

\*49FRBCERCLASF10,640\*

\*49FRBCERCLASF10,640\*

Site Name:

VCC-WINSTON-SALEM

Subsite:

Site Name: *Do not enter text.*

NCN000410344

Full Site Name (Subject): *Do not enter text.*

VCC-WINSTON-SALEM

Document Type:

CORRESPONDENCE (C)

Description:

General Correspondence, 2011

Report Segment:

1

Date of Document:

7/22/2011

Date Received:

Box: *Enter SF and # with no spaces.*

SF10,640

Access Level:

PUBLIC

Division:

WASTE MANAGEMENT

Section:

SUPERFUND

Program (Document Group):

FRB CERCLA (FRBCERCLA)

Document Category:

FACILITY

Print Report for  
Record

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Blank Record

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(default to last  
record values)

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## **Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, July 22, 2011 4:04 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 7/22/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information. Based on the approval of the Removal Action Completion Report, Ken has now authorized that the reporting frequency be reduced to quarterly for this site as noted below.

Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Received approval of Removal Action Completion Report from the Agencies per email from Ken Mallary dated 7/18/11.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Begin working with NCDENR on path forward for further evaluation of groundwater conditions at the site.
2. Discontinue weekly reporting and begin quarterly reporting. The next report will be submitted on September 30<sup>th</sup>, 2011.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)  
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## **Mattison, David**

---

**From:** Ken Mallery [Mallery.Ken@epamail.epa.gov]  
**Sent:** Monday, July 18, 2011 11:03 AM  
**To:** steven.p.schmidt@; Lauren.M.Gordon@exxonmobil.com  
**Cc:** Mattison, David; Pelton, Matthew  
**Subject:** Removal Action Report Approval - VCC Winston-Salem Site

Steven, Lauren - the EPA and the NCDENR Superfund Section have reviewed the revised Removal Action Report for the VCC Winston-Salem Site, and have no additional comments.

The purpose of this email is to provide approval of the Removal Action Report for the VCC Winston-Salem Site.

EPA and NCDENR look forward to working with you during the development and implementation of the groundwater monitoring plan for the Site.

Ken

## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, July 15, 2011 10:24 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 7/15/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report previously submitted to Agencies, under review.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

### **END OF REPORT**

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)  
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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, July 08, 2011 9:49 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 7/1/11 and 7/8/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report previously submitted to Agencies, under review.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

### **END OF REPORT**

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)  
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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, June 24, 2011 9:26 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 6/24/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report previously submitted to Agencies, under review.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, June 17, 2011 3:27 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 6/17/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Submitted response to additional NCDENR comments on report, including revised report pages and attachments.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

**END OF REPORT**

---

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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, June 10, 2011 8:42 AM  
**To:** Mallery.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 6/10/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Received additional comments on report from NCDENR and began working on comment response.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Comment response and report revision.

### **ACTION ITEMS/OTHER**

1. Submit comment response and report revisions.
2. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

### **END OF REPORT**

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Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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North Carolina Department of Environment and Natural Resources  
Division of Waste Management

Beverly Eaves Perdue  
Governor

Dexter R. Matthews  
Director

Dee Freeman  
Secretary

June 6, 2011

Mr. McKenzie Mallery  
Remedial Project Manager  
Superfund Remedial & Site Evaluation Branch  
U. S. Environmental Protection Agency, Region 4  
Sam Nunn - Atlanta Federal Center  
61 Forsyth Street, S.W.  
Atlanta, GA 30303

RE: Removal Action Completion Report – Revision 1  
Former Virginia-Carolina Chemical Company Winston-Salem Site  
Winton-Salem, Forsyth County, North Carolina

Dear Mr. Mallery:

The North Carolina Department of Environment and Natural Resources (NC DENR) Superfund Section has received the *Removal Action Completion Report – Revision 1* for the Former Virginia-Carolina Chemical Company Winston-Salem Site. The NC DENR Superfund Section has reviewed this document and offers the following attached comments.

The NC DENR Superfund Section appreciates the opportunity to comment on this document. If you have any questions or comments, please feel free to contact me at (919) 508-8466 or at [david.mattison@ncdenr.gov](mailto:david.mattison@ncdenr.gov).

Sincerely,

David B. Mattison  
Environmental Engineer  
NC DENR Superfund Section

Attachment

## **Removal Action Completion Report – Revision 1 Former Virginia-Carolina Chemical Company Winston-Salem Site**

### **Appendix B Soil Disposal Log**

1. Please supplement the Soil Disposal Log included in Appendix B with a column describing the removal action area where the contaminated soil originated (i.e., RA-10).
2. Please revise the Soil Disposal Log to provide the waste manifest numbers in numerical order. Likewise please revise the Waste Management Documentation (i.e., waste manifests) included as Appendix B to provide the waste manifests in numerical order of the waste manifest numbers.
3. Numerous waste manifests were inadvertently omitted from the Waste Management Documentation included as Appendix B. Likewise, numerous waste manifests were inadvertently duplicated in the Waste Management Documentation included as Appendix B. Please correct these oversights.
4. Numerous errors in container weight and manifest date were noted during the review of the Soil Disposal Log included in Appendix B. Please conduct a careful review of the Waste Management Documentation and the Soil Disposal Log and correct all discrepancies.

## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, June 03, 2011 9:26 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 6/3/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report previously submitted to Agencies, under review.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

### **END OF REPORT**

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, May 20, 2011 9:33 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 5/20/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report previously submitted to Agencies, under review.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

### **END OF REPORT**

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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**Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, May 13, 2011 12:46 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 5/13/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

**ACTIVITIES PERFORMED DURING PERIOD**

1. Revised report submitted to Agencies, under review.

**ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Wait for agency approval of report.

**ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

END OF REPORT

---

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Infrastructure, environment, buildings

Mr. Ken Mallary  
USEPA Region 4  
Sam Nunn Atlanta Federal Center  
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Atlanta, GA 30303-8960



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Subject:

Response to USEPA and NCDENR Comments  
Removal Action Completion Report  
Former Virginia-Carolina Chemical Company Winston-Salem Site  
Winston-Salem, Forsyth County, North Carolina

ENVIRONMENTAL

Dear Mr. Mallary:

Date:  
May 9, 2011

On behalf of ExxonMobil Environmental Services Company (EMES), this letter provides responses to comments received from the United States Environmental Protection Agency (USEPA) (received November 5, 2010) and North Carolina Department of Environment and Natural Resources (NCDENR) (dated September 29, 2010, received with the USEPA comments) on the *Removal Action Completion Report, Former Virginia-Carolina Chemical Company Winston-Salem Site, Winston-Salem, Forsyth County, North Carolina* (Report) dated September 2010. USEPA and NCDENR comments are provided in bold typeface followed by the response in standard typeface. Revision No. 1 of the Work Plan is enclosed.

Contact:  
Matthew T. Pelton

Phone:  
919.415.2308

Email:  
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Our ref:  
B0085732

### RESPONSE TO USEPA COMMENTS

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- 1. Section 3 Post-Removal Action Site Control Plan - Section 3 states that Institutional Controls (ICs) will be implemented and annual inspections will be made. I recommend that ExxonMobil, ARCADIS, EPA, and NCDENR have a conference call in the near future to discuss which type(s) of property-use limitations/restrictions are appropriate for the Site (i.e., future land use restrictions, future groundwater use restrictions, etc.), how and when the ICs will be implemented, and how the annual inspections will be conducted and reported to EPA and NCDENR. Once these decisions are made, I'd like to see a more-detailed description either provided in the Removal Action Completion Report, or described in a separate Post-Removal Site Control Plan.**

Imagine the result

**Response:** Based on the discussion had on the call between USEPA, NCDENR, EMES, and ARCADIS on November 18, 2010, Sections 3 and 4 of the Report have been revised to provide more detail on the post-removal site control plan and groundwater monitoring.

## **RESPONSE TO NCDENR COMMENTS**

- 2. Section 1.3 Report Organization – Please revise the first paragraph of Section 1.3 to correctly describe the contents of the *Removal Action Completion Report*.**

**Response:** The first paragraph of Section 1.3 has been revised to correctly describe the contents of the *Removal Action Completion Report*.

- 3. Section 1.3 Report Organization – Please revise the first bullet item of the second paragraph of Section 1.3 to state that “Appendix A contains photographs taken *before, during, and after* the soil removal action...”**

**Response:** The first bullet item has been revised to state that “Appendix A contains photographs taken before, during, and after the soil removal action...”

- 4. Section 2.4 Soil Removal Activities – Please supplement Section 2.4 with a separate appendix containing an electronic scanned copy of the field notes documenting the soil removal activities.**

**Response:** Appendix D – Removal Action Field Note Documentation has been included to supplement Section 2.4. Please note that the Analytical Sample Results for Backfill Source appendix is now designated as Appendix F.

- 5. Section 2.4.7 Soil Stabilization and Stockpiling – Please revise the first paragraph of Section 2.4.7 to indicate that the purpose of soil stabilization activities was to also reduce the leachable concentrations of *arsenic* to less than 5 milligrams per liter (mg/L).**

**Response:** The waste characterization TCLP sampling did not indicate any leachable concentrations of arsenic in any of the samples analyzed.

Therefore, the stabilization efforts were only intended to reduce the leachable concentrations of lead.

6. **Section 2.4.7 Soil Stabilization and Stockpiling** – Please supplement Section 2.4.7 with a figure depicting those areas requiring stabilization prior to transportation and disposal.

**Response:** Figure 2-2 has been added to supplement Section 2.4.7. This figure depicts those areas requiring stabilization prior to transportation and disposal.

7. **Section 2.4.7 Soil Stabilization and Stockpiling** – Please revise the second paragraph of Section 2.4.7 to more completely describe Enviroblend and the mixture ratios required to achieve stabilization.

**Response:** The second paragraph of Section 2.4.7 has been revised to provide a more complete description of Enviroblend<sup>®</sup> components, as well as the average percent (by weight) of Enviroblend<sup>®</sup> used to stabilize excavated soils during removal action activities.

8. **Section 2.4.8 Dust Monitoring Program** – Please provide additional details regarding the implementation of the dust monitoring program (i.e., how many, how frequent, duration of sampling, where located, warning alarms, etc.)

**Response:** Section 2.4.8 has been revised to further describe the dust monitoring program implemented at the Site, including sample locations, sample frequency, sample analyses, and dust monitoring action levels.

9. **Section 2.4.8 Dust Monitoring Program** – Please supplement Section 2.4.8 with a section describing the health and safety program and its implementation.

**Response:** Section 2.4.9 (Health and Safety Program Implementation) has been inserted into the report to describe the health and safety program implemented at the site and adhered to by all project personnel.

10. **Section 2.4.9 Water Management** – Please append Section 2.4.9 with a description of how the stormwater was managed when the water did come in contact with contaminated soils.

**Response:** Section 2.4.9 (Water Management) has been renumbered as 2.4.10 based on the health and safety section added above. This section has been revised to state that water that accumulated in the excavation

areas and came in contact with contaminated soil was allowed to infiltrate into the ground or evaporate.

11. **Section 2.5.1 Confirmation Sampling** – Please supplement the third paragraph of this section with a figure depicting those impacted soils that were left in place and all X-ray fluorescence (XRF) field screening results and confirmation soil sample and analytical results.

**Response:** Table 2-2 has been added to present XRF field screening results for impacted soils that were left in place. Figure 2-5 has been added to depict the XRF screening locations presented on Table 2-2. Figure 2-3A depicts the locations of confirmation samples collected from within the areas where impacted soil was left in place (WS-CS-5-1, WS-CS-5-11, and WS-CS-8-1). Analytical results for these samples are presented on Table 2-1.

Please note that the table titled "Summary of Soil Stabilization Sample Analytical Results" is now designated as Table 2-3.

12. **Section 2.5.2 Waste Stabilization Stockpile Sampling** – Please revise the second paragraph of Section 2.5.2 to include a description of the location of the area represented by the stockpile described in this paragraph (i.e., grid number, etc.).

**Response:** The second paragraph of Section 2.5.2 has been revised to state that TCLP sample WS-TCLP-5-10 corresponds to soil excavated and stabilized from the area where confirmation sample WS-CS-5-9 was located. Confirmation sample locations have been included on Figures 2-3A and 2-3B.

13. **Section 2.5.3 Backfill Material and Sampling Activities** – Please revise the fourth sentence of Section 2.5.3 to state "The fill materials were approved for use by both USEPA and NCDENR."

**Response:** The fourth sentence of Section 2.5.3 has been revised to state "The fill materials were approved for use by both USEPA and NCDENR."

14. **Section 2.6 Site Restoration** – Please supplement the second bullet item of Section 2.6 with figures depicting both pre-excavation and post-excavation topographical surveys.

**Response:** Figures 2-6A, 2-6B, 2-7C, 2-7A, 2-7B, and 2-7C have been inserted to depict pre-excavation, base of excavation, and post-excavation topographical surveys.

15. **Section 4 Groundwater** – Please revise Section 4 to include provisions for a more robust assessment of groundwater at the Site.

**Response:** Based on the discussion had on a call between USEPA, NCDENR, EMES, and ARCADIS on November 18, 2010, and subsequent conversations with USEPA and NCDENR, Section 4 of the Report has been revised to indicate that a plan for groundwater monitoring at the site will be prepared in the near future for review and approval by NCDENR Inactive Hazardous Site Branch.

16. **Table 2-1 Summary of Confirmation Soil Sample Analytical Results** – Please supplement Table 2-1 with a separate appendix containing an electronic scanned copy of the laboratory analytical results summarized in Table 2-1.

**Response:** Appendix E – Analytical Results for Confirmation Samples and TCLP Samples has been added to supplement Table 2-1.

17. **Table 2-1 Summary of Confirmation Soil Sample Analytical Results** – Please supplement Table 2-1 with a separate figure depicting the locations where the confirmation soil samples were located (i.e., specific locations for discrete samples and areas used for composite samples).

**Response:** Figure 2-3A and 2-3B have been added and depict the confirmation sample locations as well as the discrete sample points making up each composite sample.

18. **Table 2-2 Summary of Soil Stabilization Sample Analytical Results** - Please supplement Table 2-2 with a separate appendix containing an electronic scanned copy of the laboratory analytical results summarized in Table 2-2.

**Response:** Appendix E – Analytical Results for Confirmation Samples and TCLP Samples has been added to supplement Table 2-2.

19. **Figure 2-1A Site Plan Showing Limits of Soil Removal – North of Highway 52/SR-8** – Please revise Figure 2-1A to include the depths of excavation for each area.

**Response:** Figure 2-4A has been added to depict the depths of excavation for each removal area.

20. **Figure 2-1B Site Plan Showing Limits of Soil Removal – South of Highway 52/SR-8** – Please revise Figure 2-1B to include the depths of excavation for each area.

**Response:** Figure 2-4B has been inserted to depict the depths of excavation for each removal area.

21. **Appendix B Soil Disposal Log** – Please supplement Appendix B with an electronic scanned copy of the Waste Manifests summarized in the table included as Appendix B.

**Response:** Appendix B has been supplemented with a CD including electronic scanned copies of Waste Manifests summarized in the table.

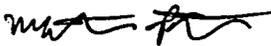
22. **Appendix C Air Monitoring Results** – Please supplement Appendix C with an electronic scanned copy of the laboratory analytical results summarized in the table included as Appendix C.

**Response:** Appendix C has been supplemented with a CD including electronic scanned copies of air monitoring laboratory analytical results.

If you have any questions or comments, please feel free to contact me at 919.415.2308.

Sincerely,

ARCADIS



Matthew T. Pelton  
Senior Environmental Engineer

Copies:

David Mattison, NCDENR  
Steve Schmidt, EMES

## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, May 06, 2011 8:43 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 5/6/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Completed revisions to EPA Removal Action Report.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Submit revised Removal Action Report to EPA and DENR.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.

END OF REPORT

---

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**Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, April 29, 2011 11:48 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 4/29/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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**ACTIVITIES PERFORMED DURING PERIOD**

1. Continued revisions to EPA Removal Action Report.

**ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue revisions to EPA Removal Action Report.

**ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

**END OF REPORT**

---

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## **Mattison, David**

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**Sent:** Friday, April 22, 2011 1:42 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 4/22/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued revisions to EPA Removal Action Report.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue revisions to EPA Removal Action Report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

---

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## **Mattison, David**

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**Sent:** Friday, April 15, 2011 11:06 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 4/15/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued revisions to EPA Removal Action Report.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue revisions to EPA Removal Action Report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

---

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## **Mattison, David**

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**Sent:** Friday, April 08, 2011 1:48 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 4/8/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued revisions to EPA Removal Action Report.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue revisions to EPA Removal Action Report.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

---

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## **Mattison, David**

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**Sent:** Friday, April 01, 2011 1:36 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 4/1/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements.
2. Submitted letter from Steve Schmidt of EMES to Mr. Bruce Parris with NCDENR IHSB.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, March 25, 2011 5:32 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 3/25/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements.
2. Prepared letter from Steve Schmidt of EMES to Mr. Bruce Parris with NCDENR IHSB.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

---

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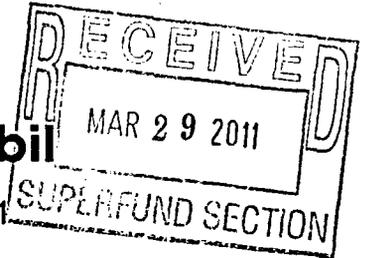
**ExxonMobil**  
**Environmental Services Company**  
3225 Gallows Road  
Fairfax, Virginia 22037

Phone: (703) 846-1005  
Fax: (703) 846-5298  
Email: [steven.p.schmidt@exxonmobil.com](mailto:steven.p.schmidt@exxonmobil.com)

STEVEN P. SCHMIDT

**ExxonMobil**

March 24, 2011



**Via UPS Next Day Air- Number: 1Z 78V 196 01 9031 0005**

Bruce Parris  
Environmental Supervisor II, Western Region  
North Carolina Dept. of Environment & Natural Resources  
Div. of Waste Mgt. - Superfund Section - Inactive Hazardous Sites Branch  
Mooresville Regional Office  
610 East Center Street, Suite 301  
Mooresville, NC 28115

**Re: Winston-Salem Virginia Carolina Chemical Site**

Dear Mr. Parris:

Thank you for your email of February 4, 2011 outlining NC IHSB standards and procedures for investigation and remediation. This letter is a response to your comments presented to ExxonMobil Environmental Service Company ("EMES") concerning the former Virginia-Carolina Chemical Company (VCC) site ("Site") on February 3, 2011.

EMES commits to start the process to plan for a final resolution of the Site. We propose to meet with your IHSB staff designee to develop a site assessment work plan. ARCADIS Project Manager Matt Pelton will also work in cooperation with Collin Day of the Division of Water Quality Winston-Salem Regional Office to develop a mutually acceptable work plan.

EMES reiterates its concern that we do not wish to become involved in a regional water quality project, as there are numerous sources that may be responsible for any exceedances of North Carolina's 15A NCAC 2L groundwater quality standards (2L) on or adjacent to the Site.

Finally, we plan to finalize the former Virginia-Carolina Chemical Company (VCC) Site Removal Action Completion Report with US EPA Region 4 in the near future. NCDENR will be copied on the final submittal.

You may reach me at (703) 846-1005 if you have questions.

Sincerely,



Steven P. Schmidt  
Project Manager, Superfund  
ExxonMobil Environmental Services Co.

cc:

David Mantor, Exxon Mobil Corp- Law Department

Ken Mallary, US EPA Region 4- On-Scene Coordinator

David B. Mattison, NC DENR Superfund Section

Matt Pelton, ARCADIS- Project Manager

## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, March 18, 2011 10:16 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 3/18/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

---

**Matthew T. Pelton, P.E.** | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## **Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, March 11, 2011 11:49 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 3/11/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

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## **Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, March 04, 2011 1:46 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 3/4/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

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## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, February 25, 2011 3:43 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 2/25/11 Weekly Status Report: VCC Winston-Salem, NC

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Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Continued review of NCDENR regulatory requirements provided by Bruce Paris.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Continue to review NCDENR regulatory requirements provided by Bruce Paris.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## Mattison, David

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, February 18, 2011 11:55 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
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Regards-  
Matt Pelton

---

### ACTIVITIES PERFORMED DURING PERIOD

1. Continued review of NCDENR regulatory requirements provided by Bruce Paris.

### ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD

2. Continue to review NCDENR regulatory requirements provided by Bruce Paris.

### ACTION ITEMS/OTHER

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

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## **Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, February 11, 2011 11:37 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
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Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. ARCADIS conducted site visit and meet with Collin Day onsite on February 8, 2011.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Review NCDENR regulatory requirements provided by Bruce Paris.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

END OF REPORT

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Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Attended meeting with NCDENR on February 3, 2011 to discuss post-removal site requirements.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Review NCDENR regulatory requirements provided by Bruce Paris.
2. Meet with Collin Day onsite to view current area conditions following DOT work.

### **ACTION ITEMS/OTHER**

1. Continue discussions with NCDENR on path forward for site under NCDENR IHSB regulatory program.
2. Finalize EPA Removal Action Report.

### **END OF REPORT**

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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## **February 3, 2011 VCC Winston-Salem Meeting Agenda**

**Date:** February 3, 2011.

**Time:** 1 PM – 3 PM

**Location:** NCDENR Office on Oberlin Road in Raleigh

### **Expected Attendees:**

- Dave Mattison, Collin Day, and Bruce Paris with NCDENR
- Steve Schmidt with ExxonMobil Environmental Services
- Matt Pelton with ARCADIS

### **Topics to be Discussed:**

- EMES summary of VCC Winston-Salem project scope and work performed – US EPA Removal Action
- IHSB expectations for post-removal site control plan for the VCC site.
  - Interpretation of groundwater potentiometric surface at VCC site.
  - Interpretation of groundwater analytical results at VCC site.
  - Expectations for additional groundwater monitoring.
- Discussion of stream and sediment sampling.
- EMES summary of VCC geochemistry (arsenic and lead).
- Discussion of Carolina Ore site following NCDOT capping work.
- Overall path forward towards closure for the VCC site.

## February 3, 2011 VCC Winston-Salem Meeting

### Summary of Project

- Property Report submitted to US EPA March 2006, upon request of NC DNER.
- Soil screening during NC DOT geotechnical investigation of bridges November 2008.
- Site investigation activities began in May, 2009 on an accelerated schedule to meet NCDOT construction schedule.
- Over the course of several events collected a total of 251 soil samples from 76 boring locations to provide delineation of soils containing arsenic and lead above NCDENR screening levels.
- Installed 5 monitoring wells in October, 2009.
  - 1 well, MW-1 located south of highway, was dry after installation.
  - Remaining 4 wells on north side of highway were gauged and sampled in November, 2009.
  - Only 1 well, MW-2, contained lead above NC2L standards. Arsenic and lead levels in all other wells were below 2L standards.
- In accordance with the Administrative Order on Consent (AOC) dated March 30, 2010, and *Site Delineation Report and Removal Action Work Plan* dated February 16, 2010, EMES conducted soil removal activities at the site.
  - Soil removal activities were conducted between May, 2010 and July, 2010.
  - 30,450 tons of arsenic and lead impacted soil and debris were removed from the site and transported to BFI/Charlotte Motor Speedway Landfill in Concord, NC.
  - Removal Action Completion Report initially submitted on September 23, 2010. Comments received from USEPA and NCDENR on November 5, 2010 and September 29, 2010, respectively. Responses complete but awaiting additional NCDENR comments prior to resubmittal.
  - Post-removal control plan recommends 1 additional sampling round on existing monitoring wells.

**Table 3-1**  
**Summary of Soil Sample Analytical Results**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-B1-C	0 - 0.5	11/20/2008	7.3 [7.2]	1.10 U [0.96 U]	185 J [163]
	0.5 - 2	11/20/2008	7.3	0.96 U	57.3
	2 - 4	11/20/2008	6.3	1.10 U	18.1
WS-EB2-D	1 - 1.5	11/20/2008	6.9	1.54	27.0 J
	1.5 - 3	11/20/2008	7.0	2.19	24.9 J
	3 - 5	11/20/2008	6.0	1.08 U	278 J
	36 - 37.55	11/20/2008	5.4 J	1.02 U	37.0 J
	38.5 - 40	11/20/2008	6.3 J	121	17.6 J
	41 - 42.5	11/20/2008	4.9 J	15.5	16.5 J
WS-SB-1	0 - 0.5	5/18/2009	5.6 J	6.50	61.1
	0.5 - 2	5/18/2009	5.3 J	5.65	86.5
	2 - 4	5/18/2009	4.8 J	6.15	15.5
WS-SB-2	0 - 0.5	5/18/2009	5.2 J	4.34	31.6
	0.5 - 2	5/18/2009	4.4 J	3.98	24.2
	2 - 4	5/18/2009	4.8 J	3.66	16.8
WS-SB-3	0 - 0.5	5/19/2009	5.9 J	6.30	38.0 J
	0.5 - 2	5/19/2009	7.3 J [5.8 J]	3.68 [2.77]	29.2 J [25.8 J]
	2 - 4	5/19/2009	4.7 J	2.74	35.3 J
WS-SB-4	0 - 0.5	5/19/2009	5.3 J	7.35	32.9 J
	0.5 - 2	5/19/2009	4.9 J	4.74	26.9 J
	2 - 4	5/19/2009	5.3 J	2.53	19.6 J
WS-SB-5	0 - 0.5	5/19/2009	5.3 J	5.74	40.5 J
	0.5 - 2	5/19/2009	5.6 J	5.69	26.9 J
	2 - 4	5/19/2009	4.9 J	3.72	27.3 J
WS-SB-6	0 - 0.5	5/19/2009	5.3 J	8.44	53.3 J
	0.5 - 2	5/19/2009	5.3 J	6.20	21.6 J
	2 - 4	5/19/2009	4.4 J	3.94	19.9 J
WS-SB-7	0 - 0.5	5/20/2009	5.0 J	1.21 J	21.3 J
	0.5 - 2	5/20/2009	4.3 J	7.10 J	51.9 J
	2 - 4	5/20/2009	5.1 J	3.72 J	22.0 J
WS-SB-8	0 - 0.5	5/20/2009	4.1 J	38.3 J	1,740 J
	0.5 - 2	5/20/2009	5.5 J	5.07 J	211 J
	2 - 4	5/20/2009	5.6 J	3.06 J	25.1 J
WS-SB-9	0 - 0.5	5/20/2009	4.4 J	0.731 UJ	40.2 J
	0.5 - 2	5/20/2009	4.6 J	9.50 J	253 J
	2 - 4	5/20/2009	4.2 J [4.1 J]	8.81 J [25.2]	635 J [3,540 J]
	4 - 6	10/13/2009	3.5	0.821 U	26.6
WS-SB-10	0 - 0.5	5/20/2009	6.0 J	6.18	203
	0.5 - 2	5/20/2009	6.6 J	9.82	3,650
	2 - 4	5/20/2009	5.0 J	6.80	1,570
	4 - 6	10/13/2009	4.3 J [4 J]	21.9 J [0.800 U]	38.0 [46.0]
WS-SB-11	0 - 0.5	5/19/2009	4.4 J	7.91	30.7
	0.5 - 2	5/19/2009	5.8 J	7.09	21.5
	2 - 4	5/19/2009	5.4 J	26.9	102
WS-SB-12	0 - 0.5	5/19/2009	5.1 J	8.83	49.8
	0.5 - 2	5/19/2009	5.6 J	6.59	64.8
	2 - 4	5/19/2009	6.2 J	8.01	73.3

**Table 3-1**  
**Summary of Soil Sample Analytical Results**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-SB-13	0 - 0.5	5/19/2009	5.1 J	33.0	40.9
	0.5 - 2	5/19/2009	5.4 J	9.39	23.0
	2 - 4	5/19/2009	5.2 J	7.30	23.6
WS-SB-14	0 - 0.5	5/19/2009	7.2 J	16.1	146
	0.5 - 2	5/19/2009	5.1 J	3.30	18.3
	2 - 4	5/19/2009	5.3 J	2.84	11.0
WS-SB-15	0 - 0.5	5/19/2009	5.6 J	6.19	79.8
	0.5 - 2	5/19/2009	5.2 J	6.75	30.6
WS-SB-16	0 - 0.5	5/19/2009	5.3 J [6.7 J]	7.56 [6.12]	18.5 [15.5 J]
	0.5 - 2	5/19/2009	5.3 J	8.25	21.3
	2 - 4	5/19/2009	5.6 J	4.29	16.7
WS-SB-17	0 - 0.5	5/20/2009	4.9 J	38.0 J	1,360 J
	0.5 - 2	5/20/2009	4.0 J	148 J	238 J
	2 - 4	5/20/2009	4.0 J	2.78 J	22.4 J
WS-SB-18	0 - 0.5	5/20/2009	6.1 J	62.8 J	946 J
	0.5 - 2	5/20/2009	3.1 J	35.1 J	2,030 J
	2 - 4	5/20/2009	5.3 J	5.94 J	287 J
WS-SB-19	0 - 0.5	5/20/2009	4.8 J	55.1 J	188 J
	0.5 - 2	5/20/2009	4.3 J	14.8 J	24.5 J
	2 - 4	5/20/2009	4.00 J	6.59 J	35.1 J
WS-SB-20	0 - 0.5	5/20/2009	7.0 J	0.924 J	23.9
	0.5 - 2	5/20/2009	6.1 J	1.92	28.0
	2 - 4	5/20/2009	5.0 J	3.56	56.5
WS-SB-21	0 - 0.5	5/19/2009	5.5 J	9.22	123
	0.5 - 2	5/19/2009	5.3 J	8.66	40.3
	2 - 4	5/19/2009	5.9 J	74.8	87.0
	4 - 6	10/14/2009	5.1	17.2	16.3 J
WS-SB-22	0 - 0.5	5/19/2009	7.2 J	15.7	214
	0.5 - 2	5/19/2009	6.3 J [7 J]	238 [221]	3,640 [4,380 J]
	2 - 4	5/19/2009	5.0 J	29.7	380
	4 - 6	10/13/2009	4.7 J [4.2]	17.8 J [2.44]	166 J [37.0]
WS-SB-23	0 - 0.5	5/19/2009	7.0 J	12.4	122
	0.5 - 2	5/19/2009	7.2 J	1.50	13.1
	2 - 4	5/19/2009	5.4 J	1.86	19.3
WS-SB-24	0 - 0.5	5/19/2009	6.0 J	60.1	657
	0.5 - 2	5/19/2009	5.1 J	6.73	47.9
	2 - 4	5/19/2009	5.3 J	2.95	14.4
WS-SB-25	0 - 0.5	10/13/2009	5.5 J	8.03 J	103
	0.5 - 2	10/13/2009	5.2 J	2.51 J	33.8
	2 - 4	10/13/2009	4.7 J	1.26 J	12.6
WS-SB-26	0 - 0.5	10/14/2009	5.2	92.6	1,590
	0.5 - 2	10/14/2009	4.7	1.21	16.8
	2 - 4	10/14/2009	4.5	3.62	26.3 J
WS-SB-27	0 - 0.5	10/13/2009	6.9 J	6.33 J	79.7 J
	0.5 - 2	10/13/2009	4.7 J	2.02 J	10.9 J
	2 - 4	10/13/2009	4.9 J	0.793 UJ	12.8

**Table 3-1**  
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**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-SB-28	0 - 0.5	10/14/2009	4.8	8.09	60.7
	0.5 - 2	10/14/2009	5.4	5.33	18.4
	2 - 4	10/14/2009	6.6	5.20	16.7
WS-SB-29	0 - 0.5	10/15/2009	6.3	1.76	36.5
	0.5 - 2	10/15/2009	7.1	2.19	28.2
	2 - 4	10/15/2009	6	2.96	36.5
WS-SB-30	0 - 0.5	10/14/2009	5.7	8.71	48.5 J
	0.5 - 2	10/14/2009	5	7.87	48.4 J
	2 - 4	10/14/2009	4.8	7.17	14.4 J
WS-SB-31	0 - 0.5	10/13/2009	6.9 J	17.4 J	138 J
	0.5 - 2	10/13/2009	6.7 J	2.87 J	13.2 J
	2 - 4	10/13/2009	5.1 J	2.12 J	11.2 J
WS-SB-32	0 - 0.5	10/14/2009	5.3	16.5	48.2 J
	0.5 - 2	10/14/2009	4.6	9.56	37.1 J
	2 - 4	10/14/2009	4.8	11.2	56.6 J
WS-SB-33	0 - 0.5	10/15/2009	5.9	10.8	60.7
	0.5 - 2	10/15/2009	5.7	4.22	15.0
	2 - 4	10/15/2009	5.8	5.96	16.4
WS-SB-34	0 - 0.5	10/13/2009	7.5 J	8.91 J	106 J
	0.5 - 2	10/13/2009	7.3 J	132 J	2,240 J
	2 - 4	10/13/2009	5.9 J	65.0 J	749 J
	4 - 6	10/13/2009	6.6 J	10.8 J	70.8 J
	6 - 8	10/13/2009	6.2 J	15.6 J	146 J
WS-SB-35	0 - 0.5	10/15/2009	7.2	1.46	16.7
	0.5 - 2	10/15/2009	7.3	13.8	87.9
	2 - 4	10/15/2009	6.7	2.46	19.9
WS-SB-36	0 - 0.5	10/15/2009	5.9	11.3	202
	0.5 - 2	10/15/2009	6.3 [5.9]	93.4 [64.5]	774 [813]
	2 - 4	10/15/2009	6.7	4.75	102
WS-SB-37	0 - 0.5	10/15/2009	6.3	5.99	141
	0.5 - 2	10/15/2009	6.6	1.17	34.1
	2 - 4	10/15/2009	5.9	3.09	24.3
WS-SB-38	0 - 0.5	10/15/2009	5.5	0.882 U	112
	0.5 - 2	10/15/2009	6.5	7.50	110
	2 - 4	10/15/2009	6.7	2.05	24.1
WS-SB-39	0 - 0.5	10/13/2009	4.9 J	0.750 UJ	67.7
	0.5 - 2	10/13/2009	4.3 J	10.2 J	488
	2 - 4	10/13/2009	4.3 J	2.30 J	43.7
WS-SB-40	0 - 0.5	10/13/2009	4.7 J	39.6 J	159
	0.5 - 2	10/13/2009	4.3 J	152 J	58.7
	2 - 4	10/13/2009	4.4 J	35.4 J	20.8
	4 - 6	10/29/2009	4.6	2.86	26.8
WS-SB-41	0 - 0.5	10/13/2009	4.4 J	292	3,440
	0.5 - 2	10/13/2009	4.2 J	240	2,280
	2 - 4	10/13/2009	4.2 J [4.7 J]	116 [120]	1,930 [1,800]
	4 - 6	10/29/2009	3.9	5.37	31.3

**Table 3-1**  
**Summary of Soil Sample Analytical Results**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-SB-42	0 - 0.5	10/13/2009	3.7 J	105	1,040
	0.5 - 2	10/13/2009	4.1 J	22.9	97.9
	2 - 4	10/13/2009	3.7 J	4.13	45.9
WS-SB-43	0 - 0.5	10/13/2009	3.8 J	24.7 J	42.2
	0.5 - 2	10/13/2009	3.9 J	7.31 J	63.5
	2 - 4	10/13/2009	3.8 J	0.801 UJ	30.3
WS-SB-44	0 - 0.5	10/12/2009	7.7 J	5.39 J	113 J
	0.5 - 2	10/12/2009	7.5 J	21.2 J	376 J
	2 - 4	10/12/2009	7.8 J	2.17 J	46.9 J
WS-SB-45	0 - 0.5	10/12/2009	7.2 J	7.64 J	184 J
	0.5 - 2	10/12/2009	7.2 J	6.49 J	46.7 J
	2 - 4	10/12/2009	7.2 J	2.32 J	43.6 J
WS-SB-46	0 - 0.5	10/12/2009	7.2 J	4.54 J	68.6 J
	0.5 - 2	10/12/2009	6.8 J	24.2 J	235 J
	2 - 4	10/12/2009	7.2 J	3.78 J	68.0 J
WS-SB-47	0 - 0.5	10/14/2009	4.5	2.94	25.8 J
	0.5 - 2	10/14/2009	4.4	4.87	25.1 J
	2 - 4	10/14/2009	4.6	4.58	31.8 J
WS-SB-48	0 - 0.5	10/14/2009	4.6	133	658 J
	0.5 - 2	10/14/2009	5.7	5.38	20.5 J
	2 - 4	10/14/2009	4.7	5.21	21.3 J
WS-SB-49	0 - 0.5	10/15/2009	5	6.48	69.1
	0.5 - 2	10/15/2009	5.3	5.26	634
	2 - 4	10/15/2009	5.5	4.84	208
WS-SB-50	0 - 0.5	10/15/2009	5	4.73	40.4
	0.5 - 2	10/15/2009	5.3	5.95	101
WS-SB-51	0 - 0.5	10/15/2009	7.4	12.5	138
	0.5 - 2	10/15/2009	7.5	6.30	65.2
	2 - 4	10/15/2009	7.2	4.86	44.6
WS-SB-52	0 - 0.5	10/15/2009	7	11.7	115
	0.5 - 2	10/15/2009	6.9	8.19	119
	2 - 3	10/15/2009	6	5.64	83.0
WS-SB-53	0 - 0.5	10/15/2009	6.8	12.0	156
	0.5 - 2	10/15/2009	6.3	269	1,640
	2 - 4	10/15/2009	6.6 [6.2]	364 [359]	1,740 [1,550]
	4 - 5	10/15/2009	4.4	21.0	64.0
WS-SB-54	0 - 0.5	10/15/2009	6.2	11.1	170
	0.5 - 2	10/15/2009	6.5	3.25	50.9
	2 - 4	10/15/2009	6.4	2.28	15.0
WS-SB-55	0 - 0.5	10/15/2009	6.4	3.26	29.1
	0.5 - 2	10/15/2009	6.6	1.74	43.1
	2 - 4	10/15/2009	6.4	2.27	124
WS-SB-56	0 - 0.5	10/29/2009	5.0	8.53	77.8
	0.5 - 2	10/29/2009	4.4	4.57	116
	2 - 4	10/29/2009	5.2	7.52	66.4

**Table 3-1**  
**Summary of Soil Sample Analytical Results**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-SB-57	0 - 0.5	4/22/2010	5.7	6.62	73.1
	0.5 - 2	4/22/2010	5.1 [5.0]	13.6 [24.1]	269 [430]
	2 - 4	4/22/2010	5.0	4.36	280
WS-SB-58	0 - 0.5	4/22/2010	4.9	6.33	74.7
	0.5 - 2	4/22/2010	4.7	11.6	56.7
	2 - 4	4/22/2010	4.6	11.9	56.4
	4 - 6	4/22/2010	4.4	13.1	86.6
	6 - 8	4/22/2010	4.8	7.61	217
WS-SB-59	0 - 0.5	4/22/2010	5.5	2.89	34.2
	0.5 - 2	4/22/2010	6.3	3.5	17.3
	2 - 4	4/22/2010	6.8	15.7	108
	4 - 6	4/22/2010	5.1	9.83	33.2
	6 - 8	4/22/2010	4.8	3.41	42.4
WS-SB-60	0 - 0.5	4/22/2010	5.1	4.16	43.6
	0.5 - 2	4/22/2010	5.1	11.0	1,160
	2 - 4	4/22/2010	5.0 [4.8]	1.34 J [7.52 J]	837 [1,420]
	4 - 6	4/22/2010	4.8	5.06 J	954
	6 - 8	4/22/2010	4.8	3.31 J	437
	8 - 10	4/22/2010	4.9	0.983 UJ	192
WS-SB-61	0 - 0.5	4/23/2010	4.8	18.0 J	179
	0.5 - 2	4/23/2010	4.3	2.47 J	87.9
	2 - 4	4/23/2010	4.3	1.55 J	55.2
	4 - 6	4/23/2010	4.4	1.01 UJ	118
	6 - 8	4/23/2010	4.3	0.874 UJ	54.5
WS-SB-62	0 - 0.5	4/23/2010	5.7	17.9 J	231
	0.5 - 2	4/23/2010	4.6	1.84 J	26.7
	2 - 4	4/23/2010	4.5	1.92 J	37.0
	4 - 6	4/23/2010	4.5	1.21 J	32.4
	6 - 8	4/23/2010	4.5	1.89 J	42.0
WS-SB-BB1	0 - 0.5	10/29/2009	4.9	4.18	236
	0.5 - 2	10/29/2009	4.0 [4.0]	22.5 [26.8]	574 [785]
	2 - 4	10/29/2009	3.8	10.1	692
	4 - 6	10/29/2009	4.4	9.16	613
	6 - 8	10/29/2009	3.9	15.2	176
	8 - 10	10/29/2009	3.8	6.31	169
WS-SB-C1	0 - 0.5	10/14/2009	4.5	94.6	588
	0.5 - 2	10/14/2009	4.3	7.25	53.8
	2 - 4	10/14/2009	4.4	1.07 J	20.2
WS-SB-C2	0 - 0.5	10/14/2009	4.5	2.06	37.1
	0.5 - 2	10/14/2009	3.8	0.820 U	20.4
	2 - 4	10/14/2009	4.3	0.841 U	17.1
WS-SB-C3	0 - 0.5	10/13/2009	3.9	7.74	59.5
	0.5 - 2	10/13/2009	4.1	3.08	55.1
	2 - 3	10/13/2009	4	2.77	65.1
WS-SB-C4	0 - 0.5	10/13/2009	5.7	53.5	20,100
	0.5 - 2	10/13/2009	6.1	33.1	14,800

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Sample ID	Depth (ft bgs)	Date	pH	As (mg/kg)	Pb (mg/kg)
WS-SB-C5	0 - 0.5	10/14/2009	6.9	11.1	146 J
	0.5 - 2	10/14/2009	6.7 [6.4]	70.2 [85.9]	583 J [612 J]
	2 - 4	10/14/2009	6.4	29.7	114 J
WS-SB-C8	0 - 0.5	10/15/2009	5.3	2.93	33.8
	0.5 - 2	10/15/2009	5.6	6.58	70.7
	2 - 3.5	10/15/2009	6.8	4.54	60.7
WS-MW-01	0 - 0.5	10/26/2009	5.4 J	7.04	58.5 J
	0.5 - 2	10/26/2009	5.8 J [5.4 J]	3.96 [4.05]	19.6 J [19.7 J]
	2 - 4	10/26/2009	5 J	5.74	33.1 J
WS-MW-02	0 - 0.5	10/27/2009	5.9 J	18.3	123 J
	0.5 - 2	10/27/2009	5.7 J	6.66	52.1 J
	2 - 4	10/27/2009	6.3 J	2.38	41.8 J
WS-MW-03	0 - 0.5	10/28/2009	5.5 J	1.48	68.1 J
	0.5 - 2	10/28/2009	4.9 J	33.9	539 J
	2 - 4	10/28/2009	4.2	4.8	20.7
WS-MW-04	0 - 0.5	10/28/2009	5.5 J	1.59	51.8 J
	0.5 - 2	10/28/2009	5.9 J	0.746 U	4.11 J
	2 - 4	10/28/2009	6.5 J	21.6	295 J
WS-MW-05	0 - 0.5	10/27/2009	4.3 J	6.74	43.4 J
	0.5 - 2	10/27/2009	4 J	2.54	21.5 J
	2 - 4	10/27/2009	4.1 J	2.4	34.4 J

**Notes:**

mg/kg - milligrams per kilogram  
ft bgs - feet below ground surface  
J - estimated value  
U - not detected

Duplicate sample concentrations are in brackets

Arsenic screening value of 22 mg/kg is based on NCDENR site-specific screening levels.

Lead screening value of 270 mg/kg is based on NCDENR site-specific screening levels.

Shaded values exceed screening levels.

**Table 3-3**  
**Summary of Groundwater Analytical Results and Field Parameter Measurements**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Analyte	NC 2L Groundwater Standards	Units	Concentration in Sample				Concentration in Sample:	
			WS-MW-01	WS-MW-02	WS-MW-02 DUP	WS-MW-03	WS-MW-04	WS-MW-05
			NA	11/11/09	11/11/09	11/11/09	11/10/09	11/10/09
<b>Metals</b>								
Arsenic	0.05	mg/L	NS	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	0.015	mg/L	NS	0.0644	0.0642	0.005 U	0.0032 J	0.0035 J
<b>Metals-Dissolved<sup>1</sup></b>								
Arsenic	0.05	mg/L	NS	0.01 U	NA	NA	NA	NA
Lead	0.015	mg/L	NS	0.0346	NA	NA	NA	NA
<b>Field Parameters</b>								
Dissolved Oxygen	--	mg/L	NS	5.2	NA	6.67	4.05	5.07
ORP	--	mV	NS	5	NA	145	423	282
pH	--	SU	NS	4.88	NA	4.93	3.82	4.25
Specific Conductance	--	mS/cm	NS	0.222	NA	0.104	0.580	0.158
Temperature	--	°C	NS	14.88	NA	14.92	15.46	14.57
Turbidity	--	NTU	NS	55	NA	11	36	28

**Notes:**

U - not detected

J - estimated value

ug/L - micrograms per liter

mg/L - milligrams per liter

mV - millivolt

NA - not analyzed

NS - not sampled; well was dry

SU - standard units

mS/cm - millisiemens per centimeter

°C - degrees Celcius

NTU - nephelometric turbidity units

Shaded values exceed the NC2L

Groundwater Standard

1 - Dissolved metals samples were field filtered with a 0.45 µm filter prior to submittal to the laboratory for analysis.

**Table 2-2**  
**Groundwater Monitoring Well Specifications**  
**Site Delineation Report and Removal Action Work Plan**  
**Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Monitoring Well ID	Installation Date	Measured Well Depth from TOPC (feet)	Surface Casing Length (feet)	Screen Length (feet)	Well Casing Diameter (Inches)	Well Screen Slot Size (Inches)	Elevation (feet)			Coordinates		Well Completion	
							TOPC	Ground Surface	Top of Screen	Bottom of Screen	Northing		Easting
WS-MW-01	10/27/2009	45.06	24.86	20	2	0.01	973.28	970.32	948.42	928.42	867672.64	1635309.08	stickup
WS-MW-02	10/29/2009	35.68	25.48	10	2	0.01	948.58	948.9	923.1	913.1	868295.27	1635362.62	flush mount
WS-MW-03	10/28/2009	39.47	19.27	20	2	0.01	951.35	951.58	932.08	912.08	868110.36	1635504.29	flush mount
WS-MW-04	10/28/2009	39.88	19.68	20	2	0.01	948.92	949.24	929.24	909.24	867964.82	1635619.87	flush mount
WS-MW-05	10/27/2009	31.18	20.98	20	2	0.01	941.12	938.14	920.14	900.14	868298.76	1635579.49	stickup

**Notes:**

TOPC - top of PVC casing

Groundwater elevations were surveyed based on National American Vertical Datum (NAVD 29).

Groundwater monitoring well locations were surveyed based on North American Datum (NAD 83).

**Table 2-3  
Groundwater Elevations  
Site Delineation Report and Removal Action Work Plan  
Former VCC Winston-Salem Site - Winston-Salem, North Carolina**

Monitoring Well ID	Top of Casing (feet)	Ground Surface Elevation (feet)	Depth to Groundwater		Depth to Groundwater		Groundwater Elevation	
			10/30/09 (feet btoc)	11/10/09 (feet btoc)	10/30/09 (bgs)	11/10/09 (bgs)	10/30/09 (feet)	11/10/09 (feet)
WS-MW-01	973.28	970.32	dry	dry	dry	dry	dry	dry
WS-MW-02	948.58	948.90	26.50	25.75	26.82	26.07	922.08	922.83
WS-MW-03	951.35	951.58	31.23	31.06	31.46	31.29	920.12	920.29
WS-MW-04	948.92	949.24	29.45	29.02	29.77	29.34	919.47	919.90
WS-MW-05	941.12	938.14	22.32	21.60	19.34	18.62	918.80	919.52

**Notes:**

bgs - below ground surface

btoc - below top of casing

Groundwater elevations were surveyed based on National American Vertical Datum (NAVD 29).

Groundwater monitoring well locations were surveyed based on North American Datum (NAD 83).





CITY: GARY DIV: GROUP: 41 DB: LELIUS LD: (Opt) PIC: (Opt) PM: (Reqd) TM: (Opt) LVR: (Opt) ON: "OFF" REF: G:\EN\CAD\CAD\CAD\B0085732\100100006\DWG\NONEN\B5732303.dwg LAYOUT: 2 SAVED: 1/27/2011 4:02 PM ACADVER: 18.05 (LMS TECH) PAGES: 18.05 (LMS TECH) PLOTSETUP: PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/27/2011 4:02 PM BY: ELIUS, LEKOREY  
 XREFS: 85732300  
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**LEGEND:**

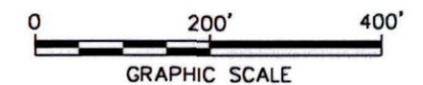
- APPROXIMATE LOCATION OF THE VIRGINIA-CAROLINA CHEMICAL CORPORATION PLANT FENCE LINE (APPROXIMATE BOUNDARY OF THE FIRST LOT OF THE ORIGINAL PLACE)
- - - CURRENT TAX PARCEL BOUNDARIES
- - - 30' POWER TRANSMISSION RIGHT-OF-WAY
- GROUNDWATER MONITORING WELL (ARCADIS, 2009)

**NOTES:**

1. 2010 AERIAL PHOTOGRAPH OF WINSTON - SALEM PROVIDED BY GOGGLE MAPS PRO.
2. PARCEL BOUNDARIES OBTAINED FROM WINSTON-SALEM AND FORSYTH COUNTY GIS. PARCELS ARE DATED OCTOBER 14, 2010.
3. ALL LOCATIONS ARE APPROXIMATE.

**FORMER STREET NAMES:**

INDIANA AVE. (FKA INVERNESS AVE.)  
 LIBERTY ST. (FKA WALKERTOWN RD.)



EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY  
 WINSTON-SALEM, FORSYTH COUNTY, NORTH CAROLINA

**MONITORING WELL AND SURFACE WATER BODY LOCATIONS**



CITY: CARY DIV: GROUP: 41 DB: LELIUS LD: (Or) PIC: (Or) PM: (Rep) TM: (Or) LVR: (Or) ON: OFF: REF: G:\ENV\CAD\Cary\ACT18008573201001000000\DWG\NON\ENR5732001-GIS.dwg LAYOUT: 2 SAVED: 1/27/2011 3:33 PM ACADVER: 18.05 (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/27/2011 4:00 PM BY: ELLIS, LEKOREY XREFS: 85732000 IMAGES: PROJECTNAME: GoogleEarth2010.mxd Mosaic.tif

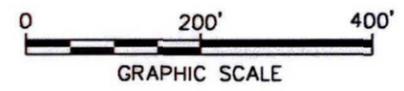


**LEGEND:**

- APPROXIMATE LOCATION OF THE VIRGINIA-CAROLINA CHEMICAL CORPORATION PLANT FENCE LINE (APPROXIMATE BOUNDARY OF THE FIRST LOT OF THE ORIGINAL PLACE)
- - - CURRENT TAX PARCEL BOUNDARIES
- - - 30' POWER TRANSMISSION RIGHT-OF-WAY
- GROUNDWATER MONITORING WELL (ARCADIS, 2009)
- (919.52) GROUNDWATER ELEVATION (FT AMSL)
- 920 GROUNDWATER ELEVATION CONTOUR
- APPROXIMATE GROUNDWATER FLOW DIRECTION

- NOTES:**
1. 2010 AERIAL PHOTOGRAPH OF WINSTON - SALEM PROVIDED BY GOGGLE MAPS PRO.
  2. PARCEL BOUNDARIES OBTAINED FROM WINSTON-SALEM AND FORSYTH COUNTY GIS. PARCELS ARE DATED OCTOBER 14, 2010.
  3. ALL LOCATIONS ARE APPROXIMATE.

**FORMER STREET NAMES:**  
 INDIANA AVE. (FKA INVERNESS AVE.)  
 LIBERTY ST. (FKA WALKERTOWN RD.)

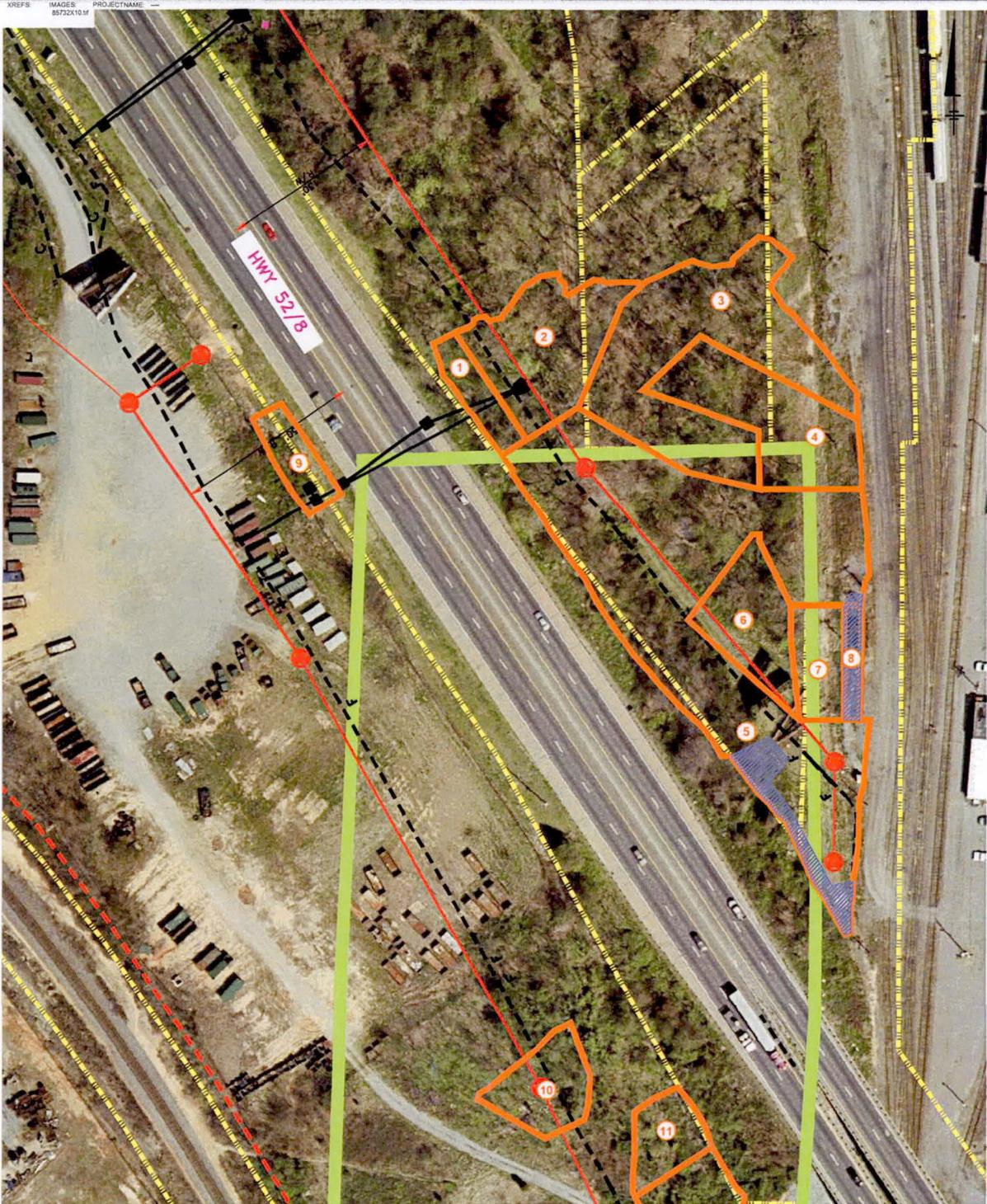


EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY  
 WINSTON-SALEM, FORSYTH COUNTY, NORTH CAROLINA

**MONITORING WELL AND SURFACE WATER BODY LOCATIONS**

**ARCADIS**

FIGURE 1



**LEGEND:**

- APPROXIMATE LOCATION OF THE VIRGINIA-CAROLINA CHEMICAL CORPORATION PLANT FENCE LINE (APPROXIMATE BOUNDARY OF THE FIRST LOT OF THE ORIGINAL PLACE)
- CURRENT TAX PARCEL BOUNDARIES
- 30' POWER TRANSMISSION RIGHT-OF-WAY
- NEW HCCDT R.O.W. (AUGUST 2008)
- APPROXIMATE LIMITS OF FILL FOR ROAD EXPANSION
- PROPOSED HCCDT DRAINAGE STRUCTURE
- AREA OF SOIL REMOVAL
- REMOVAL AREA 10
- DEMARCATION LAMER AREA

**NOTES:**

1. 2005 AERIAL PHOTOGRAPH OF WINSTON - SALEM PROVIDED BY NC ONDMAP.
2. PARCEL BOUNDARIES DIGITIZED FROM 2004 FORSYTH COUNTY COMPILED OF RECORDED PLATS.

**FORMER STREET NAMES:**  
 INDIANA AVE. (PKA INVERNESS AVE.)  
 LIBERTY ST. (PKA WALKERTOWN RD.)

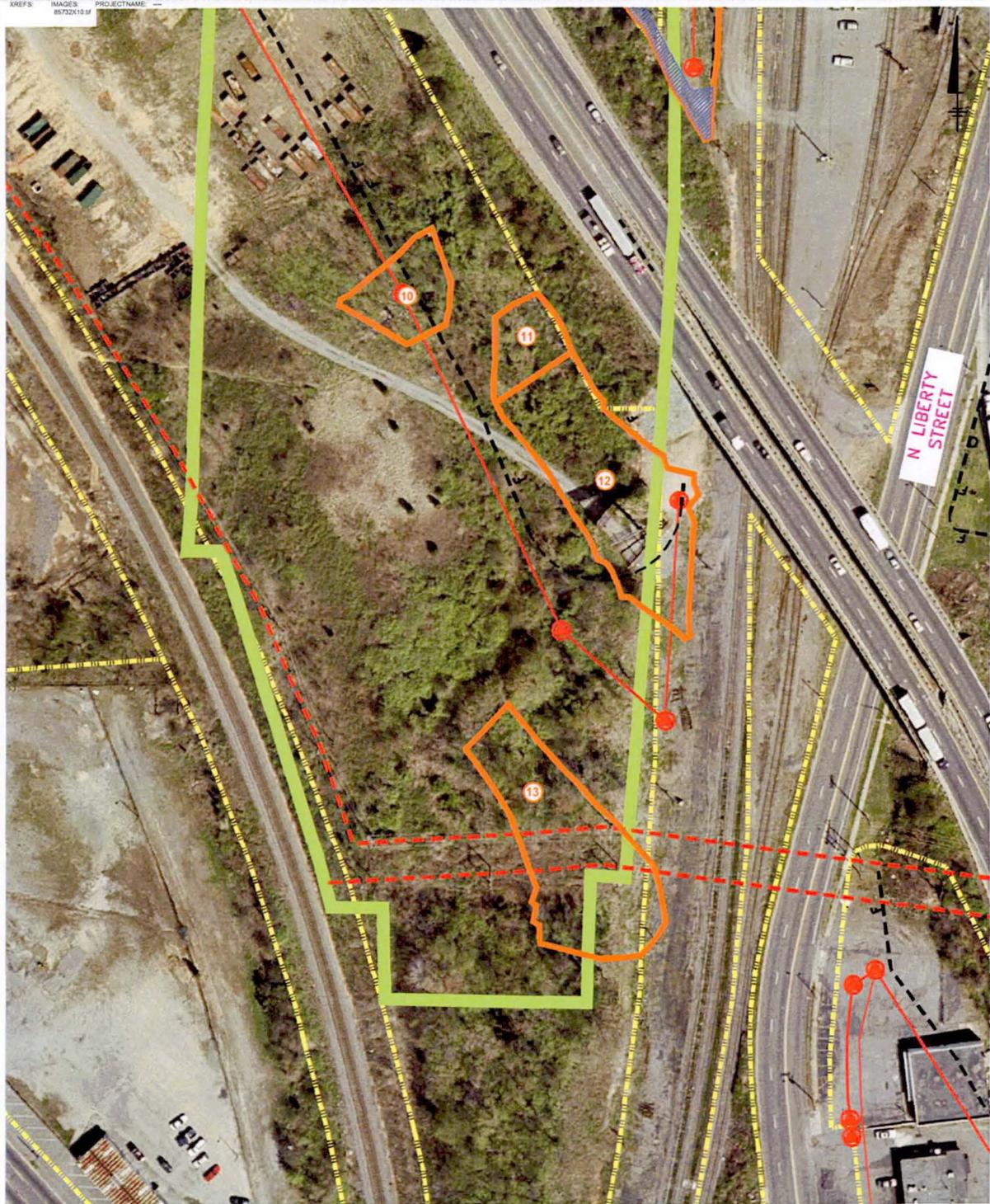
EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY  
 WINSTON-SALEM, FORSYTH COUNTY, NORTH CAROLINA  
 REMOVAL ACTION COMPLETION REPORT

**SITE PLAN SHOWING LIMITS OF SOIL  
 REMOVAL - NORTH OF HIGHWAY 52/SR-8**



FIGURE  
**2-1A**

XREFS: IMAGES: PROJECTNAME: ---  
 65720110.dwg

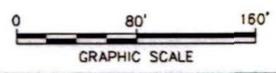


**LEGEND:**

- APPROXIMATE LOCATION OF THE VIRGINIA-CAROLINA CHEMICAL CORPORATION PLANT FENCE LINE (APPROXIMATE BOUNDARY OF THE FIRST LOT OF THE ORIGINAL PLANT)
- - - CURRENT TAX PARCEL BOUNDARIES
- - - 30' POWER TRANSMISSION RIGHT-OF-WAY
- NEW MDOT R.O.W. (AUGUST 2008)
- - - APPROXIMATE LIMITS OF FILL FOR ROAD EXPANSION
- PROPOSED MDOT DRAINAGE STRUCTURE
- AREA OF SOIL REMOVAL
- 10 REMOVAL AREA ID
- DEMARCATION LINER AREA

**NOTES:**

1. 2006 AERIAL PHOTOGRAPH OF WINSTON - SALEM PROVIDED BY MC ONEMAP.
2. PARCEL BOUNDARIES DIGITIZED FROM 2004 FORSYTH COUNTY COMPILATION OF RECORDED PLATS.



**FORMER STREET NAMES:**  
 INDIANA AVE. (PKA INVERNESS AVE.)  
 LIBERTY ST. (PKA WALKERTOWN RD.)

EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY  
 WINSTON-SALEM, FORSYTH COUNTY, NORTH CAROLINA  
 REMOVAL ACTION COMPLETION REPORT

**SITE PLAN SHOWING LIMITS OF SOIL  
 REMOVAL - SOUTH OF HIGHWAY 52/SR-8**



FIGURE  
**2-1B**

## **Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, January 28, 2011 11:45 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 1/28/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

### **ACTIVITIES PERFORMED DURING PERIOD**

1. Scheduled meeting with NCDENR for February 3, 2011 to discuss post-removal site requirements.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Hold meeting with NCDENR to discuss post-removal site requirements.

### **ACTION ITEMS/OTHER**

1. Schedule meeting with NCDENR to discuss regulatory program for VCC sites in North Carolina.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

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North Carolina Department of Environment and Natural Resources  
Division of Waste Management

Beverly Eaves Perdue  
Governor

Dexter R. Matthews  
Director

Dee Freeman  
Secretary

January 24, 2011

Mr. Cyrus F. Parker  
NC Department of Transportation  
Geotechnical Engineering Unit  
GeoEnvironmental Section  
1589 Mail Service Center  
Raleigh, NC 27699-1589

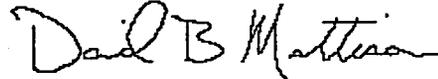
RE: Additional Assessment and Soil Capping Activities Report  
NCDOT Bridge Replacement Project on US 52 at Liberty Street  
Winton-Salem, Forsyth County, North Carolina

Dear Mr. Parker:

The North Carolina Department of Environment and Natural Resources (NC DENR) Superfund Section has received the *Additional Assessment and Soil Capping Activities Report* for the NCDOT Bridge Replacement Project on US 52 at Liberty Street in Winton-Salem, Forsyth County, North Carolina. The NC DENR Superfund Section, Federal Remediation Branch, has reviewed this document and offers the following attached comments.

The NC DENR Superfund Section, Federal Remediation Branch, appreciates the opportunity to comment on this document. If you have any questions or comments, please feel free to contact me at (919) 508-8466 or at [david.mattison@ncdenr.gov](mailto:david.mattison@ncdenr.gov).

Sincerely,



David B. Mattison  
Environmental Engineer  
NC DENR Superfund Section

Attachment

Cc: Mr. Bruce Parris, NC DENR-Winston Salem Regional Office  
Mr. Collin Day, NC DENR-Winston Salem Regional Office  
Mr. McKenzie Mallery, US EPA  
Mr. Steven Schmidt, ExxonMobil Environmental Services (via .pdf)  
Mr. Matt Pelton, ARCADIS (via .pdf)

**ADDITIONAL ASSESSMENT AND SOIL CAPPING ACTIVITIES REPORT  
NCDOT Bridge Replacement Project on US 52 at Liberty Street  
Winton-Salem, Forsyth County, North Carolina**

**Cover Letter**

1. The Cover Letter and associated Additional Assessment and Soil Capping Activities Report (Sections 1.0 - 4.0, Figure 2, Figure 3, and Appendix E) are inconsistent in the identification of the Parcel Number for the former Carolina Ores facility as well as the Parcel Number for the former Virginia Carolina Chemicals (VCC) facility. Please correct these errors as well as clearly label the Parcel Numbers in Figure 2 and Figure 3.

**Section 1.0 Introduction**

2. Please revise Figure 2 and Figure 3 to clearly indicate the areas remediated by ENTACT on behalf of ExxonMobil Environmental Services in the proximity of the former Carolina Ores facility.
3. Please revise the first sentence of Section 1.0 to indicate that the remediation was conducted by ENTACT on behalf of ExxonMobil. ARCADIS provided remediation oversight on behalf of ExxonMobil.

**Section 3.0 Vegetation Clearing, Concrete Removal, and Soil Capping**

4. Please identify the property owner of Parcel 9 in the fourth sentence of the third paragraph of Section 3.0.
5. Please identify the permitted facility and include the waste disposal manifest for the drummed waste soil material generated during sign installation as detailed in the sixth paragraph of Section 3.0.
6. Please detail in Section 3.0 how the areal extent of soil capping was determined based on the limited soil assessment activities conducted.
7. Please provide the results of all surveying activities conducted in these areas (i.e., pre-backfill topographic data, post-EVO backfill topographic data, post-NC DOT backfill data, etc.)

**Figure 3 Vegetation Clearing and Soil Capping Location Map**

8. Please revise Figure 3 to clearly make the lines depicting the approximate area of impacted soil capping more apparent and visible.

**Mattison, David**

---

**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, January 21, 2011 11:55 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 1/21/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

---

**ACTIVITIES PERFORMED DURING PERIOD**

1. Working on schedule for meeting with NCDENR to discuss site requirements.

**ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Schedule meeting with NCDENR to discuss site requirements.

**ACTION ITEMS/OTHER**

1. Schedule meetings with NCDENR to discuss regulatory program for VCC sites in North Carolina, and specific requirements for Winston-Salem site.

END OF REPORT

---

Matthew T. Pelton, P.E. | Senior Environmental Engineer | [matthew.pelton@arcadis-us.com](mailto:matthew.pelton@arcadis-us.com)

ARCADIS U.S., Inc. | 11000 Regency Parkway, West Tower, Suite 205 | Cary, NC 27518-8518  
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Professional Registration / PE-NC, 29382 | PE-GA, 30611

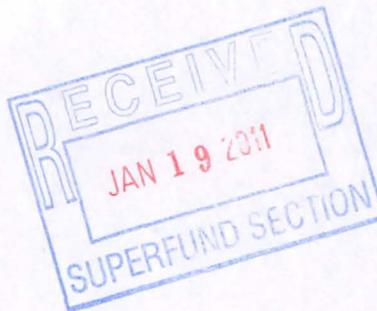
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Mr. Ken Mallary  
USEPA Region 4  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, S.W.  
Atlanta, GA 30303-8960

Environmental

Subject:  
Response to NCDENR Comments  
Site Delineation Work Plan  
Former Virginia-Carolina Chemical Corporation Site  
Charlotte, Mecklenburg County, North Carolina

Date:  
January 17, 2011

Dear Mr. Mallary:

Contact:  
Matthew T. Pelton

On behalf of ExxonMobil Environmental Services Company (EMES) this letter provides responses to comments received from North Carolina Department of Environment and Natural Resources (NCDENR) (received December 20, 2010) on the *Site Delineation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina (Work Plan)* dated November 2010. NCDENR comments are provided in bold typeface followed by the response in standard typeface.

Phone:  
919-415-2308

Email:  
Matthew.pelton@  
Arcadis-us.com

Our ref:  
B0085793

### **RESPONSE TO NCDENR COMMENTS**

1. **Section 2.8 Summary of Previous Investigations** – Please revise **Section 2.8 to include a description of the North Carolina Department of Environment and Natural Resources (NC DENR) Inactive Hazardous Sites Branch (IHSB) Preliminary Health Based Soil Remediation Goals (PSRGs) and Protection of Groundwater Soil Remediation Goals for the Site-related constituents of concern (COCs), arsenic and lead.**

**Response:** Section 2.8 has been revised to include a comparison to NCDENR IHSB Preliminary Health Based Soil Remediation Goals.

2. **Section 2.8.1 Soil Sample Results** – Please revise the second and third paragraphs of Section 2.8.1 to include a comparison of the soil sample analytical results to the NC DENR IHSB Preliminary Health Based Soil

**ARCADIS G&M of North Carolina, Inc.**  
NC Engineering License # C-1869

Imagine the result

**Remediation Goals and Protection of Groundwater Soil Remediation Goals for the Site-related COCs, arsenic and lead.**

**Response:** Section 2.8.1 has been revised to include a comparison to NCDENR IHSB Preliminary Health Based Soil Remediation Goals.

3. **Figure 3-1 - Proposed Soil Boring and Groundwater Monitoring Well Locations** – Please consider the placement of additional soil borings in the parking lot areas in order to increase the sampling density of the Site.

**Response:** Nine additional proposed soil borings (three in each parking lot) have been added to increase the sampling density. The boring locations are shown on revised Figure 3-1 attached to this letter.

Three copies of the revised pages of the Work Plan text, tables, and figures are attached. Please remove the applicable pages and replace them with the revised versions attached to this letter. If you have any questions or comments, please feel free to contact me at 919.415.2308.

Sincerely,

ARCADIS G&M of North Carolina, Inc.



Matthew T. Pelton  
Senior Environmental Engineer

Copies:

David Mattison, NCDENR (2 copies)  
Lauren Gordon, EMES  
Geoff Germann, ARCADIS  
Kirstyn White, ARCADIS

**ARCADIS**

**Revised Site  
Delineation Work Plan  
(SDWP) – Cover &  
Spines**

**ExxonMobil Environmental  
Services Company**

**Site Delineation Work Plan**

**Former Virginia-Carolina Chemical  
Corporation Site**

**Charlotte, Mecklenburg, North  
Carolina**

November 2010, Revised January 2011

**ExxonMobil Environmental Services Company**

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**ARCADIS**

**Revised SDWP Text**

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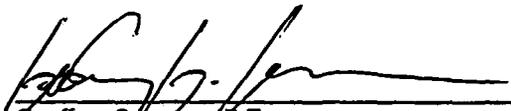
**Charlotte, Mecklenburg, North  
Carolina**

November 2010, Revised January 2011

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**Site Delineation Work Plan**

**Former Virginia-Carolina  
Chemical Corporation Site,  
Charlotte, Mecklenburg  
County, North Carolina**

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LIST OF ACRONYMS AND ABBREVIATIONS

ARCADIS	ARCADIS G&M of North Carolina, Inc.
bgs	below ground surface
COCs	Constituents of Concern
DENR	Department of Environment and Natural Resources
EMES	ExxonMobil Environmental Services Company
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IDW	investigation-derived waste
IHSB	Inactive Hazardous Sites Branch
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
NCGS	North Carolina Geological Survey
QAPP	Quality Assurance Project Plan
PPE	personal protective equipment
PWR	partially weathered rock
RAWP	Removal Action Work Plan
RSE	Removal Site Evaluation
SCS	Soil Conservation Service
SDR	Site Delineation Report
SSSLs	Site-specific screening levels
STATSGO	State Soil Geographic Database
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TestAmerica	TestAmerica, Inc. of Nashville, Tennessee
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
VCC	Virginia-Carolina Chemical Corporation
Work Plan	Site Delineation Work Plan
XRF	x-ray fluorescence

### 1. Introduction

This Site Delineation Work Plan (Work Plan) has been prepared by ARCADIS G&M of North Carolina, Inc. (ARCADIS) on behalf of ExxonMobil Environmental Services Company (EMES) to outline the technical approach and methods for conducting soil and groundwater sampling activities to investigate constituents of concern (COCs) associated with the former Virginia-Carolina Chemical Corporation (VCC) Site located in Charlotte, Mecklenburg County, North Carolina (hereafter referred to as "the Site"). Figure 1-1 identifies the location of the Site on the United States Geological Survey (USGS) 7.5-minute quadrangle maps for Charlotte West and East, North Carolina.

This Work Plan has been developed based on the findings of the *Removal Site Evaluation (RSE) Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina* prepared by ARCADIS on behalf of EMES and submitted to the United States Environmental Protection Agency (USEPA) in July 2010.

#### 1.1 Project Objectives

The objective of the delineation activities is to determine the magnitude and extent of arsenic and lead concentrations in soil at the Site. A second objective is to determine if arsenic and lead are present in groundwater above USEPA screening levels and/or North Carolina Department of Environment and Natural Resource (NCDENR) 2L groundwater standards, and if so, to determine their magnitude and extent. These data will be used to support the development of a work plan to guide implementation of the anticipated future activities at the Site. This Work Plan and supporting documents describe and guide the activities that will be undertaken to achieve this objective.

#### 1.2 Description and History of Former Phosphate Fertilizer Plants

VCC operated a former phosphate/fertilizer plant in Charlotte, North Carolina. The following description and history of former phosphate/fertilizer plants in the southeast was originally presented by the United States Environmental Protection Agency (USEPA, 1997) and is included here to provide an understanding of the history and processes associated with the historical production of phosphate fertilizers.

Phosphorus is one of the major elements essential for normal plant growth. In the mid-1800s patent fertilizers and superphosphates were unknown; rather, manure, guanos, ground-up bone, and other mineral-rich materials were used by farmers. The discovery

of large deposits of phosphate rock, combined with the demand for superior fertilizers, resulted in the growth of the phosphate/fertilizer industry in the southeastern United States.

Naturally occurring phosphorus in phosphate rock is largely insoluble. When properly dried, the phosphate rock can be easily ground and crushed. It was initially discovered in England that, when treated with sulfuric acid, ground phosphate rock is converted to phosphoric acid, which is more easily assimilated by plants. In most plants, sulfuric acid was generally manufactured onsite using the lead chamber process. Sulfur was burned in a combustion chamber at 1,800°F to 2,000°F to create sulfur dioxide (SO<sub>2</sub>). In the early years of operation, pyrite ores (FeS<sub>2</sub>) were used as the sulfur source. Elemental sulfur was later discovered in Texas and most plants switched to burning sulfur due to advantages in product purity and economics. Sulfur dioxide was reacted with oxygen (O<sub>2</sub>) from air to form sulfur trioxide (SO<sub>3</sub>). Water (H<sub>2</sub>O) was passed over packing media in a Glover Tower to react with the sulfur trioxide gas. This reaction produced sulfuric acid (H<sub>2</sub>SO<sub>4</sub>).

Ground phosphate rock and sulfuric acid were then mixed in a reaction vessel to produce phosphoric acid, the building block for phosphate fertilizers. The resultant mixture was then held in a den area for solidification, and later transferred to a storage area for curing. This process produced a bulky phosphate mass that had to be mechanically crushed and screened to product size prior to shipment. Agricultural fertilizers differ in the amount and chemical form of three primary plant nutrients: nitrogen, phosphorus, and potassium. Super-phosphate contains only one nutrient, phosphorus. Therefore, processed phosphate rock was mixed with other components such as ammonia (for nitrogen) and potash (for potassium) to produce a three-component product. The finished product was bagged or otherwise prepared for distribution in the storage facility.

The acid chambers used in the fertilizer production process represent the most relevant feature of phosphate/fertilizer operations regarding the potential for adverse environmental impacts. During periodic cleaning of the lead chambers, it is believed wash down water containing acid and soluble lead was flushed onto the ground surface. Pyrite cinders that did not burn completely in the combustion chambers may have been used as on-site fill material. This slag material has a reddish (magenta) appearance and has been found to contain elevated levels of inorganic constituents, including arsenic and lead.

### 1.3 Work Plan Organization

The introduction provided in this section is followed in Section 2 by a site description and a discussion of previous investigation activities performed at the Site. Section 3 presents the components of the delineation activities that will be performed and Section 4 describes the contents of the summary report that will be prepared. Section 5 describes the project team organization, and Section 6 provides the schedule for implementing the site delineation activities. Finally, Section 7 lists the references cited in this Work Plan.

This Work Plan has three appendices. Appendix A contains the Field Sampling Plan (FSP); Appendix B contains the Quality Assurance Project Plan (QAPP); and Appendix C contains the Health and Safety Plan (HASP). These documents will be used to guide the proposed field investigation activities required to complete the delineation activities.

## 2. Site Description and Background

### 2.1 General

Virginia-Carolina Chemical Company purchased the site from Charlotte Oil and Fertilizer Company in 1901. At the conclusion of Virginia-Carolina Chemical Company's bankruptcy and reorganization proceedings in 1926, VCC of Richmond, Virginia emerged as a new company and continued to own the Charlotte fertilizer plant until 1970. VCC merged into Socony Mobil Oil Company, Inc. in 1963, and the company name changed in 1966 to Mobil Oil Corporation. Mobil Oil Corporation sold the Charlotte plant site in 1970 to Swift Agricultural Chemical Corporation. In 1999, Exxon Corporation merged with Mobil Corporation to form Exxon Mobil Corporation. Mobil Oil became ExxonMobil Oil Corporation, the corporate successor to VCC. Exxon Mobil Corporation is the parent company of ExxonMobil Oil Corporation.

A review of the available Sanborn Fire Insurance maps confirmed that the facility was a complete factory with acid production facilities. Based on the historical information fertilizer manufacturing began at the plant site prior to 1890 and continued until sometime between 1929 and 1934. Minutes from the 1934 VCC Board of Directors meetings indicate that the acid chamber burned down prior to 1934. The Fertilizer Yearbook table indicates that the last year for acid production was 1934. During manufacturing, the facility had a single acid chamber structure that was replaced sometime between 1911 and 1929. In addition to the acid chamber, sulfur burners were present on-site in the 1890's and early 1900's, indicating that the plant burned sulfur in the production of acids. Figure 2-1 depicts the general locations of the former site features.

This section of the Work Plan is based on information previously provided to USEPA in the following three documents, which are incorporated herein by reference:

- Streamlined Property Report, Former Virginia-Carolina Chemical Corporation Site - Charlotte, North Carolina (Property Report). BBL, 2006.
- Removal Site Evaluation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina. ARCADIS, January 2010.
- Removal Site Evaluation Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina (RSE Report). ARCADIS, July 2010.

## 2.2 Site Location

The Site is located in Charlotte, Mecklenburg County, North Carolina (Figure 1-1). The current street address that most closely matches the former acid chamber location is 349 West Tremont Avenue. The geographical location of the center of the Site is at 35.21020° North Latitude and 80.86517° West Longitude (North American Datum of 1983 [NAD83]).

## 2.3 Facility Description and Operational Status

As described in Section 2.1, the Charlotte facility became a complete plant, with an acid chamber structure, that produced phosphate fertilizers prior to 1890 until sometime between 1929 and 1934.

Structures associated with the former plant included one acid chamber structure (located in two different areas of the site at different points in time), and associated burners, dry mixing plant, supply house, wash house, railroad sidings, a fertilizer factory, a fertilizer warehouse, a bag house, a 50,000-gallon water tower, a nitre house and an office. Figure 2-1 depicts the approximate locations of the historical site features digitized from Sanborn maps.

## 2.4 Current Uses of the Former Property

The Site is currently occupied with commercial and light industrial facilities located within the Tremont Center owned by Tremont Industrial Park, LLC. The former VCC property can be accessed from West Tremont Avenue, which forms the northern boundary of the site. A vast majority of the former site is currently paved as asphalt driveways and parking lots or covered by the Tremont Center buildings.

Surrounding land use of the former Charlotte property includes commercial and industrial facilities, residential apartments, restaurants, a music hall, a shopping mall, and an abandoned gas station. The nearest residential properties are two apartment buildings located east and southeast along Hawkins Street. Refer to Figure 2-1 for the listing of surrounding properties.

Currently, the former Charlotte site is occupied by two tax parcels owned by Tremont Industrial Park, LLC. Property ownership information was provided by the Mecklenburg County GIS and Property Ownership Land Records Information System.

## 2.5 Area Geology and Hydrogeology

The Site is located in the Upland Piedmont Physiographic Province in North Carolina, which is characterized by gently rolling, well-rounded hills and ridges with a few hundred feet of elevation difference between the hills and valleys (NCGS, 2004). Specifically, the Site is located within a lithotectonic region known as the Charlotte Belt (Goldsmith et. al., 1988). Bedrock geology in the Charlotte Belt is dominated by crystalline rocks that formed between 900 million and 248 million years ago. Goldsmith et. al. (1988) have mapped and classified the bedrock in the vicinity of the site as metamorphosed quartz diorite and tonolite. These closely related rock types are characteristically grey in color, generally exhibit a massive to weakly foliated structure, and are composed of a variety of minerals including plagioclase feldspar, quartz, biotite, hornblende, and epidote.

In the North Carolina Piedmont, bedrock is typically overlain by a layer of regolith, also known as overburden. Overburden varies in thickness and composition depending on the topography and geologic history of the area, but commonly consists of a variety of unconsolidated soil types including topsoil, alluvium, saprolite, and partially weathered rock (PWR). Saprolite, a major component of overburden, is the residual product of in-place chemical weathering of crystalline bedrock. PWR commonly exists in a transition zone between highly weathered saprolite and competent bedrock. Although the mineral composition of PWR differs from the parent bedrock due to weathering, PWR commonly retains many of the structural features of the parent bedrock including fractures, joints, and foliation. The contact between PWR and competent bedrock is often irregular and erratic, even over relatively short horizontal distances, due to variability in resistance to weathering controlled by structural features and natural variations in mineral composition.

The hydrogeology of the region is characterized by a two-part groundwater system, consisting of overburden and bedrock aquifers. Overburden is the primary storage reservoir for the underlying bedrock and has high porosity and low permeability. Precipitation is stored as groundwater in the intergranular spaces of the overburden as it infiltrates through the subsurface. The water table typically exists within the overburden and the direction of shallow groundwater flow generally mimics the slope of the land surface.

Review of the State Soil Geographic Database (STATSGO) soil survey data compiled by United States Department of Agriculture (USDA) Soil Conservation Service (SCS) indicates that the underlying soils of the Site (Mecklenburg County) are classified as urban land and are variable in texture. Native soils in the immediate Site vicinity are

classified as Cecil sandy clay loam, and consist of well drained, coarse-grained sand, clay, and silt with moderate infiltration rates (EDR, 2009).

Based on the limited data collected from shallow soil borings advanced at the Site during the Removal Site Evaluation (ARCADIS, 2010), the subsurface generally consists of orange brown to reddish brown silty clay and clayey silt with varying amounts of fine-grained gravel and rootlets. Orange brown to dark brown silt and sandy silt were also observed in the shallow subsurface in several of the soil borings. Gravel was encountered at depths varying from the ground surface to 4 feet below ground surface (bgs).

Fill materials consisting of sulfur (in borings CH-SB-23 and CH-SB-24) and coal (in boring CH-SB-24) fragments were observed in soil borings advanced in the southwestern portion of the Site extending from 0.5 to 4 feet bgs. Additional limited fill materials, including black and magenta slag and brick fragments, were observed in soil borings advanced in the central (borings CH-SB-10 and CH-SB-11) and southwestern (boring CH-SB-23) portions of the Site, at depths varying from the ground surface to 4 feet bgs. No fill materials or magenta slag were observed in any of the remaining soil borings. Groundwater was not encountered in any of the soil borings, which were advanced to a maximum depth of 8 feet bgs during the RSE field activities.

### 2.6 Surface Water Bodies

The Site is located near the border of the Catawba and Yadkin River Basin. No surface water features are present on or immediately adjacent to the Site. The two closest surface water features are tributaries of Irwin Creek and Dairy Branch. Irwin Creek is located approximately 4,000 feet west of the Site (Figure 1-1). Irwin Creek flows southwest and joins with Sugar Creek which feeds into the Catawba River. Tributaries of Dairy Branch are located approximately 3,000 feet southeast of the Site. Dairy Branch flows southeast and joins with Little Sugar Creek which feeds into the Catawba River. The Catawba River ultimately discharges to the Atlantic Ocean.

### 2.7 Description of Drinking Water Sources

Water is supplied to the area around the Site by Charlotte-Mecklenburg Utilities. Mountain Island Lake and Lake Norman supply the drinking water and are located approximately 10 miles and 15 miles northwest of the Site, respectively. There are no active public water supply wells in the vicinity of the Site (EDR, 2009 and personal communication with Jack Stutts of the Mecklenburg County Department of Groundwater and Wastewater in October 2010).

## 2.8 Summary of Previous Investigations

In April 2010, ARCADIS, on behalf of EMES, collected soil samples from the Site as described in the RSE Report (ARCADIS, 2010). Soil sample results were compared to the USEPA screening levels of 27 mg/kg and 895 mg/kg for arsenic and lead, respectively. However, in order to meet the soil screening level objectives of both USEPA and NCDENR, analytical results from soil samples collected during site delineation activities will be compared to site-specific screening levels of 22 mg/kg for arsenic and 400 mg/kg for lead. The screening levels are based on NCDENR Inactive Hazardous Sites Branch (IHSB) Soil Remediation Goals for arsenic and lead. A summary of the April 2010 sampling results is provided below.

### 2.8.1 Soil Sample Results

A total of 79 soil samples were collected from 25 soil borings advanced at the Site (Figure 2-2). In general, samples were collected from 0-0.5 feet, 0.5-2 feet, and in 2-foot intervals thereafter to depths of up to a maximum of 8 feet bgs. Samples were screened in the field for arsenic and lead using a portable x-ray fluorescence (XRF) device. The soil samples were then submitted to, and analyzed by, TestAmerica, Inc. of Nashville, Tennessee (TestAmerica) for arsenic, lead, and pH.

Arsenic was detected in 15 soil samples from 10 soil boring locations at concentrations exceeding the USEPA screening level of 27 mg/kg. Based on the NCDENR IHSB Preliminary Health Based Soil Remediation Goal of 22 mg/kg, arsenic concentrations exceeded NCDENR screening levels in 20 soil samples from 13 soil boring locations. Lead was detected in one soil sample (CH-SB-19) collected from 0 to 0.5 feet bgs at a concentration exceeding the USEPA screening level of 895 mg/kg. Based on the NCDENR IHSB Preliminary Health Based Soil Remediation Goal of 400 mg/kg, lead concentrations exceeded NCDENR screening levels in 4 soil samples from 2 soil boring locations. The maximum arsenic concentration of 267 mg/kg was collected from soil boring CH-SB-24 at a depth of 0.5 to 2 feet bgs. The maximum lead concentration of 20,100 mg/kg was collected from soil boring CH-SB-19 at a depth of 0 to 0.5 feet bgs. The pH of the soil samples varied between 3.1 and 7.6 standard units.

Thirteen of the 25 boring locations sampled had arsenic and/or lead concentrations that exceeded the screening levels. Soil boring locations with arsenic and/or lead concentrations greater than the screening levels are presented on Figure 2-2. A summary of the RSE analytical program is provided in Table 2-1. A complete summary of the sample analytical results is presented in Table 2-2.

### **3. Site Delineation Rationale and Activities**

#### **3.1 Data Requirements**

As described in Section 2.8, data generated from the RSE activities indicated the presence of elevated concentrations of arsenic and lead in specific areas of the site. The delineation activities described in this section will focus on the collection of soil samples around these locations to delineate the extent of arsenic and/or lead in Site soils. Soil samples will be collected from both the surface and at depth. Groundwater monitoring wells will be installed and sampled to investigate the presence of arsenic and/or lead in groundwater. This section describes the sampling activities that will be performed to delineate the extent of these constituents in Site media.

#### **3.2 Site Access**

EMES will secure a new access agreement with Tremont Industrial Park, LLC (Tax Parcel IDs 12103218 and 12103217) prior to the start of site delineation activities.

EMES will secure access agreements from adjacent properties if needed based on the results of the initial delineation sampling described herein, as necessary.

#### **3.3 Utility Clearance**

Necessary permits and utility clearances will be obtained prior to any subsurface activities. A utility markout will be performed at the Site to identify all subsurface utilities (e.g., gas, electrical, telephone, water, sewers, cable television). No drilling will be performed within five (5) feet of a utility markout without prior approval from ExxonMobil. To further confirm the absence of utilities in the drilling area, a private utility locating company will also be used to clear all areas where subsurface work will be performed. Detailed utility clearance procedures are contained in the HASP (Appendix C).

#### **3.4 Soil Sampling Program**

##### **3.4.1 Soil Sampling Analyses and Rationale**

Soil borings will be installed across the Site to delineate the horizontal and vertical extent of arsenic- and/or lead-impacted soil, focusing on those areas identified during the RSE sampling event. All soil sample results will be compared to the site-specific screening levels (SSSLs).

As stated in Section 2.8, soil sample results from samples collected during RSE activities were compared to USEPA-determined screening values of 27 mg/kg and 895 mg/kg for arsenic and lead, respectively. However, in order to meet the soil screening level objectives of both USEPA and NCDENR, analytical results from soil samples collected during site delineation activities will be compared to site-specific screening levels of 22 mg/kg for arsenic and 400 mg/kg for lead. The screening levels are based on NCDENR Inactive Hazardous Sites Branch (IHSB) Soil Remediation Goals for arsenic and lead.

Soil borings are proposed at 29 locations across the Site, including the seven proposed monitoring well borings discussed in Section 3.5. Additional contingency borings will also be advanced and sampled if adjacent borings are impacted based on the results of field screening (described below). Proposed soil sample locations are shown on Figure 3-1.

Soil samples will be collected using hand augers and/or direct push techniques and screened in the field using a portable XRF device. Soil samples will be collected from 0-0.5 feet, 0.5-2 feet, 2-4 feet and in 2-foot intervals until XRF results for arsenic and lead are less than the screening levels and no magenta slag is observed. Borings will be advanced until groundwater or refusal is encountered, whichever is shallower. Sample collection procedures are described in the FSP provided in Appendix A.

The presence of slag and the coloration of soil samples collected will be documented in the field notes and included in the investigation summary report that will be prepared following implementation of the Work Plan. Additional soil sampling activities may also be performed during this investigation at the discretion of EMES or at the request of USEPA to further refine the limits of areas that contain elevated concentrations of arsenic and/or lead.

### 3.4.2 Soil Sample Analyses

#### 3.4.2.1 XRF Screening

Soil samples collected will be screened in the field for arsenic and lead concentrations using a portable XRF device; samples will be retained and sent to a fixed-based laboratory for analyses as described below.

3.4.2.2 Laboratory Analyses

Soil samples collected from 0 to 4 feet bgs will be analyzed at the fixed-based laboratory for arsenic, lead and pH. Samples will be analyzed from successively deeper intervals until the concentrations of arsenic and lead are confirmed to be below the screening levels. Samples from deeper intervals will be analyzed as described below.

Soil Sample Depth Interval (feet bgs)	Analyze w/XRF?	Analyze at laboratory?
0 – 0.5	Yes	Yes, always
0.5 – 2	Yes	Yes, always
2 – 4	Yes	Yes, always
4 – 6	Yes	Yes, if XRF results are above XRF screening levels in the 2-4 foot depth interval of 17 mg/kg for arsenic or 300 mg/kg for lead. XRF screening levels are based on 75% of the SSSLs for arsenic and lead, respectively.
6 – 8	Yes	Yes, if XRF results are above XRF screening levels in the 4-6 foot depth interval of 17 mg/kg for arsenic or 300 mg/kg for lead. XRF screening levels are based on 75% of the SSSLs for arsenic and lead, respectively.

Select samples may be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to determine the appropriate disposal requirements for evaluating potential soil removal alternatives. TCLP analyses will be performed using a composite of the soil samples collected. The specific samples selected for TCLP analyses will be determined following receipt of preliminary laboratory analytical data. Soil borings selected for TCLP analyses will be biased toward those locations where elevated concentrations of arsenic and lead are detected or where significant amounts of magenta-stained soils are observed. The composite soil samples will be analyzed for total arsenic and lead and TCLP arsenic and lead. The soil sampling analytical program is presented in Table 3-1.

### 3.5 Groundwater Sampling Program

#### 3.5.1 Groundwater Monitoring Well Sampling Analysis and Rationale

Seven shallow groundwater monitoring wells will be installed at the Site to assess the potential impacts to the shallow aquifer resulting from rainwater infiltrating through soils containing elevated concentrations of arsenic and/or lead. Monitoring wells will be installed with a uniform distribution across the site to provide a site-wide assessment of groundwater quality and hydraulic gradient. Proposed monitoring well locations are shown on Figure 3-1; actual locations may be adjusted in the field based on observed site conditions.

As described in more detail below, groundwater samples will be collected from each of the groundwater monitoring wells to assess groundwater quality at the Site. Groundwater elevations will also be gauged to determine the direction and gradient of groundwater flow. A site-specific potentiometric surface map will be generated and included in the summary report that will be prepared following the completion of site delineation activities.

#### 3.5.2 Permanent Groundwater Monitoring Well Installation

Groundwater monitoring wells will be installed to facilitate the collection of shallow groundwater samples and the measurement of groundwater elevations. The wells will be screened so that the top of the well screen is just above the water table. Prior to construction of the monitoring wells, a soil boring will be advanced adjacent to each of the proposed monitoring well locations. An XRF will be used to screen these borings for arsenic and lead concentrations in soil. In the event that elevated concentrations of arsenic or lead are detected, or if slag or magenta-stained soil is observed, the monitoring well at that location will be completed as a double-cased monitoring well to reduce the potential downward transport of these materials during drilling. All monitoring wells will be installed and developed in accordance with the procedures specified in the FSP provided in Appendix A.

#### 3.5.3 Groundwater Sample Collection and Analysis

A groundwater sample will be collected from each of the seven groundwater monitoring wells following installation and well development. Samples will be collected using low-flow/low-stress sampling techniques in accordance with the procedures specified in the FSP (Appendix A). All groundwater samples will be analyzed for the following analytical parameters using the analytical procedures specified in the QAPP (Appendix B):

- Arsenic and lead; and
- pH, temperature, conductivity, dissolved oxygen, redox potential, and turbidity (field measurements).

The groundwater sample analytical program is summarized in Table 3-2.

### 3.5.4 Hydraulic Conductivity Testing

Slug injection and removal tests will be performed at all installed groundwater monitoring wells to provide data for calculating the hydraulic conductivity of the water table aquifer beneath the Site. The slug tests will be performed in accordance with the procedures specified in the FSP (Appendix A).

### 3.6 Groundwater Elevation Measurement

One round of groundwater elevation measurements will be recorded from the monitoring wells. The data will be used to develop a shallow groundwater potentiometric surface map for the Site. Depth-to-water measurements will be performed in accordance with the procedures specified in the in the FSP (Appendix A).

### 3.7 Surveying

All soil borings and monitoring wells will be surveyed for horizontal and vertical control. All survey data will be referenced to the North American Horizontal Datum of 1983 and the North American Vertical Datum of 1988.

### 3.8 Investigation-Derived Waste Sampling and Disposal

Waste generated as part of the delineation activities (i.e., soil, water, decontamination fluids, and personal protective equipment [PPE]) will be collected in drums and stored at the Site prior to removal. Laboratory analysis will be performed on a quick turn-around schedule to minimize the amount of time that the drums are at the Site. Drums containing solids will be analyzed for TCLP metals, while drums containing aqueous solutions will be analyzed for Target Analyte List (TAL) metals and pH. The investigation-derived waste (IDW) sample analytical program is summarized in Tables 3-1 and 3-2.

### 3.9 Analytical Data Validation

All laboratory analytical data generated from the sample analyses will be validated in accordance with the procedures listed in the QAPP (Appendix B).

#### 4. Reporting

A Site Delineation Report and Removal Action Work Plan (SDR/RAWP) will be prepared that summarizes available data from the Site. It will present and evaluate the results of all data collection activities performed during implementation of this Work Plan as well as outline the technical approach and methods for conducting future activities at the Site. Specifically, the SDR/RAWP will include the components described below:

- **Data Collection Activities:** This section will describe the activities associated with the data collection activities described in this Work Plan.
- **Summary of Results:** This section will summarize data collected during implementation of this Work Plan and previous investigations.
- **Removal Action Work Plan:** The data generated by previous investigations and during implementation of this Work Plan will be evaluated to provide a technical approach and describe the methods for conducting future actions at the Site.

The SDR/RAWP will be prepared and submitted in accordance with the schedule presented in Section 6.

**5. Project Organization**

**5.1 Introduction**

Several organizations will be directly involved in the performance and review of this project. These organizations have specific project functions and relate to each other in various ways according to their project responsibilities. The purpose of this section is to provide a description of the overall project organization. This section also describes the function and responsibility of various groups to aid in the exchange of information and to provide efficient project implementation. Table 5-1 provides contact information for key individuals working on the project.

**5.2 USEPA**

The USEPA Region IV and EMES have agreed that EMES will perform site delineation activities at the VCC-Charlotte, North Carolina Site. The USEPA will review, comment upon, and ultimately approve all plans and reports submitted for the site characterization. The USEPA contact for this Site will be Mr. Ken Mallary.

**5.3 North Carolina Department of Environment and Natural Resources (NCDENR)**

The NCDENR will review and comment upon all plans and reports submitted for the site characterization. The NCDENR contact for the Site is Mr. David Mattison.

**5.4 EMES - Responsible Party**

USEPA Region IV and EMES have agreed that EMES will perform site delineation activities. EMES is the Responsible Party for the activities at the former VCC-Charlotte, North Carolina Site. Ms. Lauren Gordon is EMES's corporate representative overseeing the project.

**5.5 Evaluation Contractor**

ARCADIS G&M of North Carolina, Inc. of Cary, North Carolina has been selected by EMES, the Respondent, as the Evaluation Contractor. All work will be performed under the supervision of the ARCADIS Project Manager, Mr. Matt Pelton, and the ARCADIS Assistant Project Manager, Ms. Kirstyn White.

**6. Schedule**

It is expected that the activities outlined herein will be completed in accordance with the following schedule:

- Obtain USEPA approval of this Work Plan 15 days
- Secure access agreements 30 days
- Procure Contractors and Equipment and Mobilize 15 days
- Complete Site Delineation and Sampling Activities 15 days
- Laboratory Analysis of Samples 30 days
- Data Validation 30 days
- Prepare/Submit the SDR/RAWP 60 days

## 7. References

ARCADIS, 2010. Removal Site Evaluation Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, North Carolina, July 2010.

ARCADIS, 2010. Removal Site Evaluation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, North Carolina, January 2010.

Blasland, Bouck & Lee, Inc., 2006. Streamlined Property Report, Former Virginia-Carolina Chemical Corporation Site – Charlotte, North Carolina (Property Report). BBL, 2006.

Environmental Data Resources (EDR), 2009. The EDR Radius Map™ with GeoCheck®, VCC-Charlotte, 301 West Tremont Ave., Charlotte, NC 28203, Inquiry Number: 2662591.2s. December 18, 2009.

Goldsmith et. al., 1988. *Geologic Map of the Charlotte 1° x 2° Quadrangle, North Carolina and South Carolina*. Goldsmith, Richard et. al. United States Geological Survey (USGS) Miscellaneous Investigation Series Map I-1251-E. 1988.

LeGrand, 2004. *A Master Conceptual Model for Hydrogeological Site Characterization in the Piedmont and Mountain Region of North Carolina: A Guidance Manual*. LeGrand, H.E. Prepared for the North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality, Groundwater Section. February 2004.

LeGrand and Mundorff, 1952. *Geology and Ground Water in the Charlotte, North Carolina Area*. LeGrand, H.E. and Mundorff, M.J. Prepared by the North Carolina Department of Conservation and Development, Division of Mineral Resources in cooperation with the United States Department of Interior, Geological Survey. Bulletin Number 63. 1952.

**ARCADIS**

**Revised SDWP –  
Table 3-1**

**Table 3-1**  
**Soil and IDW Sample Analytical Program**  
**Site Delineation Work Plan**  
**VCC Charlotte, North Carolina**

Parameter	Estimated Number of Borings	Estimated No. of Samples per Boring <sup>1</sup>	Estimated No. of Field Samples <sup>1</sup>	No. of Field QC Samples			Total No. Field + Field QC Samples <sup>1</sup>	No. of MS/MSD Samples Sets
				Duplicate	Rinse Blank	Trip Blank		
<b>Soil Delineation Samples</b>								
Total Arsenic and Lead	29	5	145	8	4	0	157	8
pH	29	5	145	8	0	0	153	8
<b>Waste Disposal Characterization Samples</b>								
TCLP Arsenic and Lead	10	1	10	1	0	0	11	1
Total Arsenic and Lead	10	1	10	1	0	0	11	1
<b>IDW Samples (Solid)</b>								
TCLP Metals	--	--	1	0	0	0	1	0

**Notes:**

<sup>1</sup> The number of samples per boring and total number of samples are approximate.

1. Field duplicate and field quality control (QC) samples will be collected at a frequency of 5% (1 for every 20 samples).
2. Equipment rinse blanks will be collected at a frequency of one per day.
3. Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 5% (1 for every 20 samples).
4. Number of soil delineation borings based on 29 new locations, including 7 monitoring well borings.
5. Number of waste disposal samples are estimated. The specific samples selected for TCLP analyses will be determined following receipt of preliminary laboratory analytical data.

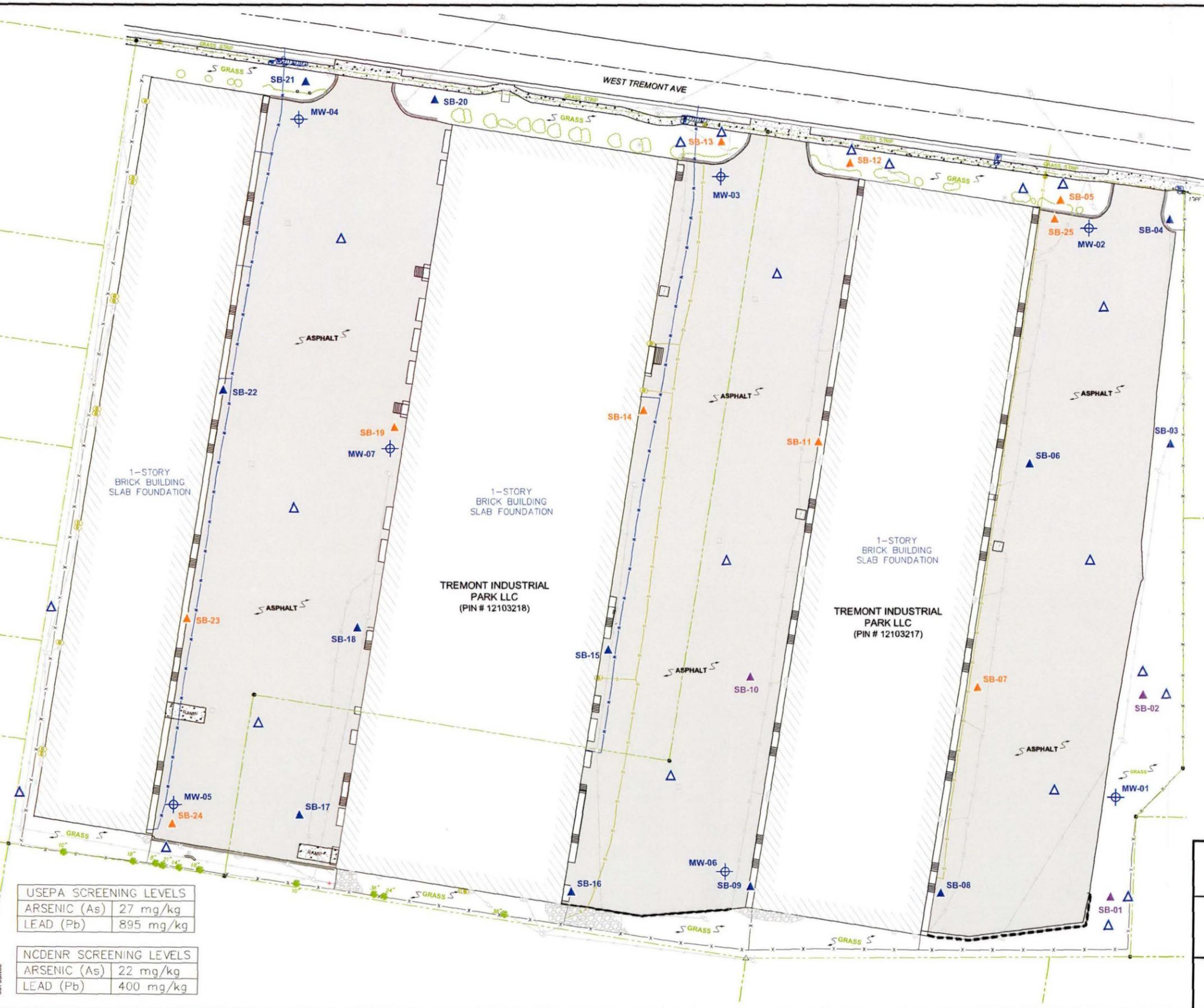
IDW - investigation-derived waste

TCLP - Toxicity Characteristic Leaching Procedure

**Revised SDWP –  
Figure 2-2 and  
Figure 3-1**



CITY-CARY DIV/GRPUP-41 DBLELUS LD(OH) PIC(OH) PM(REF) TM(OH) LVR(OH)ON+OFF=REF\*  
 G:\ENVCAD\CARACT\180857930001\0001DWDG\85793000.dwg LAYOUT: 3-1 SAVED: 1/13/2011 3:47 PM ACADVER: 18.05 (LMS TECH) PAGES: 18.05 PLOTTABLE: PLTHALF.CTB PLOTTED: 1/13/2011 3:47 PM BY: ELLIS, LEKOREY  
 PROJECTNAME: 85793000

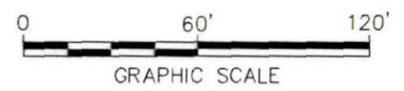


**LEGEND:**

- PROPERTY LINES
- x-x- FENCE
- ASPHALT
- TREES
- |— WATER LINE
- |— GAS LINE
- |— ELECTRIC
- |— OVERHEAD ELECTRIC
- RIP RAP
- ▲ SOIL BORING LOCATION BELOW SCREENING LEVELS
- ▲ SOIL BORING LOCATION WITH As AND/OR Pb ABOVE USEPA AND NCDENR SCREENING LEVELS
- ▲ SOIL BORING LOCATION WITH As AND/OR Pb ABOVE NCDENR SCREENING LEVELS
- △ LOCATION OF PROPOSED SOIL BORING
- ⊕ LOCATION OF PROPOSED GROUNDWATER MONITORING WELL

**NOTES:**

1. BASEMAP AND SOIL BORING LOCATIONS PROVIDED BY TAYLOR, WISEMAN & TAYLOR ON NOVEMBER 02, 2010. SOIL BORINGS 1-5, 12, 13, 20 AND 21 WERE LOCATED BY ARCADIS IN APRIL 2010 USING GPS.
2. SOIL BORINGS BEGIN WITH THE PREFIX "CH-".
3. mg/kg - MILLIGRAMS PER KILOGRAM.
4. USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
5. NCDENR - NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES.



USEPA SCREENING LEVELS	
ARSENIC (As)	27 mg/kg
LEAD (Pb)	895 mg/kg

NCDENR SCREENING LEVELS	
ARSENIC (As)	22 mg/kg
LEAD (Pb)	400 mg/kg

EXXONMOBIL  
 VCC-CHARLOTTE, NORTH CAROLINA  
**SITE DELINEATION WORK PLAN**

**PROPOSED SOIL BORING  
 AND GROUNDWATER MONITORING  
 WELL LOCATIONS**

**ARCADIS**

FIGURE  
**3-1**

**ARCADIS**

**Revised SDWP-QAPP  
Table 3-1**

**Table 3-1**  
**Environmental and Quality Control Sample Analyses**  
**Site Delineation Work Plan**  
**VCC Charlotte, North Carolina**

Environmental Sample Matrix: Laboratory Parameters	Estimated Environmental Sample Quantity	Field QC Samples				Estimated Environmental and Field QC Sample Total	Laboratory QC Samples <sup>12</sup>				Total Estimated Environ. and QC Samples		
		Trip Blank		Field Duplicate			Matrix Spike		Matrix Spike Duplicate				
		Freq.	No.	Freq.	No.		Freq.	No.	Freq.	No.			
<b>Soil</b>													
Arsenic and Lead	145	--	--	1/20	8	1/day	4	157	1/20	8	1/20	8	173
pH	145	--	--	1/20	8	--	--	153	--	--	--	--	153
TCLP Arsenic and Lead	10	--	--	1/20	1	--	--	11	1/20	1	1/20	1	13
TCLP Metals (IDW Sample)	1	--	--	--	--	--	--	1	--	--	--	--	1
<b>Groundwater (Permanent Monitoring Wells)</b>													
Arsenic and Lead	7	--	--	1/20	1	1/day	2	10	1/20	1	1/20	1	12
TAL Metals (IDW Sample)	2	--	--	--	--	--	--	2	--	--	--	--	2
pH (IDW Sample)	2	--	--	--	--	--	--	2	--	--	--	--	2

**Notes:**

- V1 One rinse blank per day per type of sample collection equipment used.
- V2 The number of laboratory QC analyses is based on the frequencies given for the number of environmental samples estimated not including field QC analyses, but assumes that the samples will be processed in groups of 20 samples.
3. The number of soil samples analyzed for metals and pH is estimated.
4. TAL and metals analyses will be run using SW-846 methods.



Infrastructure · Water · Environment · Buildings

Mr. Ken Mallary  
USEPA Region 4  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, S.W.  
Atlanta, GA 30303-8960

Subject:  
Response to NCDENR Comments  
Site Delineation Work Plan  
Former Virginia-Carolina Chemical Corporation Site  
Charlotte, Mecklenburg County, North Carolina

Dear Mr. Mallary:

On behalf of ExxonMobil Environmental Services Company (EMES) this letter provides responses to comments received from North Carolina Department of Environment and Natural Resources (NCDENR) (received December 20, 2010) on the *Site Delineation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina* (Work Plan) dated November 2010. NCDENR comments are provided in bold typeface followed by the response in standard typeface.

#### **RESPONSE TO NCDENR COMMENTS**

1. **Section 2.8 Summary of Previous Investigations** – Please revise Section 2.8 to include a description of the North Carolina Department of Environment and Natural Resources (NC DENR) Inactive Hazardous Sites Branch (IHSB) Preliminary Health Based Soil Remediation Goals (PSRGs) and Protection of Groundwater Soil Remediation Goals for the Site-related constituents of concern (COCs), arsenic and lead.

**Response:** Section 2.8 has been revised to include a comparison to NCDENR IHSB Preliminary Health Based Soil Remediation Goals.

2. **Section 2.8.1 Soil Sample Results** – Please revise the second and third paragraphs of Section 2.8.1 to include a comparison of the soil sample analytical results to the NC DENR IHSB Preliminary Health Based Soil

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Date:  
January 17, 2011

Contact:  
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Our ref:  
B0085793

ARCADIS G&M of North Carolina, Inc.  
NC Engineering License # C-1869

Imagine the result

0311111417

**Remediation Goals and Protection of Groundwater Soil Remediation Goals for the Site-related COCs, arsenic and lead.**

**Response:** Section 2.8.1 has been revised to include a comparison to NCDENR IHSB Preliminary Health Based Soil Remediation Goals.

3. **Figure 3-1 - Proposed Soil Boring and Groundwater Monitoring Well Locations** – Please consider the placement of additional soil borings in the parking lot areas in order to increase the sampling density of the Site.

**Response:** Nine additional proposed soil borings (three in each parking lot) have been added to increase the sampling density. The boring locations are shown on revised Figure 3-1 attached to this letter.

Three copies of the revised pages of the Work Plan text, tables, and figures are attached. Please remove the applicable pages and replace them with the revised versions attached to this letter. If you have any questions or comments, please feel free to contact me at 919.415.2308.

Sincerely,

ARCADIS G&M of North Carolina, Inc.



Matthew T. Pelton  
Senior Environmental Engineer

Copies:

David Mattison, NCDENR (2 copies)  
Lauren Gordon, EMES  
Geoff Germann, ARCADIS  
Kirstyn White, ARCADIS

**ARCADIS**

**Revised Site  
Delineation Work Plan  
(SDWP) – Cover &  
Spines**

**ExxonMobil Environmental  
Services Company**

**Site Delineation Work Plan**

**Former Virginia-Carolina Chemical  
Corporation Site**

**Charlotte, Mecklenburg, North  
Carolina**

November 2010, Revised January 2011

**ExxonMobil Environmental Services Company**

**Site Delineation Work Plan**

**Former Virginia-Carolina Chemical Corporation Site  
Charlotte, Mecklenburg, North Carolina**

November 2010, Revised January 2011

**ARCADIS**

**Revised SDWP Text**

**ExxonMobil Environmental  
Services Company**

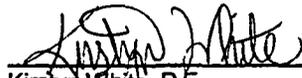
**Site Delineation Work Plan**

**Former Virginia-Carolina Chemical  
Corporation Site**

**Charlotte, Mecklenburg, North  
Carolina**

November 2010, Revised January 2011

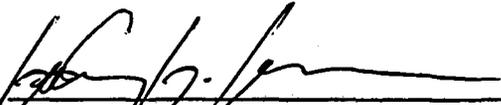
ARCADIS



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Geoffrey Germain, P.E.  
Principal Engineer

**Site Delineation Work Plan**

**Former Virginia-Carolina  
Chemical Corporation Site,  
Charlotte, Mecklenburg  
County, North Carolina**

Prepared for:  
ExxonMobil Environmental  
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Prepared by:  
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Our Ref.:  
B0085793

Date:  
November 2010, Revised January 2011

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NC Engineering License # C-1869

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**Appendices**

- A Field Sampling Plan
- B Quality Assurance Project Plan
- C Health and Safety Plan

**LIST OF ACRONYMS AND ABBREVIATIONS**

ARCADIS	ARCADIS G&M of North Carolina, Inc.
bgs	below ground surface
COCs	Constituents of Concern
DENR	Department of Environment and Natural Resources
EMES	ExxonMobil Environmental Services Company
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IDW	investigation-derived waste
IHSB	Inactive Hazardous Sites Branch
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
NCGS	North Carolina Geological Survey
QAPP	Quality Assurance Project Plan
PPE	personal protective equipment
PWR	partially weathered rock
RAWP	Removal Action Work Plan
RSE	Removal Site Evaluation
SCS	Soil Conservation Service
SDR	Site Delineation Report
SSSLs	Site-specific screening levels
STATSGO	State Soil Geographic Database
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TestAmerica	TestAmerica, Inc. of Nashville, Tennessee
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
VCC	Virginia-Carolina Chemical Corporation
Work Plan	Site Delineation Work Plan
XRF	x-ray fluorescence

### 1. Introduction

This Site Delineation Work Plan (Work Plan) has been prepared by ARCADIS G&M of North Carolina, Inc. (ARCADIS) on behalf of ExxonMobil Environmental Services Company (EMES) to outline the technical approach and methods for conducting soil and groundwater sampling activities to investigate constituents of concern (COCs) associated with the former Virginia-Carolina Chemical Corporation (VCC) Site located in Charlotte, Mecklenburg County, North Carolina (hereafter referred to as "the Site"). Figure 1-1 identifies the location of the Site on the United States Geological Survey (USGS) 7.5-minute quadrangle maps for Charlotte West and East, North Carolina.

This Work Plan has been developed based on the findings of the *Removal Site Evaluation (RSE) Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina* prepared by ARCADIS on behalf of EMES and submitted to the United States Environmental Protection Agency (USEPA) in July 2010.

#### 1.1 Project Objectives

The objective of the delineation activities is to determine the magnitude and extent of arsenic and lead concentrations in soil at the Site. A second objective is to determine if arsenic and lead are present in groundwater above USEPA screening levels and/or North Carolina Department of Environment and Natural Resource (NCDENR) 2L groundwater standards, and if so, to determine their magnitude and extent. These data will be used to support the development of a work plan to guide implementation of the anticipated future activities at the Site. This Work Plan and supporting documents describe and guide the activities that will be undertaken to achieve this objective.

#### 1.2 Description and History of Former Phosphate Fertilizer Plants

VCC operated a former phosphate/fertilizer plant in Charlotte, North Carolina. The following description and history of former phosphate/fertilizer plants in the southeast was originally presented by the United States Environmental Protection Agency (USEPA, 1997) and is included here to provide an understanding of the history and processes associated with the historical production of phosphate fertilizers.

Phosphorus is one of the major elements essential for normal plant growth. In the mid-1800s patent fertilizers and superphosphates were unknown; rather, manure, guanos, ground-up bone, and other mineral-rich materials were used by farmers. The discovery

of large deposits of phosphate rock, combined with the demand for superior fertilizers, resulted in the growth of the phosphate/fertilizer industry in the southeastern United States.

Naturally occurring phosphorus in phosphate rock is largely insoluble. When properly dried, the phosphate rock can be easily ground and crushed. It was initially discovered in England that, when treated with sulfuric acid, ground phosphate rock is converted to phosphoric acid, which is more easily assimilated by plants. In most plants, sulfuric acid was generally manufactured onsite using the lead chamber process. Sulfur was burned in a combustion chamber at 1,800°F to 2,000°F to create sulfur dioxide (SO<sub>2</sub>). In the early years of operation, pyrite ores (FeS<sub>2</sub>) were used as the sulfur source. Elemental sulfur was later discovered in Texas and most plants switched to burning sulfur due to advantages in product purity and economics. Sulfur dioxide was reacted with oxygen (O<sub>2</sub>) from air to form sulfur trioxide (SO<sub>3</sub>). Water (H<sub>2</sub>O) was passed over packing media in a Glover Tower to react with the sulfur trioxide gas. This reaction produced sulfuric acid (H<sub>2</sub>SO<sub>4</sub>).

Ground phosphate rock and sulfuric acid were then mixed in a reaction vessel to produce phosphoric acid, the building block for phosphate fertilizers. The resultant mixture was then held in a den area for solidification, and later transferred to a storage area for curing. This process produced a bulky phosphate mass that had to be mechanically crushed and screened to product size prior to shipment. Agricultural fertilizers differ in the amount and chemical form of three primary plant nutrients: nitrogen, phosphorus, and potassium. Super-phosphate contains only one nutrient, phosphorus. Therefore, processed phosphate rock was mixed with other components such as ammonia (for nitrogen) and potash (for potassium) to produce a three-component product. The finished product was bagged or otherwise prepared for distribution in the storage facility.

The acid chambers used in the fertilizer production process represent the most relevant feature of phosphate/fertilizer operations regarding the potential for adverse environmental impacts. During periodic cleaning of the lead chambers, it is believed wash down water containing acid and soluble lead was flushed onto the ground surface. Pyrite cinders that did not burn completely in the combustion chambers may have been used as on-site fill material. This slag material has a reddish (magenta) appearance and has been found to contain elevated levels of inorganic constituents, including arsenic and lead.

### 1.3 Work Plan Organization

The introduction provided in this section is followed in Section 2 by a site description and a discussion of previous investigation activities performed at the Site. Section 3 presents the components of the delineation activities that will be performed and Section 4 describes the contents of the summary report that will be prepared. Section 5 describes the project team organization, and Section 6 provides the schedule for implementing the site delineation activities. Finally, Section 7 lists the references cited in this Work Plan.

This Work Plan has three appendices. Appendix A contains the Field Sampling Plan (FSP); Appendix B contains the Quality Assurance Project Plan (QAPP); and Appendix C contains the Health and Safety Plan (HASP). These documents will be used to guide the proposed field investigation activities required to complete the delineation activities.

## 2. Site Description and Background

### 2.1 General

Virginia-Carolina Chemical Company purchased the site from Charlotte Oil and Fertilizer Company in 1901. At the conclusion of Virginia-Carolina Chemical Company's bankruptcy and reorganization proceedings in 1926, VCC of Richmond, Virginia emerged as a new company and continued to own the Charlotte fertilizer plant until 1970. VCC merged into Socony Mobil Oil Company, Inc. in 1963, and the company name changed in 1966 to Mobil Oil Corporation. Mobil Oil Corporation sold the Charlotte plant site in 1970 to Swift Agricultural Chemical Corporation. In 1999, Exxon Corporation merged with Mobil Corporation to form Exxon Mobil Corporation. Mobil Oil became ExxonMobil Oil Corporation, the corporate successor to VCC. Exxon Mobil Corporation is the parent company of ExxonMobil Oil Corporation.

A review of the available Sanborn Fire Insurance maps confirmed that the facility was a complete factory with acid production facilities. Based on the historical information fertilizer manufacturing began at the plant site prior to 1890 and continued until sometime between 1929 and 1934. Minutes from the 1934 VCC Board of Directors meetings indicate that the acid chamber burned down prior to 1934. The Fertilizer Yearbook table indicates that the last year for acid production was 1934. During manufacturing, the facility had a single acid chamber structure that was replaced sometime between 1911 and 1929. In addition to the acid chamber, sulfur burners were present on-site in the 1890's and early 1900's, indicating that the plant burned sulfur in the production of acids. Figure 2-1 depicts the general locations of the former site features.

This section of the Work Plan is based on information previously provided to USEPA in the following three documents, which are incorporated herein by reference:

- Streamlined Property Report, Former Virginia-Carolina Chemical Corporation Site - Charlotte, North Carolina (Property Report). BBL, 2006.
- Removal Site Evaluation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina. ARCADIS, January 2010.
- Removal Site Evaluation Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, Mecklenburg County, North Carolina (RSE Report). ARCADIS, July 2010.

## 2.2 Site Location

The Site is located in Charlotte, Mecklenburg County, North Carolina (Figure 1-1). The current street address that most closely matches the former acid chamber location is 349 West Tremont Avenue. The geographical location of the center of the Site is at 35.21020° North Latitude and 80.86517° West Longitude (North American Datum of 1983 [NAD83]).

## 2.3 Facility Description and Operational Status

As described in Section 2.1, the Charlotte facility became a complete plant, with an acid chamber structure, that produced phosphate fertilizers prior to 1890 until sometime between 1929 and 1934.

Structures associated with the former plant included one acid chamber structure (located in two different areas of the site at different points in time), and associated burners, dry mixing plant, supply house, wash house, railroad sidings, a fertilizer factory, a fertilizer warehouse, a bag house, a 50,000-gallon water tower, a nitre house and an office. Figure 2-1 depicts the approximate locations of the historical site features digitized from Sanborn maps.

## 2.4 Current Uses of the Former Property

The Site is currently occupied with commercial and light industrial facilities located within the Tremont Center owned by Tremont Industrial Park, LLC. The former VCC property can be accessed from West Tremont Avenue, which forms the northern boundary of the site. A vast majority of the former site is currently paved as asphalt driveways and parking lots or covered by the Tremont Center buildings.

Surrounding land use of the former Charlotte property includes commercial and industrial facilities, residential apartments, restaurants, a music hall, a shopping mall, and an abandoned gas station. The nearest residential properties are two apartment buildings located east and southeast along Hawkins Street. Refer to Figure 2-1 for the listing of surrounding properties.

Currently, the former Charlotte site is occupied by two tax parcels owned by Tremont Industrial Park, LLC. Property ownership information was provided by the Mecklenburg County GIS and Property Ownership Land Records Information System.

## 2.5 Area Geology and Hydrogeology

The Site is located in the Upland Piedmont Physiographic Province in North Carolina, which is characterized by gently rolling, well-rounded hills and ridges with a few hundred feet of elevation difference between the hills and valleys (NCGS, 2004). Specifically, the Site is located within a lithotectonic region known as the Charlotte Belt (Goldsmith et. al., 1988). Bedrock geology in the Charlotte Belt is dominated by crystalline rocks that formed between 900 million and 248 million years ago. Goldsmith et. al. (1988) have mapped and classified the bedrock in the vicinity of the site as metamorphosed quartz diorite and tonolite. These closely related rock types are characteristically grey in color, generally exhibit a massive to weakly foliated structure, and are composed of a variety of minerals including plagioclase feldspar, quartz, biotite, hornblende, and epidote.

In the North Carolina Piedmont, bedrock is typically overlain by a layer of regolith, also known as overburden. Overburden varies in thickness and composition depending on the topography and geologic history of the area, but commonly consists of a variety of unconsolidated soil types including topsoil, alluvium, saprolite, and partially weathered rock (PWR). Saprolite, a major component of overburden, is the residual product of in-place chemical weathering of crystalline bedrock. PWR commonly exists in a transition zone between highly weathered saprolite and competent bedrock. Although the mineral composition of PWR differs from the parent bedrock due to weathering, PWR commonly retains many of the structural features of the parent bedrock including fractures, joints, and foliation. The contact between PWR and competent bedrock is often irregular and erratic, even over relatively short horizontal distances, due to variability in resistance to weathering controlled by structural features and natural variations in mineral composition.

The hydrogeology of the region is characterized by a two-part groundwater system, consisting of overburden and bedrock aquifers. Overburden is the primary storage reservoir for the underlying bedrock and has high porosity and low permeability. Precipitation is stored as groundwater in the intergranular spaces of the overburden as it infiltrates through the subsurface. The water table typically exists within the overburden and the direction of shallow groundwater flow generally mimics the slope of the land surface.

Review of the State Soil Geographic Database (STATSGO) soil survey data compiled by United States Department of Agriculture (USDA) Soil Conservation Service (SCS) indicates that the underlying soils of the Site (Mecklenburg County) are classified as urban land and are variable in texture. Native soils in the immediate Site vicinity are

classified as Cecil sandy clay loam, and consist of well drained, coarse-grained sand, clay, and silt with moderate infiltration rates (EDR, 2009).

Based on the limited data collected from shallow soil borings advanced at the Site during the Removal Site Evaluation (ARCADIS, 2010), the subsurface generally consists of orange brown to reddish brown silty clay and clayey silt with varying amounts of fine-grained gravel and rootlets. Orange brown to dark brown silt and sandy silt were also observed in the shallow subsurface in several of the soil borings. Gravel was encountered at depths varying from the ground surface to 4 feet below ground surface (bgs).

Fill materials consisting of sulfur (in borings CH-SB-23 and CH-SB-24) and coal (in boring CH-SB-24) fragments were observed in soil borings advanced in the southwestern portion of the Site extending from 0.5 to 4 feet bgs. Additional limited fill materials, including black and magenta slag and brick fragments, were observed in soil borings advanced in the central (borings CH-SB-10 and CH-SB-11) and southwestern (boring CH-SB-23) portions of the Site, at depths varying from the ground surface to 4 feet bgs. No fill materials or magenta slag were observed in any of the remaining soil borings. Groundwater was not encountered in any of the soil borings, which were advanced to a maximum depth of 8 feet bgs during the RSE field activities.

### 2.6 Surface Water Bodies

The Site is located near the border of the Catawba and Yadkin River Basin. No surface water features are present on or immediately adjacent to the Site. The two closest surface water features are tributaries of Irwin Creek and Dairy Branch. Irwin Creek is located approximately 4,000 feet west of the Site (Figure 1-1). Irwin Creek flows southwest and joins with Sugar Creek which feeds into the Catawba River. Tributaries of Dairy Branch are located approximately 3,000 feet southeast of the Site. Dairy Branch flows southeast and joins with Little Sugar Creek which feeds into the Catawba River. The Catawba River ultimately discharges to the Atlantic Ocean.

### 2.7 Description of Drinking Water Sources

Water is supplied to the area around the Site by Charlotte-Mecklenburg Utilities. Mountain Island Lake and Lake Norman supply the drinking water and are located approximately 10 miles and 15 miles northwest of the Site, respectively. There are no active public water supply wells in the vicinity of the Site (EDR, 2009 and personal communication with Jack Stutts of the Mecklenburg County Department of Groundwater and Wastewater in October 2010).

## 2.8 Summary of Previous Investigations

In April 2010, ARCADIS, on behalf of EMES, collected soil samples from the Site as described in the RSE Report (ARCADIS, 2010). Soil sample results were compared to the USEPA screening levels of 27 mg/kg and 895 mg/kg for arsenic and lead, respectively. However, in order to meet the soil screening level objectives of both USEPA and NCDENR, analytical results from soil samples collected during site delineation activities will be compared to site-specific screening levels of 22 mg/kg for arsenic and 400 mg/kg for lead. The screening levels are based on NCDENR Inactive Hazardous Sites Branch (IHSB) Soil Remediation Goals for arsenic and lead. A summary of the April 2010 sampling results is provided below.

### 2.8.1 Soil Sample Results

A total of 79 soil samples were collected from 25 soil borings advanced at the Site (Figure 2-2). In general, samples were collected from 0-0.5 feet, 0.5-2 feet, and in 2-foot intervals thereafter to depths of up to a maximum of 8 feet bgs. Samples were screened in the field for arsenic and lead using a portable x-ray fluorescence (XRF) device. The soil samples were then submitted to, and analyzed by, TestAmerica, Inc. of Nashville, Tennessee (TestAmerica) for arsenic, lead, and pH.

Arsenic was detected in 15 soil samples from 10 soil boring locations at concentrations exceeding the USEPA screening level of 27 mg/kg. Based on the NCDENR IHSB Preliminary Health Based Soil Remediation Goal of 22 mg/kg, arsenic concentrations exceeded NCDENR screening levels in 20 soil samples from 13 soil boring locations. Lead was detected in one soil sample (CH-SB-19) collected from 0 to 0.5 feet bgs at a concentration exceeding the USEPA screening level of 895 mg/kg. Based on the NCDENR IHSB Preliminary Health Based Soil Remediation Goal of 400 mg/kg, lead concentrations exceeded NCDENR screening levels in 4 soil samples from 2 soil boring locations. The maximum arsenic concentration of 267 mg/kg was collected from soil boring CH-SB-24 at a depth of 0.5 to 2 feet bgs. The maximum lead concentration of 20,100 mg/kg was collected from soil boring CH-SB-19 at a depth of 0 to 0.5 feet bgs. The pH of the soil samples varied between 3.1 and 7.6 standard units.

Thirteen of the 25 boring locations sampled had arsenic and/or lead concentrations that exceeded the screening levels. Soil boring locations with arsenic and/or lead concentrations greater than the screening levels are presented on Figure 2-2. A summary of the RSE analytical program is provided in Table 2-1. A complete summary of the sample analytical results is presented in Table 2-2.

### **3. Site Delineation Rationale and Activities**

#### **3.1 Data Requirements**

As described in Section 2.8, data generated from the RSE activities indicated the presence of elevated concentrations of arsenic and lead in specific areas of the site. The delineation activities described in this section will focus on the collection of soil samples around these locations to delineate the extent of arsenic and/or lead in Site soils. Soil samples will be collected from both the surface and at depth. Groundwater monitoring wells will be installed and sampled to investigate the presence of arsenic and/or lead in groundwater. This section describes the sampling activities that will be performed to delineate the extent of these constituents in Site media.

#### **3.2 Site Access**

EMES will secure a new access agreement with Tremont Industrial Park, LLC (Tax Parcel IDs 12103218 and 12103217) prior to the start of site delineation activities.

EMES will secure access agreements from adjacent properties if needed based on the results of the initial delineation sampling described herein, as necessary.

#### **3.3 Utility Clearance**

Necessary permits and utility clearances will be obtained prior to any subsurface activities. A utility markout will be performed at the Site to identify all subsurface utilities (e.g., gas, electrical, telephone, water, sewers, cable television). No drilling will be performed within five (5) feet of a utility markout without prior approval from ExxonMobil. To further confirm the absence of utilities in the drilling area, a private utility locating company will also be used to clear all areas where subsurface work will be performed. Detailed utility clearance procedures are contained in the HASP (Appendix C).

#### **3.4 Soil Sampling Program**

##### **3.4.1 Soil Sampling Analyses and Rationale**

Soil borings will be installed across the Site to delineate the horizontal and vertical extent of arsenic- and/or lead-impacted soil, focusing on those areas identified during the RSE sampling event. All soil sample results will be compared to the site-specific screening levels (SSSLs).

As stated in Section 2.8, soil sample results from samples collected during RSE activities were compared to USEPA-determined screening values of 27 mg/kg and 895 mg/kg for arsenic and lead, respectively. However, in order to meet the soil screening level objectives of both USEPA and NCDENR, analytical results from soil samples collected during site delineation activities will be compared to site-specific screening levels of 22 mg/kg for arsenic and 400 mg/kg for lead. The screening levels are based on NCDENR Inactive Hazardous Sites Branch (IHSB) Soil Remediation Goals for arsenic and lead.

Soil borings are proposed at 29 locations across the Site, including the seven proposed monitoring well borings discussed in Section 3.5. Additional contingency borings will also be advanced and sampled if adjacent borings are impacted based on the results of field screening (described below). Proposed soil sample locations are shown on Figure 3-1.

Soil samples will be collected using hand augers and/or direct push techniques and screened in the field using a portable XRF device. Soil samples will be collected from 0-0.5 feet, 0.5-2 feet, 2-4 feet and in 2-foot intervals until XRF results for arsenic and lead are less than the screening levels and no magenta slag is observed. Borings will be advanced until groundwater or refusal is encountered, whichever is shallower. Sample collection procedures are described in the FSP provided in Appendix A.

The presence of slag and the coloration of soil samples collected will be documented in the field notes and included in the investigation summary report that will be prepared following implementation of the Work Plan. Additional soil sampling activities may also be performed during this investigation at the discretion of EMES or at the request of USEPA to further refine the limits of areas that contain elevated concentrations of arsenic and/or lead.

### 3.4.2 Soil Sample Analyses

#### 3.4.2.1 XRF Screening

Soil samples collected will be screened in the field for arsenic and lead concentrations using a portable XRF device; samples will be retained and sent to a fixed-based laboratory for analyses as described below.

3.4.2.2 Laboratory Analyses

Soil samples collected from 0 to 4 feet bgs will be analyzed at the fixed-based laboratory for arsenic, lead and pH. Samples will be analyzed from successively deeper intervals until the concentrations of arsenic and lead are confirmed to be below the screening levels. Samples from deeper intervals will be analyzed as described below.

Soil Sample Depth Interval (feet bgs)	Analyze w/XRF?	Analyze at laboratory?
0 – 0.5	Yes	Yes, always
0.5 – 2	Yes	Yes, always
2 – 4	Yes	Yes, always
4 – 6	Yes	Yes, if XRF results are above XRF screening levels in the 2-4 foot depth interval of 17 mg/kg for arsenic or 300 mg/kg for lead. XRF screening levels are based on 75% of the SSSLs for arsenic and lead, respectively.
6 – 8	Yes	Yes, if XRF results are above XRF screening levels in the 4-6 foot depth interval of 17 mg/kg for arsenic or 300 mg/kg for lead. XRF screening levels are based on 75% of the SSSLs for arsenic and lead, respectively.

Select samples may be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to determine the appropriate disposal requirements for evaluating potential soil removal alternatives. TCLP analyses will be performed using a composite of the soil samples collected. The specific samples selected for TCLP analyses will be determined following receipt of preliminary laboratory analytical data. Soil borings selected for TCLP analyses will be biased toward those locations where elevated concentrations of arsenic and lead are detected or where significant amounts of magenta-stained soils are observed. The composite soil samples will be analyzed for total arsenic and lead and TCLP arsenic and lead. The soil sampling analytical program is presented in Table 3-1.

### 3.5 Groundwater Sampling Program

#### 3.5.1 Groundwater Monitoring Well Sampling Analysis and Rationale

Seven shallow groundwater monitoring wells will be installed at the Site to assess the potential impacts to the shallow aquifer resulting from rainwater infiltrating through soils containing elevated concentrations of arsenic and/or lead. Monitoring wells will be installed with a uniform distribution across the site to provide a site-wide assessment of groundwater quality and hydraulic gradient. Proposed monitoring well locations are shown on Figure 3-1; actual locations may be adjusted in the field based on observed site conditions.

As described in more detail below, groundwater samples will be collected from each of the groundwater monitoring wells to assess groundwater quality at the Site. Groundwater elevations will also be gauged to determine the direction and gradient of groundwater flow. A site-specific potentiometric surface map will be generated and included in the summary report that will be prepared following the completion of site delineation activities.

#### 3.5.2 Permanent Groundwater Monitoring Well Installation

Groundwater monitoring wells will be installed to facilitate the collection of shallow groundwater samples and the measurement of groundwater elevations. The wells will be screened so that the top of the well screen is just above the water table. Prior to construction of the monitoring wells, a soil boring will be advanced adjacent to each of the proposed monitoring well locations. An XRF will be used to screen these borings for arsenic and lead concentrations in soil. In the event that elevated concentrations of arsenic or lead are detected, or if slag or magenta-stained soil is observed, the monitoring well at that location will be completed as a double-cased monitoring well to reduce the potential downward transport of these materials during drilling. All monitoring wells will be installed and developed in accordance with the procedures specified in the FSP provided in Appendix A.

#### 3.5.3 Groundwater Sample Collection and Analysis

A groundwater sample will be collected from each of the seven groundwater monitoring wells following installation and well development. Samples will be collected using low-flow/low-stress sampling techniques in accordance with the procedures specified in the FSP (Appendix A). All groundwater samples will be analyzed for the following analytical parameters using the analytical procedures specified in the QAPP (Appendix B):

- Arsenic and lead; and
- pH, temperature, conductivity, dissolved oxygen, redox potential, and turbidity (field measurements).

The groundwater sample analytical program is summarized in Table 3-2.

### 3.5.4 Hydraulic Conductivity Testing

Slug injection and removal tests will be performed at all installed groundwater monitoring wells to provide data for calculating the hydraulic conductivity of the water table aquifer beneath the Site. The slug tests will be performed in accordance with the procedures specified in the FSP (Appendix A).

### 3.6 Groundwater Elevation Measurement

One round of groundwater elevation measurements will be recorded from the monitoring wells. The data will be used to develop a shallow groundwater potentiometric surface map for the Site. Depth-to-water measurements will be performed in accordance with the procedures specified in the in the FSP (Appendix A).

### 3.7 Surveying

All soil borings and monitoring wells will be surveyed for horizontal and vertical control. All survey data will be referenced to the North American Horizontal Datum of 1983 and the North American Vertical Datum of 1988.

### 3.8 Investigation-Derived Waste Sampling and Disposal

Waste generated as part of the delineation activities (i.e., soil, water, decontamination fluids, and personal protective equipment [PPE]) will be collected in drums and stored at the Site prior to removal. Laboratory analysis will be performed on a quick turn-around schedule to minimize the amount of time that the drums are at the Site. Drums containing solids will be analyzed for TCLP metals, while drums containing aqueous solutions will be analyzed for Target Analyte List (TAL) metals and pH. The investigation-derived waste (IDW) sample analytical program is summarized in Tables 3-1 and 3-2.

**3.9 Analytical Data Validation**

All laboratory analytical data generated from the sample analyses will be validated in accordance with the procedures listed in the QAPP (Appendix B).

#### 4. Reporting

A Site Delineation Report and Removal Action Work Plan (SDR/RAWP) will be prepared that summarizes available data from the Site. It will present and evaluate the results of all data collection activities performed during implementation of this Work Plan as well as outline the technical approach and methods for conducting future activities at the Site. Specifically, the SDR/RAWP will include the components described below:

- **Data Collection Activities:** This section will describe the activities associated with the data collection activities described in this Work Plan.
- **Summary of Results:** This section will summarize data collected during implementation of this Work Plan and previous investigations.
- **Removal Action Work Plan:** The data generated by previous investigations and during implementation of this Work Plan will be evaluated to provide a technical approach and describe the methods for conducting future actions at the Site.

The SDR/RAWP will be prepared and submitted in accordance with the schedule presented in Section 6.

**5. Project Organization**

**5.1 Introduction**

Several organizations will be directly involved in the performance and review of this project. These organizations have specific project functions and relate to each other in various ways according to their project responsibilities. The purpose of this section is to provide a description of the overall project organization. This section also describes the function and responsibility of various groups to aid in the exchange of information and to provide efficient project implementation. Table 5-1 provides contact information for key individuals working on the project.

**5.2 USEPA**

The USEPA Region IV and EMES have agreed that EMES will perform site delineation activities at the VCC-Charlotte, North Carolina Site. The USEPA will review, comment upon, and ultimately approve all plans and reports submitted for the site characterization. The USEPA contact for this Site will be Mr. Ken Mallary.

**5.3 North Carolina Department of Environment and Natural Resources (NCDENR)**

The NCDENR will review and comment upon all plans and reports submitted for the site characterization. The NCDENR contact for the Site is Mr. David Mattison.

**5.4 EMES - Responsible Party**

USEPA Region IV and EMES have agreed that EMES will perform site delineation activities. EMES is the Responsible Party for the activities at the former VCC-Charlotte, North Carolina Site. Ms. Lauren Gordon is EMES's corporate representative overseeing the project.

**5.5 Evaluation Contractor**

ARCADIS G&M of North Carolina, Inc. of Cary, North Carolina has been selected by EMES, the Respondent, as the Evaluation Contractor. All work will be performed under the supervision of the ARCADIS Project Manager, Mr. Matt Pelton, and the ARCADIS Assistant Project Manager, Ms. Kirstyn White.

**6. Schedule**

It is expected that the activities outlined herein will be completed in accordance with the following schedule:

- Obtain USEPA approval of this Work Plan 15 days
- Secure access agreements 30 days
- Procure Contractors and Equipment and Mobilize 15 days
- Complete Site Delineation and Sampling Activities 15 days
- Laboratory Analysis of Samples 30 days
- Data Validation 30 days
- Prepare/Submit the SDR/RAWP 60 days

## 7. References

ARCADIS, 2010. Removal Site Evaluation Report, Former Virginia-Carolina Chemical Corporation Site, Charlotte, North Carolina, July 2010.

ARCADIS, 2010. Removal Site Evaluation Work Plan, Former Virginia-Carolina Chemical Corporation Site, Charlotte, North Carolina, January 2010.

Blasland, Bouck & Lee, Inc., 2006. Streamlined Property Report, Former Virginia-Carolina Chemical Corporation Site – Charlotte, North Carolina (Property Report). BBL, 2006.

Environmental Data Resources (EDR), 2009. The EDR Radius Map™ with GeoCheck®, VCC-Charlotte, 301 West Tremont Ave., Charlotte, NC 28203, Inquiry Number: 2662591.2s. December 18, 2009.

Goldsmith et. al., 1988. *Geologic Map of the Charlotte 1° x 2° Quadrangle, North Carolina and South Carolina*. Goldsmith, Richard et. al. United States Geological Survey (USGS) Miscellaneous Investigation Series Map I-1251-E. 1988.

LeGrand, 2004. *A Master Conceptual Model for Hydrogeological Site Characterization in the Piedmont and Mountain Region of North Carolina: A Guidance Manual*. LeGrand, H.E. Prepared for the North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality, Groundwater Section. February 2004.

LeGrand and Mundorff, 1952. *Geology and Ground Water in the Charlotte, North Carolina Area*. LeGrand, H.E. and Mundorff, M.J. Prepared by the North Carolina Department of Conservation and Development, Division of Mineral Resources in cooperation with the United States Department of Interior, Geological Survey. Bulletin Number 63. 1952.

**ARCADIS**

**Revised SDWP –  
Table 3-1**

**Table 3-1**  
**Soil and IDW Sample Analytical Program**  
**Site Delineation Work Plan**  
**VCC Charlotte, North Carolina**

Parameter	Estimated	Estimated	Estimated	No. of Field QC Samples			Total No. Field + Field QC Samples <sup>1</sup>	No. of MS/MSD Samples Sets
	Number of Borings	No. of Samples per Boring <sup>1</sup>	No. of Field Samples <sup>1</sup>	Field Duplicate	Rinse Blank	Trip Blank		
<b>Soil Delineation Samples</b>								
Total Arsenic and Lead	29	5	145	8	4	0	157	8
pH	29	5	145	8	0	0	153	8
<b>Waste Disposal Characterization Samples</b>								
TCLP Arsenic and Lead	10	1	10	1	0	0	11	1
Total Arsenic and Lead	10	1	10	1	0	0	11	1
<b>IDW Samples (Solid)</b>								
TCLP Metals	--	--	1	0	0	0	1	0

**Notes:**

<sup>1</sup> The number of samples per boring and total number of samples are approximate.

1. Field duplicate and field quality control (QC) samples will be collected at a frequency of 5% (1 for every 20 samples).
2. Equipment rinse blanks will be collected at a frequency of one per day.
3. Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 5% (1 for every 20 samples).
4. Number of soil delineation borings based on 29 new locations, including 7 monitoring well borings.
5. Number of waste disposal samples are estimated. The specific samples selected for TCLP analyses will be determined following receipt of preliminary laboratory analytical data.

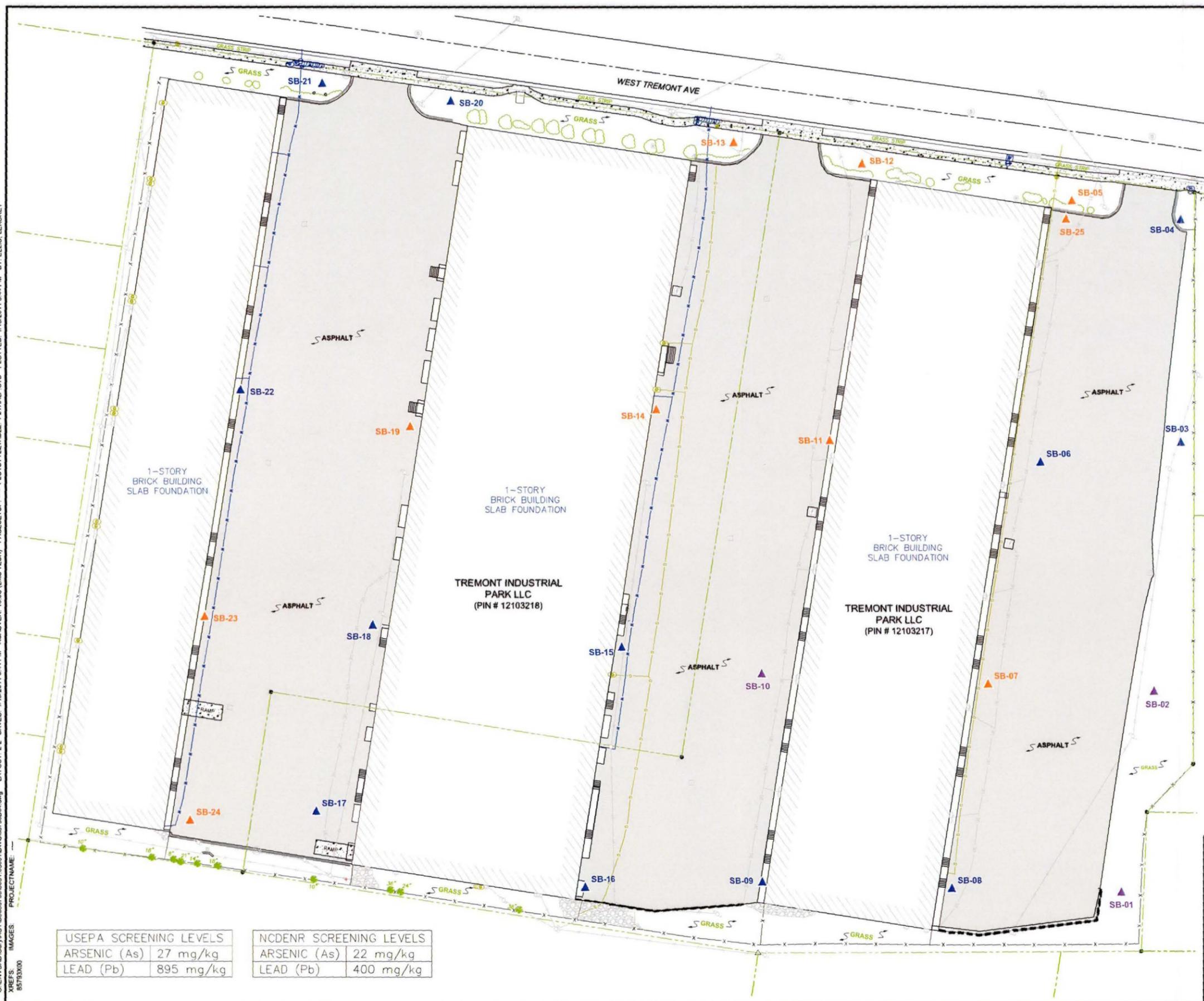
IDW - investigation-derived waste

TCLP - Toxicity Characteristic Leaching Procedure

**ARCADIS**

**Revised SDWP –  
Figure 2-2 and  
Figure 3-1**

CITY: CARY DIV: GROUP: 41 DB: LELIUS LD: (Opt) PIC: (Opt) PM: (Rpt) TM: (Opt) LVR: (Opt) ON: OFF=REF  
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 XREFS: 85793000  
 PROJECT NAME: TREMONT INDUSTRIAL PARK

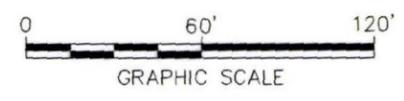


**LEGEND:**

- PROPERTY LINES
- FENCE
- ASPHALT
- TREES
- WATER LINE
- GAS LINE
- ELECTRIC
- OVERHEAD ELECTRIC
- RIP RAP
- SOIL BORING LOCATION BELOW SCREENING LEVELS
- SOIL BORING LOCATION WITH As AND/OR Pb ABOVE USEPA AND NCDENR SCREENING LEVELS
- SOIL BORING LOCATION WITH As AND/OR Pb ABOVE NCDENR SCREENING LEVELS

**NOTES:**

1. BASEMAP AND SOIL BORING LOCATIONS PROVIDED BY TAYLOR, WISEMAN & TAYLOR ON NOVEMBER 02, 2010. SOIL BORINGS 1-5, 12, 13, 20 AND 21 WERE LOCATED BY ARCADIS IN APRIL 2010 USING GPS.
2. SOIL BORINGS BEGIN WITH THE PREFIX "CH-".
3. mg/kg - MILLIGRAMS PER KILOGRAM.
4. USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
5. NCDENR - NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES.



USEPA SCREENING LEVELS		NCDENR SCREENING LEVELS	
ARSENIC (As)	27 mg/kg	ARSENIC (As)	22 mg/kg
LEAD (Pb)	895 mg/kg	LEAD (Pb)	400 mg/kg

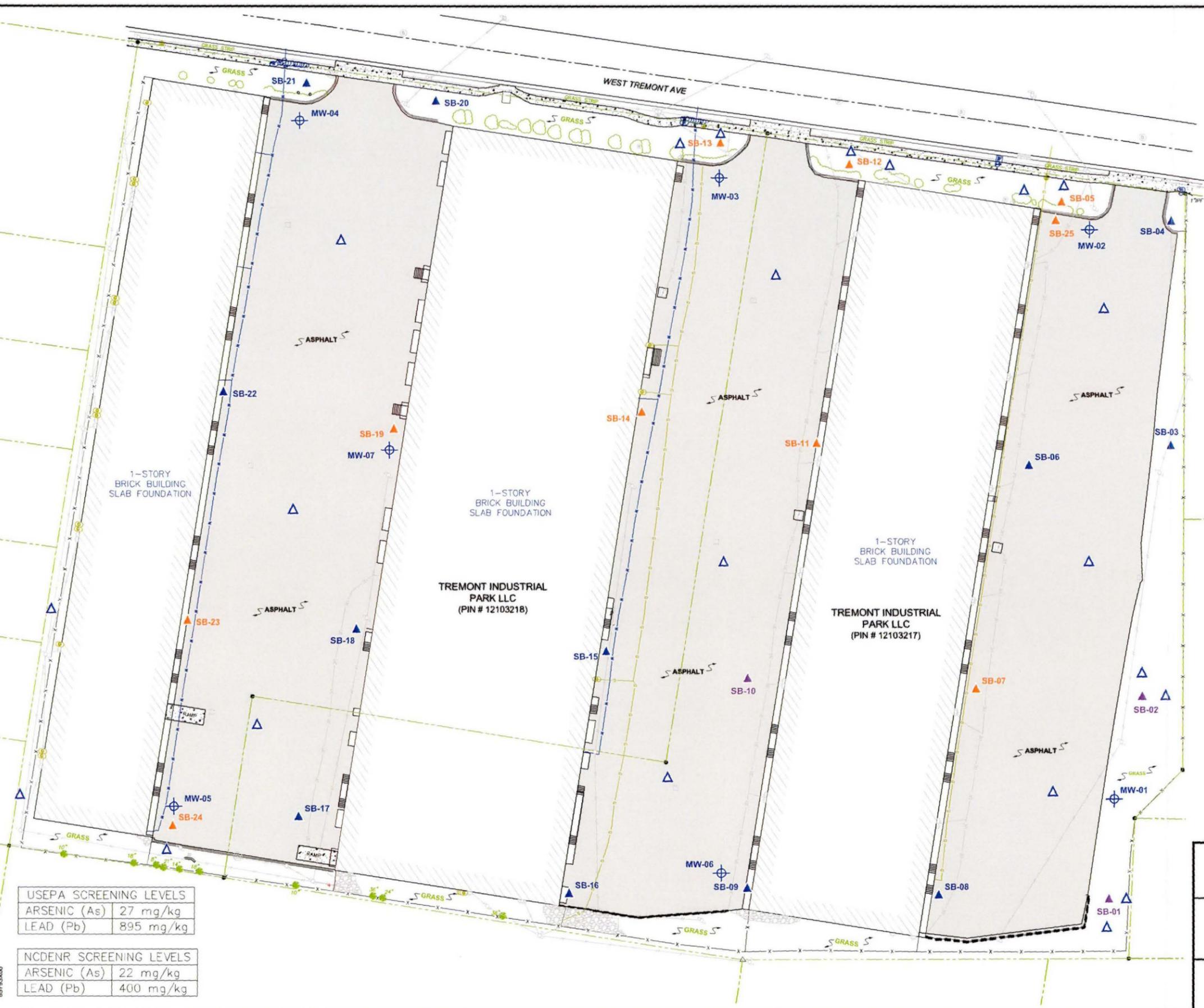
**EXXONMOBIL  
VCC-CHARLOTTE, NORTH CAROLINA  
SITE DELINEATION WORK PLAN**

**LOCATIONS OF RSE SOIL BORINGS  
WITH SOIL SAMPLES THAT  
EXCEED SCREENING LEVELS**

**ARCADIS**

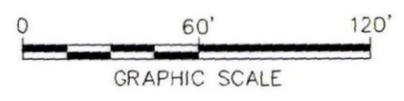
FIGURE  
**2-2**

CITY: CARY DIV: GROUP 41 DB: LELIS LD: (Or) PIC: (Or) PM: (Rev) TM: (Or) LVR: (Or) ON: OFF-REF  
 G: ENVCAD/CAD/ACT/B008750301.000110WGS8750303.dwg LAYOUT: 3-1 SAVED: 11/23/2011 3:47 PM ACADVER: 18.05 (LMS TECH) PAGES: 18 PLOTTED: 11/23/2011 3:47 PM BY: ELLIS, LEKOREY  
 XREFS: 8579300  
 IMAGES: PROJECTNAME



- LEGEND:**
- PROPERTY LINES
  - x-x- FENCE
  - ASPHALT
  - TREES
  - WATER LINE
  - GAS LINE
  - ELECTRIC
  - OVERHEAD ELECTRIC
  - RIP RAP
  - ▲ SOIL BORING LOCATION BELOW SCREENING LEVELS
  - ▲ SOIL BORING LOCATION WITH As AND/OR Pb ABOVE USEPA AND NCDENR SCREENING LEVELS
  - ▲ SOIL BORING LOCATION WITH As AND/OR Pb ABOVE NCDENR SCREENING LEVELS
  - ▲ LOCATION OF PROPOSED SOIL BORING
  - ⊕ LOCATION OF PROPOSED GROUNDWATER MONITORING WELL

- NOTES:**
1. BASEMAP AND SOIL BORING LOCATIONS PROVIDED BY TAYLOR, WISEMAN & TAYLOR ON NOVEMBER 02, 2010. SOIL BORINGS 1-5, 12, 13, 20 AND 21 WERE LOCATED BY ARCADIS IN APRIL 2010 USING GPS.
  2. SOIL BORINGS BEGIN WITH THE PREFIX "CH-".
  3. mg/kg - MILLIGRAMS PER KILOGRAM.
  4. USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
  5. NCDENR - NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES.



USEPA SCREENING LEVELS	
ARSENIC (As)	27 mg/kg
LEAD (Pb)	895 mg/kg

NCDENR SCREENING LEVELS	
ARSENIC (As)	22 mg/kg
LEAD (Pb)	400 mg/kg

EXXONMOBIL  
VCC-CHARLOTTE, NORTH CAROLINA  
**SITE DELINEATION WORK PLAN**

**PROPOSED SOIL BORING  
AND GROUNDWATER MONITORING  
WELL LOCATIONS**

**ARCADIS**

FIGURE  
**3-1**

**ARCADIS**

**Revised SDWP-QAPP  
Table 3-1**

**Table 3-1**  
**Environmental and Quality Control Sample Analyses**  
**Site Delineation Work Plan**  
**VCC Charlotte, North Carolina**

Environmental Sample Matrix: Laboratory Parameters	Estimated Environmental Sample Quantity	Field QC Samples						Estimated Environmental and Field QC Sample Total	Laboratory QC Samples <sup>12</sup>				Total Estimated Environ. and QC Samples
		Trip Blank		Field		Rinse Blank <sup>11</sup>			Matrix Spike		Matrix Spike Duplicate		
		Freq.	No.	Freq.	No.	Freq.	No.		Freq.	No.	Freq.	No.	
<b>Soil</b>													
Arsenic and Lead	145	--	--	1/20	8	1/day	4	157	1/20	8	1/20	8	173
pH	145	--	--	1/20	8	--	--	153	--	--	--	--	153
TCLP Arsenic and Lead	10	--	--	1/20	1	--	--	11	1/20	1	1/20	1	13
TCLP Metals (IDW Sample)	1	--	--	--	--	--	--	1	--	--	--	--	1
<b>Groundwater (Permanent Monitoring Wells)</b>													
Arsenic and Lead	7	--	--	1/20	1	1/day	2	10	1/20	1	1/20	1	12
TAL Metals (IDW Sample)	2	--	--	--	--	--	--	2	--	--	--	--	2
pH (IDW Sample)	2	--	--	--	--	--	--	2	--	--	--	--	2

**Notes:**

- 11 One rinse blank per day per type of sample collection equipment used.
- 12 The number of laboratory QC analyses is based on the frequencies given for the number of environmental samples estimated not including field QC analyses, but assumes that the samples will be processed in groups of 20 samples.
3. The number of soil samples analyzed for metals and pH is estimated.
4. TAL and metals analyses will be run using SW-846 methods.

## **Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Friday, January 14, 2011 1:38 PM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; Germann, Geoff; Beswick.Kevin@epamail.epa.gov; Bowman, Matthew  
**Subject:** 1/7/11 and 1/14/11 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site for the last 2 weeks. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

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### **ACTIVITIES PERFORMED DURING PERIOD**

1. Waiting for EPA response on Draft revised Post-Removal Action text.
2. Held conference call with NCDENR and EPA to discuss NCDENR requirements for the site.

### **ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Schedule meeting with NCDENR to discuss site requirements.

### **ACTION ITEMS/OTHER**

1. Schedule meetings with NCDENR to discuss regulatory program for VCC sites in North Carolina, and specific requirements for Winston-Salem site.

END OF REPORT

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**Mattison, David**

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**From:** Pelton, Matthew [Matthew.Pelton@arcadis-us.com]  
**Sent:** Monday, January 03, 2011 8:44 AM  
**To:** Mallary.Ken@epamail.epa.gov; Neal.Timothy@epamail.epa.gov  
**Cc:** Mattison, David; steven.p.schmidt@exxonmobil.com; Germann, Geoff; Bowman, Matthew; Beswick.Kevin@epamail.epa.gov  
**Subject:** 12/24/10 and 12/31/10 Weekly Status Report: VCC Winston-Salem, NC

Ken/Tim - This email provides the required weekly report for the VCC-Winston-Salem, NC site for the last 2 weeks. Please let me know if you have any questions or if you need any additional information.

Regards-  
Matt Pelton

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**ACTIVITIES PERFORMED DURING PERIOD**

1. Waiting for EPA response on Draft revised Post-Removal Action text.

**ACTIVITIES TO BE PERFORMED DURING NEXT PERIOD**

1. Submit comment responses and Report revisions pending EPA review of draft Post-Removal Action text revisions.

**ACTION ITEMS/OTHER**

1. Schedule January 2011 meeting with NCDENR to discuss regulatory program for VCC sites in North Carolina.

**END OF REPORT**

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