



Aug 07, 2009 17:06

December 29, 2008

MEMORANDUM

To: Kurt Blizzard

cc: Jean Caufield

From: Francis Ramacciotti
Steve SongSubject: Soil and Groundwater Risk Evaluation
GM: Flint East/Burton 56, Burton, Michigan

ENVIRON has performed a risk evaluation using the existing soil and groundwater data collected at the General Motors (GM) Flint East/Burton 56 in Burton, Michigan (Site) to identify potentially significant current and future exposures. Potential routine worker, maintenance worker, and construction worker exposures to soil and groundwater were evaluated based on the existing soil and groundwater data at the Site. The soil and groundwater data used in this risk evaluation were collected during a prior Phase II environmental site assessment, and as such, the selection of sampling locations and depths did not necessarily conform to GM's typical protocol for sampling to support RCRA Corrective Actions. At the request of GM, the adequacy of the characterization data was not reviewed as part of this evaluation.

Methodology

Cumulative cancer risk and non-cancer hazard index (HI) estimates for potential exposure to constituents in soil and groundwater at the Site were calculated as follows:

- routine worker ingestion, dermal contact, and inhalation of constituents in soil during typical activities that occur outdoors;
- routine worker inhalation of constituents in soil or groundwater that volatilize and migrate into indoor air assuming a hypothetical commercial/industrial building;
- routine worker inhalation of constituents in groundwater that volatilize and migrate into outdoor air;
- maintenance worker and construction worker ingestion, dermal contact, and inhalation of constituents in soil during excavations into the subsurface; and,
- maintenance worker and construction worker ingestion, dermal contact, and inhalation of constituents in groundwater during excavations that extend into groundwater.

Cumulative cancer risk and HI estimates for potential exposures to soil were calculated using the highest concentration of each chemical from any depth at all locations across the Site.

Cumulative cancer risk and HI estimates for potential exposures to groundwater were calculated using the highest concentration of each chemical in groundwater from all locations across the

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Site during any sampling event. Because the highest concentration detected in soil and groundwater were used in the risk calculations, the resulting risk estimates should be considered upper-bound risk estimates, which are more conservative than reasonable maximum exposure (RME) risk estimates. Figure 1 shows the locations where data have been collected at the Site. However, only the data from the part of the Site retained by GM (as shown on Figure 1) were used in the evaluation.

Summary of Results

The upper-bound cumulative cancer risk and HI estimates for potential routine worker contact with outdoor soil are summarized on Table 1. Table 1 also summarizes the upper-bound risk estimates for potential maintenance worker and construction worker contact with soil and groundwater. As shown in this table, none of these upper-bound cumulative cancer risk and HI estimates exceeds USEPA's acceptable cumulative cancer risk and HI limits of 10^{-4} and 1 for RME risks, respectively.

The upper-bound cumulative cancer risk and HI estimates for potential routine worker exposure to constituents in soil or groundwater that could volatilize and migrate into a hypothetical commercial/industrial building are summarized on Table 2. Table 2 also summarizes the upper-bound cumulative cancer risk and HI estimates for potential routine worker exposures to constituents in groundwater that could volatilize and migration into outdoor air. As shown in this table, none of the upper-bound cumulative cancer risk and HI estimates exceeds USEPA's acceptable cumulative cancer risk and noncancer HI limits of 10^{-4} and 1 for RME risks, respectively.

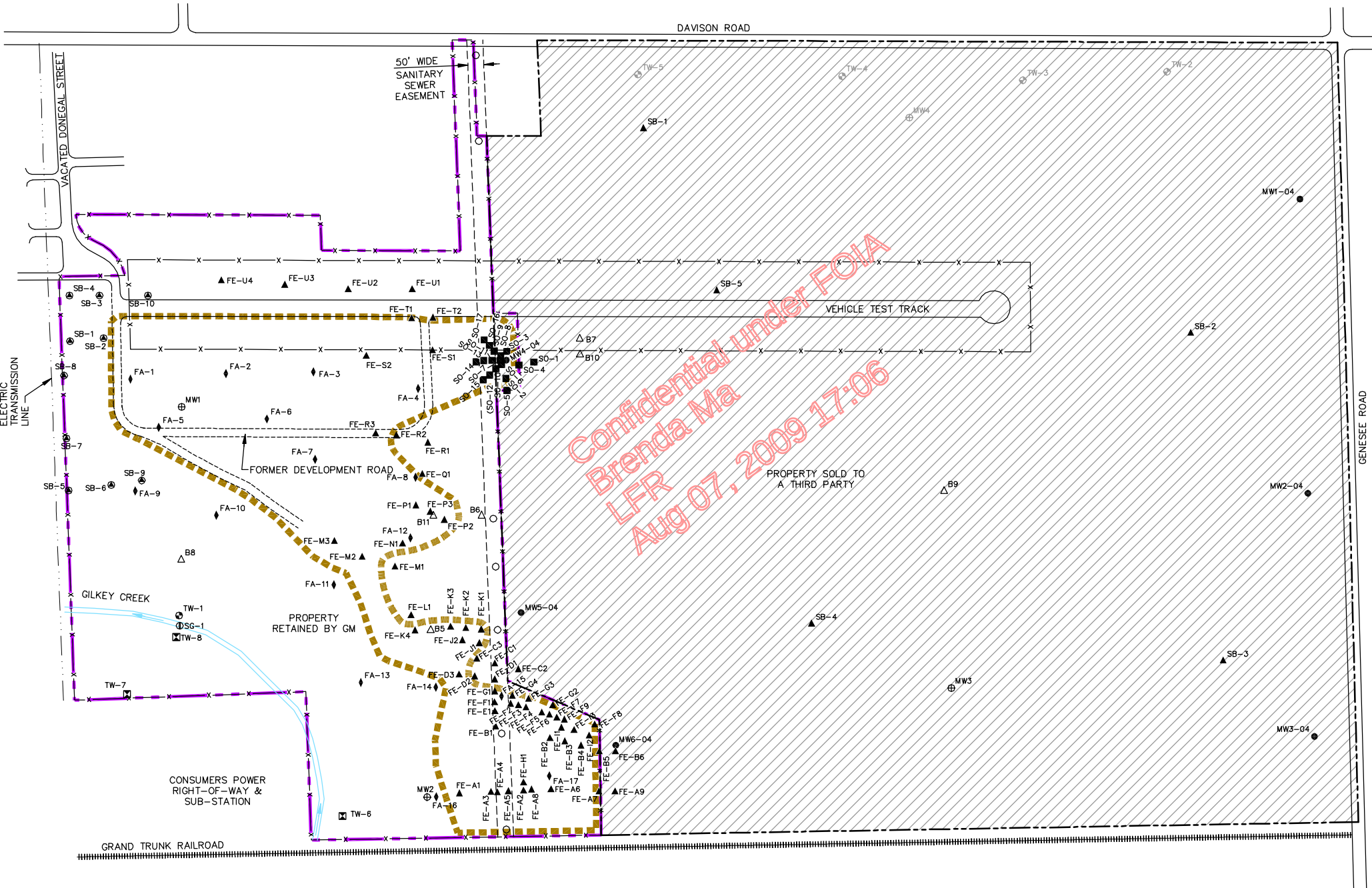
Based on the results summarized on Table 1 and Table 2, the soil and groundwater data used in the evaluation do not indicate a potential for significant worker exposures at the part of the Site retained by GM.

Please contact us if you have questions regarding this evaluation for the GM Flint East/Burton 56 Site.

Enclosures

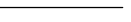
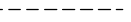
Table 1: Upper-Bound Direct Contact Cumulative Cancer Risk and HI Estimates GM: Flint East/Burton 56, Burton, Michigan				
	Soil		Groundwater	
Receptor	Cumulative Cancer Risk	HI	Cumulative Cancer Risk	HI
Routine Worker	8E-05	2E-01	NA	NA
Maintenance Worker	9E-06	4E-01	2E-08	4E-03
Construction Worker	8E-06	1E+00	2E-09	1E-03
Notes:				
Upper-bound risk estimates are based on the highest concentration from the area of the Site retained by GM.				
NA = This exposure pathway is not applicable for this receptor.				
Direct contact exposure routes include ingestion, dermal contact, and inhalation.				

Table 2: Upper-Bound Vapor Inhalation Cumulative Cancer Risk and HI Estimates GM: Flint East/Burton 56, Burton, Michigan			
Exposure Media	Exposure Route	Cancer Risk	Hazard Index
Soil	Vapor Intrusion into Indoor Air	2E-07	2E-01
Groundwater	Vapor Intrusion into Indoor Air	2E-14	2E-10
Groundwater	Vapor Inhalation in Outdoor Air	5E-15	3E-11
Notes:			
Upper-bound risk estimates are based on the highest concentration from the area of the Site retained by GM.			
Risk estimates for vapor inhalation are calculated for potential routine worker exposures.			
Vapor intrusion risk estimates are for a hypothetical commercial/industrial building.			



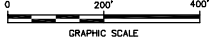


LEGEND

	PROPERTY SOLD TO A THIRD PARTY
	PROPERTY RETAINED BY GM
	APPROXIMATE EXTENT OF FILL AREA
	FORMER PROPERTY BOUNDARY
	EXISTING ROAD
	RAILROAD
	FENCE
	ELECTRIC TRANSMISSION LINE
	CREEK
	DIRECTION OF CREEK FLOW
	SANITARY SEWER MANHOLE
	SANITARY SEWER EASEMENT
	MW1 HISTORICAL OBSERVATION WELL (5/96)
	MW4 ABANDONED HISTORICAL OBSERVATION WELL
	B1 HISTORICAL SOIL BORING (5/96)
	TW-1 TEMPORARY MONITORING WELL (12/03)
	TW-2 ABANDONED TEMPORARY MONITORING WELL
	SB-4 SOIL BORING (12/03)
	FA-1 SOIL BORING (3/04)
	MW4-04 TEMPORARY MONITORING WELL (4/04)
	SO-1 SOIL BORING (5/04)
	TW-6 TEMPORARY MONITORING WELL (8/07)
	STAFF GAUGE LOCATION
	SB-6 SOIL BORING (8/07)

NOTES:

- 2003/2004/2007 SAMPLING LOCATIONS COMPLETED BY BBL WERE SURVEYED BY BMJ ENGINEERS & SURVEYORS, INC; HOWEVER, ALL LOCATIONS ILLUSTRATED ARE APPROXIMATE.
- THE MW4-04 STEP-OUT LOCATIONS (MW4-04S01 THROUGH MW4-04S017) ARE PLOTTED USING AN ABBREVIATED LOCATION NAME (SO-1 THROUGH SO-17) DUE TO SPACE LIMITATIONS.
- BASE MAP PROVIDED BY GM.



CITY:BR(SYR) DIV:GROUP:85 DB:PFS:ADF:KLS LD:PFS PIC:(Opt) PM:(Reqd) TM:(Opt) LFR:(Opt)ON="OFF=REF" J:\2008\9064449\000\00180\FDEDCP\64448B16.dwg LAYOUT: 15/08/2008 2:47 PM ACADVER: 17.15 (LMS TECH) PAGES:17 PLOTTABLE: PLT:FULL-CTB PLOTTED: 11/13/2008 2:47 PM BY: FOX, AARON