DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: Former General Motors Baltimore Assembly Plant
Facility Address: 2122 Broening Highway, Baltimore, MD 21224
Facility EPA ID #: MDD003091972

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

__X__ If yes - check here and continue with #2 below.

_____ If no - re-evaluate existing data, or

_____ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Contaminated Media	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			VOCs, PAHs, metals
Air (indoors)		X		
Surface Soil (e.g., <2 ft)	X			VOCs, PAHs, metals
Surface Water		X		
Sediment		X		
Subsuf. Soil (e.g., >2 ft)	X			VOCs, PAHs. metals
Air (outdoors)		X		

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__**X**__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

BACKGROUND

In February 2006, Duke Baltimore LLC entered into a Facility Lead Agreement with U.S. EPA Region III. Subsequent to entering into the Facility Lead Agreement, the decision was made, with U.S. EPA and Maryland Department of the Environment (MDE) consent, to assess the Facility under Resource Conservation and Recovery Act (RCRA) Corrective Action and the Maryland Voluntary Cleanup Program (VCP) as four separate sites corresponding to Duke's redevelopment areas (i.e., Areas A, B, C and D). The Facility and the redevelopment areas are shown on the attached Figure 1.

A RCRA Facility Investigation (RFI) and Corrective Measures Study was conducted for each of the Redevelopment Areas in 2007 (documented under separate cover). Soil and groundwater samples were collected from each of the redevelopment areas. Preliminary screening of chemicals of potential concern (COPCs) in soil was conducted with the April 2006 U.S. EPA Region III Risk Based Concentrations (RBCs) table (April 11, 2006) for industrial soil. The Region III Soil RBCs are based on a target excess lifetime cancer risk (ELCR) of 1 x 10^{-6} or a target non-cancer Hazard Quotient (HQ) of 1. However, in order to adjust for additive effects due to multiple COPCs, RBCs based on a non-cancer endpoint were adjusted to reflect a target HQ of 0.1. Some constituents without Region III RBCs (e.g., total petroleum hydrocarbons and lead) were evaluated via site-specific levels.

Although the Site is located within an area where groundwater is not used for potable use, concentrations of COPCs in groundwater were screened against drinking water criteria. For each COPC, the lower value between the Region III Tap Water RBC (April 11, 2006) or the Maximum Contaminant Level (MCL) was selected as the screening criterion for groundwater. As was done with the RBCs for soil, groundwater RBCs based on a non-cancer endpoint were adjusted to reflect a target HQ of 0.1 prior to comparison to site concentration data. In addition, VOCs in groundwater were screened for the potential to impact future indoor air concentrations via screening values obtained from U.S. EPA draft Vapor Intrusion Guidance (2002) Table 2-B, and are based on an ELCR of 1 x 10^{-5}.

RESULTS

Area A - Background

Area A, the former Anchor Motor Freight (AMF) property was acquired by GM in 1972 and leased by AMF to provide trucking services to GM for distribution of GM vehicles. This area consists of a southern half, which was used for truck parking, and a northern half, which was used for truck maintenance and repair. Both areas were historically operated by AMF, Penske Logistics, Inc., Leaseway Motor Car Transport, and New Concept Solutions. The AMF property was originally a part of Fort Holabird and was utilized for residences for military personnel.

Area A - Soil

Based on the results of the screening process, two chemicals were each detected at a concentration above its respective Region III Industrial Soil RBC and, therefore, each was retained as a COPC with respect to the direct contact with soil exposure pathway. The maximum detected concentrations of benzo(a)pyrene (0.923 mg/kg) and arsenic (25 mg/kg) exceed their respective RBCs of 0.39 mg/kg and 1.9 mg/kg. In general, elevated concentrations of COPCs were not identified in Area A soil.

Area A - Groundwater

Six volatile organic compounds (VOCs) were each detected at a maximum concentration above its respective potable use screening level. Most of the VOCs were detected in water samples taken from perched water in the area of the former tank pits. Specifically, the maximum detected concentration of benzene (440 ug/L) and methyl tert-butyl ether (MTBE) (7 ug/L) at sampling location 9I1, and the maximum detected concentration of toluene (590 ug/L) and total xylenes (760 ug/L) were collected at sampling location 9H1. Finally, the maximum detected concentration of chloroform (1 ug/L) and 1,2-dichloroethane (6 ug/L) were detected at sampling locations 9F6 and 9F3, respectively. Two semivolatile organic compounds (SVOCs), dibenzofuran (2 ug/L) and naphthalene (34 ug/L), were each detected at maximum concentrations above their respective potable use screening levels at sampling location 9I1. One inorganic constituent (i.e., manganese (1,180 ug/L)) was detected at a maximum concentration exceeding its potable use screening level at sampling location 9A3. Two inorganic constituents were detected at a concentration exceeding their respective potable use screening levels at sampling location 9B2 (i.e., arsenic (14.8 ug/L) and thallium (5.3 ug/L)). Two inorganic constituents were detected in samples collected from monitoring wells (i.e., cadmium and mercury). Cadmium was detected at a concentration of 1.98 ug/L at monitoring well location HMW-6, slightly exceeding its potable use screening level of 1.8 ug/L. Finally, the maximum detected concentration of mercury (0.712 ug/L) detected at HMW-4 exceeds the Tap Water RBC of 0.37 ug/L for methylmercury. In general, the detected groundwater concentrations are not indicative of a significant release to groundwater in this area of the site.

Area B - Background

Area B is the former American Standard Property which is located to the north of the Main Assembly Building and south of Holabird Avenue. American Standard formerly manufactured bathroom fixtures, such as sinks and bathtubs. This property was acquired by GM from American Standard in 1971. American Standard buildings were demolished in 1974.

Area B - Soil

Based on the results of the screening process, several chemicals were each detected at a concentration above its respective Region III Industrial Soil RBC. The maximum detected concentration of several polynuclear aromatic hydrocarbons (PAHs) (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene) and metals (antimony, arsenic, manganese and thallium) exceed their respective RBCs. One additional COPC, lead, was detected at several locations in exceedance of the MDE-recommended maximum lead concentration of 2,000 mg/kg.

Area B - Groundwater

Seventeen chemicals were detected at concentrations in groundwater at Area B above their respective Region III Tap Water RBCs, including antimony, arsenic, benzene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, tert-butylbenzene, chlorobenzene, chromium, cobalt, dibenzofuran, manganese, 2-methylnaphthalene, naphthalene, nickel, selenium, 1,1,2-trichloroethane, and vanadium. In addition, the maximum concentrations of isopropylbenzene, tetrachloroethene, and trichloroethene each exceeded both their respective Region III Tap Water RBC and draft U.S. EPA groundwater-to-indoor air screening criterion. Lead was also detected at a concentration above the potable use screening value based on the action level for lead at the tap.

Area C - Background

Area C consists of the Main Assembly Building and outdoor areas associated with the Plant. Due to its size, the area was subdivided for the purposes of the RFI into two areas – Area C-1 and Area C-2. Area C-1 includes structures that are peripheral to the Main Assembly Building: the Power House, the Pump House, the Driveaway Building, the Storage Building (formerly called the Weld Destruct Building) for unspecified materials, the Central Wastewater Treatment Plant (WWTP), the Training Facility and the Sealer Building. These structures are all of slab-on-grade, brick and concrete block construction. Concrete and asphalt paved areas offer access to Areas A, B, C-1, C-2 and Area D. Area C-2 is defined as the Main Assembly Building, which is a slab on grade building constructed of concrete block and brick. The Main Assembly Building comprises approximately 2,900,000 square feet of space on two floors and formerly contained automobile process and assembly operations. The Main Assembly Building was constructed on vacant land in 1934. The Main Assembly Building originally consisted of the Fisher Body Plant to the south and the Chevrolet Assembly Plant to the north.

Area C - Soil

The RFI for Area C described four chemicals of potential concern in soil that were present above screening criteria selected on the basis of Region III RBCs tables for Industrial Soil including arsenic (19.2 mg/kg), benzo(a)pyrene (3.2 mg/kg), benzo(b)fluoranthene (4.59 mg/kg), dibenz(a,h)anthracene (0.705 mg/kg) and thallium (8.4 mg/kg) exceed their respective RBCs. In addition, the maximum detected lead concentration (2,030 mg/kg) was above its screening level of 1,000 mg/kg.

Area C - Groundwater

Sixty-two analytes detected in groundwater were identified as COPCs with respect to the screening criteria. COPCs identified in groundwater samples collected from Area C included VOCs, polynuclear aromatic hydrocarbons (PAHs) and metals. A tabular summary of the groundwater screening is attached as Table 1.

Area D - Background

Fort Holabird occupied Area D until 1979. The No. 2 Boiler Plant, the Post Engineer Yard, offices, the Army Intelligence School, a small gymnasium, storage buildings, and barracks of Fort Holabird were demolished in 1971 by the Department of Defense. When GM acquired the land in 1979, the basements of these buildings had been filled with building debris, and the area was subsequently paved and converted to the East Employee Parking Lot.

Area D - Soil

Two chemicals were each detected at a concentration above its respective Region III Industrial Soil RBC and therefore each was identified as COPCs with respect to the direct contact with soil exposure pathway. The maximum detected concentrations of benzo(a)pyrene (1.38 mg/kg) and arsenic (14.8 mg/kg) exceed their respective RBCs of 0.39 mg/kg and 1.9 mg/kg.

Area D - Groundwater

Nine analytes detected in groundwater were identified as COPCs with respect to the screening criteria. The maximum detected concentrations of benzene (18.1 ug/L), 1,2-dichloroethane (1.67 ug/L), benzo(a)pyrene (0.1 ug/L), and benzo(b)fluoranthene (0.17 ug/L) at monitoring well sampling location MW-27D exceed their respective Tap Water RBCs of 0.34 ug/L, 0.12 ug/L, 0.0092 ug/L, and 0.092 ug/L. In addition, the concentration of 2-methylnaphthalene (9 ug/L) and naphthalene (47 ug/L) at sampling location 8B3 exceed their respective Tap Water RBCs of 2.4 ug/L. and 0.65 ug/L. Finally, the concentration of arsenic at sampling location HSBD4 (1.03 ug/L), the concentration of barium at sampling location 8B3 (1,490 ug/L), and the concentration of manganese at sampling location 8A1 (2,770 ug/L) exceed their respective Tap Water RBCs of 0.045 ug/L, 730 ug/L, and 73 ug/L.

REFERENCES

Hull & Associates, Inc. 2007a. RCRA Facility Investigation / Phase II Environmental Site Assessment and Corrective Measures Study (Revision 1.0) of Area B – Former American Standard Property Former General Motors Corporation Baltimore Assembly Plant. March 2007.

Hull & Associates, Inc. 2007b. RCRA Facility Investigation / Phase II Environmental Site Assessment and Focused Corrective Measures Study (Revision 1.0) of Area A – Anchor Motor Freight Property Former General Motors Corporation Baltimore Assembly Plant. April 2007.

Hull & Associates, Inc. 2007c. Response Action Plan for Area A – Former General Motors Corporation Baltimore Assembly Plant. April 2007.

Hull & Associates,, Inc. 2007d. RCRA Facility Investigation /Phase II Environmental Site Assessment Of Area C – Former General Motors Corporation Baltimore Assembly Plant. June 2007.

Hull & Associates, Inc. 2007e. RCRA Facility Investigation/Phase II Environmental Site Assessment of Area D – Former Fort Holabird Former General Motors Corporation Baltimore Assembly Plant. July 2007.

Hull & Associates, Inc. 2007f. Revised Response Action Plan Revision 1.0 for Area B – Former General Motors Corporation Baltimore Assembly Plant. July 2007.

Hull & Associates, Inc. 2008. Revised Response Action Plan Revision 1.0 for Area C – Former General Motors Corporation Baltimore Assembly Plant. February 2008.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

2 Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table
Potential **Human Receptors** (Under Current Conditions)

Contaminated Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food
~~Groundwater~~	No	No	No	No	No	No	No
~~Air (indoors)~~	No	No	No	No	No	No	No
~~Soil (surface, e.g., <2 ft)~~	No	No	No	No	No	No	No
~~Surface Water~~	No	No	No	No	No	No	No
~~Sediment~~	No	No	No	No	No	No	No
~~Soil (subsurface e.g., >2 ft)~~	No	No	No	No	No	No	No
~~Air (outdoors)~~	No	No	No	No	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

__**X**__ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

_____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):
As part of the RFI for each of the redevelopment areas, a site-specific risk assessment was conducted for each of the redevelopment areas for future land use. A remedial action plan was developed on the basis of the risk assessment results for Area A, B and C involving such corrective measures as soil excavation, soil capping and limitation of direct contact with groundwater, as appropriate. Area D required no corrective measures beyond the implementation of an institutional control to limit land use to commercial/industrial purposes. In addition, a Risk Mitigation Plan will be implemented as part of the final remedy to minimize potentially unacceptable exposure to subsurface soil containing lead at Area B by construction/excavation workers.

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The activities outlined in the remedial action plans for Areas A, B and C are either complete or in process. Activities in Area A and 50% of Area B are complete. Activities in the remainder of Area B and across Area C are substantially complete. Ongoing work such as grading and construction is being conducted in accordance with Health and Safety Plans, as appropriate. Access to areas of the Facility where corrective actions are in progress is currently being restricted by fencing, so unauthorized personnel should not be in contact with environmental media at the site. Therefore, there are no current complete exposure pathways with potentially significant exposure with respect to contaminated media at the Facility.

REFERENCES
Please see References listed in Item 2.

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[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):
NA

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[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):
NA

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

___**X**_ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **Former General Motors Baltimore Assembly Plant** facility, EPA ID # **MDD003091972**, located at **2122 Browning Highway, Baltimore, MD 21224** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by	(Signature) - signed -	Date: 1/7/10
	(Print) Denis M. Zielinski	
	(Title) Senior RPM	

Supervisor	(Signature) - signed -	Date: 1/14/10
	(Print) Luis Pizarro	
	(Title) Chief, Office of Remediation	
	(EPA Region or State) EPA Region III	

Locations where References may be found:

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