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ENVIRONMENT

Ms. Alicia Barraza
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste and Corrective Action
625 Broadway
Albany, New York 12233-7258

Subject:
Bayer MaterialScience LLC
125 New South Road – Hicksville, New York
Corrective Measures Study Work Plan
USEPA ID#: NYD002920312

Date:
April 2, 2008

Contact:
John C. Brussel, PE

Phone:
315.671.9441

Email:
John.Brussel@arcadis-us.com

Our ref:
B0032309 #5

Dear Ms. Barraza:

On behalf of Bayer MaterialScience LLC (Bayer), this letter presents the Corrective Measures Study (CMS) Work Plan for the CMS to be completed for the Bayer facility located in Hicksville, New York (the "site"). This CMS Work Plan outlines the approach for the CMS to address environmental conditions at the Site under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program, and is intended to facilitate preparation and review of the CMS Report. The CMS Work Plan also describes proposed additional soil sampling activities to further delineate the extent of polychlorinated biphenyl (PCB) impacted soils in certain portions of the site to provide data needed for completing the CMS Report. The Work Plan has been prepared in accordance with guidance provided in the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A, *Final RCRA Corrective Action Plan*, dated May 1994.

Environmental conditions at the site have been evaluated by the sampling and analysis performed in connection with the two-phase RCRA Facility Investigation (RFI) completed in 2004, the interim corrective measure (ICM) activities completed in 2005 and 2006, the foundation demolition activities performed in 2005 and 2006, follow-up soil sampling activities (Phase I through Phase VI soil sampling activities) completed in 2006 and 2007, and the soil vapor investigation completed in 2007. Based on the results of these investigation and remedial activities, certain soils and soil vapor at the site are impacted, as described below.

- Soils within 35 previously-identified Areas of Concern (AOCs) exhibit one or more chemical constituents (polychlorinated biphenyls [PCBs], volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], or inorganic constituents) at concentrations exceeding the soil guidance values presented in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum titled *Determination of Soil Cleanup Levels and Cleanup Objectives*, HWR-94-4046, dated January 24, 1994 (TAGM 4046).

- Soil vapors at various locations across the site contain elevated VOC concentrations.

This CMS Work Plan is organized into the following subsections:

- Background.
- Purpose and Objectives.
- Potential Corrective Measure Technologies and/or Alternatives.
- Evaluation of Potential Corrective Measures.
- Proposed Additional PCB Delineation Soil Sampling Activities.
- Proposed Pilot or Bench Scale Studies.
- Outline for the CMS Report.
- Schedule.

I. BACKGROUND

Based on the results of the previous investigation and remedial activities, the nature and extent of constituents of interest in onsite soil and soil vapor is generally understood. As indicated above, additional soil sampling will be performed to delineate the extent of PCB-impacted soils in certain portions of the site (primarily within the Pilot Plant footprint and to the northwest of the Pilot Plant footprint). Additional soil vapor sampling will be performed at certain locations (as described in a February 28, 2008 letter from ARCADIS to the NYSDEC and in forthcoming

correspondence in response to NYSDEC comments) to further evaluate the presence and distribution of VOCs in soil vapor.

In support of the CMS, a qualitative human health exposure evaluation has been completed for the site using the existing site data and the New York State Department of Health (NYSDOH) guidelines presented in Appendix 3B of the NYSDEC "draft" document titled DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002. The Human Health Exposure Evaluation is included as Attachment A to this CMS Work Plan. As indicated in the attached Human Health Exposure Evaluation, the following complete exposure pathways have been identified:

- *Current/Future Trespasser* – Although the site is surrounded by a locked chain-link fence, the potential still exists for trespassers to access the site. Exposure of trespassers would likely be infrequent and of relatively short duration. Under current conditions, trespassers may be exposed to constituents of interest in surface soil via dermal contact, incidental ingestion, and/or inhalation of soil particulates.

- *Future Maintenance Worker* – There are no current ongoing maintenance activities at the site. However, if the site is redeveloped, maintenance workers (outdoor workers) may be exposed to constituents of interest in surface soil via incidental ingestion, dermal contact, and/or inhalation of soil particulates during non-intrusive activities such as mowing.

- *Future Site Worker* – The site is expected to be redeveloped for possible commercial/industrial land use. Future workers (indoor workers) may be exposed to constituents of interest in surface soil via dermal contact, incidental ingestion, and/or inhalation of soil particulates during non-intrusive activities. Additionally, if a commercial or industrial building were to be constructed in the future, indoor air could present a potentially complete exposure pathway based on soil vapor concentrations at the site.

- *Future Construction Worker* – Because the site is expected to be redeveloped in the future, construction workers represent a receptor population that may be exposed to constituents of interest in surface and subsurface soil via incidental ingestion, dermal contact, and/or inhalation of soil particulates during intrusive activities. Additionally, construction workers could be exposed to VOCs in ambient air (soil vapors) during a trenching scenario.

II. PURPOSE AND OBJECTIVES

A CMS will be conducted to evaluate potential final corrective measure alternatives to address elevated levels of chemical constituents in onsite soil and soil vapor, thereby addressing potentially complete exposure pathways. The CMS will also identify a recommended alternative that is protective of human health and the environment and appropriate for the intended commercial/industrial future site use.

Corrective measure objectives have been developed for the CMS considering the results of the qualitative human health exposure evaluation, potentially-applicable standards/criteria/guidance, and intended future site use. Qualitative corrective measure objectives established for the Site are as follows:

- Prevent/mitigate potential future exposure of commercial/industrial workers at the Site to soil containing elevated levels of constituents of interest or exposure to other populations via wind-blown dust.

- Prevent/mitigate exposure to VOCs potentially migrating through soil vapor at the Site.

The proposed corrective measures will address each AOC at the Site where PCBs, VOCs, SVOCs, and/or inorganic constituents have been identified in soil at concentrations exceeding soil performance goals established for the site. At this time, the soil guidance values presented in TAGM 4046 have been selected as the performance goals for onsite soil. AOCs to be addressed as part of the CMS and the constituents of interest within each of these AOCs are identified in Table 1. The location of each AOC and previous soil sampling locations within and around the AOCs are shown on Figure 1.

III. POTENTIAL CORRECTIVE MEASURES TECHNOLOGIES AND/OR ALTERNATIVES

Based on review of previous investigation results, a streamlined approach will be used for the CMS. Five potential site-wide corrective measure alternatives will be evaluated and compared against each other to determine which alternative best satisfies the evaluation criteria. The proposed site-wide alternatives and their corresponding elements are summarized below:

- *Alternative 1 – No-Further Action*. Under this alternative, no further investigation or remedial activities (other than the investigation activities described in Section V) would be conducted to address site conditions.

- *Alternative 2 – Site Controls and Monitoring*. Under this alternative, the locked chain-link fence around the perimeter of the property would be maintained and an Environmental Easement/Covenant Restriction and Site Management Plan would be developed. The Environmental Easement/Covenant Restriction would be developed to restrict property use to commercial/industrial only and notify future owners of the presence of constituents of interest in soils and soil vapor. The Site Management Plan would be developed to provide for long-term maintenance of the chain-link fence and vegetation, and establish guidelines to be followed for the management of soil material, should future activities disturb site soils. The Site Management Plan would be referenced in the Environmental Easement/Covenant Restriction.

- *Alternative 3 – Barrier Layer, Site Controls, and Monitoring*. This alternative would be the same as the Site Controls and Monitoring alternative, except that a barrier layer (soil cover, asphalt/concrete pavement, concrete building foundation, etc.) would be installed as an active exposure prevention method over areas of soil exhibiting constituents of interest at concentrations exceeding soil corrective measure performance goals to be established for the site.

- *Alternative 4 – Focused Excavation/Offsite Disposal, Barrier Layer, Site Controls, and Monitoring*. This alternative would be the same as the Barrier Layer, Site Controls, and Monitoring alternative, except that soils remaining in each AOC that exhibit constituents of interest at concentrations exceeding regulated waste criteria (PCBs at concentrations exceeding the 50 ppm disposal criterion for a Toxic Substances Control Act [TSCA] regulated PCB waste and a New York State hazardous waste [Waste Code B007]) would be excavated and transported for offsite disposal prior to barrier layer construction.

- *Alternative 5 – Excavation/Offsite Disposal and Site Controls*. Under this alternative, soils remaining in each AOC that exhibit constituents of interest at concentrations exceeding the soil performance goals would be excavated and transported for offsite disposal.

Additional treatment technologies (e.g., soil vapor extraction) will be considered during the CMS technology screening. However, based on the co-mingled

constituents in site soils (PCBs and VOCs), it is unlikely that other remedial technologies will be retained through the screening process.

For each action alternative listed above, the CMS will also evaluate additional control measures to address potential onsite vapor intrusion (via an Environmental Easement/Covenant Restriction mandating future building construction requirements, such as a vapor barrier and/or sub-slab depressurization system).

IV. EVALUATION OF POTENTIAL CORRECTIVE MEASURES

The five corrective measure alternatives will be evaluated in terms of the criteria discussed in the following documents:

- The NYSDEC TAGM titled "Selection of Remedial Actions at Inactive Hazardous Waste Sites", HWR-90-4030, revised May 1990.

- Regulations contained in Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. The December 2006 revisions to Part 375 include land use as a new factor that may be considered in the remedy selection process, provided the NYSDEC determines that there is reasonable certainty associated with such land use and when cleanup to pre-disposal conditions is not feasible.

The proposed evaluation criteria are listed below.

- Compliance with New York State Standards, Criteria, and Guidelines (SCGs).

- Overall Protection of Human Health and the Environment.

- Short-Term Effectiveness.

- Long-Term Effectiveness and Permanence.

- Reduction of Toxicity, Mobility and Volume.

- Implementability.

- Land Use.

- Cost.

V. PROPOSED ADDITIONAL PCB DELINEATION SOIL SAMPLING ACTIVITIES

As previously mentioned, the full extent of PCB-impacted soils at the site has not been delineated. Based on the results of the Phase VI soil sampling activities (as provided to the NYSDEC in the data tables and figures attached to e-mail correspondence dated June 21, 2007), additional soil sampling activities are needed to further delineate the horizontal and vertical extent of PCB-impacted soils in the following areas of the site:

- In the central portion of the site (northwest of the Pilot Plant footprint).
- Within the Pilot Plant footprint (outside the limits of the previous AOC 45 ICM soil excavation).

The proposed additional (Phase VII) soil sampling activities will include the collection of soil samples from the following 15 sampling locations (refer to Figure 2 for the sampling locations):

- 13 new locations around the Pilot Plant footprint (locations AOC 52-5 and 52-6 to the southeast of the footprint and locations P1-S139 through P1-S149 to the northwest of the footprint).
- 2 revisited sampling locations in the Pilot Plant footprint (locations VS-45-15 and AOC 52-2).

Before sampling begins, a field survey crew will field-identify the proposed sampling locations using coordinates obtained from the sampling locations map. Each proposed sampling location will be marked using a flagged metal pin. Soil borings will be completed at each location using a direct-push sampling rig or conventional drill rig equipped with 3-inch inside-diameter hollow-stem augers. The soil borings at locations VS-45-15, AOC 52-2, AOC 52-5, and AOC 52-6 will each be completed to a depth of approximately 30 feet below ground surface (bgs). The remaining borings will each be completed to a depth of approximately 10 feet bgs.

Soil samples will be collected continuously (beginning 12 feet below the ground surface at re-visited sampling locations VS-45-15 and AOC 52-2 and at the ground surface at the remaining locations) to the depth of boring completion. The soil

sample recovered from each sampling interval will be visually-characterized by ARCADIS (for color, texture, and moisture content) and will undergo headspace screening using a photoionization detector (PID). Samples recovered from the intervals identified in Table 2 will be submitted to TestAmerica of Shelton, Connecticut for laboratory analysis for PCBs using USEPA SW-846 Method 8082. The analyses will be performed on a one week-turnaround for reporting of preliminary results. Samples from the remaining intervals will be extracted and then archived for potential future analysis within allowable holding times, if needed. The sampling plan will be adjusted, as appropriate (with concurrence from the NYSDEC), based the results of the PID headspace screening.

Quality assurance/quality control (QA/QC) samples, including duplicate, matrix spike, and matrix spike duplicate samples, will be analyzed in support of the proposed additional soil sampling for PCBs. QA/QC samples will be collected at a frequency of one per 20 field soil samples.

Upon completion, each soil boring will be filled with bentonite grout. Soil cuttings and acetate liners (if used) during the soil investigation will be containerized in steel 55-gallon drums for offsite transportation and disposal in accordance with applicable regulations. Liquids generated by decontamination activities will be separately containerized in steel 55-gallon drums or one of the existing onsite storage tanks for offsite transportation and disposal in accordance with applicable regulations.

VI. PROPOSED PILOT OR BENCH SCALE STUDIES

No pilot or bench scale studies are proposed. Previous sampling activities and the planned additional soil sampling activities are expected to generate adequate data to assess the AOCs and evaluate potential corrective measures.

VII. OUTLINE FOR THE FOCUSED CMS REPORT

At the completion of the CMS, a focused CMS Report will be prepared. The focused CMS Report will be organized into the following sections.

Section	Purpose
Section 1 – Introduction	Presents a brief overview of the project, describes the purpose of the document, and presents background relevant to the development of the CMS Report, including past investigation and remedial activities.
Section 2 – Current Conditions	Presents a summary of the AOCs included in the CMS and discusses the results of soil sampling activities performed in support of the CMS.
Section 3 – Standards, Criteria & Guidance	Identifies SCGs referred to in the development and selection of remedial alternatives.
Section 4 – Technology Screening and Development of Corrective Measure Alternatives	Presents the results of the identification and screening of remedial technologies and the development of remedial alternatives that have the potential to meet the corrective measure objectives.
Section 5 – Evaluation of Final Corrective Measure Alternatives	Presents an evaluation of proposed corrective measure alternatives against evaluation criteria presented in NYSDEC TAGM 4030 and 6 NYCRR Part 375.
Section 6 – Comparative Analysis of Final Corrective Measure Alternatives	Presents a comparative analysis of the alternatives and identifies the selected corrective measure alternative and the rationale used for selection.
Section 7 – References	Provides references used to prepare the CMS Report.

VIII. SCHEDULE

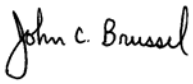
We are prepared to implement the Phase VI soil sampling activities within approximately two weeks following NYSDEC approval of this Work Plan. The CMS Report will be prepared following receipt of the analytical results for the Phase VI soil samples (including results of any follow-up analysis on samples that are initially archived). We currently anticipate that the CMS Report will be provided to the NYSDEC within approximately 6 weeks following receipt of the Phase VI soil

analytical results. If field conditions are encountered during implementation of additional (Phase VII) Plant 1 soil sampling activities that could delay the schedule for completing the CMS, then the NYSDEC will be notified of the conditions and length of any anticipated delay.

Please do not hesitate to contact Mr. Wayne Baldwin of Bayer at 281.383.6117, Mr. Ramon Simon of Bayer at 281.383.6149, or the undersigned at 315.671.9441 if you have any questions or require additional information.

Sincerely,

ARCADIS



John C. Brussel, PE
Principal Engineer

Copies:
Ms. Katy Murphy, New York State Department of Environmental Conservation – Region I
Ms. Renata Ockerby, New York State Department of Health
Mr. Paul Olivo, United States Protection Agency – Region II
Mr. Wayne Baldwin, Bayer MaterialScience LLC
Mr. Ramon Simon, Bayer MaterialScience LLC

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Tables

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

SWMU/AOC Number	Area	Location	Findings	Proposed Action
General Note: Shading below designates Areas of Concern (AOCs) to be evaluated in the Corrective Measures Study (CMS) Report				
1	Plant 1	Less than 90 day storage unit	Soil at sampling location AOC 1-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil at this location. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Arsenic in soil to be addressed in CMS.
2	Plant 1	Laboratory satellite accumulation area walkway connecting Plant 1 and Warehouse	Soil at sampling locations AOC 2-1 through AOC 2-4 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. One or more SVOCs were identified at each sampling location at concentrations slightly above the guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.
3	Plant 1	Wastewater Tanks 1, 11A, and 11B	With one minor exception, soil at sampling locations AOC 3-3 and AOC 3-4 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One VOC (acetone) was identified in sample AOC 3-3 at an estimated concentration of 0.38 ppm, which is slightly above the 0.2 ppm guidance value. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Arsenic in soil (location AOC 3-3) to be addressed in CMS.
4	Plant 1	Former liquid incinerator area	Soil at sampling location AOC 4-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values. Glycols were not detected in soil within this AOC.	Mercury and zinc in soil to be addressed in CMS.
5	Plant 1	Transfer station & associated piping	Soil at sampling locations AOC 5-1 and AOC 5-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at both locations at concentrations above TAGM 4046 soil guidance values, but the concentrations at location AOC 5-2 were only slightly above the guidance values.	SVOCs in soil to be addressed in CMS.
6	Plant 1 Transfer Station	Glycol tanks 29 & 30	Soil at sampling location AOC 6-1 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. Three SVOCs were identified at estimated concentrations slightly above the TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.

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SWMU/AOC Number	Area	Location	Findings	Proposed Action
7	Plant 1 Transfer Station	Adipic acid silos & wastewater area	Soil at sampling locations AOC 7-1 and AOC 7-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at location AOC 7-2 at concentrations slightly above the guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	SVOCs and zinc in soil (at location AOC 7-2) to be addressed in CMS.
8	Plant 1	Underground storage tank (UST)	Soil at sampling locations AOC 8-1 and AOC 8-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values.	No further action.
9	Plant 1	UST	Soil at sampling locations AOC 9-1 and AOC 9-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values.	No further action.
10	Plant 1	UST	With one minor exception, soil at sampling locations AOC 10-1 and AOC 10-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One SVOC (benzo(a)pyrene) was identified in sample AOC 10-1 at an estimated concentration of 0.12 ppm, which is slightly above the 0.061 ppm guidance value.	Benzo(a)pryene in soil (at location AOC 10-1) to be addressed in CMS.
11	Plant 1	Boiler condensate run-off	Surface soil at sampling locations AOC 11-1, AOC 11-2, and AOC 11-4 exhibit PCBs at concentrations of 28 ppm, 47 ppm, and 1.3 ppm, which are above the 1 ppm TAGM 4046 surface soil guidance value. PCBs were identified at an estimated concentration of 0.33 ppm at sampling location AOC 11-3. VOCs were not identified in soil within this AOC at concentrations above the TAGM 4046 soil guidance values. Soil at sampling locations AOC 11-1 exhibits SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	PCBs in soil to be addressed in CMS.
12	Plant 2	Waste accumulation area	With one minor exception, soil at sampling location AOC 12-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One VOC (acetone) was identified at an estimated concentration of 0.21 ppm, which is slightly above the 0.2 ppm guidance value. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.

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SWMU/AOC Number	Area	Location	Findings	Proposed Action
13	Plant 2	Former RCRA greater than 90 day storage area	With one minor exception, soil at sampling location AOC 13-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One SVOC (phenol) was identified at an estimated concentration of 0.2 ppm, which is slightly above the 0.03 ppm guidance value. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Phenol in soil to be addressed in CMS.
14	Plant 2	Waste compactor and scrap metal area	No soil sampling was required for this AOC. Concrete analytical results supported re-use of concrete as fill.	No further action.
15	Plant 2	Distillate wastewater tank 2	Soil at sampling location AOC 15-3 does not exhibit PCBs, VOCs, or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Lead in soil to be addressed in CMS.
16	Plant 2	Reactor 4 knockout pot	With two minor exceptions, soil at sampling location AOC 16-2 does not exhibit PCBs, VOCs, or SVOCs at concentrations above TAGM 4046 soil guidance values: Two SVOCs (benzo(a)pyrene and dibenzo(a,h)anthracene) were identified at estimated concentrations of 0.16 ppm and 0.074 ppm, respectively, which are slightly above the corresponding guidance values of 0.061 and 0.014 ppm respectively. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Benzo(a)pyrene and dibenzo(a,h)anthracene in soil to be addressed in CMS.
17	Plant 2	Dimethylformamide pump overflow	Soil at sampling location AOC 17-1 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. Four SVOCs were identified at sampling location AOC 17-1 at estimated concentrations slightly above the TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.
18	Plant 2 Transfer Station	Plant 2 hexandiol tank	Soil at sampling locations AOC 18-1, AOC 18-2, and AOC 18-3 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at concentrations above the guidance values at sampling locations AOC 18-1 and 18-3. However, the SVOC concentrations at sampling location AOC 18-3 were only slightly above the guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil (at locations AOC 18-1 and AOC 18-3) to be addressed in CMS).

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SWMU/AOC Number	Area	Location	Findings	Proposed Action
19	Plant 2	Fume incinerator	NYSDEC approved no further action for this AOC prior to the RFI.	No further action.
20	Plant 3 Warehouse	RCRA less than 90 day storage unit	Soil at sampling location AOC 20-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
21A	Plant 3 Transfer Station	Adipic acid silos	Soil at sampling locations AOC 21A-1 and AOC 21A-2 do not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	No further action.
21B	Plant 3 Transfer Station	Adipic acid silos	No soil sampling was required for this AOC. Impacted debris in AOC 21B was removed as part of the 2005 ICM.	No further action.
22	Plant 3	Tote storage area	Soil at sampling locations AOC 22-1 through AOC 22-4 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were not identified in soil at sampling locations AOC 22-3 and 22-4 at concentrations above guidance values. Two SVOCs were identified in soil at sampling locations AOC 22-1 and AOC 22-2 at estimated concentrations that are slightly above the TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil (at locations AOC 22-1 and 22-2) to be addressed in CMS.
23	Plant 3 Warehouse	Non-hazardous waste accumulation	Soil at sampling locations AOC 23-3 and AOC 23-4 does not exhibit PCBs, VOCs, or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
24	Tank Farm	Transfer station for the Tank Farm	Soil at sampling locations AOC 24-1 through 24-8 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at four sampling locations (AOC 24-1, AOC 24-2, AOC 24-5, and AOC 24-7) at concentrations slightly TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soils (at locations AOC 24-1, AOC 24-2, and AOC 24-7 to be addressed in CMS).
25	Pilot Plant	Former soil pile area removed from AOC 10	NYSDEC approved no further action for this AOC prior to the RFI.	No further action.

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SWMU/AOC Number	Area	Location	Findings	Proposed Action
26	Misc.	Not Applicable	AOC previously deleted prior to the RFI	No further action.
27A	Shipping/ Receiving	Non-hazardous, off-spec, damaged product and raw material storage Non-hazardous, off-spec, damaged product and raw material storage	Soil at sampling locations AOC 27A-1 and AOC 27A-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. Two SVOCs (benzo(a)pyrene and dibenzo(a,h)anthracene) were identified at location AOC 27A-1 at concentrations slightly above the TAGM guidance values. Bis(2-ethylhexyl)phthalate was identified at sampling location AOC 27 A-2 at a concentration of 720 ppm, which is above the 50 ppm guidance value. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.
27B			Soil at sampling locations AOC 27B-1 and AOC 27B-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were not identified at location AOC 27B-2 at concentrations above the guidance values. Three SVOCs (benzo(a)pyrene, dibenzo(a,h)anthracene, and phenol) were identified at location AOC 27B-1 at estimated concentrations slightly above the guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil (at location AOC 27B-1) to be addressed in CMS.
27C			Soil at sampling locations AOC 27C-1 and AOC 27C-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified in soil at both sampling locations at estimated concentrations slightly above the guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.
27D			With one minor exception, soil at sampling location AOC 27D-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One SVOC (benzo(a)pyrene) was identified at an estimated concentration of 0.18 ppm, which is slightly above the 0.061 ppm guidance value. Glycols were not detected in soil within this AOC.	Benzo(a)pyrene in soil to be addressed in CMS.
27E			NYSDEC previously approved no further action for this AOC.	No further action.
27F			Soil at sampling locations AOC 27F-1 and AOC 27F-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	No further action.

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SWMU/AOC Number	Area	Location	Findings	Proposed Action
27G	Shipping/ Receiving	Non-hazardous, off-spec, damaged product and raw material storage	With a minor exception, soil at sampling locations AOC 27G-1 and AOC 27G-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: Two SVOCs (benzo(a)pyrene and dibenzo(a,h)anthracene) were identified at location AOC 27G-1 at estimated concentrations of 0.22 ppm and 0.047 ppm, respectively, which are slightly above the guidance values of 0.061 and 0.014 ppm. Glycols were not detected in soil within this AOC.	SVOCs in soil (at location AOC 27G-1) to be addressed in CMS.
27H			With a minor exception, soil at sampling locations AOC 27H-1 and AOC 27H-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: Three SVOCs (benzo(a)anthracene, benzo(a)pyrene, and dibenzo(a,h)anthracene) were identified at location AOC 27H-1 at estimated concentrations slightly above the guidance values. Ethylene glycol was identified in sample AOC 27H-2 at an estimated concentration of 7.6 ppm.	SVOCs in soil (at location AOC 27H-1) to be addressed in CMS.
27I			Soil at sampling locations AOC 27I-1 and AOC 27I-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at the AOC 27 soil sampling locations at concentrations slightly above the TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil to be addressed in CMS.
27J			With a minor exception, soil at sampling locations AOC 27J-1 and AOC 27J-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: four SVOCs were identified at location AOC 27J-1 at estimated concentrations slightly above the guidance values. Glycols were not detected in soil within this AOC.	SVOCs in soil (at location AOC 27J-1) to be addressed in CMS.
28	Recharge Basin	Sump #1	NYSDEC approved no further action for this AOC prior to the RFI.	No further action.
29		Sump #2	NYSDEC approved no further action for this AOC prior to the RFI.	No further action.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
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SWMU/AOC Number	Area	Location	Findings	Proposed Action
30	Recharge Basin	Sump #3 Stormwater	Soil/debris at sampling locations AOC 30-1, AOC 30-2, and AOC 30-3 exhibits PCBs at estimated concentrations of 4.3 ppm, 2.1 ppm, and 1.6 ppm, respectively. One VOC (tetrachloroethene) was identified in the soil/debris samples, but the concentrations were low (0.007 and 0.008 ppm). SVOC concentrations identified in the soil/debris appear to be low (generally less than 1 ppm to 10 ppm). Selected inorganic constituents (chromium, copper, lead, nickel, and zinc) were identified in the soil/ debris at concentrations that appear slightly elevated. Glycol was not detected in soil/debris within this AOC.	PCBs, SVOCs, and inorganic constituents in debris to be addressed in CMS.
31	Recharge Basin	Sump #4 SPDES discharge	Surface soil at sampling locations AOC 31-1 through AOC 31-4 exhibits PCBs at concentrations above the 1 ppm TAGM 4046 surface soil guidance value. VOCs were not identified in soil within this AOC at concentrations above TAGM 4046 guidance values. SVOCs were identified at concentrations slightly above guidance values in the two samples, but not in the duplicate sample. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be elevated above typical background values.	PCBs, SVOCs, and inorganics in soil to be addressed in CMS.
32	Recharge Basin	Sump #5	PCBs and glycols were not detected at soil sampling location AOC 32-1 at concentrations above laboratory detection limits.	No further action.
33	Recharge Basin	Sump #6	Surface soil at sampling location AOC 33-1 exhibits PCBs at an estimated concentration of 1.5 ppm, which is slightly above the 1 ppm TAGM 4046 surface soil guidance value.	PCBs in soil to be addressed in CMS.
34	Cooling Tower	Cooling Tower Sump	NYSDEC approved no further action for this AOC prior to the RFI.	No further action.
35A	Admin.	Septic tank/leachate pits east of Administration Building	Soil at sampling locations AOC 35A-1 and AOC 35A-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35B	Plant 1	Septic tank/leachate pits northwest of Plant 1	Soil at sampling locations AOC 35B-1 and AOC 35B-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

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BAYER MATERIALSCIENCE LLC
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SWMU/AOC Number	Area	Location	Findings	Proposed Action
35C	Plant 1	Septic tank/leachate pits west of Plant 1	Soil at sampling locations AOC 35C-1, AOC 35C-2, and AOC 35C-3 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35D	Plant 1	Septic tank/leachate pits southwest of Plant 1	With one minor exception, soil at sampling locations AOC 35D-1 and AOC 35D-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One SVOC (benzo(a)pyrene) was identified at location AOC 35D-2 at an estimated concentration of 0.065 ppm, which is slightly above the 0.062 ppm guidance value. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Benzo(a)pyrene in soil (at location AOC 35D-2) to be addressed in CMS.
35E	Plant 2	Septic tank/leachate pits southwest of Plant 2	Soil at sampling locations AOC 35E-1 and AOC 35E-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35F	Pilot Plant	Septic tank/leachate pits northwest of Pilot Plant	Soil at sampling locations AOC 35F-1, AOC 35F-2, and AOC 35F-3 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35G	Admin.	Septic tank/leachate pits south of Administration Building	Soil at sampling locations AOC 35G-1 and AOC 35G-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35H	Plant 1	Suspected leachate pit northeast of Plant 1	Soil at sampling location AOC 35H-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

SWMU/AOC Number	Area	Location	Findings	Proposed Action
35I	Plant 1	Suspected leachate pit northeast of Plant 1	Soil at sampling locations AOC 35I-1 and AOC 35I-2 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35J	Plant 3	Suspected leachate pits southeast of Plant 3	Soil at sampling location AOC 35J-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35K	Plant 1	Suspected leachate pit northeast of Plant 1	Soil at sampling location AOC 35K-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35L	Plant 1	Suspected leachate pit southwest of Plant 1	Soil at sampling location AOC 35L-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35M	Pilot Plant	Suspected leachate pits east of Pilot Plant	Soil at sampling location AOC 35M-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35N	Admin.	Suspected leachate pits north of Administration Building	Soil at sampling location AOC 35N-1 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
35O	Plant 1	Suspected leachate pit beneath northwest end of Plant 1	Sample collection was not possible during the RFI due to the presence of a construction and demolition (C&D) debris stockpile over the approximate location of the suspected leachate pit as identified using dimensions shown on the design drawings. The pit was identified during the subsequent foundation demolition activities, and soil samples were collected in October 2006. One SVOC (benzo(a)pyrene) was identified in soil at sampling location AOC 35O at a concentration exceeding the TAGM 4046 soil guidance values (estimated 0.066 ppm sample result vs. 0.061 ppm guidance value).	Benzo(a)pyrene in soil to be addressed in CMS.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
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SWMU/AOC Number	Area	Location	Findings	Proposed Action
36	Admin.	Administration Building closed. Lab storage area	Concrete at sampling location AOC 36-1 does not exhibit a toxicity characteristic for VOCs, SVOCs, or metals.	No further action.
37	Plant 2	DOA Sump	Soil at sampling location AOC 37-3 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at concentrations slightly above TAGM 4046 soil guidance values in soil at sampling location AOC 37-3. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	SVOCs, cobalt, and lead in soil to be addressed in CMS.
38	Plant 2	Exterior trench	Impacted debris in AOC 38 was removed as part of the ICM. No soil sampling was required for this AOC.	No further action.
39	Plant 1	Electrical transformers	Concrete pad and PCB-impacted soils in AOC 39 were removed as part of the ICM. Verification soil sample results indicate that PCB concentrations in soils at the excavation limits are less than the TAGM 4046 soil guidance values.	No further action.
40	Plant 3	Trench system	Accessible impacted debris in AOC 40 was removed as part of the ICM. Debris previously encountered beneath the concrete previously used to fill a portion of the former Plant 3 trench system was removed when the concrete floor slab in the area was removed. The debris was transported for offsite disposal.	No further action.
41	Plant 1	Stained concrete in warehouse	Soil at sampling locations AOC 41-4 through AOC 41-8 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	Inorganic constituents in soil (at locations AOC 41-6 through AOC 41-8) to be addressed in CMS.
42	Plant 1	Center trench	Impacted debris in AOC 42 was removed as part of the ICM. No soil sampling was required for this AOC.	No further action.
43	Plant 1	Sump in foundation, NE end of plant	Impacted debris in AOC 43-1 was removed as part of the ICM. No soil sampling was required for this AOC.	No further action.
44	Plant 1	Sump in foundation, SE end of plant	Standing water and impacted debris in AOC 44 was removed as part of the ICM. No soil sampling was required for this AOC.	No further action.

TABLE 1
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CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
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SWMU/AOC Number	Area	Location	Findings	Proposed Action
45	Pilot Plant	Sump in NE corner of Plant (interior and exterior)	Impacted debris in AOC 45 was removed as part of the 2006 ICM. Soils within and around AOC 45 exhibiting PCBs at concentrations above 50 ppm (as delineated by the ICM) were addressed via removal. Details of the ICM activities are presented in the *AOC 45 Interim Corrective Measure Certification Report* (ARCADIS BBL, May 2007).	Soils exhibiting PCBs at concentrations above 50 ppm were addressed via removal as an ICM. No further action (other than in the neighboring area to the north and east).
46	Plant 2	Scale Area and Circular Plate Area in foundation	Impacted debris in AOC 46 was removed as part of the 2005 ICM. Soil at sampling location AOC 46-4 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	No further action.
47	Plant 2	Trench system and sump leading to sump 4	Structures had been filled in with concrete. Therefore, no debris samples collected at this location. No soil sampling was required for this AOC.	No further action.
48	Plant 1	Empty drum storage at NW end of Warehouse	Soil at sampling locations AOC 48-1 and AOC 48-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were identified at concentrations above TAGM 4046 soil guidance values at both sampling locations, but the concentrations at location AOC 48-2 were only slightly above the guidance values. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	SVOCs and lead in soil (at location AOC 48-1) to be addressed in CMS.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

SWMU/AOC Number	Area	Location	Findings	Proposed Action
49	Pilot Plant	Trench around East wall	Impacted debris in AOC 49 was removed as part of the 2005 ICM. With one minor exception, soil at sampling location AOC 49-4 does not exhibit VOCs or SVOCs at concentrations above TAGM 4046 soil guidance values: One SVOC (benzo(a)pyrene) was identified at location AOC 49-4 at an estimated concentration of 0.067 ppm, which is slightly above the 0.061 ppm guidance value. Glycols were not detected in soil within this AOC. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values. Following foundation demolition activities, soil from the eastern portion of the Pilot Plant (including from the trench area) was removed and stockpiled just north of the plant footprint. PCBs were identified in a sample of the stockpiled soils at a concentration of 18 ppm (refer to an October 16, 2006 letter from ARCADIS BBL to the NYSDEC and Section 2.11 of the Demolition Report (ARCADIS BBL, April 2007).	PCBs and benzo(a)pyrene in soil to be addressed in CMS.
50	Plant 1	Underground Storage Tank	Soil at sampling locations AOC 50-1 and AOC 50-2 does not exhibit VOCs at concentrations above TAGM 4046 soil guidance values. SVOCs were not identified at concentrations above TAGM 4046 soil guidance values, except at location AOC 50-2. Benzo(a)pyrene was identified at AOC 50-2 at an estimated concentration of 0.063 ppm, slightly above the 0.061 TAGM 4046 soil guidance value. Tank closure performed as part of 2005 ICM. PCB concentration in overburden soils removed from above the UST were less than the 10 ppm TAGM 4046 subsurface soil guidance value.	No further action.
51	Plant 2	Underground Storage Tank	A previously unidentified UST was encountered and removed during foundation demolition activities. Verification soil samples were collected from the excavation limits. With one minor exception, soil at verification soil sampling locations does not exhibit PCBs, VOCs, or SVOCs at concentrations above TAGM 4046 soil guidance values. One SVOC [benzo(a)pyrene] was identified at location AOC-51-CB1 at an estimated concentration of 0.13 ppm, which is above the 0.061 ppm TAGM 4046 soil guidance value.	Benzo(a)pyrene in soil to be addressed in CMS.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

SWMU/AOC Number	Area	Location	Findings	Proposed Action
52	Pilot Plant	Soils within the eastern two-thirds of the Pilot Plant footprint.	Impacted soils were encountered following the removal of the building slab. PCBs were identified at several locations at concentrations above TAGM 4046 soil guidance values. The extent of PCB-impacted soils within and around AOC 52 will be delineated during CMS pre-design sampling. With the exception of acetone, no VOCs were identified at concentrations above TAGM 4046 soil guidance values. Acetone was identified at locations AOC52-2 (1.0-1.5') and AOC 52-3 (1.5-2.5') at concentrations of 0.21 and 0.24 ppm, respectively, which are slightly above the 0.2 ppm TAGM 4046 soil guidance value. However, in the case of both samples, acetone was also detected in the corresponding blank, suggesting this may be a laboratory artifact. With the exception of benzo(a)anthracene and benzo(a)pyrene, no SVOCs were identified at concentrations above TAGM 4046 soil guidance values. Benzo(a)anthracene was identified at location AOC52-1 (1.5-2.0') at an estimated concentration of 0.28 ppm, which is slightly above the 0.224 ppm TAGM 4046 soil guidance value. Benzo(a)pyrene was identified at location AOC52-1 (1.5-2.0') at an estimated concentration of 0.28 ppm, and at location AOC 52-2 (1.0-1.5') at an estimated concentration of 0.062 ppm, which is slightly above the 0.061 ppm TAGM 4046 soil guidance value. Inorganic constituent concentrations in soil appear to be generally consistent with typical background values.	PCBs and SVOCs in soil to be addressed in the CMS.

TABLE 1
SUMMARY OF FINDINGS AND PROPOSED ACTIONS FOR SOILS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

Notes:

1. PCBs = Polychlorinated Biphenyls.
2. VOCs = Volatile Organic Compounds.
3. SVOCs = Semi-Volatile Organic Compounds.
4. TCLP = Toxicity Characteristic Leaching Procedure.
5. TAGM 4046 Soil Guidance Values = soil guidance values presented in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Soil Cleanup Objectives and Cleanup Levels", HWR-94-4046 (TAGM 4046) dated January 24, 1994.

TABLE 2
PROPOSED PCB SOIL SAMPLING LOCATIONS

CORRECTIVE MEASURES STUDY WORK PLAN
BAYER MATERIALSCIENCE LLC
125 NEW SOUTH ROAD
HICKSVILLE, NEW YORK

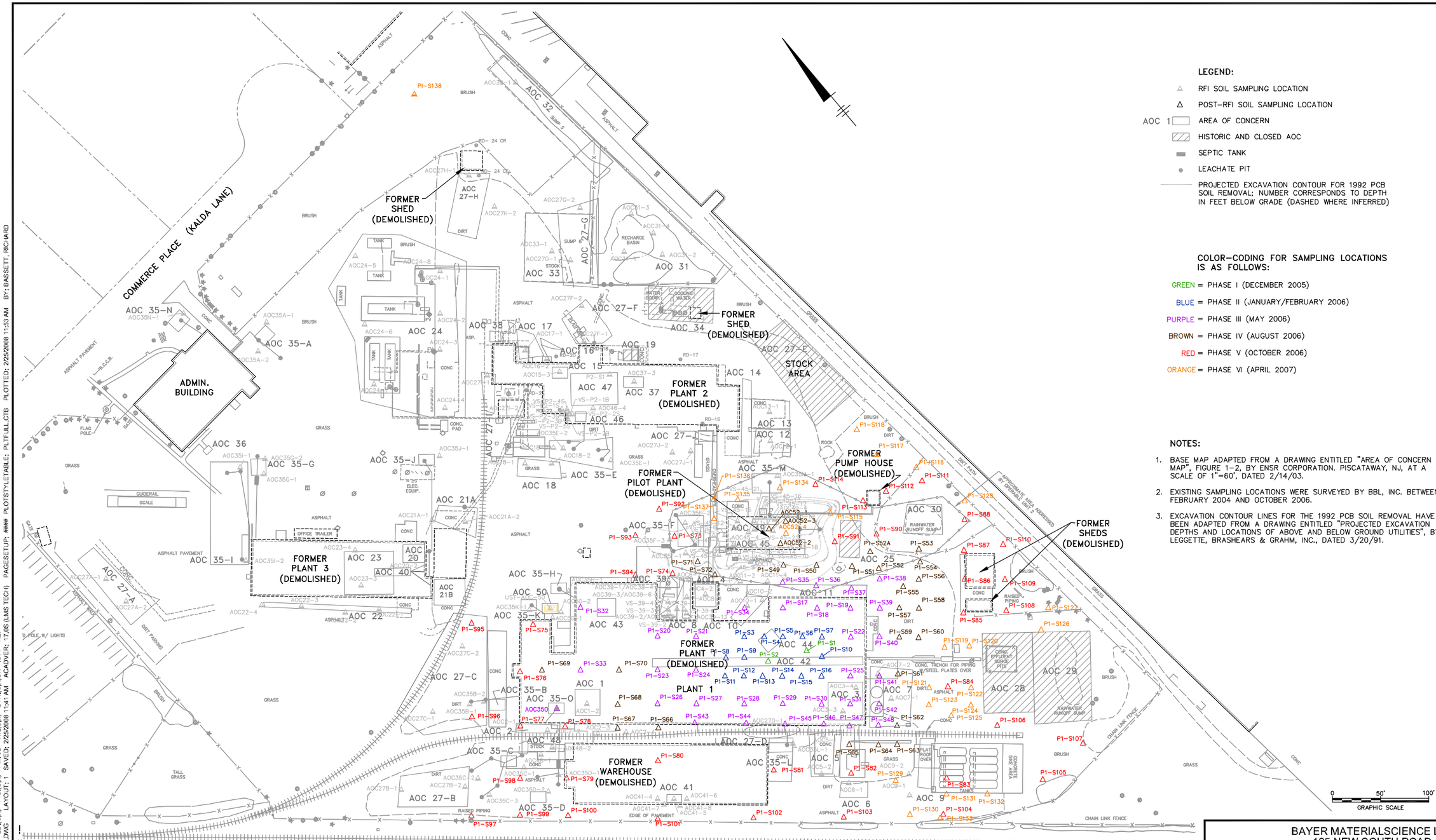
Sampling Interval	Sampling Locations														
	Revisited Locations		Proposed New Locations												
	VS-45-15	AOC 52-2	AOC 52-5	AOC 52-6	P1-S139	P1-S140	P1-S141	P1-S142	P1-S143	P1-S144	P1-S145	P1-S146	P1-S147	P1-S148	P1-S149
(0.0-0.5')	8.1	23 @ 1-1.5'	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**
(2.0-2.5')	0.98	53 @ 1.5-2.5'	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**	**PCBs**
(4.0-4.5')	3.0	510 [220]	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive
(6.0-6.5')	38	500	**PCBs**	**PCBs**	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive
(8.0-8.5')	280	230 [330]	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive	Archive
(10.0-10.5')	83	160	**PCBs**	**PCBs**	--	--	--	--	--	--	--	--	--	--	--
(12.0-14.0')	**PCBs**	**PCBs**	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(14.0-16.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(16.0-18.0')	**PCBs**	**PCBs**	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(18.0-20.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(20.0-22.0')	**PCBs**	**PCBs**	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(22.0-24.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(24.0-26.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(26.0-28.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--
(28.0-30.0')	Archive	Archive	Archive	Archive	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Laboratory analysis for polychlorinated biphenyls (PCBs) was performed by TestAmerica, Inc. (formerly Severn Trent Laboratories) of Shelton, Connecticut using United States Environmental Protection Agency (USEPA) SW-846 Method 8082, as referenced in the New York State Department of Environmental Conservation (NYSDEC) 2005 Analytical Services Protocol (ASP).
2. Results shown above for sampling locations VS-45-15 and AOC 52-2 are in parts per million (ppm), which is equivalent to milligrams per kilogram (mg/kg).
3. [ ] = Result for Blind Duplicate.
4. **PCBs** = indicates sample will be submitted to TestAmerica of Shelton, CT for laboratory analysis for PCBs.
5. Archive = Sample will be submitted to TestAmerica of Shelton, CT for extraction for PCBs. The sample extract will then be archived for potential future PCB analysis, if needed, within allowable holding times.
6. -- = Sample will not be collected from the designated interval.

ARCADIS

Figures



LEGEND:

- RFI SOIL SAMPLING LOCATION
- POST–RFI SOIL SAMPLING LOCATION
- AOC 1 — AREA OF CONCERN
- HISTORIC AND CLOSED AOC
- SEPTIC TANK
- LEACHATE PIT
- PROJECTED EXCAVATION CONTOUR FOR 1992 PCB SOIL REMOVAL; NUMBER CORRESPONDS TO DEPTH IN FEET BELOW GRADE (DASHED WHERE INFERRED)

COLOR–CODING FOR SAMPLING LOCATIONS IS AS FOLLOWS:

GREEN = PHASE I (DECEMBER 2005)
BLUE = PHASE II (JANUARY/FEBRUARY 2006)
PURPLE = PHASE III (MAY 2006)
BROWN = PHASE IV (AUGUST 2006)
RED = PHASE V (OCTOBER 2006)
ORANGE = PHASE VI (APRIL 2007)

NOTES:

1. BASE MAP ADAPTED FROM A DRAWING ENTITLED "AREA OF CONCERN MAP", FIGURE 1–2, BY ENSR CORPORATION. PISCATAWAY, NJ, AT A SCALE OF 1"=60', DATED 2/14/03.
2. EXISTING SAMPLING LOCATIONS WERE SURVEYED BY BBL, INC. BETWEEN FEBRUARY 2004 AND OCTOBER 2006.
3. EXCAVATION CONTOUR LINES FOR THE 1992 PCB SOIL REMOVAL HAVE BEEN ADAPTED FROM A DRAWING ENTITLED "PROJECTED EXCAVATION DEPTHS AND LOCATIONS OF ABOVE AND BELOW GROUND UTILITIES", BY LEGGETTE, BRASHEARS & GRAHM, INC., DATED 3/20/91.

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HICKSVILLE, NEW YORK
CMS WORK PLAN

AREAS OF CONCERN & PREVIOUS SOIL SAMPLING LOCATIONS

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FIGURE
1

CITY:SYR DIV/GROUP:85/ENV DB:RCB LD:(Opt) PIC:(Opt) PM:JB TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\CADACT\B0032309000\00001\32309B01.DWG LAYOUT: 1 SAVED: 2/25/2008 11:41 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ####
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XREFS:
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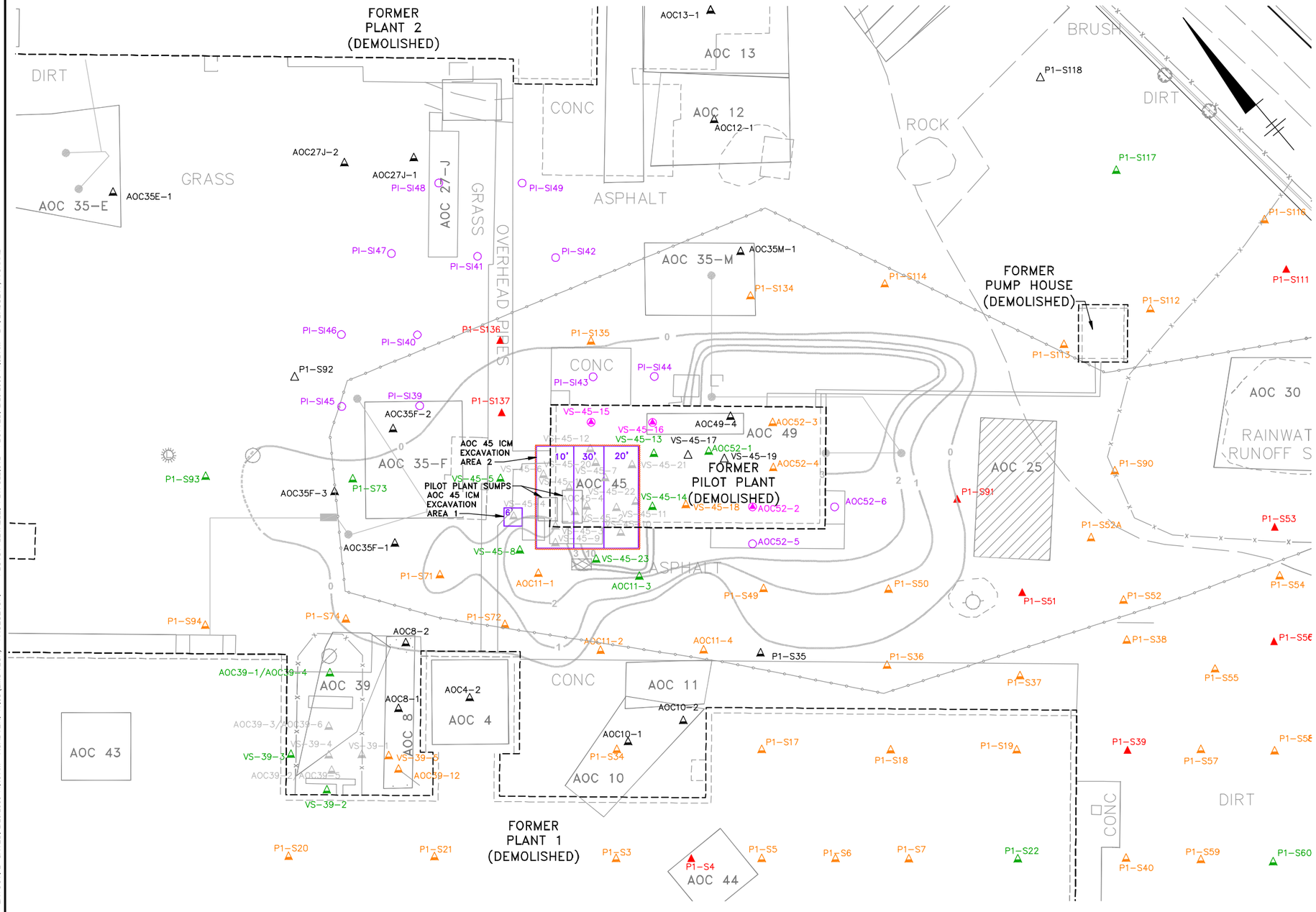

NOTES:

1. BASE MAP ADAPTED FROM A DRAWING ENTITLED "AREA OF CONCERN MAP", FIGURE 1-2, BY ENSR CORPORATION. PISCATAWAY, NJ, AT A SCALE OF 1"=60', DATED 2/14/03.
2. ARCADIS BBL SAMPLING LOCATIONS WERE SURVEYED BY ARCADIS BBL BETWEEN FEBRUARY 2004 AND APRIL 2007.
3. PCB=POLYCHLORINATED BIPHENYL
4. TAGM 4046 = NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM (TAGM) TITLED "DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS", HWR-94-4046 DATED 1994.
5. ICM = INTERIM CORRECTIVE MEASURE.
6. EXCAVATION CONTOUR LINES FOR THE 1992 PCB SOIL REMOVAL HAVE BEEN ADAPTED FROM A DRAWING ENTITLED "PROJECTED EXCAVATION DEPTHS AND LOCATIONS OF ABOVE AND BELOW GROUND UTILITIES", BY LEGGETTE, BRASHEARS & GRAHM, INC., DATED 3/20/91.
7. IMPACT SAMPLING LOCATIONS WERE SURVEYED BY IMPACT IN 2006.
8. IMPACT SAMPLING LOCATIONS AND RESULTS ARE ARE FROM A DRAWING ENTITLED "PLATE 4: DETECTED PCBs IN SOIL," BY IMPACT ENVIRONMENTAL OF BOHEMIA, NEW YORK AT A SCALE OF 1" = 111', 10/19/06.

BAYER MATERIALSCIENCE LLC
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CMS WORK PLAN

PROPOSED PHASE VII SOIL SAMPLING LOCATIONS

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FIGURE
2

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Attachment A

Human Health Exposure Evaluation

ARCADIS
Infrastructure, environment, facilities

Imagine the result

Bayer MaterialScience LLC

Human Health Exposure Evaluation

125 New South Road
Hicksville, New York

April 2008

ARCADIS

Human Health Exposure Evaluation

Bayer MaterialScience LLC
125 New South Road
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Our Ref.:
B0032309

Date:
April 2008

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1. General

This attachment presents a qualitative human health exposure evaluation (HHEE) for the Bayer Material Science LLC (Bayer) site located at 125 New South Road in Hicksville, New York ("the site"). This HHEE has been prepared in support of the Corrective Measures Study (CMS) Work Plan under the Resource Conservation and Recovery Act (RCRA) Correction Action Program at the site. The HHEE was conducted consistent with guidelines provided by the New York State Department of Health (NYSDOH 2002).

The HHEE is based on the environmental site setting, available analytical data, and the current and likely future land use. The exposure evaluation includes a characterization of the exposure setting, identification of constituents of interest and potential fate and transport mechanisms, and an evaluation of potential exposure pathways. The results of the HHEE will be used, in part, to evaluate alternatives for addressing environmental conditions at the site.

2. Environmental Setting/Land Use

The site consists of a 14-acre triangular-shaped parcel located just southeast of the intersection of New South Road and Commerce Road in the City of Hicksville, New York. The site is bordered to the north by industrial properties, to the south and west by the Long Island Railroad and commercial/industrial properties, and to the east by a warehouse owned by Northrop Grumman Corporation (Northrop Grumman). There is no current use of the site. Bayer Polymers (now known as Bayer MaterialScience LLC) terminated production operations at the site in 2002 and conducted demolition of the aboveground production facilities in 2003. Aside from the Administration Building located in the northern portion of the site, all other buildings and aboveground structures formerly used in connection with site operations were demolished down to their floor slabs in 2003. The remaining concrete floor slabs and other concrete surfaces, including ramps, driveways, and former equipment/tank pads associated with the production facilities were demolished in 2005 and 2006. Concrete that was not visibly stained and did not exhibit unacceptable chemical characteristics was crushed and either used onsite as hard fill or stockpiled for future onsite use. Impacted concrete was transported for offsite disposal.

The site is generally covered with crushed stone/gravel, crushed concrete, or vegetation (grass or brush). A large asphalt-paved parking area is located in the western portion of the site, and a series of rainwater runoff sumps/recharge basins are

located along the eastern property boundary. Additionally, a railroad spur enters the northwestern portion of the site and splits into two separate lines, including one that continues southward between the former Plant 1 building and warehouse and a second that extends eastward toward the Plant 2 building. Access to the site is limited by a chain-link fence and locking gates.

The site is located on relatively level land at an elevation of approximately 129 to 134 feet above mean sea level. The northwestern portion of the site (the vicinity of former Plant 3 and the parking lot) slopes gently to the west, and the southern portion of the site (vicinity of former Plant 1) slopes gently to the south. Depending on location, stormwater either flows to the recharge basins/rainwater runoff sumps (via overland flow and storm sewer piping) or is conveyed offsite via overland flow.

The site sits on the Harbor Drift Unit, which is composed primarily of glacial outwash sand and gravel. The Magothy aquifer, immediately below the Harbor Drift Unit, is the principal aquifer in the region. The Magothy aquifer is the primary source of water for municipal and industrial use in the vicinity of the site. The aquifer is recharged by infiltration of precipitation, industrial discharges, and stormwater runoff collected via recharge basins. Based on available information, groundwater at the site is located at depths greater than 50 feet below ground surface (bgs). The general groundwater flow direction in the vicinity of the site is north to south.

Because site access is restricted, potential current receptors are limited to possible trespassers. Potential future plans for the site may include the construction of a commercial/industrial facility. Therefore, based on the anticipated future commercial/industrial land use, potential future receptors at the site may include construction workers, maintenance workers (i.e., outdoor workers that may be responsible for grounds-keeping), site workers (i.e., indoor workers), and trespassers.

3. Constituents and Media of Interest

For purposes of the CMS and this HHEE, the primary media of interest at the site are soil and soil vapor. Site groundwater has been addressed as Operable Unit 1 pursuant to a Record of Decision signed by the United States Environmental Protection Agency (USEPA) in 1994 (ROD R01-94/235). Therefore, groundwater is not evaluated as part of this HHEE. Further, groundwater would not be expected to be a complete exposure pathway based on depth to groundwater (greater than 50 feet bgs) and lack of potable use.

3.1 Soil

The constituents of interest in soil are based on sampling performed as part of the following:

- The two-phase RCRA Facility Investigation (RFI) performed in 2004.
- Soil sampling performed following demolition activities (the Phase I through Phase VI soil sampling), between December 2005 and April 2007.

Soils data were collected across the site, including within identified Areas of Concern (AOCs) and within/around the footprints of the former buildings. Interim Corrective Measure (ICM) soil removal activities were performed in 2005 and 2006 to address soils in certain areas of the site exhibiting polychlorinated biphenyls (PCBs) at concentrations exceeding the 50 part per million (ppm) disposal threshold for a Toxic Substances Control Act (TSCA) regulated PCB waste and New York State hazardous waste (Waste Code B007), as follows:

- *2005:* PCB-impacted soils in a former transformer area (AOC 39) were removed as part of the ICM in 2005.
- *2006:* PCB-impacted soils around a sump (AOC 45) associated with the former Pilot Plant were removed in 2006.

This HHEE only focuses on soils data representative of current conditions and does not consider soils that have already been removed from the site.

Soil samples collected as part of the previous site investigation activities have been analyzed for PCBs (Aroclors), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganic constituents. In an effort to be consistent with previous evaluations, constituents of interest were primarily identified by comparing soils data to the soil guidance values presented in the NYSDEC Technical Administrative Guidance Memorandum titled "Determination of Soil Cleanup Objectives and Cleanup Levels," HWR-94-4046, dated January 24, 1994 (TAGM #4046) and New York State regional background levels (inorganics only). TAGM #4046 values are based on human health levels, groundwater protection, background values, and/or detection limits (NYSDEC 1994). Although some of the TAGM #4046 values are risk-based, these values were developed prior to 1994 and, as such, do not incorporate the most recent toxicity data.

Constituents that exceeded their associated TAGM #4046 values are considered to be constituents of interest, and are summarized as follows:

- PCBs (total Aroclors) in surface and subsurface soil.
- Several VOCs in surface and subsurface soil.
- Several SVOCs (primarily PAHs) in surface and subsurface soil.
- Selected inorganic constituents (primarily arsenic, lead, mercury, and zinc) in surface soil.

In an effort to put soil concentrations into further perspective, soils data have also compared to NYSDEC (2006) Part 375 Industrial Use Soil Cleanup Objectives (SCOs). Based on current land use and the industrial nature of the site, these SCOs were considered to be the most appropriate. The industrial SCOs are risk-based values based on exposure of adult workers and adolescent trespassers to soil via ingestion, inhalation, and dermal contact, and incorporate recent toxicity data (NYSDEC 2006).

Based on review of the analytical results for the RFI and Phase I through Phase VI sampling, total PCBs, one VOC (tetrachloroethene), and several SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were identified in surface soil (0- to 0.2 feet bgs) at concentrations exceeding their associated industrial SCOs. These same constituents were identified in subsurface soil (greater than 1 foot bgs) at concentrations exceeding their associated industrial SCOs. Although several metals exceeded their New York State regional background levels, inorganic concentrations in soil were less than their associated industrial SCOs.

The majority of the PCB exceedances occur in the vicinity of the former Plant 1 and Pilot Plant areas. Several PCB exceedances also occur in the northern portion of the site, near AOC 31 and AOC 33. VOC exceedances are restricted to the footprint of former Plant 1. SVOC exceedances occur primarily within the footprint of former Plant 1, but also occur in various other AOCs across the site.

3.2 Soil Vapor

A soil vapor investigation was conducted in September 2007. Work performed and results obtained for the soil vapor investigation are summarized in a letter report

submitted to the NYSDEC (ARCADIS BBL 2007). The results of the soil vapor investigation are considered as part of this HHEE in an effort to evaluate potential future indoor air exposures at the site. In total, 18 soil vapor samples and two ambient air samples were collected and analyzed as part of the soil vapor investigation. Soil vapor sampling locations were selected to provide coverage across the site, including in areas where building construction may occur during site redevelopment, within/near footprints of the former plant buildings, near areas where trichloroethene (TCE) was identified in a 1989 soil vapor assessment, and in various paved areas.

At the request of the NYSDOH, soil vapor data were compared to indoor air values presented in the NYSDOH (2006) document entitled *Guidance for Evaluating Soil Vapor in the State of New York*. Use of indoor air values is conservative because indoor air concentrations are typically less than soil vapor concentrations due to attenuation caused by the floor slab and dilution of compounds into a large volume of indoor air (ARCADIS BBL 2007).

Several VOCs were identified in soil vapor at concentrations exceeding associated screening criteria. Two or more VOCs were identified at concentrations exceeding indoor air values at each soil vapor sampling location. Constituents that were detected at the highest concentrations included PCE, TCE, cis-1,2-dichloroethene, and vinyl chloride. PCE and/or TCE were detected above indoor air values at 12 of the 18 sampling locations. The highest VOC soil vapor concentrations were observed in the footprints of the former onsite buildings.

4. Contaminant Fate and Transport

The potential fate and transport of these constituents of interest depends on the chemical-specific properties of the constituents of interest and the physical properties of the site. The following subsections provide a brief discussion of the environmental fate of these constituents in soil.

4.1 PCBs

In soil, PCBs adsorb strongly to soil particles with adsorption generally increasing with the degree of chlorination (HSDB 2003). PCBs are strongly sorbed to soils as a result of low water solubility and a high octanol-water partition coefficient (K_{ow}) (ATSDR 2000). As such, PCBs will generally not leach significantly in aqueous soil systems. Leaching is expected to be most significant in soils with low organic carbon (ATSDR 2000). Biodegradation is the most important fate process in soil and depends on the

degree of chlorination. Lower chlorinated congeners biodegrade relatively rapidly, but biodegradation of higher chlorinated congeners is very slow in terrestrial systems. Biodegradation can occur under both aerobic and anaerobic conditions (ATSDR 2000). Volatilization of PCBs from soil surfaces can be an important fate mechanism. In the atmosphere, PCBs can exist in both the vapor-phase and particulate phase (HSDB 2003).

4.2 PAHs

PAHs in soil can volatilize, undergo abiotic degradation (photolysis and oxidation), biodegrade, or accumulate in plants (ATSDR 1995). Environmental factors such as temperature, pH, oxygen concentration, soil type, and moisture may affect the rate of degradation of PAHs in soil. Sorption to soil increases with increasing organic carbon content and with increasing surface area of soil particles. Microbial metabolism is the major degradation process for PAHs in soil (ATSDR 1995). Transport and partitioning in the environment are regulated by several physiochemical properties such as water solubility, vapor pressure, Henry's law constant, K_{ow}, and organic carbon partition coefficient (K_{oc}) (ATSDR 1995). In general, PAHs have low water solubilities. Based on K_{oc} values, PAHs are expected to have slight to no mobility in soils (HSDB 2004). Volatilization from moist soil surfaces may be an important fate process for low and medium molecular weight PAHs. In the atmosphere, PAHs may exist in both the vapor and particulate phases based on their wide range of vapor pressures (HSDB 2004).

4.3 VOCs

Several VOCs (e.g., methylene chloride, PCE, TCE, trans-1,2-DCE, vinyl chloride) exceeded the TAGM #4046 soil values. However, PCE was the only VOC to exceed its industrial SCO and only exceeded in two soil samples (one surface and one subsurface sample, at location P1-S119). Based on K_{oc} values, PCE is expected to have moderate to high mobility in soil (HSDB 2005; ATSDR 1997). Volatilization from moist soil surfaces is an important fate process, although volatilization from soils is much slower than from water (ATSDR 1997). Soil type and organic carbon content of the soil has been found to have an effect on volatilization rates of PCE. Biodegradation is expected to occur slowly in soil under both aerobic and anaerobic conditions (HSDB 2005).

4.4 Inorganic Constituents

Metal speciation determines the behavior and toxicity of metals in the environment (USEPA, 2007). The pH is the dominant variable that influences the behavior of metals in the environment (USEPA, 2007). Heavy metals are generally associated with soil solids in four ways: (1) a small proportion is held in adsorbed or exchangeable forms; (2) elements are bound by the soil organic matter; (3) association with carbonates and oxides of iron and manganese; and (4) association with sulfides and other insoluble compounds (Brady and Weil, 1996). Depending on their chemical state, metals may exist as soluble salts or insoluble forms. In soils, metals may exist as cations, anions, or neutral species. Cationic metals occur naturally in soils as oxides and hydroxides and to a lesser extent as carbonates, phosphates, and sulfates, and under reducing conditions as sulfides. Environmental parameters such as temperature and humidity influence the rate of transformation (USEPA, 2007).

The relatively low vapor pressures of metals (with the exception of mercury that may partition into air) and their complexes indicate that they will not volatilize from soil. However, the binding tendency of certain metallic species may result in metals being adsorbed to soil and then resuspended to air via wind erosion under certain conditions (e.g., lack of soil cover).

5. Potentially Complete Exposure Pathways

An initial step in evaluating potential human exposure is the identification of complete exposure pathways. An exposure pathway is complete when the following five elements are documented (NYSDOH 2002):

1. Constituent source.

2. Constituent release and transport mechanisms.

3. Point of exposure.

4. Route of exposure.

5. Receptor population.

An exposure pathway is typically eliminated from further evaluation when any one of the five elements has not existed in the past, does not exist in the present, and will never exist in the future (NYSDOH 2002).

Based on current and possible future land use, potentially complete exposure pathways exist for surface and subsurface soils and indoor air (i.e., vapor intrusion to indoor air pathway). Based on the available site information, several potentially complete exposure pathways have been identified.

- *Current/Future Trespasser* – Although the site is surrounded by a locked chain-link fence, the potential still exists for trespassers to access the site. Exposure of trespassers would likely be infrequent and of relatively short duration. Under current conditions, trespassers may be exposed to constituents of interest in surface soil via dermal contact, incidental ingestion, and/or inhalation of soil particulates.

- *Future Maintenance Worker* – There are no current ongoing maintenance activities at the site. However, if the site is redeveloped, maintenance workers (i.e., outdoor workers) may be exposed to constituents of interest in surface soil via incidental ingestion, dermal contact, and/or inhalation of soil particulates during non-intrusive activities such as mowing.

- *Future Site Worker* – The site is expected to be redeveloped for possible commercial/industrial land use. Future workers (i.e., indoor workers) may be exposed to constituents of interest in surface soil via dermal contact, incidental ingestion, and/or inhalation of soil particulates during non-intrusive activities. Additionally, if a commercial/industrial building were to be constructed in the future, indoor air could present a potentially complete exposure pathway based on soil vapor concentrations at the site.

- *Future Construction Worker* – Because the site is expected to be redeveloped in the future, construction workers represent a receptor population that may be exposed to constituents of interest in surface and subsurface soil via incidental ingestion, dermal contact, and/or inhalation of soil particulates during intrusive activities. Additionally, construction workers could be exposed to VOCs in ambient air (i.e., soil vapors) during a trenching scenario.

Exposure via inhalation of soil particulates is likely not a significant pathway because the majority of onsite soils are covered by impervious surfaces (e.g., asphalt, concrete),

gravel/stone, and vegetation. The potential for future construction worker exposure to soils via all exposure routes could be mitigated through the use of properly trained personnel and the use of personal protective equipment (PPE). Air monitoring in accordance with the NYSDOH's Community Air Monitoring Program (NYSDOH 2000) and implementation of dust control measures in accordance with NYSDEC (1989) TAGM #4031, entitled *Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites*, during future construction activities would also mitigate potential exposures.

Future plans for the site will likely involve the removal of soils containing greater than 50 ppm PCBs (which will also result in removal of soils from the Plant 1 footprint that contain VOCs), the placement of a soil cover across the site, and a covenant restriction (deed restriction) that limits land use. These activities would mitigate potential exposure of onsite receptors to surface soils. The vapor intrusion to indoor air exposure pathway could be further mitigated via installation of a vapor barrier or passive subslab ventilation system capable of being converted to an active system, if needed.

6. Summary

The HHEE presents an assessment of potential human exposure to constituents of interest at the site. Exposure of trespassers, maintenance workers, site workers, and construction workers to soils via incidental ingestion, dermal contact, and inhalation were identified as potentially complete exposure pathways. However, exposure via inhalation of soil particulates (i.e., dust) is not considered to be a significant pathway due to the presence of impervious surfaces and vegetation at the site that would likely limit such exposures. The vapor intrusion to indoor air pathway also represents a potentially complete future exposure pathway if the site is redeveloped.

Exposure to constituents of interest in soil could be mitigated through the use of properly trained personnel and use of PPE, dust control measures (e.g., maintaining vegetation in the areas of bare soil), soil removal, or the placement of clean fill or an impervious barrier. The vapor intrusion to indoor air pathway could be mitigated with the installation of an appropriate barrier or ventilation system.

Based on current conditions, soils present a potentially complete current and future exposure pathway, and indoor air represents a potentially complete future exposure pathway. However, depending on the proposed future development, potential exposures to soils and indoor air could be appropriately mitigated.

7. References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for Polycyclic Aromatic Hydrocarbons (PAHs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1997. Toxicological profile for Tetrachloroethene (PCE). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 2000. Toxicological profile for Polychlorinated Biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ARCADIS BBL. 2007. Soil Vapor Investigation Report. Dated December 20, 2007. Syracuse, New York.

Brady, Nyle C. and Ray R. Weil. 1996. The Nature and Properties of Soils, Eleventh Edition. Prentice-Hall, Inc. Upper Saddle River, NJ. 740 pp.

Hazardous Substances Data Bank (HSDB). 2003. Toxicological profile for polychlorinated biphenyls (PCBs). Available at http://toxnet.nlm.nih.gov.

HSDB. 2004. Toxicological profile for polycyclic aromatic hydrocarbons (PAHs). Available at http://toxnet.nlm.nih.gov.

HSDB. 2005. Toxicological profile for tetrachloroethene (PCE). Available at http://toxnet.nlm.nih.gov.

New York State Department of Environmental Conservation (NYSDEC). 1989. Fugitive Dust Suppression and Particulate Monitoring Program, TAGM #4031. Issued October 27, 1989.

NYSDEC. 1994. Determination of Soil Cleanup Objectives and Cleanup Levels, TAGM #4046. Issued January 24, 1994.

NYSDEC and New York State Department of Health (NYSDOH). 2006. New York State Brownfield Cleanup Program, Development of Soil Cleanup Objectives, Technical Support Document. September 2006.

NYSDOH. 2000. Community Air Monitoring Program.

NYSDOH. 2002. Qualitative Human Health Exposure Assessment. Presented in NYSDEC's Draft DER-10 Technical Guidance for Site Investigation and Remediation. December 2002.

NYSDOH. 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006.

USEPA. 2007. Framework for Metals Risk Assessment. EPA 120/R-07/001. March 2007.