UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 RENNER BLVD.
LENEXA, KANSAS 66219

IN THE MATTER OF:

Viburnum Trend Lead Haul Roads Site
Reynolds, Iron, and Dent Counties,
Missouri

The Doe Run Resources Corporation,
Teck American Incorporated,
Cyprus Amax Minerals Company,
Homestake Lead Company of Missouri,
and
DII Industries, LLC

Respondents

Proceeding Under Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9604, 9606(a), 9607, and 9622

U.S. EPA REGION 7
CERCLA-07-2015-0004

ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent (Settlement Agreement) is entered into voluntarily by the United States Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (MDNR) and The Doe Run Resources Corporation, Teck American Incorporated, Cyprus Amax Minerals Company, Homestake Lead Company of Missouri, and DII Industries, LLC (Respondents). This Settlement Agreement also includes certain covenants not to sue by the Trustees (defined in Section III below). This Settlement Agreement provides for the performance of a removal action by Respondents and the payment of certain response costs incurred by the United States and MDNR at or in connection with certain portions of the "Viburnum Trend Lead Haul Roads Site" (defined in Section III below). Specifically, the area addressed under this Settlement Agreement is located in Reynolds, Iron and Dent Counties in Missouri and consists of specified residential properties and child high use areas that are adjacent to or in the vicinity of certain haul road segments identified on Attachment 1 (Map of Haul Road Segments) to the Statement of Work (SOW) found in Appendix A to this Agreement (the "Site"). The residential properties and child high use areas that constitute the Site and that are to be addressed under this Settlement Agreement through sampling and/or soil removal activities are identified in Attachments 2 and 3 to the SOW.

2. This Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622, as amended (CERCLA) and the Director, Superfund Division by EPA Delegation No. R7-14-14-C and No. R7-14-14-D. This Settlement Agreement is also entered into pursuant to the authority of the Attorney General of the United States to compromise and settle claims of the United States, which authority, in the circumstance of this settlement, has been delegated to the United States Department of Justice.

3. EPA has notified the State of Missouri (State) of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

4. MDNR enters into this Settlement Agreement pursuant to Sections 260.500-260.550, RSMo. By MDNR's entering into this Settlement Agreement the EPA shall be deemed to have notified the State of this action, including any required notice under Section 104(b)(2) of CERCLA, 42 U.S.C. § 9604(b)(2).

5. The Parties recognize that this Settlement Agreement has been negotiated in good faith and that the actions undertaken by Respondents in accordance with this Settlement Agreement do not constitute an admission of any liability. Respondents do not admit, and retain the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Settlement Agreement, the validity of the Findings of Fact, Conclusions of Law and Determinations in Sections IV and V of this Settlement Agreement and any other findings, conclusions of law and/or determinations in any appendix thereto. The fact that Respondents have agreed to undertake a removal action at a particular residence or child high use area within the Site shall not be considered an admission by Respondents regarding the source of any lead contamination at such residence or child high use area or Respondents' liability for such contamination. Respondents agree to comply with and be bound by the terms of this Settlement

Agreement and further agree that they will not contest the basis or validity of this Settlement Agreement or its terms.

II. PARTIES BOUND

6. This Settlement Agreement applies to and is binding upon EPA, MDNR, and upon Respondents and their successors and assigns. The Trustees are bound by the covenants not to sue in paragraph 83. Any change in ownership or corporate status of a Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondent's responsibilities under this Settlement Agreement.

7. Except as provided in Section XIX, Respondents are jointly and severally liable for carrying out all activities required by this Settlement Agreement. In the event of the insolvency or other failure of any one or more Respondents to complete the requirements of this Settlement Agreement, the remaining Respondents shall complete all such requirements unless specifically provided otherwise by this Settlement Agreement.

8. Respondents shall ensure that their contractors, subcontractors, and representatives receive a copy of this Settlement Agreement and comply with this Settlement Agreement. Respondents shall be responsible for any noncompliance with this Settlement Agreement.

III. DEFINITIONS

9. Unless otherwise expressly provided in this Settlement Agreement, terms used in this Settlement Agreement which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Settlement Agreement or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, *et seq.*

b. "Day" shall mean a calendar day. In computing any period of time under this Settlement Agreement, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

c. "Doe Run" shall mean The Doe Run Resources Corporation.

d. "Effective Date" shall be the effective date of this Settlement Agreement as provided in Section XXXI.

e. "Engineering Evaluation/Cost Analysis Report" or "EE/CA Report" shall mean the April 2010 Engineering Evaluation/Cost Analysis Report prepared by Respondents. The EE/CA will be added to the Administrative Record and is attached as Appendix B.

f. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

g. "Future Response Costs" shall mean all costs not inconsistent with the NCP, including, but not limited to, direct and indirect costs, that the United States incurs after the Effective Date and before the issuance of the Notice of Completion of Work (Section XXVIII) in reviewing or developing plans, reports and other items pursuant to this Settlement Agreement, verifying the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, attorneys fees, any monies paid to secure access including the amount of just compensation, emergency response costs, and work takeover costs.

h. "Future State Response Costs" shall mean all costs not inconsistent with the NCP, including, but not limited to direct and indirect costs, that MDNR will incur after the Effective Date and before the issuance of the Notice of Completion of Work (Section XXVIII) in reviewing plans, reports and other items pursuant to this Settlement Agreement, verifying the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, attorneys fees, and emergency response costs.

i. "Haul Road Soils" shall mean all materials excavated from residences and child high use areas within the Viburnum Trend Lead Haul Roads Site and disposed of at the Tailings Facility in connection with performance of work under the Time-Critical Removal Order and this Settlement Agreement.

j. "Interest" shall mean interest at the rate specified for interest on investments of EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

k. "Interim Response Costs" shall mean all costs incurred in connection with the Site by or on behalf of the United States that are not inconsistent with the NCP and were incurred between December 31, 2009 and the Effective Date, including any such costs paid by EPA after the Effective Date.

l. "MDNR" shall mean the Missouri Department of Natural Resources and any successor departments or agencies of the State.

m. "MoDOT" shall mean the Missouri Department of Transportation.

n. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

o. "Non-Time-Critical Removal Action" shall mean all Work conducted by the Respondents in accordance with this Settlement Agreement, CERCLA 07-2015-0004.

p. "Operable Unit 01" or "OU-01" shall mean the Middlebrook Railhead Site, as defined in the Unilateral Administrative Order for Performance of Time-Critical Removal Action, Dkt. No, CERCLA-07-2005-0083.

q. "Operable Unit 02" or "OU-02" shall mean the St. Joe Minerals Corp. Viburnum Site, as defined in the Administrative Order on Consent for the Time-Critical Removal Action, Dkt. No. CERCLA-07-2007-0013.

r. "Paragraph" shall mean a portion of this Settlement Agreement identified by an Arabic numeral.

s. "Parties" shall mean EPA, MDNR, and all Respondents.

t. "Past Response Costs" shall mean all costs not inconsistent with the NCP, including, but not limited to, direct and indirect costs, that the United States paid at or in connection with the Site through December 31, 2009.

u. "Past State Response Costs" shall mean all costs not inconsistent with the NCP, including, bu not limited to, direct and indirect costs, that MDNR incurred from January 1, 2012 through the Effective Date in connection with the Site.

v. "RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901, *et seq.* (also known as the Resource Conservation and Recovery Act).

w. "Respondents" shall mean Doe Run, Teck American Incorporated, Cyprus Amax Minerals Company, Homestake Lead Company of Missouri, and DII Industries, LLC.

x. "Section" shall mean a portion of this Settlement Agreement identified by a Roman numeral.

y. "Settlement Agreement" shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto (listed in Section XXIX). In the event of conflict between this Administrative Settlement Agreement and Order on Consent and any appendix, this Administrative Settlement Agreement and Order on Consent shall control.

z. "Site" shall mean specified residential properties and child high use areas that are adjacent to or in the vicinity of 22 segments of Missouri State Routes, as defined in Attachment 1 to the Statement of Work, and that are within the Viburnum Trend Lead Haul Road Site. The residential properties and child high use areas that are to be addressed under this Settlement Agreement through sampling and/or soil removal activities are identified in Attachments 2 and 3 to the Statement of Work. In this Settlement Agreement, "Site" shall not include OU-01 or OU-02.

aa. "Staging Area" shall mean the area at the Tailings Facility where Respondents have temporarily placed Haul Road Soils from the Time-Critical Removal Action.

bb. "State" shall mean the State of Missouri.

cc. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the non-time-critical removal action as set forth in Appendix A to this Settlement Agreement, and any modifications made thereto in accordance with this Settlement Agreement.

dd. "State Response Costs" shall mean Past State Response Costs and Future State Response Costs.

ee. "Tailings Facility" shall mean the facility permitted by MDNR under the Missouri Metallic Minerals Waste Management Act Permit MM-008, as amended, including the areas of tailings used as a remediation waste management site that are addressed by the EPA Remedial Action Plan (RAP) Permit, EPA ID: MOD 000 823 252. The Tailings Facility is located within OU-02 and is part of the Viburnum Trend Lead Haul Roads Site.

ff. "Tailings Pile" shall mean areas within the Tailings Facility where tailings and other lead bearing materials, including but not limited to Haul Road Soils, have been and will be deposited for final disposal in accordance with the RAP Permit, or any subsequent modifications or replacement permits approved by the EPA or duly delegated authority.

gg. "Time-Critical Removal Action" shall mean the sampling and excavation activities performed by Respondents and their representatives under the Time-Critical Removal Order.

hh. "Time-Critical Removal Order" shall mean the Administrative Order on Consent for Removal Action entered into among EPA and Respondents in 2005 providing for the Time-Critical Removal Action at the Viburnum Trend Lead Haul Roads Site, Dkt. No. CERCLA-07-2005-152.

ii. "Trustees" shall mean the State and the United States Department of the Interior acting in the capacity of a trustee for natural resources as defined in 40 C.F.R. Sections 300.5, 300.605, and 300.600.

jj. "Viburnum Trend Lead Haul Roads Site" shall mean the area that includes (i) all residential and child high use areas that are adjacent to or in the vicinity of 22 segments of Missouri State Routes, as defined in Attachment 1 to the Statement of Work, (ii) OU-01, and (iii) OU-02.

kk. "Waste Material" shall mean 1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and 260.565(1) RSMo; 2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); and 3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), and 260.005(15) RSMo.

ll. "Work" shall mean all activities Respondents are required to perform under this Settlement Agreement with respect to the Site.

IV. FINDINGS OF FACT

10. The Site, as defined in Paragraph 9(z), is located in Reynolds, Iron, and Dent Counties in the southeastern region of Missouri, approximately 90 miles southwest of St. Louis and falls within the footprint of the Viburnum Trend Lead Haul Roads Site.

11. The Site is part of what is commonly known as the New Lead Belt, which began producing lead in the mid-1960s around Viburnum, Missouri, and continues production to this

day. During the next two decades, 10 mines were opened along the north-south trending ore body. Generally, the older mines were established in the northern part of the Viburnum Trend, a relatively contiguous ore body extending from north of the town of Viburnum, Missouri, to south of the town of Corridon, Missouri. The mines and other facilities used in processing ore from what is known as the Viburnum Trend are as follows:

- Viburnum Mine 27
- Viburnum Mine 28
- Viburnum Mine 29
- Casteel Mine (a.k.a. Viburnum Mine 35)
- Viburnum Central Concentrator
- Magmont Mine
- Buick Mine and Concentrator
- Buick Smelter
- Buick Loading Station (railhead)
- Brushy Creek Mine and Concentrator
- West Fork Mine
- Fletcher Mine and Concentrator
- Sweetwater Mine and Concentrator
- Glover Smelter
- Herculaneum Smelter
- Other smelters outside the state of Missouri

12. Ore from the mines was or is crushed, milled, and processed to form a lead concentrate. Lead concentrate contains lead at concentrations generally greater than 70 percent or 700,000 parts per million (ppm). This concentrate was or is shipped by rail and/or truck to various smelters where it was/is further processed into a purer form of lead. Historically, the majority of concentrate from the Viburnum Trend was shipped to one of three smelters in Herculaneum, Glover, and nearby Bixby, Missouri. Currently, lead concentrate from the Viburnum Trend is shipped by truck to Cape Girardeau, Missouri (Southeast Missouri Regional Port Authority in Scott City) where it is loaded onto barges and shipped overseas for further processing.

13. In September 1996, MoDOT conducted a study of lead chat (*i.e.*, mine waste rock). The purpose of the study was to determine if lead chat used in highway asphalt pavement posed a risk to persons living near these highways. Missouri State Highway J was chosen as the "control road" and according to MoDOT, no lead chat was used in the construction or maintenance of this highway. State Route 49 (two miles south of Highway J) was used as the "target" highway. Lead containing materials were used in the pavement of State Route 49. Both of the study highways are located in Reynolds County near the Viburnum Trend Lead Haul Roads Site. Analysis of four samples collected along Highway J detected concentrations of lead at 9,631, 10,958, 3,871, and 801 parts per million (ppm) at distances of zero, five, ten and fifteen feet from the highway, respectively.

14. In June 1998, MDNR conducted an investigation to confirm MoDOT's previous findings. MDNR collected samples from 16 different locations along State Route 49 within the same general area as MoDOT. Analysis of these soil samples revealed lead concentrations as high as 8,452 ppm.

15. In October 2001, MDNR conducted a Screening Investigation to determine if the transportation routes in the area warranted further investigation. MDNR labeled this site the Viburnum Trend Lead Haul Roads Site and collected samples from 16 separate road segments along which it was assumed that lead concentrate was hauled from the lead processing facilities to the various Missouri lead smelters. Over 400 samples were collected along State Routes 21, 32, 49, 72, B, J, KK, N, and TT. Analysis of the resulting data revealed 12 road segments where lead contamination above 400 ppm was present and that residences along these roads were potentially impacted by the contamination.

16. From October 2002 to October 2003, MDNR conducted a large scale removal site evaluation along the 12 previously identified haul road segments. During this evaluation 412 homes were identified and 158 yards were sampled. Lead contamination was detected at concentrations above 400 ppm in 54 yards, and lead contamination was found at above 1,200 ppm in 18 yards. Lead concentrations in the yards were as high as 6,534 ppm with cadmium levels as high as 8.19 ppm and zinc as high as 3,570 ppm.

17. Between June 2004 and May 2005, EPA screened residential yards, adjacent to or in the vicinity of 22 segments of Missouri State Routes, as defined in Attachment 1 to the Statement of Work, for lead contamination. As of February 2005, EPA sampled approximately 565 yards out of an estimated 914 yards along the haul roads.

18. On February 25, 2005, Respondents and EPA entered into the Time-Critical Removal Order. Pursuant to the Time-Critical Removal Order, Respondents sampled and, where required, removed soil at residences and child high use areas (e.g., playgrounds) where lead contamination exceeded 1,200 ppm. Respondents, in performing the Time-Critical Removal Action, sampled 74 additional yards and removed contaminated soil from 34 residential yards.

19. As a result of sampling conducted by EPA, MDNR, and the Respondents, residences or child high use areas were identified with soil lead concentrations below 1,200 ppm but greater than 400 ppm. Soils exceeding the time-critical action level of 1,200 ppm lead have been addressed pursuant to the Time-Critical Removal Action. However, soils with lead concentrations that exceeded 400 ppm currently remain at certain residences and/or child high use areas at the Site.

20. The clean-up level for total lead in soils for the Site's Non-Time-Critical Removal Action has been established at 400 ppm in the SOW. The clean-up level is based on the preliminary remediation goal (PRG) accepted by EPA as being protective of sensitive residential receptors.

21. Over 1,095 tons of lead-impacted soils from the Viburnum Trend Lead Haul Roads Site were excavated and disposed of at a Subtitle C facility as part of the Time-Critical Removal Action. Respondents have stockpiled additional excavated material from the Time-Critical Removal Action at the Staging Area at the Tailings Facility, which is owned and operated by Doe Run.

22. Doe Run has been issued a Remedial Action Permit (RAP), USEPA ID# MOD 000-823-252 authorizing the treatment, storage, and disposal of hazardous remediation waste at

the Tailings Facility. This permit allows the placement on the Tailings Pile of up to 100,000 tons of remediation waste, including but not limited to Haul Road Soils. Haul Road Soils from the Time-Critical Removal Action and Non-Time-Critical Removal Action will be placed on the Tailings Pile as a soil to grow vegetative cover.

23. Pursuant to the RAP, Haul Road Soils from the Time-Critical Removal Action will be transferred from the Staging Area at the Tailings Facility and placed on the Tailings Pile at the Tailings Facility.

24. Doe Run is a corporate successor of the St. Joe Minerals Corporation and has conducted mining operations in the Viburnum Trend. Lead concentrate, owned by Doe Run and its predecessors, was at certain times hauled by truck on the roads in the vicinity of the Site. Doe Run currently owns and operates mining and concentrating facilities near the Site where lead concentrate is hauled on roads in the vicinity of the Site to Cape Girardeau, Missouri. Doe Run is the former and current owner or operator of the Tailings Facility.

25. From 1965 through May 1986, Homestake Lead Company of Missouri (Homestake Lead) co-owned with Amax Lead Company of Missouri (Amax Lead) a mine and mill and related facilities in Iron County, Missouri (Buick Mine and Mill). From approximately 1967 to 1986, Homestake Smelting Co. (Homestake Smelting) and Missouri Lead Smelting Co. (Missouri Smelting) were general partners in Amax-Homestake Lead Tollers (AHLT). AHLT was the owner of a lead smelter and other related facilities (Buick Smelter).

26. In May 1986, Homestake Lead and Homestake Smelting acquired the remaining interest in the Buick Mine and Mill and AHLT. In October 1986, Homestake Smelting merged into Homestake Lead. In November 1986, Homestake Lead and St. Joe Minerals Corporation formed The Doe Run Company, a Missouri general partnership, to which Homestake Lead contributed the Buick Mine and Mill and the Buick Smelter. Concentrate, owned by Homestake Lead, was at certain times shipped by truck over roads located along the 22 segments of Missouri State Routes, as defined in Attachment 1 to the Statement of Work. In 1990, Homestake Lead sold its interest in The Doe Run Company to Fluor Corporation.

27. Teck American Incorporated is the corporate successor of Teck Cominco American Incorporated. Teck Cominco American Incorporated is the corporate successor of Cominco American Incorporated. Cominco American Incorporated operated and co-owned the Magmont Mine in a joint venture with Dresser Industries, Inc. The Magmont Mine began production in 1968. Concentrate from the mine was at certain times shipped by truck over roads in the vicinity of the Site. Doe Run purchased the underground interest to the Magmont Mine and the mining rights of Cominco American Incorporated and Dresser Industries, Inc. in March 1995.

28. DII Industries, LLC is the corporate successor of Dresser Industries, Inc. Dresser Industries, Inc. co-owned the Magmont Mine in a joint venture with Cominco American Incorporated from 1968 to 1995. The Magmont Mine began production in 1968, and concentrate owned by Dresser Industries, Inc. from the mine was at certain times shipped by truck over roads in the vicinity of the Site.

29. Cyprus Amax Minerals Company is the corporate successor of AMAX, Inc. Amax Lead, a former subsidiary of AMAX, Inc., co-owned with Homestake Lead, the Buick Mine and Mill. Missouri Smelting and Homestake Smelting were general partners in AHLT. Concentrate, owned by Amax Lead, was at certain times shipped by trucks on roads located along the 22 segments of Missouri State Routes, as defined in Attachment 1 to the Statement of Work. Amax Lead and Missouri Smelting sold their respective ownership interests in the Buick Mine and Mill and AHLT to Homestake Lead and Homestake Smelting in 1986.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

30. Based on the Findings of Fact set forth above, and the Administrative Record supporting this removal action, EPA has determined that:

a. The Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. Lead has been found at the Site and is a "hazardous substance" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. Each Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. Subject to Section XIX, each Respondent is a responsible party and jointly and severally liable under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

e. The actual release of a hazardous substance at this Site, if not addressed by implementing the response action selected in the attached Statement of Work, may present an imminent and substantial endangerment to the health of the public that comes in contact with the Site and to public welfare and the environment.

f. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C.§ 9601(22).

g. The removal action required by this Settlement Agreement is necessary to protect the public health, welfare, or the environment and, if carried out in compliance with the terms of this Settlement Agreement, will be consistent with the NCP, as provided in Section 300.700(c)(3)(ii) of the NCP.

VI. SETTLEMENT AGREEMENT AND ORDER

31. Based upon the foregoing Findings of Fact, Conclusions of Law and Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that Respondents shall comply with all provisions of this Settlement Agreement, including, but not limited to, all appendices to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

VII. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR, AND ON-SCENE COORDINATOR

32. Respondents shall retain one or more contractors to perform the Work and shall notify EPA and MDNR of the name(s) and qualifications of such contractor(s) within ten (10) days of the Effective Date. Should Respondents elect to conduct some of the Work themselves, they shall notify EPA and MDNR of the Respondents' qualifications to perform the elected Work at least seven (7) days prior to commencement of such Work. Respondents shall also notify EPA and MDNR of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least seven (7) days prior to commencement of such Work. EPA retains the right after consultation with MDNR to disapprove of any or all of the contractors and/or subcontractors retained by Respondents. EPA shall provide written notice to Respondents of any such disapproval along with a statement of its reasons for disapproval. If EPA disapproves of a selected contractor, Respondents shall retain a different contractor and shall notify EPA and MDNR of that contractor's name and qualifications within fifteen (15) days of EPA's disapproval. The proposed contractor must demonstrate compliance with ANSI/ASQC E-4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B0-1/002) or equivalent documentation as required by EPA.

33. Within seven (7) days after the Effective Date, Respondents shall designate a Project Coordinator who shall be responsible for administration of all actions by Respondents required by this Settlement Agreement and shall submit to EPA and MDNR the designated Project Coordinator's name, address, telephone number, and qualifications. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. EPA retains the right after consultation with MDNR to disapprove of the designated Project Coordinator. EPA shall provide written notice to Respondents of any such disapproval along with a statement of its reasons for disapproval. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA and MDNR of that person's name, address, telephone number, and qualifications within fifteen (15) days following EPA's disapproval. With the exception of a disapproval of the Project Coordinator, receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Settlement Agreement shall constitute receipt by all Respondents.

34. EPA On-Scene Coordinator. EPA has designated Adam Ruiz of the Emergency Response and Removal North Branch, Region 7, as its On-Scene Coordinator (OSC). Except as otherwise provided in this Settlement Agreement, Respondents shall direct all submissions required by this Settlement Agreement to the EPA OSC as follows:

Adam Ruiz
On-Scene Coordinator
U.S. EPA, Region 7- SUPR/ERNB/PPNS
11201 Renner Blvd
Lenexa, KS 66219
ruiz.adam@epa.gov

35. MDNR Project Manager. MDNR has designated Brandon Wiles as its Project Manager for work conducted pursuant to this Settlement Agreement. Respondents shall direct all submissions required by this Settlement Agreement to the MDNR Project Manager as follows:

Brandon Wiles
Environmental Specialist
Hazardous Waste Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
brandon.wiles@dnr.mo.gov

36. EPA, MDNR, and Respondents shall have the right, subject to Paragraph 33, to change their respective designated OSC, Project Manager or Project Coordinator. Respondents shall notify EPA and MDNR seven (7) days before such a change is made. The initial notification may be made orally, but shall be promptly followed by a written notice.

VIII. WORK TO BE PERFORMED

37. Respondents shall perform, at a minimum, all actions necessary to implement non-time-critical sampling and removals for the Site in accordance with this Settlement Agreement, the Statement of Work (Appendix A), and the April 2010 Engineering Evaluation/Cost Analysis Report (EE/CA Alternative 2) (Appendix B). The actions to be implemented generally include, but are not limited, to the following:

a. Sampling of residences and child high use areas that have not yet been sampled as identified in Attachment 2 to the SOW;

b. Residential soil removal and replacement per the SOW;

c. Proper handling, treatment, and disposal of contaminated materials;

d. Post removal site controls to assure continued protection and prevent recontamination; and

e. Provide proper documentation and quality controls.

38. Work Plan and Implementation

a. Within sixty (60) days of the Effective Date of this Settlement Agreement, Respondents shall prepare and submit to EPA and MDNR, for EPA review and approval after a reasonable opportunity for review and comment by MDNR, a Non-Time-Critical Removal Action Work Plan (Work Plan) that presents the plans and specifications for the Non-Time-Critical Removal Action to be conducted at the Site and describes the proposed tasks and schedules associated with implementation of the Non-Time-Critical Removal Action. The schedule shall provide for completion of SOW activities, including, but not limited to excavation,

backfilling, grading, and initial vegetative seeding, within three (3) years of EPA's approval of the Work Plan with respect to those properties for which access is timely obtained, unless EPA agrees to a longer period. The Work Plan shall conform to the requirements of the attached SOW, and the EE/CA Alternative 2. In the event that there is any conflict between the language of this Settlement Agreement, the SOW, and EE/CA Alternative 2, this Settlement Agreement shall control. The SOW shall control over the EE/CA Alternative 2. EPA shall require preparation of a Quality Assurance Project Plan (QAPP) as part of the Work Plan except in circumstances involving emergency or non-complex removal work. The QAPP should be prepared in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/0003, March 2001) and the "EPA Guidance for Quality Assurance Project Plans (QA/G-5) (EPA/600/R098/98/018, February 1998).

b. EPA, after consultation with MDNR, may approve, disapprove, require revisions to, or modify the Work Plan in whole or in part provided that any revisions or modifications shall be required to achieve the objectives set forth in the SOW. If EPA, after consultation with MDNR, requires revisions, Respondents shall submit a revised Work Plan within thirty (30) days of receipt of EPA's notification of the required revisions. Respondents shall implement the Work Plan as approved in writing by EPA and in accordance with the schedule approved by EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be incorporated into and become fully enforceable under this Settlement Agreement.

c. Respondents shall not commence any Work unless approved by the OSC in conformance with the terms of this Settlement Agreement. Unless approved by the OSC, Respondents shall not commence implementation of the Work Plan developed hereunder until receiving written EPA approval pursuant to Paragraph 38(b).

39. Health and Safety Plan. Within thirty (30) days after the Effective Date, Respondents shall submit for EPA and MDNR review and comment a plan that ensures the protection of the public health and safety during performance of on-Site work under this Settlement Agreement. This plan shall be prepared in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 C.F.R. Part 1910. If EPA determines that it is appropriate, the plan shall also include contingency planning. Respondents shall incorporate all changes to the plan recommended by EPA and MDNR and shall implement the plan during the pendency of the Non-Time-Critical Removal Action.

40. Quality Assurance and Sampling

a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control (QA/QC), data validation, and chain of custody procedures in consultation with MDNR. Respondents shall ensure that the laboratory used to perform analyses participates in a QA/QC program that complies with the appropriate EPA guidance. Respondents shall follow, as appropriate, "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures" (OSWER Directive No.

9360.4-01, April 1, 1990), as guidance for QA/QC sampling. Respondents shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E-4 1994, "Specifications and Guidelines for Quality Systems Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2) (EPA/240/B-01/002, March 2001)," or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements.

b. Upon request by EPA, Respondents shall have such a laboratory analyze samples submitted by EPA for QA/QC monitoring. Respondents shall provide to EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

c. Upon request by EPA, Respondents shall allow EPA or its authorized representatives to take split and/or duplicate samples. Respondents shall notify EPA and MDNR not less than thirty (30) days in advance of any sample collection activity, unless shorter notice is agreed to by EPA. EPA and MDNR shall have the right to take any additional samples that EPA or MDNR deem necessary. Upon request, EPA and MDNR shall allow Respondents to take split or duplicate samples of any samples EPA or MDNR takes as part of their oversight of Respondents' implementation of the Work.

41. Post-Removal Site Control. Respondents shall implement post-removal site controls as required by the SOW and shall provide EPA and MDNR with documentation of all post-removal site control arrangements.

42. Reporting.

a. Respondents shall submit a written progress report to EPA and MDNR concerning actions undertaken pursuant to this Settlement Agreement on the tenth (10^{th}) day of every month from the date of receipt of EPA's approval of the Work Plan until termination of this Settlement Agreement, unless otherwise directed in writing by the OSC. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

b. Respondents shall submit one (1) copy to EPA and one (1) copy to MDNR, of all plans, reports, or other submissions required by this Settlement Agreement, the SOW, or any approved Work Plan. Upon request by EPA, Respondents shall submit such documents in electronic form.

c. Respondents who own or control property at the Site shall, at least thirty (30) days prior to the conveyance of any interest in real property at the Site, give written notice to the transferee that the property is subject to this Settlement Agreement and written notice to EPA and MDNR of the proposed conveyance, including the name and address of the transferee.

Respondents who own or control property at the Site also agree to require that their successors comply with the immediately preceding sentence and Sections IX (Site Access) and X (Access to Information).

43. Final Report. Within sixty (60) days after completion of all Work required by this Settlement Agreement, Respondents shall submit a final report summarizing the actions taken to comply with this Settlement Agreement to EPA and MDNR, for EPA's review and approval after a reasonable opportunity for review and comment by MDNR. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports." The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Settlement Agreement, a listing of quantities and types of materials removed off-Site or handled on-Site, a discussion of removal and disposal options considered for these materials, a listing of the ultimate destination(s) of those materials, a presentation of analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (*e.g.*, manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

> "Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

44. Off-Site Shipments

a. Respondents shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification of such shipment of Waste Material to the appropriate state environmental official in the receiving facility's state and to the OSC. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

i. Respondents shall include in the written notification the following information: 1) the name and location of the facility to which the Waste Material is to be shipped; 2) the type and quantity of the Waste Material to be shipped; 3) the expected schedule for the shipment of the Waste Material; and 4) the method of transportation. Respondents shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

ii. The identity of the receiving facility and state will be determined by Respondents following the award of the contract for the removal action. Respondents shall provide the identity of the receiving facility as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

b. In addition, before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-site location outside of the Viburnum Trend Lead Haul

Roads Site, Respondents shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondents shall only send hazardous substances, pollutants, or contaminants from the Site to a facility outside of the Viburnum Trend Lead Haul Roads Site if it complies with the requirements of the statutory provision and regulation cited in the preceding sentence.

IX. SITE ACCESS

45. If the Site, or any other property where access is needed to implement this Settlement Agreement, is owned or controlled by any of the Respondents, such Respondents shall, commencing on the Effective Date, provide EPA, MDNR, and their representatives, including contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Settlement Agreement.

46. Where any action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall commence the use of best efforts to obtain all necessary access agreements within thirty (30) days after the Effective Date, or as otherwise specified in the Work Plan or in writing by the OSC. For purposes of this Paragraph, "best efforts" means Respondents shall send a letter, which has been reviewed and approved by EPA, to the owner of the property to which access is sought that describes the process and purpose of the removal action, the reasons access is needed, and includes a telephone contact number; and it means Respondents shall make an initial visit to each property to which access is sought and conduct at least two follow-up visits if necessary in order to secure access. The follow-up visits shall be conducted during weekday evening hours between 6:00 p.m. and 8:00 p.m. Respondents shall maintain a log in which they record their efforts to obtain access, including the date the letter was mailed, the time and dates of the initial and follow-up visits, and either the date of the response by the landowner or the date EPA was notified of the failure of Respondents to obtain a response from the property owner. Respondents shall immediately notify EPA if, after using best efforts, Respondents are unable to obtain an access agreement. If Respondents fail to secure necessary access agreements, EPA may assist Respondents in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as EPA deems appropriate, including exercising its authority pursuant to Section 104(e) of CERCLA, 42 U.S.C. § 9604(e). Each access agreement shall permit Respondents and EPA, including its authorized representatives and representatives of the State, access to the property to conduct the activities required under this Settlement Agreement. These individuals shall be permitted to enter and move freely at the property in order to conduct actions that EPA determines to be necessary. Such access shall continue until such time as EPA has issued a Notice of Completion of Work as set forth in Section XXVIII of this Settlement Agreement. Nothing herein shall be interpreted as limiting or affecting EPA's statutory right of entry or inspection authority under federal or state law. All costs and attorney's fees incurred by the United States in obtaining access shall be considered Future Response Costs. Notwithstanding any provision of this Settlement Agreement, EPA and MDNR retain all of their access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

X. ACCESS TO INFORMATION

47. Respondents shall provide to EPA and MDNR, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Settlement Agreement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Upon request, Respondents shall also make available to EPA and MDNR, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work. Any such requests are subject to Respondents' right to assert applicable privileges.

48. Respondents may assert business confidentiality claims covering part or all of the documents or information submitted to EPA under this Settlement Agreement to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA, or if EPA has notified Respondents that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Respondents.

49. Respondents may assert that certain documents, records, and other information are privileged under the attorney-client privilege or any other privilege or protection recognized by federal or state law. If Respondents assert such privilege or protection in lieu of providing documents, they shall provide EPA and MDNR with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the contents of the document, record, or information; and 6) the privilege asserted by Respondents. However, no documents, reports, or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged or otherwise protected.

50. No claim of confidentiality shall be made with respect to any data generated or submitted pursuant to the requirements of this Settlement Agreement, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data or any other documents or information evidencing conditions at or around the Site.

XI. RECORD RETENTION

51. Until ten (10) years after Respondents' receipt of EPA's notification pursuant to Section XXVIII (Notice of Completion of Work), each Respondent shall preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or the liability of any person under CERCLA with respect to the Site, regardless of any corporate retention policy to the contrary. Until ten (10) years after Respondents' receipt of EPA's notification pursuant to Section XXVIII (Notice of

Completion of Work), Respondents shall also instruct their contractors and agents to preserve all documents, records, and information of whatever kind, nature, or description relating to performance of the Work.

52. At the conclusion of this document retention period, Respondents shall notify EPA and MDNR at least ninety (90) days prior to the destruction of any such records or documents, and, upon request by EPA and MDNR, Respondents shall deliver any such records or documents to EPA and MDNR. Respondents may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege or protection recognized by federal or state law. If Respondents assert such a privilege or protection, they shall provide EPA and MDNR with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the subject of the document, record, or information; and 6) the privilege asserted by Respondents. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.

53. Each Respondent hereby certifies individually that to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any records, documents, or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XII. COMPLIANCE WITH OTHER LAWS

54. Respondents shall perform all actions required pursuant to this Settlement Agreement in accordance with all applicable state and federal laws and regulations except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and 40 C.F.R. §§ 300.400(e) and 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-Site actions required pursuant to this Settlement Agreement shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) under federal environmental or state environmental or facility siting laws.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

55. In the event of any action or occurrence during performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action. Respondents shall take these actions in accordance with all applicable provisions of this Settlement Agreement, including, but not limited to, the Health and Safety Plan, in order to prevent, abate or minimize such release or endangerment caused or threatened by the release. Respondents shall also immediately notify the OSC or, in the event of his/her unavailability, the EPA Regional Emergency 24-hour number, 913-281-0991, of the incident or Site conditions. In the event that Respondents fail to take appropriate response action

as required by this Paragraph, and EPA takes such action instead, Respondents shall reimburse EPA for all costs of the response action not inconsistent with the NCP pursuant to Section XV (Payment of Response Costs).

56. In addition, in the event of any release in excess of reportable quantities under CERCLA of a hazardous substance from the Site, Respondents shall immediately notify the National Response Center at (800) 424-8802. Respondents shall submit a written report to EPA and MDNR within seven (7) days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. §§ 11004, *et seq.*

XIV. AUTHORITY OF ON-SCENE COORDINATOR

57. The OSC shall be responsible for overseeing Respondents' implementation of this Settlement Agreement. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement Agreement, or to direct any other removal action undertaken at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

XV. PAYMENT OF RESPONSE COSTS

58. Payment for Past Response Costs

a. Within thirty (30) days after the Effective Date, Respondents shall pay to EPA **$1,571,069.58** for Past Response Costs. Payment shall be made to EPA by Electronic Funds Transfer (EFT) in accordance with current EFT procedures to be provided to Respondents by EPA Region VII, and shall be accompanied by a statement identifying the name and address of the party(ies) making payment, the Site name, the EPA Region and Site/ID Number A75J, and the EPA docket number for this action, CERCLA-07-2015-0004, and shall be sent to:

US Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, MO 63197-9000

b. Within three (3) days of payment, Respondents shall send notice that such payment has been made to the EPA OSC pursuant to Paragraph 34, and to the Cincinnati Finance Office by email to cinwd_acctsrecievable@epa.gov, or to:

EPA Cincinnati Finance Office
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

c. The total amount to be paid by Respondents pursuant to Paragraph 58(a) shall be deposited by EPA in the Viburnum Trend Lead Haul Roads Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

59. Payments for Interim Response Costs and Future Response Costs

a. Respondents shall pay to EPA all Interim Response Costs and Future Response Costs not inconsistent with the NCP. On a periodic basis, EPA will send Respondents a bill requiring payment that includes a Regionally-prepared cost summary, together with supporting detail, which includes direct and indirect costs incurred by EPA and its contractors. Respondents shall make all payments within thirty (30) days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 61 of this Settlement Agreement.

b. Within thirty (30) days of receipt of each bill requiring payment and the supporting documentation, Respondents shall pay to EPA the total billed amount for Interim Response and Future Response Costs. Payment shall be made to EPA by EFT in accordance with current EFT procedures to be provided to Respondents by EPA Region VII, and shall be accompanied by a statement identifying the name and address of the party(ies) making payment, the Site name, the EPA Region and Site/ID Number A75J, and the EPA docket number for this action, CERCLA-07-2015-0004, and shall be sent to:

US Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, MO 63197-9000

c. At the time of payment, Respondents shall send notice that such payment has been made to the OSC pursuant to Paragraph 34, and to the Cincinnati Finance Office by email at cinwd_acctsreceivable@epa.gov, or by mail to:

EPA Cincinnati Finance Office
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

d. The total amount to be paid by Respondents pursuant to Paragraph 59(a) shall be deposited by EPA in the Viburnum Trend Lead Haul Roads Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

60. Interest. In the event that the payment for Past Response Costs is not made within thirty (30) days of the Effective Date, or the payments for Interim Response Costs and Future Response Costs are not made within thirty (30) days of Respondents' receipt of a bill, Respondents shall pay Interest on the unpaid balance. The Interest on Past Response Costs shall begin to accrue on the Effective Date and shall continue to accrue until the date of payment. The Interest on Interim Response Costs and Future Response Costs shall begin to accrue on the date of the demand

and shall continue to accrue until the date of payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondents' failure to make timely payments under this Section, including, but not limited to, payment of stipulated penalties pursuant to Section XVIII.

61. Respondents may contest payment of any Interim Response Costs or Future Response Costs billed under Paragraph 59 if they determine that the costs billed are not Interim Response Costs or Future Response Costs, EPA has made a mathematical error, or if Respondents believe EPA incurred excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP. Such objection shall be made in writing within thirty (30) days of receipt of the bill and the supporting documentation and must be sent to the OSC. Any such objection shall specifically identify the contested Interim Response Costs or Future Response Costs and the basis for objection. In the event of an objection, Respondents shall within the thirty (30) day period pay all uncontested Interim Response Costs and Future Response Costs to EPA in the manner described in Paragraph 59. Within the same 30-day period, Respondents shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of Missouri and remit to that escrow account funds equivalent to the amount of the contested Interim Response Costs and Future Response Costs. Respondents shall send to the OSC a copy of the transmittal letter and check paying the uncontested Interim Response Costs and Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Within the same 30-day period of the establishment of the escrow account, Respondents shall initiate the Dispute Resolution procedures in Section XVI (Dispute Resolution). If EPA prevails in the dispute, within five (5) days of the resolution of the dispute, Respondents shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 59. If Respondents prevail concerning any aspect of the contested costs, Respondents shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to EPA in the manner described in Paragraph 59. Respondents shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XVI (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondents' obligation to reimburse EPA for its Interim Response Costs and Future Response Costs.

62. Payment by Respondents of State Response Costs.

a. Within sixty (60) days of the Effective Date of this Settlement Agreement, Respondents shall pay MDNR all Past State Response Costs owed for the period from January 1, 2012 to the Effective Date of this Settlement Agreement in the amount of $5,610.25. Respondents shall pay MDNR all Future State Response Costs owed on or after the Effective Date of this Settlement Agreement on a periodic basis. On a periodic basis after the Effective Date of the Settlement Agreement, MDNR will send Respondents a bill requiring payment that includes a cost summary, together with supporting detail, which includes any direct and indirect costs incurred by MDNR and its contractors. MDNR will submit a final bill for Future State Response Costs to Respondents under this Paragraph 62 no later than one year after the issuance of the Notice of Completion (Section XXVIII), and Respondents will have no obligation under this Paragraph 62 to pay bills submitted by MDNR to Respondents later than one year after the

issuance of the Notice of Completion. Respondents shall make all payments within thirty (30) days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 62 of this Settlement Agreement. Payment shall be made by official bank check made payable to "State of Missouri (Hazardous Waste Fund)." Respondents shall send the payment to:

Missouri Department of Natural Resources
Attention: Chief, Superfund Section
Hazardous Waste Program
Post Office Box 176
Jefferson City, Missouri 65102-0176

b. Any disputed State Response Costs shall be subject to the procedures and terms of Paragraphs 61 and the related provisions of Section XVI of this Settlement Agreement, with MDNR being automatically substituted for EPA, Paragraph 62 being substituted for Paragraph 59 of this Settlement Agreement, State Response Costs being automatically substituted for Interim Response Costs and Future Response Costs, collectively, and the Director of MDNR being automatically substituted for Regional Judicial Officer.

XVI. DISPUTE RESOLUTION

63. Unless otherwise expressly provided for in this Settlement Agreement, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement Agreement. The Parties shall attempt to resolve any disagreements concerning this Settlement Agreement expeditiously and informally.

64. If Respondents object to any EPA action taken pursuant to this Settlement Agreement, including billings for Interim Response Costs or Future Response Costs, they shall notify EPA in writing of their objection(s) within thirty (30) days of such action, unless the objection(s) has/have been resolved informally. EPA and Respondents shall have thirty (30) days from EPA's receipt of Respondents' written objection(s) to resolve the dispute through formal negotiations (Negotiation Period). The Negotiation Period may be extended at the sole discretion of EPA.

65. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Settlement Agreement. If the Parties are unable to reach an agreement within the Negotiation Period, the Regional Judicial Officer will issue a written decision on the dispute to Respondents that shall be consistent with the NCP and based on the terms of this Settlement Agreement, the Administrative Record, and those written materials submitted to the Regional Judicial Officer by Respondents and EPA. EPA's decision shall be incorporated into and become an enforceable part of this Settlement Agreement, provided that incorporation of the Regional Judicial Officer's decision into the Settlement Agreement shall not deprive Respondents of the right to contest the validity of the Regional Judicial Officer's decision in any judicial action taken by EPA to enforce this Settlement Agreement, or the terms thereof, as provided by Section 113(h) of CERCLA, 42 U.S.C. § 9613(h). Respondents' obligations under this Settlement Agreement shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondents shall fulfill the requirement that was the

subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs.

XVII. FORCE MAJEURE

66. Respondents agree to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed by a *force majeure*. For purposes of this Settlement Agreement, a *force majeure* is defined as any event arising from causes beyond the control of Respondents, or of any entity controlled by Respondents, including but not limited to their contractors and subcontractors, which delays or prevents performance of any obligation under this Settlement Agreement despite Respondents' best efforts to fulfill the obligation. *Force majeure* does not include financial inability to complete the Work, or increased cost of performance, or a failure to attain performance standards/action levels set forth in this Settlement Agreement and its Appendices.

67. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a *force majeure* event, Respondents shall notify EPA orally within thirty (30) days of when Respondents first knew that the event might cause a delay. Within thirty (30) days thereafter, Respondents shall provide to EPA and MDNR in writing an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondents' rationale for attributing such delay to a *force majeure* event if they intend to assert such a claim; and a statement as to whether, in the opinion of Respondents, such event may cause or contribute to an endangerment to public health, welfare, or the environment. Failure to comply with the above requirements shall preclude Respondents from asserting any claim of *force majeure* for that event for the period of time of such failure to comply and for any additional delay caused by such failure.

68. If EPA agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this Settlement Agreement that are affected by the *force majeure* event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, EPA will notify Respondents in writing of its decision within fourteen (14) days of Respondents' notification pursuant to Paragraph 67. If EPA agrees that the delay is attributable to a *force majeure* event, EPA will notify Respondents in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XVIII. STIPULATED PENALTIES

69. Respondents shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 70, 71, and 72 for failure to comply with the requirements of this Settlement Agreement specified below, unless excused under Section XVII (Force Majeure). "Compliance" by Respondents shall include completion of the activities under this Settlement Agreement or any work plan or other plan approved under this Settlement Agreement identified below in accordance

with all applicable requirements of law, this Settlement Agreement, the SOW, and any plans or other documents approved by EPA pursuant to this Settlement Agreement and within the specified time schedules established by and approved under this Settlement Agreement.

70. Stipulated Penalty Amounts - Work

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 70(b):

Penalty Per Violation Per Day	Period of Noncompliance
$1,000	1st through 14th day
$2,000	15th through 30th day
$3,000	31st day and beyond

b. Compliance Milestones

i. Failure to complete "best efforts" in accordance with Paragraph 46 of this Settlement Agreement for obtaining access for sampling and remediation at all residential properties and child high use areas identified in the SOW within nine (9) months of Respondents' receipt of EPA's written approval of the Work Plan and any access letter templates.

ii. Failure to complete excavation and backfill of a quadrant on a residential or child high use area within twenty-one (21) days of initiation of excavation of that quadrant unless otherwise approved by EPA.

iii. Failure to complete disposal of Haul Road Soils at the Tailings Facility or any other location approved by EPA within twelve (12) months of completion of all soil removal and replacement work at the Site.

iv. Failure to submit the Health and Safety Plan within thirty (30) days after the Effective Date.

v. Failure to submit the Work Plan and QAPP within sixty (60) days after the Effective Date.

71. Stipulated Penalty Amounts - Reports

a. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents as set forth in Paragraph 71(b):

Penalty Per Violation Per Day	Period of Noncompliance
$250	1st through 14th day
$500	15th through 30th day
$750	31st day and beyond

b. Compliance Milestones

i. Failure to submit the Final Report in a timely or adequate manner.

ii. Failure to submit Written Progress Reports in a timely or adequate manner.

iii. Any other violation of this Settlement Agreement, other than those milestones identified in Paragraph 70.b. and 71.b.

72. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 87, Respondents shall be liable for a stipulated penalty in the amount of the cost of the removal activities incurred by EPA.

73. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: 1) with respect to a deficient submission under Section VIII (Work to be Performed), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Respondents of any deficiency; and 2) with respect to a decision by the EPA Regional Judicial Officer, under Section XVI (Dispute Resolution), during the period, if any, beginning on the 31st day after the Negotiation Period begins until the date that the EPA Regional Judicial Officer issues a final decision regarding such dispute. Nothing in this Settlement Agreement shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement Agreement.

74. EPA will consider any good faith efforts by Respondents to comply with the requirements of this Settlement Agreement in making any demand for stipulated penalties.

75. Following EPA's determination that Respondents have failed to comply with a requirement of this Settlement Agreement, EPA may give Respondents written notification of the failure and describe the noncompliance. EPA may send Respondents a written demand for payment of the penalties. However, penalties shall accrue as provided in Paragraph 73 regardless of whether EPA has notified Respondents of a violation.

76. All penalties accruing under this Section shall be due and payable to EPA within thirty (30) days of Respondents' receipt from EPA of a demand for payment of the penalties, unless Respondents invoke the dispute resolution procedures under Section XVI (Dispute Resolution). Payment shall be made to EPA by Electronic Funds Transfer (EFT) in accordance with current EFT procedures to be provided to Respondents by EPA Region VII. The payment shall indicate that the payment is for stipulated penalties, reference the EPA Region and Site/Spill ID Number A75J, indicate the EPA Docket Number CERCLA-07- 2015-0004, and the name and address of the party(ies) making payment. Payments shall be sent to:

US Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, MO 63197-9000

a. At the time of payment, Respondents shall send notice that such payment has been made to the OSC pursuant to Paragraph 34, and to the Cincinnati Finance Office by email at cinwd_ acctsreceivable.@epa.gov, or by mail to:

EPA Cincinnati Finance Office
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

b. The total amount to be paid by Respondents pursuant to Paragraphs 70, 71, and 72 shall be deposited by EPA in the EPA Hazardous Substance Superfund.

77. The payment of penalties shall not alter in any way Respondents' obligation to complete performance of the Work required under this Settlement Agreement.

78. Penalties shall continue to accrue during any dispute resolution period, but need not be paid until fifteen (15) days after the dispute is resolved by agreement or by receipt of EPA's decision. The Regional Judicial Officer shall have the discretion to reduce any amount of stipulated penalties initially demanded by EPA, as indicated in his/her decision.

79. If Respondents fail to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as Interest. Respondents shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 76. Nothing in this Settlement Agreement shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondents' violation of this Settlement Agreement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(*l*) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(*l*), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Provided, however, that EPA shall not seek civil penalties pursuant to Section 106(b) or 122(*l*) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided in this Section, except in the case of a willful violation of this Settlement Agreement or in the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 87. Notwithstanding any other provision of this Section, EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Settlement Agreement.

XIX. COVENANTS NOT TO SUE

80. Covenant Not to Sue by EPA. In consideration of the actions that will be performed and the payments that will be made by Respondents under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, EPA covenants not to sue or to take administrative action against Respondents pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for the Work, Past Response Costs, Interim Response Costs, and Future Response Costs. This covenant not to sue shall take effect upon receipt by EPA of the Past Response Costs due under Section XV of this Settlement Agreement and any Interest or Stipulated Penalties due for failure to pay Past Response Costs as required by Sections XV and XVIII of this Settlement Agreement. This covenant not to sue is conditioned upon the complete and satisfactory performance by Respondents of their obligations under this

Settlement Agreement, including, but not limited to, payment of Interim Response Costs and Future Response Costs pursuant to Section XV. This covenant not to sue extends only to Respondents and does not extend to any other person.

81. Covenant Not to Sue by EPA for Tailings Facility Materials other than Haul Road Soils Disposed of at the Tailings Facility. In further consideration of the actions that will be performed and the payments that will be made by Respondents under the terms of the Settlement Agreement and except as specifically provided in Section XX (Reservation of Rights), the United States covenants not to sue or to take administrative action against Respondents, other than Doe Run, pursuant to Section 7003 of RCRA, 42 U.S.C. §6973, and Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), with respect to releases or threats of releases of Waste Material from any materials in the Tailings Facility other than releases or threats of releases of hazardous substances from Haul Road Soils.

In any action pursuant to Section 7003 of RCRA and Sections 106 and 107(a) of CERCLA with respect to releases of Waste Material from the Tailings Facility, the United States shall not seek to impose joint and several liability on Respondents, except for Doe Run, for any releases or threats of releases of hazardous substances from material in the Tailings Facility other than for releases or threats of releases of hazardous substances from Haul Road Soils in the Tailings Facility. This covenant not to sue shall not extend to Doe Run. This covenant not to sue shall not extend to any Haul Road Soils placed on the Tailings Facility NOT in accordance with the Time Critical Order and/or this Settlement Agreement.

This covenant not to sue shall take effect upon receipt by EPA of the payments of Past Response Costs required in Section XV (Payments for Past Response Costs). This covenant not to sue extends only to Respondents other than Doe Run and does not extend to any other person.

82. Covenants Not to Sue by the State

a. Covenant Not to Sue by the State for Work and State Response Costs. In consideration of the actions that will be performed and the payments that will be made by Respondents under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, the State covenants not to sue or to take administrative action against Respondents pursuant to Sections 260.500-260.550, RSMo and Section 107 of CERCLA 42 U.S.C. § 9607, or under common law, for the Work and State Response Costs. This covenant not to sue shall take effect upon receipt by MDNR of all State Response Costs due under Section XV of this Settlement Agreement and any Interest due for failure to pay State Response Costs as required by Section XV of this Settlement Agreement. This covenant not to sue is conditioned upon the complete and satisfactory performance by Respondents of their obligations under this Settlement Agreement, including, but not limited to, payment of State Response Costs pursuant to Section XV. This covenant not to sue extends only to Respondents and does not extend to any other person.

b. Covenant Not to Sue by the State for Waste Material other than Haul Road Soils disposed of at the Tailings Facility. In consideration of the actions that will be performed and the payments that will be made by Respondents under the terms of this Settlement Agreement, and except as specifically provided in this Settlement Agreement, the State covenants not to sue

and agrees not to assert any claims or causes of action or take administrative action against Respondents, other than Doe Run, pursuant to Sections 260.500-260.550, RSMo, and Section 107 of CERCLA 42 U.S.C. § 9607, with respect to releases or threats of releases of Waste Material in the Tailings Facility other than releases or threats of releases of Waste Material from Haul Road Soils.

This covenant not to sue shall not extend to any Haul Road Soils placed on the Tailings Facility NOT in accordance with the Time Critical Order and/or this Settlement Agreement.

This covenant not to sue shall not extend to Doe Run.

This covenant not to sue shall take effect upon receipt by MDNR of the payments Past State Response Costs required in Section XV (Payments for Past State Response Costs). This covenant not to sue extends only to Respondents other than Doe Run and does not extend to any other person.

83. Covenant Not to Sue by Natural Resource Damage Trustees. Except as specifically provided in Section XX (Reservation of Rights), the United States, on behalf of the Department of the Interior, and the State, and MDNR covenant not to sue Respondents, other than Doe Run, pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), § 260.500, et seq., RSMo, and § 644.096, RSMo, or under common law for injuries to natural resources under the trusteeship of the United States and the State resulting from releases or threats of releases of Waste Material from any materials in the Tailings Facility other than releases or threats of releases of Waste Material from Haul Road Soils.

The United States, on behalf of the Department of the Interior, and the State shall not seek to impose joint and several liability on Respondents, except for Doe Run, for any releases or threats of releases of Waste Material in the Tailings Facility other than releases or threats of releases of Waste Material from Haul Road Soils.

This covenant not to sue shall not extend to any Haul Road Soils placed on the Tailings Facility NOT in accordance with the Time Critical Removal Order and/or this Settlement Agreement.

This covenant not to sue shall not extend to Doe Run.

This covenant not to sue shall take effect upon receipt by EPA and MDNR of the payments for Past Response Costs and Past State Response Costs required in Section XV. This covenant not to sue extends only to Respondents other than Doe Run and does not extend to any other person.

XX. RESERVATIONS OF RIGHTS BY EPA, UNITED STATES, THE STATE AND MDNR

84. Except as specifically provided in this Settlement Agreement, nothing in this Settlement Agreement shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing in this

Settlement Agreement shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law, except as provided in Section XIX.

85. Except as specifically provided in this Settlement Agreement, nothing in this Settlement Agreement shall limit the power and authority of MDNR or the State to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing in this Settlement Agreement shall prevent MDNR or the State from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA, Sections 260.500-260.550, RSMo, or any other applicable law, except as provided in Section XIX.

86. The covenants not to sue set forth in Section XIX (Covenants Not To Sue) above do not pertain to any matters other than those expressly identified therein. EPA, the United States, and MDNR reserve, and this Settlement Agreement is without prejudice to, all rights against Respondents with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondents to meet a requirement of this Settlement Agreement;

b. liability for costs not included within the definitions of Past Response Costs, Interim Response Costs, Future Response Costs, and State Response Costs;

c. liability for performance of response action other than the Work, except as provided in Section XIX;

d. criminal liability;

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments, except as provided in Section XIX;

f. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Viburnum Trend Lead Haul Roads Site;

g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site not paid as a Future Response Cost under this Settlement Agreement; and

h. liability for violations of federal or state law that occur during or after implementation of the Work.

87. Work Takeover. In the event EPA determines that Respondents have ceased implementation of any portion of the Work, are seriously or repeatedly deficient or late in their

performance of the Work, or are implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA may assume the performance of all or any portion of the Work as EPA determines necessary. Respondents may invoke the procedures set forth in Section XVI (Dispute Resolution) to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Costs incurred by the United States in performing the Work pursuant to this Paragraph shall be considered Future Response Costs that Respondents shall pay pursuant to Section XV (Payment of Response Costs). Notwithstanding any other provision of this Settlement Agreement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XXI. COVENANT NOT TO SUE BY RESPONDENTS

88. Respondents covenant not to sue and agree not to assert any claims or causes of action against the United States, or its contractors or employees, or the State, or its contractors or employees, with respect to the Work, Past Response Costs, Interim Response Costs, Future Response Costs, State Response Costs, or this Settlement Agreement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613 or any other provision of law;

b. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the Missouri Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Work, Past Response Costs, Interim Response Costs, or Future Response Costs.

These covenants not to sue shall not apply in the event the United States, the State, or MDNR bring a cause of action or issue an order pursuant to the reservations set forth in Section XX, but only to the extent that Respondents' claim arises from the same response action, response costs, or damages that the United States, the State, or MDNR are seeking pursuant to the applicable reservation.

89. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

90. Respondents agree not to assert any claims and to waive all claims or causes of action that they may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Respondents with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if all or part of the disposal, treatment, or transport occurred before April

1, 2001, and the total amount of material containing hazardous substances contributed by such person to the Site was less than 110 gallons of liquid materials or 200 pounds of solid materials.

91. The waivers in Paragraph 90 shall not apply with respect to any defense, claim, or cause of action that a Respondent may have against any person meeting the above criteria if such person asserts a claim or cause of action relating to the Site against such Respondent. This waiver also shall not apply to any claim or cause of action against any person meeting the above criteria if EPA determines:

a. that such person has failed to comply with any EPA requests for information or administrative subpoenas issued pursuant to Section 104(e) or 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) or 9622(e), or Section 3007 of the Solid Waste Disposal Act (also known as the Resource Conservation and Recovery Act or "RCRA"), 42 U.S.C. § 6972, or has impeded or is impeding, through action or inaction, the performance of a response action or natural resource restoration with respect to the Site, or has been convicted of a criminal violation for the conduct to which this waiver would apply and that conviction has not been dismissed on appeal or otherwise; or

b. that the materials containing hazardous substances contributed to the Site by such person have contributed significantly, or could contribute significantly, either individually or in the aggregate, to the cost of response action or natural resource restoration at the Site.

XXII. OTHER CLAIMS

92. By issuance of this Settlement Agreement, the United States, EPA, the State, and MDNR assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States, EPA, the State or MDNR shall not be deemed a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.

93. Except as expressly provided in Section XIX (Covenants Not To Sue), nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Respondents or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

94. No action or decision by EPA or MDNR pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XXIII. CONTRIBUTION

95. a. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. § 9613(f)(2) and 9622(h)(4), and that Respondents are entitled, as of the Effective Date, to

protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), or as may otherwise be provided by law, for "matters addressed" in this Settlement Agreement. The "matters addressed" in this Settlement Agreement are the Work, Interim Response Costs, Past Response Costs, , Future Response Costs, and State Response Costs.

b. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B), pursuant to which Respondents have, as of the Effective Date, resolved their liability to the United States and the State for the Work, Past Response Costs, Interim Response Costs, Future Response Costs, and State Response Costs.

c. Nothing in this Settlement Agreement precludes the United States, the State, or Respondents from asserting any claims, causes of action, or demands for indemnification, contribution, or cost recovery against any persons not parties to this Settlement Agreement. Nothing in this Settlement Agreement diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

XXIV. INDEMNIFICATION

96. Respondents shall indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees, and representatives and the State, its officials, agents, contractors, subcontractors, employees, and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Settlement Agreement. In addition, Respondents agree to pay the United States and the State all costs incurred by the United States and the State, respectively, including but not limited to attorneys fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States or the State based on negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Settlement Agreement. The United States and the State shall not be held out as a party to any contract entered into by or on behalf of Respondents in carrying out activities pursuant to this Settlement Agreement. Neither Respondents nor any such contractor shall be considered an agent of the United States or the State.

97. The United States and MDNR shall give Respondents notice of any claim for which the United States or MDNR plans to seek indemnification pursuant to this Section and shall consult with Respondents prior to settling such claim.

98. Respondents waive all claims against the United States and MDNR for damages or reimbursement or for set-off of any payments made or to be made to the United States or MDNR, arising from or on account of any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Work on or relating to the Site including, but not limited to, claims on account of construction delays. In addition, Respondents

shall indemnify and hold harmless the United States and MDNR with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXV. INSURANCE

99. At least thirty (30) days prior to commencing any on-Site Work under this Settlement Agreement, Respondents shall secure, and shall maintain for the duration of this Settlement Agreement, comprehensive general liability insurance and automobile insurance with limits of $1.1 million, combined single limit, naming EPA as an additional insured. Within the same time period, Respondents shall provide EPA and MDNR with certificates of such insurance and a copy of each insurance policy. Respondents shall submit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Settlement Agreement, Respondents shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Respondents in furtherance of this Settlement Agreement. If Respondents demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondents need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor.

XXVI. MODIFICATIONS

100. The OSC may upon consultation with MDNR make modifications to any plan or schedule or SOW in writing or by oral direction. Any oral modification will be memorialized in writing by EPA promptly, but shall have as its effective date the date of the OSC's oral direction. Any other requirements of this Settlement Agreement may be modified in writing by mutual agreement of the parties.

101. If Respondents seek permission to deviate from any approved Work Plan or schedule or SOW, Respondents' Project Coordinator shall submit a written request to EPA and MDNR for approval outlining the proposed modification and its basis. After consultation with MDNR, EPA will grant or deny the requested deviation. Respondents may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to this Paragraph.

102. No informal advice, guidance, suggestion, or comment by the OSC, other EPA representatives, or MDNR regarding reports, plans, specifications, schedules, or any other writing submitted by Respondents shall relieve Respondents of their obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXVII. ADDITIONAL REMOVAL ACTIONS

103. If EPA, in consultation with MDNR, determines that additional removal actions not included in an approved plan are necessary to protect public health, welfare, or the environment, EPA will notify Respondents of that determination. No later than fifteen (15) calendar days after EPA's notification, Respondents shall notify EPA in writing of their agreement or refusal to conduct the additional work. In the event that Respondents agree to conduct the additional work within fifteen (15) days of receipt of the notice from EPA, Respondents shall submit to EPA and MDNR, for review and approval by EPA after a reasonable opportunity for review and comment by MDNR, a Work Plan for the additional removal actions. The plan shall conform to the applicable requirements of Section VIII (Work to Be Performed) of this Settlement Agreement. Upon EPA's approval of the plan pursuant to Section VIII, Respondents shall implement the plan for additional removal actions in accordance with the provisions and schedule contained therein. If Respondents refuse to conduct the additional work, EPA may take any and all steps it determines are appropriate to implement the additional work and reserves the right to seek reimbursement pursuant to section 107 of CERCLA, 42 U.S.C. § 9607, from Respondents for the costs thereof, except as provided in Section XIX. This Section does not alter or diminish the OSC's authority to make oral modifications to any plan or schedule pursuant to Section XXVI (Modifications).

XXVIII. NOTICE OF COMPLETION OF WORK

104. When EPA, in consultation with MDNR, determines, after review of the Final Report, that all Work has been fully performed in accordance with this Settlement Agreement, with the exception of any continuing obligations required by this Settlement Agreement, including but not limited to, record retention and post-removal site control, EPA will provide written notice to Respondents. Such notice shall terminate the Respondents' obligations to undertake the Work, including the activities set forth in the SOW, except for continuing obligations set forth in Section X (Access to Information), Section XI (Record Retention), Section XXI (Covenant Not to Sue By Respondents), and Section XXIV (Indemnification). If EPA, after consultation with MDNR, determines that any such Work has not been completed in accordance with this Settlement Agreement, EPA will notify Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan if appropriate in order to correct such deficiencies. Respondents shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the EPA notice. Failure by Respondents to implement the approved modified Work Plan shall be a violation of this Settlement Agreement.

XXIX. INTEGRATION/APPENDICES

105. This Settlement Agreement and its appendices constitute the final, complete and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The Parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Settlement Agreement. The following appendices are attached to and incorporated into this Settlement Agreement:

a. Appendix A: Statement of Work

i. Attachment 1 (Map of Haul Roads Segments)

ii. Attachment 2 (List of Properties to be Sampled)

iii. Attachment 3 (List of Properties to be Excavated)

iv. Attachment 4 (Notice of Declaration)

b. Appendix B: EE/CA Report and EE/CA Responsiveness Summary

XXX. NOTICE

106. All notices required or permitted to be given under this Settlement Agreement shall be in writing (including email) and shall be deemed to have been duly made upon receipt.

XXXI. EFFECTIVE DATE

107. This Settlement Agreement shall be effective seven (7) days after the Settlement Agreement is signed by Director of the Superfund Division, EPA Region VII. The undersigned representatives of Respondents certify that they are fully authorized to enter into the terms and conditions of this Settlement Agreement and to bind the parties they represent to this document.

EXECUTED AS TO THE RESPONDENTS TO THE ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT:

Agreed this 4th day of November, 2015

For The Doe Run Resources Corporation

Mark R. Yingling
Name

11/4/15
Date

Mark R. Yingling
VP EHS & Land
Title

Agreed this 29th day of October, 2015

For Teck American Incorporated

Name Phillip A. Resek

Vice President
Title

10/29/2015
Date

Agreed this ___ day of _____, 2015

For Cyprus Amax Minerals Company

R McMillan

Name

10.27.15

Date

Senior Vice President

Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name

12/Oct/2015
Date

President
Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name
Paul D. Judd
CFO & Tax Director

12/Oct/2015
Date

Title

Agreed this ___ day of _____, 2015

For DII Industries, LLC

Name

11-30-15
Date

Sr. VP
Title

IN WITNESS WHEREOF, the other Parties have affixed their signatures below:

For the Missouri Department of Natural Resources:

BY: _____ 11/25/15
Sara Parker Pauley, Director — Date
P.O. Box 176
Jefferson city, MO 65102

MISSOURI ATTORNEY GENERAL KRIS KOSTER

By: _____ 11/13/15
Chris Koster — Date
Missouri Attorney General
Kara Valentine
Assistant Attorney General

For the United States Environmental Protection Agency, Region 7

_____ 5/26/16
Jennifer Trotter — Date
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
Region VII

IT IS SO ORDERED.

Mary P. Peterson 6/3/2016
Mary P. Peterson, Director — Date
Superfund Division
Region VII
U.S. Environmental Protection Agency

For the Department of Justice on behalf of the Attorney General of the United States:

_____ _____
Sam Hirsch — Date
Acting Assistant Attorney General
Environment & Natural Resources Division

IN WITNESS WHEREOF, the other Parties have affixed their signatures below:

For the Missouri Department of Natural Resources:

BY: _____ _____
Sara Parker Pauley, Director Date
P.O. Box 176
Jefferson City, MO 65102

MISSOURI ATTORNEY GENERAL KRIS KOSTER

By: _____ _____
Chris Koster Date
Missouri Attorney General

For the United States Environmental Protection Agency, Region7

_____ _____
Jennifer Trotter Date
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
Region VII

IT IS SO ORDERED.

_____ _____
Mary P. Peterson, Director Date
Superfund Division
Region VII
U.S. Environmental Protection Agency

For the Department of Justice on behalf of the Attorney General of the United States:

_____ _____
John C. Cruden Date
Assistant Attorney General
Environment & Natural Resources Division

EXECUTED ONLY AS TO THE PARTIES TO THE COVENANT NOT TO SUE BY DOI FOR TAILINGS FACILITY MATERIALS OTHER THAN HAUL ROAD SOILS DISPOSED OF AT THE TAILINGS FACILITY:

For the Natural Resource Damage claims, the Department of Justice on Behalf of the Department of the Interior:

Name

5/20/2016
Date

Senior Litigation Counsel
Title

US Department of Justice
Agency Organization

Agreed this 29th day of October, 2015

For Teck American Incorporated

Name Phillip A. Posek

10/29/2015
Date

Vice President
Title

Agreed this ___ day of _____, 2015

For Cyprus Amax Minerals Company

_____ 10.27.15

Name Date

Senior Vice President

Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name

12/Oct/2015
Date

Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name
Paul D. Judd
CFO & Tax Director

12/Oct/2015
Date

Title

Agreed this ___ day of _____, 2015

For DII Industries

_____ 11-30-15
Name Date

Sr. VP
Title

EXECUTED ONLY AS TO THE PARTIES TO THE COVENANT NOT TO SUE BY MDNR FORTAILINGS FACILITY MATERIALS OTHER THAN HAUL ROAD SOILS DISPOSED OF AT TAILINGS FACILITY:

For MDNR as Natural Resource Damage Trustee

Name

11/25/15
Date

Director
Title

MDNR
Agency Organization

Agreed this 29th day of October, 2015

For Teck American Incorporated

Name Phillip A. Pesek

Vice President
Title

10/29/2015
Date

Agreed this ___ day of _____, 2015

For Cyprus Amax Minerals Company

_____ 10.27.15
Name Date

Senior Vice President
Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name

12/Oct/2015
Date

Title

Agreed this 12 day of October, 2015

For Homestake Lead Company of Missouri

Name

Paul D. Judd
CFO & Tax Director

12/Oct/2015
Date

Title

Agreed this ___ day of _____, 2015

For DII Industries, LLC

_____ 11-30-15

Name Date

Sr. VP

Title

APPENDIX A

Statement of Work
including Attachments 1-4:

Attachment 1-Map of Haul Roads Segments
Attachment 2- List of properties to be sampled
Attachment 3- List of properties to be excavated and remediated
Attachment 4-Notice of Declaration

Appendix A

Statement of Work
Removal Action

Administrative Settlement Agreement and Order on Consent
Viburnum Trend Haul Roads
Iron, Reynolds and Dent County, Missouri

1.0 REMOVAL GOALS AND OBJECTIVES

Respondents must provide appropriate plans with an aggressive work schedule and documentation to perform the tasks listed in this Statement of Work. The goal of this removal action is to remove lead contaminated soils from residential properties which were allegedly contaminated from past or present commercial trucking operations associated with mining activities and to prevent recontamination from materials at depth associated with mining activities that may remain in place at these properties.

The objectives to achieve this goal are as follows:

1. To gain access and conduct certain sampling activities at any previously un-sampled residential property or child high use area located adjacent to the "haul roads" identified on Attachment 1 (Map of the Haul Roads Segments) to this Statement of Work ("SOW") where the Environmental Protection Agency ("EPA") provides written notice to Respondents that property has been identified as a residence or child high use area along the haul roads. This obligation to obtain access and sample shall continue until final demobilization, as approved in writing by the On-scene Coordinator, of excavation equipment from the Site. The On-scene Coordinator shall provide his written approval of final demobilization in a timely manner. The sampling activities will be conducted in a manner that is substantially consistent with applicable portions of EPA's *Superfund Lead-Contaminated Residential Sites Handbook, OSWER 9285.7-50, August 2003* or as otherwise approved by EPA. Respondents may choose to conduct their own sampling at residences or child high use areas previously sampled by EPA or the Missouri Department of Natural Resources ("MDNR") and may present the results of such sampling to EPA.
2. To remove lead-contaminated soil and replace with clean soil at residential properties;
3. Proper handling, treatment, and disposal of contaminated materials;
4. Post removal site controls to assure continued protection and prevent recontamination from materials at depth that are associated with mining activities that may remain in place as part of this removal action;
5. To provide High Efficiency Particulate Air (HEPA) household vacuums to

each home at the site where the soils in any portion of the yard exceeded 1,200 parts per million ("ppm"); and

6. Provide proper documentation and quality controls.

2.0 SOIL CHARACTERIZATION

A list of un-sampled properties within the Site to which Respondents will attempt to gain access to conduct sampling is set forth in Attachment 2 to this Statement of Work. If EPA identifies additional properties within the Site that have not been sampled prior to Respondents' demobilization from the Site, EPA shall provide notice to Respondents to add these properties to Attachment 2 (List of Properties to be Sampled).

For properties in Attachment 2 (List of Properties to be Sampled) which have been identified as a residence or a child high use area adjacent to the haul roads that has not previously been sampled, Respondents shall attempt to gain access to sample the property and characterize the surface soils of such properties to determine the lead concentration present.

Soil characterization shall be done within one hundred (100) feet of a residence. Sampling priority will be given to residences where Respondents are notified that an Elevated Blood Lead ("EBL") child under seventy-two (72) months of age resides therein. The sampling will be conducted in accordance with the Field Sampling Plan ("FSP") and Quality Assurance Project Plan ("QAPP") and Health and Safety Plan ("HASP"). The EPA recognizes that the Respondents have conducted similar activities during their earlier time-critical work at the Site. As a result, Respondents may modify their EPA-approved FSP, QAPP, and HASP from the time-critical removal to meet the requirements of the Order and this SOW. The Respondents' access agreement and any modified plans are subject to EPA review and approval procedures.

Multi-aliquot soil samples will be collected from the upper one inch of soil in each quadrant of a residential property. Separate multi-aliquot soil samples will be collected from drip zones, down spout outfalls, driveways, garden areas, and child play areas.

Analysis will be performed using an X-Ray Fluorescence instrument with 5% of the samples submitted to a laboratory for analysis. Respondents shall prove, in advance, to EPA's satisfaction that each laboratory Respondents use is qualified to conduct the proposed work. The laboratory shall have and follow a quality assurance program. Data shall be provided to EPA in both paper and in a Geographical Information System ("GIS") format.

Respondents may conduct their own soil sampling at a residence or child high use area previously sampled by EPA or MDNR that has been found to contain surface soils greater than 400 ppm and therefore included in this removal action. The Respondents' sampling will be conducted, at their discretion, and changes to the area of excavation within the yard will be discussed with the EPA OSC to determine if refining the area of

excavation is justified.

If Respondents believe that their sampling results call into question the accuracy of sampling results obtained by EPA or MDNR, the Respondents shall present their sampling results to EPA along with a statement setting forth the basis for any conclusion by the Respondents that the residence or child high use area in question does not have lead concentrations that exceed 400 ppm. The EPA shall provide a written response to the Respondents setting forth its determination regarding whether the lead concentrations at the residence or child high use area exceed 400 ppm. Any such determination shall be subject to the Dispute Resolution procedures of the Order.

3.0 SOIL/WASTE EXCAVATION, REMOVAL, AND REPLACEMENT FROM RESIDENTIAL AREAS

To the extent the owner allows access and removal, Respondents shall excavate and remove all soils and gravels affected by mining operations in the individual quadrants, cells or zones ("Areas") within properties sampled, per Attachment 2, as part of this removal action that contained a composite sample from such Areas that showed the soil or gravels exceeded a concentration of 400 ppm lead and properties shown on Attachment 3 of this Statement of Work where a previous composite sample from such Areas showed that the soil or gravels exceeded a concentration of 400 ppm lead. Hereafter, such lead-contaminated soils and gravels affected by mining operations shall be referred to in this Statement of Work collectively as "Soil(s)". Areas with Soil concentrations exceeding action levels of 400 ppm lead will be excavated until the concentration is below the action level(s) described in this paragraph. Soil excavation shall be conducted in a manner substantially consistent with EPA's *Superfund Lead-Contaminated Residential Sites Handbook, OSWER 9285.7-50, August 2003* or as otherwise approved by EPA. Soil replacement in any quadrant shall be conducted within one hundred (100) feet of a residence.The excavation will be conducted with excavating machinery, such as skid loaders, dozers, excavators, backhoes, and hand tools. Respondents may choose to excavate in six inch lifts, but if after excavating the first 6-inch lift the Soil lead concentrations still exceed 400 ppm lead, a second 6-inch lift will be removed. If Soils at a depth of 12 inches are more than 1,200 ppm lead, Respondents must continue to excavate until Soils are less than 1,200 ppm lead. At 24 inches, if lead concentrations still exceed 1,200 ppm lead, the Respondents will notify the EPA and a decision will be made to continue excavation or to implement a post removal site control.

After removing the Soils from the affected Areas, the excavated Soils will be replaced with clean soils and the areas will be restored to as near the original condition as possible. Clean soils are soils that have been analyzed and results indicate that the constituent concentrations meet or are below the criteria set forth in Respondents' work plan as approved by EPA, including lead concentrations that are below 240 ppm. The Areas will be backfilled as near to their original grades as possible by placing and lightly compacting the clean soils in the excavation. The lawn vegetation will be replaced. The Respondents shall be responsible for replacing or repairing any property damage caused during the cleanup; such as structures, sidewalks and driveways, and utilities.

Vegetable garden Soils in any yard that exceed 400 ppm lead (based on composite samples in a discrete sampling area) will be excavated until lead concentrations are below cleanup levels. If such vegetable garden Soils at any depth less than 24 inches exceed 400 ppm lead, excavation will continue to 24 inches. At 24 inches if lead concentrations still exceed 1,200 ppm lead, the Respondents will notify the EPA and a decision will be made to continue excavation or to implement a post removal site control.

Respondents are responsible for the placement of silt fences, straw bales or other items or structures used to prevent and/or control soil runoff from excavated areas or from backfilled Areas which have no vegetation, until vegetation is established.

4.0 SOIL TREATMENT AND DISPOSAL

Excavated Soils will first be transported to the Viburnum Soil Repository or another disposal facility approved by the EPA, where Respondents shall then sample and analyze the excavated Soils using the Toxicity Characteristic Leaching Procedure ("TCLP") according to the requirements of SW-846-Chapter 9 (representative sampling for waste piles). Excavated Soils that exceed the TCLP limits for lead must be properly treated with an appropriate lead stabilization chemical and re-sampled until the levels are below the TCLP limits for lead.

Transportation, treatment, storage, and disposal of the excavated material shall be in accordance with all applicable Local, State, or Federal requirements.

5.0 INTERIOR HOME CLEANUPS

The Respondents shall offer to supply a new High Efficiency Particulate Air ("HEPA") household vacuum to each home at the Site where the soils in any portion of the yard exceeded 1,200 ppm lead.

6.0 POST REMOVAL SITE CONTROL

It is EPA policy that Post Removal Site Control (PRSC) shall be the responsibility of the State, Potentially Responsible Parties, or the remedial program. At this time it is uncertain what, if any, PRSCs will be needed. In the event PRSCs are needed and contamination is to be left in place at a property at levels exceeding those set forth in Section 3.0 above, Respondents will utilize a PRSC. An example of an acceptable PRSC is Attachment 4 (Notice of Declaration), for homeowners to provide awareness to current and future homeowners of the potential of contamination that may remain on their property.

7.0 DOCUMENTATION, DELIVERABLES AND REPORTING REQUIREMENTS

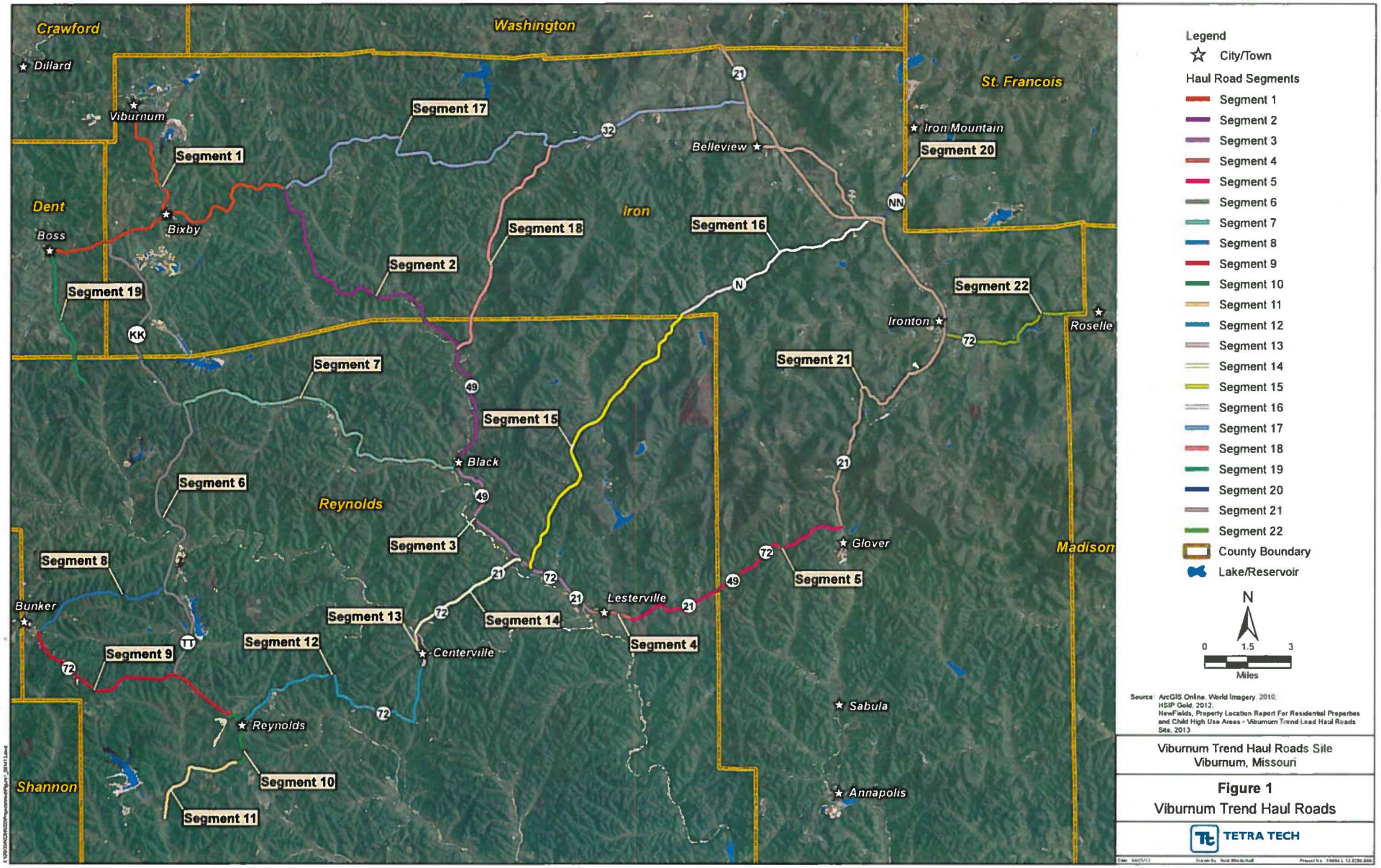
Work Plan:

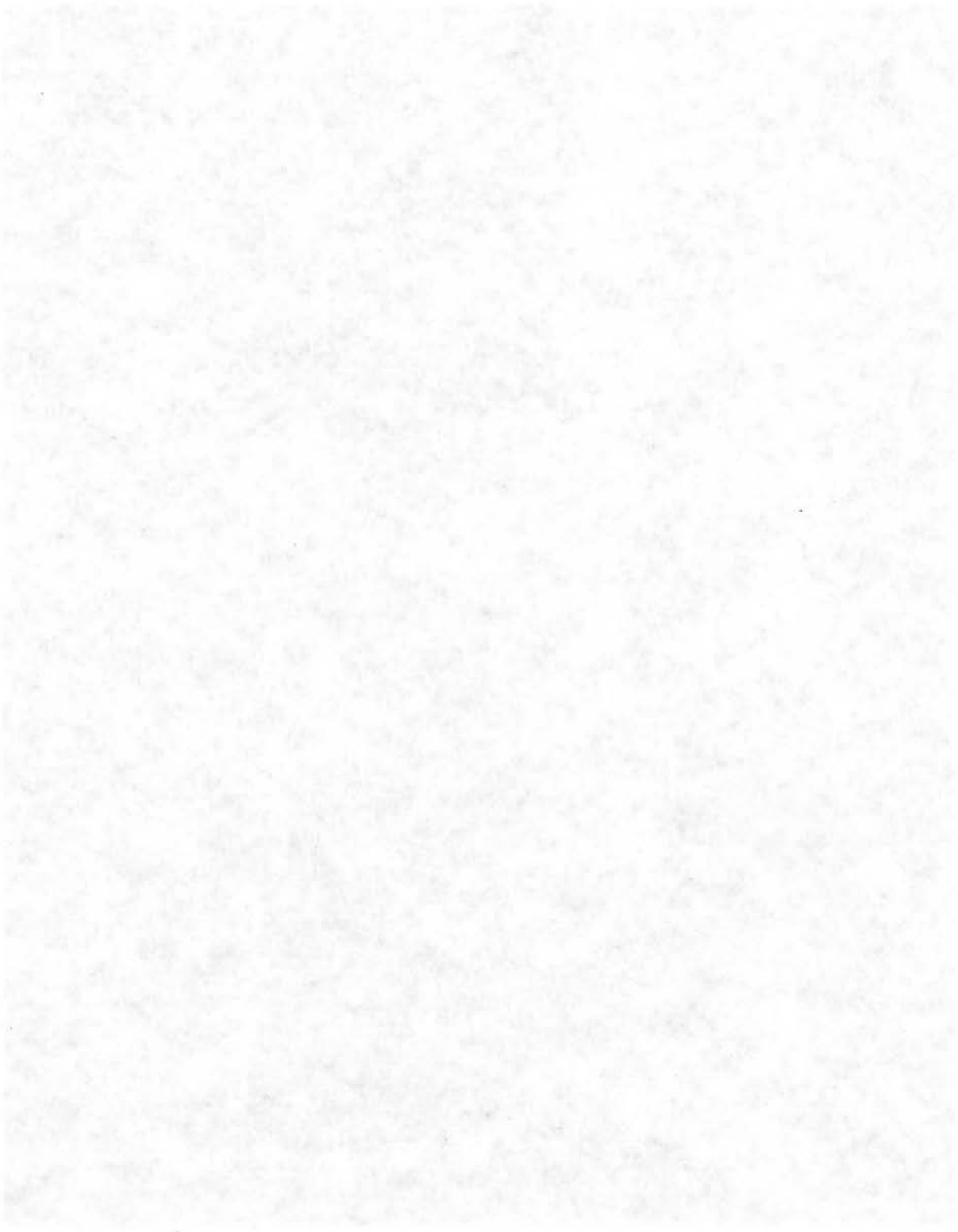
The Respondents shall prepare a Work Plan. The Work Plan shall include a Field Sampling Plan, a Quality Assurance Project Plan ("QAPP"), and Health and Safety Plan in accordance with the terms of the Order.

Removal Action Report:

This report shall describe all removal activities which took place and, at a minimum, provide the following:

- Analytical results of all samples collected during the removal action.
- Drawings, to approximate scale, of excavated Areas documenting the extent and location of the excavation and backfill placement and the location of any marker layer material placed in the excavation. Pre- and post -sampling results shall be included on the drawing.
- A summary of and location of the remediated Areas.
- The volume of contaminated Soils excavated and disposed of and a description of the disposal location.
- All laboratory quality assurance data.
- All TCLP sample data collected for Soil disposal.


Crawford
Washington
St. Francois
Dent
Iron
Reynolds
Madison
Shannon
Dillard
Viburnum
Bixby
Boss
Belleview
Iron Mountain
Ironton
Roselle
Black
Glover
Lesterville
Centerville
Bunker
Reynolds
Sabula
Annapolis
Segment 1
Segment 2
Segment 3
Segment 4
Segment 5
Segment 6
Segment 7
Segment 8
Segment 9
Segment 10
Segment 11
Segment 12
Segment 13
Segment 14
Segment 15
Segment 16
Segment 17
Segment 18
Segment 19
Segment 20
Segment 21
Segment 22
Legend
City/Town
Haul Road Segments
Segment 1
Segment 2
Segment 3
Segment 4
Segment 5
Segment 6
Segment 7
Segment 8
Segment 9
Segment 10
Segment 11
Segment 12
Segment 13
Segment 14
Segment 15
Segment 16
Segment 17
Segment 18
Segment 19
Segment 20
Segment 21
Segment 22
County Boundary
Lake/Reservoir
N
0
1.5
3
Miles
Source: ArcGIS Online, World Imagery, 2010;
HSIP Gold, 2012;
NewFields, Property Location Report For Residential Properties and Child High Use Areas - Viburnum Trend Lead Haul Roads Site, 2013
Viburnum Trend Haul Roads Site
Viburnum, Missouri
Figure 1
Viburnum Trend Haul Roads
TETRA TECH



Attachment 2 - Agreed Properties to be sampled in Non-Time Critical Action – VTLHR

Number	PropID	Number	PropID	Number	PropID
1	S01-006	51	S05-014	101	S10-016
2	S01-011	52	S05-023	102	S10-017
3	S01-012	53	S05-024	103	S12-001N
4	S01-022	54	S05-025	104	S12-001S
5	S01-041	55	S05-031	105	S12-003
6	S02-001	56	S05-032	106	S12-007
7	S02-006	57	S05-034	107	S12-009
8	S02-011	58	S05-040	108	S12-012
9	S02-013	59	S05-041	109	S12-013
10	S02-016	60	S06-008	110	S12-014
11	S02-017	61	S06-009	111	S12-016
12	S02-025	62	S06-011	112	S12-018
13	S02-027	63	S07-002	113	S12-019
14	S02-029	64	S07-003	114	S12-020
15	S02-030	65	S07-004	115	S12-021
16	S02-034	66	S07-010	116	S12-029
17	S02-041	67	S07-015	117	S12-030
18	S02-044	68	S07-016	118	S13-007
19	S02-045	69	S07-017	119	S13-008
20	S03-007	70	S07-019	120	S13-009
21	S03-008	71	S07-021	121	S13-010
22	S03-009	72	S07-031	122	S13-012
23	S03-010	73	S07-039	123	S13-020
24	S03-010Y	74	S07-046	124	S13-031E
25	S03-017	75	S07-068	125	S13-032W
26	S03-019X	76	S07-070	126	S13-033
27	S03-023	77	S07-081	127	S13-033W
28	S03-032	78	S08-002	128	S13-033X
29	S03-035	79	S08-003	129	S13-034E
30	S03-036	80	S08-006	130	S13-034F
31	S03-037	81	S09-007	131	S13-038
32	S03-038	82	S09-008	132	S13-039N
33	S03-042	83	S09-012	133	S13-040N
34	S04-005	84	S09-013	134	S13-045N
35	S04-014S	85	S09-014	135	S13-048N
36	S04-017S	86	S09-017	136	S13-051N
37	S04-018S	87	S09-020X	137	S13-053
38	S04-020	88	S09-023	138	S13-056
39	S04-027	89	S09-024	139	S13-060X
40	S04-028	90	S09-025	140	S13-065
41	S04-037	91	S09-026	141	S13-067
42	S04-041	92	S09-027	142	S14-006
43	S04-044	93	S10-002	143	S14-010
44	S05-003	94	S10-003X	144	S14-012
45	S05-004	95	S10-004	145	S14-013
46	S05-006	96	S10-004X	146	S14-016
47	S05-009	97	S10-010	147	S14-016X
48	S05-010	98	S10-011	148	S14-017
49	S05-011	99	S10-013	149	S14-017X
50	S05-012	100	S10-014	150	S14-019

Number	PropID	Number	PropID	Number	PropID
151	S15-000E	201	S18-009	251	S21-092
152	S15-001	202	S18-013	252	S21-093
153	S15-002	203	S18-014	253	S21-097
154	S15-004	204	S18-020	254	S21-099
155	S15-005	205	S18-033	255	S21-102
156	S15-010	206	S18-036	256	S21-108A
157	S15-011	207	S18-043	257	S21-109A
158	S15-014	208	S18-047	258	S21-110B
159	S15-014X	209	S18-049	259	S21-112A
160	S15-020	210	S18-049X	260	S21-115
161	S15-025X	211	S18-050	261	S21-116
162	S15-025Y	212	S19-002	262	S21-120
163	S15-027X	213	S19-003	263	S21-121
164	S15-028	214	S19-008	264	S21-129
165	S15-029	215	S19-009	265	S21-133
166	S16-001	216	S19-010	266	S21-135
167	S16-002	217	S19-013	267	S21-136
168	S16-006	218	S19-016	268	S21-136X
169	S16-008Z	219	S19-017	269	S21-144
170	S16-009	220	S19-018	270	S21-148
171	S16-012	221	S20-000	271	S21-162A
172	S16-013	222	S20-000X	272	S21-184
173	S16-016	223	S20-001X	273	S21-186
174	S16-017	224	S20-003	274	S21-192F
175	S16-020	225	S20-004	275	S21-193
176	S16-022	226	S20-005	276	S21-194
177	S16-032	227	S20-005X	277	S21-194A
178	S16-036	228	S20-006X	278	S21-194D
179	S16-037	229	S20-009W	279	S21-194E
180	S17-007	230	S21-014	280	S21-194G
181	S17-008	231	S21-021	281	S21-194J
182	S17-011	232	S21-022	282	S21-194K
183	S17-012	233	S21-023	283	S21-194M
184	S17-013	234	S21-030X	284	S21-194N
185	S17-015X	235	S21-031	285	S21-197
186	S17-021	236	S21-035	286	S21-199
187	S17-023	237	S21-037	287	S21-204A
188	S17-025	238	S21-046	288	S21-222
189	S17-026	239	S21-052S	289	S21-225
190	S17-027	240	S21-052X	290	S21-228X
191	S17-027X	241	S21-052Y	291	S21-256
192	S17-035	242	S21-053	292	S21-264
193	S17-039	243	S21-072	293	S21-266
194	S17-043	244	S21-073	294	S21-267
195	S17-046	245	S21-074	295	S21-274
196	S17-047	246	S21-077	296	S21-282
197	S17-048	247	S21-078	297	S21-284
198	S17-055	248	S21-085	298	S21-288
199	S18-002	249	S21-090	299	S21-290
200	S18-008	250	S21-091	300	S21-303N

Number	PropID
301	S21-306W
302	S21-308W
303	S21-314
304	S21-315
305	S21-317
306	S21-321
307	S22-001
308	S22-002
309	S22-005
310	S22-005S
311	S22-007
312	S22-008
313	S22-010S
314	S22-014
315	S22-016S
316	S22-019
317	S22-020
318	S22-029
319	S22-030
320	S22-033
321	S22-039
322	S22-040
323	S22-041b
324	S22-042
325	S22-048
326	S22-051
327	S22-052
328	S22-053
329	S22-055
330	S22-057
331	S22-058
332	S22-060
333	S22-061
334	S22-064
335	S22-067
336	S22-068
337	S22-069
338	S22-070
339	S22-071
340	S22-073X
341	S22-075
342	S22-079
343	S22-080
344	S22-084
345	S22-085

Attachment 3 - Agreed Properties to be excavated in Non-Time Critical Removal – VTLHR

Number	PropID	Number	PropID	Number	PropID	Number	PropID
1	07S11	47	167	93	489	139	LFI-31
2	346	48	172	94	510	140	LFI-38
3	435	49	175	95	523	141	LFI-40
4	475	50	177	96	524	142	LFI-49
5	478	51	181	97	525	143	LFI-61
6	675	52	182	98	533	144	LFI-66
7	LFI-6	53	184	99	539	145	LFI-71
8	LFI-43	54	185	100	547	146	LFI-73
9	01N03	55	196	101	554	147	LFI-75
10	01N05	56	207	102	555		
11	01N06	57	226	103	556		
12	01N08	58	230	104	560		
13	01N10	59	231	105	561		
14	01N20/349	60	232	106	577		
15	01S08	61	234	107	578		
16	01S10	62	237	108	583		
17	01W01	63	242	109	588		
18	03W06	64	248	110	600		
19	04N02	65	268	111	603		
20	04S01	66	282	112	611		
21	04S04	67	289	113	618		
22	04S05	68	298	114	619		
23	04S07	69	305	115	621		
24	04S11	70	306	116	622		
25	05N01	71	313	117	628		
26	05S10	72	341	118	630		
27	06E02	73	361	119	650		
28	07S03	74	396	120	651		
29	07S05	75	420	121	652		
30	07S09	76	423	122	653		
31	11E01	77	429	123	655		
32	11W01	78	434	124	662		
33	12N04	79	436	125	665		
34	13E03	80	437	126	670		
35	13E06	81	439	127	679		
36	13W03	82	440	128	683		
37	13W04	83	441	129	689		
38	13W05	84	455	130	691		
39	13W06	85	456	131	692		
40	13W13	86	457	132	693		
41	13W17	87	460	133	710		
42	14E10/290	88	462	134	719		
43	14W05	89	463	135	720		
44	162	90	483	136	LFI-4		
45	163	91	484	137	LFI-5		
46	164	92	486	138	LFI-12		

Attachment 4
Form of Notice and Declaration of
Environmental Condition

(ABOVE SPACE RESERVED FOR RECORDER'S USE)

Document Title: Environmental Covenant

Document Date:

Department: Missouri Department of Natural Resources
P.O. Box 176, 1101 Riverside Drive, Jefferson City, Missouri 65102

EPA: U.S. Environmental Protection Agency
Adam Ruiz
On Scene Coordinator
11201 Renner Blvd
Lenexa, KS 66219

Legal Description: [*Insert here if space allows OR refer to attached Exhibit*]

WHEREAS, _____("Owner") is the owner of the above-described property (the "Property"); and

WHEREAS, EPA and the Department have determined that soils in certain residential yards within the Viburnum Trend Lead Haul Roads Superfund Site exceed EPA's human health risk based action level for the Site based on sampling conducted by or overseen by EPA; and

WHEREAS, certain soil located on the Property was deemed to exceed EPA cleanup standards for lead; and

WHEREAS, in accordance with EPA and Department requirements, soil exceeding EPA cleanup standards was removed to a maximum depth of twenty-four inches and covered with up to twenty-four inches of clean soil; and

WHEREAS, average concentrations of lead in soil located below twenty-four inches may exceed applicable EPA cleanup standards in the area shown in Exhibit A and has been left in place consistent with EPA requirements for the Viburnum Trend Lead Haul Roads Site; and

WHEREAS, Owner desires and intends to advise future owners of environmental conditions on the Property in the remediated areas of the Property shown in Exhibit A and associated maintenance recommendations.

NOW THEREFORE, Owner hereby declares that all of the Property is held and shall be held, conveyed or encumbered, leased, rented, used, occupied, and improved subject to the following notices:

- Average concentrations of lead in soil located below twenty-four inches may exceed applicable EPA cleanup standards in the area shown in Exhibit A; and

- Direct contact with elevated soil lead concentrations should be avoided by maintaining the existing twenty-four-inch soil cover over the area shown in Exhibit A and repairing or replacing disturbed portions of the soil cover with a similar barrier, such as new soil, gravel, or pavement; and

- The plastic marker that separates clean soil from contaminated soil at or below a depth of twenty-four inches should be maintained or replaced as necessary as a warning that soil lead concentrations exceed EPA cleanup standards below the plastic marker.

This Notice and Declaration of Environmental Condition is hereby declared to be a covenant running with the land and shall be fully binding upon all persons acquiring the above-described property whether by descent, devise, purchase, or otherwise.

IN WITNESS WHEREOF, Owner has executed this Notice and Declaration of Environmental Condition this ____ day of _____, 20___.

Signature:
Printed Name:

Subscribed and sworn to before me
This _____ day of _____, 20___.

_____
Notary Public, State of : _____
My commission _____

EXHIBIT A
to Form of Notice and Declaration of
Environmental Condition

[Aerial photograph of property identifying areas with soil lead concentrations exceeding 1,200 ppm below 24 inches]

APPENDIX B

April 2010 Engineering Evaluation/Cost Analysis Report and EE/CA Responsiveness Summary

ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)

NON-TIME-CRITICAL REMOVAL ACTION

Viburnum Trend Haul Roads Site, Missouri

April 8, 2010

Prepared by:

NEWFIELDS
730 17th Street, Suite 925
Denver, Colorado 80202

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Engineering Evaluation/Cost Analysis (EE/CA) Non-Time-Critical Removal Action

Viburnum Trend Haul Roads Site, Missouri

1.0 INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) has been prepared on behalf of The Doe Run Resources Corporation, Teck American Incorporated, Cyprus Amax Minerals Company, Homestake Lead Company of Missouri, and DII Industries, LLC (collectively referred to herein as "The Respondents") as part of a Non-Time-Critical Removal Action at the Viburnum Trend Haul Roads Site (VTHR Site). The VTHR Site is defined in section 7(o) of the AOC for Time-Critical Removal Action as "the Viburnum Trend Haul Roads Site, which is located in Reynolds, Iron, and Dent Counties, Missouri, and which consists of residential properties and child high use areas that are adjacent to or in the vicinity of certain haul road segments, which segments are identified on Exhibit A to the Statement of Work."

This EE/CA has been prepared in accordance with the requirements of an Administrative Order on Consent (AOC), U.S. Environmental Protection Agency (USEPA) Docket No. CERCLA-07-2007-0014, effective date May 25, 2007 (referred to herein as the EE/CA AOC) and the *EE/CA Work Plan, Non-Time Critical Removal Action, Viburnum Trend Haul Roads Site, Missouri* (NewFields 2010).

The Non-Time-Critical Removal Action which will be subject to a separate AOC (or a consent decree) among the Respondents and USEPA (or possibly the U.S. Department of Justice) for Non-Time-Critical Removal Action will follow a Time-Critical Removal Action that has been performed at the VTHR Site pursuant to an AOC, USEPA Docket No. CERCLA-07-2005-152, effective date March 1, 2005 (referred to herein as the AOC for Time-Critical Removal Action).

As part of the Time-Critical Removal Action, soils with lead levels exceeding 1,200 parts per million (ppm) were removed from residential yards and child high use areas. In these yards, soils in excess of 400 ppm were also removed and replaced. The Non-Time-Critical Removal Action will address those remaining residential yards and child high use areas that have been identified as containing soil lead levels exceeding 400 ppm.

1.1 General EE/CA Process

The EE/CA is a mechanism for the development, screening and detailed evaluation of alternative removal actions, and recommendation of the alternative that best satisfies the evaluation criteria. The purpose of an EE/CA is to document development, screening and detailed evaluation of proven focused alternatives to facilitate selection of an environmentally-sound, cost-effective removal alternative which can be implemented to attain chemical-specific removal goals to ensure protection of human health. The tasks performed for this EE/CA are summarized as follows:

- Summarizing the identification of process options and removal technologies
- Summarizing the technology screening
- Developing alternatives for removal based on the technology screening
- Evaluating the removal action alternatives to develop the most cost effective solution that meets the RAOs.

1.2 Report Organization

The EE/CA documents the development of Applicable or Relevant and Appropriate Requirements (ARARs) and removal action objectives, technology screening, alternative development, and the results of the screening and analysis process. The EE/CA report outline is provided below:

Section 1.0	Introduction
Section 2.0	Site Characterization
Section 3.0	Identification of Removal Action Objectives
Section 4.0	Removal Action Technology Screening and Alternative Development
Section 5.0	Removal Alternative Evaluation
Section 6.0	Recommended Removal Action Alternative
Section 7.0	References.

1.3 Definitions

The following definitions are used in this document.

Child high use area – A play and recreational area frequented by children and not part of a residential yard (*e.g.*, apartment or school playground, or daycare yard).

EBL child – a child under 72 months of age whose blood lead concentration is elevated, *i.e.*, greater than or equal to 10 µg/dL.

Haul Road – a state or county road in Reynolds, Iron, or Dent counties, Missouri that has been identified in Exhibit A to the Scope of Work for the AOC for Time-Critical Removal Action.

2.0 SITE CHARACTERISTICS

2.1 Site Description and Physical Setting

The VTHR Site is located in southeastern Missouri within Reynolds, Iron, and Dent counties, approximately 90 miles southwest of St. Louis and consists of residential properties and child high use areas that are adjacent to or in the vicinity of the Haul Road segments identified in Exhibit A to the SOW. Child high use areas are defined as play and recreational areas frequented by children and not part of a residential yard (*e.g.*, apartment or school playground, or daycare yard). The VTHR Site consists of 22 Segments of Missouri State Routes 21, 32, 49, 72, AC, B, J, KK, N, O, Y, and TT, as identified in the SOW. These are presented on Figure 1.

The topography is hilly with elevations ranging from about 700 to 1,000 feet above mean sea level (msl). The climate is continental with cold winters and hot summers. Annual precipitation is approximately 40 inches with a rainy season in fall and winter. Average annual snowfall is 13.7 inches. Prevailing winds are from the south and west-northwest (NewFields 2005). The population within the three counties is roughly 32,000 according to the 2003 Census projections.

2.2 Exposure Pathways and Constituent of Concern

As discussed in the *Streamlined Risk Evaluation Report* (NewFields 2008), lead in soil is considered to be the constituent of concern for the VTHR Site. Local residents are assumed to be the primary population potentially exposed to lead in soil under the current and reasonably anticipated future land uses. Based on the site conceptual model, the only complete exposure pathways are incidental ingestion of lead in surficial soils and inhalation of lead in dust generated from surface soil. Therefore, the exposure pathways of concern for adult and child residents are incidental ingestion of soil and inhalation of dust in and about the home and yard.

2.3 Nature and Extent of Contamination and Scope of the Removal Action

The preliminary cleanup level for total lead in soils for the Non-Time-Critical Removal Action has been established at 400 ppm. This preliminary level is based on the residential preliminary remediation goal (PRG) accepted by the USEPA as being protective of sensitive residential receptors.

Based yard sampling results from the Removal Site Evaluation (RSE) Report (TTEMI 2005) and the Time-Critical Removal Action, 157 residential yards or child high use areas have been identified that exceed the threshold value for lead of 400 ppm in surface soil. These yards were not addressed as part of the Time-Critical Removal Action. Additional residences may be added to the Non-Time-Critical Removal Action as a result of additional sampling and pursuit of access agreements by the USEPA.

3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section of the EE/CA presents the Remedial Action Objectives (RAOs) established to address lead in soil and identifies ARARs with which a selected removal action must comply.

3.1 Removal Action Objectives

The overall cleanup goal for the VTHR Site is to protect human health. As discussed previously, soil with lead concentrations above 400 ppm in residential yards or child high use areas will be addressed by the Non-Time-Critical Removal Action. Residents are assumed to be the primary population potentially exposed to soil under the current and reasonably anticipated future land uses. For the VTHR Site, the specific RAO is to:

> Limit exposure to lead in soil such that no more than 5 percent of young children (72 months or younger) who live within the site are at risk for blood lead levels higher than 10 µg/dL from such exposure, based on the IEUBK model.

This objective is consistent with USEPA's guidance that USEPA should "...limit exposure to soil lead levels such that a typical child or group of similarly exposed children would have an estimated risk of no more than 5 percent of exceeding the 10 µg/dL blood lead level." Under this scenario, it is assumed that acceptable exposure point concentration (EPC) protective of this sensitive subpopulation could be reasonably assumed to be protective of other sensitive receptors.

USEPA's child lead uptake model ("IEUBK": Integrated Exposure Uptake Biokinetic model) considers many exposure, uptake, and biokinetic parameters in predicting the blood lead concentrations in young children exposed to lead from several sources and by several routes. The four primary components of the model include exposure, uptake, biokinetics, and variability. Complete exposure requires the contact and absorption of lead through exchange boundaries such as the gastrointestinal tract, lungs and skin. Uptake models the process by which lead that has entered a child's body is transferred to the blood. The biokinetic component describes the movement of absorbed lead throughout the body over time by physiologic or biochemical processes. Finally, variability addresses the different concentrations observed among exposed children. Using the default values for the model (*e.g.*, a bioavailability of 60 percent), an EPC of 400 ppm lead in soil is derived that is protective of a child receptor and meets the RAO established above.

3.2 Identification of ARARs

As part of the EE/CA and in accordance with the National Contingency Plan (NCP), 40 CFR 300.415(j), ARARs were evaluated to ensure that all requirements are met for the scope of work to be performed. As specified in the NCP, removal alternatives must satisfy two "threshold" criteria specified in order to be eligible for selection: 1) the remedy must be protective of human health and the environment; and 2) the remedy must meet (or provide the basis for waiving) the ARARs identified for the action.

Federal standards, requirements, criteria or limitations that are determined to be legal ARARs must be met by removal actions, as required by CERCLA (Section 121(d)(2)(A)). Also, State ARARs must be met if they are more stringent than Federal requirements. ARARs are designed to assure that potential removal actions at a site are protective of human health and the environment, cost-effective, and use permanent solutions, alternative treatment technologies or resource recovery technologies to the maximum extent practicable (USEPA 1988a). The Superfund Amendments and Reauthorization Act (SARA) requires that any hazardous substance or pollutant remaining on a site must meet the level or standard of control that is established by the ARARs for that site, unless the ARAR is waived.

Applicable requirements are defined by the NCP as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, removal action, location, or other circumstances at a site (40 CFR 300.5).

Although a requirement may not be applicable as a matter of law, it may still be relevant and appropriate. A requirement is deemed relevant and appropriate if it regulates or addresses problems or situations sufficiently similar to those encountered such that it is well suited to that particular site. Determination of whether a requirement is relevant and appropriate is site-specific and determined by professional judgment based on the characteristics of the removal action, the hazardous substances present at the site, and the physical circumstances of the site and of the release. In some cases, only a portion of a requirement may be deemed relevant and appropriate (USEPA 1988b).

Compliance with all requirements found to be applicable or relevant and appropriate is required under SARA. A waiver from an ARAR may be obtained under certain circumstances (CERCLA Section 121(d)(4)). Other CERCLA statutory requirements, such as the requirement that remedies be protective of human health and the environment, cannot be waived. CERCLA Section 121(d)(2)(A) specifically limits the scope of State ARARs to standards, requirements, criteria, or limitations under environmental or facility siting laws that are promulgated and more stringent than Federal requirements.

ARARs are grouped into three categories:

- Chemical-Specific
- Location-Specific
- Action-Specific.

The NCP identifies a fourth category of information termed "to be considered" (TBC) when evaluating appropriate removal action goals or approaches. This fourth category generally includes Federal and State advisories, criteria or guidance that are not ARARs, and while not legally binding may be useful in developing CERCLA remedies (see 40 CFR 300.400(g)(3)).

The following sections provide a discussion of those requirements that have significant potential to be applicable or relevant and appropriate to removal actions at the VTHR Site.

3.2.1 Potential Chemical-Specific ARARs

Chemical-specific requirements are based on health- or risk-based concentration limits or discharge limitations in environmental media (*i.e.*, water, soil, air) for specific hazardous chemicals. These requirements may be used to set cleanup levels for the chemicals of concern in the designated media or to set a safe level of releases where releases occur as part of the removal activity.

Sources for potential target cleanup levels include selected standards, criteria, and guidelines that are typically considered ARARs for removal actions conducted under CERCLA. Potential chemical-specific ARARs are presented in Table 1. No chemical-specific ARARs have been identified that directly relate to development of RAOs. However, they are pertinent to how the removal action may be implemented.

3.2.2 Potential Location-Specific ARARs

Location-specific ARARs are restrictions placed on the types of removal activities that may be implemented at particular site locations. The location of a site may be an important factor in determining the potential impact of removal actions on human health and the environment. These ARARs may restrict or preclude certain removal actions or they may apply only to certain portions of a site. The only potential location-specific State ARARs identified for the VTHR Site were related to management of the waste materials. Potential Federal and State location-specific ARARs for the VTHR Site are presented in Table 2.

3.2.3 Potential Action-Specific ARARs

Action-specific ARARs are usually technology or activity-based requirements or limitations on actions taken with respect to hazardous substances. These requirements are triggered by the removal activities selected to accomplish a remedy. Because there may be several alternative actions for any site, different requirements may be established. The action-specific requirements do not in themselves determine the removal alternative; rather, they indicate how a selected alternative should be implemented to achieve the requirement. Table 3 lists and describes potential Federal and State action-specific ARARs. The regulations on these tables represent potential action-specific ARARs for activities generally encountered in hazardous substance site remediation (*e.g.*, generation, transportation, storage, disposal, etc.). Regulations regarding worker health and safety such as Occupational Safety and Health Administration (OSHA) requirements are not included because they are not environmental requirements and are therefore not technically ARARs.

3.2.4 Other Guidance To Be Considered

For the VTHR Site, guidance TBC that may be potentially applicable is related to location standards for hazardous waste facilities. As the Old Viburnum tailings facility that may be used to accept the excavated soils is a mine tailings pile and (most) mining wastes are explicitly excluded from RCRA regulations, these regulations are not enforceable but should be considered as part of the best management practices for the VTHR Site.

3.2.5 Data Needs

The SOW requires that data needs be identified which are necessary in order to make ARAR determinations or evaluate the ability of an alternative to comply with ARARs. Consistent with the evaluation described above, no data needs have been identified.

4.0 REMOVAL ACTION TECHNOLOGY SCREENING AND ALTERNATIVE DEVELOPMENT

Consistent with USEPA's Guidance for conducting an EE/CA (USEPA 1993a), this section includes a summary of the identification and screening of removal technologies followed by the development of removal action alternatives to achieve the RAO developed in the previous section.

4.1 Technology Identification and Screening

Based on VTHR Site conditions and the RAO, a range of General Response Actions (GRAs) were identified. GRAs are general categories of removal activities (*e.g.* no action, institutional controls, containment, etc.) that may be taken, either singly or in combination, to satisfy the requirements of the RAO.

Following this, removal action technologies and process options to be considered under each GRA were identified that would be applicable to the VTHR Site. However, unlike a comprehensive Feasibility Study (FS), the purpose of an EE/CA is not to systematically evaluate every potential technology but to focus on proven technologies based on similar contamination scenarios at other sites. For the Non-Time-Critical Removal Action, these necessarily include the Time-Critical Removal Action at the VTHR Site and Removal Action(s) at the St. Joe Minerals Corp. – Viburnum Site (City of Viburnum Site). Additionally, similar sites such as the Jasper County Superfund Site in Joplin, Missouri and Vasquez Boulevard and I-70 Superfund Site in Denver, Colorado provide examples of potential available remedies for residential soil with elevated lead concentrations.

GRAs that are pertinent to the Non-Time-Critical Removal Action therefore include:

- No action
- Institutional Controls
- Public Health Actions
- Containment
- Soil removal.

Following the identification of the pertinent removal technologies and process options under each GRA, the technologies and process options were evaluated for effectiveness, implementability, and relative cost. The removal action technologies and process options that remained following the screening were carried forward for consideration in the development of removal action alternatives. The overall goal is to narrow the focus to a subset of options consisting of only the most viable removal alternatives. Factors considered for each evaluation are as follows.

Effectiveness Evaluation. The primary measure of effectiveness used in this evaluation is the degree to which a process option would contribute to achievement of the RAO. Other effectiveness criteria include:

- The capacity to handle the estimated areas or volumes of soils to be cleaned up
- Potential impacts to human health and the environment during the construction and implementation phase
- The demonstrated reliability with respect to the Contaminants of Concern (COCs) and conditions at the site.

Process options may also be evaluated on the basis of effectiveness relative to other processes within the same technology type.

Implementability Evaluation. Technically inapplicable and infeasible removal technologies were eliminated from further consideration during the initial screening process described in the previous section. The technical and administrative feasibility of implementing a technology or process option is further considered during this final evaluation. Some of the administrative and technical aspects of a technology's implementability considered during this screening step include the following:

- Anticipated community acceptance (in particular compatibility with residential yard use)
- Availability of treatment, storage, and disposal services
- The availability of resources to implement the technology.

Cost Evaluation. The cost analysis is performed on the basis of information contained in USEPA guidance documents, experience in costing similar projects, independent estimates, and engineering judgment. Those process options providing similar effectiveness at significantly higher relative costs are eliminated from further consideration at this screening level. Relative cost evaluations between process options were only performed where they were necessary to facilitate the screening process. Detailed costs are provided for all retained options in Section 5.0.

The identified removal technologies and an evaluation are summarized on Table 4 and discussed in the following subsections.

4.1.1 No Action

No Action would entail performing no additional removal activities. The NCP requires that a No Action alternative be retained as a baseline against which other alternatives can be compared in the detailed analysis, and therefore this alternative is retained without screening.

4.1.2 Institutional Controls

Institutional Controls are non-engineering mechanisms that provide the means by which Federal, State and local governments or private parties can prevent or limit access to or use of contaminated environmental media, the use of areas impacted by COCs, and/or to ensure the integrity and maintenance of engineered removal components. Institutional Controls may be applied on a stand-alone basis or implemented in conjunction with other response actions as part of an overall site remedy.

Types of land use controls are: (1) local land use regulations (such as subdivision ordinances or zoning regulations implemented by local governments for the purpose of protecting the health, safety and general welfare of the people by limiting access); (2) easements created by a grant from a property owner to another party prohibiting the property owner from conducting certain activities that may have the potential to cause a health threat; and (3) restrictive covenants, which are written restrictions or requirements placed on the title to real property that pass with the property and bind both current and future owners of the property to prohibit activities which may have the potential to cause a health threat.

Land use controls are typically used in situations where current use is something other than residential and RAOs are developed to protect workers or visitors. Controls that prevent future residential land use can, in these situations, achieve the requirements of risk-based RAOs. Because the VTHR Site is already residential, in order to achieve the RAO, land use controls would need to restrict common activities that are associated with incidental exposure to soil and dust. It is likely that land use controls would not be effective in protecting human health and would not be accepted by the community and therefore this removal technology is eliminated from further consideration.

4.1.3 Public Health Actions

Public health actions could entail a program targeting specific subpopulations at risk and/or specific behavior that could potentially cause higher exposure. Actions may include education, biomonitoring and environmental sampling, public health referrals and engineering response to protect health.

Educational Materials

The deployment of educational materials was implemented during the investigation performed during the RSE and Time-Critical Removal Action as required under the AOC and is currently in effect for the VTHR Site. Additionally, educational materials have been used at other similar sites to assist in managing risks and to assist in preventing or minimizing exposures that are associated with specific subpopulations and activities, are very infrequent, or are suspected to be from multiple sources. Educational materials can be used to raise overall community awareness of the potential health risks, inform the community about behaviors and activities that result in exposure, inform the community on how to reduce or prevent exposures, and provide information about public health resources. Consequently, this option is retained for the development of removal alternatives and will be included in all action alternatives.

Biomonitoring

Biomonitoring programs (such as blood lead testing) have been implemented successfully at other similar sites and would potentially be appropriate at the VTHR Site for identifying higher than normal exposures that result from reasonable maximum exposure behavior and/or sources other than soil, as well as for evaluation of the effectiveness of other removal action engineering and response components.

However, under the Time-Critical Removal Action those portions of residential yards and child high use areas containing lead above 1,200 ppm were removed, as well as portions of the same property containing lead above 400 ppm. Additionally at properties to be addressed as part of the Non-Time-Critical Removal Action, the remaining total lead in residential surface soils above 400 ppm will be removed. Confirmation sampling will be conducted to ensure that post removal action objectives are met. Consequently, continued monitoring of sensitive receptors will not be necessary at properties where removal activities have occurred, as the EPC would be reduced below risk-based levels. As a result, this option of continued monitoring of sensitive receptors has not been retained.

Environmental Sampling and Response

Environmental sampling and response activities could be implemented to address health risks identified by the biomonitoring program by accurately identifying sources of unacceptable exposure and addressing these sources.

However, the remaining total lead in residential surface soils above 400 ppm at properties to be addressed as part of the Non-Time-Critical Removal Action will be removed. Confirmation sampling will be conducted to ensure that post removal action objectives are met. As biomonitoring (above) has not been retained, there would be no basis for undertaking further environmental sampling. Consequently, environmental sampling (beyond confirmation sampling) has not been retained for the Non-Time-Critical Removal Action.

4.1.4 Containment

Containment actions entail isolating the COCs by physical means. Containment technologies include covering and surface control.

Covering

Containment of residential soils may be achieved by installation of engineered covers to prevent direct contact. There are a variety of available engineered cover designs, including simple soil, rock/gravel, geosynthetic, asphalt, concrete and multimedia (for example, soil-synthetic membrane, soil-synthetic membrane-clay caps, etc.). As the VTHR Site is residential in nature, the application of a cover would restrict normal activities and not be compatible with residential yard use. As a result, application of a cover is not retained as an option in the development of removal alternatives.

Surface Control

Surface controls may include soil grading, vegetation or tilling. Soil grading typically entails contouring the ground surface to potentially reduce exposure. Vegetation consists of seeding appropriate grass, legume or shrub species to provide a stand of vegetation that will reduce erosion and stabilize soils. Tilling includes mechanically turning over and mixing of the upper soil column such that contaminant levels at the surface are reduced. Grading would not be implementable in residential yards due to existing use requirements. Vegetation would not be effective as a stand-alone solution but could be used as a component of a tilling and restoration alternative.

Tilling includes mechanically turning over and mixing the upper soil column such that contaminant levels at the surface are reduced or in conjunction with other treatment technologies such as phosphate amendment. Tilling with revegetation may be a viable stand-alone alternative in cases where contaminant concentrations are close to cleanup goal levels and decrease with depth. It would not be effective as a stand-alone solution in situations where similar levels and/or relatively high levels of contamination exist throughout the tilling depth. Hand rototilling would be the most consistently practical option (larger mechanical tillers may be usable in large open areas with easy access, but this would not consistently be the case for the yards at the VTHR Site where access is limited). Hand rototilling typically achieves about a 6-inch tilling depth. At the VTHR Site the rocky soil and the established tree root structure would tend to effectively prohibit rototilling in most of the yards by either damaging the roots or equipment. Since tilling has some problems associated with implementation at the VTHR Site, it was not retained as an option in the development of removal alternatives.

4.1.5 Soil Removal

Conventional open cut excavation of shallow soils is typically conducted by means of earthmoving equipment, including excavators, wheel loaders, and scrapers. This technology was used during the Time-Critical Removal Action at the VTHR Site and is therefore applicable to VTHR Site conditions and retained for further evaluation.

Excavated soils may be disposed at an appropriate landfill or other facility. Disposal was used during the previous Time-Critical Removal Action and therefore is applicable to site conditions and is retained for further evaluation. Under the soil removal action the soils would be excavated and disposed of off-site at either the Old Viburnum Tailings Facility near the City of Viburnum, Missouri (where they will be used as cover at the behest of MDNR and EPA), used for most of the soils removed during the Time-Critical Removal Action, or a suitable landfill. Soils that fall between 400 and 1,200 ppm total lead, which are expected to comprise the bulk of the soils from the future Non-Time-Critical Removal, are expected to be non-hazardous by RCRA toxicity characteristics based on the results obtained from the Time-Critical Removal Action and could be placed in a suitable Subtitle D landfill. Soils with lead concentrations greater than 1,200 ppm may be hazardous by RCRA toxicity characteristic and thus will need to be placed in a Subtitle C landfill if disposed of off-site. Doe Run has received a Remedial Action Plan (RAP) permit (USEPA ID# MOD 000-823-252) authorizing the treatment, storage and disposal of hazardous remediation waste (as defined under 40 CFR §260.10). This permit allows the placement of up to 100,000 tons of remediation waste (including soils from the VTHR Time-Critical and Non-Time-Critical Removal Actions) at the existing permitted Old Viburnum tailings facility. Sampling will be performed on the soils at the Old Viburnum tailings facility at a rate of one sample per excavated waste pile to

determine if the soils are hazardous by characteristic. If the Toxicity Characteristic Leaching Procedure (TCLP) test results equal or exceed 5 mg/L, the soils will be amended with phosphate and retested prior to placement in the Old Viburnum tailings facility. Final placement following amendment will be contingent on meeting a treatment value of 10 times the Universal Treatment Standard for lead in non-wastewaters (7.5 mg/L) as determined by TCLP analysis.

All excavated areas of the yard will be replaced with clean fill. Once clean soil has been brought in to bring the excavated areas to approximate pre-excavation grade, filled areas will be seeded with lawn grass. Vegetation will be used to stabilize restored yard soils.

4.2 Removal Alternative Development

Cleanup of residential yards with elevated lead levels has been performed at many Sites across the United States, including the New Lead Belt. Consistent with experience gained at those Sites, the following basic conceptual removal alternatives have been identified for the Site:

- **Alternative 1: No Action**
- **Alternative 2: Soil Removal**
  - 2.a Disposal at the Old Viburnum tailings facility
  - 2.b Disposal at the Old Viburnum tailings facility and Subtitle C (Hazardous Waste) Landfill
  - 2.c Disposal at Subtitle D (Solid Waste) and Subtitle C (Hazardous Waste) Landfills.

The conceptual alternatives are described in more detail in the following subsections. Supporting actions such as residential interior dust cleaning and health education materials will be considered for all action alternatives.

4.2.1 Alternative 1 – No Action

No Action would entail performing no additional removal activities. The NCP requires that a No Action alternative be retained as a baseline against which other alternatives can be compared in the EE/CA analysis.

4.2.2 Alternative 2 – Soil Removal

Under this Alternative 2, accessible surface soils in residential yards and child high use areas with lead concentrations greater than 400 ppm would be removed to a depth of 12 inches and confirmation sampling performed to document the lead concentrations at the base of the excavation. An area of a yard may be excavated to a depth of less than 12 inches provided confirmation sampling indicates that remaining soil lead concentrations do not exceed 400 ppm. Should lead concentrations after removing 12 inches of soil be greater than 1,200 ppm, excavation would continue in 6- to 12-inch lifts until the soil concentration falls below 1,200 ppm. As a result, in these areas, this would result in excavations greater than 12 inches. Based on results of the Time-Critical Removal Action, these deeper excavations are expected to be rare. Conventional open cut excavation of shallow soils is typically conducted by means of earthmoving equipment, including excavators, wheel loaders, and scrapers. This technology was used during the Time-Critical Removal Action at the VTHR Site and is therefore applicable to VTHR Site conditions. Excavated areas would be backfilled with clean soil or other suitable material and the area restored for use.

Excavated soils that contain between 400 and 1,200 ppm total lead, which comprise the bulk of the soils from the Non-Time-Critical Removal, are expected to be non-hazardous by characteristic (TCLP test) based on the soil results obtained from the Time-Critical Removal Action. However, it is possible that some soils will be hazardous by characteristic.

There are certain basic options for disposal of excavated soil as described below.

Summary of Soil Disposal Options – Removal Alternative 2

Alternative	Soils Non-Hazardous By Characteristic	Soils Hazardous by Characteristic
2.a	Old Viburnum tailings facility	Old Viburnum tailings facility (after Phosphate Amendment)
2.b	Old Viburnum tailings facility	Subtitle C Landfill
2.c	Subtitle D Landfill	Subtitle C Landfill

Doe Run has received a RAP permit (USEPA ID# MOD 000-823-252) authorizing the treatment, storage, and disposal of hazardous remediation waste (as defined under 40 CFR §260.10) at its existing Old Viburnum tailings facility. This permit allows the placement of up to 100,000 tons of remediation waste (including soils and other materials from the VTHR Time-Critical and Non-Time-Critical Removal Actions). If the TCLP results equal or exceed 5 mg/L lead, the soils could be amended with phosphate until the TCLP result is reduced below 5 mg/L lead and then placed in the Old Viburnum tailings facility. Final placement following amendment will be contingent on meeting a

treatment value of 10 times the Universal Treatment Standard for lead in non-wastewaters (7.5 mg/L) as determined by TCLP analysis.

Excavated soils could also be disposed at a Subtitle D landfill (non-hazardous by characteristic) or at a Subtitle C landfill (hazardous by characteristic).

5.0 REMOVAL ALTERNATIVE EVALUATION

This section provides a detailed analysis of the removal alternatives developed in Section 4. The alternatives are evaluated to ensure that the selected removal alternative will be protective of human health; comply with or include a waiver of ARARs; be cost-effective; utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and address the statutory preference for treatment as a principal element.

5.1 Evaluation Criteria

The evaluation of the overall protection of human health and the environment is based on a composite of factors assessed under the evaluation criteria. The criteria specifically considered are: short-term effectiveness, long-term effectiveness and permanence, implementability, cost, and compliance with ARARs.

5.1.1 Effectiveness

Short-Term Effectiveness

This evaluation criterion addresses the effects of the removal alternative during the construction and implementation phase until the removal objectives are met. Alternatives are evaluated with respect to their potential effects on human health and the environment during implementation of the removal action. As specified in the CERCLA guidance, the short-term impacts of each removal alternative are assessed considering the following factors:

- Short-term risks that might be posed to the community during implementation of removal action
- Potential impacts on workers during removal action and the effectiveness and reliability of protective measures
- Potential environmental impacts of the removal action and the effectiveness and reliability of mitigative measures during implementation
- The time until protection is achieved.

Long-Term Effectiveness/Permanence

Evaluation of long-term effectiveness and permanence considers the risks remaining after the response objectives have been met. Factors considered, as appropriate, include the following.

- Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the removal activities.

- Adequacy and reliability of controls. This factor assesses the adequacy and suitability of controls, if any, that are used to manage untreated wastes that remain at the site. The long-term reliability of management controls for providing continued protection are also assessed, including the potential need to replace technical components of the alternative, and the potential exposure pathway and the risks, should the removal action need replacement.

5.1.2 Implementability

This criterion addresses the technical and administrative feasibility of implementing each removal alternative and the availability of various services and materials required during its implementation. As specified in the CERCLA guidance, the evaluation of implementability includes three categories of analysis: technical feasibility, administrative feasibility, and availability of services and materials.

5.1.3 Cost

For each alternative, a -30 to +50 percent cost estimate is developed in accordance with procedures in the *Remedial Action Costing Procedures Manual (USEPA 2000).* Cost estimates for each alternative are based on conceptual engineering and design and are expressed in terms of 2010 dollars. The cost estimate for a removal alternative consists of four principal elements.

- **Removal action cost** – Removal action cost consists of direct (construction), indirect (non-construction and overhead) costs, and costs associated with the implementation of health educational materials. Direct costs include the cost for equipment, labor, and materials incurred to develop, construct, and implement a removal action. Indirect costs are expenditures for engineering, financial, and other services that are not actually a part of construction but are required to implement a removal alternative. These items are included in the detailed cost analysis.

- **Operation and maintenance cost** – Operation and maintenance (O&M) cost refers to post-removal action cost items necessary to ensure the continued effectiveness of a removal action. For the alternatives under consideration in this EE/CA, there are no O&M activities other than periodic review. Long-term actions, such as implementation of distribution of health education materials, are considered to be a component of the removal action.

- **Cost for a 5-year review** – Section 121(c) of CERCLA, as amended, states that a 5-year review of a removal action is required if that removal action results in hazardous constituents remaining on-site.

- **Present worth analysis** – This analysis is used to evaluate the removal action and O&M costs of a removal alternative based on its present worth. A present worth analysis compares expenditures for various alternatives where those expenditures occur over different time periods. By discounting all costs to a common base year, the costs for different removal action alternatives can be compared based on a single cost figure for each alternative. The total present worth for a single alternative is equal to the full amount of all costs incurred through the end of the first year of operation (capital cost), plus the series of expenditures in following years reduced by the appropriate future value/present worth discount factor. This analysis allows the comparison of removal alternatives on the basis of a single cost representing an amount that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the removal action over its planned life. A discount rate of 7 percent is assumed for base calculations (USEPA 1993b). The discount rate represents the anticipated difference between the rate of inflation and investment return.

5.2 Individual Removal Alternative Evaluation

5.2.1 Alternative 1 – No Action

The No Action alternative provides a baseline for the evaluation of other alternatives in accordance with the NCP. No additional protective measures would be taken for the no-action option. As noted previously, soils have been removed from 33 residential properties at the site.

The No Action alternative does not meet the requirements of the RAO and does not provide protection of human health for the remaining non-time-critical properties.

5.2.2 Alternative 2 – Soil Removal

This alternative considers the removal of VTHR Site surface soils in yards with total lead concentrations greater than 400 ppm. Accessible soils would be removed to a maximum depth of 12 inches and confirmation sampling performed to document that remaining soil concentrations are below 1,200 ppm. Areas that have subgrade soil concentrations greater than 1,200 ppm would be removed until subgrade soils contain total lead concentrations less than 1,200 ppm per the procedures required under the Time-Critical Removal Action.

Effectiveness

Alternative 2 would meet the requirements of the RAO by removal of all soil with lead concentrations above 400 ppm within the upper foot of soil and backfilling with clean material. This would prevent direct contact with soils with lead concentrations above 400 ppm. The alternative would provide a high level of protection of human health, although there would be increased short-term risks associated with transportation of excavated soil from and clean backfill to the site.

ARARs relating to the generation of fugitive dust and lead concentrations in ambient air would be applicable to actions performed to implement Alternative 2. Although the potential exists for dust generation during soil excavation, transport and backfilling activities, engineering controls would be readily implementable and effective to achieving compliance with the applicable regulations. ARARs relating to the characterization, transport and disposal of solid wastes would be applicable and would be met by standard construction and transportation practices. Alternative 2 would therefore meet the requirements of all ARARs.

Short Term

The short-term risk to the community and workers during implementation of this alternative would be low.

Risks would be posed to members of the community due to the operation of heavy equipment in the residential areas and by truck traffic associated with transportation of excavated soil off site and import of clean backfill. As a screening level estimate, a total of approximately 2,200 dump truck trips would be needed to transport the excavated soil to the Old Viburnum tailings facility and to transport the clean backfill soil to the site (about 22,000 cubic yards of excavated soil and an equal amount of backfill transported in 12 cubic yard capacity trucks). The injury and fatality rates for accidents involving large trucks in 2007 (most recent data available; FMCSA 2008) were 33.4 per 100 million vehicle miles driven and 2.02 per 100 million vehicle miles driven, respectively.

Assuming a transport distance of 25 miles to the Old Viburnum tailings facility and 25 miles to the backfill source, application of the 1997 statistics estimates that there would be a 7.3 percent probability that one of the trucks would be involved in an accident that injures someone and a 0.44 percent chance of a fatality.

Long Term

This alternative would provide a high degree of long-term effectiveness and protection, because accessible soils with lead concentrations above 400 ppm within the upper foot of soil would be removed from the site and replaced with clean backfill.

Implementability

Alternative 2 would be implementable with standard equipment and services, and trained personnel would be readily available for this type of work. The construction technologies required to implement this alternative are commonly used and widely accepted. Adequate disposal facilities are available in the area, as are suitable sources of clean backfill. Removal is a reliable technology, and no future removal actions would be required because soils of concern would be removed from the VTHR Site.

Cost

The present net worth cost for Alternative 2 using the Old Viburnum tailings facility disposal option (2a) is approximately $10 million. Detailed information on the unit rates, quantities and assumptions used in the development of the costs are presented in Table 5. A cost comparison of the Alternative using the other combinations of disposal options is presented below.

Summary Cost by Soil Disposal Options – Removal Alternative 2

Alternative	Soils Non-Hazardous By Characteristic	Soils Hazardous by Characteristic	Total Cost	Net Present Worth (assumes capital costs are distributed equally over two years)
2.a	Old Viburnum tailings facility	Old Viburnum tailings facility (after Phosphate Amendment)	$9,996,000	$9,669,000
2.b	Old Viburnum tailings facility	Subtitle C Landfill	$10,998,000	$10,638,000
2.c	Subtitle D Landfill	Subtitle C Landfill	$19,527,000	$18,888,000

As no hazardous constituents are left in the residential yards or child high use areas, a 5-year review will not be required. After initial seeding and watering, all lawn care will be the responsibility of the property owner. Therefore, no periodic or ongoing costs are associated with this Alternative.

5.3 Comparative Analysis of Alternatives

This section contains a comparative analysis of the alternatives. However, the No Action Alternative is not protective of human health and is not evaluated. Therefore, Alternative 2 is the recommended alternative.

6.0 RECOMMENDED ALTERNATIVE

Based on the above comparison, it is recommended that Alternative 2 be selected. Alternative 2 contains the following elements:

- Residential yard and child high use area soils with lead greater than 400 ppm will be excavated to a depth of one foot or until the subgrade soil lead concentrations are less than 1,200 ppm and replaced with clean materials. Excavated soils will be disposed of at the Old Viburnum tailings facility or appropriate Subtitle C and/or D landfill.

- Consistent with the Time-Critical Removal activities, health educational materials will be provided and residential interior dust cleaning shall be performed following the soil removal activities.

7.0 REFERENCES

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USEPA, 2000. *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study.* OSWER 9355.0-75. EPA/540/R-00/002. July.

TABLES

TABLE 1

SUMMARY OF POTENTIAL CHEMICAL-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
FEDERAL					
Hazardous Waste Criteria	Potentially	--	40 CFR 264	Establishes criteria for use in determining hazardous wastes and disposal requirements. Excavated soil would be classified as D008 hazardous waste if the lead concentration from the TCLP test was greater than 5.0 mg/L.	Would be applicable if hazardous wastes are generated and disposed of off-site at a RCRA Facility. Based on data from the Time-Critical Removal, soils containing less than 1,200 ppm lead were all non-hazardous by TCLP. However, soils with total lead greater than 1,200 ppm did exhibit TCLP values greater than 5.0 mg/L. This would be relevant to the residences that have areas greater than 1,200 ppm that are being addressed under the Non-Time-Critical Removal action. These regulations are potentially applicable if future sampling indicates that excavated soil is hazardous.
National Ambient Air Quality Standards	No	Yes	40 CFR Part 50	Establishes ambient air quality standards for certain "criteria pollutants" to protect public health and welfare. Standard is: 1.5 microgram lead per cubic meter ($\mu g/m^3$) maximum – arithmetic mean averaged over a calendar quarter.	National ambient air quality standards (NAAQS) are implemented through the New Source Review Program and State Implementation Plans (SIPs). The Federal New Source Review Program addresses only major sources. Emissions associated with the removal action would be limited to fugitive dust emissions associated with earth moving activities during construction. These activities will not constitute a major source. Therefore, attainment and maintenance of NAAQS pursuant to the New Source Review Program are not applicable. However, the standards relating to lead are relevant and appropriate.

TABLE 1

SUMMARY OF POTENTIAL CHEMICAL-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
STATE					
Missouri Ambient Air Standards	Yes	--	Missouri Code of State Regulations (CSR) 10 CSR 010-06.010	Missouri uses the National Ambient Air Quality Standards (NAAQS) as the state standards for airborne emissions. The NAAQS air quality standards for particulates, as PM_{10}, are 50 $\mu g/m^3$ (annual geometric mean) and 150 $\mu g/m^3$ (24 hour), as $PM_{2.5}$ they are 15 $\mu g/m^3$ (annual geometric mean) and 65 $\mu g/m^3$ (24 hour). The NAAQS emission limit for lead is 1.5 $\mu g/m^3$ averaged over a three-month period.	Relevant and appropriate to actions that generate fugitive dust at individual properties and the staging area.

TABLE 2

SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
FEDERAL					
Archaeological and Historic Preservation Act	No	No	16 USC Sec. 469	Establishes procedures to provide for preservation of historical and archaeological data that might be destroyed through alteration of terrain as a result of a Federally licensed activity or program.	Area to be part of soil cleanup activities is not believed to contain any historical or archaeological resources due to residential nature of Site and shallow depth (<1 ft) of excavation activities to be performed (if necessary).
Archaeological Resources Protection Act	No	No	16 USC Secs. 470 aa - mm	Requires permits for any excavation or removal of archaeological resources from public or Indian lands. Provides guidance for federal land managers to protect such resources.	Activities will not take place on public land or Indian land.
National Historic Preservation Act	No	No	16 USC Sec. 470 36 CFR Part 800 Executive Order 11593, May 3, 1971	Requires Federal agencies to take into account the effect of any Federally assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for Register of Historic Places.	Area to be part of soil cleanup activities is not believed to contain any feature that would be eligible for registration as a historic place due to residential nature and location of Site.
Historic Sites, Buildings, and Antiquities Act	No	No	16 USC Secs. 461 - 467, 470h-2(f)	Requires Federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks.	Area to be part of soil cleanup activities is not believed to contain any National Natural Landmarks due to residential nature and location of Site.

TABLE 2

SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
Fish and Wildlife Coordination Act	No	No	16 USC Secs. 661 - 666	Requires any Federal agency or permitted entity to consult with the U.S. Fish and Wildlife Service and appropriate state agency prior to modification of any stream or other water body. The intent of this requirement is to conserve, improve, or prevent loss of wildlife habitat and resources.	Area to be part of soil cleanup activities is not believed to directly impact any stream or water feature. However, streams adjacent to properties could be potentially affected by runoff from cleanup activities.
Fish and Wildlife Conservation Act	No	No	16 USC Secs. 2901 - 2912	Requires Federal agencies to utilize their statutory and administrative authority to conserve and promote conservation of non-game fish and wildlife species.	Area to be part of soil cleanup activities is not believed to directly impact any stream or water feature. However, streams adjacent to properties could be potentially affected by runoff from cleanup activities.
Endangered Species Act	No	No	16 USC Secs. 1531-1544 50 CFR Parts 17, 402	Requires that Federal agencies ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat.	Area to be part of soil cleanup activities is not believed to directly impact any critical habitat. Cleanup activities will be restricted to residential properties and are not expected to adversely impact listed species.
Federal Migratory Bird Treaty Act	No	No	16 USC Secs. 703 - 712	Prohibits taking of any migratory bird.	Area to be part of soil cleanup activities is not believed to directly impact any critical habitat. Cleanup activities will be restricted to residential properties and not expected to adversely impact migratory birds.

TABLE 2

SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
Executive Order on Floodplain Management	No	No	Executive Order No. 11988	Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the maximum extent possible, the adverse impacts associated with direct and indirect development of a floodplain.	Cleanup activities to be performed are comprised of restoration of residential properties. As such, no additional development within the floodplain is anticipated beyond that previously performed during the original development of the property.
Executive Order on Protection of Wetlands	No	No	Executive Order No. 11990	Requires Federal agencies to avoid, to the maximum extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid new construction in wetlands, if a practicable alternative exists.	Cleanup activities to be performed are comprised of restoration of residential properties. As such, no adverse impacts on wetlands are anticipated.
Farmland Protection Policy Act	No	No	7 USC Sec. 4201 *et. seq.*	Protects significant or important agricultural lands from irreversible conversion to uses that result in its loss as an environmental or essential food production resource.	Cleanup activities to be performed are comprised of restoration of residential properties and are not expected to impact agricultural lands. As such, no loss of environmental or essential food production resources is anticipated.
RCRA – Location Standards for Hazardous Waste Facilities	Potentially	--	42 USC Sec. 6901 40 CFR 264.18	Requires that any hazardous waste facility located within the 100-year floodplain be designed, constructed, operated, and maintained to avoid washout. Also, contains requirements for locating facilities away from seismically active zones. Because most mining and mill wastes are explicitly excluded from RCRA regulations, these requirements are only TBCs for the Site.	Materials from removal action may be placed on Doe Run Old Viburnum tailings facility consistent with VTHR Time-Critical Removal. This unit is to be managed according to the USEPA RAP permit (USEPA ID# MOD 000-823-252) for Management of Hazardous Remediation Waste.

TABLE 2

SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs
VTHR Site – Non-Time-Critical Removal

Standard, Requirement or Criteria	Applicable	Relevant and Appropriate	Citation	Description	Comment
Rivers and Harbors Act	No	No	33 CFR Secs. 320 - 330	Requires preapproval of the US Army Corps of Engineers prior to placement of any structures in waterways and restricts the placement of structures in waterways.	Area to be part of soil cleanup activities is not believed to directly impact any navigable stream or water feature or necessitate placement of any structures within these features.
STATE					
Missouri Hazardous Waste Regulations	--	Potentially	10 CSR 25-7.264 - 270	Hazardous waste disposal areas shall not be placed within a 100-year floodplain or wetland. Provisions related to placement and management of hazardous waste units.	Relevant and appropriate to actions that generate hazardous waste. Soils with lead greater than 1,200 ppm likely to be hazardous by characteristic. Materials from removal action may be placed on Doe Run Old Viburnum tailings facility consistent with Time-Critical Removal.
Missouri Metallic Minerals Waste Management Act	--	Yes	10 CSR 45	Actions involving placement of metallic mineral waste shall be performed according to permit.	Materials from removal action are expected to be placed on Doe Run Old Viburnum tailings facility consistent with Time-Critical Removal. This unit is to be managed according to the USEPA RAP permit (USEPA ID# MOD 000-823-252) for Management of Hazardous Remediation Waste and Permit.
Missouri Solid Waste Regulations	Potentially	--	11 CSR 80-11.010	Actions involving solid waste disposal areas shall not cause degradation to wetlands or jeopardize existence of endangered or threatened species protected under the Endangered Species Act of 1973 or violate any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972.	Relevant and appropriate to actions that generate solid waste. Materials from removal action are to be placed on Doe Run Old Viburnum tailings facility consistent with Time-Critical Removal.

TABLE 3

SUMMARY OF POTENTIAL ACTION-SPECIFIC ARARS
VTHR Site – Non-Time-Critical Removal

Action	Applicable	Relevant and Appropriate	Citation	Description	Comment
FEDERAL					
Hazardous and Solid Waste: 1. Criteria for Classification of Solid Waste and Disposal Facilities and Practices	Yes	--	40 CFR Part 257	Establishes criteria for use in determining solid wastes and disposal requirements.	Excavated soil is a solid waste.
2. Criteria for Classification of Hazardous Waste and Disposal Facilities and Practices	Potentially	--	40 CFR 264	Establishes criteria for use in determining hazardous wastes and disposal requirements. Excavated soil would be classified as D008 hazardous waste if the lead concentration from the TCLP test was greater than 5.0 mg/L.	Would be applicable if hazardous wastes are generated. Based on data from the Time-Critical Removal, soils containing less than 1,200 ppm lead were all non-hazardous by TCLP. However, some soils with total lead greater than 1,200 ppm did exhibit TCLP values greater than 5.0 mg/L. This would be relevant to the residences that have areas greater than 1,200 ppm that are being addressed under the Non-Time-Critical Removal action. These regulations are potentially applicable if future sampling indicates that excavated soil is hazardous.
3. Hazardous Materials Transportation Regulations	Potentially	--	49 CFR Parts 107, 171-177	Regulates transportation of hazardous materials.	Applicable only if the Cleanup action involves off-site transportation of hazardous materials. The regulations affecting packaging, labeling, marking, placarding, using proper containers, and reporting discharges of hazardous materials would be potential ARARs.

TABLE 3

SUMMARY OF POTENTIAL ACTION-SPECIFIC ARARS
VTHR Site – Non-Time-Critical Removal

Action	Applicable	Relevant and Appropriate	Citation	Description	Comment
Air Emission Control:					
1. National Ambient Air Quality Standards	No	Yes	40 CFR Part 50	Establishes ambient air quality standards for certain "criteria pollutants" to protect public health and welfare. Standards are: 150 $\mu g/m^3$ for particulate matter for a 24 hour period; 50 $\mu g/m^3$ for particulate matter – annual arithmetic mean; 1.5 $\mu g/m^3$ maximum – arithmetic mean averaged over a calendar quarter.	NAAQS are implemented through the New Source Review Program and State Implementation Plans (SIPs). The federal New Source Review Program addresses only major sources. Emissions associated with the Cleanup would be limited to fugitive dust emissions associated with earth moving activities during construction. These activities will not constitute a major source. Therefore, attainment and maintenance of NAAQS pursuant to the New Source Review Program are not applicable. However, the standards relating to particulate matter and to lead are relevant and appropriate.
STATE					
Hazardous and Solid Waste:					
1. Solid waste determination	Yes	--	Missouri Solid Waste Regulations 11 CSR 80-11	A solid waste is any discarded material that is not excluded by Regulation.	Applicable to soil excavated from residential yards.
2. Determination of hazardous waste.	Yes	--	Missouri Hazardous Waste Regulations 10 CSR 25-7.264 - 270	If an extract from a solid waste, tested using the Toxicity Characteristic Leaching Procedure (test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA publication SW 846), contains concentrations of any of the materials above the listed level (5 mg/L for lead), the waste is considered hazardous.	Applicable to soil excavated from residential yards.

TABLE 3

SUMMARY OF POTENTIAL ACTION-SPECIFIC ARARS
VTHR Site – Non-Time-Critical Removal

Action	Applicable	Relevant and Appropriate	Citation	Description	Comment
3. Transportation of Hazardous Waste	Potentially	--	Missouri Solid Waste Regulations 11 CSR 80-11	Rules regarding Transportation of Hazardous Substances.	Applicable only if the Cleanup action involves off-site transportation of hazardous materials. The regulations affecting packaging, labeling, marking, placarding, using proper containers, and reporting discharges of hazardous materials would be potential ARARs.
Air Emission Control: 1. Particulate emissions during excavation and backfill.	Yes	--	Missouri Code of State Regulations 10 CSR 010-06	Missouri air pollution regulations require persons that emit fugitive particulates to minimize emissions through use of all reasonable precautions. In addition, no visible fugitive dust transport is allowed beyond the lot line of the property where the emissions originate.	Applicable to actions that entail excavation, moving, storing, transportation of redistribution of soil.
2. Ambient Air Standard for Total Suspended Particulate Matter	No	Yes	Missouri Code of State Regulations 10 CSR 010-06	Missouri uses the NAAQS as the state standards for airborne emissions. The NAAQS air quality standards for particulates, as PM_{10}, are 50 $\mu g/m^3$ (annual geometric mean) and 150 $\mu g/m^3$ (24 hour), as $PM_{2.5}$ they are 15 $\mu g/m^3$ (annual geometric mean) and 65 $\mu g/m^3$ (24 hour).	Cleanup activities will not constitute a major source and therefore regulations are not applicable. Relevant and appropriate to actions that generate fugitive dust at individual properties and the staging area.
3. Ambient Air Standards	No	Yes	Missouri Code of State Regulations 10 CSR 010-06	Missouri uses the NAAQS as the state standards for airborne emissions. Excavation and backfill of soils could potentially cause emission of hazardous air pollutants. The NAAQS emission limit for lead is 1.5 $\mu g/m^3$ averaged over a three-month period.	Relevant and appropriate to actions that generate fugitive dust at individual properties and the staging area.

TABLE 3

SUMMARY OF POTENTIAL ACTION-SPECIFIC ARARS
VTHR Site – Non-Time-Critical Removal

Action	Applicable	Relevant and Appropriate	Citation	Description	Comment
Storm water Controls:					
1. Storm water NPDES Permit	No	Yes	Missouri Clean Water Commission 10 CSR 020-06	Missouri has established General NPDES Storm Water Permit for a land disturbance site such as would be encountered during the soil removal action at the Site. The permit requires the establishment of best management practices (BMP) to control runoff.	This project is being performed under CERCLA as an Emergency Removal Action and therefore does not require a permit. However, the substantive requirements of the Missouri General Permit will be implemented at the site including CBMP, routine inspections and record keeping.

TABLE 4

SUMMARY[1] OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
VTHR Site – Non-Time-Critical Removal

General Removal Action (GRA)	Remedial Technology	Process Options	Effectiveness	Implementability	Screening Results/Comments
No action	No action	- [2]	-	-	Retained as required by NCP.
Institutional Controls	Land Use Controls	Local Land Use Regulations Easements Restrictive Covenants	Would not be protective because land use is already residential and would require restrictions on common activities.	Would likely not be accepted by community since common activities would be restricted.	Eliminated from further consideration.
Public Health Actions	Education	Educational Materials	Effective in modifying behavior patterns that contribute to possible exposure.	Readily implementable.	Retained - already performed during the Remedial Site Evaluation (RSE) and Time-Critical Removal Action.
	Monitoring	Biomonitoring for lead (elevated blood lead testing)	Could be used to direct environmental sampling activities.	Readily implementable.	Biomonitoring has not been actively performed as part of the RSE or Time-Critical Removal; however, child elevated blood lead has been documented for certain residences during RSE. Soils above health risk based standards are being removed; therefore the applicability of biomonitoring as it relates to soil is removed and not considered further.
	Sampling and Response	Environmental Sampling and Response Program	Would be effective in addressing residual risks by identifying sources of and preventing unacceptable exposures.	Readily implementable.	Assuming that soils above health risk based standards are removed the need for biomonitoring would not be necessary. Without active biomonitoring, additional environmental sampling is unnecessary and has been removed from further consideration.

TABLE 4

SUMMARY[1] OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
VTHR Site – Non-Time-Critical Removal

General Removal Action (GRA)	Remedial Technology	Process Options	Effectiveness	Implementability	Screening Results/Comments
Containment	Covering	Rock Geosynthetic Asphalt Concrete Multimedia/Soil	Barriers would generally be effective in preventing direct contact with contaminated soil. Effectiveness would be increased if used in conjunction with other options.	Surface cover would not be compatible with residential yard use.	Installation of a cover is not retained at this time.
	Surface Control	Soil Grading	Not effective.	-	Vegetation is retained for further consideration in conjunction with other remedial options. Tilling and grading are not retained at this time.
		Vegetation	Not effective as a stand-alone option, but could be part of a comprehensive alternative.	Could be implemented in a residential yard setting.	
		Tilling	Not effective as a stand-alone option, but could be effective in conjunction with treatment option.	Could be implemented in a residential yard setting. However, equipment access, existing tree roots and tilling depth would limit yards that could benefit from this technique.	
Removal/Disposal	Removal	Excavation	Effective in removing contaminated soil.	Implementable in a residential yard setting.	Retained.

TABLE 4

SUMMARY[1] OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
VTHR Site – Non-Time-Critical Removal

General Removal Action (GRA)	Remedial Technology	Process Options	Effectiveness	Implementability	Screening Results/Comments
Removal/Disposal (cont.)	Disposal	On-site	Effective in preventing contact with excavated contaminated soil.	Implementable – Old Viburnum tailings facility used in the Time-Critical Removal is available for Non-Time-Critical Removal.	Retained for further consideration.
		Off-site	Effective in preventing contact with excavated contaminated soil.	Implementable-suitable off-site disposal facilities are currently used to accept waste from mining operations in the area. However, distance to nearest landfill used for disposal is 100 miles from Site.	Retained for further consideration.

NOTES:
(1) Per CERCLA guidance relative cost evaluation is only performed to evaluate process options providing similar effectiveness. This was performed following detailed evaluation.
(2) Evaluation not performed if not required for screening purposes.

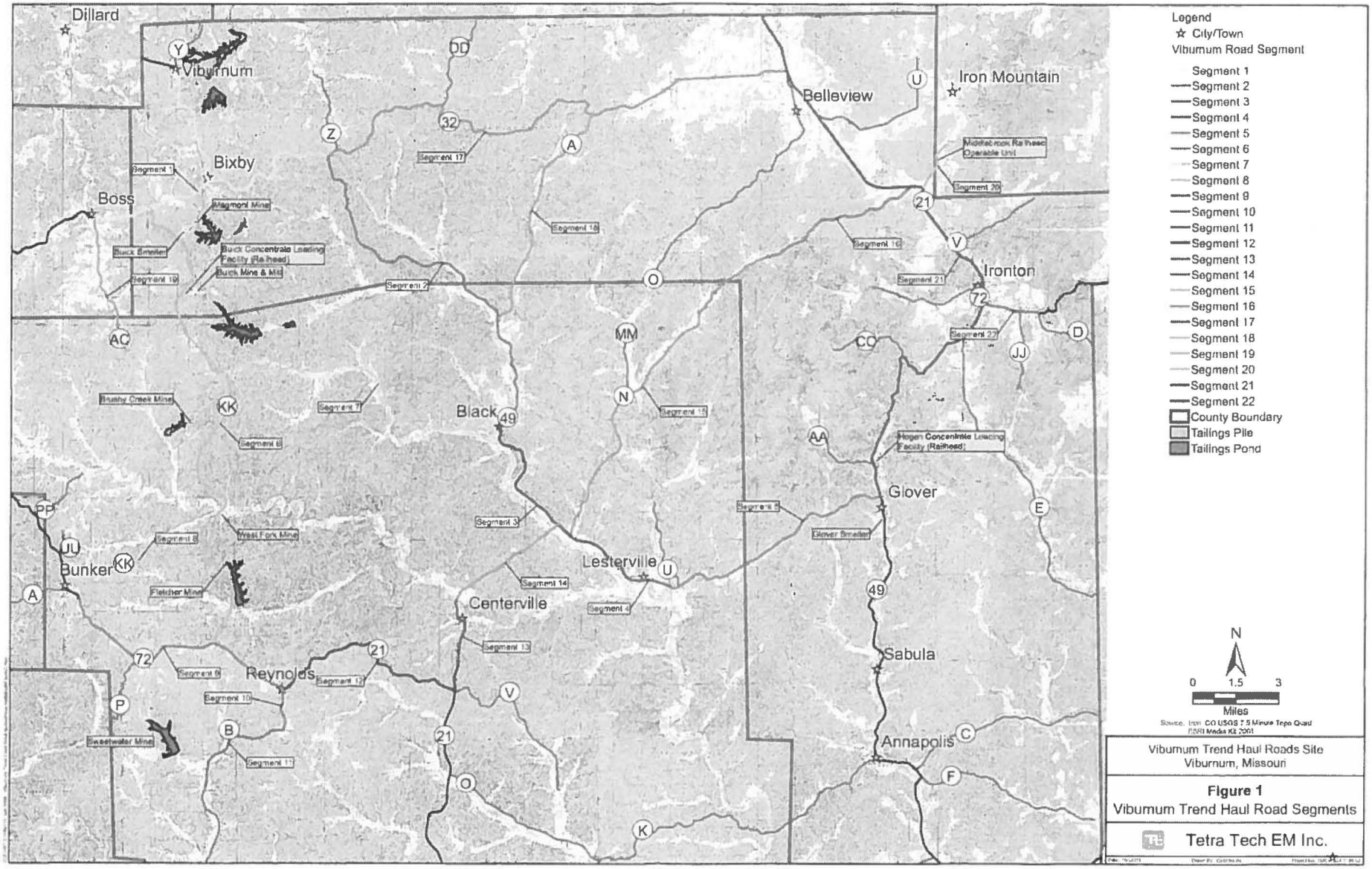
TABLE 5

DETAILED COST ESTIMATE
VTHR SITE - NON-TIME-CRITICAL REMOVAL
ALTERNATIVE 2 - REMOVAL AND DISPOSAL

Item/Description	Quantity	Est. Area per each	Extension	Unit	Unit Cost	Total Cost
DIRECT CAPITAL COSTS						
Excavation & Placement						
Non-Time-Critical Yards						
Yard Quadrants/Areas	147	3,000	441,000	CF	$1.60	$705,600
Driveway	69	1,500	103,500	CF	$1.60	$165,600
Right of Way	4	800	3,200	CF	$1.60	$5,120
Garden	2	1,250	2,500	CF	$1.60	$4,000
Play Area	1	625	625	CF	$1.60	$1,000
Hauling						
Excavated Soils - assumes staging area at the Old Viburnum tailings facility						
Old Viburnum tailings facility (Doe Run Viburnum Lead Tailings Pile)	20,401	CY	20,401	CY	$106.25	$2,167,598
Clean Backfill	20,401	CY	20,401	CY	$133.00	$2,713,323
HazWaste Testing (TCLP)	157	Sample	157	Sample	$80.00	$12,560
Disposal Options						
a Old Viburnum tailings facility Only						
Non-Hazardous (no additional cost)						
Hazardous - Phosphate Treatment (Soils > 5 mg/L TCLP) at Old Viburnum tailings facility						
MAP	510	CY	1,428	lb	$0.28	$400
KCL	510	CY	321	lb	$0.15	$48
b Old Viburnum tailings facility/Subtitle C Landfill						
Non-Hazardous (no additional cost)						
Hazardous - Offsite Disposal						
Subtitle C Landfill (Peoria IL)	510	CY	510	CY	$1,145.50	$584,232
c Subtitle D/Subtitle C Landfill						
Non-Hazardous - Offsite Disposal						
Subtitle D Landfill (Butler County, MO)	19,891	CY	19,891	CY	$395.00	$7,856,907
Hazardous - Offsite Disposal						
Subtitle C Landfill (Peoria IL)	510	CY	510	CY	$1,145.50	$584,232
Lawn Watering	119	Yards	59	Hr	$70.35	$4,151
Indoor Dust Cleaning	18	1,500	27,000	SF	$1.68	$45,360
Education Materials	1	-	1	Each	$0.0	$0
SUBTOTAL DIRECT CAPITAL COSTS - Disposal Option 2a						$5,824,780
SUBTOTAL DIRECT CAPITAL COSTS - Disposal Option 2b						$8,408,544
SUBTOTAL DIRECT CAPITAL COSTS - Disposal Option 2c						$14,265,450
INDIRECT CAPITAL COSTS						
2a Old Viburnum tailings facility Only						
Mob/Demob					10%	$582,478
Engineering/Administration Costs					10%	$582,478
Construction Management Costs					8%	$465,981
Health & Safety					3%	$174,743
2b Old Viburnum tailings facility/Subtitle C Landfill						
Mob/Demob					10%	$840,854
Engineering/Administration Costs					10%	$840,854
Construction Management Costs					6%	$512,683
Health & Safety					3%	$192,256
2c Subtitle D/Subtitle C Landfill						
Mob/Demob					10%	$1,426,545
Engineering/Administration Costs					10%	$1,426,545
Construction Management Costs					8%	$1,141,236
Health & Safety					3%	$427,964
SUBTOTAL INDIRECT CAPITAL COSTS - Disposal Option 2a						$1,805,676
SUBTOTAL INDIRECT CAPITAL COSTS - Disposal Option 2b						$2,596,648
SUBTOTAL INDIRECT CAPITAL COSTS - Disposal Option 2c						$4,046,724
Scope and Bid Contingencies						
2a Old Viburnum tailings facility Only					31%	$2,363,435
2b Old Viburnum tailings facility/Subtitle C Landfill					31%	$2,802,510
2c Subtitle D/Subtitle C Landfill					31%	$4,626,914
TOTAL ESTIMATED CAPITAL COST - Disposal Option 2a						$9,995,871
TOTAL ESTIMATED CAPITAL COST - Disposal Option 2b						$10,997,702
TOTAL ESTIMATED CAPITAL COST - Disposal Option 2c						$19,527,088
PERIODIC COSTS - FIVE YEAR REVIEWS						
None - No Hazardous Materials remain in residential yards or child high use area						
SUBTOTAL FIVE YEAR REVIEW COSTS						$0
Five Year Review Contingency					10%	
TOTAL FIVE YEAR REVIEW COSTS						$0
TOTAL PRESENT WORTH (7% rate of return, 1 year period)					2a 2b 2c	$9,669,000 $10,638,000 $18,888,000

NOTES:
Details of cost assumptions are provided in Appendix A.
Total Present Worth calculation presented in Table A-1

FIGURE


Dillard
Viburnum
Bixby
Boss
Belleview
Iron Mountain
Ironton
Glover
Sabula
Annapolis
Lesterville
Centerville
Reynolds
Bunker
Black
Legend
City/Town
Viburnum Road Segment
Segment 1
Segment 2
Segment 3
Segment 4
Segment 5
Segment 6
Segment 7
Segment 8
Segment 9
Segment 10
Segment 11
Segment 12
Segment 13
Segment 14
Segment 15
Segment 16
Segment 17
Segment 18
Segment 19
Segment 20
Segment 21
Segment 22
County Boundary
Tailings Pile
Tailings Pond
N
0
1.5
3
Miles
Viburnum Trend Haul Roads Site
Viburnum, Missouri
Figure 1
Viburnum Trend Haul Road Segments
Tetra Tech EM Inc.

Appendix A

Basis of Cost Estimates

Appendix A
Basis of Cost Estimates

Detailed cost estimates for the action alternative are provided in Table 5. Alternative 1 (No Action) is the baseline for the cost estimates for the other alternatives and is assumed to have no associated cost. These detailed estimates present the quantities made in establishing the scope of work (areas, volumes, etc.) and the calculations from which the estimated costs were derived. The unit costs shown for each work item reflect an assessment of the labor, materials and equipment required for each identified item and include allowances for appurtenant and incidental work as well as contractor overhead and profit. Unit cost rates and assumptions are discussed below. These costs have been developed such that the accuracy of the estimates is anticipated to fall within the acceptable range for typical feasibility study/EECA evaluations of +50% to -30%, in accordance with USEPA guidance ("A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" OSWER 9355.0-75).

Direct Capital Costs

The basis and assumption for direct costs for each major task as it relates to the alternatives evaluated under the Non-Time-Critical Removal Action are broken down in the following sections.

General

Number of residences included in Non-Time-Critical Removal Action was set at 157 based on information provided by LFI. LFI received most of this information from USEPA in 2005. There was some ambiguity related to several properties as to whether these should be included or not; however, for estimating purposes the residences on this list were used. The estimated areas used for each excavation feature were developed based on information provided by LFI during the Time-Critical Removal Action and professional judgment. Values for yard quadrants and driveways were provided by LFI. Play areas and gardens were estimated to be 25' x 25' while the ROW was estimated to be 10' x 80'. The actual number of these areas was small relative to the yard quadrants and driveways (which compromised the greatest aerial extent) so the sensitivity should be small. The actual quantities used were obtained from the RSE database (prepared by TTEMI) and the RSE report (TTEMI 2005) and information provided by LFI.

Soil Removal and Placement

For the purposes of costing all removals were conservatively estimated to be one foot deep, which is the basis for the Non-Time-Critical Removal Action. Based on

information obtained from the Time-Critical Removal Action, most contamination was found to drop below 400 ppm within six inches with only a few areas requiring excavation greater than 12" depth. Consequently, the use of one foot is conservative and likely biased high. Gardens were estimated at 24" depth in accordance with the Residential Lead Handbook (USEPA 2003).

Unit costs provided by WRS Compass (2008) and LFI for the Time-Critical Removal Action were applied to the soil excavation and restoration. These unit costs have been assumed to be similar to 2010 costs.

Soil Hauling and Disposal

As part of the RAP, the Doe Run Old Viburnum tailings facility has been approved to accept 100,000 tons of soil generated as part of the Non-Time-Critical Removal Action. This is sufficient to accommodate the expected soils generated as part of the removal action. Soils less than 1,200 ppm lead are anticipated to be non-hazardous by characteristic and meet the requirements for direct placement (Toxicity Characteristic Leaching Procedure [TCLP] test less than 5 mg/L) based on the testing performed by LFI during the Time-Critical Removal Action. Each stockpile of excavated waste will be sampled and tested for TCLP lead prior to final disposal. For the cost estimate it is assumed that each property will generate one stockpile of waste. Analytical cost per sample for the TCLP lead is based on the Accutest Mountain States 2010 price catalog and the assumption that several samples can be shipped and analyzed at the same time.

LFI reports that only 2.5 to 5% of the Time-Critical yard soils were found to be hazardous. As the Non-Time-Critical Removal Action soils are not expected to be greater than 1,200 ppm lead, the assumption that 2.5% of the total excavated waste will be considered hazardous by characteristic and would require special disposal (either phosphate amendment prior to placement in the Old Viburnum tailings facility as required under the RAP or disposal at a Subtitle C landfill) is considered over-conservative. A single phosphate/ potassium chloride treatment was estimated assuming the same ratio as required for in-place amendment of soils or 2.8 lbs/CY MAP and 0.63 lbs/CY KCl based on an assumed average of 2000 ppm lead in these soils. Labor for the mixing and placement of soils on the pile were not included as these were assumed to be performed by Doe Run personnel as part of mine O&M activities.

The distances provided to the nearest Subtitle D landfill (Butler County, MO) and Subtitle C landfill (Peoria, IL) that could accept the soils were approximately 100 miles and 290 miles, respectively. The average distance to the on-site Repository was given as approximately 25 miles by Doe Run which was used as the basis for the estimate. For

the purposes of this estimate, the unit rate for hauling the excavated soils provided by WRSCompass in 2008 for the Time-Critical Removal Action was used. Likewise, for the borrow soils, it was estimated that these would be available locally (within 25 miles of the VTHR Site) and the unit rate provided by WRSCompass in 2008 for the Time-Critical Removal Action was used.

Lawn Watering

For the purposes of this cost evaluation, it was estimated that one watering event would occur following the restoration of the lawn and would take approximately one-half hour per lawn. The unit rate provided by WRSCompass in 2008 as part of the Time-Critical Removal Action was used.

Indoor Dust Cleaning

As part of the Non-Time-Critical Removal Action, all residences will be offered indoor dust cleaning. However, as experienced during the Time-Critical Removal Action, only a small number of residents (approximately 12 percent) accepted the cleaning. Consequently, it was assumed for the basis of this cost evaluation that a similar percentage of residents would accept the cleaning under the Non-Time-Critical Removal Action. The area of each residence was estimated at 1500 square feet based on professional judgment and the unit pricing provided by WRSCompass in 2008 for the Time-Critical Removal Action was applied.

Education Materials

For the Known Yards, educational materials have already been distributed and no direct additional cost was assumed for the purposes of this evaluation.

Indirect Capital Costs

Indirect capital costs were developed based on the USEPA Guidance (USEPA, 2000) and professional judgment. For these, recommended factors were applied to the direct capital costs as provided on Table 5.

The RSE presented up to 236 residences within the VTHR Site that were not sampled by USEPA or MDNR due to lack of access (either refusal or inability to contact the owner). During the Time-Critical Removal Action, LFI sampled 77 yards, therefore 159 yards remain unsampled. These remaining 159 yards are believed to be yard sampling refusals and, therefore, sampling costs have not been included in the cost estimate. Due to lack of yard sketches for 20 MDNR sampled properties, the Respondents may

choose to further delineate these yards prior to yard soil removal, but as this is optional, these costs were not included in the cost estimate.

Additionally, as the costs have been developed based (primarily) on the Time-Critical Removal Action, the low end of the recommended contingency for the bidding of ten percent was selected. Therefore, the overall scope and bid contingency was established at 31 percent for the Non-Time-Critical Removal Action.

Ongoing Removal Action Annual Cost Estimates

There are no ongoing costs associated with any of the alternatives – all activities are considered to be part of remedial action.

Periodic Costs

There are no periodic costs associated with any of the alternatives – all activities are considered to be part of remedial action. As specified in USEPA guidance (USEPA, 1988), a 30-year period has been used for costing purposes. The 5-year review cost estimate is not included in Table 5 as no waste will remain at the site with the exception of the Old Viburnum tailings facility, if used. All periodic costs for this facility are managed under the RAP permit.

Operation and Maintenance Costs

There are no Operation and Maintenance costs associated with any of the alternatives – all activities are considered to be part of remedial action.

Present Worth Calculations

Present worth analyses were performed on estimated costs associated with each remedial alternative to provide a common basis for comparison. Present worth analysis calculates a current value, or worth, of all costs incurred in the present or at some future date at an assumed constant rate of return, or discount rate. The present worth calculated represents an amount, which if invested in 2010 at a certain rate of return would yield the appropriate dollar amount to meet the required expenditures over the construction and 30-year remedial action periods. The exact duration of initial implementation and corresponding capital costs will be dependent on the results of the remedial design phase. At that time the most appropriate implementation scenario can be developed. However, the assumed durations are reasonable and allow for an objective, relative comparison of the alternatives. Capital costs have been spread

equally over two years. Present worth calculations are presented in Table A-1 for Alternative 2.

Because total remedial action costs could be especially sensitive to the prevailing rate of return used in the present worth analyses, rates of return of 3%, 7%, and 10% were used to prepare present worth estimates for each alternative. The capital costs spread out over the anticipated implementation period of two years were also discounted to constant 2010 dollars using rates of return of 3%, 7%, and 10%. As recommended in the USEPA Guidance (USEPA 2000), only the present worth calculated at an assumed 7% rate of return has been presented in the text and used in the comparison of costs. The present worth analyses performed in this report are considered before-tax analyses and do not consider future escalation of costs.

Cited References

Tetra Tech EM Inc. (TTEMI), 2005. *Removal Site Evaluation Report, Viburnum Trend Lead Site – Viburnum Missouri.* Prepared for USEPA Region 7, START 2 Contract No. 68-S7-01-41, Task Order No. 0188, July 27, 2005.

United States Environmental Protection Agency (USEPA), 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final.* EPA/540/G-89/004, OSWER Directive 9355.3-01. October 1998.

USEPA, 2000. *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study.* OSWER 9355.0-75. EPA/540/R-00/002. July 2000.

USEPA, 2003. *Superfund Lead-Contaminated Residential Sites Handbook. Prepared by the Environmental Protection Agency Lead Sites Workgroup (LSW),* OSWER 9285.7-50, August 2003.

WRSCompass, 2008. Letter to J.M. Schultz regarding Request for Pricing Adjustment, Viburnum Trend Haul Roads Site. June 17, 2008.

TABLE A-1

PRESENT WORTH ANALYSIS
VTHR NON-TIME-CRITICAL REMOVAL
ALTERNATIVE 2 - REMOVAL AND DISPOSAL

Year	Capital Costs	Ongoing Costs	Total Annual Expenditure	Rate of Return = 3% Discount Factor	Rate of Return = 3% Present Worth	Rate of Return = 7% Discount Factor	Rate of Return = 7% Present Worth	Rate of Return = 10% Discount Factor	Rate of Return = 10% Present Worth
Disposal Option 2a		Old Viburnum tailings facility Only							
0	$4,997,936	$0	$4,997,936	1.0000	$4,997,936	1.0000	$4,997,936	1.0000	$4,997,936
1	$4,997,936	$0	$4,997,936	0.9709	$4,852,365	0.9346	$4,670,968	0.9091	$4,543,578
2		$0	$0	0.9426	$0	0.8734	$0	0.8264	$0
3		$0	$0	0.9151	$0	0.8163	$0	0.7513	$0
4		$0	$0	0.8885	$0	0.7629	$0	0.6830	$0
5		$0	$0	0.8626	$0	0.7130	$0	0.6209	$0
6		$0	$0	0.8375	$0	0.6663	$0	0.5645	$0
7		$0	$0	0.8131	$0	0.6227	$0	0.5132	$0
8		$0	$0	0.7894	$0	0.5820	$0	0.4665	$0
9		$0	$0	0.7664	$0	0.5439	$0	0.4241	$0
10		$0	$0	0.7441	$0	0.5083	$0	0.3855	$0
11		$0	$0	0.7224	$0	0.4751	$0	0.3505	$0
12		$0	$0	0.7014	$0	0.4440	$0	0.3186	$0
13		$0	$0	0.6810	$0	0.4150	$0	0.2897	$0
14		$0	$0	0.6611	$0	0.3878	$0	0.2633	$0
15		$0	$0	0.6419	$0	0.3624	$0	0.2394	$0
16		$0	$0	0.6232	$0	0.3387	$0	0.2176	$0
17		$0	$0	0.6050	$0	0.3166	$0	0.1978	$0
18		$0	$0	0.5874	$0	0.2959	$0	0.1799	$0
19		$0	$0	0.5703	$0	0.2765	$0	0.1635	$0
20		$0	$0	0.5537	$0	0.2584	$0	0.1486	$0
21		$0	$0	0.5375	$0	0.2415	$0	0.1351	$0
22		$0	$0	0.5219	$0	0.2257	$0	0.1228	$0
23		$0	$0	0.5067	$0	0.2109	$0	0.1117	$0
24		$0	$0	0.4919	$0	0.1971	$0	0.1015	$0
25		$0	$0	0.4776	$0	0.1842	$0	0.0923	$0
26		$0	$0	0.4637	$0	0.1722	$0	0.0839	$0
27		$0	$0	0.4502	$0	0.1609	$0	0.0763	$0
28		$0	$0	0.4371	$0	0.1504	$0	0.0693	$0
29		$0	$0	0.4243	$0	0.1406	$0	0.0630	$0
30		$0	$0	0.4120	$0	0.1314	$0	0.0573	$0
TOTAL PRESENT WORTH				@ 3% $9,850,000		@ 7% $9,669,000		@ 10% $9,542,000	
Disposal Option 2b		Old Viburnum tailings facility/Subtitle C Landfill							
0	$5,498,851	$0	$5,498,851	1.0000	$5,498,851	1.0000	$5,498,851	1.0000	$5,498,851
1	$5,498,851	$0	$5,498,851	0.9709	$5,338,690	0.9346	$5,139,113	0.9091	$4,998,955
2		$0	$0	0.9426	$0	0.8734	$0	0.8264	$0
3		$0	$0	0.9151	$0	0.8163	$0	0.7513	$0
4		$0	$0	0.8885	$0	0.7629	$0	0.6830	$0
5		$0	$0	0.8626	$0	0.7130	$0	0.6209	$0
6		$0	$0	0.8375	$0	0.6663	$0	0.5645	$0
7		$0	$0	0.8131	$0	0.6227	$0	0.5132	$0
8		$0	$0	0.7894	$0	0.5820	$0	0.4665	$0
9		$0	$0	0.7664	$0	0.5439	$0	0.4241	$0
10		$0	$0	0.7441	$0	0.5083	$0	0.3855	$0
11		$0	$0	0.7224	$0	0.4751	$0	0.3505	$0
12		$0	$0	0.7014	$0	0.4440	$0	0.3186	$0
13		$0	$0	0.6810	$0	0.4150	$0	0.2897	$0
14		$0	$0	0.6611	$0	0.3878	$0	0.2633	$0
15		$0	$0	0.6419	$0	0.3624	$0	0.2394	$0
16		$0	$0	0.6232	$0	0.3387	$0	0.2176	$0
17		$0	$0	0.6050	$0	0.3166	$0	0.1978	$0
18		$0	$0	0.5874	$0	0.2959	$0	0.1799	$0
19		$0	$0	0.5703	$0	0.2765	$0	0.1635	$0
20		$0	$0	0.5537	$0	0.2584	$0	0.1486	$0
21		$0	$0	0.5375	$0	0.2415	$0	0.1351	$0
22		$0	$0	0.5219	$0	0.2257	$0	0.1228	$0
23		$0	$0	0.5067	$0	0.2109	$0	0.1117	$0
24		$0	$0	0.4919	$0	0.1971	$0	0.1015	$0
25		$0	$0	0.4776	$0	0.1842	$0	0.0923	$0
26		$0	$0	0.4637	$0	0.1722	$0	0.0839	$0
27		$0	$0	0.4502	$0	0.1609	$0	0.0763	$0
28		$0	$0	0.4371	$0	0.1504	$0	0.0693	$0
29		$0	$0	0.4243	$0	0.1406	$0	0.0630	$0
30		$0	$0	0.4120	$0	0.1314	$0	0.0573	$0
TOTAL PRESENT WORTH				@ 3% $10,838,000		@ 7% $10,638,000		@ 10% $10,498,000	

TABLE A-1

PRESENT WORTH ANALYSIS
VTHR NON-TIME-CRITICAL REMOVAL
ALTERNATIVE 2 - REMOVAL AND DISPOSAL

Year	Capital Costs	Ongoing Costs	Total Annual Expenditure	Rate of Return = 3% Discount Factor	Rate of Return = 3% Present Worth	Rate of Return = 7% Discount Factor	Rate of Return = 7% Present Worth	Rate of Return = 10% Discount Factor	Rate of Return = 10% Present Worth
Disposal Option 2c		Subtitle D/Subtitle C Landfill							
0	$9,763,544	$0	$9,763,544	1.0000	$9,763,544	1.0000	$9,763,544	1.0000	$9,763,544
1	$9,763,544	$0	$9,763,544	0.9709	$9,479,169	0.9346	$9,124,807	0.9091	$8,875,949
2		$0	$0	0.9426	$0	0.8734	$0	0.8264	$0
3		$0	$0	0.9151	$0	0.8163	$0	0.7513	$0
4		$0	$0	0.8885	$0	0.7629	$0	0.6830	$0
5		$0	$0	0.8626	$0	0.7130	$0	0.6209	$0
6		$0	$0	0.8375	$0	0.6663	$0	0.5645	$0
7		$0	$0	0.8131	$0	0.6227	$0	0.5132	$0
8		$0	$0	0.7894	$0	0.5820	$0	0.4665	$0
9		$0	$0	0.7664	$0	0.5439	$0	0.4241	$0
10		$0	$0	0.7441	$0	0.5083	$0	0.3855	$0
11		$0	$0	0.7224	$0	0.4751	$0	0.3505	$0
12		$0	$0	0.7014	$0	0.4440	$0	0.3186	$0
13		$0	$0	0.6810	$0	0.4150	$0	0.2897	$0
14		$0	$0	0.6611	$0	0.3878	$0	0.2633	$0
15		$0	$0	0.6419	$0	0.3624	$0	0.2394	$0
16		$0	$0	0.6232	$0	0.3387	$0	0.2176	$0
17		$0	$0	0.6050	$0	0.3166	$0	0.1978	$0
18		$0	$0	0.5874	$0	0.2959	$0	0.1799	$0
19		$0	$0	0.5703	$0	0.2765	$0	0.1635	$0
20		$0	$0	0.5537	$0	0.2584	$0	0.1486	$0
21		$0	$0	0.5375	$0	0.2415	$0	0.1351	$0
22		$0	$0	0.5219	$0	0.2257	$0	0.1228	$0
23		$0	$0	0.5067	$0	0.2109	$0	0.1117	$0
24		$0	$0	0.4919	$0	0.1971	$0	0.1015	$0
25		$0	$0	0.4776	$0	0.1842	$0	0.0923	$0
26		$0	$0	0.4637	$0	0.1722	$0	0.0839	$0
27		$0	$0	0.4502	$0	0.1609	$0	0.0763	$0
28		$0	$0	0.4371	$0	0.1504	$0	0.0693	$0
29		$0	$0	0.4243	$0	0.1406	$0	0.0630	$0
30		$0	$0	0.4120	$0	0.1314	$0	0.0573	$0
TOTAL PRESENT WORTH				@ 3% $19,243,000		@ 7% $18,888,000		@ 10% $18,639,000	

RESPONSIVENESS SUMMARY

ENGINEERING EVALUATION/COST ANALYSIS

VIBURNUM TREND LEAD HAUL ROADS SITE

The National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP), 40 CFR §300 et seq., establishes procedures for evaluation of potential response actions at sites contaminated with hazard substances. 40 CFR §300.415(b)(4) requires that, in instances where a planning period of at least six months exists, and Engineering Evaluation/Cost Analysis (EE/CA) shall be prepared that develops and evaluates potential response alternatives to address site contaminants. The EE/CA process involves providing an opportunity for public comment on alternatives under consideration. This document presents United States Environmental Protection Agency's (EPA) responses to public comments received concerning the April 2010 draft EE/CA for the Viburnum Trend Lead Haul Roads Site (the Site).

Upon consideration of conditions at the Site, EPA determined that preparation of an EE/CA was warranted since at least six months planning time was available. An agreement was reached between EPA and the identified Potentially Responsible Parties (PRPs) for the Site at that time. The PRPs agreed to take a lead role in the preparation of the EE/CA.

The PRPs submitted the draft EE/CA to EPA in April 2010. A public comment period was announced, commencing March 7, 2012, and ending April 7, 2012. A public meeting was held on March 27, 2012, at the Fire Department Training Building in Viburnum to present the findings of the draft EE/CA and to receive comments from the community in attendance. A transcript of this public meeting was prepared to enable EPA to better respond to individual comments received from the community at the meeting. There were approximately 15 individuals who attended the public meeting.

The EPA did not receive any comments from the public meeting regarding the alternatives presented in the EE/CA. During the comment period, EPA received written comments on the draft EE/CA from the Missouri Department of Natural Resources (MDNR).

Copies of the individual comments received by EPA concerning the EE/CA are available for public review in the Administrative Record located at the Ozark Region Library, 402 N. Main Street, Ironton, Missouri 63650, the Ozark Regional Library Branch, #1 Missouri Avenue, Viburnum, Missouri 65566, or the EPA Regional Office, 901 North 5th Street, Kansas City, Kansas 66101. Questions regarding the EE/CA or document repositories should be directed to Belinda Young, at (913) 551-7463, or toll-free at 1-800-223-0425.

Upon consideration of public comments received, EPA has elected to approve the draft EE/CA and proceed with the decision document, also known as the Action Memorandum, for finalizing EPA's decision to implement the EE/CA.

Response to Comments Received From the Missouri Department of Natural Resources (MDNR)

Comment:

Do the time-critical residential soil removal actions meet the non-time-critical removal action objectives, or will time-critical properties have to be revisited as part of the non-time-critical removal action? Specifically, will any properties cleaned up during the time-critical removal action require additional cleanup during the non-time-critical removal action to meet the non-time-critical objectives? Will residential soils between 400 ppm and 1,200 ppm lead identified during the time-critical removal action be cleaned up during the non-time critical removal action? These questions are not specifically addressed in the EE/CA.

Response:

Properties which were addressed during the time-critical removal action were cleaned up to levels that would also meet the non-time-critical objectives. Properties that were addressed during the time-critical removal action will not have to be revisited as part of the non-time-critical removal action. Properties that were identified during the time-critical action with soils above 400 ppm will be subject to the non-time-critical removal action.

Comment:

The EE/CA does not specify how far laterally from residential structures contaminated soils will be excavated. The EE/CA also does not specifically describe any special procedures for play areas, gardens, driveways, and any other yard areas that may require special consideration. The EE/CA does not include EPA's "Superfund Lead-Contaminated Residential Sites Handbook" as a reference for the non-time-critical removal action.

Response:

EPA's "Superfund Lead-Contaminated Residential Sites Handbook" will be referenced in the Administrative Order on Consent, under the Statement of Work Attachment. The "Superfund Lead-Contaminated Residential Sites Handbook" addresses yard areas that may require special considerations. Also, as part of the Statement of Work, sampling and excavation will be conducted up to one hundred (100) feet from a residence.

Comment:

The recommended removal action alternative in the EE/CA appears to include provisions to offer indoor cleaning to remove contaminated dust from homes that have yard soil cleanups. However, the EE/CA does not include any data from indoor dust sampling and does not describe specific criteria for the indoor cleanings. Also, the EE/CA does not appear to include providing HEPA vacuum cleaners as part of the recommended removal action alternative.

Response:

Currently, no indoor data has been collected for residences that will be part of this removal action. As an alternative to indoor cleanings, EPA is considering providing HEPA vacuums to residences. EPA will take residential soil contamination levels into consideration when determining which residences should be considered for HEPA vacuums. Residences with soil lead concentrations above 1200 parts per million will be considered. Provisions for HEPA vacuums are discussed in the Administrative Order on Consent, as part of the Statement of Work Attachment.

Comment:

The EE/CA indicates that health education materials will be provided in conjunction with soil removal actions conducted as part of the recommended removal action alternative. However, the EE/CA does not include copies of health education materials to be distributed. Has the Agency for Toxic Substances and Disease Registry (ATSDR) and/or the Missouri Department of Health and Senior Services reviewed and commented on the health education materials?

Response:

The health education materials to be distributed are ATSDR fact sheets pertaining to lead. These materials were reviewed by the Missouri Department of Health and Senior Services. These materials will be made available for review at the following locations in Ironton and Viburnum Missouri:

Ozark Regional Library
402 N. Main Street
Ironton, Missouri 63650
Contact: Connie Reed
(573) 546-2615

Ozark Regional Library Branch
#1 Missouri Avenue
Viburnum, Missouri 65566
Contact: Kathy Snider
(573) 244-5986

Comment:

The EE/CA indicates no operation and maintenance (O&M) or institutional controls (ICs) are needed for this action, and these do not appear to be included in the recommended removal action. However, it would appear that O&M/post-removal site control (PRSC) and appropriate ICs will need to be implemented at the Viburnum tailings facility soil repository to assure long-term integrity of the removal action and to assure the repository property is not used in the future for purposes that are unprotective or which threaten the integrity of the action. Contaminated soils from the residential soil removal action will be placed in perpetuity in the Viburnum tailings facility soil repository, and thus will require maintenance to assure the integrity of the removal action by assuring there are no releases from the repository. If there are releases of soil from the removal actions, contamination may be transferred to different locations and

may cause additional risks. Therefore, O&M/PRSC, monitoring, and ICs should be addressed for the soil repository. An Environmental Covenant under Missouri Environmental Covenants Act, including appropriate property activity and use limitations, should be considered for the Viburnum tailings soil repository in conjunction with any O&M/PRSC conducted, as part of the removal actions and/or the Remedial Action Permit (RAP) and/or Missouri Metallic Minerals Waste Management Act permit and closure plan for the Viburnum tailings facility.

The EE/CA does not describe use of a witness barrier (construction fence, etc.) in yard soil excavations, or maintenance of any kind of database of residential cleanups in lieu of proprietary ICs.

Response:

Operation & Maintenance, Institutional Controls, and/or Post Removal Site Controls pertaining to the Viburnum tailings facility soil repository will not be addressed in this removal action. The Viburnum Tailings Facility is an active facility that is permitted by MDNR under the Missouri Metallic Minerals Waste Management Act, Permit MM-008 and EPA Remedial Action Permit EPA ID: MOD 000 823 252. Any Operation & Maintenance, Institutional Controls or Post Removal Site Controls will be addressed under the facility's permits. Post Removal Site Controls (PRSCs) for residences are discussed in the Administrative Order on Consent, as part of the Statement of Work Attachment. PRSCs at residences can consist of measures ranging from agreements with property owners restricting activities at the property, such as installing underground pools or planting trees, to placing deed notifications on the property to inform future residents of potential contamination. The EPA is working with the PRP's and MDNR in considering a PRSC that would consist of documentation to alert homeowners or future homeowners of potential contaminated soil at depth that may remain on site after removal actions were completed.

Comment:

The EE/CA does not appear to identify the area of clean backfill soil to be used for the residential soil removal actions. The EE/CA does not describe any sampling and analyses to be conducted to demonstrate backfill soil is clean, and what the clean lead and other metal levels are. The EE/CA does not describe any provisions for restoration of clean soil borrow areas.

Response:

Before replacement of clean soils into excavated areas, backfill areas will be required to be sampled and tested to meet standards approved by EPA. These standards include acceptable lead concentrations and nutrient levels to sustain plant life. Backfill sampling, analyses, and other considerations are outlined in the Administrative Order on Consent, as part of the Statement of Work Attachment and will be addressed further in the Removal Action Work Plan.