-04		7E-06		7E-06					
81-1	INORG	Chromium (total)	7440-47-3	5.50E-03		2E-04		3E-05					
81-1	INORG	Cobalt	7440-48-4	3.80E-03		5E-07		5E-07					
81-1	INORG	Copper	7440-50-8	2.80E-02		2E-06		2E-06					
81-1	INORG	Cyanide (total)	57-12-5	4.50E-03		7E-07		7E-07					
81-1	INORG	Lead	7439-92-1	1.00E-02									
81-1	INORG	Manganese	7439-96-5	2.40E-01		4E-05		4E-05					
81-1	INORG	Mercury	7439-97-6	1.29E-04		5E-04		5E-04	1E-06		1E-04		2E-04
81-1	INORG	Nickel	7440-02-0	2.40E-02		1E-05		1E-05					
81-1	INORG	Selenium	7782-49-2	3.50E-03		2E-06		2E-06					
81-1	INORG	Silver	7440-22-4	1.30E-04		6E-07		6E-07					
81-1	INORG	Thallium	7440-28-0	1.30E-04		6E-06		6E-06					
81-1	INORG	Vanadium	7440-62-2	1.20E-02		9E-05		9E-05					
81-1	INORG	Zinc	7440-66-6	2.60E-02		2E-07		2E-07					
81-2	VOC	Acetone	67-64-1	6.10E-03		1E-06		9E-07	3E-11		1E-08		3E-08
81-2	VOC	Benzene	71-43-2	5.00E-04	1E-09	3E-05	1E-10	2E-05	8E-08	5E-10	6E-06	1E-09	1E-05
81-2	VOC	2-Butanone	78-93-3	1.20E-03		1E-07		1E-07	2E-11		2E-09		4E-09
81-2	VOC	Chloroethane	75-00-3	3.50E-03	2E-11	8E-07	2E-12	8E-07	1E-09		2E-07		4E-07
81-2	VOC	Cumene	98-82-8	2.30E-02		1E-04		9E-05	6E-08		3E-05		4E-05
81-2	VOC	1,1-Dichloroethane	75-34-3	1.60E-03		5E-06		5E-07	2E-09		1E-06		2E-06
81-2	VOC	cis-1,2-Dichloroethene	156-59-2	3.20E-03		2E-04		2E-05	2E-09		3E-05		5E-05
81-2	VOC	Ethyl Benzene	100-41-4	1.20E-03		3E-06		3E-06	2E-09		5E-07		7E-07
81-2	VOC	Methylcyclohexane	108-87-2	1.00E-03		5E-07		5E-07	1E-09		5E-07		7E-07
81-2	VOC	Toluene	108-88-3	2.00E-04		2E-07		8E-08	3E-10		1E-08		2E-08
81-2	VOC	1,1,1-Trichloroethane	71-55-6	6.30E-04		5E-07		1E-07	3E-10		2E-07		3E-07
81-2	VOC	Trichloroethene	79-01-6	2.90E-03	1E-09	2E-05	1E-10	2E-05	7E-09	8E-10		2E-09	
81-2	VOC	Vinyl Chloride	75-01-4	6.30E-04	3E-09	2E-05	3E-10	2E-05	3E-07	2E-09	6E-06	3E-09	9E-06
81-2	VOC	Xylenes (total)	1330-20-7	2.20E-03		3E-05		3E-05	3E-09		8E-06		1E-05
81-2	SVOC	Benzo(a)anthracene	56-55-3	8.89E-04	1E-07		1E-08			1E-11		4E-11	
81-2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.11E-03	6E-09	2E-04	6E-10	2E-04	5E-12	3E-14	3E-10	8E-14	6E-10
81-2	SVOC	Di-n-butylphthalate	84-74-2	1.76E-03		4E-06		4E-07	1E-12				
81-2	SVOC	Fluoranthene	206-44-0	1.18E-03		3E-05		3E-06			2E-08		4E-08
81-2	SVOC	Pyrene	129-00-0	1.07E-03		3E-05		3E-06			2E-08		4E-08
81-2	INORG	Antimony	7440-36-0	1.70E-03		4E-05		4E-05					
81-2	INORG	Arsenic	7440-38-2	3.50E-02	2E-08	4E-04	2E-09	2E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
81-2	INORG	Barium	7440-39-3	5.00E-01		1E-04		1E-04					
81-2	INORG	Beryllium	7440-41-7	2.30E-03		2E-04		2E-04					
81-2	INORG	Cadmium	7440-43-9	4.40E-04		2E-05		2E-05					
81-2	INORG	Chromium (total)	7440-47-3	1.90E-03		7E-05		1E-05					
81-2	INORG	Cobalt	7440-48-4	1.60E-02		2E-06		2E-06					
81-2	INORG	Copper	7440-50-8	1.50E-02		1E-06		1E-06					
81-2	INORG	Cyanide (total)	57-12-5	1.60E-03		3E-07		3E-07					
81-2	INORG	Lead	7439-92-1	5.50E-02									
81-2	INORG	Manganese	7439-96-5	3.20E+00		5E-04		5E-04					
81-2	INORG	Mercury	7439-97-6	1.78E-04		7E-04		7E-04	1E-06		2E-04		2E-04
81-2	INORG	Nickel	7440-02-0	3.90E-02		2E-05		2E-05					
81-2	INORG	Selenium	7782-49-2	1.70E-02		1E-05		1E-05					
81-2	INORG	Thallium	7440-28-0	4.80E-04		2E-05		2E-05					
81-2	INORG	Vanadium	7440-62-2	1.20E-03		9E-06		9E-06					
81-2	INORG	Zinc	7440-66-6	7.30E-02		7E-07		7E-07					
81-3	VOC	Acetone	67-64-1	8.00E-03		1E-06		1E-06	4E-11		1E-08		4E-08
81-3	VOC	Benzene	71-43-2	3.00E-04	7E-10	2E-05	7E-11	1E-05	5E-08	3E-10	4E-06	6E-10	6E-06
81-3	VOC	2-Butanone	78-93-3	2.50E-03		3E-07		3E-07	5E-11		4E-09		9E-09
81-3	VOC	1,1-Dichloroethane	75-34-3	4.70E-03		2E-05		2E-06	6E-09		3E-06		6E-06
81-3	VOC	1,1-Dichloroethene	75-35-4	6.00E-04		5E-06		5E-06	3E-08		2E-06		4E-06
81-3	VOC	cis-1,2-Dichloroethene	156-59-2	1.62E-01		8E-03		8E-04	9E-08		1E-03		2E-03
81-3	VOC	trans-1,2-Dichloroethene	156-60-5	8.20E-03		2E-04		2E-04	8E-09		7E-05		1E-04
81-3	VOC	1,1,1-Trichloroethane	71-55-6	1.20E-03		9E-07		2E-07	5E-10		3E-07		5E-07
81-3	VOC	Trichloroethene	79-01-6	3.20E-02	1E-08	2E-04	1E-09	2E-04	8E-08	9E-09		2E-08	
81-3	VOC	Vinyl Chloride	75-01-4	6.40E-02	3E-07	2E-03	3E-08	2E-03	3E-05	2E-07	6E-04	3E-07	9E-04
81-3	SVOC	Acenaphthene	83-32-9	5.93E-04		4E-06		4E-07			5E-08		1E-07
81-3	INORG	Antimony	7440-36-0	5.70E-03		2E-04		2E-04					
81-3	INORG	Arsenic	7440-38-2	1.30E-02	9E-09	1E-04	9E-10	8E-06					
81-3	INORG	Barium	7440-39-3	2.50E+00		7E-04		7E-04					
81-3	INORG	Beryllium	7440-41-7	7.00E-04		7E-05		7E-05					
81-3	INORG	Cadmium	7440-43-9	9.80E-03		5E-04		5E-04					
81-3	INORG	Chromium (total)	7440-47-3	5.60E-03		2E-04		3E-05					
81-3	INORG	Cobalt	7440-48-4	7.20E-02		9E-06		9E-06					
81-3	INORG	Copper	7440-50-8	5.10E-02		4E-06		4E-06					
81-3	INORG	Cyanide (total)	57-12-5	1.10E-02		2E-06		2E-06					
81-3	INORG	Lead	7439-92-1	4.70E-02									
81-3	INORG	Manganese	7439-96-5	3.30E+00		6E-04		6E-04					
81-3	INORG	Mercury	7439-97-6	1.94E-04		7E-04		7E-04	1E-06		2E-04		3E-04
81-3	INORG	Nickel	7440-02-0	2.40E-01		1E-04		1E-04					
81-3	INORG	Selenium	7782-49-2	5.90E-03		4E-06		4E-06					
81-3	INORG	Silver	7440-22-4	1.40E-03		6E-06		6E-06					
81-3	INORG	Thallium	7440-28-0	4.50E-04		2E-05		2E-05					
81-3	INORG	Vanadium	7440-62-2	8.60E-03		6E-05		6E-05					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
81-3	INORG	Zinc	7440-66-6	6.00E+00		5E-05		5E-05					
81-4	VOC	Tetrachloroethene	127-18-4	1.10E-02	8E-09	6E-05	8E-10	4E-05	5E-08	7E-09	2E-05	1E-08	2E-05
81-4	INORG	Arsenic	7440-38-2	2.60E-03	2E-09	3E-05	2E-10	2E-06					
81-4	INORG	Barium	7440-39-3	2.40E-01		7E-05		7E-05					
81-4	INORG	Cadmium	7440-43-9	2.10E-04		1E-05		1E-05					
81-4	INORG	Cobalt	7440-48-4	2.00E-03		2E-07		2E-07					
81-4	INORG	Copper	7440-50-8	1.70E-03		1E-07		1E-07					
81-4	INORG	Cyanide (total)	57-12-5	3.80E-03		6E-07		6E-07					
81-4	INORG	Manganese	7439-96-5	7.00E-01		1E-04		1E-04					
81-4	INORG	Nickel	7440-02-0	6.00E-03		3E-06		3E-06					
81-4	INORG	Selenium	7782-49-2	3.50E-03		2E-06		2E-06					
81-4	INORG	Zinc	7440-66-6	8.10E-03		7E-08		7E-08					
83/84-1	VOC	Benzene	71-43-2	1.10E-03	2E-09	7E-05	2E-10	4E-05	2E-07	1E-09	1E-05	2E-09	2E-05
83/84-1	VOC	2-Butanone	78-93-3	5.30E-04		7E-08		6E-08	1E-11		8E-10		2E-09
83/84-1	VOC	cis-1,2-Dichloroethene	156-59-2	5.90E-04		3E-05		3E-06	3E-10		5E-06		9E-06
83/84-1	VOC	Trichloroethene	79-01-6	1.60E-03	6E-10	1E-05	6E-11	1E-05	4E-09	5E-10		9E-10	
83/84-1	INORG	Arsenic	7440-38-2	8.10E-03	6E-09	9E-05	6E-10	5E-06					
83/84-1	INORG	Barium	7440-39-3	1.70E-01		5E-05		5E-05					
83/84-1	INORG	Chromium (total)	7440-47-3	1.80E-03		6E-05		9E-06					
83/84-1	INORG	Cobalt	7440-48-4	6.70E-04		8E-08		8E-08					
83/84-1	INORG	Copper	7440-50-8	9.60E-03		8E-07		8E-07					
83/84-1	INORG	Cyanide (total)	57-12-5	5.10E-02		8E-06		8E-06					
83/84-1	INORG	Lead	7439-92-1	6.50E-04									
83/84-1	INORG	Manganese	7439-96-5	1.10E+00		2E-04		2E-04					
83/84-1	INORG	Nickel	7440-02-0	5.10E-03		2E-06		2E-06					
83/84-1	INORG	Selenium	7782-49-2	1.90E-02		1E-05		1E-05					
83/84-1	INORG	Silver	7440-22-4	1.40E-03		6E-06		6E-06					
83/84-1	INORG	Thallium	7440-28-0	1.20E-04		6E-06		6E-06					
83/84-1	INORG	Vanadium	7440-62-2	2.40E-04		2E-06		2E-06					
83/84-1	INORG	Zinc	7440-66-6	1.90E-02		2E-07		2E-07					
83/84-2	VOC	Acetone	67-64-1	9.00E-03		1E-06		1E-06	4E-11		2E-08		4E-08
83/84-2	VOC	Benzene	71-43-2	4.00E-04	9E-10	3E-05	9E-11	1E-05	7E-08	4E-10	5E-06	8E-10	8E-06
83/84-2	VOC	Cumene	98-82-8	2.00E-04		1E-06		8E-07	5E-10		2E-07		3E-07
83/84-2	VOC	Methylcyclohexane	108-87-2	3.00E-04		2E-07		2E-07	3E-10		1E-07		2E-07
83/84-2	VOC	Toluene	108-88-3	4.00E-04		4E-07		2E-07	6E-10		3E-08		5E-08
83/84-2	VOC	Xylenes (total)	1330-20-7	2.70E-03		4E-05		4E-05	3E-09		1E-05		2E-05
83/84-2	SVOC	Di-n-butylphthalate	84-74-2	1.56E-03		3E-06		3E-07	1E-12				
83/84-2	SVOC	2-Methylnaphthalene	91-57-6	9.50E-04		4E-04		4E-04			2E-05		4E-05
83/84-2	SVOC	Naphthalene	91-20-3	2.97E-03		1E-03		1E-03	5E-09		5E-05		1E-04
83/84-2	SVOC	Phenol	108-95-2	1.34E-03		4E-08		4E-08	6E-12				
83/84-2	INORG	Arsenic	7440-38-2	7.90E-03	5E-09	9E-05	5E-10	5E-06					
83/84-2	INORG	Barium	7440-39-3	3.30E-01		1E-04		1E-04					
83/84-2	INORG	Beryllium	7440-41-7	2.30E-02		2E-03		2E-03					

Attachment G12: Groundwater Incremental Risks
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Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
83/84-2	INORG	Cadmium	7440-43-9	1.40E-03		8E-05		8E-05					
83/84-2	INORG	Chromium (total)	7440-47-3	1.40E-02		5E-04		7E-05					
83/84-2	INORG	Cobalt	7440-48-4	3.70E-03		5E-07		5E-07					
83/84-2	INORG	Copper	7440-50-8	7.30E-03		6E-07		6E-07					
83/84-2	INORG	Cyanide (total)	57-12-5	7.40E-03		1E-06		1E-06					
83/84-2	INORG	Lead	7439-92-1	9.20E-04									
83/84-2	INORG	Manganese	7439-96-5	1.20E+00		2E-04		2E-04					
83/84-2	INORG	Mercury	7439-97-6	2.08E-04		8E-04		8E-04	2E-06		2E-04		3E-04
83/84-2	INORG	Nickel	7440-02-0	1.20E-02		5E-06		5E-06					
83/84-2	INORG	Silver	7440-22-4	1.10E-03		5E-06		5E-06					
83/84-2	INORG	Vanadium	7440-62-2	9.90E-04		7E-06		7E-06					
83/84-2	INORG	Zinc	7440-66-6	2.40E-02		2E-07		2E-07					
83/84-3	VOC	Acetone	67-64-1	7.60E-04		1E-07		1E-07	4E-12		1E-09		3E-09
83/84-3	VOC	cis-1,2-Dichloroethene	156-59-2	8.30E-04		4E-05		4E-06	5E-10		7E-06		1E-05
83/84-3	VOC	Toluene	108-88-3	7.80E-04		8E-07		3E-07	1E-09		6E-08		1E-07
83/84-3	VOC	Trichloroethene	79-01-6	1.50E-03	6E-10	9E-06	6E-11	9E-06	4E-09	4E-10		8E-10	
83/84-3	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.33E-03	2E-08	5E-04	2E-09	5E-04	2E-11	8E-14	8E-10	2E-13	2E-09
83/84-3	INORG	Arsenic	7440-38-2	2.30E-02	2E-08	2E-04	2E-09	1E-05					
83/84-3	INORG	Barium	7440-39-3	1.30E-01		4E-05		4E-05					
83/84-3	INORG	Beryllium	7440-41-7	1.10E-02		1E-03		1E-03					
83/84-3	INORG	Cadmium	7440-43-9	1.10E-03		6E-05		6E-05					
83/84-3	INORG	Chromium (total)	7440-47-3	1.40E-02		5E-04		7E-05					
83/84-3	INORG	Cobalt	7440-48-4	6.00E-03		7E-07		7E-07					
83/84-3	INORG	Copper	7440-50-8	6.80E-03		6E-07		6E-07					
83/84-3	INORG	Cyanide (total)	57-12-5	2.80E-03		5E-07		5E-07					
83/84-3	INORG	Lead	7439-92-1	1.70E-02									
83/84-3	INORG	Manganese	7439-96-5	9.20E-01		2E-04		2E-04					
83/84-3	INORG	Nickel	7440-02-0	2.40E-02		1E-05		1E-05					
83/84-3	INORG	Selenium	7782-49-2	2.60E-03		2E-06		2E-06					
83/84-3	INORG	Silver	7440-22-4	4.70E-04		2E-06		2E-06					
83/84-3	INORG	Thallium	7440-28-0	7.10E-04		3E-05		3E-05					
83/84-3	INORG	Vanadium	7440-62-2	2.30E-03		2E-05		2E-05					
83/84-3	INORG	Zinc	7440-66-6	8.10E-02		7E-07		7E-07					
83/84-4	VOC	1,1-Dichloroethane	75-34-3	5.20E-04		2E-06		2E-07	7E-10		4E-07		6E-07
83/84-4	SVOC	Naphthalene	91-20-3	1.34E-03		5E-04		5E-04	2E-09		2E-05		5E-05
83/84-4	INORG	Antimony	7440-36-0	2.20E-03		6E-05		6E-05					
83/84-4	INORG	Arsenic	7440-38-2	1.10E-01	8E-08	1E-03	8E-09	7E-05					
83/84-4	INORG	Barium	7440-39-3	4.00E-01		1E-04		1E-04					
83/84-4	INORG	Beryllium	7440-41-7	1.40E-01		1E-02		1E-02					
83/84-4	INORG	Cadmium	7440-43-9	2.70E-03		1E-04		1E-04					
83/84-4	INORG	Chromium (total)	7440-47-3	1.60E-02		6E-04		8E-05					
83/84-4	INORG	Cobalt	7440-48-4	1.10E-02		1E-06		1E-06					
83/84-4	INORG	Copper	7440-50-8	3.10E-02		3E-06		3E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
83/84-4	INORG	Lead	7439-92-1	8.10E-03									
83/84-4	INORG	Manganese	7439-96-5	3.60E-01		6E-05		6E-05					
83/84-4	INORG	Nickel	7440-02-0	4.20E-02		2E-05		2E-05					
83/84-4	INORG	Selenium	7782-49-2	3.00E-03		2E-06		2E-06					
83/84-4	INORG	Silver	7440-22-4	1.90E-03		8E-06		8E-06					
83/84-4	INORG	Thallium	7440-28-0	1.00E-03		5E-05		5E-05					
83/84-4	INORG	Vanadium	7440-62-2	1.00E-02		7E-05		7E-05					
83/84-4	INORG	Zinc	7440-66-6	7.10E-02		6E-07		6E-07					
83/84-5	INORG	Arsenic	7440-38-2	3.10E-03	2E-09	3E-05	2E-10	2E-06					
83/84-5	INORG	Barium	7440-39-3	3.40E-01		1E-04		1E-04					
83/84-5	INORG	Chromium (total)	7440-47-3	6.00E-04		2E-05		3E-06					
83/84-5	INORG	Cobalt	7440-48-4	6.20E-04		8E-08		8E-08					
83/84-5	INORG	Copper	7440-50-8	2.60E-03		2E-07		2E-07					
83/84-5	INORG	Cyanide (total)	57-12-5	3.50E-03		6E-07		6E-07					
83/84-5	INORG	Manganese	7439-96-5	1.30E-01		2E-05		2E-05					
83/84-5	INORG	Nickel	7440-02-0	1.50E-02		6E-06		6E-06					
83/84-5	INORG	Selenium	7782-49-2	4.50E-03		3E-06		3E-06					
83/84-5	INORG	Zinc	7440-66-6	9.20E-03		8E-08		8E-08					
83/84-7	VOC	Acetone	67-64-1	3.00E-02		5E-06		4E-06	1E-10		5E-08		1E-07
83/84-7	VOC	Benzene	71-43-2	1.60E-01	4E-07	1E-02	4E-08	6E-03	3E-05	2E-07	2E-03	3E-07	3E-03
83/84-7	VOC	Chloromethane	74-87-3	1.60E-02		4E-04		4E-04	9E-08		7E-05		1E-04
83/84-7	VOC	Cumene	98-82-8	2.30E-02		1E-04		9E-05	6E-08		3E-05		4E-05
83/84-7	VOC	Cyclohexane	110-82-7	6.90E-02		2E-05		2E-05	1E-07		2E-05		2E-05
83/84-7	VOC	1,1-Dichloroethane	75-34-3	2.20E-03		7E-06		7E-07	3E-09		2E-06		3E-06
83/84-7	VOC	1,2-Dichloroethane	107-06-2	8.50E-04	5E-09	2E-04	5E-10	2E-04	3E-08	8E-10	2E-05	2E-09	4E-05
83/84-7	VOC	cis-1,2-Dichloroethene	156-59-2	8.80E-02		4E-03		4E-04	5E-08		8E-04		1E-03
83/84-7	VOC	trans-1,2-Dichloroethene	156-60-5	1.60E-03		5E-05		4E-05	1E-09		1E-05		2E-05
83/84-7	VOC	Ethyl Benzene	100-41-4	5.65E-01		1E-03		1E-03	7E-07		2E-04		3E-04
83/84-7	VOC	Methylcyclohexane	108-87-2	2.20E-02		1E-05		1E-05	2E-08		1E-05		2E-05
83/84-7	VOC	Methylene Chloride	75-09-2	1.00E-02	1E-09	7E-06	1E-10	7E-06	3E-08	3E-10	7E-07	8E-10	1E-06
83/84-7	VOC	Toluene	108-88-3	2.30E+00		2E-03		9E-04	3E-06		2E-04		3E-04
83/84-7	VOC	1,2,4-Trichlorobenzene	120-82-1	7.50E-04		2E-05		1E-05			4E-07		8E-07
83/84-7	VOC	Trichloroethene	79-01-6	3.50E-02	1E-08	2E-04	1E-09	2E-04	9E-08	1E-08		2E-08	
83/84-7	VOC	Vinyl Chloride	75-01-4	1.50E-01	8E-07	4E-03	8E-08	4E-03	8E-05	4E-07	1E-03	8E-07	2E-03
83/84-7	VOC	Xylenes (total)	1330-20-7	1.92E+00		3E-02		3E-02	2E-06		7E-03		1E-02
83/84-7	SVOC	Diethylphthalate	84-66-2	1.39E-03		3E-08		3E-09	3E-11		3E-11		9E-11
83/84-7	SVOC	2-Methylnaphthalene	91-57-6	1.49E-03		6E-04		6E-04			3E-05		6E-05
83/84-7	SVOC	Naphthalene	91-20-3	3.47E-02		1E-02		1E-02	5E-08		6E-04		1E-03
83/84-7	INORG	Arsenic	7440-38-2	3.90E-02	3E-08	4E-04	3E-09	3E-05					
83/84-7	INORG	Barium	7440-39-3	8.90E-01		3E-04		3E-04					
83/84-7	INORG	Cadmium	7440-43-9	4.00E-04		2E-05		2E-05					
83/84-7	INORG	Chromium (total)	7440-47-3	3.10E-03		1E-04		2E-05					
83/84-7	INORG	Cobalt	7440-48-4	8.70E-03		1E-06		1E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
83/84-7	INORG	Copper	7440-50-8	4.30E-02		3E-06		3E-06					
83/84-7	INORG	Cyanide (total)	57-12-5	9.90E-03		2E-06		2E-06					
83/84-7	INORG	Lead	7439-92-1	1.60E-03									
83/84-7	INORG	Manganese	7439-96-5	1.10E+00		2E-04		2E-04					
83/84-7	INORG	Mercury	7439-97-6	2.64E-04		1E-03		1E-03	2E-06		2E-04		4E-04
83/84-7	INORG	Nickel	7440-02-0	1.60E-02		7E-06		7E-06					
83/84-7	INORG	Selenium	7782-49-2	6.00E-03		4E-06		4E-06					
83/84-7	INORG	Silver	7440-22-4	7.70E-03		3E-05		3E-05					
83/84-7	INORG	Thallium	7440-28-0	1.00E-04		5E-06		5E-06					
83/84-7	INORG	Vanadium	7440-62-2	6.40E-03		5E-05		5E-05					
83/84-7	INORG	Zinc	7440-66-6	2.80E-02		3E-07		3E-07					
84-A	VOC	Acetone	67-64-1	8.00E-03		1E-06		1E-06	4E-11		1E-08		4E-08
84-A	VOC	Benzene	71-43-2	6.00E-03	1E-08	4E-04	1E-09	2E-04	1E-06	6E-09	7E-05	1E-08	1E-04
84-A	VOC	1,1-Dichloroethene	75-35-4	8.00E-03		7E-05		7E-05	5E-07		3E-05		5E-05
84-A	VOC	cis-1,2-Dichloroethene	156-59-2	3.22E-01		2E-02		2E-03	2E-07		3E-03		5E-03
84-A	VOC	trans-1,2-Dichloroethene	156-60-5	2.70E-02		8E-04		7E-04	2E-08		2E-04		4E-04
84-A	VOC	Methyl tert-butyl ether	1634-04-4	3.00E-04		1E-07		1E-07	2E-10		7E-09		1E-08
84-A	VOC	Trichloroethene	79-01-6	2.58E-01	1E-07	2E-03	1E-08	2E-03	7E-07	7E-08		1E-07	
84-A	VOC	Vinyl Chloride	75-01-4	1.05E-01	5E-07	3E-03	5E-08	3E-03	6E-05	3E-07	1E-03	6E-07	1E-03
84-A	INORG	Antimony	7440-36-0	9.40E-04		2E-05		2E-05					
84-A	INORG	Arsenic	7440-38-2	3.50E-03	2E-09	4E-05	2E-10	2E-06					
84-A	INORG	Barium	7440-39-3	7.00E-02		2E-05		2E-05					
84-A	INORG	Cadmium	7440-43-9	9.00E-05		5E-06		5E-06					
84-A	INORG	Chromium (total)	7440-47-3	6.60E-03		2E-04		3E-05					
84-A	INORG	Cobalt	7440-48-4	1.80E-03		2E-07		2E-07					
84-A	INORG	Copper	7440-50-8	1.30E-02		1E-06		1E-06					
84-A	INORG	Cyanide (total)	57-12-5	7.10E-02		1E-05		1E-05					
84-A	INORG	Lead	7439-92-1	9.40E-04									
84-A	INORG	Manganese	7439-96-5	5.10E-02		9E-06		9E-06					
84-A	INORG	Nickel	7440-02-0	9.20E-03		4E-06		4E-06					
84-A	INORG	Selenium	7782-49-2	4.00E-03		3E-06		3E-06					
84-A	INORG	Silver	7440-22-4	2.40E-04		1E-06		1E-06					
84-A	INORG	Thallium	7440-28-0	1.70E-04		8E-06		8E-06					
84-A	INORG	Vanadium	7440-62-2	4.00E-03		3E-05		3E-05					
84-A	INORG	Zinc	7440-66-6	2.00E-02		2E-07		2E-07					
84-D	VOC	Acetone	67-64-1	2.00E-01		3E-05		3E-05	9E-10		4E-07		9E-07
84-D	VOC	Benzene	71-43-2	1.44E+00	3E-06	1E-01	3E-07	5E-02	2E-04	1E-06	2E-02	3E-06	3E-02
84-D	VOC	Chloroform	67-66-3	2.00E-03	9E-09	6E-05	9E-10	6E-05	9E-08	5E-09	1E-05	1E-08	2E-05
84-D	VOC	Cyclohexane	110-82-7	7.00E-02		2E-05		2E-05	1E-07		2E-05		2E-05
84-D	VOC	1,1-Dichloroethane	75-34-3	1.80E-02		6E-05		6E-06	2E-08		1E-05		2E-05
84-D	VOC	1,1-Dichloroethene	75-35-4	8.00E-04		7E-06		7E-06	5E-08		3E-06		5E-06
84-D	VOC	cis-1,2-Dichloroethene	156-59-2	7.80E-02		4E-03		4E-04	4E-08		7E-04		1E-03
84-D	VOC	trans-1,2-Dichloroethene	156-60-5	6.00E-03		2E-04		2E-04	6E-09		5E-05		8E-05

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
84-D	VOC	Methyl tert-butyl ether	1634-04-4	3.00E-03		1E-06		1E-06	2E-09		7E-08		1E-07
84-D	VOC	Methylcyclohexane	108-87-2	6.00E-03		3E-06		3E-06	6E-09		3E-06		4E-06
84-D	VOC	Tetrachloroethene	127-18-4	5.00E-04	4E-10	3E-06	4E-11	2E-06	2E-09	3E-10	7E-07	6E-10	1E-06
84-D	VOC	Toluene	108-88-3	1.00E-02		1E-05		4E-06	1E-08		7E-07		1E-06
84-D	VOC	1,1,1-Trichloroethane	71-55-6	1.10E-02		8E-06		2E-06	5E-09		3E-06		5E-06
84-D	VOC	Trichloroethene	79-01-6	1.30E-02	5E-09	8E-05	5E-10	8E-05	3E-08	4E-09		7E-09	
84-D	VOC	Vinyl Chloride	75-01-4	1.14E-01	6E-07	3E-03	6E-08	3E-03	6E-05	3E-07	1E-03	6E-07	2E-03
84-D	INORG	Antimony	7440-36-0	3.20E-03		8E-05		8E-05					
84-D	INORG	Arsenic	7440-38-2	1.30E-02	9E-09	1E-04	9E-10	8E-06					
84-D	INORG	Barium	7440-39-3	1.70E-01		5E-05		5E-05					
84-D	INORG	Beryllium	7440-41-7	2.60E-01		2E-02		2E-02					
84-D	INORG	Cadmium	7440-43-9	2.90E-03		2E-04		2E-04					
84-D	INORG	Chromium (total)	7440-47-3	4.50E-01		2E-02		2E-03					
84-D	INORG	Cobalt	7440-48-4	2.00E-02		2E-06		2E-06					
84-D	INORG	Copper	7440-50-8	6.40E-02		5E-06		5E-06					
84-D	INORG	Cyanide (total)	57-12-5	9.10E-03		1E-06		1E-06					
84-D	INORG	Lead	7439-92-1	2.60E-03									
84-D	INORG	Manganese	7439-96-5	4.30E-01		7E-05		7E-05					
84-D	INORG	Mercury	7439-97-6	8.21E-05		3E-04		3E-04	6E-07		7E-05		1E-04
84-D	INORG	Nickel	7440-02-0	9.10E-01		4E-04		4E-04					
84-D	INORG	Selenium	7782-49-2	4.20E-02		3E-05		3E-05					
84-D	INORG	Silver	7440-22-4	1.90E-03		8E-06		8E-06					
84-D	INORG	Thallium	7440-28-0	1.40E-03		6E-05		6E-05					
84-D	INORG	Vanadium	7440-62-2	2.00E-03		1E-05		1E-05					
84-D	INORG	Zinc	7440-66-6	5.30E-02		5E-07		5E-07					
85-1	VOC	Acetone	67-64-1	4.60E-03		7E-07		7E-07	2E-11		8E-09		2E-08
85-1	VOC	Benzene	71-43-2	1.20E-03	3E-09	8E-05	3E-10	4E-05	2E-07	1E-09	1E-05	2E-09	2E-05
85-1	VOC	Bromodichloromethane	75-27-4	9.50E-04	3E-09	2E-05	3E-10	2E-05		8E-10	2E-06	2E-09	3E-06
85-1	VOC	2-Butanone	78-93-3	3.00E-03		4E-07		4E-07	6E-11		5E-09		1E-08
85-1	VOC	Chloroform	67-66-3	3.50E-03	2E-08	1E-04	2E-09	1E-04	1E-07	8E-09	2E-05	2E-08	4E-05
85-1	VOC	Cyclohexane	110-82-7	1.40E-02		4E-06		4E-06	3E-08		3E-06		4E-06
85-1	VOC	1,1-Dichloroethane	75-34-3	6.20E-04		2E-06		2E-07	8E-10		4E-07		8E-07
85-1	VOC	cis-1,2-Dichloroethene	156-59-2	5.30E-03		2E-04		2E-05	3E-09		5E-05		8E-05
85-1	VOC	trans-1,2-Dichloroethene	156-60-5	2.70E-03		8E-05		7E-05	2E-09		2E-05		4E-05
85-1	VOC	Ethyl Benzene	100-41-4	2.50E-02		6E-05		6E-05	3E-08		9E-06		2E-05
85-1	VOC	Methylcyclohexane	108-87-2	6.50E-03		4E-06		4E-06	7E-09		3E-06		4E-06
85-1	VOC	Tetrachloroethene	127-18-4	2.20E-02	2E-08	1E-04	2E-09	7E-05	1E-07	1E-08	3E-05	3E-08	5E-05
85-1	VOC	1,1,1-Trichloroethane	71-55-6	2.70E-03		2E-06		4E-07	1E-09		7E-07		1E-06
85-1	VOC	Trichloroethene	79-01-6	9.30E-02	4E-08	6E-04	4E-09	6E-04	2E-07	3E-08		5E-08	
85-1	VOC	Vinyl Chloride	75-01-4	6.70E-04	3E-09	2E-05	3E-10	2E-05	4E-07	2E-09	6E-06	4E-09	9E-06
85-1	VOC	Xylenes (total)	1330-20-7	7.79E-02		1E-03		1E-03	1E-07		3E-04		5E-04
85-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.04E-03	6E-09	1E-04	6E-10	1E-04	5E-12	2E-14	2E-10	7E-14	6E-10
85-1	SVOC	Diethylphthalate	84-66-2	2.02E-03		4E-08		4E-09	4E-11		5E-11		1E-10

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
85-1	INORG	Arsenic	7440-38-2	1.00E-02	7E-09	1E-04	7E-10	6E-06					
85-1	INORG	Barium	7440-39-3	7.20E-01		2E-04		2E-04					
85-1	INORG	Beryllium	7440-41-7	7.00E-03		7E-04		7E-04					
85-1	INORG	Cadmium	7440-43-9	3.40E-03		2E-04		2E-04					
85-1	INORG	Chromium (total)	7440-47-3	8.10E-03		3E-04		4E-05					
85-1	INORG	Cobalt	7440-48-4	2.70E-03		3E-07		3E-07					
85-1	INORG	Copper	7440-50-8	9.80E-03		8E-07		8E-07					
85-1	INORG	Cyanide (total)	57-12-5	1.60E-02		3E-06		3E-06					
85-1	INORG	Lead	7439-92-1	3.30E-04									
85-1	INORG	Manganese	7439-96-5	9.40E-01		2E-04		2E-04					
85-1	INORG	Nickel	7440-02-0	1.30E-02		5E-06		5E-06					
85-1	INORG	Selenium	7782-49-2	8.00E-02		5E-05		5E-05					
85-1	INORG	Silver	7440-22-4	3.10E-03		1E-05		1E-05					
85-1	INORG	Thallium	7440-28-0	4.30E-04		2E-05		2E-05					
85-1	INORG	Vanadium	7440-62-2	1.30E-01		1E-03		1E-03					
85-1	INORG	Zinc	7440-66-6	2.50E-02		2E-07		2E-07					
86-1	VOC	Acetone	67-64-1	2.90E-03		5E-07		4E-07	1E-11		5E-09		1E-08
86-1	VOC	Benzene	71-43-2	7.90E-03	2E-08	5E-04	2E-09	3E-04	1E-06	8E-09	9E-05	2E-08	2E-04
86-1	VOC	2-Butanone	78-93-3	3.90E-03		5E-07		5E-07	8E-11		6E-09		1E-08
86-1	VOC	Carbon Disulfide	75-15-0	6.00E-03		2E-05		2E-05	6E-07		7E-06		1E-05
86-1	VOC	Chloroethane	75-00-3	1.40E+01	7E-08	3E-03	7E-09	3E-03	5E-06		8E-04		1E-03
86-1	VOC	Chloroform	67-66-3	4.00E-04	2E-09	1E-05	2E-10	1E-05	2E-08	9E-10	2E-06	2E-09	4E-06
86-1	VOC	Chloromethane	74-87-3	5.80E-04		1E-05		1E-05	3E-09		3E-06		4E-06
86-1	VOC	Cumene	98-82-8	7.70E-04		4E-06		3E-06	2E-09		8E-07		1E-06
86-1	VOC	1,2-Dichlorobenzene	95-50-1	9.60E-04		7E-06		2E-06	1E-09		8E-07		1E-06
86-1	VOC	1,1-Dichloroethane	75-34-3	1.30E-01		4E-04		4E-05	2E-07		9E-05		2E-04
86-1	VOC	1,2-Dichloroethane	107-06-2	2.20E-03	1E-08	6E-04	1E-09	6E-04	9E-08	2E-09	5E-05	5E-09	1E-04
86-1	VOC	1,1-Dichloroethene	75-35-4	2.70E-02		2E-04		2E-04	2E-06		1E-04		2E-04
86-1	VOC	cis-1,2-Dichloroethene	156-59-2	4.50E-01		2E-02		2E-03	2E-07		4E-03		7E-03
86-1	VOC	trans-1,2-Dichloroethene	156-60-5	2.00E-02		6E-04		5E-04	2E-08		2E-04		3E-04
86-1	VOC	Ethyl Benzene	100-41-4	3.50E-03		8E-06		8E-06	4E-09		1E-06		2E-06
86-1	VOC	Methylene Chloride	75-09-2	3.10E-03	4E-10	2E-06	4E-11	2E-06	1E-08	1E-10	2E-07	3E-10	4E-07
86-1	VOC	Tetrachloroethene	127-18-4	4.10E-02	3E-08	2E-04	3E-09	1E-04	2E-07	3E-08	6E-05	5E-08	9E-05
86-1	VOC	Toluene	108-88-3	2.00E-02		2E-05		8E-06	3E-08		1E-06		2E-06
86-1	VOC	1,1,1-Trichloroethane	71-55-6	8.40E-03		6E-06		1E-06	4E-09		2E-06		3E-06
86-1	VOC	1,1,2-Trichloroethane	79-00-5	3.90E-03	1E-08	1E-05	1E-09	1E-06	1E-08	2E-09		5E-09	
86-1	VOC	Trichloroethene	79-01-6	2.00E+00	8E-07	1E-02	8E-08	1E-02	5E-06	6E-07		1E-06	
86-1	VOC	Trichlorofluoromethane	75-69-4	1.20E-03		2E-06		3E-07	4E-10		2E-06		3E-06
86-1	VOC	Vinyl Chloride	75-01-4	4.30E-01	2E-06	1E-02	2E-07	1E-02	2E-04	1E-06	4E-03	2E-06	6E-03
86-1	VOC	Xylenes (total)	1330-20-7	1.31E-02		2E-04		2E-04	2E-08		5E-05		8E-05
86-1	SVOC	Acenaphthene	83-32-9	5.60E-04		4E-06		4E-07			5E-08		1E-07
86-1	SVOC	Biphenyl	92-52-4	1.05E-02		1E-04		1E-04	5E-07		2E-06		4E-06
86-1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3.19E-03	2E-08	4E-04	2E-09	4E-04	1E-11	7E-14	7E-10	2E-13	2E-09

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
86-1	SVOC	Dibenzofuran	132-64-9	2.19E-03		4E-04		4E-04			5E-07		1E-06
86-1	SVOC	2,4-Dimethylphenol	105-67-9	2.87E-03		5E-06		5E-07			1E-08		3E-08
86-1	SVOC	Fluorene	86-73-7	1.97E-03		2E-05		2E-06			1E-07		3E-07
86-1	SVOC	2-Methylnaphthalene	91-57-6	5.45E-02		2E-02		2E-02			1E-03		2E-03
86-1	SVOC	Naphthalene	91-20-3	3.73E-02		1E-02		1E-02	6E-08		7E-04		1E-03
86-1	PCB	PCBs (total)	1336-36-3	3.30E-04	2E-07	4E-02	2E-08	1E-02	1E-07	7E-09		1E-08	
86-1	INORG	Antimony	7440-36-0	1.30E-03		3E-05		3E-05					
86-1	INORG	Arsenic	7440-38-2	4.70E-02	3E-08	5E-04	3E-09	3E-05					
86-1	INORG	Barium	7440-39-3	6.20E-01		2E-04		2E-04					
86-1	INORG	Beryllium	7440-41-7	9.80E-03		9E-04		9E-04					
86-1	INORG	Cadmium	7440-43-9	2.00E-03		1E-04		1E-04					
86-1	INORG	Chromium (total)	7440-47-3	1.60E-02		6E-04		8E-05					
86-1	INORG	Cobalt	7440-48-4	1.70E-02		2E-06		2E-06					
86-1	INORG	Copper	7440-50-8	1.40E-02		1E-06		1E-06					
86-1	INORG	Cyanide (total)	57-12-5	3.20E-03		5E-07		5E-07					
86-1	INORG	Lead	7439-92-1	1.00E-02									
86-1	INORG	Manganese	7439-96-5	1.30E+00		2E-04		2E-04					
86-1	INORG	Nickel	7440-02-0	3.00E-02		1E-05		1E-05					
86-1	INORG	Selenium	7782-49-2	1.50E-02		1E-05		1E-05					
86-1	INORG	Silver	7440-22-4	7.40E-04		3E-06		3E-06					
86-1	INORG	Thallium	7440-28-0	1.40E-04		6E-06		6E-06					
86-1	INORG	Vanadium	7440-62-2	1.40E-02		1E-04		1E-04					
86-1	INORG	Zinc	7440-66-6	2.20E-01		2E-06		2E-06					
94-B	VOC	Benzene	71-43-2	5.00E-04	1E-09	3E-05	1E-10	2E-05	8E-08	5E-10	6E-06	1E-09	1E-05
94-B	VOC	Chloroform	67-66-3	3.00E-03	1E-08	9E-05	1E-09	9E-05	1E-07	7E-09	2E-05	2E-08	3E-05
94-B	VOC	1,1-Dichloroethane	75-34-3	1.00E-03		3E-06		3E-07	1E-09		7E-07		1E-06
94-B	VOC	1,1-Dichloroethene	75-35-4	7.50E-03		6E-05		6E-05	4E-07		3E-05		5E-05
94-B	VOC	cis-1,2-Dichloroethene	156-59-2	2.30E-02		1E-03		1E-04	1E-08		2E-04		4E-04
94-B	VOC	trans-1,2-Dichloroethene	156-60-5	3.00E-04		8E-06		8E-06	3E-10		3E-06		4E-06
94-B	VOC	1,1,1-Trichloroethane	71-55-6	3.90E-02		3E-05		6E-06	2E-08		1E-05		2E-05
94-B	VOC	1,1,2-Trichloroethane	79-00-5	8.10E-04	2E-09	3E-06	2E-10	3E-07	3E-09	4E-10		1E-09	
94-B	VOC	Trichloroethene	79-01-6	9.50E-01	4E-07	6E-03	4E-08	6E-03	2E-06	3E-07		5E-07	
94-B	VOC	Trichlorofluoromethane	75-69-4	1.10E-03		2E-06		3E-07	3E-10		2E-06		3E-06
94-B	SVOC	Phenol	108-95-2	1.85E-02		6E-07		6E-07	9E-11				
94-B	INORG	Barium	7440-39-3	4.70E-02		1E-05		1E-05					
94-B	INORG	Cadmium	7440-43-9	7.50E-05		4E-06		4E-06					
94-B	INORG	Chromium (total)	7440-47-3	3.40E-04		1E-05		2E-06					
94-B	INORG	Cobalt	7440-48-4	1.60E-03		2E-07		2E-07					
94-B	INORG	Copper	7440-50-8	5.20E-03		4E-07		4E-07					
94-B	INORG	Cyanide (total)	57-12-5	3.20E-03		5E-07		5E-07					
94-B	INORG	Lead	7439-92-1	2.80E-04									
94-B	INORG	Manganese	7439-96-5	2.90E-01		5E-05		5E-05					
94-B	INORG	Nickel	7440-02-0	1.60E-02		7E-06		7E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
94-B	INORG	Vanadium	7440-62-2	3.50E-04		3E-06		3E-06					
94-B	INORG	Zinc	7440-66-6	8.90E-03		8E-08		8E-08					
94-D	VOC	Trichloroethene	79-01-6	7.40E-04	3E-10	5E-06	3E-11	5E-06	2E-09	2E-10		4E-10	
94-D	INORG	Arsenic	7440-38-2	1.20E-03	8E-10	1E-05	8E-11	8E-07					
94-D	INORG	Barium	7440-39-3	4.50E-02		1E-05		1E-05					
94-D	INORG	Chromium (total)	7440-47-3	1.30E-03		5E-05		7E-06					
94-D	INORG	Cobalt	7440-48-4	9.10E-04		1E-07		1E-07					
94-D	INORG	Copper	7440-50-8	2.90E-03		2E-07		2E-07					
94-D	INORG	Lead	7439-92-1	8.60E-04									
94-D	INORG	Manganese	7439-96-5	1.20E-01		2E-05		2E-05					
94-D	INORG	Nickel	7440-02-0	5.60E-03		2E-06		2E-06					
94-D	INORG	Thallium	7440-28-0	1.50E-04		7E-06		7E-06					
94-D	INORG	Vanadium	7440-62-2	1.10E-03		8E-06		8E-06					
94-D	INORG	Zinc	7440-66-6	5.10E-03		5E-08		5E-08					
Aeration Lagoon	SVOC	Acetophenone	98-86-2	5.00E-04		2E-07		2E-08	2E-11		2E-09		6E-09
Aeration Lagoon	INORG	Arsenic	7440-38-2	3.20E-02	2E-08	3E-04	2E-09	2E-05					
Aeration Lagoon	INORG	Barium	7440-39-3	1.19E-01		3E-05		3E-05					
Aeration Lagoon	INORG	Cadmium	7440-43-9	1.00E-04		5E-06		5E-06					
Aeration Lagoon	INORG	Copper	7440-50-8	1.50E-03		1E-07		1E-07					
Aeration Lagoon	INORG	Manganese	7439-96-5	2.49E-01		4E-05		4E-05					
Aeration Lagoon	INORG	Selenium	7782-49-2	1.00E-02		6E-06		6E-06					
Aeration Lagoon	INORG	Zinc	7440-66-6	1.10E-02		1E-07		1E-07					
BD01	VOC	Acetone	67-64-1	1.90E-03		3E-07		3E-07	9E-12		3E-09		8E-09
BD01	VOC	Benzene	71-43-2	8.70E-02	2E-07	6E-03	2E-08	3E-03	1E-05	9E-08	1E-03	2E-07	2E-03
BD01	VOC	2-Butanone	78-93-3	1.30E-03		2E-07		2E-07	3E-11		2E-09		5E-09
BD01	VOC	1,3-Dichlorobenzene	541-73-1	1.10E-03		1E-05		1E-05			2E-06		3E-06
BD01	VOC	1,2-Dichloroethane	107-06-2	3.80E-03	2E-08	1E-03	2E-09	1E-03	1E-07	4E-09	8E-05	9E-09	2E-04
BD01	VOC	Methyl tert-butyl ether	1634-04-4	7.50E-03		4E-06		4E-06	4E-09		2E-07		4E-07
BD01	VOC	4-Methyl-2-pentanone	108-10-1	3.80E-03		1E-06		1E-06	2E-10		2E-08		5E-08
BD01	VOC	Toluene	108-88-3	1.20E-03		1E-06		5E-07	2E-09		9E-08		1E-07
BD01	VOC	Trichlorofluoromethane	75-69-4	1.00E-03		2E-06		2E-07	3E-10		2E-06		2E-06
BD01	INORG	Arsenic	7440-38-2	2.80E-03	2E-09	3E-05	2E-10	2E-06					
BD01	INORG	Barium	7440-39-3	2.00E-01		6E-05		6E-05					
BD01	INORG	Beryllium	7440-41-7	7.90E-04		7E-05		7E-05					
BD01	INORG	Cadmium	7440-43-9	7.10E-05		4E-06		4E-06					
BD01	INORG	Chromium (total)	7440-47-3	6.20E-03		2E-04		3E-05					
BD01	INORG	Cobalt	7440-48-4	8.00E-04		1E-07		1E-07					
BD01	INORG	Copper	7440-50-8	3.10E-03		3E-07		3E-07					
BD01	INORG	Cyanide (total)	57-12-5	3.20E-03		5E-07		5E-07					
BD01	INORG	Lead	7439-92-1	1.00E-04									
BD01	INORG	Manganese	7439-96-5	1.40E-01		2E-05		2E-05					
BD01	INORG	Nickel	7440-02-0	5.10E-03		2E-06		2E-06					
BD01	INORG	Selenium	7782-49-2	3.00E-03		2E-06		2E-06					

Attachment G12: Groundwater Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk	Redevelopment Construction Worker GW Contact Risk	Redevelopment Construction Worker GW Contact HQ	Occupational Vapor Intrusion Ratio	Industrial Vapor Intrusion Risk	Industrial Vapor Intrusion HQ	Residential Vapor Intrusion Risk	Residential Vapor Intrusion HQ
BD01	INORG	Silver	7440-22-4	6.40E-04		3E-06		3E-06					
BD01	INORG	Thallium	7440-28-0	5.50E-05		3E-06		3E-06					
BD01	INORG	Vanadium	7440-62-2	1.20E-03		9E-06		9E-06					
BD01	INORG	Zinc	7440-66-6	1.40E-02		1E-07		1E-07					
Build 94 Parking Lot	SVOC	Formaldehyde	50-00-0	4.90E-02	6E-10	1E-06	6E-11	1E-06	4E-09	1E-11		4E-11	
Harriet Street	VOC	Acetone	67-64-1	5.10E-03		8E-07		7E-07	2E-11		9E-09		2E-08
Harriet Street	VOC	Benzene	71-43-2	4.40E-02	1E-07	3E-03	1E-08	2E-03	7E-06	4E-08	5E-04	9E-08	9E-04
Harriet Street	VOC	Cyclohexane	110-82-7	4.00E-02		1E-05		1E-05	7E-08		9E-06		1E-05
Harriet Street	VOC	Ethyl Benzene	100-41-4	5.00E-04		1E-06		1E-06	6E-10		2E-07		3E-07
Harriet Street	VOC	4-Methyl-2-pentanone	108-10-1	1.70E-03		5E-07		5E-07	1E-10		1E-08		2E-08
Harriet Street	VOC	Methylcyclohexane	108-87-2	1.10E-02		6E-06		6E-06	1E-08		5E-06		8E-06
Harriet Street	VOC	Toluene	108-88-3	3.90E-03		4E-06		2E-06	6E-09		3E-07		5E-07
Harriet Street	VOC	Trichlorofluoromethane	75-69-4	1.00E-03		2E-06		2E-07	3E-10		2E-06		2E-06
Harriet Street	VOC	Xylenes (total)	1330-20-7	1.22E-03		2E-05		2E-05	2E-09		5E-06		8E-06
Harriet Street	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.93E-03	1E-08	3E-04	1E-09	3E-04	9E-12	4E-14	4E-10	1E-13	1E-09
Harriet Street	SVOC	Diethylphthalate	84-66-2	1.64E-03		4E-08		4E-09	3E-11		4E-11		1E-10

Note:
Only detected chemicals in each area are shown.

Attachment G12: Basement, Tunnel, and Sewer Water Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Matrix	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk
12-A	PCB	PCBs (total)	1336-36-3	Basement Water	8.90E-05	6E-08	1E-02
12-A	INORG	Antimony	7440-36-0	Basement Water	5.40E-03		1E-04
12-A	INORG	Arsenic	7440-38-2	Basement Water	3.60E-03	3E-09	4E-05
12-A	INORG	Barium	7440-39-3	Basement Water	3.20E-03		9E-07
12-A	INORG	Cadmium	7440-43-9	Basement Water	1.30E-03		7E-05
12-A	INORG	Chromium (total)	7440-47-3	Basement Water	4.30E-03		2E-04
12-A	INORG	Cobalt	7440-48-4	Basement Water	4.50E-03		6E-07
12-A	INORG	Copper	7440-50-8	Basement Water	6.10E-02		5E-06
12-A	INORG	Cyanide (total)	57-12-5	Basement Water	1.80E-03		3E-07
12-A	INORG	Lead	7439-92-1	Basement Water	7.90E-03		
12-A	INORG	Manganese	7439-96-5	Basement Water	5.50E-02		9E-06
12-A	INORG	Nickel	7440-02-0	Basement Water	3.40E-02		1E-05
12-A	INORG	Vanadium	7440-62-2	Basement Water	2.50E-03		2E-05
12-A	INORG	Zinc	7440-66-6	Basement Water	1.60E-01		1E-06
23-A	VOC	Acetone	67-64-1	Basement Water	5.00E-03		8E-07
23-A	VOC	2-Butanone	78-93-3	Basement Water	2.50E-03		3E-07
23-A	VOC	1,1-Dichloroethane	75-34-3	Basement Water	6.40E-04		2E-06
23-A	VOC	cis-1,2-Dichloroethene	156-59-2	Basement Water	1.30E-03		6E-05
23-A	VOC	4-Methyl-2-pentanone	108-10-1	Basement Water	6.70E-04		2E-07
23-A	SVOC	Benzo(a)anthracene	56-55-3	Basement Water	1.13E-02	2E-06	
23-A	SVOC	Benzo(a)pyrene	50-32-8	Basement Water	1.13E-02	3E-05	
23-A	SVOC	Benzo(b)fluoranthene	205-99-2	Basement Water	6.59E-02	2E-05	
23-A	SVOC	Benzo(k)fluoranthene	207-08-9	Basement Water	8.80E-03	2E-07	
23-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	Basement Water	1.97E-01	1E-06	3E-02
23-A	SVOC	Chrysene	218-01-9	Basement Water	1.02E-02	2E-08	
23-A	SVOC	Di-n-octylphthalate	117-84-0	Basement Water	2.34E-01		2E-02
23-A	SVOC	Fluoranthene	206-44-0	Basement Water	2.22E-02		5E-04
23-A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	Basement Water	1.66E-02	6E-06	
12-A	VOC	Acetone	67-64-1	Basement Water	4.10E-03		7E-07
12-A	VOC	2-Butanone	78-93-3	Basement Water	7.70E-04		1E-07

Attachment G12: Basement, Tunnel, and Sewer Water Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Matrix	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk
12-A	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	Basement Water	1.40E-03	8E-09	2E-04
23-A	SVOC	Phenanthrene	85-01-8	Basement Water	1.62E-02		2E-04
23-A	SVOC	Pyrene	129-00-0	Basement Water	1.95E-02		6E-04
23-A	INORG	Antimony	7440-36-0	Basement Water	3.10E-03		8E-05
23-A	INORG	Barium	7440-39-3	Basement Water	4.00E-02		1E-05
23-A	INORG	Cadmium	7440-43-9	Basement Water	3.10E-04		2E-05
23-A	INORG	Chromium (total)	7440-47-3	Basement Water	6.70E-03		2E-04
23-A	INORG	Cobalt	7440-48-4	Basement Water	7.50E-04		9E-08
23-A	INORG	Copper	7440-50-8	Basement Water	6.90E-03		6E-07
23-A	INORG	Lead	7439-92-1	Basement Water	7.70E-03		
23-A	INORG	Manganese	7439-96-5	Basement Water	1.70E-01		3E-05
23-A	INORG	Nickel	7440-02-0	Basement Water	6.80E-03		3E-06
23-A	INORG	Selenium	7782-49-2	Basement Water	2.40E-03		2E-06
23-A	INORG	Silver	7440-22-4	Basement Water	5.20E-04		2E-06
23-A	INORG	Vanadium	7440-62-2	Basement Water	6.90E-04		5E-06
23-A	INORG	Zinc	7440-66-6	Basement Water	9.40E-02		9E-07
36-3	VOC	Acetone	67-64-1	Basement Water	4.70E-03		7E-07
36-3	VOC	Benzene	71-43-2	Basement Water	1.40E-02	3E-08	9E-04
36-3	VOC	Chloroethane	75-00-3	Basement Water	8.20E-04	4E-12	2E-07
36-3	VOC	1,1-Dichloroethane	75-34-3	Basement Water	1.50E-02		5E-05
36-3	VOC	1,1-Dichloroethene	75-35-4	Basement Water	1.00E-02		9E-05
36-3	VOC	cis-1,2-Dichloroethene	156-59-2	Basement Water	1.00E+00		5E-02
36-3	VOC	trans-1,2-Dichloroethene	156-60-5	Basement Water	2.10E-02		6E-04
36-3	VOC	Ethyl Benzene	100-41-4	Basement Water	5.70E-04		1E-06
36-3	VOC	Tetrachloroethene	127-18-4	Basement Water	1.50E-01	1E-07	9E-04
36-3	VOC	Toluene	108-88-3	Basement Water	5.30E-04		5E-07
36-3	VOC	1,1,2-Trichloroethane	79-00-5	Basement Water	8.40E-04	2E-09	3E-06
36-3	VOC	Trichloroethene	79-01-6	Basement Water	3.60E-01	1E-07	2E-03
36-3	VOC	Vinyl Chloride	75-01-4	Basement Water	1.40E-01	7E-07	3E-03
36-3	INORG	Arsenic	7440-38-2	Basement Water	3.30E-02	2E-08	4E-04

Attachment G12: Basement, Tunnel, and Sewer Water Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Matrix	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk
36-3	INORG	Barium	7440-39-3	Basement Water	2.60E-01		8E-05
36-3	INORG	Cadmium	7440-43-9	Basement Water	4.20E-05		2E-06
36-3	INORG	Chromium (total)	7440-47-3	Basement Water	1.30E-03		5E-05
36-3	INORG	Cobalt	7440-48-4	Basement Water	3.90E-04		5E-08
36-3	INORG	Copper	7440-50-8	Basement Water	6.50E-02		5E-06
36-3	INORG	Fluoride	16984-48-8	Basement Water	4.30E-01		
36-3	INORG	Lead	7439-92-1	Basement Water	2.20E-04		
36-3	INORG	Manganese	7439-96-5	Basement Water	3.00E-01		5E-05
36-3	INORG	Nickel	7440-02-0	Basement Water	1.00E-02		4E-06
36-3	INORG	Selenium	7782-49-2	Basement Water	1.00E-02		6E-06
36-3	INORG	Thallium	7440-28-0	Basement Water	2.60E-04		1E-05
36-3	INORG	Vanadium	7440-62-2	Basement Water	2.30E-03		2E-05
36-3	INORG	Zinc	7440-66-6	Basement Water	2.50E-02		2E-07
40-D	VOC	Benzene	71-43-2	Tunnel Water	8.10E-04	2E-09	5E-05
40-D	VOC	Xylenes (total)	1330-20-7	Tunnel Water	8.80E-04		1E-05
40-D	SVOC	Benzo(b)fluoranthene	205-99-2	Tunnel Water	6.90E-04	2E-07	
40-D	SVOC	Benzo(k)fluoranthene	207-08-9	Tunnel Water	7.20E-04	2E-08	
40-D	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	Tunnel Water	9.60E-04	5E-09	1E-04
40-D	SVOC	Chrysene	218-01-9	Tunnel Water	1.14E-03	2E-09	
40-D	SVOC	Fluoranthene	206-44-0	Tunnel Water	1.35E-03		3E-05
40-D	SVOC	Phenanthrene	85-01-8	Tunnel Water	8.80E-04		1E-05
40-D	SVOC	Pyrene	129-00-0	Tunnel Water	2.97E-03		9E-05
40-D	PCB	PCBs (total)	1336-36-3	Tunnel Water	3.65E-04	2E-07	4E-02
40-D	INORG	Arsenic	7440-38-2	Tunnel Water	3.50E-03	2E-09	4E-05
40-D	INORG	Barium	7440-39-3	Tunnel Water	4.20E-02		1E-05
40-D	INORG	Chromium (total)	7440-47-3	Tunnel Water	2.70E-03		9E-05
40-D	INORG	Copper	7440-50-8	Tunnel Water	2.30E-03		2E-07
40-D	INORG	Cyanide (total)	57-12-5	Tunnel Water	6.10E-03		1E-06
40-D	INORG	Lead	7439-92-1	Tunnel Water	4.90E-04		
40-D	INORG	Manganese	7439-96-5	Tunnel Water	5.00E-02		8E-06

Attachment G12: Basement, Tunnel, and Sewer Water Incremental Risks
GMC: NAO Flint Operations Site, Flint, Michigan

Area	Chem Group	Chemical	CASRN	Matrix	Max Detected (mg/L)	Maintenance Worker GW Contact Risk	Maintenance Worker GW Contact Risk
40-D	INORG	Nickel	7440-02-0	Tunnel Water	7.70E-04		3E-07
40-D	INORG	Vanadium	7440-62-2	Tunnel Water	5.50E-03		4E-05
40-D	INORG	Zinc	7440-66-6	Tunnel Water	1.20E-02		1E-07
SS	VOC	Acetone	67-64-1	Storm Sewer Water	1.50E-02		2E-06
SS	VOC	Bromodichloromethane	75-27-4	Storm Sewer Water	4.00E-03	1E-08	7E-05
SS	VOC	2-Butanone	78-93-3	Storm Sewer Water	4.90E-03		6E-07
SS	VOC	Chloroethane	75-00-3	Storm Sewer Water	2.70E-02	1E-10	6E-06
SS	VOC	Chloroform	67-66-3	Storm Sewer Water	8.90E-03	4E-08	3E-04
SS	VOC	Dibromochloromethane	124-48-1	Storm Sewer Water	1.70E-03	6E-09	2E-05
SS	VOC	Dichlorodifluoromethane	75-71-8	Storm Sewer Water	1.40E-03		1E-05
SS	VOC	1,1-Dichloroethane	75-34-3	Storm Sewer Water	3.70E-02		1E-04
SS	VOC	cis-1,2-Dichloroethene	156-59-2	Storm Sewer Water	5.90E-02		3E-03
SS	VOC	trans-1,2-Dichloroethene	156-60-5	Storm Sewer Water	2.50E-03		7E-05
SS	VOC	4-Methyl-2-pentanone	108-10-1	Storm Sewer Water	1.20E-03		3E-07
SS	VOC	Methylene Chloride	75-09-2	Storm Sewer Water	9.00E-04	1E-10	6E-07
SS	VOC	Tetrachloroethene	127-18-4	Storm Sewer Water	6.30E-04	5E-10	4E-06
SS	VOC	1,1,1-Trichloroethane	71-55-6	Storm Sewer Water	4.10E-03		3E-06
SS	VOC	Trichloroethene	79-01-6	Storm Sewer Water	8.00E-03	3E-09	5E-05
SS	VOC	Vinyl Chloride	75-01-4	Storm Sewer Water	7.30E-03	4E-08	2E-04
SS	PCB	PCBs (total)	1336-36-3	Storm Sewer Water	3.10E-03	2E-06	3E-01
Note:							
Only detected chemicals in each area are shown.							

Attachment G13
Point-by-Point Risk Estimates at the Southend

Attachment G13
Point-by-Point Risk Estimates at the Southend

The methodology for calculating the location-by-location upper-bound cumulative cancer and noncancer risk estimates for exposure to soil in Parcels 1, 2, and 3 at the Southend of the Site is discussed below:

> The highest concentration of each chemical detected in soil that could be encountered by a receptor population at each location was used as exposure concentrations to calculate upper-bound cumulative cancer and noncancer risk estimates. For routine worker and resident exposure to surface soil, the highest concentration of each chemical detected in the surface soil sample (samples collected to characterize the first 2 ft bgs) at each location was used in the calculations. For the redevelopment worker exposure scenario, the highest concentration of each chemical detected among all the samples (surface and subsurface) at each location was conservatively used in the calculations.
>
> If a chemical was analyzed and not detected in a particular soil sample but was detected in at least another soil sample from the Southend of the Site, one-half the sample quantitation limit (SQL) for that sample was assigned as the concentration for the chemical (consistent with USEPA risk assessment guidance). If the SQL was unusually high and gave significant risk estimates, one-half the lowest SQL among the samples at that boring location was assigned as the concentration. Chemicals that were not detected in any soil sample at the Southend of the Site were not included in the risk calculations.
>
> If a chemical was not analyzed in a soil sample at a particular location but was detected in at least one soil sample from the Southend of the Site, a surrogate concentration was assigned to the location if the chemical was identified as a key chemical that could contribute significantly to the cumulative cancer and/or noncancer risk estimates for any of the four exposure scenarios evaluated. The assignment of surrogate concentrations was performed only for the key chemicals because the procedure for assigning surrogates (described below) is time-consuming and would not have enhanced the reliability of the risk assessment results for the other chemicals.

The identification of key chemicals was based on an initial set of risk calculations for each exposure scenario that used the highest concentrations for all chemicals among all samples from the Site. From the calculations for a particular scenario, the estimates of cancer risk were ranked from low to high and the lowest estimates were summed until they reached approximately 10^{-5}. Similarly, the lowest HQs were summed until they reach approximately 0.1. The chemicals associated with the estimates that were included in both sums are those for which their highest concentrations across the entire Site, taken in combination, contribute to only a small fraction of the acceptable cumulative cancer risk limit of 10^{-4} and HI limit of 1, and therefore are not considered key chemicals for the given exposure scenario. The remaining chemicals were identified as the key chemicals that warrant assignment of surrogate concentrations.

Assignment of surrogate concentrations for key chemicals was performed using measured concentrations from the nearest location or depth (i.e., nearest neighbor method). For a chemical that was not analyzed in a surface sample, a surrogate concentration was assigned from the nearest location where the chemical was analyzed in a surface sample. For a chemical that was not analyzed in a subsurface sample (deeper than 2 ft bgs), the highest measured concentration of the chemical among the other samples at that location was assigned as the surrogate. If the chemical was not analyzed in another sample at the location, then the highest concentration among samples at the nearest boring location was used as the surrogate. The results of this surrogating can be represented as Thiessen polygon tessellations across the entire Parcel.

Site-related cumulative cancer risk and HI were calculated for each location. The exposure factors, toxicity values, and physical/chemical property data used in these calculations are the same as those used in the calculations based on the maximum concentrations by AOI. The details of the risk calculations for boring locations RFI-84-12 and RFI-09-48 are shown as an example of the risk calculations that were performed for each of the 184 soil boring locations.

Attachment G13: Incremental Risk Calculations at RFI-84-10
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Limit (mg/kg)	Max Exposure Conc (mg/kg)	Concentration Basis	Surrogate Sample Name	RW SCC-C (mg/kg)	RW SCC-NC (mg/kg)	RW SC Risk	RW SC HQ	Redev Worker SCC-C (mg/kg)	Redev Worker SCC-NC (mg/kg)	Redev Worker SC Risk	Redev Worker SC HQ	Res SCC-C (mg/kg)	Res SCC-NC (mg/kg)	Res SC Risk	Res SC HQ
RFI-84-10	VOC	Acetone	67-64-1		9.00E-01	4.50E-01	Half-Limit	NA		3.6E+04		1E-05		4.4E+03		1E-04		2.6E+04		2E-05
RFI-84-10	VOC	Benzene	71-43-2		6.00E-02	3.00E-02	Half-Limit	NA	8.1E+00	6.8E+01	4E-08	4E-04	2.2E+01	1.5E+01	1E-08	2E-03	5.1E+00	5.1E+01	6E-08	6E-04
RFI-84-10	VOC	Bromodichloromethane	75-27-4		6.00E-02	3.00E-02	Half-Limit	NA	1.1E+01	4.7E+02	3E-08	6E-05	2.9E+01	5.1E+01	1E-08	6E-04	6.6E+00	3.5E+02	5E-08	9E-05
RFI-84-10	VOC	Bromoform	75-25-2		6.00E-02		No Value	NA	4.7E+02				1.3E+03				2.3E+02			
RFI-84-10	VOC	Bromomethane	74-83-9		3.00E-01		No Value	NA		8.3E+00				3.5E+01				6.4E+00		
RFI-84-10	VOC	2-Butanone	78-93-3		9.00E-01	4.50E-01	Half-Limit	NA		5.9E+04		8E-06		6.7E+03		7E-05		3.8E+04		1E-05
RFI-84-10	VOC	Carbon Disulfide	75-15-0		3.00E-01	1.50E-01	Half-Limit	NA		7.4E+02		2E-04		8.0E+01		2E-03		5.7E+02		3E-04
RFI-84-10	VOC	Carbon Tetrachloride	56-23-5		6.00E-02	3.00E-02	Half-Limit	NA	3.2E+00		9E-08		8.6E+00		3E-08		2.0E+00		1E-07	
RFI-84-10	VOC	Chlorobenzene	108-90-7		6.00E-02	3.00E-02	Half-Limit	NA		3.0E+02		1E-04		3.2E+01		9E-04		2.3E+02		1E-04
RFI-84-10	VOC	Chloroethane	75-00-3		3.00E-01	1.50E-01	Half-Limit	NA		8.0E+03		2E-05		8.7E+02		2E-04		6.0E+03		3E-05
RFI-84-10	VOC	Chloroform	67-66-3		6.00E-02	3.00E-02	Half-Limit	NA	2.7E+00	1.1E+02	1E-07	3E-04	7.4E+00	1.2E+01	4E-08	2E-03	1.8E+00	8.5E+01	2E-07	4E-04
RFI-84-10	VOC	Chloromethane	74-87-3		3.00E-01	1.50E-01	Half-Limit	NA		1.3E+02		1E-03		1.4E+01		1E-02		9.9E+01		2E-03
RFI-84-10	VOC	Cumene	98-82-8		6.00E-02	3.00E-02	Half-Limit	NA		2.0E+03		2E-05		2.1E+02		1E-04		1.5E+03		2E-05
RFI-84-10	VOC	Cyclohexane	110-82-7		6.00E-02	3.00E-02	Half-Limit	NA		7.9E+03		4E-06		8.5E+02		4E-05		6.2E+03		5E-06
RFI-84-10	VOC	1,2-Dibromo-3-chloropropane	96-12-8		6.00E-02		No Value	NA	3.9E+01	4.0E+00			2.3E+02	4.3E-01			4.5E+00	3.1E+00		
RFI-84-10	VOC	Dibromochloromethane	124-48-1		6.00E-02		No Value	NA	1.4E+01	8.6E+02			3.9E+01	9.3E+02			8.5E+00	6.1E+02		
RFI-84-10	VOC	1,2-Dibromoethane	106-93-4		2.00E-02		No Value	NA	2.2E-01	4.2E+01			5.8E-01	4.5E+00			1.4E-01	3.2E+01		
RFI-84-10	VOC	1,2-Dichlorobenzene	95-50-1		6.00E-02	3.00E-02	Half-Limit	NA		2.3E+03		1E-05		2.4E+03		1E-05		1.7E+03		2E-05
RFI-84-10	VOC	1,3-Dichlorobenzene	541-73-1		6.00E-02	3.00E-02	Half-Limit	NA		1.2E+03		2E-05		1.3E+02		2E-04		9.2E+02		3E-05
RFI-84-10	VOC	1,4-Dichlorobenzene	106-46-7		6.00E-02	3.00E-02	Half-Limit	NA	4.5E+01	7.2E+03	7E-09	4E-06	1.2E+02	2.3E+03	2E-09	1E-05	2.7E+01	3.6E+03	1E-08	8E-06
RFI-84-10	VOC	Dichlorodifluoromethane	75-71-8		6.00E-02	3.00E-02	Half-Limit	NA		1.7E+02		2E-04		1.9E+02		2E-04		1.4E+02		2E-04
RFI-84-10	VOC	1,1-Dichloroethane	75-34-3		6.00E-02	3.00E-02	Half-Limit	NA		1.0E+03		3E-05		1.1E+03		3E-05		7.9E+02		4E-05
RFI-84-10	VOC	1,2-Dichloroethane	107-06-2		6.00E-02	3.00E-02	Half-Limit	NA	3.6E+00	1.7E+01	8E-08	2E-03	9.8E+00	1.8E+00	3E-08	2E-02	2.3E+00	1.3E+01	1E-07	2E-03
RFI-84-10	VOC	1,1-Dichloroethene	75-35-4		6.00E-02	3.00E-02	Half-Limit	NA		2.5E+02		1E-04		2.7E+01		1E-03		1.9E+02		2E-04
RFI-84-10	VOC	cis-1,2-Dichloroethene	156-59-2		6.00E-02	3.00E-02	Half-Limit	NA		8.6E+01		3E-04		9.3E+01		3E-04		6.6E+01		5E-04
RFI-84-10	VOC	trans-1,2-Dichloroethene	156-60-5		6.00E-02	3.00E-02	Half-Limit	NA		1.2E+02		3E-04		1.3E+01		2E-03		9.0E+01		3E-04
RFI-84-10	VOC	1,2-Dichloropropane	78-87-5		6.00E-02		No Value	NA		1.2E+01				4.2E+00				9.4E+00		
RFI-84-10	VOC	1,3-Dichloropropene (total)	542-75-6		6.00E-02		No Value	NA	1.1E+01	3.2E+01			3.0E+01	3.5E+00			6.6E+00	2.5E+01		
RFI-84-10	VOC	Ethyl Benzene	100-41-4	8.00E-03	6.00E-02	8.00E-03	Max Detect	NA		4.3E+03		2E-06		4.6E+02		2E-05		3.0E+03		3E-06
RFI-84-10	VOC	2-Hexanone	591-78-6		3.00E+00		Removed Limit	NA		8.1E+04				1.8E+04				1.1E+04		
RFI-84-10	VOC	Methyl Acetate	79-20-9		3.00E+00	1.50E+00	Half-Limit	NA		3.1E+04		5E-05		3.3E+04		4E-05		2.2E+04		7E-05
RFI-84-10	VOC	Methyl tert-butyl ether	1634-04-4		3.00E-01		No Value	NA		1.3E+04				1.4E+03				1.0E+04		
RFI-84-10	VOC	4-Methyl-2-pentanone	108-10-1		3.00E+00	1.50E+00	Half-Limit	NA		2.9E+04		5E-05		3.1E+03		5E-04		2.2E+04		7E-05
RFI-84-10	VOC	Methylcyclohexane	108-87-2	4.00E-02	6.00E-02	4.00E-02	Max Detect	NA		3.0E+03		1E-05		3.2E+02		1E-04		2.3E+03		2E-05
RFI-84-10	VOC	Methylene Chloride	75-09-2		3.00E-01	1.50E-01	Half-Limit	NA	1.3E+02	6.3E+03	1E-08	2E-05	3.5E+02	7.0E+02	4E-09	2E-04	7.8E+01	3.9E+03	2E-08	4E-05
RFI-84-10	VOC	Styrene	100-42-5		6.00E-02	3.00E-02	Half-Limit	NA		1.0E+04		3E-06		3.3E+03		9E-06		7.2E+03		4E-06
RFI-84-10	VOC	1,1,2,2-Tetrachloroethane	79-34-5		6.00E-02		No Value	NA	5.4E+00				1.5E+01				3.2E+00			
RFI-84-10	VOC	Tetrachloroethene	127-18-4		6.00E-02	3.00E-02	Half-Limit	NA	1.9E+01	8.1E+02	2E-08	4E-05	5.2E+01	9.1E+01	6E-09	3E-04	1.1E+01	5.3E+02	3E-08	6E-05
RFI-84-10	VOC	Toluene	108-88-3	2.00E-02	6.00E-02	2.00E-02	Max Detect	NA		1.5E+04		1E-06		1.7E+03		1E-05		8.0E+03		3E-06
RFI-84-10	VOC	1,2,4-Trichlorobenzene	120-82-1		1.00E-01	5.00E-02	Half-Limit	NA		5.1E+03		1E-05		3.0E+03		2E-05		1.8E+03		3E-05
RFI-84-10	VOC	1,1,1-Trichloroethane	71-55-6		6.00E-02	3.00E-02	Half-Limit	NA		4.0E+03		7E-06		4.3E+03		7E-06		3.1E+03		1E-05
RFI-84-10	VOC	1,1,2-Trichloroethane	79-00-5		6.00E-02	3.00E-02	Half-Limit	NA	9.4E+00		3E-08		2.5E+01		1E-08		5.8E+00		5E-08	
RFI-84-10	VOC	Trichloroethene	79-01-6		6.00E-02	3.00E-02	Half-Limit	NA	4.4E+01		7E-09		1.2E+02		3E-09		2.7E+01		1E-08	
RFI-84-10	VOC	Trichlorofluoromethane	75-69-4		1.00E-01	5.00E-02	Half-Limit	NA		7.3E+02		7E-05		7.9E+02		6E-05		5.7E+02		9E-05
RFI-84-10	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1.00E-01	5.00E-02	Half-Limit	NA		3.0E+04		2E-06		3.2E+03		2E-05		2.3E+04		2E-06
RFI-84-10	VOC	Vinyl Chloride	75-01-4		1.00E-01	5.00E-02	Half-Limit	NA	2.8E+00	9.4E+01	2E-07	5E-04	7.9E+00	1.0E+01	6E-08	5E-03	1.4E+00	6.8E+01	4E-07	7E-04
RFI-84-10	VOC	Xylenes (total)	1330-20-7	4.50E-02	6.00E-02	4.50E-02	Max Detect	NA		4.7E+02		1E-04		5.1E+01		9E-04		3.6E+02		1E-04
RFI-84-10	SVOC	Benzo(a)anthracene	56-55-3	1.95E-01		1.95E-01	Interpolated Max	RFI-17-01(0.7-02)	2.9E+01		7E-08		3.3E+02		6E-09		6.2E+00		3E-07	
RFI-84-10	SVOC	Benzo(a)pyrene	50-32-8	2.93E-01		2.93E-01	Interpolated Max	RFI-17-01(0.7-02)	2.9E+00		1E-06		3.4E+01		9E-08		6.2E-01		5E-06	
RFI-84-10	SVOC	Benzo(b)fluoranthene	205-99-2	5.26E-01		5.26E-01	Interpolated Max	RFI-17-01(0.7-02)	2.8E+01		2E-07		3.1E+02		2E-08		6.2E+00		9E-07	
RFI-84-10	SVOC	Benzo(k)fluoranthene	207-08-9	3.20E-01		3.20E-01	Interpolated Max	RFI-17-01(0.7-02)	2.9E+02		1E-08		3.4E+03		9E-10		6.2E+01		5E-08	
RFI-84-10	SVOC	Dibenz(a,h)anthracene	53-70-3		2.00E-01	1.00E-01	Interpolated QL/2	RFI-17-01(02-04)	2.9E+00		3E-07		3.4E+01		3E-08		6.2E-01		2E-06	

Attachment G13: Incremental Risk Calculations at RFI-84-10
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Limit (mg/kg)	Max Exposure Conc (mg/kg)	Concentration Basis	Surrogate Sample Name	RW SCC-C (mg/kg)	RW SCC-NC (mg/kg)	RW SC Risk	RW SC HQ	Redev Worker SCC-C (mg/kg)	Redev Worker SCC-NC (mg/kg)	Redev Worker SC Risk	Redev Worker SC HQ	Res SCC-C (mg/kg)	Res SCC-NC (mg/kg)	Res SC Risk	Res SC HQ
RFI-84-10	VOC	Acetone	67-64-1		9.00E-01	4.50E-01	Half-Limit	NA		3.6E+04		1E-05		4.4E+03		1E-04		2.6E+04		2E-05
RFI-84-10	VOC	Benzene	71-43-2		6.00E-02	3.00E-02	Half-Limit	NA	8.1E+00	6.8E+01	4E-08	4E-04	2.2E+01	1.5E+01	1E-08	2E-03	5.1E+00	5.1E+01	6E-08	6E-04
RFI-84-10	VOC	Bromodichloromethane	75-27-4		6.00E-02	3.00E-02	Half-Limit	NA	1.1E+01	4.7E+02	3E-08	6E-05	2.9E+01	5.1E+01	1E-08	6E-04	6.6E+00	3.5E+02	5E-08	9E-05
RFI-84-10	VOC	Bromoform	75-25-2		6.00E-02		No Value	NA	4.7E+02				1.3E+03				2.3E+02			
RFI-84-10	VOC	Bromomethane	74-83-9		3.00E-01		No Value	NA		8.3E+00				3.5E+01				6.4E+00		
RFI-84-10	VOC	2-Butanone	78-93-3		9.00E-01	4.50E-01	Half-Limit	NA		5.9E+04		8E-06		6.7E+03		7E-05		3.8E+04		1E-05
RFI-84-10	VOC	Carbon Disulfide	75-15-0		3.00E-01	1.50E-01	Half-Limit	NA		7.4E+02		2E-04		8.0E+01		2E-03		5.7E+02		3E-04
RFI-84-10	VOC	Carbon Tetrachloride	56-23-5		6.00E-02	3.00E-02	Half-Limit	NA	3.2E+00		9E-08		8.6E+00		3E-08		2.0E+00		1E-07	
RFI-84-10	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.90E-01		1.90E-01	Interpolated Max	RFI-17-01(0.7-02)	2.9E+01		7E-08		3.4E+02		6E-09		6.2E+00		3E-07	
RFI-84-10	SVOC	2-Methylnaphthalene	91-57-6	8.45E-01		8.45E-01	Interpolated Max	RFI-17-01(0.7-02)		2.3E+02		4E-03		2.6E+01		3E-02		1.6E+02		5E-03
RFI-84-10	SVOC	Naphthalene	91-20-3	5.82E-01		5.82E-01	Interpolated Max	RFI-17-01(0.7-02)		1.3E+02		4E-03		1.4E+01		4E-02		1.0E+02		6E-03
RFI-84-10	SVOC	N-Nitroso-di-n-propylamine	621-64-7		2.00E-01	1.00E-01	Interpolated QL/2	RFI-17-01(02-04)	1.0E+00		1E-06		3.5E+00		3E-07		4.0E-01		3E-06	
RFI-84-10	PCB	PCBs (total)	1336-36-3	2.82E-01		2.82E-01	Interpolated Max	RFI-17-01(02-04)	8.7E+00	1.4E+01	3E-07	2E-02	7.1E+01	1.7E+01	4E-08	2E-02	2.1E+00	3.8E+00	1E-06	7E-02
RFI-84-10	INORG	Antimony	7440-36-0	4.00E-01		3.14E-01	Interpolated Max	RFI-17-01(0.7-02)		8.2E+02		4E-04		2.0E+02		2E-03		1.1E+02		3E-03
RFI-84-10	INORG	Arsenic	7440-38-2	1.30E+01		4.88E+00	Interpolated Max	RFI-17-01(0.7-02)	2.7E+01	4.4E+02	2E-06	1E-02	2.1E+02	2.3E+03	2E-07	2E-03	3.9E+00	7.5E+01	1E-05	7E-02
RFI-84-10	INORG	Beryllium	7440-41-7	4.50E-01			Interpolated Max	RFI-17-01(0.7-02)	2.2E+04	3.7E+03			8.5E+03	3.7E+02			1.3E+04	5.4E+02		
RFI-84-10	INORG	Cadmium	7440-43-9	2.50E-01			Interpolated Max	RFI-17-01(0.7-02)	3.0E+04	1.3E+03			1.1E+04	4.4E+02			1.8E+04	2.4E+02		
RFI-84-10	INORG	Chromium (total)	7440-47-3	3.10E+01			Interpolated Max	RFI-17-01(0.7-02)	4.5E+03	5.9E+03			1.7E+03	2.3E+03			2.7E+03	8.2E+02		
RFI-84-10	INORG	Cobalt	7440-48-4	3.70E+00			Interpolated Max	RFI-17-01(02-04)	1.9E+04	2.0E+04			7.3E+03	5.5E+02			1.1E+04	4.6E+03		
RFI-84-10	INORG	Copper	7440-50-8	2.90E+01		5.38E-01	Interpolated Max	RFI-17-01(0.7-02)		8.2E+04		7E-06		2.0E+04		3E-05		1.1E+04		5E-05
RFI-84-10	INORG	Lead	7439-92-1	6.50E+01			Interpolated Max	RFI-17-01(0.7-02)												
RFI-84-10	INORG	Manganese	7439-96-5	4.90E+02		1.25E+01	Interpolated Max	RFI-17-01(0.7-02)		7.2E+04		2E-04		1.4E+03		9E-03		2.5E+04		5E-04
RFI-84-10	INORG	Mercury	7439-97-6	4.42E-02			Interpolated Max	RFI-17-01(02-04)		6.7E+01				7.7E+00				3.4E+01		
RFI-84-10	INORG	Thallium	7440-28-0	1.60E-01			Interpolated Max	RFI-17-01(0.7-02)		1.4E+02				3.6E+01				1.9E+01		
RFI-84-10	INORG	Vanadium	7440-62-2	1.20E+01			Interpolated Max	RFI-17-01(02-04)		1.4E+04				3.6E+03				1.9E+03		
RFI-84-10	INORG	Zinc	7440-66-6	5.00E+01			Interpolated Max	RFI-17-01(02-04)		6.1E+05				1.5E+05				8.2E+04		

Notes:

The pathways shown are those for which at least one location at the Southend had unacceptable bounding risk estimates.

Site-specific background concentrations of inorganics are subtracted to obtain the site-related exposure concentration.

Occ - Occupational

VI - Vapor Intrusion

RW - Routine Worker; Redev Worker - Redevelopment Construction Worker; Res - Resident

SCC - Soil Contact Criteria; SC - Soil Contact

C - Carcinogenic; NC - Noncarcinogenic

HQ - Hazard Quotient

Attachment G13: Incremental Risk Calculations at RFI-09-48
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Limit (mg/kg)	Max Exposure Conc (mg/kg)	Concentration Basis	Surrogate Sample Name	RW SCC-C (mg/kg)	RW SCC-NC (mg/kg)	RW SC Risk	RW SC HQ	Redev Worker SCC-C (mg/kg)	Redev Worker SCC-NC (mg/kg)	Redev Worker SC Risk	Redev Worker SC HQ	Res SCC-C (mg/kg)	Res SCC-NC (mg/kg)	Res SC Risk	Res SC HQ
RFI-09-48	VOC	Acetone	67-64-1		4.00E-01	2.00E-01	Half-Limit	NA		3.6E+04		6E-06		4.4E+03		5E-05		2.6E+04		8E-06
RFI-09-48	VOC	Benzene	71-43-2		4.60E-02	2.30E-02	Half-Limit	NA	8.1E+00	6.8E+01	3E-08	3E-04	2.2E+01	1.5E+01	1E-08	2E-03	5.1E+00	5.1E+01	5E-08	5E-04
RFI-09-48	VOC	Bromodichloromethane	75-27-4		9.30E-02	4.65E-02	Half-Limit	NA	1.1E+01	4.7E+02	4E-08	1E-04	2.9E+01	5.1E+01	2E-08	9E-04	6.6E+00	3.5E+02	7E-08	1E-04
RFI-09-48	VOC	Bromoform	75-25-2		9.30E-02		No Value	NA	4.7E+02				1.3E+03				2.3E+02			
RFI-09-48	VOC	Bromomethane	74-83-9		2.00E-01		No Value	NA		8.3E+00				3.5E+01				6.4E+00		
RFI-09-48	VOC	2-Butanone	78-93-3		4.00E-01	2.00E-01	Half-Limit	NA		5.9E+04		3E-06		6.7E+03		3E-05		3.8E+04		5E-06
RFI-09-48	VOC	Carbon Disulfide	75-15-0		2.00E-01	1.00E-01	Half-Limit	NA		7.4E+02		1E-04		8.0E+01		1E-03		5.7E+02		2E-04
RFI-09-48	VOC	Carbon Tetrachloride	56-23-5		4.60E-02	2.30E-02	Half-Limit	NA	3.2E+00		7E-08		8.6E+00		3E-08		2.0E+00		1E-07	
RFI-09-48	VOC	Chlorobenzene	108-90-7		4.60E-02	2.30E-02	Half-Limit	NA		3.0E+02		8E-05		3.2E+01		7E-04		2.3E+02		1E-04
RFI-09-48	VOC	Chloroethane	75-00-3		2.00E-01	1.00E-01	Half-Limit	NA		8.0E+03		1E-05		8.7E+02		1E-04		6.0E+03		2E-05
RFI-09-48	VOC	Chloroform	67-66-3		4.60E-02	2.30E-02	Half-Limit	NA	2.7E+00	1.1E+02	8E-08	2E-04	7.4E+00	1.2E+01	3E-08	2E-03	1.8E+00	8.5E+01	1E-07	3E-04
RFI-09-48	VOC	Chloromethane	74-87-3		2.00E-01	1.00E-01	Half-Limit	NA		1.3E+02		8E-04		1.4E+01		7E-03		9.9E+01		1E-03
RFI-09-48	VOC	Cumene	98-82-8		2.00E-01	1.00E-01	Half-Limit	NA		2.0E+03		5E-05		2.1E+02		5E-04		1.5E+03		7E-05
RFI-09-48	VOC	Cyclohexane	110-82-7		2.00E-01	1.00E-01	Half-Limit	NA		7.9E+03		1E-05		8.5E+02		1E-04		6.2E+03		2E-05
RFI-09-48	VOC	1,2-Dibromo-3-chloropropane	96-12-8		2.00E-01		No Value	NA	3.9E+01	4.0E+00			2.3E+02	4.3E-01			4.5E+00	3.1E+00		
RFI-09-48	VOC	Dibromochloromethane	124-48-1		9.30E-02		No Value	NA	1.4E+01	8.6E+02			3.9E+01	9.3E+02			8.5E+00	6.1E+02		
RFI-09-48	VOC	1,2-Dibromoethane	106-93-4		2.00E-01		No Value	NA	2.2E-01	4.2E+01			5.8E-01	4.5E+00			1.4E-01	3.2E+01		
RFI-09-48	VOC	1,2-Dichlorobenzene	95-50-1		9.30E-02	4.65E-02	Half-Limit	NA		2.3E+03		2E-05		2.4E+03		2E-05		1.7E+03		3E-05
RFI-09-48	VOC	1,3-Dichlorobenzene	541-73-1		9.30E-02	4.65E-02	Half-Limit	NA		1.2E+03		4E-05		1.3E+02		4E-04		9.2E+02		5E-05
RFI-09-48	VOC	1,4-Dichlorobenzene	106-46-7		9.30E-02	4.65E-02	Half-Limit	NA	4.5E+01	7.2E+03	1E-08	6E-06	1.2E+02	2.3E+03	4E-09	2E-05	2.7E+01	3.6E+03	2E-08	1E-05
RFI-09-48	VOC	Dichlorodifluoromethane	75-71-8		9.30E-02	4.65E-02	Half-Limit	NA		1.7E+02		3E-04		1.9E+02		2E-04		1.4E+02		3E-04
RFI-09-48	VOC	1,1-Dichloroethane	75-34-3		4.60E-02	2.30E-02	Half-Limit	NA		1.0E+03		2E-05		1.1E+03		2E-05		7.9E+02		3E-05
RFI-09-48	VOC	1,2-Dichloroethane	107-06-2		4.60E-02	2.30E-02	Half-Limit	NA	3.6E+00	1.7E+01	6E-08	1E-03	9.8E+00	1.8E+00	2E-08	1E-02	2.3E+00	1.3E+01	1E-07	2E-03
RFI-09-48	VOC	1,1-Dichloroethene	75-35-4		4.60E-02	2.30E-02	Half-Limit	NA		2.5E+02		9E-05		2.7E+01		9E-04		1.9E+02		1E-04
RFI-09-48	VOC	cis-1,2-Dichloroethene	156-59-2		4.60E-02	2.30E-02	Half-Limit	NA		8.6E+01		3E-04		9.3E+01		2E-04		6.6E+01		3E-04
RFI-09-48	VOC	trans-1,2-Dichloroethene	156-60-5		4.60E-02	2.30E-02	Half-Limit	NA		1.2E+02		2E-04		1.3E+01		2E-03		9.0E+01		3E-04
RFI-09-48	VOC	1,2-Dichloropropane	78-87-5		4.60E-02		No Value	NA		1.2E+01				4.2E+00				9.4E+00		
RFI-09-48	VOC	1,3-Dichloropropene (total)	542-75-6		4.60E-02		No Value	NA	1.1E+01	3.2E+01			3.0E+01	3.5E+00			6.6E+00	2.5E+01		
RFI-09-48	VOC	Ethyl Benzene	100-41-4	3.40E-02	4.60E-02	3.40E-02	Max Detect	NA		4.3E+03		8E-06		4.6E+02		7E-05		3.0E+03		1E-05
RFI-09-48	VOC	2-Hexanone	591-78-6		9.30E-02	4.65E-02	Half-Limit	NA		8.1E+04		6E-07		1.8E+04		3E-06		1.1E+04		4E-06
RFI-09-48	VOC	Methyl Acetate	79-20-9	9.00E-02	1.70E-01	9.00E-02	Max Detect	NA		3.1E+04		3E-06		3.3E+04		3E-06		2.2E+04		4E-06
RFI-09-48	VOC	Methyl tert-butyl ether	1634-04-4		2.00E-01		No Value	NA		1.3E+04				1.4E+03				1.0E+04		
RFI-09-48	VOC	4-Methyl-2-pentanone	108-10-1		2.00E+00	1.00E+00	Half-Limit	NA		2.9E+04		3E-05		3.1E+03		3E-04		2.2E+04		4E-05
RFI-09-48	VOC	Methylcyclohexane	108-87-2	6.80E-02		6.80E-02	Max Detect	NA		3.0E+03		2E-05		3.2E+02		2E-04		2.3E+03		3E-05
RFI-09-48	VOC	Methylene Chloride	75-09-2	1.30E-01		1.30E-01	Max Detect	NA	1.3E+02	6.3E+03	1E-08	2E-05	3.5E+02	7.0E+02	4E-09	2E-04	7.8E+01	3.9E+03	2E-08	3E-05
RFI-09-48	VOC	Styrene	100-42-5		4.60E-02	2.30E-02	Half-Limit	NA		1.0E+04		2E-06		3.3E+03		7E-06		7.2E+03		3E-06
RFI-09-48	VOC	1,1,2,2-Tetrachloroethane	79-34-5		9.30E-02		No Value	NA	5.4E+00				1.5E+01				3.2E+00			
RFI-09-48	VOC	Tetrachloroethene	127-18-4		4.60E-02	2.30E-02	Half-Limit	NA	1.9E+01	8.1E+02	1E-08	3E-05	5.2E+01	9.1E+01	4E-09	3E-04	1.1E+01	5.3E+02	2E-08	4E-05
RFI-09-48	VOC	Toluene	108-88-3	3.90E-02	9.30E-02	3.90E-02	Max Detect	NA		1.5E+04		3E-06		1.7E+03		2E-05		8.0E+03		5E-06
RFI-09-48	VOC	1,2,4-Trichlorobenzene	120-82-1		2.00E-01	1.00E-01	Half-Limit	NA		5.1E+03		2E-05		3.0E+03		3E-05		1.8E+03		6E-05
RFI-09-48	VOC	1,1,1-Trichloroethane	71-55-6		4.60E-02	2.30E-02	Half-Limit	NA		4.0E+03		6E-06		4.3E+03		5E-06		3.1E+03		8E-06
RFI-09-48	VOC	1,1,2-Trichloroethane	79-00-5		4.60E-02	2.30E-02	Half-Limit	NA	9.4E+00		2E-08		2.5E+01		9E-09		5.8E+00		4E-08	
RFI-09-48	VOC	Trichloroethene	79-01-6		4.60E-02	2.30E-02	Half-Limit	NA	4.4E+01		5E-09		1.2E+02		2E-09		2.7E+01		8E-09	
RFI-09-48	VOC	Trichlorofluoromethane	75-69-4		9.30E-02	4.65E-02	Half-Limit	NA		7.3E+02		6E-05		7.9E+02		6E-05		5.7E+02		8E-05
RFI-09-48	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2.00E-01	1.00E-01	Half-Limit	NA		3.0E+04		3E-06		3.2E+03		3E-05		2.3E+04		4E-06
RFI-09-48	VOC	Vinyl Chloride	75-01-4		9.30E-02	4.65E-02	Half-Limit	NA	2.8E+00	9.4E+01	2E-07	5E-04	7.9E+00	1.0E+01	6E-08	5E-03	1.4E+00	6.8E+01	3E-07	7E-04
RFI-09-48	VOC	Xylenes (total)	1330-20-7	7.20E-02	9.30E-02	7.20E-02	Max Detect	NA		4.7E+02		2E-04		5.1E+01		1E-03		3.6E+02		2E-04
RFI-09-48	SVOC	Acenaphthene	83-32-9		9.50E-01	4.75E-01	Half-Limit	NA		2.0E+04		2E-05		3.3E+04		1E-05		8.3E+03		6E-05
RFI-09-48	SVOC	Acenaphthylene	208-96-8		9.50E-01	4.75E-01	Half-Limit	NA		1.1E+04		4E-05		1.9E+04		3E-05		4.3E+03		1E-04
RFI-09-48	SVOC	Acetophenone	98-86-2		9.50E-01	4.75E-01	Half-Limit	NA		1.3E+04		4E-05		1.6E+04		3E-05		7.6E+03		6E-05
RFI-09-48	SVOC	Anthracene	120-12-7		9.50E-01	4.75E-01	Half-Limit	NA		2.3E+05		2E-06		1.1E+06		4E-07		5.8E+04		8E-06
RFI-09-48	SVOC	Atrazine	1912-24-9		9.50E-01	4.75E-01	Half-Limit	NA	9.8E+01	2.7E+04	5E-08	2E-05	7.8E+02	8.7E+03	6E-09	5E-05	2.1E+01	7.0E+03	2E-07	7E-05

Attachment G13: Incremental Risk Calculations at RFI-09-48
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Limit (mg/kg)	Max Exposure Conc (mg/kg)	Concentration Basis	Surrogate Sample Name	RW SCC-C (mg/kg)	RW SCC-NC (mg/kg)	RW SC Risk	RW SC HQ	Redev Worker SCC-C (mg/kg)	Redev Worker SCC-NC (mg/kg)	Redev Worker SC Risk	Redev Worker SC HQ	Res SCC-C (mg/kg)	Res SCC-NC (mg/kg)	Res SC Risk	Res SC HQ
RFI-09-48	SVOC	Benzaldehyde	100-52-7		9.50E-01	4.75E-01	Half-Limit	NA		9.1E+03		5E-05		1.1E+03		4E-04		5.7E+03		8E-05
RFI-09-48	SVOC	Benzo(a)anthracene	56-55-3		9.50E-01	4.75E-01	Half-Limit	NA	2.9E+01		2E-07		3.3E+02		1E-08		6.2E+00		8E-07	
RFI-09-48	SVOC	Benzo(a)pyrene	50-32-8		9.50E-01	4.75E-01	Half-Limit	NA	2.9E+00		2E-06		3.4E+01		1E-07		6.2E-01		8E-06	
RFI-09-48	SVOC	Benzo(b)fluoranthene	205-99-2		9.50E-01	4.75E-01	Half-Limit	NA	2.8E+01		2E-07		3.1E+02		2E-08		6.2E+00		8E-07	
RFI-09-48	SVOC	Benzo(g,h,i)perylene	191-24-2		9.50E-01	4.75E-01	Half-Limit	NA		2.3E+04		2E-05		1.1E+05		4E-06		5.8E+03		8E-05
RFI-09-48	SVOC	Benzo(k)fluoranthene	207-08-9		9.50E-01	4.75E-01	Half-Limit	NA	2.9E+02		2E-08		3.4E+03		1E-09		6.2E+01		8E-08	
RFI-09-48	SVOC	Biphenyl	92-52-4		9.50E-01	4.75E-01	Half-Limit	NA		1.7E+04		3E-05		2.5E+03		2E-04		7.0E+03		7E-05
RFI-09-48	SVOC	bis(2-Chloroethoxy)methane	111-91-1		9.50E-01	4.75E-01	Half-Limit	NA												
RFI-09-48	SVOC	bis(2-Chloroethyl) ether	111-44-4		1.80E-01	9.00E-02	Half-Limit	NA	2.2E+00		4E-07		6.5E+00		1E-07		1.2E+00		8E-07	
RFI-09-48	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7		9.50E-01	4.75E-01	Half-Limit	NA	1.8E+03	1.8E+04	3E-09	3E-05	1.9E+04	7.7E+03	2E-10	6E-05	3.5E+02	4.2E+03	1E-08	1E-04
RFI-09-48	SVOC	4-Bromophenyl-phenyl ether	101-55-3		9.50E-01		No Value	NA												
RFI-09-48	SVOC	Butylbenzylphthalate	85-68-7		9.50E-01	4.75E-01	Half-Limit	NA	1.3E+04	1.7E+05	4E-10	3E-06	1.3E+05	6.8E+05	4E-11	7E-07	2.5E+03	4.1E+04	2E-09	1E-05
RFI-09-48	SVOC	Caprolactam	105-60-2		9.50E-01	4.75E-01	Half-Limit	NA		2.7E+05		2E-06		5.3E+04		9E-06		8.7E+04		5E-06
RFI-09-48	SVOC	Carbazole	86-74-8		9.50E-01	4.75E-01	Half-Limit	NA	1.2E+03		4E-09		1.1E+04		4E-10		2.4E+02		2E-08	
RFI-09-48	SVOC	4-Chloro-3-methylphenol	59-50-7		9.50E-01		No Value	NA						3.9E+05						
RFI-09-48	SVOC	4-Chloroaniline	106-47-8		3.80E+00		No Value	NA	2.6E+02	2.0E+03			1.3E+03	3.9E+02			7.4E+01	6.8E+02		
RFI-09-48	SVOC	2-Chloronaphthalene	91-58-7		9.50E-01	4.75E-01	Half-Limit	NA		2.5E+04		2E-05		3.7E+03		1E-04		1.1E+04		4E-05
RFI-09-48	SVOC	2-Chlorophenol	95-57-8		9.50E-01		No Value	NA		3.8E+02				4.4E+02				2.5E+02		
RFI-09-48	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		3.80E+00		No Value	NA												
RFI-09-48	SVOC	Chrysene	218-01-9		9.50E-01	4.75E-01	Half-Limit	NA	2.8E+03		2E-09		2.9E+04		2E-10		6.1E+02		8E-09	
RFI-09-48	SVOC	Dibenz(a,h)anthracene	53-70-3		9.50E-01	4.75E-01	Half-Limit	NA	2.9E+00		2E-06		3.4E+01		1E-07		6.2E-01		8E-06	
RFI-09-48	SVOC	Dibenzofuran	132-64-9		9.50E-01	4.75E-01	Half-Limit	NA		1.5E+03		3E-04		4.4E+02		1E-03		3.9E+02		1E-03
RFI-09-48	SVOC	3,3'-Dichlorobenzidine	91-94-1		3.80E+00		No Value	NA	5.0E+01				4.3E+02				1.0E+01			
RFI-09-48	SVOC	2,4-Dichlorophenol	120-83-2		9.50E-01	4.75E-01	Half-Limit	NA		1.2E+03		4E-04		1.9E+02		2E-03		4.5E+02		1E-03
RFI-09-48	SVOC	Diethylphthalate	84-66-2		9.50E-01	4.75E-01	Half-Limit	NA		5.3E+05		9E-07		1.3E+06		4E-07		1.5E+05		3E-06
RFI-09-48	SVOC	2,4-Dimethylphenol	105-67-9		9.50E-01	4.75E-01	Half-Limit	NA		8.4E+03		6E-05		1.4E+04		3E-05		3.1E+03		2E-04
RFI-09-48	SVOC	Dimethylphthalate	131-11-3		9.50E-01	4.75E-01	Half-Limit	NA						3.8E+06		1E-07				
RFI-09-48	SVOC	Di-n-butylphthalate	84-74-2		9.50E-01	4.75E-01	Half-Limit	NA		8.8E+04		5E-06		3.8E+05		1E-06		2.1E+04		2E-05
RFI-09-48	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3.80E+00	1.90E+00	Half-Limit	NA		5.9E+01		3E-02		1.3E+01		1E-01		1.8E+01		1E-01
RFI-09-48	SVOC	2,4-Dinitrophenol	51-28-5		3.80E+00		No Value	NA		1.8E+03				7.7E+02				4.2E+02		
RFI-09-48	SVOC	2,4-Dinitrotoluene	121-14-2		3.80E+00	1.90E+00	Half-Limit	NA	3.6E+01	1.8E+03	5E-07	1E-03	4.0E+02	7.7E+02	5E-08	2E-03	7.1E+00	4.2E+02	3E-06	5E-03
RFI-09-48	SVOC	2,6-Dinitrotoluene	606-20-2		9.50E-01		No Value	NA	2.0E+01	4.8E+02			9.0E+01	8.8E+02			5.7E+00	1.7E+02		
RFI-09-48	SVOC	Di-n-octylphthalate	117-84-0		9.50E-01	4.75E-01	Half-Limit	NA		3.5E+04		1E-05		1.5E+05		3E-06		8.3E+03		6E-05
RFI-09-48	SVOC	Fluoranthene	206-44-0		9.50E-01	4.75E-01	Half-Limit	NA		2.8E+04		2E-05		1.0E+05		5E-06		7.5E+03		6E-05
RFI-09-48	SVOC	Fluorene	86-73-7		9.50E-01	4.75E-01	Half-Limit	NA		2.0E+04		2E-05		4.3E+04		1E-05		6.6E+03		7E-05
RFI-09-48	SVOC	Hexachlorobenzene	118-74-1		9.50E-01		No Value	NA	5.6E+00	7.0E+02			2.1E+01	3.1E+02			2.0E+00	1.7E+02		
RFI-09-48	SVOC	Hexachlorobutadiene	87-68-3		9.50E-01	4.75E-01	Half-Limit	NA	5.9E+01	1.8E+02	8E-08	3E-03	1.8E+02	2.7E+02	3E-08	2E-03	2.7E+01	4.2E+01	2E-07	1E-02
RFI-09-48	SVOC	Hexachlorocyclopentadiene	77-47-4		9.50E-01	4.75E-01	Half-Limit	NA		2.2E+01		2E-02		8.4E+00		6E-02		1.7E+01		3E-02
RFI-09-48	SVOC	Hexachloroethane	67-72-1		9.50E-01	4.75E-01	Half-Limit	NA	3.9E+02	8.8E+02	1E-08	5E-04	1.3E+03	3.8E+03	4E-09	1E-04	1.7E+02	2.1E+02	3E-08	2E-03
RFI-09-48	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5		9.50E-01	4.75E-01	Half-Limit	NA	2.9E+01		2E-07		3.4E+02		1E-08		6.2E+00		8E-07	
RFI-09-48	SVOC	Isophorone	78-59-1		9.50E-01	4.75E-01	Half-Limit	NA	2.6E+04	1.8E+05	2E-10	3E-06	2.8E+05	7.7E+05	2E-11	6E-07	5.1E+03	4.2E+04	9E-10	1E-05
RFI-09-48	SVOC	2-Methylnaphthalene	91-57-6	7.50E-02	9.50E-01	7.50E-02	Max Detect	NA		2.3E+02		3E-04		2.6E+01		3E-03		1.6E+02		5E-04
RFI-09-48	SVOC	Methylphenol (total)	1319-77-3		1.90E+00	9.50E-01	Half-Limit	NA		4.4E+04		2E-05		1.9E+05		5E-06		1.0E+04		9E-05
RFI-09-48	SVOC	Naphthalene	91-20-3		9.50E-01	4.75E-01	Half-Limit	NA		1.3E+02		4E-03		1.4E+01		3E-02		1.0E+02		5E-03
RFI-09-48	SVOC	2-Nitroaniline	88-74-4		3.80E+00		No Value	NA		7.8E+01				8.0E+01				5.7E+01		
RFI-09-48	SVOC	3-Nitroaniline	99-09-2		3.80E+00		No Value	NA	1.2E+03	2.6E+02			1.3E+04	1.1E+02			2.3E+02	6.2E+01		
RFI-09-48	SVOC	4-Nitroaniline	100-01-6		3.80E+00		No Value	NA	1.2E+03	1.2E+03			1.3E+04	2.0E+02			2.3E+02	4.6E+02		
RFI-09-48	SVOC	Nitrobenzene	98-95-3		3.80E-01	1.90E-01	Half-Limit	NA		6.2E+01		3E-03		7.5E+01		3E-03		3.7E+01		5E-03
RFI-09-48	SVOC	2-Nitrophenol	88-75-5		9.50E-01	4.75E-01	Half-Limit	NA												
RFI-09-48	SVOC	4-Nitrophenol	100-02-7		3.80E+00		No Value	NA												
RFI-09-48	SVOC	N-Nitrosodiphenylamine	86-30-6		9.50E-01	4.75E-01	Half-Limit	NA	5.0E+03	1.8E+04	9E-10	3E-05	5.5E+04	7.7E+03	9E-11	6E-05	9.9E+02	4.2E+03	5E-09	1E-04
RFI-09-48	SVOC	N-Nitroso-di-n-propylamine	621-64-7		9.50E-01	4.75E-01	Half-Limit	NA	1.0E+00		5E-06		3.5E+00		1E-06		4.0E-01		1E-05	
RFI-09-48	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1		9.50E-01	4.75E-01	Half-Limit	NA	7.3E+01	3.5E+04	6E-08	1E-05	2.3E+02	1.5E+04	2E-08	3E-05	3.2E+01	8.3E+03	1E-07	6E-05

Attachment G13: Incremental Risk Calculations at RFI-09-48
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Chem Group	Chemical	CASRN	Max Detected (mg/kg)	Max Limit (mg/kg)	Max Exposure Conc (mg/kg)	Concentration Basis	Surrogate Sample Name	RW SCC-C (mg/kg)	RW SCC-NC (mg/kg)	RW SC Risk	RW SC HQ	Redev Worker SCC-C (mg/kg)	Redev Worker SCC-NC (mg/kg)	Redev Worker SC Risk	Redev Worker SC HQ	Res SCC-C (mg/kg)	Res SCC-NC (mg/kg)	Res SC Risk	Res SC HQ
RFI-09-48	SVOC	Pentachlorophenol	87-86-5		3.80E+00	1.90E+00	Half-Limit	NA	1.0E+02	1.3E+04	2E-07	1E-04	1.2E+03	6.1E+03	2E-08	3E-04	2.9E+01	4.5E+03	7E-07	4E-04
RFI-09-48	SVOC	Phenanthrene	85-01-8	3.60E-01		3.60E-01	Max Detect	NA		1.8E+04		2E-05		5.1E+04		7E-06		5.4E+03		7E-05
RFI-09-48	SVOC	Phenol	108-95-2		9.50E-01	4.75E-01	Half-Limit	NA		2.6E+05		2E-06		1.2E+05		4E-06		6.2E+04		8E-06
RFI-09-48	SVOC	Pyrene	129-00-0	5.33E-01	2.00E-01	5.33E-01	Max Detect	NA		2.1E+04		3E-05		8.2E+04		7E-06		5.7E+03		9E-05
RFI-09-48	SVOC	2,4,5-Trichlorophenol	95-95-4		9.50E-01	4.75E-01	Half-Limit	NA		8.8E+04		5E-06		3.8E+05		1E-06		2.1E+04		2E-05
RFI-09-48	SVOC	2,4,6-Trichlorophenol	88-06-2		9.50E-01	4.75E-01	Half-Limit	NA	1.0E+03	8.8E+01	5E-09	5E-03	4.2E+03	3.8E+01	1E-09	1E-02	3.3E+02	2.1E+01	1E-08	2E-02
RFI-09-48	PCB	PCBs (total)	1336-36-3		4.20E-02	2.10E-02	Half-Limit	NA	8.7E+00	1.4E+01	2E-08	1E-03	7.1E+01	1.7E+01	3E-09	1E-03	2.1E+00	3.8E+00	1E-07	6E-03
RFI-09-48	INORG	Antimony	7440-36-0	2.10E-01		1.24E-01	Max Detect	NA		8.2E+02		2E-04		2.0E+02		6E-04		1.1E+02		1E-03
RFI-09-48	INORG	Arsenic	7440-38-2	1.00E+01		1.88E+00	Max Detect	NA	2.7E+01	4.4E+02	7E-07	4E-03	2.1E+02	2.3E+03	9E-08	8E-04	3.9E+00	7.5E+01	5E-06	3E-02
RFI-09-48	INORG	Barium	7440-39-3	1.10E+02		1.43E+01	Max Detect	NA												
RFI-09-48	INORG	Beryllium	7440-41-7	2.40E+00		1.81E+00	Max Detect	NA	2.2E+04	3.7E+03	8E-10	5E-04	8.5E+03	3.7E+02	2E-09	5E-03	1.3E+04	5.4E+02	1E-09	3E-03
RFI-09-48	INORG	Cadmium	7440-43-9	4.80E-01	1.50E-01		Max Detect	NA	3.0E+04	1.3E+03			1.1E+04	4.4E+02			1.8E+04	2.4E+02		
RFI-09-48	INORG	Chromium (total)	7440-47-3	1.50E+02		1.18E+02	Max Detect	NA	4.5E+03	5.9E+03	3E-07	2E-02	1.7E+03	2.3E+03	7E-07	5E-02	2.7E+03	8.2E+02	4E-07	1E-01
RFI-09-48	INORG	Cobalt	7440-48-4	8.10E+00		1.05E+00	Max Detect	NA	1.9E+04	2.0E+04	5E-10	5E-05	7.3E+03	5.5E+02	1E-09	2E-03	1.1E+04	4.6E+03	9E-10	2E-04
RFI-09-48	INORG	Copper	7440-50-8	5.70E+01		2.85E+01	Max Detect	NA		8.2E+04		3E-04		2.0E+04		1E-03		1.1E+04		3E-03
RFI-09-48	INORG	Cyanide (total)	57-12-5	2.40E-01	2.00E-01	2.40E-01	Max Detect	NA		4.1E+04		6E-06		1.0E+04		2E-05		5.5E+03		4E-05
RFI-09-48	INORG	Lead	7439-92-1	6.10E+01		6.10E+01	Max Detect	NA												
RFI-09-48	INORG	Manganese	7439-96-5	1.80E+03		1.32E+03	Max Detect	NA		7.2E+04		2E-02		1.4E+03		9E-01		2.5E+04		5E-02
RFI-09-48	INORG	Mercury	7439-97-6	1.00E-01		4.76E-02	Max Detect	NA		6.7E+01		7E-04		7.7E+00		6E-03		3.4E+01		1E-03
RFI-09-48	INORG	Nickel	7440-02-0	8.70E+01		6.70E+01	Max Detect	NA	2.2E+05		3E-09		8.5E+04		8E-09		1.3E+05		5E-09	
RFI-09-48	INORG	Selenium	7782-49-2	8.20E-01		3.01E-01	Max Detect	NA		1.0E+04		3E-05		2.5E+03		1E-04		1.4E+03		2E-04
RFI-09-48	INORG	Silver	7440-22-4	1.50E-01			Max Detect	NA		6.7E+03				2.6E+02				1.2E+03		
RFI-09-48	INORG	Thallium	7440-28-0	7.90E-01		5.93E-01	Max Detect	NA		1.4E+02		4E-03		3.6E+01		2E-02		1.9E+01		3E-02
RFI-09-48	INORG	Vanadium	7440-62-2	2.70E+01		2.13E+00	Max Detect	NA		1.4E+04		1E-04		3.6E+03		6E-04		1.9E+03		1E-03
RFI-09-48	INORG	Zinc	7440-66-6	5.40E+01			Max Detect	NA		6.1E+05				1.5E+05				8.2E+04		

Notes

The only pathways shown are those for which at least one location at the Southend had unacceptable bounding risk estimates.

Site-specific background concentrations of inorganics are subtracted to obtain the site-related exposure concentration.

Occ - Occupational

VI - Vapor Intrusion

RW - Routine Worker; Redev Worker - Redevelopment Construction Worker; Res - Resident

SCC - Soil Contact Criteria; SC - Soil Contact

C - Carcinogenic; NC - Noncarcinogenic

HQ - Hazard Quotient

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
40-303R	3E-06	3E-02	5E-06	2E-01	5E-08	1E-03	7E-07	1E-01	1E-05	9E-02	1E-05	2E-01
40-4R	4E-06	7E-02	1E-05	5E-01	4E-08	2E-03	1E-06	5E-01	1E-05	1E-01	2E-05	8E-01
40-7R	6E-06	7E-02	4E-06	3E-01	1E-07	3E-03	1E-06	3E-01	3E-05	2E-01	9E-06	4E-01
84-07	5E-06	5E-02	7E-06	9E-02	9E-08	1E-02	1E-06	3E-01	1E-05	1E-01	1E-05	2E-01
BD 94 EP-01	2E-06	2E-02	3E-06	2E-01	4E-08	1E-03	5E-07	1E-01	8E-06	6E-02	6E-06	2E-01
BD 94 EP-02	2E-05	6E-01	4E-06	2E-01	3E-07	2E-02	3E-06	6E-01	7E-05	2E+00	1E-05	3E-01
BD 94 EP-03	3E-06	3E-02	3E-06	2E-01	6E-08	2E-03	7E-07	1E-01	1E-05	1E-01	6E-06	2E-01
EP 94-02A	2E-05	5E-01	4E-06	2E-01	3E-07	2E-02	3E-06	6E-01	7E-05	2E+00	8E-06	2E-01
EP 94-02B	3E-06	3E-02	3E-06	2E-01	6E-08	2E-03	6E-07	1E-01	1E-05	9E-02	6E-06	2E-01
EP 94-02C	9E-06	2E-02	2E-06	1E-02	1E-07	1E-03	2E-06	8E-02	3E-05	6E-02	4E-06	2E-02
EP 94-02D	9E-06	2E-02	2E-06	1E-02	1E-07	1E-03	2E-06	8E-02	3E-05	6E-02	4E-06	2E-02
RFI-02-01	2E-06	3E-02	3E-06	2E-01	4E-08	2E-03	6E-07	2E-01	8E-06	1E-01	6E-06	2E-01
RFI-02-02	3E-06	4E-02	3E-06	2E-01	6E-08	2E-02	7E-07	4E-01	1E-05	1E-01	6E-06	2E-01
RFI-02-03	3E-06	8E-02	3E-06	2E-01	1E-06	1E-02	3E-06	3E-01	1E-05	5E-01	6E-06	2E-01
RFI-02-04	3E-05	2E-02	3E-06	2E-01	4E-07	9E-04	3E-06	1E-01	1E-04	6E-02	6E-06	2E-01
RFI-02-05	4E-06	3E-02	3E-06	2E-01	7E-08	2E-03	8E-07	2E-01	2E-05	1E-01	7E-06	3E-01
RFI-02-06	1E-05	9E-02	4E-06	2E-01	2E-07	9E-03	2E-06	4E-01	4E-05	2E-01	1E-05	3E-01
RFI-02-07	3E-06	3E-02	3E-06	2E-01	5E-08	1E-02	6E-07	3E-01	8E-06	9E-02	6E-06	2E-01
RFI-02-08	5E-06	4E-02	3E-06	2E-01	1E-07	4E-02	9E-07	7E-01	2E-05	1E-01	6E-06	2E-01
RFI-02-09	3E-06	7E-02	1E-06	8E-03	1E-06	1E-02	3E-06	2E-01	8E-06	5E-01	2E-06	1E-02
RFI-02-10	3E-06	7E-02	1E-06	8E-03	1E-06	1E-02	3E-06	2E-01	8E-06	5E-01	2E-06	1E-02
RFI-02-11	3E-06	7E-02	1E-06	8E-03	1E-06	1E-02	3E-06	2E-01	8E-06	5E-01	2E-06	1E-02
RFI-02-12	3E-06	2E-02	3E-06	8E-02	4E-08	1E-03	6E-07	1E-01	9E-06	6E-02	7E-06	1E-01
RFI-02-13	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	5E-07	9E-02	8E-06	5E-02	6E-06	2E-01
RFI-02-14	7E-06	4E-02	5E-06	5E-02	1E-07	1E-03	1E-06	1E-01	3E-05	1E-01	1E-05	9E-02
RFI-02-19	8E-06	4E-02	5E-06	5E-02	1E-07	1E-03	1E-06	1E-01	3E-05	1E-01	1E-05	8E-02
RFI-02-20	4E-06	4E-02	5E-06	5E-02	7E-08	6E-03	1E-06	2E-01	1E-05	1E-01	1E-05	8E-02
RFI-02-21	4E-06	4E-02	5E-06	5E-02	6E-08	1E-03	1E-06	1E-01	1E-05	1E-01	1E-05	8E-02
RFI-02-22	4E-06	8E-02	4E-06	5E-02	6E-08	2E-02	1E-06	7E-01	1E-05	3E-01	9E-06	9E-02
RFI-02-23	4E-06	4E-02	5E-06	5E-02	6E-08	1E-03	1E-06	1E-01	1E-05	1E-01	1E-05	9E-02
RFI-04-01	1E-05	7E-02	4E-06	2E-01	2E-07	3E-03	2E-06	3E-01	5E-05	2E-01	9E-06	3E-01
RFI-04-02	5E-06	2E-02	3E-06	2E-01	7E-08	9E-04	7E-07	1E-01	2E-05	7E-02	6E-06	2E-01

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
RFI-04-03	2E-06	2E-02	3E-06	2E-01	4E-08	8E-03	6E-07	2E-01	8E-06	6E-02	6E-06	2E-01
RFI-04-04	2E-06	3E-02	3E-06	2E-01	3E-08	1E-03	5E-07	9E-02	7E-06	8E-02	6E-06	2E-01
RFI-09-01	5E-06	1E-01	5E-06	2E-01	2E-07	1E-02	1E-06	7E-01	2E-05	5E-01	9E-06	3E-01
RFI-09-01R	4E-06	9E-02	2E-06	2E-02	2E-07	1E-02	8E-07	6E-01	2E-05	4E-01	3E-06	3E-02
RFI-09-02	4E-05	7E-01	1E-05	2E-01	6E-07	4E-02	8E-06	7E-01	1E-04	2E+00	2E-05	3E-01
RFI-09-03	3E-04	2E-01	7E-06	2E-01	5E-06	2E-02	3E-05	3E-01	1E-03	8E-01	2E-05	3E-01
RFI-09-03R	1E-05	2E-01	1E-06	2E-02	2E-07	7E-03	1E-06	2E-01	5E-05	7E-01	2E-06	4E-02
RFI-09-04	5E-06	2E-01	3E-06	2E-01	2E-07	3E-01	1E-06	6E+00	2E-05	5E-01	7E-06	2E-01
RFI-09-05	3E-05	8E-01	6E-06	2E-01	5E-07	3E-02	5E-06	9E-01	1E-04	3E+00	2E-05	4E-01
RFI-09-06	8E-06	6E-02	4E-06	2E-01	2E-07	4E-02	1E-06	8E-01	3E-05	2E-01	9E-06	3E-01
RFI-09-07	2E-06	3E-02	3E-06	2E-01	3E-08	3E-03	6E-07	2E-01	8E-06	7E-02	7E-06	2E-01
RFI-09-08	3E-06	4E-02	9E-06	3E-01	1E-07	2E-03	9E-07	2E-01	9E-06	1E-01	2E-05	4E-01
RFI-09-09	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	5E-07	1E-01	7E-06	5E-02	6E-06	2E-01
RFI-09-10	3E-06	3E-02	3E-06	2E-01	6E-08	2E-03	7E-07	1E-01	1E-05	1E-01	6E-06	2E-01
RFI-09-11	2E-06	3E-02	3E-06	2E-01	3E-08	9E-04	5E-07	1E-01	7E-06	7E-02	6E-06	2E-01
RFI-09-12	2E-05	5E-02	3E-06	2E-01	4E-07	4E-02	2E-06	8E-01	1E-04	1E-01	6E-06	2E-01
RFI-09-15	2E-05	3E-01	5E-06	2E-01	4E-07	2E-02	2E-06	8E-01	8E-05	1E+00	1E-05	3E-01
RFI-09-16	1E-05	8E-02	1E-06	2E-02	3E-07	1E-02	2E-06	6E-01	7E-05	4E-01	2E-06	4E-02
RFI-09-18	2E-05	3E-02	4E-06	3E-02	3E-07	9E-04	6E-06	1E-01	8E-05	7E-02	1E-05	5E-02
RFI-09-19	5E-05	2E-01	1E-06	2E-02	8E-07	8E-03	4E-06	2E-01	2E-04	7E-01	2E-06	4E-02
RFI-09-20	8E-06	2E-01	1E-06	2E-02	1E-07	7E-03	1E-06	2E-01	3E-05	7E-01	2E-06	4E-02
RFI-09-21	6E-06	2E-01	1E-06	2E-02	1E-07	7E-03	9E-07	2E-01	2E-05	7E-01	2E-06	4E-02
RFI-09-22	5E-06	3E-02	1E-06	2E-02	2E-07	3E-03	9E-07	8E-02	2E-05	1E-01	3E-06	3E-02
RFI-09-23	6E-06	9E-02	1E-05	2E-01	2E-07	4E-03	1E-06	2E-01	2E-05	3E-01	2E-05	3E-01
RFI-09-24	2E-06	5E-02	9E-07	8E-03	3E-07	1E-01	8E-07	2E+00	6E-06	2E-01	2E-06	2E-02
RFI-09-25	5E-06	7E-02	1E-06	2E-02	2E-07	1E-01	9E-07	2E+00	2E-05	3E-01	3E-06	3E-02
RFI-09-26	2E-05	3E-02	4E-06	3E-02	2E-07	9E-04	3E-06	1E-01	6E-05	7E-02	9E-06	6E-02
RFI-09-27	2E-05	2E-02	4E-06	3E-02	2E-07	7E-04	3E-06	1E-01	6E-05	5E-02	9E-06	6E-02
RFI-09-28	4E-06	3E-02	3E-06	2E-01	6E-08	1E-03	7E-07	1E-01	2E-05	9E-02	6E-06	2E-01
RFI-09-29	2E-05	5E-02	4E-06	3E-02	2E-07	2E-03	3E-06	2E-01	6E-05	2E-01	9E-06	6E-02
RFI-09-33	2E-06	3E-02	9E-07	8E-03	3E-07	4E-02	8E-07	8E-01	6E-06	1E-01	2E-06	2E-02
RFI-09-34	2E-06	3E-02	9E-07	8E-03	3E-07	4E-02	8E-07	7E-01	6E-06	1E-01	2E-06	2E-02

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
RFI-09-35	5E-06	8E-02	1E-06	1E-02	2E-07	5E-02	1E-06	9E-01	2E-05	3E-01	3E-06	2E-02
RFI-09-36R	3E-05	3E-01	7E-06	2E-01	6E-06	2E-01	6E-06	9E-01	1E-04	1E+00	2E-05	4E-01
RFI-09-37	2E-05	2E-01	1E-06	1E-02	3E-07	9E-03	2E-06	3E-01	8E-05	8E-01	2E-06	3E-02
RFI-09-38	3E-05	6E-01	4E-06	3E-02	5E-07	2E-02	7E-06	6E-01	1E-04	2E+00	1E-05	5E-02
RFI-09-39	4E-05	3E-02	1E-06	3E-02	7E-07	9E-04	4E-06	1E-01	2E-04	7E-02	2E-06	5E-02
RFI-09-40	2E-06	5E-02	3E-06	2E-01	3E-08	8E-03	5E-07	4E-01	7E-06	1E-01	6E-06	2E-01
RFI-09-41	2E-06	8E-02	3E-06	2E-01	3E-08	3E-03	6E-07	6E-01	7E-06	2E-01	7E-06	3E-01
RFI-09-42	1E-05	4E-02	3E-06	8E-02	2E-07	8E-03	1E-06	3E-01	4E-05	9E-02	7E-06	1E-01
RFI-09-43	3E-06	2E-02	3E-06	8E-02	5E-08	8E-04	6E-07	1E-01	1E-05	6E-02	7E-06	1E-01
RFI-09-44	7E-06	5E-02	3E-06	8E-02	1E-07	2E-02	1E-06	5E-01	3E-05	2E-01	6E-06	1E-01
RFI-09-45	7E-05	2E-01	4E-06	3E-01	2E-06	8E-03	7E-06	9E-01	3E-04	5E-01	9E-06	4E-01
RFI-09-45R	5E-05	3E-02	1E-06	2E-02	9E-07	3E-03	5E-06	2E-01	2E-04	9E-02	2E-06	5E-02
RFI-09-47	2E-05	1E-01	5E-06	3E-01	3E-07	5E-03	4E-06	5E-01	7E-05	4E-01	1E-05	4E-01
RFI-09-49	2E-06	6E-02	3E-06	7E-02	3E-07	9E-02	9E-07	2E+00	8E-06	2E-01	6E-06	1E-01
RFI-09-50	4E-05	4E-02	7E-06	9E-02	6E-07	2E-03	9E-06	3E-01	1E-04	7E-02	2E-05	1E-01
RFI-09-52	4E-06	8E-02	4E-06	8E-02	6E-07	4E-02	2E-06	7E-01	1E-05	4E-01	8E-06	1E-01
RFI-09-53	7E-06	1E-01	9E-06	5E-02	2E-07	5E-02	2E-06	1E+00	2E-05	4E-01	2E-05	9E-02
RFI-09-56	5E-06	1E-01	4E-06	5E-02	6E-08	6E-03	1E-06	4E-01	1E-05	6E-01	8E-06	9E-02
RFI-09-57	4E-06	4E-02	5E-06	5E-02	6E-08	1E-03	1E-06	1E-01	1E-05	1E-01	1E-05	9E-02
RFI-12-01	4E-06	3E-02	2E-06	2E-01	5E-08	1E-03	6E-07	9E-02	1E-05	1E-01	5E-06	2E-01
RFI-12-02	1E-05	1E-01	5E-06	2E-01	7E-07	5E-02	2E-06	1E+00	4E-05	3E-01	1E-05	3E-01
RFI-12-03	7E-06	7E-02	5E-06	2E-01	1E-07	2E-03	1E-06	4E-01	3E-05	2E-01	9E-06	3E-01
RFI-12-04	7E-06	3E-02	3E-06	2E-01	1E-07	1E-02	1E-06	3E-01	3E-05	8E-02	7E-06	2E-01
RFI-12-05	2E-05	1E-01	3E-06	2E-01	3E-07	4E-03	2E-06	1E+00	7E-05	3E-01	6E-06	3E-01
RFI-12-06	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	6E-07	9E-02	8E-06	5E-02	6E-06	2E-01
RFI-12-07	3E-06	4E-02	3E-06	2E-01	3E-07	5E-03	1E-06	1E-01	1E-05	2E-01	6E-06	2E-01
RFI-12-08	1E-05	1E-01	3E-06	2E-01	3E-07	1E-02	2E-06	5E-01	7E-05	4E-01	6E-06	2E-01
RFI-12-10	2E-05	2E-01	5E-06	3E-01	3E-07	6E-03	4E-06	7E-01	7E-05	4E-01	1E-05	4E-01
RFI-12-11D	3E-06	6E-02	3E-06	2E-01	2E-07	6E-02	9E-07	1E+00	8E-06	2E-01	6E-06	2E-01
RFI-12-14	2E-06	5E-02	3E-06	2E-01	2E-07	6E-02	7E-07	1E+00	7E-06	2E-01	6E-06	2E-01
RFI-12-15	5E-06	3E-02	3E-06	2E-01	8E-08	9E-04	8E-07	1E-01	2E-05	7E-02	6E-06	2E-01
RFI-12-16	8E-06	5E-02	1E-06	3E-02	6E-07	4E-02	9E-07	9E-01	3E-05	1E-01	2E-06	6E-02

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
RFI-12-17	4E-05	4E-02	5E-06	2E-02	6E-07	4E-03	7E-06	3E-01	1E-04	1E-01	1E-05	5E-02
RFI-12-18	8E-06	5E-02	1E-06	3E-02	6E-07	4E-02	9E-07	9E-01	3E-05	1E-01	2E-06	6E-02
RFI-12-21	3E-06	3E-02	3E-06	2E-01	4E-08	2E-03	6E-07	1E-01	9E-06	7E-02	7E-06	3E-01
RFI-12-22	2E-06	3E-02	3E-06	2E-01	4E-08	3E-02	6E-07	5E-01	7E-06	1E-01	7E-06	2E-01
RFI-12-23	4E-06	5E-02	3E-06	9E-02	6E-08	2E-03	7E-07	3E-01	1E-05	1E-01	7E-06	1E-01
RFI-12-24	2E-06	2E-02	3E-06	6E-02	3E-08	6E-04	5E-07	8E-02	7E-06	5E-02	6E-06	1E-01
RFI-12-25	1E-05	8E-02	4E-06	1E-01	2E-07	4E-03	2E-06	3E-01	4E-05	2E-01	1E-05	2E-01
RFI-12-26	9E-06	3E-01	5E-06	2E-01	6E-07	1E-02	2E-06	1E+00	3E-05	9E-01	1E-05	4E-01
RFI-12-27	3E-06	3E-02	5E-06	8E-02	4E-08	9E-04	7E-07	1E-01	1E-05	7E-02	9E-06	1E-01
RFI-12-28	2E-05	2E-01	3E-06	1E-01	3E-07	5E-03	2E-06	1E+00	8E-05	3E-01	7E-06	2E-01
RFI-12-29	3E-06	3E-02	3E-06	7E-02	3E-08	1E-03	6E-07	1E-01	8E-06	8E-02	7E-06	1E-01
RFI-12-30	3E-06	9E-02	3E-06	7E-02	1E-06	2E-02	3E-06	4E-01	1E-05	6E-01	7E-06	1E-01
RFI-12-31	5E-06	3E-01	3E-06	7E-02	4E-07	3E-02	1E-06	1E+00	2E-05	2E+00	6E-06	1E-01
RFI-12-32	4E-06	3E-02	3E-06	7E-02	5E-08	9E-04	7E-07	9E-02	1E-05	8E-02	6E-06	1E-01
RFI-12-33	1E-05	1E-01	4E-06	2E-01	8E-07	1E-02	3E-06	5E-01	3E-05	5E-01	1E-05	4E-01
RFI-12-34	3E-06	6E-02	3E-06	7E-02	1E-07	7E-02	8E-07	1E+00	8E-06	2E-01	6E-06	1E-01
RFI-12-35	5E-06	3E-01	3E-06	8E-02	4E-07	3E-02	1E-06	1E+00	2E-05	2E+00	7E-06	1E-01
RFI-16-01	6E-06	4E-02	3E-06	2E-01	1E-07	5E-03	1E-06	1E-01	3E-05	2E-01	6E-06	2E-01
RFI-16-02	3E-06	3E-02	3E-06	2E-01	4E-08	1E-03	6E-07	1E-01	8E-06	8E-02	7E-06	2E-01
RFI-16-03	4E-06	3E-02	4E-06	2E-01	5E-08	1E-02	7E-07	3E-01	1E-05	9E-02	8E-06	3E-01
RFI-16-04	8E-06	1E-01	3E-06	2E-01	1E-07	4E-03	1E-06	2E-01	3E-05	4E-01	6E-06	2E-01
RFI-16-05	2E-06	3E-02	3E-06	2E-01	3E-08	4E-03	6E-07	2E-01	8E-06	7E-02	6E-06	2E-01
RFI-16-06	2E-06	3E-02	3E-06	2E-01	3E-08	6E-03	5E-07	2E-01	8E-06	8E-02	5E-06	2E-01
RFI-16-07	2E-06	2E-02	3E-06	2E-01	7E-08	1E-03	6E-07	9E-02	7E-06	6E-02	6E-06	2E-01
RFI-16-08	4E-06	7E-02	1E-05	4E-01	7E-08	2E-02	1E-06	5E-01	1E-05	1E-01	2E-05	7E-01
RFI-16-09	2E-06	2E-02	3E-06	2E-01	3E-08	9E-04	5E-07	9E-02	7E-06	5E-02	6E-06	2E-01
RFI-16-10	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	5E-07	8E-02	7E-06	5E-02	6E-06	2E-01
RFI-16-11	3E-05	2E-01	3E-06	2E-01	1E-06	4E-02	3E-06	1E+00	1E-04	5E-01	8E-06	4E-01
RFI-16-12	5E-06	6E-02	5E-06	3E-01	1E-07	3E-03	1E-06	1E-01	2E-05	2E-01	1E-05	5E-01
RFI-16-13	2E-06	3E-02	3E-06	2E-01	3E-08	1E-03	6E-07	2E-01	8E-06	7E-02	6E-06	3E-01
RFI-16-20	3E-06	2E-02	4E-06	2E-01	4E-08	9E-04	6E-07	1E-01	8E-06	6E-02	8E-06	3E-01
RFI-16-24	4E-05	3E-02	4E-06	6E-02	7E-07	4E-02	5E-06	7E-01	1E-04	1E-01	1E-05	9E-02

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
RFI-16-25	4E-05	3E-02	4E-06	6E-02	7E-07	4E-02	5E-06	7E-01	1E-04	1E-01	1E-05	1E-01
RFI-17-01	5E-06	7E-02	3E-06	1E-01	1E-07	3E-03	9E-07	3E-01	3E-05	2E-01	6E-06	2E-01
RFI-17-02	5E-06	4E-02	3E-06	2E-01	1E-07	2E-03	9E-07	1E-01	2E-05	2E-01	6E-06	2E-01
RFI-23-01	4E-06	2E-02	3E-06	2E-01	5E-08	1E-03	7E-07	1E-01	1E-05	6E-02	6E-06	2E-01
RFI-23-02	3E-06	2E-02	3E-06	2E-01	4E-08	8E-04	5E-07	1E-01	8E-06	6E-02	6E-06	2E-01
RFI-29-01	4E-06	7E-02	3E-06	2E-01	7E-07	1E-02	2E-06	3E-01	1E-05	4E-01	6E-06	2E-01
RFI-29-02	3E-06	5E-02	1E-06	8E-03	7E-07	1E-02	2E-06	2E-01	1E-05	3E-01	2E-06	1E-02
RFI-29-03	3E-06	5E-02	1E-06	8E-03	7E-07	1E-02	2E-06	2E-01	1E-05	3E-01	2E-06	1E-02
RFI-40-01	3E-06	2E-02	3E-06	2E-01	4E-08	8E-04	6E-07	1E-01	1E-05	6E-02	6E-06	2E-01
RFI-40-02	5E-06	3E-02	3E-06	2E-01	8E-08	1E-03	8E-07	1E-01	2E-05	8E-02	6E-06	2E-01
RFI-40-03	3E-06	3E-02	3E-06	2E-01	5E-08	3E-02	6E-07	6E-01	1E-05	1E-01	7E-06	2E-01
RFI-40-04	3E-06	3E-02	3E-06	2E-01	5E-08	2E-03	6E-07	1E-01	1E-05	1E-01	6E-06	2E-01
RFI-40-05	2E-06	2E-02	3E-06	2E-01	3E-08	9E-04	6E-07	1E-01	8E-06	7E-02	6E-06	2E-01
RFI-40-06	3E-06	2E-02	3E-06	2E-01	4E-08	9E-04	6E-07	1E-01	9E-06	6E-02	6E-06	2E-01
RFI-40-07	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	5E-07	9E-02	7E-06	5E-02	6E-06	2E-01
RFI-40-08	4E-06	6E-02	3E-06	2E-01	3E-07	2E-02	1E-06	4E-01	2E-05	3E-01	7E-06	2E-01
RFI-40-09	3E-06	3E-02	3E-06	2E-01	5E-08	2E-03	7E-07	2E-01	1E-05	9E-02	6E-06	3E-01
RFI-40-10	4E-06	3E-02	3E-06	2E-01	6E-08	1E-03	7E-07	1E-01	2E-05	8E-02	7E-06	2E-01
RFI-40-12	2E-04	3E-01	4E-06	2E-01	3E-06	1E-02	1E-05	9E-01	8E-04	8E-01	1E-05	3E-01
RFI-40-16	5E-05	1E-01	1E-06	3E-02	8E-07	4E-03	5E-06	4E-01	2E-04	4E-01	2E-06	8E-02
RFI-40-17	4E-05	1E-01	1E-06	3E-02	6E-07	4E-03	4E-06	4E-01	2E-04	4E-01	2E-06	8E-02
RFI-44-01	2E-06	2E-02	2E-06	2E-01	3E-08	6E-04	5E-07	8E-02	8E-06	5E-02	5E-06	2E-01
RFI-44-02	1E-05	1E-01	4E-06	2E-01	2E-07	3E-02	2E-06	7E-01	5E-05	4E-01	9E-06	3E-01
RFI-44-03	1E-05	7E-02	3E-06	2E-01	1E-07	2E-03	2E-06	3E-01	3E-05	2E-01	8E-06	3E-01
RFI-44-04	2E-05	1E-01	5E-06	2E-01	3E-07	5E-03	4E-06	6E-01	7E-05	4E-01	1E-05	3E-01
RFI-44-05	2E-05	2E-01	5E-06	2E-01	9E-07	2E-01	5E-06	3E+00	5E-05	6E-01	1E-05	2E-01
RFI-44-06	3E-06	2E-02	3E-06	2E-01	4E-08	9E-04	6E-07	1E-01	1E-05	7E-02	6E-06	2E-01
RFI-44-07	1E-05	7E-02	2E-06	1E-02	8E-07	5E-02	4E-06	9E-01	4E-05	3E-01	6E-06	3E-02
RFI-44-09	1E-05	6E-02	2E-06	1E-02	8E-07	7E-03	4E-06	2E-01	4E-05	3E-01	6E-06	3E-02
RFI-84-01	8E-06	6E-02	4E-06	2E-01	2E-07	3E-03	1E-06	2E-01	4E-05	2E-01	8E-06	2E-01
RFI-84-02	5E-06	2E-02	3E-06	2E-01	8E-08	8E-04	8E-07	9E-02	2E-05	6E-02	6E-06	2E-01
RFI-84-03	3E-06	3E-02	3E-06	2E-01	6E-08	1E-03	7E-07	1E-01	2E-05	1E-01	6E-06	2E-01

Attachment G13: Cumulative Cancer Risk and HI at all Southend Locations
GMC: NAO Flint Operations Site, Flint, Michigan

Location	RW SC Risk	RW SC HI	RW VI Risk	RW VI HI	MW SC Risk	MW SC HI	Redev Worker SC Risk	Redev Worker SC HI	Res SC Risk	Res SC HI	Res VI Risk	Res VI HI
RFI-84-04	7E-06	5E-02	3E-06	2E-01	2E-07	3E-03	1E-06	1E-01	4E-05	3E-01	6E-06	2E-01
RFI-84-05	5E-06	4E-02	1E-05	2E-01	1E-07	1E-02	1E-06	3E-01	2E-05	1E-01	2E-05	3E-01
RFI-84-06	4E-06	2E-02	3E-06	2E-01	7E-08	1E-03	7E-07	9E-02	2E-05	6E-02	6E-06	2E-01
RFI-84-09	5E-06	3E-02	4E-06	4E-02	1E-07	2E-03	9E-07	1E-01	2E-05	1E-01	9E-06	7E-02
RFI-84-10	5E-06	5E-02	4E-06	4E-02	1E-07	2E-03	9E-07	1E-01	3E-05	2E-01	8E-06	7E-02
RFI-84-11	5E-06	5E-02	4E-06	4E-02	1E-07	2E-03	9E-07	2E-01	3E-05	2E-01	8E-06	8E-02
RFI-84-7	5E-06	5E-02	5E-06	5E-02	9E-08	3E-03	1E-06	2E-01	1E-05	2E-01	1E-05	9E-02
RFI-84-8	5E-06	4E-02	5E-06	5E-02	6E-08	1E-03	1E-06	1E-01	1E-05	1E-01	1E-05	9E-02
RFI-86-01	3E-05	1E-01	4E-06	2E-01	5E-07	1E-01	3E-06	2E+00	1E-04	3E-01	7E-06	3E-01
RFI-86-07	4E-05	5E-01	3E-06	2E-01	1E-06	3E-02	6E-06	5E-01	3E-04	2E+00	7E-06	2E-01
RFI-86-10	2E-05	4E-02	2E-06	4E-02	5E-07	9E-03	3E-06	3E-01	1E-04	2E-01	3E-06	9E-02
RFI-86-11	1E-05	8E-02	9E-07	7E-03	4E-07	4E-02	2E-06	6E-01	9E-05	4E-01	2E-06	1E-02
RFI-86-12	2E-05	4E-01	9E-07	6E-03	6E-07	3E-02	3E-06	4E-01	1E-04	2E+00	2E-06	1E-02
RFI-86-13	5E-06	3E-02	9E-07	7E-03	1E-07	4E-02	8E-07	6E-01	2E-05	1E-01	2E-06	1E-02
RFI-86-17	7E-05	4E-01	9E-07	7E-03	2E-06	6E-02	9E-06	7E-01	5E-04	3E+00	2E-06	1E-02
RFI-86-18	1E-05	3E-01	9E-07	6E-03	2E-07	2E-02	1E-06	4E-01	5E-05	1E+00	2E-06	1E-02
RFI-94-01	2E-06	2E-02	3E-06	2E-01	3E-08	7E-04	5E-07	9E-02	8E-06	5E-02	6E-06	2E-01
RFI-94-02	3E-06	2E-02	3E-06	2E-01	4E-08	8E-04	6E-07	1E-01	1E-05	6E-02	6E-06	2E-01
RFI-94-03	3E-06	3E-02	3E-06	2E-01	8E-08	1E-02	7E-07	3E-01	1E-05	1E-01	6E-06	2E-01
RFI-94-04	3E-06	3E-02	3E-06	2E-01	6E-08	5E-03	6E-07	2E-01	8E-06	8E-02	6E-06	2E-01
RFI-94-05	2E-06	2E-02	3E-06	2E-01	3E-08	1E-03	5E-07	9E-02	8E-06	6E-02	6E-06	2E-01
RFI-94-06	4E-06	3E-02	3E-06	2E-01	7E-08	1E-03	7E-07	1E-01	2E-05	1E-01	6E-06	2E-01
RFI-94-07	1E-05	1E-01	4E-06	2E-01	2E-07	4E-02	3E-06	9E-01	6E-05	4E-01	1E-05	3E-01
RFI-94-08	3E-06	2E-02	3E-06	7E-02	5E-08	8E-04	6E-07	1E-01	1E-05	6E-02	7E-06	1E-01

Notes

RW - Routine Worker; MW - Maintenance Worker; Redev Worker - Redevelopment Construction Worker; Res - Resident

SC - Soil Contact; VI - Vapor Intrusion

HI - Hazard Index

Attachment G14
Area-Weighted Risk Estimates at the Southend

Attachment G14: Area-weighted Cancer Risks
GMC: NAO Flint Operations Site, Flint, Michigan

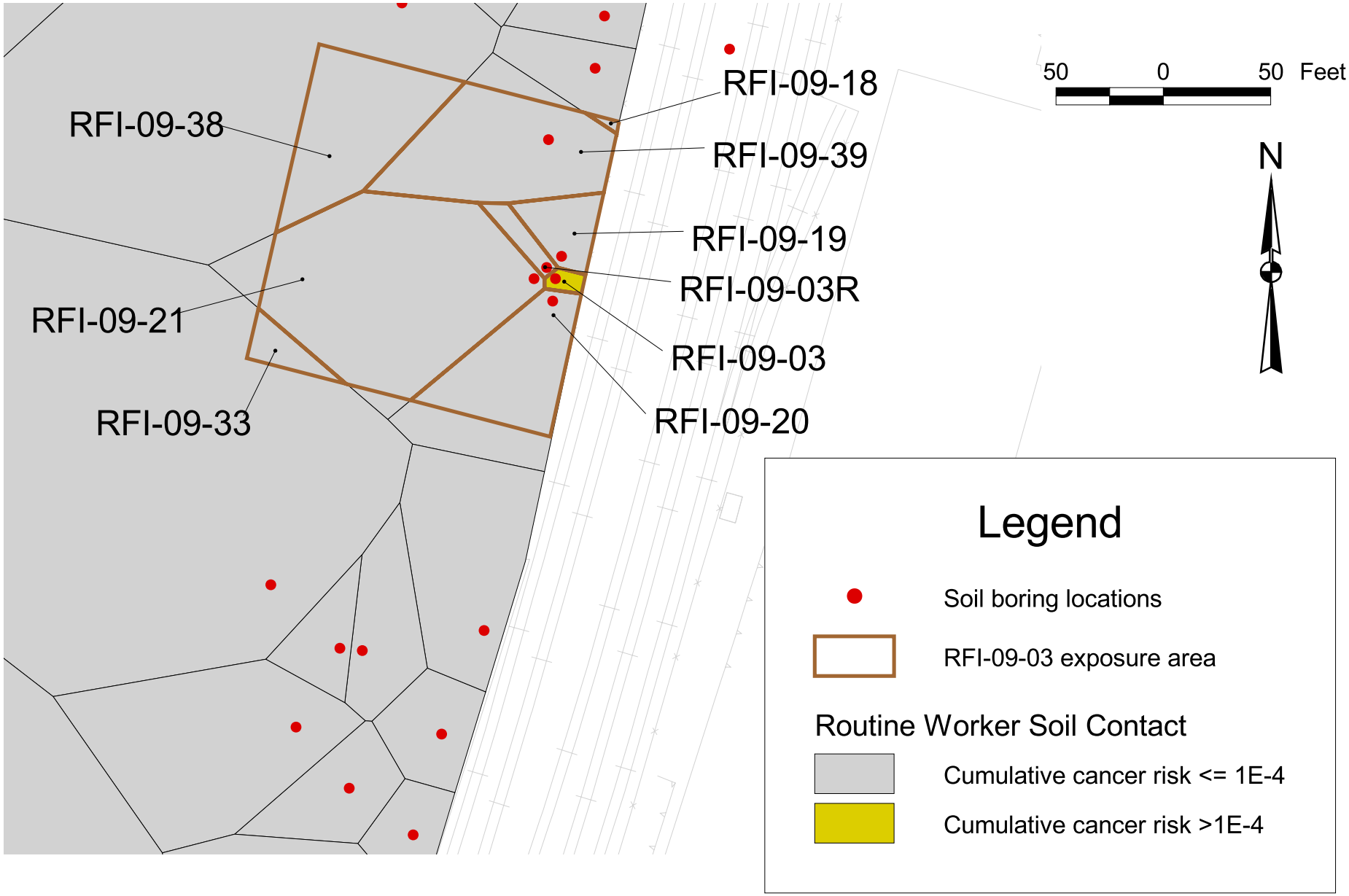
Location	Polygon Area (ft^2)	Lot Area (ft^2)	% Area	Receptor	Risk	Weighted Risk	Total
RFI-09-03	168	21762	0.8%	Routine Worker	3E-04	2E-06	2E-05
RFI-09-03R	395		1.8%		1E-05	2E-07	
RFI-09-18	46		0.2%		2E-05	5E-08	
RFI-09-19	984		4.5%		5E-05	2E-06	
RFI-09-20	2803		12.9%		8E-06	1E-06	
RFI-09-21	8664		39.8%		6E-06	2E-06	
RFI-09-33	571		2.6%		2E-06	5E-08	
RFI-09-38	3734		17.2%		3E-05	6E-06	
RFI-09-39	4396		20.2%		4E-05	9E-06	
40-4R	295	21736	1.4%	Routine Worker	4E-06	5E-08	3E-05
40-7R	6413		29.5%		6E-06	2E-06	
RFI-40-02	3482		16.0%		5E-06	8E-07	
RFI-40-12	263		1.2%		2E-04	2E-06	
RFI-40-16	7145		32.9%		5E-05	2E-05	
RFI-40-17	4138		19.0%		4E-05	7E-06	
40-7R	1514	21784	7.0%	Resident	3E-05	2E-06	1E-04
RFI-40-02	5590		25.7%		2E-05	5E-06	
RFI-40-10	1612		7.4%		2E-05	1E-06	
RFI-40-12	260		1.2%		8E-04	9E-06	
RFI-40-16	7164		32.9%		2E-04	7E-05	
RFI-40-17	5644		25.9%		2E-04	4E-05	
RFI-09-02	334	21715	1.5%	Resident	1E-04	2E-06	1E-04
RFI-09-03	168		0.8%		1E-03	1E-05	
RFI-09-03R	395		1.8%		5E-05	1E-06	
RFI-09-18	1698		7.8%		8E-05	6E-06	
RFI-09-19	976		4.5%		2E-04	1E-05	
RFI-09-20	754		3.5%		3E-05	1E-06	
RFI-09-21	5886		27.1%		2E-05	7E-06	
RFI-09-37	77		0.4%		8E-05	3E-07	
RFI-09-38	6565		30.2%		1E-04	4E-05	
RFI-09-39	4862		22.4%		2E-04	4E-05	

Attachment G14: Residential Area-weighted Noncancer Hazard Index
GMC: NAO Flint Operations Site, Flint, Michigan

Location	Polygon Area (ft^2)	Lot Area (ft^2)	% Area	Receptor	HI	Weighted HI	Total
RFI-09-05	645	21791	3.0%	Resident	3E+00	9E-02	2E-01
RFI-09-26	4647		21.3%		7E-02	1E-02	
RFI-09-27	5063		23.2%		5E-02	1E-02	
RFI-09-28	5708		26.2%		9E-02	2E-02	
RFI-09-29	5728		26.3%		2E-01	5E-02	
RFI-12-06	3557	21812	16.3%	Resident	5E-02	9E-03	1E+00
RFI-12-11D	804		3.7%		2E-01	8E-03	
RFI-12-28	173		0.8%		3E-01	3E-03	
RFI-12-30	1619		7.4%		6E-01	4E-02	
RFI-12-31	5923		27.2%		2E+00	6E-01	
RFI-12-35	5121		23.5%		2E+00	5E-01	
RFI-29-01	1873		8.6%		4E-01	3E-02	
RFI-29-03	2743		12.6%		3E-01	4E-02	
RFI-09-02	334	21715	1.5%	Resident	2E+00	4E-02	1E+00
RFI-09-03	168		0.8%		8E-01	6E-03	
RFI-09-03R	395		1.8%		7E-01	1E-02	
RFI-09-18	1698		7.8%		7E-02	5E-03	
RFI-09-19	976		4.5%		7E-01	3E-02	
RFI-09-20	754		3.5%		7E-01	2E-02	
RFI-09-21	5886		27.1%		7E-01	2E-01	
RFI-09-37	77		0.4%		8E-01	3E-03	
RFI-09-38	6565		30.2%		2E+00	7E-01	
RFI-09-39	4862		22.4%		7E-02	2E-02	

Attachment G14: Redevelopment Worker Area-weighted Noncancer Hazard Index GMC: NAO Flint Operations Site, Flint, Michigan							
Location	**Polygon Area (ft^2)**	**Lot Area (ft^2)**	**% Area**	**Receptor**	**HI**	**Weighted HI**	**Total**
RFI-09-04	1885	83483	2.3%	Redevelopment Construction Worker	6E+00	1E-01	9E-01
RFI-09-22	5213		6.2%		8E-02	5E-03	
RFI-09-23	1423		1.7%		2E-01	4E-03	
RFI-09-24	2381		2.9%		2E+00	5E-02	
RFI-09-25	2262		2.7%		2E+00	7E-02	
RFI-09-33	54937		65.8%		8E-01	5E-01	
RFI-09-34	7507		9.0%		7E-01	6E-02	
RFI-09-35	6533		7.8%		9E-01	7E-02	
RFI-09-49	1342		1.6%		2E+00	2E-02	
RFI-44-04	30937	108950	28.4%	Redevelopment Construction Worker	6E-01	2E-01	6E-01
RFI-44-05	7810		7.2%		3E+00	2E-01	
RFI-44-07	16095		14.8%		9E-01	1E-01	
RFI-44-09	54104		49.7%		2E-01	1E-01	
RFI-86-01	1399	5946	23.5%	Redevelopment Construction Worker	2E+00	5E-01	9E-01
RFI-86-10	1992		33.5%		3E-01	9E-02	
RFI-86-11	2555		43.0%		6E-01	3E-01	

Attachment G14: Area-weighted Lead Concentrations GMC: NAO Flint Operations Site, Flint, Michigan							
Location	**Polygon Area (ft^2)**	**Lot Area (ft^2)**	**% Area**	**Receptor**	**Lead Conc (mg/kg)**	**Weighted Lead Conc (mg/kg)**	**Total**
RFI-40-01	5184	21701	23.9%	Resident	2E+01	5E+00	2E+02
RFI-40-05	2557		11.8%		8E+00	1E+00	
RFI-40-06	5976		27.5%		2E+02	6E+01	
RFI-40-07	19		0.1%		2E+01	2E-02	
RFI-40-08	3126		14.4%		1E+02	1E+01	
RFI-40-09	4838		22.3%		5E+02	1E+02	

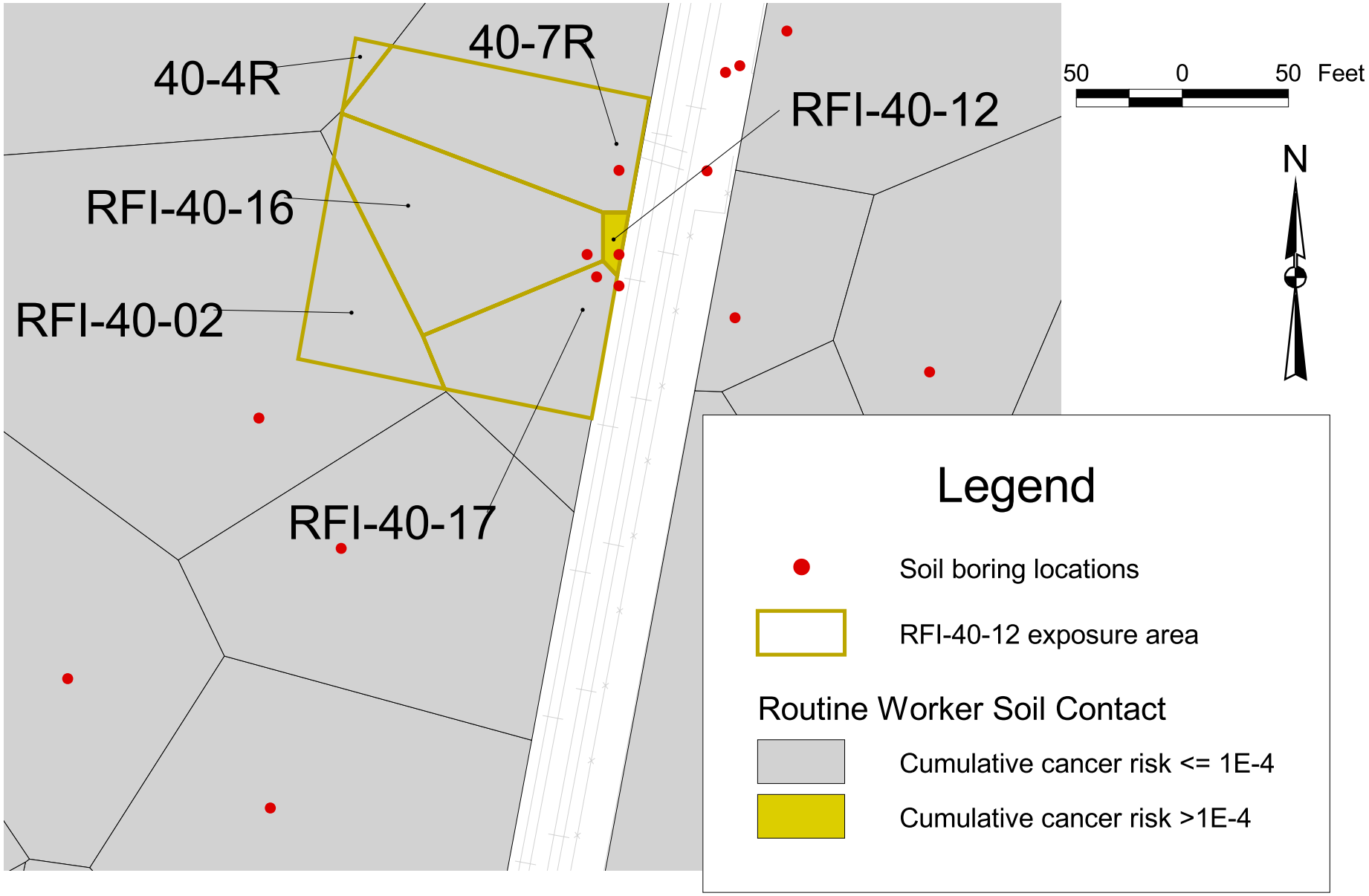


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-09-03
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

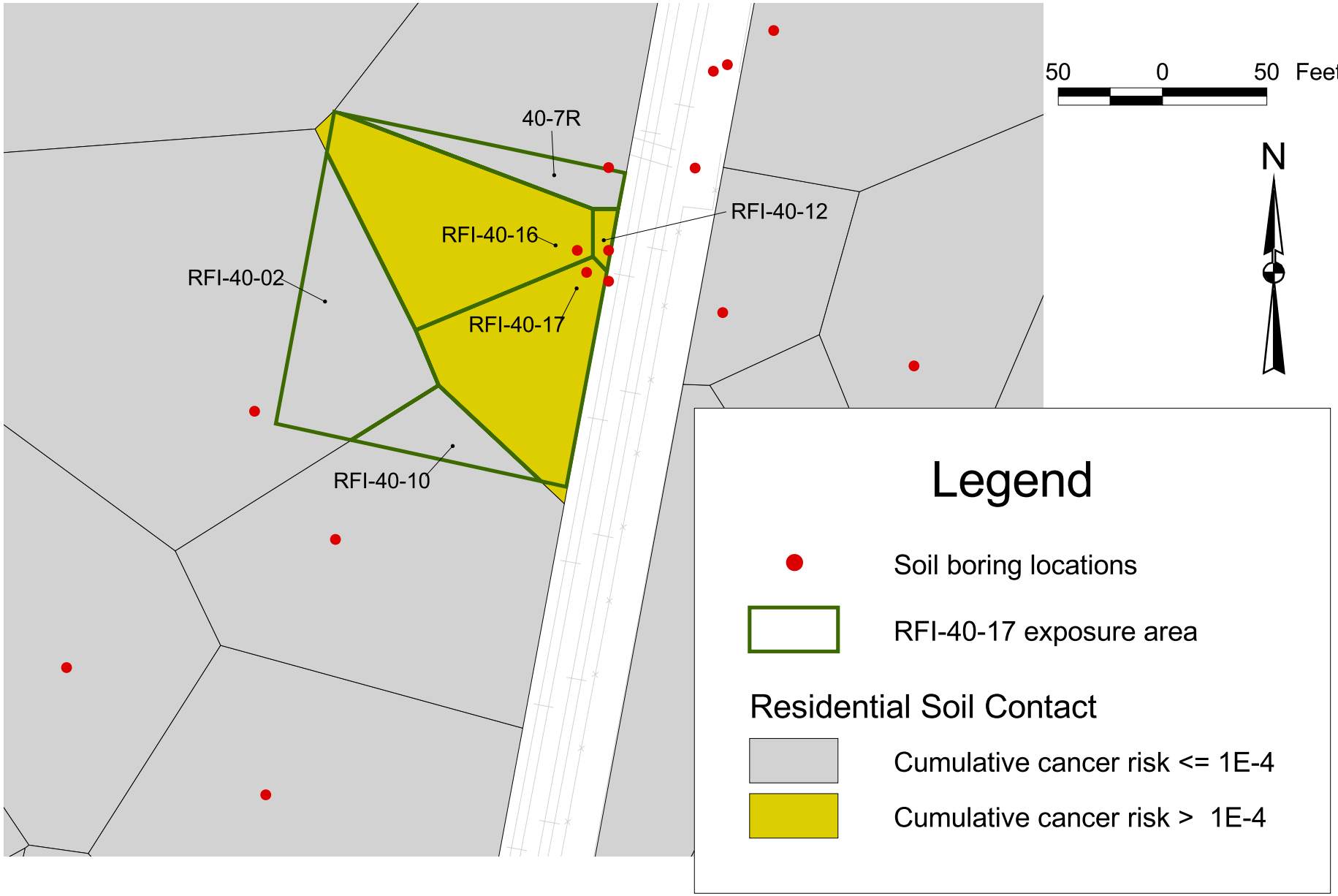


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-40-12
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

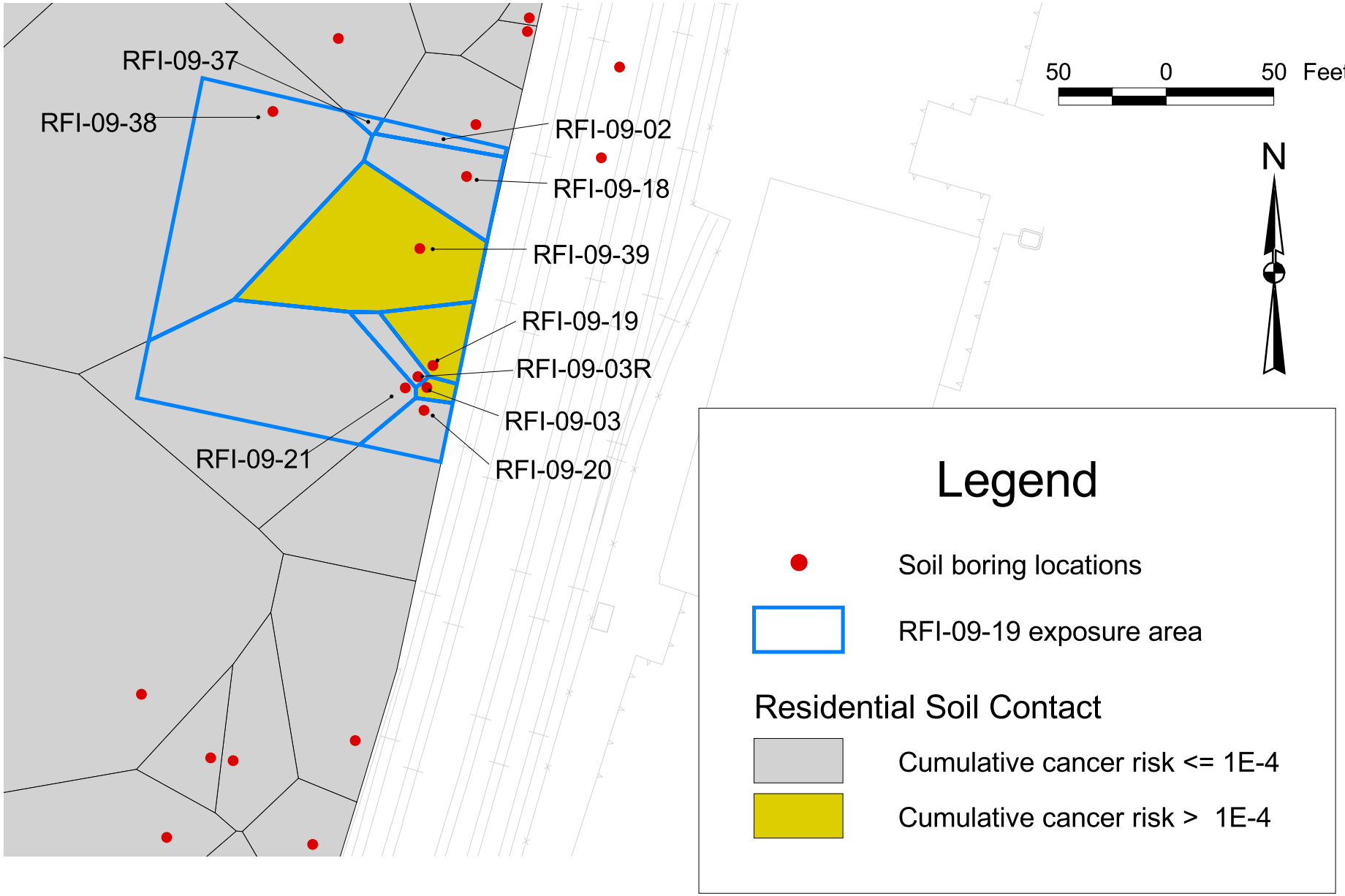


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-40-17
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

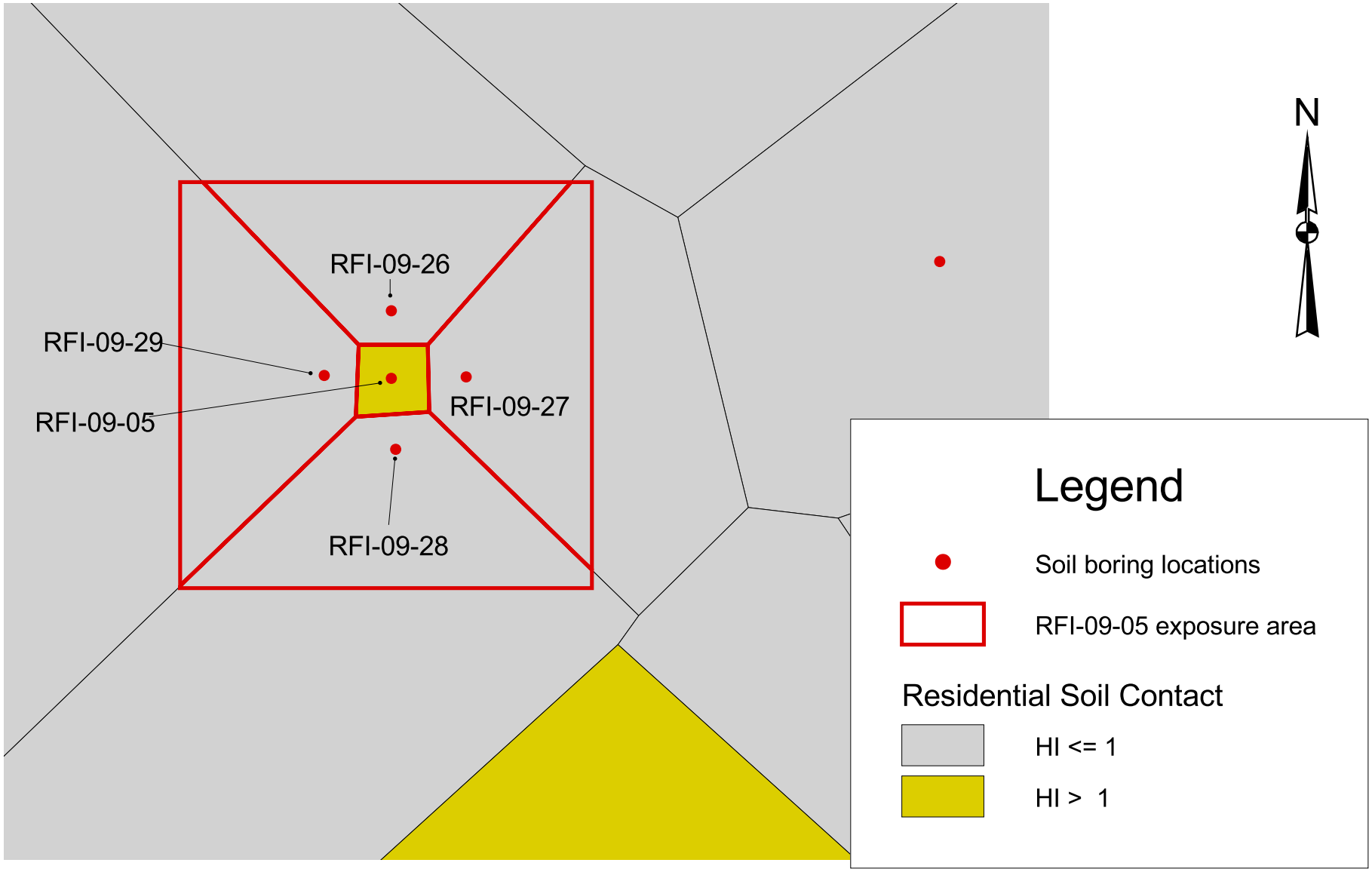


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-09-19
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

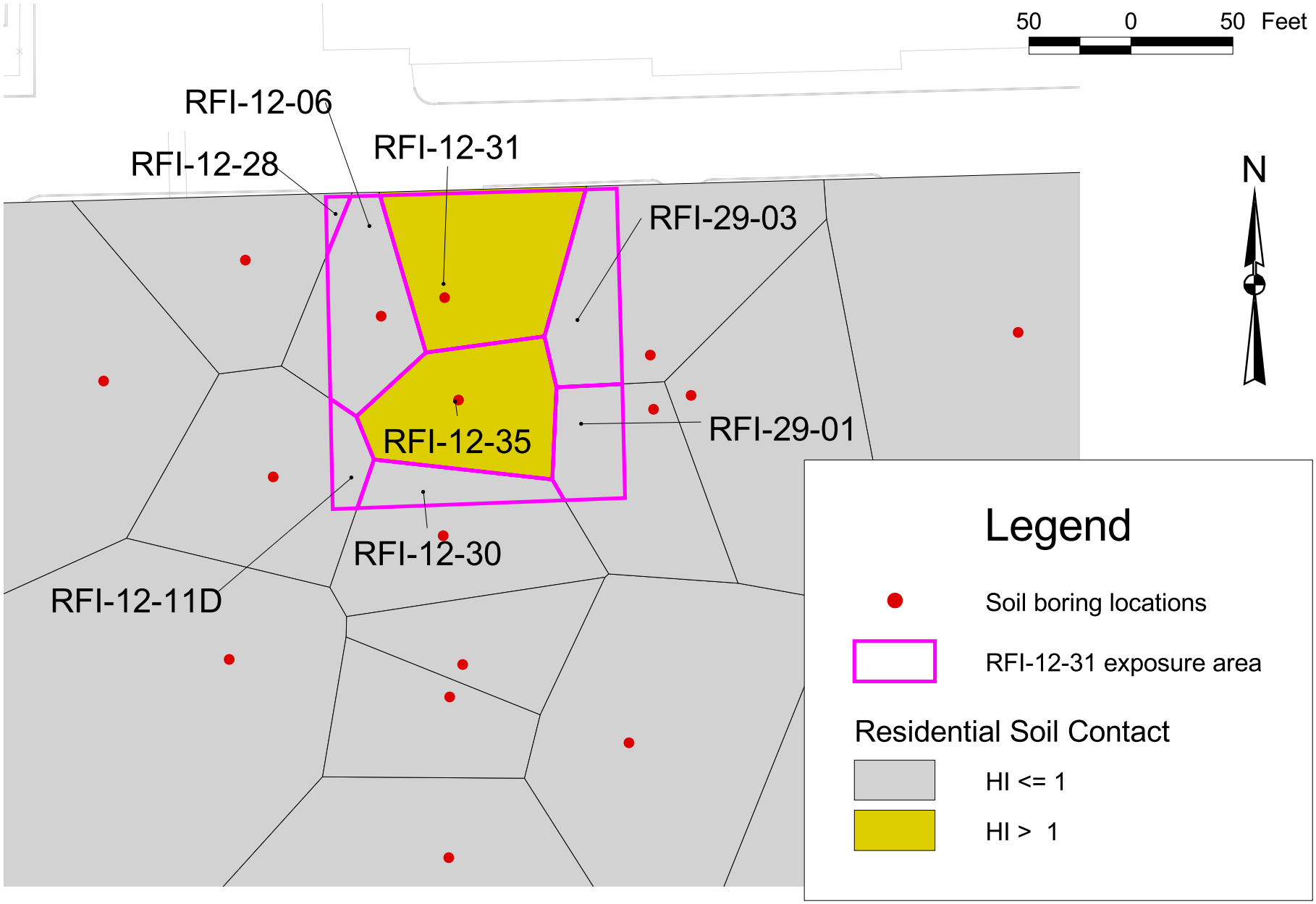


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-09-05
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot



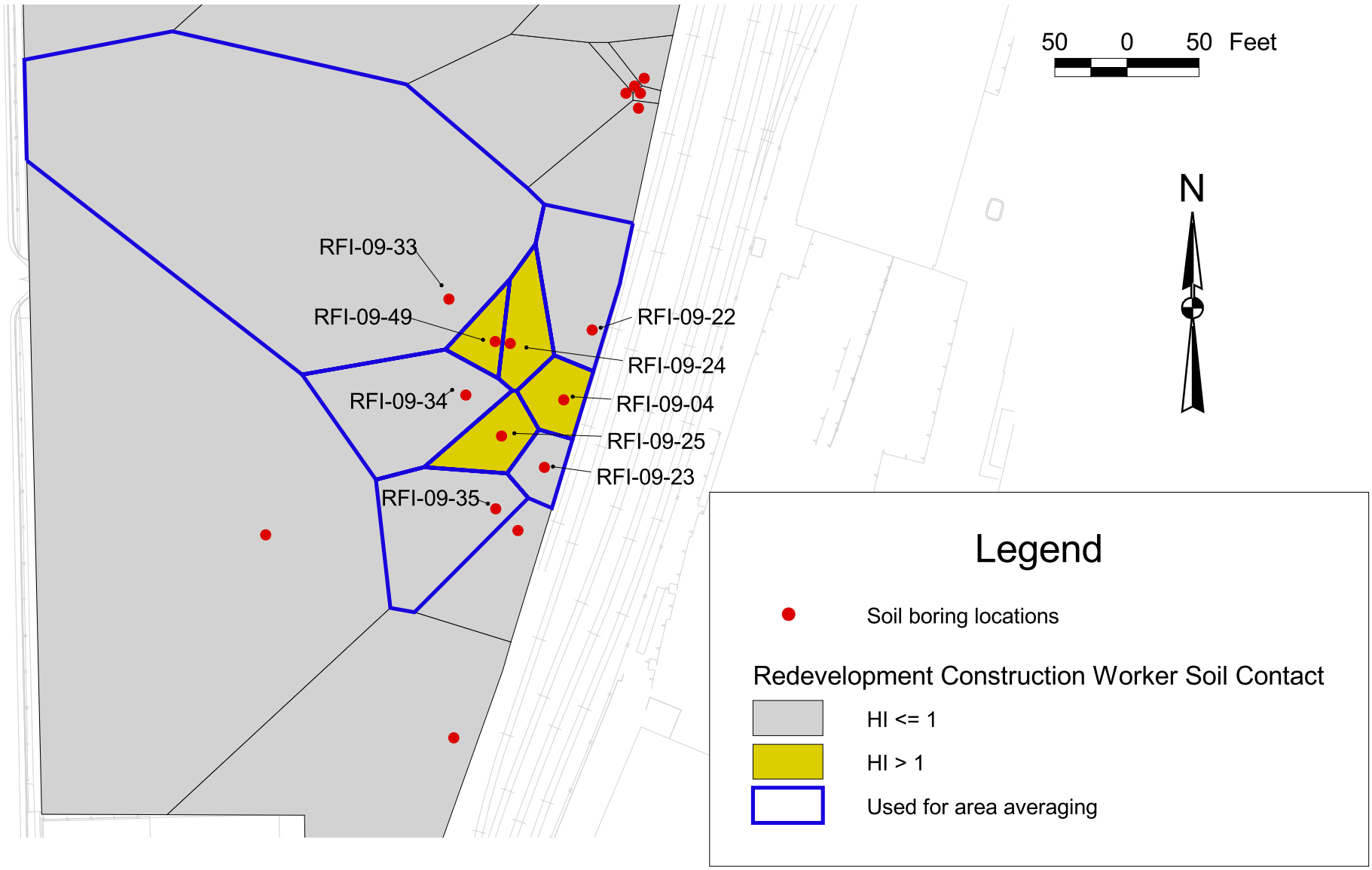
ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-12-31
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

DRAFT



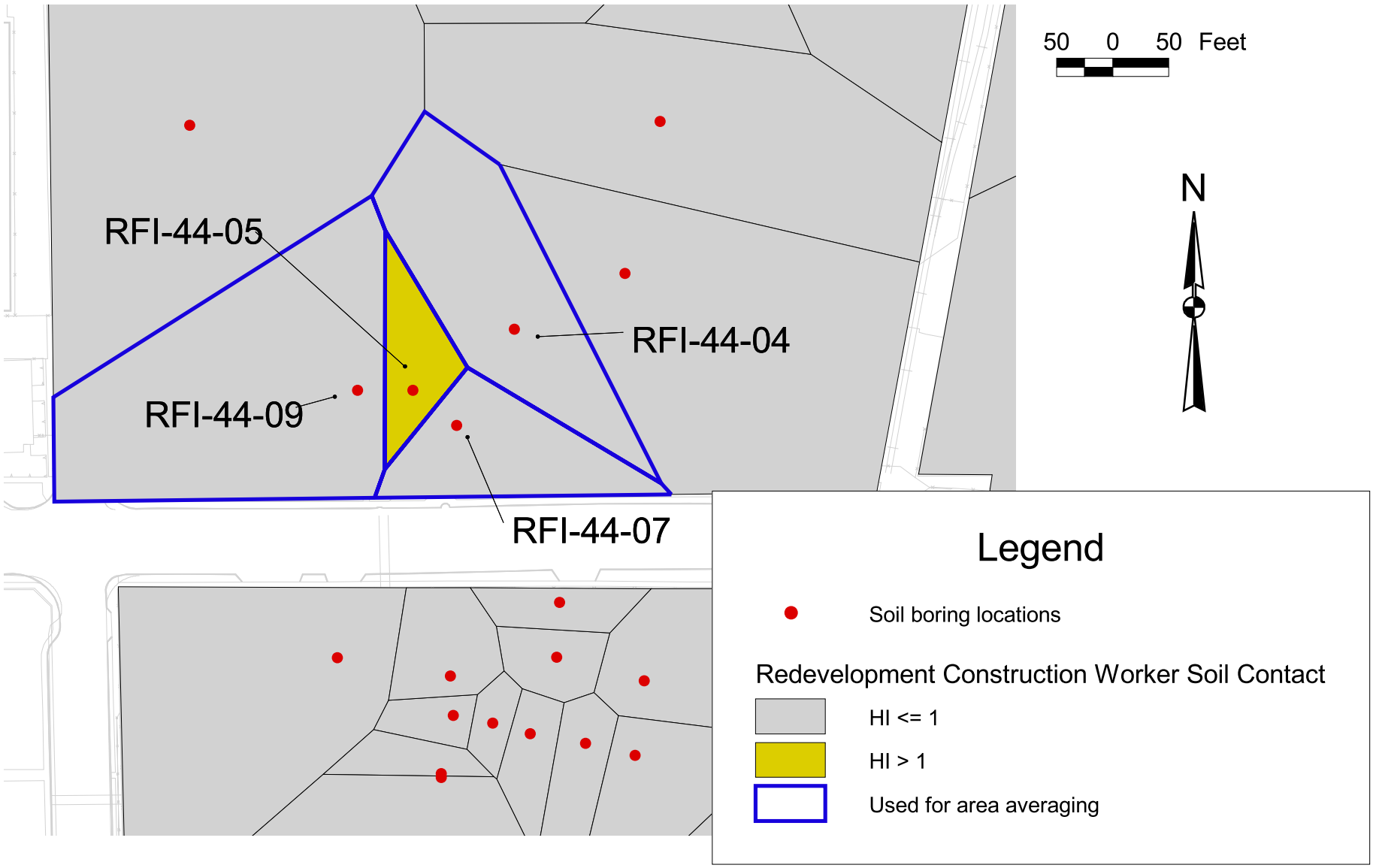
ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-09-24
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

DRAFT

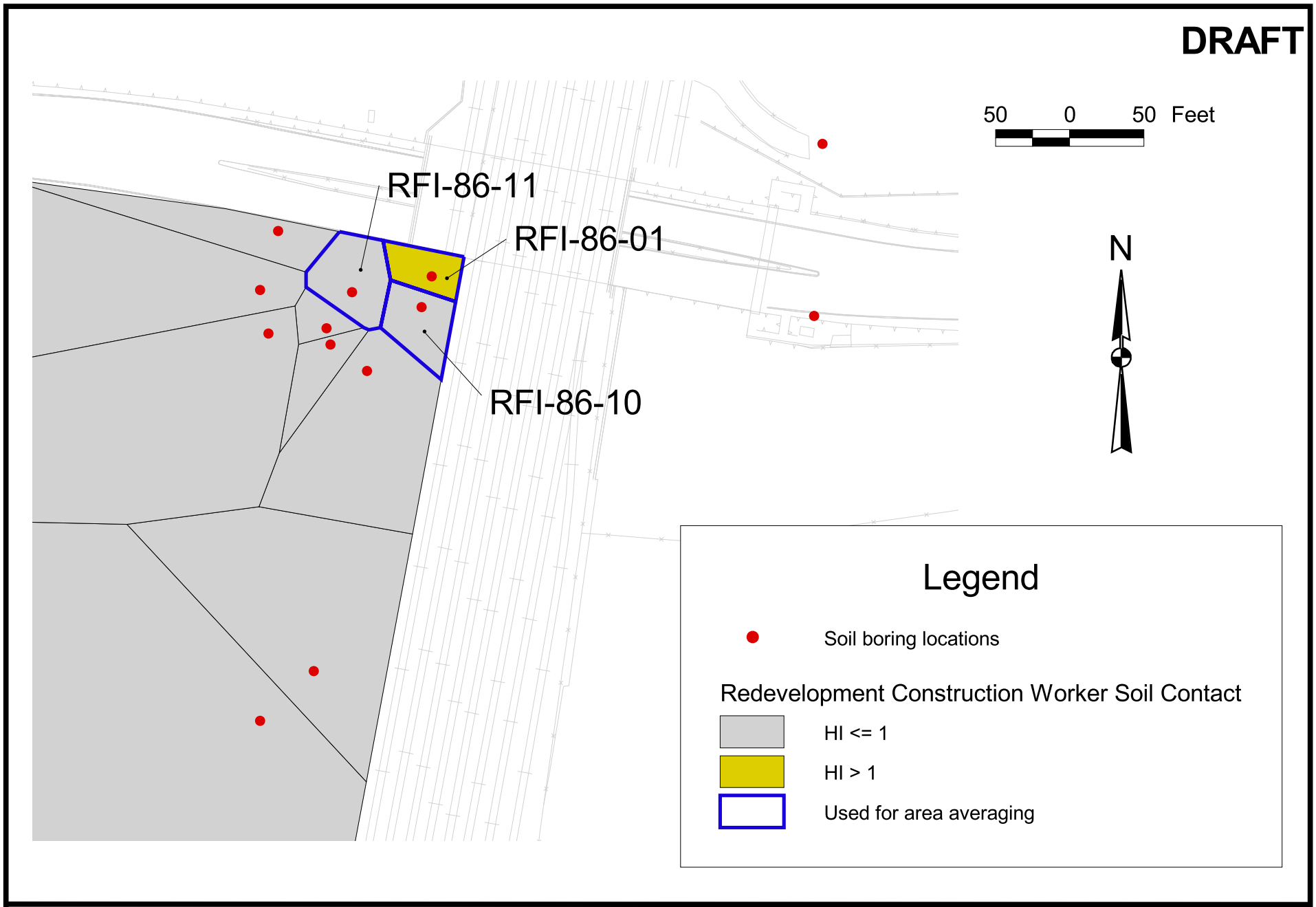


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-44-05
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

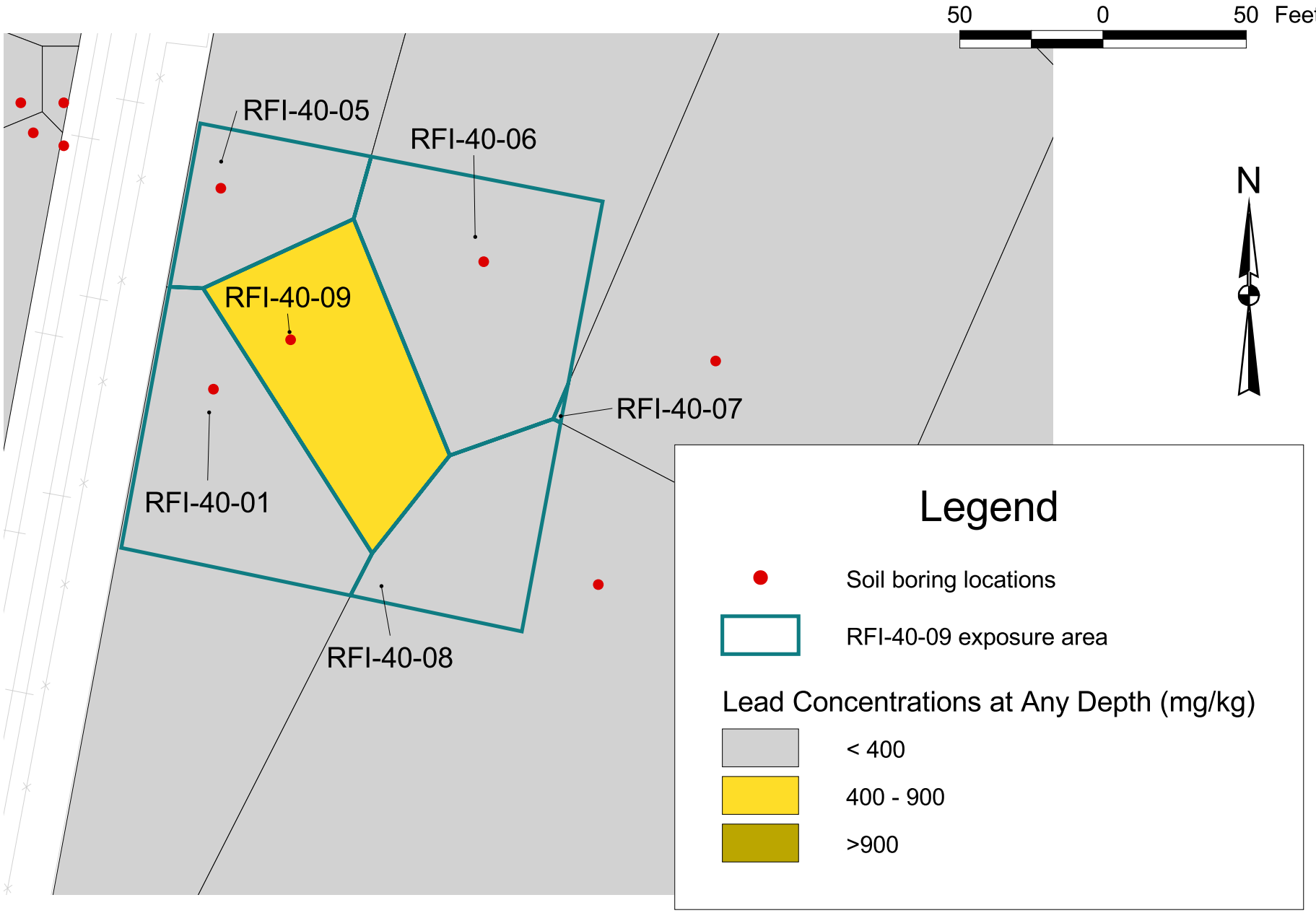


ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-86-01
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot



ENVIRON

Date: May 2006

EXPOSURE AREA FOR AREA-WEIGHTED RISKS NEAR RFI-40-09
GMC: NAO FLINT OPERATIONS SITE, FLINT, MICHIGAN

Attachment G-14
Arcview Plot

Attachment G15

Supplemental Evaluation of Arsenic Groundwater Data

February 13, 2006

To: Kurt Blizzard, General Motors
Derek Kaiding, Blasland Bouck & Lee

From: Francis Ramacciotti
C.Y. Jeng

RE: Supplemental Evaluation of Arsenic Groundwater Data
NAO Flint Operations Site, Flint, Michigan

This memorandum discusses a supplemental evaluation of arsenic groundwater data in support of the RCRA Corrective Action for the General Motors Corporation's (GM's) North American Operations (NAO) Flint Operations Site located at 902 East Leith Street in Flint, Michigan (the Site). This supplemental evaluation compares the arsenic groundwater data for the Site with an update to the generic drinking water criterion for arsenic outlined in Part 201 of the Michigan Natural Resources and Environmental Protection Act, 1994, Public Act 451 (Part 201). This criterion update (the update) was issued by the Michigan Department of Environmental Quality (MDEQ) on October 26, 2005, and became effective on October 31, 2005. As discussed below, the update affects some of the data screening results presented in the RCRA Facility Investigation (RFI) Phase II Report (BBL 2004; revised 2006) and the Migration of Contaminated Groundwater Environmental Indicator (EI) Report (CA750 Report) (ENVIRON 2005), but it does not substantively affect the conclusions of these Reports.

The December 2004 version of the Part 201 generic cleanup criteria (MDEQ 2004) was used for data screening during the preparation of the RFI Phase II Report and the CA750 Report, because it was the version in effect at the time. Subsequently, MDEQ announced revisions to the Part 201 generic cleanup criteria that, among other things, revised from 0.05 mg/L to 0.010 mg/L the generic drinking water criterion for arsenic that was used for data screening (MDEQ 2005). During the RFI 48 groundwater samples from 21 monitoring well locations had arsenic concentrations that exceeded the 2004 Part 201 generic industrial drinking water criterion. As

discussed in the RFI Phase II Report and the CA750 Report, these concentrations were limited to several small areas. Groundwater at the Site is not currently used as a drinking water supply, and the Site has institutional controls to prohibit future use of groundwater as a drinking water supply.

Ninety-eight groundwater samples from 60 monitoring wells have arsenic concentrations that did not exceed the 2004 Part 201 generic drinking water criterion but now exceed the 2005 criterion (see attached Table 1). Figures 4-1 through 4-28 show the locations of these monitoring wells at the Northend and Southend, respectively. As shown on these figures, most of these monitoring wells are interior to the Site and have been sufficiently characterized for arsenic at the downgradient property boundary by other monitoring wells based on site-wide groundwater flow direction from December 2004. There are five areas (two at the Northend and three at the Southend) where arsenic concentrations higher than the 2005 Part 201 generic drinking water criterion lack sufficient downgradient characterization. These five areas are discussed in the following paragraphs.

Northend

The arsenic concentration of 0.013 mg/L at monitoring well RFI-36-02 is slightly higher than the 2005 Part 201 generic drinking water criterion (see Figure 4-4), but it does not exceed the other pertinent Part 201 criteria. As discussed above, no current or future potable or nonpotable uses of groundwater exist at the Site and direct contact is the only potential exposure pathway. Therefore, the fact that this arsenic concentration is now higher than the new the new drinking water criterion does not alter the conclusions in the RFI Report. However, no arsenic groundwater data have been collected downgradient of RFI-36-02. Monitoring well RFI-36-47 is downgradient of RFI 36-02, but it was analyzed for only volatile organic compounds (VOCs) during the RFI. It might be prudent to sample this monitoring well during the next CA750 quarterly sampling event to provide downgradient characterization of arsenic at RFI-36-02.

Five monitoring wells (70-160, GM-1, GM-4, GM-11, and GM-12), located upgradient of or in the Former Aeration Lagoons area (see Figure 4-28), had arsenic concentrations (ranging from 0.012 to 0.032 mg/L) higher than the new drinking water criterion. Groundwater in this area flows west to east toward the Flint River, which is approximately 650 feet downgradient of GM-1 and GM-11. According to USEPA's default dilution factor of 10 for assessing the significance of groundwater discharge to surface water (in Question 5 of the CA750), arsenic concentrations at these locations are not expected to have a significant effect if they discharge to the Flint River since they are less than 10 times the new drinking water criterion. Additionally, arsenic concentrations at these monitoring wells are below the other pertinent Part 201 generic criteria.

Therefore, the conclusions in the RFI Phase II Report and the CA750 Report regarding this area remain unchanged.

Southend

The arsenic concentration of 0.036 mg/L at monitoring well RFI-02-08 from September 2001 exceeded the 2005 Part 201 generic drinking water criterion (see Figure 4-14), but does not exceed the other pertinent Part 201 criteria. Groundwater in this area flows north toward monitoring well RFI-86-01R, where the arsenic concentration in groundwater collected in April 2003 is lower than the 2005 Part 201 generic drinking water criterion. Furthermore, no current or future potable or nonpotable uses of groundwater exist at the Site as discussed above, so the fact that this arsenic concentration now exceeds the new drinking water criterion does not alter the conclusions in the RFI and EI Reports for this area.

The arsenic concentration of 0.037 mg/L at monitoring well 40-303R exceeded the 2005 Part 201 generic drinking water criterion (see Figure 4-22), but does not exceed the other pertinent Part 201 criteria. Groundwater in this area flows southeast toward monitoring well RFI-84-06R (see Figure 4-18), where the arsenic concentration in groundwater collected in April 2003 is lower than the 2005 Part 201 generic drinking water criterion. Furthermore, no current or future potable or nonpotable uses of groundwater exist at the Site as discussed above, so the fact that this arsenic concentration now exceeds the new drinking water criterion does not alter the conclusions in the RFI and EI Reports for this area.

The arsenic concentration of 0.049 mg/L at monitoring well RFI-09-49 exceeded the 2005 Part 201 generic drinking water criterion (see Figure 4-24). Groundwater in this area flows southeast toward the Flint River, about 75 feet downgradient. According to USEPA's default dilution factor of 10 for assessing the significance of groundwater discharge to surface water (in Question 5 of the CA750), arsenic concentrations at this location are not expected to have a significant effect if it discharges to the Flint River since it is less than 10 times the new drinking water criterion. Additionally, arsenic at this monitoring well is below the other pertinent Part 201 generic criteria. Therefore, the conclusions in the RFI Phase II Report and the CA750 Report regarding this area remain unchanged.

References

Blasland, Bouck & Lee, Inc. (BBL). 2004. Phase II RFI Report, NAO Flint Operations Site, Flint, Michigan. March.

ENVIRON International Corporation (ENVIRON). 2005. RCRA Environmental Indicator CA750 Report Determination of Migration of Contaminated Groundwater Under Control, NAO Flint Operations Site, Flint, Michigan. September.

Michigan Department of Environmental Quality (MDEQ). 2004 Update. Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as Amended. Generic Cleanup Criteria and Screening Levels. December.

Michigan Department of Environmental Quality (MDEQ). 2005. Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as Amended. Generic Cleanup Criteria and Screening Levels. October.

T A B L E

Table 1: Arsenic Concentrations in Groundwater Exceeding 2005 MDEQ Generic Drinking Water Criteria NAO Flint Operations Site, Flint, Michigan					
Area	**AOI**	**Well ID**	**Sample Date**	**Meas Basis**	**Conc** (mg/L)
GM-North	03-1	03-101	9/27/2001	D	2.90E-02
GM-North	03-1	RFI-03-01	9/19/2001	D	1.10E-02
GM-North	03-1	RFI-03-02	2/26/2002	D	1.10E-02
GM-North	03-1	RFI-03-04	6/13/2002	T	1.20E-02
GM-North	05-1	43-166	9/26/2001	D	2.40E-02
GM-North	05-1	43-166	6/19/2002	T	2.90E-02
GM-North	05-1	43-167	9/26/2001	D	3.70E-02
GM-North	05-1	RFI-05-21	9/25/2001	D	4.60E-02
GM-North	05-1	RFI-05-21	3/27/2003	T	3.50E-02
GM-North	05-2	RFI-05-01	9/25/2001	D	1.80E-02
GM-North	05-3	RFI-05-06	9/25/2001	D	2.40E-02
GM-North	05-5	RFI-05-10	9/19/2001	D	2.30E-02
GM-North	05-5	RFI-05-12	6/14/2002	T	4.60E-02
GM-North	05-6	RFI-05-19DR	12/18/2002	T	1.70E-02
GM-North	10-2	RFI-10-02	9/24/2001	D	3.80E-02
GM-North	10-2	RFI-10-02	6/18/2002	T	4.10E-02
GM-North	10-2	RFI-10-02	3/27/2003	D	3.30E-02
GM-North	10-2	RFI-10-12	12/18/2002	T	4.50E-02
GM-North	10-2	RFI-10-12	12/18/2002	D	4.40E-02
GM-North	10-3	20-101R	11/15/2001	T	2.40E-02
GM-North	10-3	20-101R	11/15/2001	D	2.80E-02
GM-North	10-4	20-FP10	9/25/2001	D	3.80E-02
GM-North	36-1	36-100	9/27/2001	D	1.70E-02
GM-North	36-1	36-100	9/27/2001	T	2.10E-02
GM-North	36-1	36-100	6/13/2002	T	1.20E-02
GM-North	36-1	36-100	3/25/2003	T	1.20E-02
GM-North	36-1	RFI-36-02	3/25/2003	T	1.90E-02
GM-North	36-1	RFI-36-02	10/13/2004	T	1.30E-02
GM-North	36-1	RFI-36-29R	4/3/2003	D	5.00E-02
GM-North	36-1	RFI-36-32	9/28/2001	D	5.00E-02
GM-North	36-1	RFI-36-32	4/2/2003	T	3.70E-02
GM-North	36-1	RFI-36-35	9/27/2001	T	2.00E-02
GM-North	36-1	RFI-36-35	6/18/2002	T	1.50E-02
GM-North	36-1	RFI-36-35	6/18/2002	D	1.20E-02
GM-North	36-2	36-FP1	9/27/2001	D	4.80E-02
GM-North	36-2	36-FP1	6/14/2002	T	3.30E-02
GM-North	36-3	36-FP8	9/27/2001	T	1.40E-02
GM-North	36-3	36-FP8	9/27/2001	D	1.10E-02
GM-North	36-3	RFI-36-08	9/27/2001	D	3.90E-02
GM-North	36-3	RFI-36-08	3/25/2003	T	1.30E-02
GM-North	36-5	20-500	9/21/2001	D	4.10E-02
GM-North	36-5	20-500	3/26/2003	T	5.00E-02
GM-North	36-5	37-01	9/26/2001	D	1.20E-02
GM-North	36-5	37-01	12/18/2002	T	1.40E-02
GM-North	55-1	55-1	9/26/2001	D	2.70E-02
GM-North	55-1	55-2	9/26/2001	D	2.00E-02

Table 1: Arsenic Concentrations in Groundwater Exceeding 2005 MDEQ Generic Drinking Water Criteria NAO Flint Operations Site, Flint, Michigan					
Area	**AOI**	**Well ID**	**Sample Date**	**Meas Basis**	**Conc** (mg/L)
GM-North	55-1	RFI-55-09	9/27/2001	D	2.70E-02
GM-North	55-1	RFI-55-11	9/26/2003	T	3.10E-02
GM-North	55-1	RFI-55-12	10/8/2004	T	2.10E-02
GM-North	81-2	70-160	9/26/2001	D	3.50E-02
GM-North	81-2	70-160	6/17/2002	T	2.00E-02
GM-North	81-2	70-160	6/17/2002	D	2.20E-02
GM-North	81-2	70-160	3/28/2003	T	2.40E-02
GM-North	81-3	RFI-81-11	9/24/2001	D	1.30E-02
GM-North	81-3	RFI-81-11	6/19/2002	T	1.10E-02
GM-North	83/84-3	RFI-83/84-20	2/22/2002	D	1.70E-02
GM-North	83/84-3	RFI-83/84-20	6/20/2002	T	1.40E-02
GM-North	83/84-3	RFI-83/84-20	4/2/2003	T	2.30E-02
GM-North	83/84-7	88-8	9/20/2001	D	3.90E-02
GM-North	83/84-7	88-9	9/20/2001	D	3.60E-02
GM-North	86-1	87-FP3	9/27/2001	D	2.20E-02
GM-North	86-1	RFI-02-08	9/19/2001	T	3.60E-02
GM-North	86-1	RFI-02-08	9/19/2001	D	2.20E-02
GM-North	86-1	RFI-86-01	9/20/2001	T	1.40E-02
GM-North	86-1	RFI-86-08R	2/21/2002	D	3.60E-02
GM-North	86-1	RFI-86-08R	6/20/2002	T	4.70E-02
GM-North	86-1	RFI-86-08R	12/18/2002	T	4.10E-02
GM-North	Aeration Lagoon	GM-1	10/6/2004	T	3.20E-02
GM-North	Aeration Lagoon	GM-11	10/6/2004	T	1.40E-02
GM-North	Aeration Lagoon	GM-12	11/8/2000	D	1.20E-02
GM-North	Aeration Lagoon	GM-4	11/8/2000	D	2.00E-02
GM-South	09-B	31-8	9/17/2001	D	1.60E-02
GM-South	09-B	31-8	6/24/2002	T	2.20E-02
GM-South	09-B	RFI-09-06	9/13/2001	D	1.70E-02
GM-South	09-B	RFI-09-06	9/13/2001	T	1.60E-02
GM-South	09-B	RFI-09-12	12/13/2001	D	4.30E-02
GM-South	09-B	RFI-09-12	6/21/2002	T	4.90E-02
GM-South	09-B	RFI-09-12	6/21/2002	D	4.00E-02
GM-South	09-B	RFI-09-48	4/24/2003	T	4.90E-02
GM-South	12-A	RFI-12-35	9/17/2003	D	2.00E-02
GM-South	16-C	RFI-16-11	8/13/2001	D	1.90E-02
GM-South	16-C	RFI-16-12	2/28/2002	D	1.90E-02
GM-South	16-C	RFI-16-12	6/24/2002	T	1.20E-02
GM-South	17-A	RFI-17-02	6/25/2002	T	2.70E-02
GM-South	40-A	RFI-40-09	2/26/2002	D	4.90E-02
GM-South	40-A	RFI-40-09	6/24/2002	T	4.30E-02
GM-South	40-A	RFI-40-09	6/24/2002	D	4.10E-02
GM-South	40-A	RFI-40-15	4/22/2003	T	1.10E-02
GM-South	40-D	40-303R	12/7/2001	T	1.80E-02
GM-South	40-D	40-303R	12/7/2001	D	1.40E-02
GM-South	40-D	40-303R	6/24/2002	T	4.10E-02
GM-South	40-D	40-303R	3/27/2003	T	3.70E-02

Table 1: Arsenic Concentrations in Groundwater Exceeding 2005 MDEQ Generic Drinking Water Criteria NAO Flint Operations Site, Flint, Michigan					
Area	**AOI**	**Well ID**	**Sample Date**	**Meas Basis**	**Conc** (mg/L)
GM-South	40-D	40-305	3/21/2003	D	1.10E-02
GM-South	44-A	04-160	9/21/2001	D	1.10E-02
GM-South	44-A	RFI-44-05	12/20/2002	T	3.30E-02
GM-South	44-A	RFI-44-05	12/20/2002	D	3.60E-02
GM-South	84-D	84-6	10/17/2001	D	1.30E-02
GM-South	84-D	84-6R2	9/15/2003	T	1.30E-02
Notes:					
Meas Basis - Measured Basis; T = Total, D = Dissolved					
2005 MDEQ Part 201 Generic Drinking Water Criterion is 0.010 mg/L.					