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Transmitted by E-mail and US Postal Service

December 3, 2007

Ms. Michelle Majack
U.S. Environmental Protection Agency, Region 5
Waste Management Division
77 West Jackson Blvd., DE-9J
Chicago, IL 60604-3590

RE: Soil Vapor Sampling Results
RCRA Corrective Action
Former GM Delco Plant 5, Kokomo, IN
USEPA ID No. IND000806844

Dear Ms. Majack:

This correspondence is being provided on behalf of General Motors Corporation (GM) and Environmental Corporate Remediation Company, Inc. (ENCORE), in response to USEPA's October 2, 2007 letter regarding this subject.

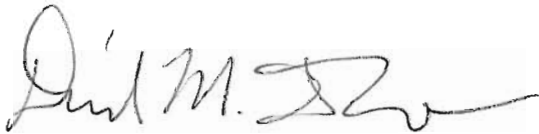
After receiving the October 2, 2007 letter, GM representatives held conference calls with USEPA to discuss USEPA's comments and the soil vapor sampling results. To supplement those discussions, ENVIRON, GM's risk assessment consultant, performed risk calculations using the soil vapor sampling results.

During a conference call with USEPA on October 16, 2007, GM explained these calculations and its belief that the calculations are sufficiently conservative and the results are sufficiently robust relative to the inputs used that they provide a sound basis for a CA725 determination that no unacceptable current exposure via vapor intrusion is occurring. GM also believes this demonstration is consistent with EPA's recommendation in the November 2002 *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* to use predictive modeling to support CA725 determinations and not perform confirmatory sampling when the assumptions used in the data evaluation are sufficiently conservative (p. 9, 38, 40, and 42).

Based on the conference call with USEPA (Ms. Bhooma Sundar and you) on October 16, 2007, it is our understanding that USEPA is in agreement that the low TCE concentrations in the soil gas would result in indoor air concentrations that are lower than the detection limit and pose no significant risk. Further, we understand that USEPA is not requesting any further sampling of soil gas, crawl space air, or indoor air. During the call, USEPA requested that GM include the ENVIRON calculations in its draft CA725 Report. GM included these calculations in Appendix D of the draft CA725 Report, which was submitted to USEPA for review on October 30, 2007. Based upon discussions with USEPA the CA725 Report was finalized and submitted to USEPA on November 30, 2007, so Appendix D from the final report is included as an attachment to this letter.

Please advise us if our understanding is not accurate or contact me if you would like to discuss this matter further. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "David M. Favero". The signature is fluid and cursive, with a long horizontal stroke at the end.

David M. Favero, P.G.
Project Manager

Attachment – CA725 Appendix D - Soil Gas Data Evaluation Supporting Information and Calculations

C: Bhooma Sundar, USEPA Region 5 (e-mail only)
Marilyn Dedyne, GM/ENCORE (e-mail only)
Jean Caufield, GM/ENCORE (e-mail only)

ref: c:\proj\kokomo\rcracorrectiveaction\rfi\ltr_majack_soil gas results_20071127_final

ATTACHMENT

CA 725 APPENDIX D
SOIL GAS DATA EVALAUTION
SUPPORTING INFORMATION AND CALCULATIONS

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D1 Introduction

This appendix explains how the trichloroethene (TCE) soil gas data that were collected off-site near monitoring well MW-0612-S1 were used to verify the findings from comparison of the TCE groundwater data from this location to vapor intrusion criteria developed to guide the RFI field investigation. The following sections describe how the TCE soil gas data were used to estimate a hypothetical upper-bound TCE indoor air concentration and the cancer risk associated with residential inhalation of the hypothetical concentration.

D2 Hypothetical Indoor Air Concentration

The hypothetical upper-bound TCE indoor air concentration was estimated by using the TCE soil gas data to derive an upper-bound estimate of the rate at which TCE mass can diffuse from the soil per unit area (or mass flux). This estimate of TCE mass flux was then assumed to enter a residence without any attenuation, and mix with the indoor air.

Three soil gas samples from soil gas sampling ports SGP-0704 and SGP-0708 had detected concentrations of TCE. Concentrations in the duplicate pairs were averaged to obtain a representative concentration for the sample and the maximum concentration from the three samples was used to estimate the hypothetical upper-bound TCE mass flux from the soil. This average TCE soil gas concentration (C_{sg}) is approximately 0.064 mg/m³ (or 12 ppbv).

The upper-bound TCE mass flux (J) was calculated using Fick's law of diffusion and an upper-bound concentration gradient, as follows:

$$J = D_e \left(\frac{C_{sg} - 0}{L} \right)$$

where L is the depth at which C_{sg} was measured (approximately 1.6 m) and D_e is the effective diffusion coefficient of TCE in soil (8.29×10^{-2} m²/day). The calculated TCE mass flux is 3.31×10^{-3} mg/m²-day. The D_e was calculated by:

$$D_e = D_a \cdot \frac{\theta_a^{10/3}}{\theta_t^2} + \frac{D_w}{H} \cdot \frac{\theta_w^{10/3}}{\theta_t^2}$$

where D_a is the diffusion coefficient in air ($6.83 \times 10^{-1} \text{ m}^2/\text{day}$), D_w is the diffusion coefficient in water ($7.86 \times 10^{-5} \text{ m}^2/\text{day}$), H is the Henry's law constant at 12.5°C (0.235), θ_t is the total porosity of silty clay soil (0.48), θ_a is the air-filled porosity of soil (0.342), and θ_w is the water filled porosity of soil (0.138) (USEPA 1996). The soil type and water-filled porosity are based on those observed at soil gas sampling ports SGP-0704 and SGP-0708.

All the TCE emitted from the soil is assumed to enter a residence without any attenuation. Under this hypothetical worst-case assumption, the indoor air concentration (C_{bldg}) is calculated by conservation of mass as follows:

$$C_{bldg} = \frac{J}{H_b \cdot Ach}$$

where H_b is the building's occupied height (2.44 m based on a single story building) and A_{ch} is the building's long-term air exchange rate (assumed to be 1/hr). The calculated indoor air concentration is $5.7 \times 10^{-5} \text{ mg/m}^3$.

D3 Cancer Risk

The cancer risk associated with residential inhalation of the hypothetical TCE indoor air concentration C_{bldg} is calculated using the standard risk equation for inhalation:

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

where URF is the unit risk factor ($1.7 \times 10^{-3} (\text{mg/m}^3)^{-1}$ from NCEA 1995), EF is the exposure frequency (350 day/yr), ED is the exposure duration (30 yr), and AT is the averaging time (365 day/yr x 70 yr) (USEPA 1991). The calculated cancer risk is 4×10^{-8} . Since TCE was the only USEPA-designated human carcinogen detected in the soil gas, the calculated risk estimate also represents a cumulative cancer risk estimate, which is well below USEPA's cumulative cancer risk limit of 1×10^{-4} .

D4 Sensitivity Analysis

Additional calculations were performed to assess the robustness of the above result to changes in two input parameters: the air exchange rate and the URF . The additional calculations were

performed with an air exchange rate of 0.25/hr (USEPA 2004) and a *URF* of 1.5×10^{-2} (mg/m³)⁻¹ (IDEM 2005). The cancer risk calculated using the combination of a lower air exchange rate and a higher *URF* is 1×10^{-6} , which is still well below the limit of 10^{-4} .

D5 References

National Center for Environmental Assessment (NCEA). 1995. Risk Assessment Issue paper for: Carcinogenicity Information for Trichloroethylene (TCE) [CASRN 79-01-6]. September.

United States Environmental Protection Agency (USEPA). 1991. Human health evaluation manual, supplemental guidance: "Standard default exposure factors." Memorandum from T. Fields, Jr., Office of Emergency Remedial Response, to B. Diamond, Office of Waste Programs Enforcement. OSWER Directive 9285.6-03. March.

United States Environmental Protection Agency (USEPA). 1996. Office of Solid Waste and Emergency Response (OSWER). Soil Screening Guidance: Technical Background Document, 2nd Ed. EPA/540/R95/128. May.

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