

Worldwide Facilities Group ENVIRONMENTAL SERVICES Remediation Team

5 February 2009 File No. 70613-115

Linda Taylor Supervisor New Jersey Department of Environmental Protection 401 East State Street P.O. Box 028 Trenton, New Jersey 08625

Subject: Proposed Site-Specific Impact to Groundwater Soil Remediation Standards Former Delphi Interior and Lighting Systems Division 1445 Parkway Avenue, Ewing Township, Mercer County, New Jersey 08628 ISRA Case No. E97070

Dear Ms. Taylor:

General Motors Corporation (General Motors) is pleased to submit to the New Jersey Department of Environmental Protection (NJDEP) recommendations for Site-specific Impact to Groundwater-Soil Remediation Standards (IGW-SRS) for metals and cyanide at the former Delphi Interior and Lighting Systems Division site (Site). The Site is located at 1445 Parkway Avenue, Lot 1.01, Section 343, of the tax map of Ewing Township, Mercer County, New Jersey.

As indicated in the meeting held at the NJDEP offices in Trenton, New Jersey on 16 December 2008, General Motors evaluated the occurrence of metals and cyanide in soil and groundwater to develop Site-specific IGW-SRS based on the specific conditions at the Site. The IGW-SRS proposed in the attached memo are intended to satisfy the requirements in NJAC 7:26D-1.1(b) for establishment of IGW-SRS; and we request these standards be approved by the Department, pursuant to the Department's authority under N.J.S.A. 58:10B-12a.

The attached memo presents the results of a data-analysis effort to determine if groundwater quality is adversely affected by metals and cyanide, and, if so, if the soil in the vicinity of the degraded groundwater contains metals that could cause the observed water quality. We present an approach to use the calculated IGW-SRS, the restrictions on the application of the IGW-SRS, and a limited groundwater monitoring program to be included in a post-soil remediation effort (additional groundwater monitoring beyond that presented in the attached is likely, but for reasons other than metals in groundwater).



This submission also contains the one-part Certification form executed by General Motors as required by N.J.A.C. 7: 26B-1.6(c).

Thank you for your consideration of the attached. At this point, the NJDEP should have all the information necessary to issue an approval of the Revised Remedial Action Workplan for soils submitted on 2 December 2008. It is our understanding, based on your 16 December 2008 e-mail correspondence, that you will expedite the review this RIPR and other outstanding documents.

Please contact the undersigned if you have any questions concerning this letter or its attachments. We look forward to a positive response to our proposal.

Sincerely yours, GENERAL MOTORS CORPORATION WORLDWIDE FACILITIES GROUP

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Geraldine Barnuevo, MSc. Remediation Project Manager

Enclosures:

Proposed Site-Specific Impact to Groundwater Soil Remediation Standards – 3 copies General Motors Certification

c: General Motors Corporation; Attn: Marilyn Dedyne Haley & Aldrich, Inc.; Attn: Jeffrey L. Duncan, P.E. Haley & Aldrich, Inc.; Attn: Amy K. Murphy Ewing Township; Attn: Administrator – David W. Thompson (cover letter only) Ewing Township; Attn: Municipal Clerk – Stephen Elliot Ewing Township; Attn: Health Officer – W. Allen Lee

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CERTIFICATION

As required by N.J.A.C. 7:26B-1.6(c)

Any person making a submission to the Department required by this chapter and pursuant to N.J.A.C. 7:26E, shall include the following signatures and notarized certification, for each technical submittal. Additionally, the certification shall indicate the case name and address, case number, type of documents submitted, e.g. Remedial Action Report, for each technical submittal.

Type of Document: Proposed Site-Specific Impact to Groundwater Soil Remediation Standards Case Name: Former Delphi Interior & Lighting System Division, General Motors Corporation Case Address: 1445 Parkway Avenue, Trenton, New Jersey 08628 Case Number: ISRA Case No. E97070

An individual who is familiar with the Industrial Establishment through on-site observation must sign the certification. The individual must be in a position of authority that can attest to the accuracy of the response to each question. When the situations arise, the certification shall be executed as follows:

- 1. For a corporation or limited liability company, by a principal executive officer of at least the lever of Vice President;
- 2. For a partnership or sole proprietorship, by a general partner of the proprietor, respectively;
- 3. For a municipality, state, Federal or other public agency, by ether a principal executive officer or ranking elected official; or
- 4. By a duly authorized representative of a corporation, partnership, sole proprietorship, municipality, state or Federal or other public agency, as applicable. A person is deemed to be a duly authorized representative if the person is authorized in writing by an individual described in 1, 2, or 3 above and the authorization meets the following criteria:

• The authorization specifies either an individual or a position having responsibility for the overall operation of the industrial establishment or activity, such as the position of plant manager, or superintendent or person of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position);

The written authorization is submitted to the Department; and

• If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the industrial establishment or activity, a new authorization satisfying the requirements listed above shall be submitted to the Department prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of N.J.S.A. 13:1K-6 et seq., I am personally liable for the penalties set forth at N.J.S.A. 13:1K-13.

Typed/Printed	
Name WILLIAM J. MEFARLAND Title DIRECTOR	
Signature William J. m. Failand Date 2-6-09	
Sworn to and Subscribed Before Me	
On this lett day of February 20 09]
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Notary V State Andread State A	
ALLICIA NAJOR NOTARY PUBLIC – STATE OF MICHIGAN	
My Commission expires April 3, 2015 Acting in the County of MACOM	

Haley & Aldrich, Inc. 299 Cherry Hill Rd. Suite 105 Parsippany, NJ 07054-1124

Tel: 973.263.3900 Fax: 973.263.2580 HaleyAldrich.com

HALEY& MEMORANDUM ALDRICH

6 February 2009 File No. 70613-100

TO:	General Motors Corporation
	Geraldine Barnuevo, MSc

FROM:	Haley & Aldrich, Inc.
	Jeffrey L. Duncan, PE

SUBJECT: Proposed Site-Specific Impact to Groundwater Soil Remediation Standards

INTRODUCTION

This document presents the results of a review of the metals in soil and groundwater data yielding recommendations for Impact to Groundwater-Soil Remediation Standards (IGW-SRS) for metals and cyanide at the General Motors (GM) facility in Trenton, New Jersey. We have evaluated the occurrence of metals and cyanide in soil and groundwater to develop Site-specific IGW-SRS based on the specific conditions at the Site.

The IGW-SRS proposed in this report are intended to satisfy the requirements in NJAC 7:26D-1.1(b) for establishment of IGW-SRS; and we request these standards be approved by the Department, pursuant to the Department's authority under N.J.S.A. 58:10B-12a.

Table 1 presents a summary of the recommendations.

DISCUSSION

GM has reviewed the June 2005 to November 2008 dataset to identify metals exceeding their respective GWQS (NJAC 7:9C) at the former Delphi Interior and Lighting Systems Site (Site) in Ewing Township, New Jersey. While groundwater quality data exist for many of the current wells that pre-date June 2005, the June 2005 cutoff was selected because groundwater sampling from that time forward utilized only low-flow sampling techniques. Some groundwater samples prior to that date may have been collected using low flow techniques, but it was in conjunction with traditional bailer sampling for organic compounds.

Site groundwater analysis has included hexavalent chromium (Cr^{+6}) and vanadium, but these two metals do not have a GWQS. Therefore, GM has not included a discussion of these metals in this memorandum. GM proposes excluding vanadium from the post-excavation, soil-sample analysis. Soil analysis for Cr^{+6} will be included as proposed in the RRAW.

Five metals have been detected at concentrations less than their respective GWQS in groundwater samples collected from June 2005 to November 2008: barium, copper, mercury, selenium, and silver. Therefore, concentrations of these metals that may be present in soil at the Site are not adversely affecting the groundwater quality. Concentrations of these metals in soil are sufficiently low enough to be protective of groundwater quality and soil remediation for these metals for IGW is not necessary. Because barium, mercury, selenium, and silver were also found to not exceed the Residential SRS in any of the samples analyzed for them, GM proposes to exclude these metals in the post-excavation, soil-sample analyses. Copper will be included in the post-excavation analysis because it does exceed the Residential SRS at multiple locations and may be considered a Metal of Concern (MoC) at the Site; however, because copper does not exceed its GWQS in groundwater, the post-excavation soil sample results will be compared to the Residential SRS.

Temporary well point (TWP) data were not included in the review (unless they represented the only data from a specific area of interest) because the nature of the TWP-installations typically resulted in turbid, low-flow samples that are not considered representative of actual groundwater quality. In addition, many of the TWP locations that exhibited elevated concentrations of a Site MoC now have permanent wells installed with data that are considered more representative of actual groundwater conditions. These locations, for metals, are:

TWP	Well Identifier
FFWG-1	MW-41
FFWG-2	MW-39
FGWG-1	MW-54
XWG-4	MW-44
XWG-12	MW-45 ¹
XWG-17	Between MW-19 and MW-45

1) MW-45 may not be representative of local groundwater conditions due to its construction as discussed below.

Based on the most recent, Site-wide sampling event (August 2008), the following metals exceeded the appropriate GWQS at one or more wells: arsenic, beryllium, total chromium, lead, nickel. Reviewing the groundwater data set from June 2005 to present, the following metals have exceeded the appropriate GWQS one or more times at one or more wells, but did not exceed the appropriate GWQS in August 2008: antimony, cadmium, cobalt (Interim Specific Standard set February 2008), thallium and zinc. These ten metals plus copper, as noted above, are considered to be the Site-MoCs.

The data for cyanide were also reviewed.



APPROACH

Because metals and cyanide contamination of groundwater is not Site-wide and was not generally consistent during all sampling events, GM considers the IGW-SRS presented herein to be applicable only to the areas of the Site where groundwater has exhibited repeated exceedances of a GWQS. Areas that cause an exceedance for one metal may not for another, and only the metal(s) that are causing an exceedance of the GWQS in that area will have the IGW-SRS applied. For the Site-MoCs that are not affecting groundwater at an Area of Interest (AOI) that is being excavated and in other AOIs that are not affecting the groundwater, GM will use the Residential SRS for comparison of post-excavation results. Areas that the IGW-SRS will apply are noted in the discussion of the individual metals presented below and are summarized in Table II.

In order to minimize the amount of time any particular excavation is open during the remediation, GM proposes to obtain sufficient information to generate a Site-widespecific SPLP value for beryllium, cadmium, lead, nickel, and zinc. The SPLP-value will be determined using Guidance for the use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards; June 2008 (SPLP Guidance) as guidance. In the AOIs where one or more of these metals may be contributing to groundwater quality degradation, as discussed below, GM will collect a sufficient number of samples for metals analysis in the soil and in the leachate produced using the SPLP. GM proposes the following modification to the SPLP Guidance: instead of collecting a minimum of three samples from each AOI, GM proposes to collect a minimum of six samples for analysis for each of the five metals from the Site to account for the size of the area. Each sample location may have more than one metal analyzed for. GM will determine a "maximum" soil concentration that can be left in place without exceeding the standard (GWQS times the Site-specific DAF). If a future post-excavation sample result exceeds the pre-calculated maximum, GM will submit that additional sample for SPLP analysis and, if the SPLP does not exceed the standard, GM will calculate a new soil maximum for that metal. If the SPLP exceeds the standard, GM will revise the calculation and note this area for the Deed Notice. This approach is recommended because the Site soils where metals impacts are anticipated (fill material overlying native soils and weathered bedrock) are generally consistent (silty sand or sandy silt with varying amounts of clay, gravel, and man-made material) both horizontally and vertically.

GM intends to use the applicable SRS (IGW or Residential) as a guide for determining the extent of an excavation during the Site remediation or to establish the limits of an area to be included in a Deed Notice for the Site. It is not GM's intent to excavate all soil exceeding the most stringent SRS. The proposed excavation presented in the RRAW is intended to be the extent of the excavation performed and is expected to remove the majority of soil/materials with concentrations (metals and organics) that are above the SRS and may be adversely affecting groundwater quality. Post-excavation sampling and analysis will determine if gross contamination remains following the proposed excavation. GM requests NJDEP's approval to utilize results-averaging (NJAC 7:26E-4.8(c)), as implemented by the Guidance in the Spring 1995 Site Remediation News (http://www.state.nj.us/dep/srp/news/1995/95spr 08.htm) in each



AOI to determine if an AOI is in compliance with the appropriate SRS, even though sub-paragraph iii does not include procedures for post-excavation sample result averaging. If the average concentration exceeds the applicable SRS at an excavation, the offending sample location(s) will be field delineated. If, following delineation, minimal (less than 10% by volume) additional excavation will result in an AOI meeting the SRS; GM will extend the excavation accordingly with the intent of closing this AOI. If the additional excavation noted above or if the additional excavation needed to close an AOI is greater than minimal (10% or more), GM will not perform the additional excavation and will include this AOI in the Site Deed Notice.

Because of localized, sporadic groundwater contamination has been identified in some areas of the Site where soil remediation is proposed which may not fully remove contaminated soil, and GM believes sufficient material will be removed to improve groundwater quality with time, GM proposes groundwater monitoring and evaluation following the soil remediation. This evaluation is not intended to include periodic measurements over a long period, but, instead, is intended to evaluate groundwater quality following the soil remediation to document groundwater quality at that time and provide information about the need or not to implement a Classification Exception Area (CEA) for one or more metals. Therefore, GM proposes to collect eight quarters of groundwater quality data from the wells noted below following completion of the soil remediation. Table III summarizes the monitoring wells that have been specifically identified in the metal-specific discussion below. The following summary is not intended to be a complete groundwater evaluation plan following soil remediation. Such a plan can only be prepared after the wells that would remain or would be replaced following the soil excavation activity are determined. Table III provides only the wells GM is identifying at this time for post-remediation monitoring to determine if the soil remediation was sufficient to address minor issues identified in the groundwater.

EVALUATION OF METALS AND CYANIDE RESULTS

Our analysis of the ten MoCs is presented below, in alphabetical order. Figures 1 through 10 display the groundwater results (June 2005 through November 2008) qualitatively (colored dots for clean and one or more GWQS exceedances) for these ten metals. For metals that GM proposes to use an IGW-SRS for, the areas of the Site where GM proposes to compare post-excavation samples results to an IGW-SRS are depicted on the appropriate figure.

Antimony

Antimony exceeded the GWQS (6 μ g/L) at the following locations and dates:

- MW-4 only June 2005 (11.2 μ g/L) in 10 sampling events between June 2005 and August 2008.
- MW-6A only June 2005 (7.4 μ g/L) in 10 sampling events between June 2005 and August 2008.
- MW-7 only June 2005 (6.2 μ g/L) in 10 sampling events between June 2005 and August 2008.



• MW-8 - June (9.5 μ g/L) and September 2005 (11.5 μ g/L) in 8 sampling events between June 2005 and April 2007.

592 soil samples analyzed for antimony including 36 duplicates from 342 locations around the Site (including multiple depths at multiple locations). Of these, the antimony concentrations in 478 were not detected. Of those detected (114 samples), only five have exceeded the Residential SRS (31 mg/Kg).

GM suspended sampling at MW-8 after the April 2007 event due to anomalous water level readings in this well compared to surrounding monitoring well groundwater levels. Due to this anomaly, the analytical data from this location was determined to be suspect and not representative of overall groundwater conditions.

Because the groundwater data for antimony are, generally across the Site, less than the GWQS, and concentrations exceeding the standard are less than 2 times the standard, isolated to a time three or more years ago, and not concentrated in one area of the Site, GM proposes that the soil quality for antimony is satisfactory to protect the groundwater. Because antimony does exceed the Residential SRS at one or more locations, GM proposes including antimony as a Site-MoC and GM will include antimony in the post-excavation sample analysis. Results of this analysis will be compared to the Residential SRS (31 mg/Kg).

Arsenic

Arsenic exceeded the GWQS (3 μ g/L) at only eight locations in August 2008 (MW-5A, MW-6, MW-6A, MW-27, MW-34, MW-40, MW-45, and MW-53) out of 62 locations sampled (seven additional wells were to be sampled but had insufficient water to sample). The GWQS has been exceeded at least once in 22 of the Site wells between June 2005 and August 2008.

Of the 22, the following six wells have only exhibited a single exceedance during this sampling period (not including the wells installed in 2008): MW-5 (3/07), MW-7A (6/05), MW-9 (12/05), MW-16A (4/07), MW-22 (12/05), and UST-2 (3/06).

Of the 22, the following seven wells have arsenic concentrations below the GWQS during the April and August 2008 sampling events: MW-1A, MW-5, MW-7A, MW-16A, MW-22A, MW-30, and UST-5. During the 2008 sampling events, the samples were analyzed by Method 200.7 or .8 instead of Method 6010 during the previous events yielding lower detection levels.

Of the 22, the following six wells were last sampled during the March/April 2007 sampling event (not included in the subsequent sampling proposed in the addendum to the Groundwater Investigation Workplan; 2007): MW-9, MW-10, MW-12R, MW-22, MW-31, and UST-2.

Concentrations exceeding the GWQS occur most frequently at MW-5A (5 times ranging from 3.4 to 4.7 μ g/L), MW-6 (8 times ranging from 3.9 to 11.5 μ g/L) and MW-31 (6 times ranging from 3.5 to 14.7 μ g/L). Of the monitoring wells installed in 2008, the following locations had arsenic concentrations above the GWQS for one or both sampling events: MW-40 (3.45 μ g/L; 8/08), MW-45 (20.8 μ g/L, 4/08 and 14.8 μ g/L, 8/08), MW-47 (4.52 μ g/L, 8/08), and MW-53 (7.9 μ g/L, 8/08).



766 soil samples (including 50 field duplicates) have been tested for arsenic. Of the 766 samples, 612 samples exhibited detectable concentrations. Of the 612, only 116 have exceeded the Residential-SRS (19 mg/Kg), The Residential-SRS is determined based on the state-wide background concentration. Because approximately 85% of the arsenic concentrations reported in soil are either non-detect or is less than the state-wide background, and the average of the Site-wide data set is approximately 17 mg/Kg, GM believes the Residential-SRS represents a reasonable background for the Site.

The concentration of arsenic in groundwater samples collected from MW-5A, MW-6, and MW-6A exceeded the GWQS during several sampling events. These wells are in the vicinity of Sludge Bed No. 1. The proposed remediation in the RRAW (1H10a) for this area is excavation of the top four feet of material from the sludge bed, extension of the excavation to 6 feet in the vicinity of SB-10-SO-10 (for lead and volatile organic compounds). GM will evaluate the condition of this area after completion of the proposed excavation to determine if further excavation is warranted or if the remaining material should be included in the Site Deed Notice.

The arsenic concentration in MW-31 is similar to, but slightly higher than the concentration in MW-30, immediately up-gradient of MW-31. The difference in the concentrations between these two wells is not explained by former operations in this area (above ground storage of xylene-based solvents). Only three exceedances of the GWQS in MW-30 have occurred in the 10 sampling events (4.7 μ g/L, 9/05; 4.2 μ g/L, 12/05; and 4.7 μ g/L, 10/06) and the concentration was approximately 2 μ g/L during April and August 2008 monitoring. GM does not have any arsenic in soil data in this area. The concentration of arsenic in groundwater down gradient of MW-31 (MW-50) is less than or about 1 μ g/L. The RRAW (1H4a) includes removal of xylene-contaminated soil in this AOI (AOI 4). Due to the depth of this proposed excavation, the excavation will require removal of MW-30 and may require removal of MW-31. GM will analyze post-excavation samples from AOI 4 for arsenic.

The occurrence of arsenic in MW-45 exceeded the GWQS in the two sampling events completed since well installation in January 2008 (April, 20.8 μ g/L; and August, 14.8 μ g/L). However, the data from this well are not likely representative of Site groundwater conditions. The well is screened across a clay layer. The observations made during well installation suggested perched water above the clay and the soil was dry beneath it. The water level in this well is typically higher than surrounding wells. Therefore, this well is likely monitoring conditions of the perched water. GM recommends abandoning this well as soon as practical and constructing a well to monitor the area following remediation of soil in AOI-1.

Post-excavation soil sample analysis will include analysis for arsenic. The arsenic results will be compared to 19 mg/Kg, as it represents state-wide background conditions.

Beryllium

Beryllium exceeded the GWQS (1 μ g/L) at only four locations in August 2008: MW-33, MW-53, MW-55, and UST-9R. Beryllium exceeded the GWQS in 12 wells from June 2005 to November 2008 at least one time, including the wells noted as exceeding in August 2008. Six of the wells are near the eastern property line (MW-21, MW-21A, MW-23, MW-24, MW-33, and MW-55 [off-site]). The six remaining



locations include: MW-53 (along the southern property line); MW-45 (under the slab); and in the former UST area (UST-1, UST-8, UST-9R, and UST-13).

596 soil samples analyzed for beryllium (including 36 duplicates) from 346 locations. Of these, the beryllium concentrations in 103 were not detected. None of the soil sample results exceeded the Residential SRS (16 mg/Kg). Of the samples with detectable concentrations (493 samples), the average concentration is 0.93 mg/Kg. The concentration in samples adjacent to Parkway Avenue and in the northeast corner of the Site, areas where process-related activities have not occurred and should be representative of background, range from 0.68 mg/Kg to 1.2 mg/Kg.

Beryllium was not detected (detection limit less than 1 mg/Kg) in the contents of the drums removed from the eastern portion of the Site (MOA-A; AOI 31). The beryllium concentrations in the post-drum-removal soil and the excavated soil ranged from non-detected (less than 0.11 mg/Kg) to 0.4 J mg/Kg. Water removed from the excavation did not have detectable concentrations (less than 5 μ g/L) of beryllium.

GM proposes to use 1.2 mg/Kg as representative of background below which remediation is not required. Because this background value is greater than the calculated IGW-SRS for beryllium (Partition Guidance; 0.5 mg/Kg), GM proposes using 1.2 mg/Kg as the IGW-SRS. The highest concentration (11 mg/Kg at SB-3-SO-11; 0 to 0.5 ft from ground surface) is east of the former Powerhouse and appears to be isolated because surrounding samples delineate this occurrence. The next highest concentration is 3.1 mg/Kg in the vicinity of the former and new oil-water separators (AOI 23; MOA-B-S1; 10 to 10.5 ft bgs).

The Gold Run Pond sediment contains beryllium at concentrations above the background concentration. The highest concentration (12 mg/Kg) in sediment is approximately equal to the highest concentration in Site soils. This was detected in a sample (S11-8) collected near the Parkway Avenue storm water sewer outfall (which conveys surface water from west of Gold Run Pond), suggesting an off-site source of beryllium is entering the Site through the storm sewers (or has historically).

While the concentrations of beryllium in MW-21, MW-21A, MW-23, MW-24, MW-53 and UST-8 are only slightly above (less than 2 μ g/L) the GWQS, many of the results are only estimated concentrations. For MW-21, MW-21A, MW-23, and MW-24 (located in or down gradient of the former drum burial area), GM believes these generally define the outer edge of a beryllium plume emanating from the Gold Run Pond sediment because beryllium was not found in this AOI when the drums were removed in 1996.

The occurrence of beryllium in MW-53 (1.14 μ g/L) appears to be an outlier. Beryllium was not detected (less than 0.025 μ g/L) at this location in April 2008. The concentrations in nearby monitoring wells (MW-7, MW-11, and MW-40) are well below the GWQS (non-detect or estimated at 0.03 μ g/L). Following remediation of soils in AOI-23 and AOI-26, per the RRAW, GM will monitor this well to determine if groundwater quality in this area will be acceptable. Post-excavation samples from these two AOIs will include analysis for beryllium and the results will be compared to 1.2 mg/Kg.

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The occurrence of beryllium in UST-8 (1.8 μ g/L; June 2006) similarly appears to be an isolated event. All other data from this well are below the GWQS (non-detect to

0.72 μ g/L). The wells in the immediate vicinity (UST-2, UST-5, UST-6 and UST-7) have beryllium concentrations well below the GWQS.

The concentration of beryllium in MW-55, present in both samples (August; $3.5 \ \mu g/L$ and November; $3.68 \ \mu g/L$) collected since installing this well, is approximately 3 times the GWQS. This well, based on the interpreted overburden groundwater flow direction, is down gradient of Gold Run Pond. GM believes the beryllium in this well is representative of a plume emanating from the Pond and is due to an off-site source of beryllium entering the pond system.

Similar to arsenic, the beryllium in MW-45 is not considered representative of the groundwater in this area. As noted above, abandonment and re-installation of a well following soil remediation in AOI-1 is recommended.

Beryllium in UST-1 occurred in June (2.3 μ g/L) and October (2.6 μ g/L) in 2006. Since then, the highest concentration was 0.634 μ g/L in August 2008.

Beryllium in UST-13 ranges from an estimated 1.7 μ g/L (April 2007, the last time this well was sampled) to 5.9 μ g/L (March 2006). UST-13 is an overburden well. GM proposes to excavate soil in the vicinity of UST-13 (1H3h(v) of the RRAW) and analyze post-excavation samples for metals. GM will include beryllium in this analysis and compare the results to 1.2 mg/Kg.

Beryllium concentrations, like other metals (cadmium, chromium, lead, and nickel), in UST-9R have been increasing since June 2005. The reason for the increase is not currently understood. An analysis of water conditions indicates the pH is decreasing (from 7 to 5), the turbidity is increasing (from 9 NTU to 130 NTU), the oxidation-reduction potential has been increasing (-183 mV to +232 mV). Comparing these trends to nearby wells that have been demonstrated to be hydraulically linked to UST-9R (UST-3 and UST-11) during the summer 2006 packer tests indicates the trends are unique to UST-9R. Only one metal in the other two wells was reported above GWQS (lead, 7.4 μ g/L in UST-11, April 2007 – the last sampling event for this well); however, detection limits for both arsenic and beryllium in UST-3 and UST-11 have historically been above the GWQS. The pH, red/ox potential, and turbidity have been generally similar throughout the time period in UST-3 and UST-11 and different from UST-9R. As stated above, excavation in the immediate vicinity of UST-9R is not proposed. GM will monitor UST-9R following the proposed soil remediation to determine if groundwater quality in this well improves.

Excavations proposed in the northern portion of AOI-7 and the southern portion of AOI-6 will include post-excavation analysis for beryllium and the results will be compared to the higher of 1.2 mg/Kg or the concentration that does not cause leachate generated, using SPLP, to exceed the leachate guidance (13 μ g/L or site-specific value, if higher). All other post-excavation samples analyzed for beryllium will be compared to the Residential SRS (16 mg/Kg).



Cadmium

Cadmium exceeded the GWQS (4 μ g/L) at the following locations and dates:

- MW-2 5 of the 10 sampling events. The maximum concentration detected (15.4 μ g/L) occurred April 2008 and the groundwater concentration was below the GWQS in August 2008 (2.4 μ g/L).
- MW-7 only June 2005 (4.2 μ g/L) in 10 sampling events between June 2005 and August 2008.
- UST-9R 4 of the 10 sampling events. The maximum concentration (15.4 μ g/L) occurred April 2007 and the groundwater concentration was below the GWQS in August 2008 (2.08 μ g/L).

645 soil samples analyzed for cadmium including 40 duplicates from 385 locations around the Site (including multiple depths at multiple locations). Of these, the cadmium concentrations in 340 were not detected. Of those detected (305 samples), only eleven have exceeded the Residential SRS (78 mg/Kg).

The proposed excavation in Sludge Bed No. 4 (RRAW; 1H10a) would remove up to 4 feet of material from this Sludge Bed and extend the excavation to 6 feet at former sample location SB10-SO2. MW-2 is located in or in the vicinity of Sludge Bed No. 4. If evidence of limited sludge is found during the excavation, the excavation limits would be extended to remove the sludge. Post-excavation sampling would include metals, including cadmium.

GM recommends, as a revision to the RRAW (1H8), to remove the paint-like material (PLM) in the vicinity of B8-8. MW-7 is installed in or adjacent to this PLM. Delineation sampling in January 2008 of the PLM indicates soil around the PLM will likely meet IGW SRS calculated (1.2 mg/Kg) using the Partition Guidance (*Guidance Document Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation*; June 2008).

The source of cadmium at UST-9R is not known. Only limited soil samples have been analyzed for this metal from the area around this well. None of the other wells in the vicinity of UST-9R (up gradient, down gradient and cross-gradient) have cadmium above the GWQS. Since April 2007, the cadmium concentration has decreased to below the GWQS. GM will monitor groundwater in this well following the completion of the soil remediation proposed in the RRAW to evaluate the water quality. Provided the water in this well continues to be below the GWQS, no additional soil remediation for cadmium in this area will be required. Excavation in the vicinity of UST-9R is not proposed. See the beryllium discussion above for further information on the water quality in UST-9R.

Because the occurrences of cadmium in groundwater exceeding GWQS are at locations that are not physically near one another, cadmium in the soil does not appear to be a wide-spread issue at the Site. Removal of contaminated soil (including PLM and sludge) will likely be sufficient to remove the source of cadmium in the groundwater. GM proposes to use cadmium as a criterion for post-excavation comparison only in AOI 24 (PLM removal) and AOI 31 (Sludge Bed No. 4). GM proposes using the higher of 1.2 mg/Kg or soil concentration determined, using the Synthetic Precipitation Leaching Procedure (SPLP; *Guidance for the use of the Synthetic Precipitation*



Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards), that yields the higher of 52 μ g/L or as defined using Site-specific values as allowed in the Guidance as the relevant Remediation Goal for only the two areas in AOI 24 and AOI 31 noted above. Cadmium will be included in the post-excavation sample analysis at other AOIs, but the results will be compared to the Residential SRS (78 mg/Kg) at these areas because groundwater is not affected by cadmium at these areas.

Chromium

The GWQS for chromium (70 μ g/L) was exceeded at eight locations in August 2008 (MW-19, MW-42, MW-44 and MW-45; and MW-16B, MW-37A, MW-38, and MW-38A). In addition to these eight wells, the chromium GWQS was exceeded in two other wells during the period June 2005 to August 2008 (MW-15; last sampled April 2007) and UST-1.

693 soil samples analyzed for chromium. Of these, the chromium concentrations in only 5 were not detected. Of the samples with detectable concentrations (688 samples), the average concentration is 358 mg/Kg. None of the results exceed the Residential Chromium Guideline (120,000 mg/Kg) and only 15 exceed the recommended screening criterion to further evaluate for Cr^{+6} (2,000 mg/Kg).

Chromium was identified in the drums that had been buried east of Gold Run (AOI-31). The predominant material identified in the drums was barium chromate (BaCrO₄; paint sludge). A composite sample of excavated soil from this area contained 455 mg/Kg chromium. Grab samples of soil between the drums contained from 3,230 mg/Kg to 18,800 mg/Kg. Water removed from the excavation contained 400 μ g/L chromium. Following removal of the drums and contaminated soil, the post-excavation samples from this excavation contained less than 40 mg/Kg total chromium.

Chromium is identified in the sediment in Gold Run Pond ranging from less than 10 mg/Kg (S11-5, near the eastern shore where the eastern-Parkway Avenue storm sewer enters the Pond) to 5,880 mg/Kg (PS-23, near the middle of the Pond). The concentration in the sediment near the outfall of the western Parkway Avenue storm sewer is 64 mg/Kg. The source of the chromium in the Pond sediment is not known.

Chrome does not have a SRS for Residential or IGW. GM has proposed using $Cr^{+6}/Total$ Chrome as a remediation goal. Per the NJDEP Guidance for chromium¹, the Residential remediation goal for total chromium is 120,000 mg/Kg. Based on the analysis of Total Chromium to Cr^{+6} (RRAW), GM will screen remedial excavations, as proposed, for total chromium and will analyze sample locations for Cr^{+6} if the Total Chromium exceeds 2,000 mg/Kg. Additional remediation of areas exhibiting Cr^{+6} in excess of 240 mg/Kg is proposed. A GWQS for Cr^{+6} does not exist (New Jersey's Maximum Contaminant Level in drinking water for chromium is 100 μ g/L).

Based on the requirements of NJDEP and areas GM identified, removal of soil containing Cr^{+6} in excess of 240 mg/Kg has been proposed in the RRAW. GM did not propose a Remediation Goal for total chromium, but did indicate any total chrome

Summary of the Basis and Background of the Soil Cleanup Criteria for Trivalent and Hexavalent Chromium. New Jersey Department of Environmental Protection, Site Remediation Program. September 18, 1998. <u>http://www.nj.gov/dep/srp/siteinfo/chrome/b_b_sum.pdf</u>



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concentrations greater than 2,000 mg/Kg would trigger analysis for Cr^{+6} . This proposal includes excavation in "hot spots" defined by NJDEP under the slab, and sediment from Gold Run Pond.

The only well east of Gold Run that has had chromium detected in its groundwater samples in excess of the GWQS is MW-15. This well is located between Gold Run and the former drum burial area. This overburden well is constructed of 304-stainless steel. It is the only well east of Gold Run that is constructed with a stainless-steel, well screen. All the other wells in this vicinity (MW-15A, MW-21, MW-21A, MW-23, MW-24, MW-25, MW-33, MW-33A, MW-34, MW-34A, MW-35, and MW-35A) do not have concentrations of chromium above 70 μ g/L. According to an article in Ground Water Monitoring & Remediation, chromium can be leached from 304-stainless steel when the steel is in contact with groundwater.² Therefore, the water from this well is not likely representative of the overall groundwater quality and the well is not suitable for monitoring for chromium.

Chromium in UST-1 above the GWQS occurs only once (October 2006) at $151 \ \mu g/L$. UST-1 is the only well in the area southeast of the former building, also known as the underground-storage-tank area, with a chromium concentration exceeding GWQS during the period June 2005 to November 2008. The single event is considered anomalous. Because this well is in the immediate vicinity of the southeast corner of the slab (discussed below) and closer to this area than any of the other UST wells, GM believes the chromium in this well is likely from the activities in the former building. GM will continue to monitor UST-1 following the proposed soil remediation to occur below the slab to determine if the proposed source-removal activity in this area results in a lowering of the chromium concentration in this well. See the next paragraph regarding post-excavation sampling below the slab.

Chromium exceeds the GWQS in wells installed through and adjacent to the former plant floor slab (MW-19, MW-42, MW-44 and MW-45). With the exception of MW-19, these wells were installed in 2008 and do not have a history of sampling and analysis. MW-44 exhibits the highest concentration of chromium in any of the Site wells (greater than 10,000 μ g/L). MW-44 was installed in the vicinity of Former Plater Pit No. 7 and is co-located where temporary well point XWG4 was placed. The proposed remediation of this area (RRAW: 1H1a (iii)) includes excavation of this "hot spot" and post-excavation sampling with analysis including total and Cr^{+6} . See the discussion concerning MW-45 in "Arsenic" above. MW-42 is in the vicinity of a discontinuity in lateral L-4. The proposed remediation in this area (RRAW: 1H1d (ii)) is to excavate contaminated soil along this lateral to a depth of 8 feet or bedrock. As a revision to the RRAW, GM proposes adding total chromium (with contingency for Cr^{+6}) to the post-excavation soil samples for this AOI (AOI 1-18). The concentration in MW-19 is two orders-of-magnitude lower than at MW-44 and is thought to represent the chromium plume in the southeast corner of the former manufacturing area (considered to be defined by roof columns U and 32 to the southern and eastern walls of the building). GM will continue to monitor MW-19 following the proposed soil



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Nickel and Chromium in Ground Water Samples as Influenced by Well Construction and Sampling Methods, Ground Water Monitoring & Remediation, Volume 16 Issue 1, Pages 93 – 99, D. Oakley, N.E. Korte http://www3.interscience.wiley.com/journal/119956962

remediation in AOI 1 to determine if the proposed source-removal activity in this area results in a lowering of the chromium concentration in this well.

Chromium has exceeded the GWQS to the west of Gold Run Pond in monitoring wells MW-16B, MW-37A, MW-38 and MW-38A since they were installed. These wells are relatively new, and the oldest of them, MW-37A and MW-38, were first sampled in August 2007. Chromium in these wells has likely entered the groundwater from the chromium in the Pond sediment. The proposed remediation of this area (RRAW: 1H11a) includes removal of the contaminated sediment to the bottom of contamination or bedrock and analysis of post-excavation samples collected from sidewalls (and bottom sediment if any remains above the bedrock) for metals including chromium. Based on the existing data for this AOI, the proposed remediation will likely remove a large portion of the chromium mass from this AOI. GM proposes monitoring these wells following remediation of this AOI (AOI 32) to determine if the proposed source-removal activity in this area results in a lowering of the chromium concentration in groundwater surrounding the Pond.

GM proposes to use the Residential Guidance value of 120,000 mg/Kg as the remediation goal. In addition, if the total chromium concentration exceeds 2,000 mg/Kg, GM will analyze soil from that location and interval for Cr^{+6} and compare the results to 240 mg/Kg.

Cobalt

Cobalt exceeded the Interim Specific GWQS (100 μ g/L) at the following well location and date:

MW-1A - only June 2006 (195 μ g/L) in 10 sampling events between June 2005 and August 2008.

166 soil samples have been analyzed for cobalt (including 13 duplicates) from 117 locations around the Site (including multiple depths at one or more locations). Cobalt was not detected in three samples. All detected cobalt concentrations have been between 0.8 (estimated) and 1,460 mg/Kg. None of the soil results exceed the Residential SRS (1,600 mg/Kg). Note: the non-Residential SRS for cobalt is more stringent than the residential (590 mg/Kg). Only one soil sample exceeds the more stringent standard.

The cobalt in groundwater data are generally, across the Site, less than the GWQS; with one exception that occurred more than two years ago. The cobalt in soil results are less than the IGW-SRS calculated using the Partition Guidance (59 mg/Kg) at all but 14 sampled locations. Of these 14, nine are located in the vicinity of AOI 11 (the former hazardous waste storage area). The other five are in the vicinity of four different plater pits under the former plant floor slab.

The June 2006 reported concentration for MW-1A exceeding the cobalt GWQS is considered anomalous. All other results in samples collected from MW-1A, before and after, have been at least one order-of-magnitude lower than the June 2006 result. Therefore, GM does not consider cobalt to be adversely affecting groundwater quality.

Because cobalt is not adversely affecting groundwater quality, the cobalt in soil is not in sufficient concentration or mass to be considered detrimental to groundwater quality.



GM proposes to exclude cobalt in the "Site Metals" for post-excavation sample analysis.

Lead

Lead exceeds the GWQS (5 μ g/L) at MW-45 and MW-53 in August 2008. In addition, lead has exceeded its GWQS at numerous other wells during historical sampling: MW-4, MW-4A, MW-5, MW-6, MW-6A, MW-7A, MW-9, MW-9A, MW-11, MW-11A, MW-16A, MW-20, UST-1, UST-2, UST-7, UST-9R, and UST-11. Many of these have only exhibited one exceedance during the June 2005 to November 2008 interval (all, except: MW-4, MW-11, MW-11A, MW-20, MW-45, UST-2, UST-7 and UST-9R).

The USTs formerly located southeast of the southeast corner of the former manufacturing building included tanks that held leaded gasoline. Lead was used as electrodes in the plating process and a lead-based material was plated onto some metal parts for corrosion protection prior to other surface coating. The highest lead concentration in soil is 10,600 mg/Kg in the vicinity of Plater Pit No. 6.

Lead is detected in soil at random depths, including at greater depths where shallower soils are lower in concentration, in the vicinity of the former Hazardous Waste storage pad (AOI 11). This is true in other areas, such as in the vicinity of the oil water separators (AOI-23) and along the exposed face of the fill (northern bank of the southern swale).

823 soil samples (including 51 field duplicates) have been tested for lead. Of the 823 samples, 750 samples exhibited detectable concentrations. Of the 750, only 64 have exceeded the Residential-SRS (400 mg/Kg). Of the 750 samples exhibiting detectable concentrations, the average lead-concentration is 184 mg/Kg.

The occurrence of lead in the UST wells is likely from releases of leaded gasoline in the vicinity of these wells. Concentrations exceeding GWQS are low level (at or only slightly above the GWQS – the highest concentration in one of the UST wells is $11.2 \ \mu g/L$ in UST-9R in October 2006). The RRAW does not include active remediation of soil in the former UST-area (AOI-10). GM proposed including the soil in this AOI in the Deed Notice. GM will continue to monitor UST-2 as a representative well for this AOI for lead.

The occurrence of lead in groundwater, other than the UST area, appears to be focused on two areas: south of the oil/water separators (MW-7A, MW-11, MW-11A, and MW-53) and in the vicinity of Sludge Bed Nos. 1 and 2 (MW-4, MW-4A, MW-5, MW-6, and MW-6A).

The single concentration exceeding GWQS (April 2007; 9 μ g/L) in MW-16A is an anomaly for this well and the detectable concentrations of lead in this well is likely attributable to Parkway Avenue roadway runoff. Similarly, the single concentration exceeding GWQS in MW-30 (April 2007, 6.8 μ g/L) and the two concentrations exceeding GWQS in MW-20 (June 2006, 12.5 μ g/L and April 2008, 5.75 μ g/L) are not in areas of known lead use. The exceeding concentrations do not occur consistently, and the concentrations are only slightly over the GWQS. Therefore, these three wells are not representative of groundwater contamination by lead.



The concentration of lead in the groundwater wells in or adjacent to the sludge beds, noted above, only slightly exceeds the GWQS (5.6 to $15.2 \mu g/L$). Other than the $15.2 \mu g/L$ (MW-6, October 2006), the highest concentration of lead in this area is 7.6 $\mu g/L$. GM proposes to remove the top 4 feet of soil from the former sludge beds (RRAW: 1H10a) with localized excavations to 6 feet. Minimal amounts of sludge found during this excavation event will also be removed. If large amounts (more than 10% of the soil-volume proposed to be excavated in this AOI) of sludge are found, the sludge will be evaluated as a separate matrix using SPLP (lead analysis) to determine if leaving this material will adversely affect the groundwater. GM proposes to monitor the wells noted above following soil remediation to determine if the proposed source-removal activity in this area results in lowering of the lead concentrations in these wells.

The lead in the wells south of the oil-water separator noted above is slightly higher in concentration than in the wells in or near Sludge Beds Nos. 1 and 2 (6 to 71.3 μ g/L). Except for the 71.3 μ g/L at MW-53 in August 2008, the next highest concentration is 22.3 μ g/L (MW-11; September 2005). Although only two data points exist for MW-53, the August 2008 groundwater sample is not likely representative of the groundwater quality. According to the field notes, the sample from this well was turbid (236 NTU) and reducing (-105.3 mV) when compared to April (17.6 NTU and -57.4 mV). The concentration of lead in April 2008 in MW-53 was 0.9 μ g/L (estimated). GM proposes to continue monitoring this location following soil remediation of AOI-23.

Of the wells MW-7A, MW-11 and MW-11A, MW-11 most consistently exhibits lead above the GWQS (6 times of 9 events from June 2005 to August 2008), compared to 3 of 10 and 1of 10 for MW-11A and MW-7A, respectively. The proposed remediation of this area varies based on the portion of the AOI. For the new oil/water separator, the proposal is to include this area in the Deed Notice and not perform active remediation (RRAW: 1H8a). Around the old oil/water separator and former above ground oil storage tank, the proposal is removal of the top four to six feet (RRAW: 1H8o). GM proposes to include lead in the post-excavation sampling in AOI 23. GM will continue monitoring groundwater down gradient of the area of soil to be remediated, as represented by these wells, to determine if the proposed sourceremoval activity in this area results in lowering of the lead concentrations in these wells.

Post-excavation sample analyses will include lead as noted in the RRAW. Site-wide, the lead results will be compared to the Residential SRS (400 mg/Kg) except at excavations at the old oil/water separator in AOI 23 and Sludge Beds 1 & 2 in AOI 31. Only at these specific locations, GM will compare the post-excavation sample results to the higher of 59 mg/Kg or the concentration that does not cause leachate generated, using SPLP, to exceed the leachate guidance (65 μ g/L or site-specific value, if higher).

Nickel

Nickel exceeds the GWQS (100 μ g/L) in five wells in August 2008: MW-7, MW-18A, MW-44, MW-45, and UST-9R. In addition to these locations, historical sample results include nickel above the GWQS in MW-1A and MW-22A (June 2006), MW-53 (April 2008), and MW-9 (December 2005 and December 2006). Nickel was also detected in MW-8 in 7 of 8 sampling events. However, as noted above for



antimony, data from MW-8 is not considered representative of groundwater quality due to construction and placement of the well resulting in anomalous water levels and suspect chemistry results.

743 soil samples (including 46 field duplicates) have been tested for nickel. Of the 743 samples, 737 samples exhibited detectable concentrations. Of the 737, only 40 have exceeded the Residential-SRS (1,600 mg/Kg). Of the 691 samples exhibiting detectable concentrations, the average nickel-concentration is 466 mg/Kg.

The June 2006 results for groundwater samples collected from MW-1A and MW-22A are, at least, one order-of-magnitude higher in concentration than the other results from these two wells. MW-1A and MW-22A are not in the same area; MW-1A is north of Sludge Bed No. 4 (south of Gold Run Pond, west of Gold Run) and MW-22A is south of Sludge Bed 5 (near southern property line). Therefore, the June 2006-data from these two wells do not likely represent the groundwater in these two areas, but instead are anomalous.

The concentration of nickel in MW-7 (116 μ g/L) slightly exceeds GWQS and is the only such result in 10 events for this location. GM will monitor the groundwater in this well following remediation of AOI 23 to determine if the proposed source-removal activity in this area results in lowering of the nickel concentration in this well.

The concentration of nickel in MW-9 ($120 \ \mu g/L$, December 2005, and $145 \ \mu g/L$, December 2006) represent two concentrations above GWQS in only three sampling events in this well during the period June 2005 to November 2008. This well was last sampled in April 2007 ($41.1 \ \mu g/L$). More frequent sampling of this well prior to April 2007 has been hindered by insufficient water in the well. Because of this condition, this well was not included in post-April 2007 sampling events. MW-9 is down gradient of the former Hazardous Waste storage pad (AOI 11). The proposed remediation for AOI 11 is removal of up to 6 feet of contaminated soil (RAW: 1H4d) and analysis of post-excavation samples for metals, including nickel. GM will continue to monitor MW-9, provided there is sufficient water, for nickel following soil remediation activities in AOI 11.

The concentration of nickel reported in MW-18A (109 μ g/L) for August 2008 is slightly above the GWQS, while the April 2008 result is below GWQS. The lower pH and higher temperature in August, compared to April may explain the increased nickel concentration in this well between these two sampling events. GM does not propose specific excavation activities in the immediate vicinity of this well. Excavation in AOI 1 (the former manufacturing building) is proposed. Post-excavation sampling in AOI 1 will include analysis for nickel. GM will continue to monitor MW-18A for nickel following soil remediation activities at the Site.

The concentration of nickel in MW-44 (3,790 μ g/L in April 2008 and 4,620 μ g/L in August 2008) is the highest for on-site monitoring wells. As noted above (see Chromium), MW-44 is in the vicinity of Former Plater Pit No. 7. The proposed remediation of this area (RRAW: 1H1a (iii)) includes excavation of this "hot spot" and post-excavation sampling with analysis including nickel. Other areas of AOI 1 will also be excavated and post-excavation soil samples will be analyzed for nickel.



The groundwater-results from MW-45 are not considered to be representative of overall Site groundwater conditions in this area. See the discussion concerning MW-45 in "Arsenic" above.

Nickel in UST-9R has exceeded the GWQS in the last five sampling events (since October 2006). As noted above (Beryllium), the reason for the increasing trend for metals in this well is not fully understood. Also, as noted above, GM does not propose any specific active remediation in the vicinity of UST-9R. Remediation in the northern portion of AOI 7 and the southern portion of AOI 6 will include post-excavation sampling and analysis of these samples will include nickel. GM will continue to monitor UST-9R for nickel following soil remediation activities in AOIs 6 and 7.

GM proposes using the higher of 31 mg/Kg or the concentration determined using the SPLP Guidance (the higher of 1,300 μ g/L or as defined using Site specific values as allowed in the Guidance) as the relevant Remediation Goal for nickel for AOIs 1, southern AOI 6 and northern AOI 7, 11, and 24 (PLM). For the remainder of the samples tested for nickel, the results will be compared to the Residential SRS (1,600 mg/Kg).

Thallium

Thallium exceeded the GWQS (2.0 μ g/L) at the following locations and dates:

- MW-4 only June 2005 (4.9 μ g/L) in 10 sampling events between June 2005 and August 2008.
- MW-11A only June 2006 (4.9 μ g/L) in 10 sampling events between June 2005 and August 2008.
- UST-2 only June 2006 (4.8 μ g/L) in 8 sampling events between June 2005 and April 2007. This well was not sampled during the 2008 sampling events.

592 soil samples have been analyzed for thallium (including 36 duplicates) from 342 locations around the Site (including multiple depths at one or more locations). Thallium was not detected at all but 23 unique samples. All detected thallium concentrations have been less than the Residential SRS (5 mg/Kg): 2.2 mg/Kg or less (0.33 to 2.2 mg/Kg).

The concentrations of thallium in groundwater are generally, across the Site, less than the GWQS. The only concentrations exceeding the GWQS were geographically isolated and occurred more than two years ago. Therefore, GM does not consider thallium to be adversely affecting groundwater quality. All detected thallium soil results are less than the IGW-SRS calculated using the Partition Guidance (3 mg/Kg).

Because thallium is not adversely affecting groundwater quality, the thallium in soil is not in sufficient concentration or mass to be considered detrimental to groundwater quality. Therefore, the presence of 2.2 mg/Kg of thallium is not affecting groundwater. Because thallium in soil is not affecting groundwater quality and the maximum concentration in soil is less than the Residential SRS, GM proposes to exclude thallium in the Site Metals for post-excavation sample analysis.



Zinc

Zinc exceeded the GWQS (2,000 μ g/L) at the following locations and dates:

- MW-7 only June 2005 (2,370 μ g/L) in 10 sampling events between June 2005 and August 2008.
- MW-48 only April 2008 (3,000 μ g/L) in 2 sampling events between April 2008 and August 2008.

774 soil samples have been analyzed for zinc (including 48 duplicates) from 458 locations around the Site (including multiple depths at one or more locations). Of the 774 samples, only seven were non-detect. Of the 767 samples exhibiting detected concentrations, only 12 have exceeded the Residential SRS (23,000 mg/Kg).

The June 2005 concentration of zinc in groundwater in MW-7 is only slightly (less than 20%) above the GWQS and is one to two orders-of-magnitude higher than subsequent concentrations at this location. The most recent result (August 2008) for MW-7 was 224 μ g/L. The sampler noted the June 2005 sample was slightly turbid. Subsequent samples were not so noted. Therefore, GM believes the June 2005 result represents an anomaly in this data set.

MW-48 has only been sampled twice. The first event, approximately 2-1/2 months after installation, yielded a concentration of 3,000 μ g/L. Zinc was not detected (9.33 μ g/L detection limit) in the groundwater sample collected from MW-48 in August 2008. The first result likely included interference from the well-installation activity and the second result is considered representative of actual conditions.

Soil quality data were not collected in the vicinity of MW-48. However, due to the concentration of zinc in groundwater during August 2008 at MW-48, soil in this vicinity does not appear to be contributing to degradation of the groundwater quality. Remediation of soil in this Area of Interest (AOI) is not proposed in the RRAW.

Although zinc does not appear to exceed the GWQS in MW-7, as noted above, GM recommends removing the paint-like material (PLM) in the vicinity of B8-8. MW-7 is installed in or adjacent to this PLM. Based on soil sampling in July 1998 and January 2008, the removal of the PLM will likely remove the bulk of the mass of the zinc in this area. GM proposes to analyze the post-excavation soil samples from this AOI (AOI 24 - PLM) for zinc. GM proposes using the higher of 600 mg/Kg or the concentration determined using the SPLP Guidance (the higher of 26,000 μ g/L or as defined using Site-specific values as allowed in the Guidance) as the relevant Remediation Goal for this AOI only.

Because zinc is a Site-MoC, GM proposes testing post-excavation soil samples at all excavations for zinc. However, because the Site groundwater is generally below the GWQS for zinc, GM believes the zinc in the soil is not degrading groundwater quality. Therefore, except as noted above in AOI 24, GM will compare the post-excavation results to the Residential SRS (23,000 mg/Kg) to determine if the remediation is complete or if an area needs to be included in the Site Deed Notice.



Cyanide

Cyanide exceeds the GWQS (100 μ g/L) at the following well location and date:

• MW-11 - only October 1998 (1,300 μ g/L) in 3 sampling events between February 1994 and October 2002.

Total cyanide in soil has been analyzed in 287 samples (including 18 duplicates) from 145 locations around the Site, including multiple depths at one or more locations. Cyanide was not detected in 180 samples. Of the 89 detections for cyanide, the soil results are less than the IGW-SRS calculated using the Partition Guidance (13 mg/Kg) at 66 sampled locations. The concentrations of cyanide in 22 samples were between the Partition Guidance and the Residential SRS (1,600 mg/Kg) and only 1 sample exceeded the Residential SRS (near Plater Pit No. 5; 9,960 mg/Kg) The next highest concentration in soil (291 mg/Kg) is also in the vicinity of this Plater Pit.

The cyanide in groundwater data (1994 to 2007) are generally, across the Site, below detection (10 μ g/L); In addition to the one exception that occurred more than ten years ago, noted above, only two other samples of a total of 95 samples reported detectable levels of cyanide (10 μ g/L).

The single concentration of cyanide exceeding GWQS is considered anomalous. All other results in MW-11, before and after, have indicated cyanide is not detectable. As noted above, the single exceedance is the only result greater than 10 μ g/L. Therefore, we do not consider cyanide in soil to be adversely affecting groundwater quality.

Because cyanide is not adversely affecting groundwater quality, the cyanide in soil is not in sufficient concentration or mass to be considered a threat to groundwater quality. Also, because cyanide does not exceed the Residential SRS except for at one location, GM does not consider cyanide to be a Site chemical of concern and proposes not including it Site-wide in the post-excavation soil sample analyses. Because it was found at 9,960 mg/Kg in soil in the vicinity of Plater Pit No. 5, GM will include cyanide as a post-excavation parameter at this area only. Cyanide was not detected in the only groundwater sampling in the vicinity of Plater Pit No. 5 (TWPs XWG-1, -2 and -3). Therefore, GM proposes to compare the results from this post-excavation sampling to the Residential SRS (1,600 mg/Kg).

Attachments Tables Figures

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TABLES

Metal	IGW-SRS	Basis	Post-excavation Criteria
Antimony	Not Required	Only limited, isolated, historical results exceeding GWQS. Groundwater not adversely affected by this substance. Maximum Soil	31 mg/Kg (Residential-SRS) Site-wide
		Conc.: 487 mg/Kg	
Arsenic	19 mg/Kg	State-wide Background	19 mg/Kg Site-wide
Barium	Not Required	No concentrations exceeding GWQS since June 2005. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 16,000 mg/Kg	No post-excavation evaluation for Barium.
Beryllium	The higher of: • soil yielding 13 μ g/L ¹ in SPLP Leachate • 1.2 mg/Kg	SPLP Guidance ² Site background	16 (Residential-SRS) site-wide, except southern AOI 6 and northern AOI 7 where IGW will be used.
Cadmium	The higher of: • soil yielding 52 μ g/L ¹ in SPLP Leachate • 1.2 mg/Kg	SPLP Guidance ² Partition Guidance ³	78mg/Kg Site-wide, except southern AOI 6 and northern AOI 7, PLM in AOI-24 and Sludge Bed 4 in AOI-31. Use IGW-SRS in these areas only.
Chromium	No specific IGW-Goal for total chromium	RRAW	Site-wide: Test for Cr^{+6} when total chromium exceeds 2,000 mg/Kg 240 mg/Kg for Cr^{+6}
Cobalt	Not Required	Only a single historical result exceeding GWQS. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 1,460 mg/Kg	No post-excavation evaluation proposed for Cobalt.
Copper	Not Required	No concentrations exceeding GWQS since June 2005. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 46,700 mg/Kg	Site –wide Residential-SRS (3,100 mg/Kg)
Lead	 The higher of: soil yielding 65 μg/L¹ in SPLP Leachate 59 mg/Kg 	SPLP Guidance ² Partition Guidance ³	400 mg/Kg (Residential-SRS) Site- wide, except the old oil/water separator in AOI 23 and Sludge Beds 1 & 2 in AOI 31. Use IGW in these areas only.
Mercury	Not Required	No concentrations exceeding GWQS since June 2005. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 6.4 mg/Kg	No post-excavation evaluation proposed for Mercury.

TABLE 1: Proposed IGW soil values for 1445 Parkway Avenue, Ewing, New Jersey



TABLE 1 (CONT)

Metal	IGW-SRS	Basis	Post-excavation Criteria
Nickel	The higher of: • soil yielding 1,300 µg/L ¹ in SPLP	SPLP Guidance ²	1600 mg/Kg (Residential-SRS) site- wide, except AOIs 1, southern AOI 6 and northern AOI 7, 11, and 24
	Leachate		(PLM). Use IGW in these areas only.
	• 31 mg/Kg	Partition Guidance ³	
Selenium	Not Required	No concentrations exceeding GWQS since June 2005. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 41.4 mg/Kg	No post-excavation evaluation proposed for Selenium.
Silver	Not Required	No concentrations exceeding GWQS since June 2005. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 110 mg/Kg	No post-excavation evaluation proposed for Silver.
Thallium	Not Required	Only limited, isolated, historical results exceeding GWQS. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 2.2 mg/Kg (detected)	No post-excavation evaluation proposed for Thallium.
Zinc	The higher of: • soil yielding 26,000 µg/L ¹ in SPLP Leachate • 600 mg/Kg	Only limited, isolated, historical results exceed GWQS. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 101,000 mg/Kg	Site-wide: Residential-SRS (23,000 mg/Kg), except for AOI-24 (removal of PLM)
Cyanide	Not Required.	Only a single historical result exceeding GWQS. Groundwater not adversely affected by this substance. Maximum Soil Conc.: 9,960 mg/Kg	Site-wide: Residential-SRS (1,600 mg/Kg).

1) Or a higher value using Site-specific values.

2) Guidance for the use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards; June 2008

3) Guidance Document Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation; June 2008

4) This analysis does not include the Temporary Well Point (TWP) sample results

Because barium, cobalt, mercury, selenium, silver, thallium, and vanadium are not generating an adverse affect on the groundwater quality and do not exceed a residential direct contact or inhalation-based SRS, GM proposes to remove these metals from the "Site Metals" and will not include these metals in post-excavation samples analyses. Based on no affect on groundwater and only one soil-sample location exceeding the Residential SRS, GM proposes excluding cyanide in any post-excavation sample analysis also. The remaining "Site Metals", therefore, are: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel and zinc.



Table II Summary of Application of IGW-SRS By AOI and Metal

AOI	Metal	IGW-SRS
6 (southern portion) and 7 (northern portion)	Beryllium	Higher of 1.2 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 13 μ g/L ²
	Nickel	Higher of 31 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 1,300 μ g/L ²
24 (Paint Like Material)	Cadmium	Higher of 1.2 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 52 μ g/L ²
	Nickel	Higher of 31 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 1,300 μ g/L ²
	Zinc	Higher of 600 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 26,000 μ g/L ²
31 (Sludge Bed No. 4)	Cadmium	Higher of 1.2 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 52 μ g/L ²
23 (Old Oil Water Separator)	Lead	Higher of 59 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 65 μ g/L ²
31 (Sludge Beds 1 and 2)	Lead	Higher of 59 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 65 μ g/L ²
1, 11	Nickel	Higher of 31 mg/Kg or soil concentration resulting in SPLP ¹ leachate concentration of 1,300 μ g/L ²

Notes:

Synthetic Precipitation Leaching Procedure; EPA Method 1312
 Standard derived using Generic Dilution Attenuation Factor (DAF) of 13. If Site-Specific DAF is higher, the target SPLP concentration will be higher.



Table IIIMinimal Groundwater Investigation Following Soil Remediation

Well	Action	Analysis
7	Reinstall Following Soil Remediation	Cadmium, Nickel, Zinc
7A	Reinstall Following Soil Remediation	Lead
9		Nickel
11	Reinstall Following Soil Remediation	Lead
11A	Reinstall Following Soil Remediation	Lead
18A		Nickel
30	Reinstall Following Soil Remediation	Arsenic
45	Abandon and Install Modified Well	Arsenic, Beryllium, Nickel
48		Zinc
53	Reinstall, if necessary	Beryllium, Lead
UST-2		Lead
UST-9R		Beryllium, Cadmium, Chromium, Lead, Nickel







DEED REFERENCE : DEED BOOK 4512, PAGE 252 & C.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED. MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870 N.J. LAND SURVEYOR LIC. NO. 26791 NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.



SCALE IN FEET

600

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

ANTIMONY EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009





NOTES:

GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & C.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

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LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.



SCALE IN FEET

600

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070



SCALE: AS SHOWN FEBRUARY 2009



	0	MW-1A 10 2	SAMPLE LOCATION TOTAL NUMBER OF SAMPLING EVENTS EVENTS EXCEEDED GWQS
	0	NOT E	EXCEEDED
	•	EXCE	EDED ONCE
	0	EXCE	EDED 2 TO 3 TIMES
	0	EXCE	EDED 4 TO 6 TIMES
	•	EXCE	EDED 7 + TIMES
/		AREAS BE US	S WHERE IGW-SRS WILL ED

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & C.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY,NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

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NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

- 2. GWQS NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.
- 3. IGW-SRS SITE SPECIFIC IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD.



SCALE IN FEET

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

BERYLLIUM EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009



	0	MW-1A 10 2	SAMPLE LOCATION TOTAL NUMBER OF SAMPLING EVENTS EVENTS EXCEEDED GWQS	
	0	NOT E	EXCEEDED	
	ightarrow	EXCEEDED ONCE		
	0	EXCEEDED 2 TO 3 TIMES		
	0	EXCE	EDED 4 TO 6 TIMES	
	•	EXCEEDED 7 + TIMES		
/		AREAS BE US	S WHERE IGW-SRS WILL ED	

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED. MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870 N.J. LAND SURVEYOR LIC. NO. 26791 NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

- BENCH MARK N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983) 2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.
- 3. IGW-SRS SITE SPECIFIC IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD.

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SCALE IN FEET

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HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

CADMIUM EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & C.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

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LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.

300

SCALE IN FEET

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

TOTAL CHROMIUM EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009

FIGURE 5

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1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1

ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.

SCALE IN FEET

600

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

SCALE: AS SHOWN FEBRUARY 2009

0	MW-1A 10 2	SAMPLE LOCATION TOTAL NUMBER OF SAMPLING EVENTS EVENTS EXCEEDED GWQS
0	NOT E	EXCEEDED
•	EXCE	EDED ONCE
0	EXCE	EDED 2 TO 3 TIMES
0	EXCE	EDED 4 TO 6 TIMES
•	EXCE	EDED 7 + TIMES
	AREAS BE US	3 WHERE IGW-SRS WILL ED

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

- 2. GWQS NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.
- 3. IGW-SRS SITE SPECIFIC IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD.

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

LEAD EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009

0	MW-1A 10 2	SAMPLE LOCATION TOTAL NUMBER OF SAMPLING EVENTS EVENTS EXCEEDED GWQS
igodot	NOT E	XCEEDED
ightarrow	EXCE	EDED ONCE
0	EXCE	EDED 2 TO 3 TIMES
0	EXCE	EDED 4 TO 6 TIMES
•	EXCE	EDED 7 + TIMES
	AREAS BE US	3 WHERE IGW-SRS WILL ED

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & C.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY,NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED. MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870 N.J. LAND SURVEYOR LIC. NO. 26791

NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

- 2. GWQS NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.
- 3. IGW-SRS SITE SPECIFIC IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD.

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

NICKEL EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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LAST REVISED OCTOBER 21, 2008

NEW JERSEY"

BENCH MARK - N.J.G.S. MON. 11 B 1

ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

2. GWQS - NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.

SCALE IN FEET

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

SCALE: AS SHOWN FEBRUARY 2009

FIGURE 9

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0	MW-1A 10 2	SAMPLE LOCATION TOTAL NUMBER OF SAMPLING EVENTS EVENTS EXCEEDED GWQS	
0	NOT E	NOT EXCEEDED	
•	EXCE	EXCEEDED ONCE	
0	EXCE	EXCEEDED 2 TO 3 TIMES	
0	EXCE	EXCEEDED 4 TO 6 TIMES	
•	EXCE	EXCEEDED 7 + TIMES	
AREAS WHERE IGW-SRS WILL BE USED			

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1 ELEVATION 131.49' (NAVD 1988) HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

- 2. GWQS NEW JERSEY GROUNDWATER QUALITY STANDARDS, AS PUBLISHED IN N.J.A.C. 7:9C.
- 3. IGW-SRS SITE SPECIFIC IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD.

HALEY& GENERAL MOTORS CORPORATION TRENTON, NEW JERSEY ISRA CASE NO. E97070

ZINC EXCEEDANCES IN GROUNDWATER (JUNE 2005 TO NOVEMBER 2008)

SCALE: AS SHOWN FEBRUARY 2009