

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII

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KANSAS CITY, KANSAS 66101

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ENVIRONMENTAL PROTECTION  
AGENCY REGION VII  
REGIONAL HEARING CLERK

IN THE MATTER OF:

FEDERAL TAILINGS PILE SITE )  
St. Francois County, Missouri ) Docket No. CERCLA-07-2009-0012  
)  
THE DOE RUN RESOURCES CORPORATION ) ADMINISTRATIVE SETTLEMENT  
and ) AGREEMENT AND ORDER ON  
STATE OF MISSOURI DEPARTMENT OF ) CONSENT FOR REMOVAL ACTION  
NATURAL RESOURCES, DIVISION OF )  
STATE PARKS )  
)  
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, 9607(a) and 9622. )  
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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) and The Doe Run Resources Corporation, and the State of Missouri Department of Natural Resources, Division of State Parks, (Respondents). This Settlement Agreement provides for the performance of a removal action by Respondents and the reimbursement of certain response costs incurred by the United States at or in connection with the Federal Tailings Pile Site (the Site) generally located within St. Joe State Park, in St. Francois County, Missouri.

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).

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

4. EPA and Respondents 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 facts, conclusions of law, and determinations in Sections IV and V of this Settlement Agreement. 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**

5. This Settlement Agreement applies to and is binding upon EPA and upon Respondents and their successors and assigns. 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.

6. 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 implement the requirements of this Settlement Agreement, the remaining Respondent shall complete all such requirements.

7. 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

8. 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. "Action Memorandum" shall mean the EPA Action Memorandum relating to the Site signed on September 11, 2009, by the Regional Administrator, EPA Region VII, or his delegate, and all attachments thereto. The Action Memorandum is attached as Appendix A.

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

c. "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.

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

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

f. "Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs subsequent to December 1, 2010, 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, the costs incurred pursuant to Paragraph 51 (costs and attorneys fees and any monies paid to secure access, including the amount of just compensation), and Paragraph 61 (emergency response), and Paragraph 87(work takeover).

g. "Interest" shall mean interest at the rate specified for interest on investments of the 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.

h. "Past Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States paid at or in connection with the Site through November 30, 2010.

i. “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.

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

k. “Paragraph” shall mean a portion of this Settlement Agreement identified by an Arabic numeral.

l. “Parties” shall mean EPA and Respondents.

m. “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).

n. “Section” shall mean a portion of this Settlement Agreement identified by a Roman numeral.

o. “Site” shall mean the Federal Tailings Pile Superfund Site, encompassing approximately 1,240 acres, located within St. Joe State Park/Missouri Mines State Historic Site, St. Francois County, Missouri, and depicted generally on the map attached as Attachment 2 to Appendix A (Action Memorandum).

p. “Statement of Work” or “SOW” shall mean the statement of work for implementation of the removal action, as set forth in Appendix B to this Settlement Agreement, and any modifications made thereto in accordance with this Settlement Agreement.

q. “Waste Material” shall mean 1) any “hazardous substance” under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); 2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); 3) any “solid waste” under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and 4) any “hazardous material” under Section 1004(5) of RCRA, 42 U.S.C. § 6903(5).

r. “Work” shall mean all activities Respondents are required to perform under this Settlement Agreement.

#### **IV. FINDINGS OF FACT**

9. The Site is located near the City of Park Hills in St. Francois County, Missouri. The Site is located in the area known as the Old Lead Belt. The Old Lead Belt is located in St. Francois County and covers approximately 110 square miles. The Site is located on the eastern

edge of the Ozark Highlands in St. Francois County. The Site is situated in St. Joe State Park in the southeast quarter of the intersection of Missouri Routes 32 and 67. The Site covers approximately 1,240 acres and consists mainly of mine tailings to 115 feet deep.

10. The principal feature of the Site is a 1,240-acre tailings pond created behind two 130-foot high dams resulting from the lead mine and mill operations of the St. Joe Mineral Corporation (formerly St. Joe Lead Company). St. Joe Lead operated a series of mines and mills in the district from 1900 to 1972.

11. From approximately 1903 to 1923, Federal Lead Co., owned and operated lead mining and milling operations at the Site. From approximately 1923 to 1972, St. Joe Minerals Corporation, or related corporations, conducted lead mining and milling operations in the vicinity of the Site. During this time period, St. Joe Minerals Corporation owned all of the property where the tailings are now located and, consistent with the mining and milling practices of the time, disposed of mining and milling wastes at the Site by pumping mine and mill tailings across the Site. St. Joe Minerals Corporation changed its name to The Doe Run Resources Corporation in April 1994.

12. St. Joe State Park is managed by the Missouri Department of Natural Resources (MDNR), Division of State Parks.

13. In 1976, the St. Joe Minerals Corporation donated 8,561 acres to the State of Missouri. The State of Missouri developed the area into a state park, known as "St. Joe State Park" (the Park). The 1,240-acre tailings pond is currently operated by the State of Missouri as an Off-Road Vehicle (ORV) Recreation Area within St. Joe State Park.

14. Investigations by EPA, the MDNR, the University of Missouri (MU), and The Doe Run Resources Corporation (Doe Run) have revealed significant lead levels in tailings on the Site (including within the Park) and in soils adjacent to the Site. In addition, lead has been found in sediment, surface water, and aquatic life adjacent to the Site in the Shaw Branch of Flat River, a tributary of Big River.

15. Past sampling and analysis by MDNR has revealed elevated lead levels in both sediments and in aqueous samples taken from the Shaw Branch and the Flat River downstream of the Site. Specifically, in early 1994, MDNR found lead levels up to 1,300 parts per million (ppm) in sediment samples and 290 parts per billion (ppb) in aqueous samples from the Shaw Branch, and up to 24,700 ppm in sediment samples and 69 ppb in aqueous samples from the Flat River. The Shaw Branch receives runoff discharges from the tailings pile, seepage from the dam, and/or dissolved metal leached from the tailings or leached from the sediments transported from the tailings. The elevated metals levels indicate that migration of contaminants from the Site into the river has occurred.

17. While the mine was operating at the Site, tailings from a “jig” mill were deposited by a conveyor system to form what is now known as the “chat pile” on the northwestern edge of the park. Tailings from the most recent mill, which employed the flotation separation process, were hydraulically placed behind either of the two conjoined dams located in a tributary of the Flat River. The older dam, known as the Original Dam, is a “sidehill” type and the newer dam, known as the Main Dam, is a cross-valley type. The dams are joined to form an “L” shaped structure. The crest height of the Main Dam is approximately 135 feet from the original stream bed. The dams are constructed of tailings material with a veneer of shot rock. Decant structures were incorporated to act as a drain for excess surface water runoff and to return processed water to the mill. Due to characteristics of the tailings and slimes behind the dams, the materials do not easily drain and are saturated at various levels. The impounded tailings extend roughly southward from the dam up the tributary approximately two miles. The tailings act as dams for tributary branches, thus forming several lakes in the upper watershed. MDNR, Division of State Parks, voluntarily stabilized the dam structures in 1996 as an emergency response to the threat that the structures could fail.

18. The primary contaminants of concern at this Site are lead and lead compounds. The lead at the Site is a result of 70 years of stockpiling of mine wastes. The exact waste volume has not been determined, but millions of tons of partially saturated mine waste are impounded behind the dams.

19. Samples from the Site collected as a part of the sample collection and analysis during the Site Inspection (SI), ranged from less than 1,000 ppm to as much as 20,000 ppm lead.

20. Transport of lead-bearing tailings material from the Site has and can occur because of wind erosion, sediment transport, catastrophic dam failures, and leaching.

21. The Site is within the boundary of the Big River Mine Tailings Site which is currently on the National Priorities List. The Big River Mine Tailings Site contains seven (7) large mine waste piles: Bonne Terre, Desloge, Doe Run, Elvins, Federal, Leadwood, and National. These mine waste piles are being addressed as Non-Time Critical Removal Actions. The residual waste will be addressed in the Final Record of Decision for the Big River Mine Tailings Site.

22. The 8,238 acre Park is used for a variety of recreational activities, including off-road vehicle (ORV) use, camping, picnicking, hiking, horseback riding, swimming, and fishing.

23. Of the approximately 2,000 acres that are designated as ORV riding area, about 800 acres are sand flats or tailings and the remainder are wooded hillsides. Large numbers of visitors from the State of Missouri and other states are attracted to the ORV riding areas. In 2003, about 800,000 persons visited the Park. During 2003, 52,053 daily permits were issued to recreational vehicles, and 61 % of park visitors who were surveyed stated that they rode ORVs.

24. In September of 1997, EPA and Doe Run, Asarco Incorporated (Asarco), and MDNR voluntarily entered into an Administrative Order on Consent (September 1997 Order) concerning the Site in St. Francois, Missouri. The September 1997 Order required the performance of removal response activities and the reimbursement of response costs for the portion of the Federal Tailings Pile Site located in St. Joe State Park.

25. The September 1997 Order, required Respondents to perform a Risk Assessment and Engineering Evaluation and Cost Analysis (EE/CA) to assess conditions at the Site that may present a threat to public health, welfare, or the environment, and to evaluate alternative additional response actions for the Site.

26. In 2008, MDNR and EPA sampled the ORV tailings area at the surface (0-1" depth) and sub-surface (approximately 30-40cm depth). Over 300 surface samples and 80 sub-surface samples were collected. Results showed that lead concentrations ranged from 96 to 1,014 mg/kg. MDNR and EPA characterized the ORV tailings area by sampling every 100 meters per trail.

27. In July of 2008, EPA, Doe Run and MDNR voluntarily modified the September 1997 Order and filed a First Amendment to the September 1997 Order to incorporate a Removal Action at Monsanto Beach and Pim Beach.

28. Although Asarco was a party to the September 1997 Order, Asarco was under bankruptcy protection in the United States Bankruptcy Court for the Southern District of Texas and did not participate in the First Amendment.

29. On May 12, 2008, the United States Bankruptcy Court for the Southern District of Texas issued an Order approving a settlement agreement between the United States on behalf of EPA and ASARCO LLC that resolved ASARCO LLC's liability for the Site.

30. On April 16, 2009, EPA released an EE/CA that described the conditions at the Site and evaluated removal action alternatives.

31. On September 11, 2009, EPA issued an Action Memorandum that determines that a removal action was necessary to address the threat to the public health and the environment posed by the mine waste at the Site. The Action Memorandum is attached as Appendix A.

32. Lead is a metal and has been listed as a hazardous waste (D008) in the regulations for the Resource Conservation and Recovery Act (RCRA). Lead is classified by the EPA as a probable human carcinogen and is a cumulative toxicant. Lead poisoning causes decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, digestive symptoms (particularly constipation), abdominal cramping, nausea, vomiting, and decreased appetite. With increased exposure, symptoms include anemia, pallor, a "lead line" on the gums, and decreased hand grip strength. Alcohol and physical exertion may exacerbate these symptoms. The radial nerve is affected most severely causing weakness in the hands and wrists.



Central nervous system effects include severe headaches, convulsions, coma, delirium, and possibly death. The kidneys can also be damaged after long periods of exposure to lead, with loss of kidney function and progressive azotemia. Reproductive effects in women include decreased fertility, increased rates of miscarriage and stillbirth, decreased birth weight, premature rupture of membrane, and/or pre-term delivery. Reproductive effects in men include erectile dysfunction, decreased sperm count, abnormal sperm shape and size, and reduced semen volume. Lead exposure is associated with increases in blood pressure and left ventricular hypertrophy. A significant amount of lead that enters the body is stored in the bone for many years and can be considered an irreversible health effect.

33. In May 1997, the Missouri Department of Health and Senior Services (MDHSS) released a draft Lead Exposure study of children in the Old Lead Belt of St. Francois County. The MDHSS study, funded by the ATSDR, EPA, and Doe Run, included sampling children's blood, sampling environmental media such as soil and dust, and questioning residents about their lifestyle as is related to lead exposure. The study compared the results of blood lead levels collected from children in the Old Lead Belt of St. Francois County to blood lead level test results collected from children during the study on a control area, Salem, Missouri, located outside the area of concern. In the Old Lead Belt, about 17 percent of the children tested showed a blood lead level of more than 10 micrograms/deciliter whereas only about 3 percent of the children in Salem showed a blood lead level of more than 10 micrograms/deciliter.

34. Children are more vulnerable to lead poisoning than adults. For children, lead can damage the central nervous system, kidneys and reproductive system. At higher levels, it can cause comas, convulsions, and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth, impaired hearing acuity, and possibly high blood pressure.

35. The human health risk assessment (HHRA) shows that lead concentrations in tailings samples ranged from 349 to 4,638 mg/kg, with an arithmetic mean of 885 mg/kg.

36. The Doe Run Resources Corporation is a New York corporation registered to do business in the State of Missouri.

37. The Missouri Department of Natural Resources(MDNR) is an agency of the State of Missouri, created by Section 640.010, RSMo. MDNR is authorized to acquire lands or rights in lands to be held, preserved, improved and maintained for park purposes, pursuant to Section 253.040, RSMo. The Park is property of the State of Missouri maintained by the Division of State Parks within the MDNR.

## **V. CONCLUSIONS OF LAW AND DETERMINATIONS**

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

- a. The Federal Tailings Pile Site is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
- b. The contamination found at the Site, as identified in the Findings of Fact above, includes 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. Each Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is jointly and severally liable for performance of response action and for response costs incurred and to be incurred at the Site.
- i. Respondent, MDNR, Division of State Parks, is the “owner” and/or “operator” of the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1).
  - ii. Respondent, The Doe Run Resources Corporation, was the “owner” and/or “operator” of the facility at the time of disposal of hazardous substances at the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2).
- e. The conditions described in the Findings of Fact above constitute an actual or threatened of “release” of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).
- f. 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**

Based upon the foregoing Findings of Fact, Conclusions of Law, 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 attachments to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

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

39. Respondents shall retain one or more contractors to perform the Work and shall notify EPA of the name(s) and qualifications of such contractor(s) within 30 days of the Effective Date. Respondents shall also notify EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least 30 days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondents. If EPA disapproves of a selected contractor, Respondents shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within 30 days of EPA's disapproval. The contractor proposed by the Respondents 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.

40. Within 30 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 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 to disapprove of the designated Project Coordinator. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number, and qualifications within 30 days following EPA's disapproval. Receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Settlement Agreement shall constitute receipt by all Respondents.

41. EPA has designated Jason Gunter of the Special Emphasis and Remedial Branch of the Superfund Division of EPA, Region VII, as its Remedial Project Manager (RPM). Except as otherwise provided in this Settlement Agreement, Respondents shall direct all submissions required by this Settlement Agreement to the RPM to: Jason Gunter, United States Environmental Protection Agency, Region VII, SPEB, 901 North Fifth Street, Kansas City, Kansas 66101.

42. EPA and Respondents shall have the right, subject to Paragraph 40, to change their respective designated RPM or Project Coordinator. Respondents shall notify EPA 30 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

43. Respondents shall perform, at a minimum, all actions necessary to implement the Action Memorandum, attached as Appendix A, and the Statement of Work, attached as Appendix B. The actions to be implemented generally include, but are not limited to, the following:

a. All ORV trails within the 100 meter grids that are contaminated with greater than or equal to 600 mg/kg lead located in the Historical Mining complex will be covered with a minimum of 12 inches of clean soil, rock, or a mixture of both;

b. Steep slopes will be regraded and stabilized with rock to prevent erosion. Vegetation will be established/augmented to reduce exposure to the public and minimize erosion;

c. Sediment and surface water will be addressed by: removing creek-side tailings deposits; constructing stormwater retention structures to assist with reduction of sediment migration; regrading to stabilize steep slopes; and improving the drainage channels that cross the Site.

d. Post Removal Site Control will be required at the Site. Administrative controls will be required to prevent public access to vegetated areas. Monitoring will be required to ensure that the remedy remains protective of human health and the environment.

### 44. Work Plan and Implementation.

a. Within 60 days after the Effective Date, Respondents shall submit to EPA for approval a draft Work Plan for performing the removal action generally described in Paragraph 43 above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the actions required by this Settlement Agreement. The Work Plan shall require preparation of a Quality Assurance Project Plan (QAPP). The QAPP should be prepared in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/003, March 2001), and "EPA Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998).

b. EPA may approve, disapprove, require revisions to, or modify the draft Work Plan in whole or in part. If EPA requires revisions, Respondents shall submit a revised draft Work Plan within 30 days of receipt of EPA's notification of the required revisions. Respondents shall implement the Work Plan as approved in writing by EPA 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 except in conformance with the terms of this Settlement Agreement. Respondents shall not commence implementation of the Work Plan developed hereunder until receiving written EPA approval pursuant to Paragraph 44(b).

45. Health and Safety Plan. Within 60 days after the Effective Date, Respondents shall submit for EPA 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 shall implement the plan during the pendency of the removal action.

46. 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. Respondents shall ensure that the laboratory used to perform the 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 and 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 for 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 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 not less than 30 days in advance of any sample collection activity, unless shorter notice is agreed to by EPA. EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Respondents to take split or duplicate samples of any samples it takes as part of its oversight of Respondents' implementation of the Work.

47. Post-Removal Site Control. In accordance with the Work Plan schedule, or as otherwise directed by EPA, Respondents shall submit a proposal for post-removal site control consistent with Section 300.415(I) of the NCP and OSWER Directive No. 9360.2-02. Upon EPA approval, Respondents shall implement such controls and shall provide EPA with documentation of all post-removal site control arrangements.

48. Reporting.

a. Respondents shall submit a written progress report to EPA concerning actions undertaken pursuant to this Settlement Agreement every 30th day after 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 RPM. 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 2 copies of all plans, reports or other submissions required by this Settlement Agreement, and the attached the Statement of Work, 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 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 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).

49. Final Report. Within 60 days after completion of all Work required by this Settlement Agreement, Respondents shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Settlement Agreement. The final report shall conform, at a minimum, with the requirements set forth in "Superfund Removal Procedures: Removal Response Reporting – POLREPS and OSC Reports" (OSWER Directive No. 9360.3-03, June 1, 1994). 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 those materials, a listing of the ultimate destination(s) of those materials, a presentation of the 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.”

#### **IX. SITE ACCESS**

50. 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, and its 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.

51. 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 use their best efforts to obtain all necessary access agreements within 30 days after the Effective Date, or as otherwise specified in writing by the RPM. Respondents shall immediately notify EPA if after using their best efforts they are unable to obtain such agreements. For purposes of this Paragraph, “best efforts” includes the payment of reasonable sums of money in consideration of access. Respondents shall describe in writing their efforts to obtain access. EPA may then assist Respondents in gaining access, to the extent necessary to effectuate the response actions described in this Settlement Agreement, using such means as EPA deems appropriate. Respondents shall reimburse EPA for all costs and attorney’s fees incurred by the United States in obtaining such access, in accordance with the procedures in Section XV (Payment of Response Costs).

52. Notwithstanding any provision of this Settlement Agreement, EPA retains all of its access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

#### **X. ACCESS TO INFORMATION**

53. Respondents shall provide to EPA, 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. Respondents shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

54. 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.

55. Respondents may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Respondents assert such a privilege in lieu of providing documents, they shall provide EPA 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.

56. No claim of confidentiality shall be made with respect to any data, 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**

57. Until 10 years after Respondents' receipt of EPA's notification pursuant to Section XXIX (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 10 years after Respondents' receipt of EPA's notification pursuant to Section XXIX (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.

58. At the conclusion of this document retention period, Respondents shall notify EPA at least 90 days prior to the destruction of any such records or documents, and, upon request by EPA, Respondents shall deliver any such records or documents to EPA. Respondents may assert that certain documents, records and other information are privileged under the attorney-client



privilege or any other privilege recognized by federal law. If Respondents assert such a privilege, they shall provide EPA 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.

59. 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 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**

60. 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. § 6921(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. Respondents shall identify ARARs in the Work Plan subject to EPA approval.

## **XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES**

61. In the event of any action or occurrence during performance of the Work which 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 RPM at 913-551-7358, or, in the event of his/her unavailability, EPA's Spill Line at 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 all costs of the response action not inconsistent with the NCP pursuant to Section XV (Payment of Response Costs).

62. In addition, in the event of any release of a hazardous substance from the Site, Respondents shall immediately notify the RPM at 913-551-7358, and the National Response Center at 800 424-8802. Respondents shall submit a written report to EPA 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 REMEDIAL PROJECT MANAGER**

63. The EPA RPM shall be responsible for overseeing Respondents' implementation of this Settlement Agreement. The RPM shall have the authority vested in an On Scene Coordinator (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 RPM from the Site shall not be cause for stoppage of work unless specifically directed by the RPM.

#### **XV. PAYMENT OF RESPONSE COSTS**

##### **64. Payment for Past Response Costs.**

a. Within 30 days after the Effective Date, Respondents shall pay to EPA \$49,585.93, 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 making payment, the Site name, the EPA Region and Site/Spill ID Number 07WG, and the EPA docket number for this action, CERCLA-07-2009-0012.

b. At the time of payment, Respondents shall send notice that such payment has been made by email to [acctsreceivable.cinwd@epa.gov](mailto:acctsreceivable.cinwd@epa.gov), and by regular mail to:

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

c. The total amount to be paid by Respondents pursuant to Paragraph 64(a) shall be deposited by EPA in the Federal Tailings Pile Superfund Site Special Account within the EPA Hazardous Substance Superfund 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.

65. Payments for Future Response Costs.

a. Respondents shall pay EPA all Future Response Costs not inconsistent with the NCP. On a yearly basis, EPA will send Respondents a bill requiring payment that includes a cost summary, which includes direct and indirect costs incurred by EPA and its contractors. Respondents shall make all payments within 30 days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 67 of this Settlement Agreement.

b. Respondents shall make all payments required by this Paragraph by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party making payment and EPA Site/Spill ID number 07WG. Respondents shall send the check to:

U.S. Environmental Protection Agency  
Superfund Payments  
Cincinnati Finance Center  
Post Office Box 97907  
St. Louis, Missouri 63197-9000.

c. At the time of payment, Respondents shall send notice that payment has been made by e-mail to [acctsreceivable.cinwd@epa.gov](mailto:acctsreceivable.cinwd@epa.gov), and by regular mail to:

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

d. The total amount to be paid by Respondents pursuant to Paragraph 65(a) shall be deposited by EPA in the Federal Tailings Pile Superfund Site Special Account within the EPA Hazardous Substance Superfund 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.

66. In the event that the payment for Past Response Costs is not made within 30 days of the Effective Date, or the payment for Future Response Costs is not made within 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 Future Response Costs shall begin to accrue on the date of the bill 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.

67. Respondents may contest payment of any Future Response Costs billed under Paragraph 65 if they determine that EPA has made a mathematical error, or if they believe EPA incurred excess costs as a direct result of an EPA action that was inconsistent with the NCP. Such objection shall be made in writing within 30 days of receipt of the bill and must be sent to the RPM. Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Respondents shall within the 30-day period pay all uncontested Future Response Costs to EPA in the manner described in Paragraph 65. Simultaneously, 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 Future Response Costs. Respondents shall send to the RPM a copy of the transmittal letter and check paying the uncontested 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. Simultaneously with 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 65. 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 65. 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 Future Response Costs.

## **XVI. DISPUTE RESOLUTION**

68. 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.

69. If Respondents object to any EPA action taken pursuant to this Settlement Agreement, including billings for Future Response Costs, they shall notify EPA in writing of their objections within 14 days of such action, unless the objections have been resolved informally. EPA and Respondents shall have 30 days from EPA's receipt of Respondents' written objections to resolve the dispute through formal negotiations (the Negotiation Period). The Negotiation Period may be extended at the sole discretion of EPA.

70. Any agreement reached by the parties pursuant to this Section shall be in writing and shall, upon signature by both 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 Director of EPA Region VII's Superfund Division will issue a written decision on the dispute to Respondents. EPA's decision shall be incorporated into and become an enforceable part of this Settlement Agreement. 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**

71. 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.

72. 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 48 hours of when Respondents first knew that the event might cause a delay. Within 7 days thereafter, Respondents shall provide to EPA 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.

73. 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. 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**

74. Respondents shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 75 and 76 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.

75. Stipulated Penalty Amounts - Work.

a. The following stipulated penalties shall accrue per violation per day for failure to perform any Work, including the submission of the Work Plan and any revisions required by EPA; the QAPP; the Post-Removal Site Control Plan; payment of Past Response Costs or Future Response Costs; and any other requirement under this Settlement Agreement, required hereunder in a timely or adequate manner:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$2,500	1st through 14th day
\$5,000	15th through 30th day
\$10,000	31st day and beyond

76. Stipulated Penalty Amounts - Reports. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports pursuant to Paragraphs 48a and 49:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1000	1st through 14th day
\$2,000	15th through 30th day
\$5,500	31st day and beyond

77. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 87 of Section XX, Respondents shall be liable for a stipulated penalty in the amount of \$350,000.

78. 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 Director of the Superfund Division, EPA, Region VII, under Paragraph 70 of Section XVI (Dispute Resolution), during the period, if any, beginning on the 21st day after the Negotiation Period begins until the date that the EPA management official 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.

79. 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 the preceding Paragraph regardless of whether EPA has notified Respondents of a violation.

80. All penalties accruing under this Section shall be due and payable to EPA within 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). All payments to EPA under this Section shall be paid by certified or cashier's check made payable to "EPA Hazardous Substances Superfund," shall be mailed to U.S. Environmental Protection Agency, Superfund Payments, Cincinnati Finance Center, Post Office Box 97907, St. Louis, Missouri 63197-9000, shall indicate that the payment is for stipulated penalties, and shall reference EPA Region VII, and Site/Spill ID Number 07WG, the EPA Docket Number CERCLA-07-2009-0012, and the name and address of the party making payment. Copies of the check paid pursuant to this Section, and any accompanying transmittal letter, shall be sent to EPA as provided in Paragraph 65.

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

82. Penalties shall continue to accrue during any dispute resolution period, but need not be paid until 15 days after the dispute is resolved by agreement or by receipt of EPA's decision.

83. 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 80. 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(I) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(I), 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(I) 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 Section XX, 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. COVENANT NOT TO SUE BY EPA**

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

#### **XX. RESERVATIONS OF RIGHTS BY EPA**

85. 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.

86. The covenant not to sue set forth in Section XIX above does not pertain to any matters other than those expressly identified therein. EPA reserves, 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 or Future Response Costs;



- c. liability for performance of response action other than the Work;
- 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;
- f. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and
- g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.

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, after providing Respondents with written notice of such failure to perform and such time as determined by EPA to cure such failure, 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, with respect to the Work, Past Response Costs, Future 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, or Future Response Costs.

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).

## **XXII. OTHER CLAIMS**

90. By issuance of this Settlement Agreement, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA 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.

91. Except as expressly provided in Section XIX (Covenant Not to Sue by EPA), 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.

92. No action or decision by EPA 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**

93. a. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), 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), for “matters addressed” in this Settlement Agreement. The “matters addressed” in this Settlement Agreement are the Work, Past Response Costs, and Future 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 for the Work, Past Response Costs, and Future Response Costs.

#### **XXIV. INDEMNIFICATION**

94. Respondents shall indemnify, save and hold harmless the United States, 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 all costs incurred by the United States, 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 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 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.

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

96. Respondents waive all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, 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 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**

97. At least 7 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 \$3,000,000, combined single limit, naming EPA as an additional insured. Within the same time period, Respondents shall provide EPA 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. FINANCIAL ASSURANCE**

98. Within 30 days of the Effective Date, Respondents shall establish and maintain financial security for the benefit of EPA in the amount of \$200,000, in one or more of the following forms, in order to secure the full and final completion of Work by Respondents:

- a. a surety bond unconditionally guaranteeing payment and/or performance of the Work;
- b. one or more irrevocable letters of credit, payable to or at the direction of EPA, issued by a financial institution acceptable in all respects to EPA;
- c. a trust fund administered by a trustee acceptable in all respects to EPA;
- d. a policy of insurance issued by an insurance carrier acceptable in all respects to EPA, which ensures the payment and/or performance of the Work;
- e. a written guarantee to pay for or perform the Work provided by one or more parent companies of Respondents, or by one or more unrelated companies that have a substantial business relationship with at least one of Respondents; including a demonstration that any such guarantor company satisfies the financial test requirements of 40 C.F.R. Part 264.143(f); and/or
- f. a demonstration of sufficient financial resources to pay for the Work made by one or more of Respondents, which shall consist of a demonstration that any such Respondent satisfies the requirements of 40 C.F.R. Part 264.143(f).

99. Any and all financial assurance instruments provided pursuant to this Section shall be in form and substance satisfactory to EPA, determined in EPA's sole discretion. In the event that EPA determines at any time that the financial assurances provided pursuant to this Section (including, without limitation, the instrument(s) evidencing such assurances) are inadequate, Respondents shall, within 30 days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in Paragraph 98, above. In addition, if at any time EPA notifies Respondents that the anticipated cost of completing the Work has increased, then, within 30 days of such notification, Respondents shall obtain and present to EPA for approval a revised form of financial assurance (otherwise acceptable under this Section) that reflects such cost increase. Respondents' inability to

demonstrate financial ability to complete the Work shall in no way excuse performance of any activities required under this Settlement Agreement.

100. If Respondents seek to ensure completion of the Work through a guarantee pursuant to Subparagraph 98(e) or 98(f) of this Settlement Agreement, Respondents shall (i) demonstrate to EPA's satisfaction that the guarantor satisfies the requirements of 40 C.F.R. Part 264.143(f); and (ii) resubmit sworn statements conveying the information required by 40 C.F.R. Part 264.143(f) annually, on the anniversary of the Effective Date or such other date as agreed by EPA, to EPA. For the purposes of this Settlement Agreement, wherever 40 C.F.R. Part 264.143(f) references "sum of current closure and post-closure costs estimates and the current plugging and abandonment costs estimates," the dollar amount to be used in the relevant financial test calculations shall be the current cost estimate of the Respondents' share which is \$200,000, for the Work at the Site plus any other RCRA, CERCLA, TSCA, or other federal environmental obligations financially assured by the relevant Respondent or guarantor to EPA by means of passing a financial test.

101. If, after the Effective Date, Respondents can show that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 98 of this Section, Respondents may, on any anniversary date of the Effective Date, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining Work to be performed. Respondents shall submit a proposal for such reduction to EPA, in accordance with the requirements of this Section, and may reduce the amount of the security after receiving written approval from EPA. In the event of a dispute, Respondents may seek dispute resolution pursuant to Section XVI (Dispute Resolution). Respondents may reduce the amount of security in accordance with EPA's written decision resolving the dispute.

102. Respondents may change the form of financial assurance provided under this Section at any time, upon notice to and prior written approval by EPA, provided that EPA determines that the new form of assurance meets the requirements of this Section. In the event of a dispute, Respondents may change the form of the financial assurance only in accordance with the written decision resolving the dispute.

## **XXVII. MODIFICATIONS**

103. The RPM may make modifications to any plan or schedule 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 RPM's oral direction. Any other requirements of this Settlement Agreement, including any modification of the Statement of Work, may be modified in writing by mutual agreement of the parties.

104. If Respondents seek permission to deviate from any approved work plan or schedule or Statement of Work, Respondents' Project Coordinator shall submit a written request

to EPA for approval outlining the proposed modification and its basis. Respondents may not proceed with the requested deviation until receiving oral or written approval from the RPM pursuant to Paragraph 103.

105. No informal advice, guidance, suggestion, or comment by the RPM or other EPA representatives 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.

### **XXVIII. ADDITIONAL REMOVAL ACTION**

106. If EPA 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. Unless otherwise stated by EPA, within 30 days of receipt of notice from EPA that additional removal actions are necessary to protect public health, welfare, or the environment, Respondents shall submit for approval by EPA 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. This Section does not alter or diminish the RPM's authority to make oral modifications to any plan or schedule pursuant to Section XXVII (Modifications). Notwithstanding any other provisions of this Paragraph, unless mutually agreed, Respondents will not be obligated to perform additional removal actions that are beyond the scope and substance of the work delineated in the Statement of Work and supporting EE/CA released by EPA on April 16, 2009.

### **XXIX. NOTICE OF COMPLETION OF WORK**

107. When EPA determines, after EPA's 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 post-removal site controls, payment of Future Response Costs, or record retention, EPA will provide written notice to Respondents. If EPA 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.

### **XXX. INTEGRATION/APPENDICES**

108. 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: Action Memorandum (Appendix A); and, Statement of Work (Appendix B).

### **XXXI DISBURSEMENT OF SPECIAL ACCOUNT FUNDS**

#### **109. Disbursement Special Account and Agreement to Disburse Funds to Respondents.**

Within 30 days after the Effective Date, EPA shall establish the Federal Tailings Pile Superfund Site Disbursement Special Account and shall transfer \$6,800,000 from the Federal Tailings Pile Superfund Site Special Account to the Federal Tailings Pile Superfund Site Disbursement Special Account. EPA agrees to make the funds in the Federal Tailings Pile Superfund Site Disbursement Special Account, available for disbursement to Respondents as partial reimbursement for performance of the Work under this Settlement Agreement. Subject to the terms and conditions set forth in this Section, Respondents are eligible to receive, as partial reimbursement, 97% of costs incurred in performance of the Work under this Settlement Agreement, up to \$6,800,000. EPA shall disburse funds from the Federal Tailings Pile Superfund Site Disbursement Special Account to Respondents in accordance with the procedures for phased disbursement set forth in this Section. Any remaining funds in the Federal Tailings Pile Superfund Site Disbursement Special Account will be transferred by EPA to the Federal Tailings Pile Superfund Site Special Account or to the Superfund Trust Fund.

110. Timing, Amount, and Method of Disbursing Funds From the Federal Tailings Pile Superfund Site Disbursement Special Account. As soon as practicable after EPA approves each Cost Summary and Certification, as defined by Paragraph 111c, or if EPA has requested additional information under Paragraph 111d, as soon as practicable after EPA approves the revised Cost Summary and Certification under Paragraph 111d, and subject to the conditions set forth in this Section, EPA shall disburse the funds from the Federal Tailings Pile Superfund Site Disbursement Special Account. EPA shall disburse the funds from the Federal Tailings Pile Superfund Site Disbursement Special Account to Respondents in the following manner:

For electronic funds transfer, for payments to the Respondent State of Missouri  
Department of Natural Resources, Division of State Parks:

Bank Name: OFFICE OF MO STATE TREASURER (PROCESSING THROUGH  
CENTRAL BANK)  
Bank Address: P.O. Box 210, Jefferson City, MO 65102  
ABA Number: 086507174  
Account Number: 7800090

For wire instructions for payments to Respondent The Doe Run Resources Corporation:

Bank Name: Wells Fargo, Wachovia  
ABA Number: 053000219  
SWIFT: PNBPUS33  
Bank Address: Attn: Funds Transfer Security NC0803  
1525 W. WT Harris Blvd.  
Charlotte, NC 28288-0803

For credit to: The Doe Run Resources Corporation  
Or The Doe Run Company  
Account Number: 2000035275905

111. Requests for Disbursement of Special Account Funds.

a. Within 60 days of commencement by the Respondents of the Removal Action, each Respondent may submit to EPA a Cost Summary and Certification, as defined in Paragraph 111c, covering the Work performed by that Respondent pursuant to this Settlement Agreement. Respondents may receive 97% of costs incurred in performance of the Work under this Settlement Agreement, up to \$6,800,000.

b. On or after 60 days from the date of any Cost Summary and Certification that Respondents submit to EPA pursuant to Paragraph 111c, Respondents may submit to EPA a Cost Summary and Certification meeting the requirements of Paragraph 111c documenting costs incurred after the most recently submitted Cost Summary and Certification. Respondents shall not include in any submission costs included in a previous Cost Summary and Certification if those costs have been previously sought or reimbursed. Respondents may receive 97% of costs incurred in performance of the Work under this Settlement Agreement, up to \$6,800,000.

c. Each Cost Summary and Certification shall include a complete and accurate written cost summary and certification of the necessary costs incurred and paid by Respondents for the Work covered by the particular submission, excluding costs not eligible for disbursement under Paragraph 112. Each Cost Summary and Certification submitted by Doe Run shall contain the following statement signed by the Chief Financial Officer of Respondent Doe Run and each Cost Summary and Certification submitted by MDNR, Division of State Parks, shall contain the



following statement signed by the Department's Program Director, Division of Administrative Support/Budget Program:

To the best of my knowledge, after thorough investigation and review of the documentation of costs incurred and paid for Work performed pursuant to this Settlement Agreement [**specify the beginning and ending dates covered by the Cost Summary**] I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

The Respondent submitting the Cost Summary and Certification shall also provide EPA a list of the documents that he or she reviewed in support of the Cost Summary and Certification. Upon request by EPA, the Respondent that submitted the Cost Summary and Certification shall submit to EPA any additional information that EPA deems necessary for its review and approval of a Cost Summary and Certification.

d. If EPA finds that a Cost Summary and Certification includes a mathematical error, costs excluded under Paragraph 112, costs that are inadequately documented, or costs submitted in a prior Cost Summary and Certification, it will notify Respondents and provide them an opportunity to cure the deficiency by submitting a revised Cost Summary and Certification. If Respondents fail to cure the deficiency within 30 days after being notified of, and given the opportunity to cure, the deficiency, EPA will recalculate Respondents' costs eligible for disbursement for that submission and disburse the corrected amount to Respondents in accordance with the procedures in Paragraph 110 of this Section. Respondents may dispute EPA's recalculation under this Paragraph pursuant to Section XVI (Dispute Resolution). In no event shall Respondents be disbursed funds from the Federal Tailings Pile Superfund Site Disbursement Special Account in excess of amounts properly documented in a Cost Summary and Certification accepted or modified by EPA.

112. Costs Excluded from Disbursement. The following costs are excluded from, and shall not be sought by Respondents for, disbursement from the Federal Tailings Pile Superfund Site Disbursement Special Account: (a) response costs paid pursuant to Section XV (Payment of Response Costs); (b) any other payments made by Respondents to the United States pursuant to this Settlement Agreement, including, but not limited to, any interest or stipulated penalties paid pursuant to Section XVIII (Stipulated Penalties); (c) attorneys' fees and costs, except for reasonable attorneys' and costs necessarily related to obtaining access as required by Section IX (Site Access); (d) costs of any response activities Respondents perform that are not required under, or approved by EPA pursuant to, this Settlement Agreement; (e) costs related to Respondents' litigation, settlement, development of potential contribution claims, or identification of PRPs; (f) internal costs of Respondents, including but not limited to, salaries, travel, or in-kind services, except for those costs that represent the work of employees of Respondents directly performing or supervising the Work; (g) any costs incurred by Respondents prior to the Effective Date; or (h) any costs incurred by Respondents pursuant to Section XVI

(Dispute Resolution). This paragraph shall not be construed as prohibiting reimbursement of costs incurred in operating and maintaining the removal action.

113. Termination of Disbursements from the Special Account. EPA's obligation to disburse funds from the Federal Tailings Pile Superfund Site Disbursement Special Account under this Settlement Agreement shall terminate upon EPA's determination that Respondents: (a) have knowingly submitted a materially false or misleading Cost Summary and Certification; (b) have submitted a materially inaccurate or incomplete Cost Summary and Certification, and have failed to correct the materially inaccurate or incomplete Cost Summary and Certification within 30 days after being notified of, and given the opportunity to cure, the deficiency; or (c) failed to submit a Cost Summary and Certification as required by Paragraph 111 within 30 days (or such longer period as EPA agrees) after being notified that EPA intends to terminate its obligation to make disbursements pursuant to this Section because of Respondents' failure to submit the Cost Summary and Certification as required by Paragraph 111. EPA's obligation to disburse funds from the Federal Tailings Pile Superfund Site Disbursement Special Account shall also terminate upon EPA's assumption of performance of any portion of the Work pursuant to Paragraph 87, when such assumption of performance of the Work is not challenged by Respondents or, if challenged, is upheld under Section XVI (Dispute Resolution). Respondents may dispute EPA's termination of special account disbursements under Section XVI (Dispute Resolution).

114. Recapture of Special Account Disbursements. Upon termination of disbursements from the Federal Tailings Pile Superfund Site Disbursement Special Account under Paragraph 113, if EPA has previously disbursed funds from the Federal Tailings Pile Superfund Site Disbursement Special Account for activities specifically related to the reason for termination, e.g., discovery of a materially false or misleading submission after disbursement of funds based on that submission, EPA shall submit a bill to Respondents for those amounts already disbursed from the Federal Tailings Pile Superfund Site Disbursement Special Account specifically related to the reason for termination, plus Interest on that amount covering the period from the date of disbursement of the funds by EPA to the date of repayment of the funds by Respondents. Within 30 days of receipt of EPA's bill, Respondents shall reimburse the Hazardous Substance Superfund for the total amount billed. Payment shall be made in accordance with Paragraph 65. Upon receipt of payment, EPA may deposit all or any portion thereof in the Federal Tailings Pile Superfund Site Special Account, the Federal Tailings Pile Superfund Site Disbursement Special Account, or the Hazardous Substance Superfund. The determination of where to deposit or how to use the funds shall not be subject to challenge by Respondents pursuant to the dispute resolution provisions of this Settlement Agreement or in any other forum. Respondents may dispute EPA's determination as to recapture of funds pursuant to Section XVI (Dispute Resolution).

115. Balance of Special Account Funds. After EPA issues its written Certification of Completion of the Removal Action pursuant to this Settlement Agreement, and after EPA completes all disbursement to Respondents in accordance with this Section, if any funds remain in the Federal Tailings Pile Superfund Site Disbursement Special Account, EPA may transfer

such funds to the Federal Tailings Pile Superfund Site Special Account or to the Hazardous Substance Superfund. Any transfer of funds to the Federal Tailings Pile Superfund Site Special Account or the Hazardous Substance Superfund shall not be subject to challenge by Respondents pursuant to the dispute resolution provisions of this Settlement Agreement or in any other forum.


**XXXII. EFFECTIVE DATE**

116. This Settlement Agreement shall be effective upon the signature of the Director of the EPA, Region VII's Superfund Division.


Federal Tailings Pile Site  
Administrative Settlement Agreement and Order on Consent  
The Doe Run Resources Corporation and  
State of Missouri Department of Natural Resources, Division of State Parks, Respondents

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

3/23, 2011

  
\_\_\_\_\_  
CECILIA TAPIA  
Director, Superfund Division  
U.S. Environmental Protection Agency  
Region VII  
901 North Fifth Street  
Kansas City, Kansas 66101


23 March, 2011

  
\_\_\_\_\_  
JULIE M. VAN HORN  
Senior Assistant Regional Counsel  
U.S. Environmental Protection Agency  
Region VII  
901 North Fifth Street  
Kansas City, Kansas 66101

Federal Tailings Pile Site  
Administrative Settlement Agreement and Order on Consent  
The Doe Run Resources Corporation and  
State of Missouri Department of Natural Resources, Division of State Parks, Respondents

The undersigned representative of Respondent certifies that he/she is fully authorized to enter into the terms and conditions of this Settlement Agreement and to bind Respondent to this Settlement Agreement.

FOR THE DOE RUN RESOURCES CORPORATION

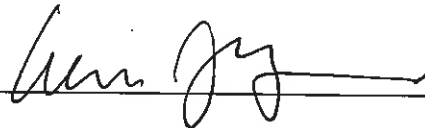
18 MARCH, 2011                      Signature:   
Name (print): LOUIS J. MARUCHEAN  
Title: VICE PRESIDENT LAW

Federal Tailings Pile Site  
Administrative Settlement Agreement and Order on Consent  
The Doe Run Resources Corporation and  
State of Missouri Department of Natural Resources, Division of State Parks, Respondents

The undersigned representatives of Respondent certify that they are fully authorized to enter into the terms and conditions of the Settlement Agreement and to bind Respondent to this Settlement Agreement.

FOR THE STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES, DIVISION OF STATE PARKS

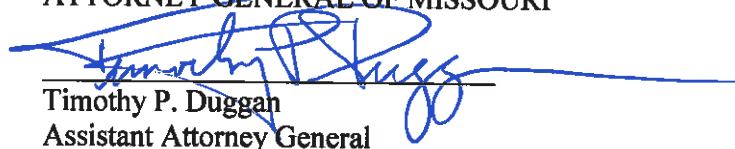
2/18/11, 2011

Signature: 

Name (print): William J. Bryan

Title: Director

CHRIS KOSTER  
ATTORNEY GENERAL OF MISSOURI

  
Timothy P. Duggan  
Assistant Attorney General

IN THE MATTER OF Federal Tailings Pile Site; The Doe Run Resources Corporation and State of Missouri Department of Natural Resources, Division of State Parks, Respondents  
Docket No. CERCLA-07-2009-0012

CERTIFICATE OF SERVICE

I certify that a true and correct copy of the foregoing Consent Agreement and Final Order was sent this day in the following manner to the addressees:

Copy hand delivered to  
Attorney for Complainant:

Julie M. Van Horn  
Senior Assistant Regional Counsel  
Region 7  
United States Environmental Protection Agency  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101


Copy by Certified Mail Return Receipt to:

Timothy P. Duggan  
Assistant Attorney General  
Supreme Court Building  
207 W. High Street  
P.O. Box 899  
Jefferson City, Missouri 65102-0899

and

Louis J. Maruchau  
Vice President Law  
The Doe Run Company  
1801 Park 270 Drive, Suite 300  
St. Louis, Missouri 63146

Dated: 3/23/11

  
\_\_\_\_\_  
Kathy Robinson  
Hearing Clerk, Region 7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

SEP 11 2009

ACTION MEMORANDUM

**SUBJECT:** Request for a Removal Action at the Federal Tailings Pile  
St. Francois County, Missouri  
Non-Time-Critical Removal

**FROM:** Jason Gunter, Remedial Project Manager *Jason A. Gunter*  
Special Emphasis and Remedial Branch

**THRU:** Gene Gunn, Chief *Gene Gunn*  
Special Emphasis and Remedial Branch

**TO:** Cecilia Tapia, Director  
Superfund Division

**SITE ID:** 07.WG  
**CERCLIS ID:** MOD985808070  
**CATEGORY OF REMOVAL:** Non-Time-Critical

2.0



I. PURPOSE

The purpose of this action memorandum is to request and document approval of a Non-Time-Critical-Removal Action for the Federal Tailings Pile (Site). The removal action will consist of regrading, removing, and covering contaminated soil and sediment. The primary objective of this action is to stabilize the mine wastes and mitigate their migration off-site via surface water runoff and wind erosion.

On April 16, 2009, the Environmental Protection Agency (EPA) released an Engineering Evaluation/Cost Analysis (EE/CA) which described conditions at the Site and evaluated different removal action alternatives. The EE/CA was available for public comment for 30 days following its release. Attached to this Action Memorandum is a Responsiveness Summary which contains the EPA's responses to the comments received regarding the EE/CA. The text of the EE/CA can be found at the following locations: St. Francois County Health Department, 1025 West Main Street, Park Hills, Missouri; and the EPA Region 7 Records Center, 901 North 5th Street, Kansas City, Kansas. The Responsiveness Summary is included as Attachment 1.





The information supporting this removal action decision, including the EE/CA and all the public comments which EPA received during the public comment period, is contained in the Administrative Record for the Site. The Administrative Record is available for review at the St. Francois County Health Center and the EPA Region 7 Records Center.

## II. SITE CONDITIONS AND BACKGROUND

### A. Site Description

#### 1. Removal Site Evaluation

The principal feature of the Site is a 1,240-acre tailings pond created behind two 130-foot-high dams resulting from the lead mine and mill operations of the St. Joe Mineral Corporation (formerly St. Joe Lead Company). St. Joe Lead operated a series of mines and mills in the district from 1900 to 1972.

Investigations by the EPA, the Missouri Department of Natural Resources (MDNR), the University of Missouri (MU), and The Doe Run Company have revealed significant lead levels in tailings on the Site and in soils adjacent to the Site. In addition, lead has been found in sediment, surface water, and aquatic life adjacent to the Site in the Shaw Branch of Flat River, a tributary of Big River.

#### 2. Physical Location

The Site is located on the eastern edge of the Ozark Highlands in St. Francois County. The Site is situated in St. Joe State Park in the southeast quarter of the intersection of Missouri Routes 32 and 67. The Site covers approximately 1,240 acres and consists mainly of mine tailings to 115 feet deep.

#### 3. Site Characteristics

In 1976, the St. Joe Mineral Corporation donated 8,561 acres to the state of Missouri. The state of Missouri developed the area into a state park. The 1,240-acre tailings pond is currently operated by the state of Missouri as an Off-Road Vehicle (ORV) Recreation Area within St. Joe State Park.

Most of the Site consists of dry and partially vegetated tailings. Because the tailings material is dolomitic sand and silt that is easily suspended in the air, wind erosion and airborne dust contribute to the spread of lead contamination at the Site.

Tailings from a jig mill were deposited by a conveyor system to form what is now known as the chat pile on the northwestern edge of the park. Tailings from the most recent mill, which employed the flotation separation process, were hydraulically placed behind either of the two conjoined dams located in a tributary of the Flat River. The older dam, known as the Original Dam, is a sidehill type, and the newer dam, known as the Main Dam, is a cross-valley type. The dams are joined to form an L-shaped structure. The crest height of the Main Dam is

approximately 135 feet from the original stream bed. The dams are constructed of tailings material with a veneer of shot rock. Decant structures were incorporated to act as a drain for excess surface water runoff and to return processed water to the mill. Due to characteristics of the tailings and slimes behind the dams, the materials do not easily drain and are saturated at various levels. The impounded tailings extend roughly southward from the dam up the tributary approximately two miles. The tailings act as dams for tributary branches, thus forming several lakes in the upper watershed.

4. EE/CA

On April 16, 2009, the Environmental Protection Agency (EPA) released an Engineering Evaluation/Cost Analysis (EE/CA) which described conditions at the Site and evaluated different removal action alternatives. The EE/CA was available for public comment for 30 days following its release. Attached to this Action Memorandum is a Responsiveness Summary which contains the EPA's responses to the comments received regarding the EE/CA. The EE/CA and the Responsiveness Summary is included as Attachment 1

5. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant, or Contaminant

The primary contaminants of concern at this Site are lead and lead compounds. The lead at the Federal Tailings Pile is a result of 70 years of stockpiling of mine wastes. Determining the actual waste volume would require extensive Site characterization and information that has not been collected to date, but millions of tons of partially saturated mine waste are impounded behind the dams.

As a part of the sample collection during the Site Inspection (SI), one sample at the base of the Hill Climb Area showed a lead concentration of more than 20 percent lead (210,000 parts per million (ppm)); although this sample may be anomalous, other SI samples from the Site ranged from less than 1,000 ppm to as much as 20,000 ppm lead.

Transport of lead-bearing tailings material from the Site could occur because of wind erosion, sediment transport, catastrophic dam failures, and leaching.

MDNR and EPA sampled the tailings area for surface (0-1 inch depth) and subsurface (approximately 30-40cm depth). Over 300 surface samples and 80 sub-surface samples were collected. Results showed a Site-wide mean lead concentration of 449 ppm, much higher than the screening level for lead in residential settings of 400 ppm. Lead and lead compounds are hazardous substances (as defined by section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and is listed at 40 CFR § 302.4) and have been detected in the soils and mining wastes at the Site.

5. National Priorities List Status (NPL)

The Site is within the boundary of the Big River Mine Tailings Site which is currently on the NPL. The Big River Mine Tailings Site contains seven large mine waste piles: Bonne Terre, Desloge, Doe Run, Elvins, Federal, Leadwood, and National. These mine waste piles are being addressed as Non-Time-Critical Removal Actions. The residual waste will be addressed in the Final Record of Decision for the Big River Mine Tailings Site.

6. Map, Pictures, and Other Graphic Representations

A map depicting the Site is included as Attachment 2.

B. Other Actions to Date

1. Previous Actions

St. Joe Park Dam Improvements

In the early 1990s, a seismic evaluation of the St. Joe State Park was made to determine if it met the Missouri Dam and Reservoir Safety Program standards for a dam its size. This evaluation determined that the dams were susceptible to deformation during seismic events. It also determined that the spillways needed to be upgraded to handle the design flood described in the rules and regulations for a Class 1 dam. In 1996 and 1997, work was completed on the dams to improve the seismic stability and upgrade the spillways. The most recent inspection conducted in April 2008 found this dam to be in compliance with the appropriate laws, rules, and regulations.

a. Erosion Control Structures

Following the completion of the work on St. Joe State Park Dam to reduce the migration of sediment into Shaw Branch, it was determined that efforts were needed to control the migration of sediment within the tailings basin. This work, completed in 1998 and 1999, focused on the construction of two stormwater detention structures in the southern end of the basin. One of these structures was constructed on the downstream end of Apollo Lake. This structure was designed to handle the 100-year, 24-hour storm for the 557-acre drainage area upstream of the structure.

The other structure was constructed in the upstream end of the tailings basin north of Apollo Lake on the downstream end of a 99-Acre Lake. This structure was designed to handle a 100-year, 24-hour storm for the 99-acre drainage area upstream of the structure.

**b. Emergency Actions**

In 1999-2000, an emergency action was completed in the Hill Climb Area as a result of erosion and slope failures. The focus of this emergency action was to remove the tailings materials that had washed into the sedimentation basins during several slope failures that had occurred on the west slope of the Slime Pit Area. The material removed was placed in the abandoned quarry located northeast of the Slime Pit Area.

Work also focused on removing material from the west slope of the Slime Pit Area. This material was placed in the abandoned quarry located northeast of the Slime Pit Area.

The emergency action also included work on the abandoned quarry located northeast of the Slime Pit Area. This work was primarily completed by filling the quarry with materials from the Slime Pit Area.

**c. Wash Station**

As part of an effort to minimize the amount of tailings leaving the Site, MDNR constructed a self-service vehicle wash station. This two-bay station was constructed at the entrance/exit of the ORV staging area. It is equipped to wash two full-size vehicles at a time with all of the water draining out onto the tailings basin. This wash station was operational by late spring/early summer of 2007.

**d. ORV Staging Area**

Activities at the Site also included work on the parking lot in the ORV staging area. Every spring, park staff places a layer of rock obtained from outside the park on this parking lot. This work is completed to minimize the amount of exposure vehicles parked in this area have to contaminated materials.

**e. Beach Projects**

Work at the Site also included work on the beaches located at Pim Lake and Monsanto Lake. This work focused on placing soil and sand with lead less than 400 ppm from off-Site on these areas. The work on Pim Lake was completed in September 2008. The work on Monsanto Lake is ongoing.

**f. Miscellaneous Park Cleanup**

The Doe Run Company took actions to eliminate chat and tailings from park campgrounds and playgrounds. Campground tent pads and some playgrounds were originally filled with mill-waste chat and tailings. There was concern that park users could be exposed to residual lead contained in those materials. Staff from the MDNR Environmental

Services Program characterized and delineated the areas comprised of chat and tailings. Staff from Doe Run excavated the lead-containing materials and incorporated them in the Hill Climb Area stabilization. MDNR then rebuilt the tent pads and playground surfaces using non-lead-containing crushed limestone obtained outside the park.

**C. State and Local Authorities' Roles**

**1. State and Local Actions to date**

The EPA is closely coordinating with MDNR, the Missouri Department of Health and Senior Services (MDHSS), and the St. Francois County Health Department. These agencies, the EPA, and the Agency for Toxic Substances and Disease Registry (ATSDR) meet regularly to stay updated and discuss various issues with the Federal Tailings Pile. MDNR along with the Doe Run Company has taken measures to improve conditions on-site.

Local health officials are assisting in health education and blood-lead testing. The EPA, ATSDR, and MDHSS are assisting the St. Francois County Health Department in conducting health education on lead prevention via and interagency agreement.

**2. Potential for Continued State/Local Response**

The Site is operated by the state of Missouri as a state park; therefore, Site security and access are closely monitored. The state of Missouri will continue operating the park and future actions will be taken to reduce risk associated with lead contamination.

**III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES,**

At any release, regardless or whether the Site is included on the NPL, where the lead agency makes the determination, based on factors in 40 Code of Federal Regulations (CFR) section 300.415 (b)(2) that there is a threat to the public health or welfare of the United States, or the environment, the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release, or threat of release. The factors in 40 CFR § 300.415(b)(2) which apply to this Site are:

**300.415 (b)(2)(i) – Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants, or contaminants.**

Elevated concentrations (greater than 600 ppm) of lead have been found throughout the Site. Children playing in and around the contaminated areas have the highest potential to be exposed. In addition, sampling has determined that surface water and sediment are contaminated with lead.

Lead is a metal and has been listed as a hazardous waste (D008) in the regulations for the Resource Conservation and Recovery Act (RCRA). Lead is classified by the EPA as a probable human carcinogen and is a cumulative toxicant. The early effects of lead poisoning are nonspecific and difficult to distinguish from the symptoms of minor seasonal illnesses. Lead poisoning causes decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, digestive symptoms (particularly constipation), abdominal cramping, nausea, vomiting, and decreased appetite. With increased exposure, symptoms include anemia, pallor, a lead line on the gums, and decreased hand grip strength. Alcohol and physical exertion may exacerbate these symptoms. The radial nerve is affected most severely causing weakness in the hands and wrists. Central nervous system effects include severe headaches, convulsions, coma, delirium, and possibly death. The kidneys can also be damaged after long periods of exposure to lead, with loss of kidney function and progressive azotemia. Reproductive effects in women include decreased fertility, increased rates of miscarriage and stillbirth, decreased birth weight, premature rupture of membrane, and/or pre-term delivery. Reproductive effects in men include erectile dysfunction, decreased sperm count, abnormal sperm shape and size, and reduced semen volume. Lead exposure is associated with increases in blood pressure and left ventricular hypertrophy. A significant amount of lead that enters the body is stored in the bone for many years and can be considered an irreversible health effect.

In May 1997, the MDHSS released a draft lead exposure study of children in the Old Lead Belt of St. Francois County. The MDHSS study, funded by the ATSDR, EPA, and The Doe Run Company, included sampling children's blood, sampling environmental media such as soil and dust, and questioning residents about their lifestyle as related to lead exposure. The study compared the results of blood-lead levels collected from children in the Old Lead Belt of St. Francois County to blood lead level test results collected from children during the study on a control area, Salem, Missouri, located outside the area of concern. In the Old Lead Belt, about 17 percent of the children tested showed a blood lead level of more than 10 micrograms/deciliter whereas only about 3 percent of the children in Salem showed a blood lead level of more than 10 micrograms/deciliter.

Children are more vulnerable to lead poisoning than adults. For children, lead can damage the central nervous system, kidney, and reproductive system. At higher levels, it can cause comas, convulsions, and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth, impaired hearing acuity, and possibly high blood pressure.

**300.415 (b)(2)(iv) – High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate.**

Lead has been detected in surface soils above the proposed action level of 600 ppm (Attachment 3). Lead-contaminated soils may migrate via airborne dusts, surface runoff, percolation into groundwater, construction activity, ORV traffic, by children transporting soils/dusts into their homes after playing in the affected areas.

**300.415 (b)(2)(v) – Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.**

Weather conditions may cause the contaminated mine tailings to migrate. High wind events could cause the tailings and contaminated soil to migrate via airborne dust. Rain may cause contamination via surface runoff.

**IV. ENDANGERMENT DETERMINATION**

The actual release of a hazardous substance at this Site, if not addressed by implementing the response action selected in this Action Memorandum, presents an imminent and substantial endangerment to public health, or welfare, or the environment.

**V. PROPOSED ACTIONS AND ESTIMATED COST**

**Proposed Actions**

**1. Proposed Action Description**

**SOIL/WASTE REMEDIATION**

MDNR and EPA characterized the ORV riding area by sampling 100-meter-square grids. Every grid in the ORV riding area with a lead concentration greater than or equal to 600 ppm will be covered with a minimum of 12 inches of clean soil, rock, or a mixture of both. All trails within the grids greater than or equal to 600 ppm lead located in the Historical Mining complex will be covered with a minimum of 12 inches of clean soil, rock, or a mixture of both. These areas are shown in Attachment 2.

MDNR and EPA characterized the ORV trails by sampling every 100 meters per trail. Every trail with a lead concentration greater than or equal to 600 ppm will be covered with a minimum of 12 inches of clean soil, rock, or a mixture of both. These areas are shown on Attachment 2.

Steep slopes will be regraded and stabilized with rock to prevent erosion. Vegetation will be established/augmented to reduce exposure to the public and minimize erosion.

**SEDIMENT/SURFACE WATER REMEDIATION**

Removal activities on the drainage areas include:

- a) Removing creek-side tailings deposits.
- b) Constructing stormwater retention structures to assist with reduction of sediment migration.
- c) Regrading to stabilize steep slopes.
- d) Improving the drainage channels that cross the Site.

## POST REMOVAL SITE CONTROL

It is the policy of the EPA that Post Removal Site Control (PRSC) shall be the responsibility of the responsible parties. PRSC will be required at the Site. Administrative controls will be required to prevent public access to vegetated areas. Monitoring will be required to ensure the remedy remains protective of human health and the environment.

### 2. Contribution to Remedial Performance

The planned action is expected to be the long-term response action for the Site. After the action is complete, no significant releases under normal circumstances are expected. Further evaluation of the impacts of the Site to the vicinity and the downstream surface water and sediment were assessed as part of the Remedial Investigation for the Big River Site and will be addressed under the Record of Decision for Operable Unit 2.

### 3. Action/Cleanup Level

Areas with soils contaminated with lead greater than or equal to 600 ppm will be covered with an acceptable material. These levels are appropriate for nonresidential use. For more information, please refer to Attachment 3.

### 4. Applicable Relevant and Appropriate Requirements

The Applicable or Relevant and Appropriate Requirements for the removal action, which were discussed in detail in the EE/CA, include the following:

- National Ambient Air Quality Standards (NAAQS) – Clean Air Act, 42 U.S.C. § 7401 et. seq. 40 CFR Part 250 and 10 CSR 10-6.010. Air monitoring and controls such as dust suppression will be implemented as necessary to ensure that airborne emissions of particulates and lead during removal activities are below the NAAQS.
- Fugitive Particulate Matter Regulations – 10 CSR 10-6.170. Air monitoring and controls such as dust suppression will be implemented as necessary to ensure that fugitive particulate matter is controlled.
- Surface Mining Control and Reclamation Act (SMCRA) – Sediment Control Measures (§ 816.45), Siltation Structures (§ 816.46), Grading Requirements (§ 816.102), and Revegetation (§ 816.111 through §816.116). The SMCRA requirements will be implemented to ensure compliance.



- **Clean Water Act (CWA) Direct Discharge Requirements – Section 301(b) and 404 of the CWA and 10 CSR 20-7.015 and 10 CSR 20-7.031.** On-Site discharges from CERCLA Sites to surface waters must meet the substantive requirements of the National Pollutant Discharge Elimination System (NPDES) program. The Site will be monitored to ensure compliance with the CWA.
- **Stormwater Requirements – 10 CSR 20-6.200.** The state of Missouri has promulgated regulations that are applicable to stormwater discharges associated with industrial activities, including mining. The substantive requirements of the stormwater program must be complied with at the Site so long as runoff from the Site comes into contact with the tailings.
- **Protection of Flood Plains – Executive Order 11990 and 40 CFR 6, Appendix A.** If a proposed federal government action is located in or affects a 100-year floodplain, the action must be designed and carried out to avoid adversely impacting the floodplain wherever possible.
- **RCRA Subtitle D Solid Waste Disposal Regulations – 40 CFR part 257 and the state of Missouri Solid Waste Management Law and Regulations.** These regulations require that the facility be maintained to prevent a washout of solid waste and that public not be allowed uncontrolled access to the facility. The Site will be properly maintained and will be monitored by park staff to ensure compliance with these regulations.

#### **5. Project Schedule and Cost**

The total estimated cost for the implementation of the selected removal action alternative is \$7,006,271.00. The construction is estimated to take from 1 to 2.5 years following the completion of the Removal Action Work Plan, and is dependent on the workforce and equipment dedicated to the project.

#### **VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

Conditions at this Site will continue to pose a threat to public health and the environment until response actions are implemented.

#### **VII. OUTSTANDING POLICY ISSUES**

None.

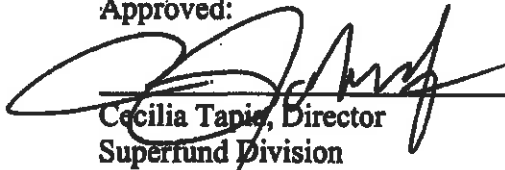
## VIII. ENFORCEMENT

Enforcement confidential addendum: There is a Confidential Enforcement Addendum for this Site. For NCP consistency purposes, it is not part of this Action Memorandum. This Site is similar to other mine waste sites found in St. Francois County. However, due to the fact that the Site is located in a state park, there is a greater potential for exposure. The Doe Run Company, a mining company that has performed similar removal actions at other mine waste sites in the county, has participated with MDNR in developing the EE/CA for the Site. The EPA anticipates that The Doe Run Company and MDNR will implement the recommended Removal Action described in this Action Memorandum.

## IX. RECOMMENDATION

This decision document represents a selected removal action for the Federal Tailings Pile, Park Hills, Missouri, developed in accordance with CERCLA as amended and is consistent with the NCP. This decision is based on the administrative record for the Site. Conditions at the Site meet the criteria for a removal action set forth in section 300.415(b)(2) of the NCP. I recommend your approval of the proposed removal action.

Approved:

 9-11-07  
Cecilia Tapia, Director Date  
Superfund Division

### Attachments

1. EE/CA and Responsiveness Summary
2. Site Map
3. Soil Cleanup Goals

## **ATTACHMENT 1**

### **RESPONSIVENESS SUMMARY**

## **RESPONSIVENESS SUMMARY**

### **ENGINEERING EVALUATION/COST ANALYSIS**

#### **FEDERAL MINE TAILINGS 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 hazardous substances. 40 CFR §300.415(b)(4) requires that, in instances where a planning period of at least six months exists, an 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 the alternatives under consideration. This document presents the United States Environmental Protection Agency's (EPA) responses to public comments received concerning the EE/CA for the Federal Mine Tailings 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 Doe Run Company (Doe Run) and the Missouri Department of Natural Resources (MDNR), whereby Doe Run agreed to take a lead role in the preparation of the EE/CA.

Doe Run submitted the draft EE/CA to EPA in March 2009. A public comment period was announced, commencing April 16, 2009, and ending May 14, 2009. A public meeting was held on April 16, 2009, at Central High School in Park Hills, Missouri, to present the findings of the draft EE/CA and to receive comments from the community in attendance.

During the public comment period, EPA received numerous comments from the public. 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 Public:**

### **Comment:**

I would like to express my wish to keep this riding area open as it is. I have been riding there since I was 14 and I am 42 years old now. I ride there every other weekend from March 1<sup>st</sup> until it reaches 50 degrees in the fall. Neither I nor anyone I know has ever experienced any side effects from this riding area. I am secure enough in this area's safety that I take my 2 daughters riding with me quite often. I believe the EPA should remove themselves from this debate and leave this area alone as well as its patrons who are perfectly happy with what we have and are aware of the material we are riding in due to public notices that have been posted there for as long as I can remember. Closing St. Joe affects family fun and recreation for thousands of Missourians that cannot be replaced by any other riding and camping area. Thank you for your time and interest in my opinion.

### **Response:**

The EPA has never intended to shut down the riding area. The goal of the EPA is to protect human health and the environment. Portions of the Site present an unacceptable risk to human health and the environment. The preferred alternative in the EE/CA addresses risk without shutting down the riding area.

### **Comment:**

I am one of the many members of the user group SAVESTJOESTATEPARK, and I did attend the public meeting on April 16, 2009. I do want to thank you for the time you folks took to reconsider what the EPA was recommending as far as the tailings area and our fine lakes there. I do agree that better erosion control needs to be put in place and we do need to keep down stream areas clean of tailings. I do not agree at the 600 ppm threshold on the riding area at all. I do ask that the EPA consider raising that to at least 700 ppm due to certain factors that will not harm park users in any way. By raising the number it will save about \$250,000 in original cleanup cost if we would start tomorrow, but what will the cost be when it does take place, as there is no time line that I am aware of? Also, as you know the DNR will be responsible for maintaining the project long term and a higher number will mean a lot of less maintaining of the tailings area, and that cost down the road could be a problem with the current state budget. The less we impact the riding areas will save us money down the road, and people come from all over the country to ride, and the less we impact it, the more people are willing to ride there. This also brings in over 18 million dollars a year to this area! I know that it's always mentioned that we need to save the kids from lead and I agree with that, but the EPA in their two "Risk Studies" has failed to prove that park users or park staff has had any effects of lead. In addition, people do not stay in one area where the ppm would be 644 and the next area be 379. They ride all over the area and I know the average is way below 600 to begin with. Also there is a youth area planned and with a large amount of the younger ones spending time in those areas the risk is even less. I do want to thank

you for taking another look at the original level planned for St. Joe State Park and I ask that the final threshold be changed from 600 to 700. This will not only save the taxpayers money but will also provide a needed recreation outlet with minimal disruption to the riding area without effecting health of all park users and park workers.

**Response:**

The EPA is aware of the additional cost saved by raising the cleanup level to 700 ppm. However, EPA bases the cleanup level on risk, not cost. The cleanup goal of 600 ppm is the highest acceptable level of lead at the site. The goal of the EPA is to protect human health and the environment. Portions of the Site present an unacceptable risk to human health and the environment and must be remediated to less than 600 ppm.

**Comment:**

I would like to express our opinion that EPA should go elsewhere and leave St. Joe Park alone. If it did not have St. Joe Lead Mining Company to pay the bill they would not be there. The DNR is going to have to come up with the money to oversee the project once it is finished and they are already running on a smaller budget than last year. They cannot guarantee that they can take care of the project after it is completed.

Why is it that 1,200 parts per million is acceptable in Joplin but not St. Joe State Park? Could it be there is no one to foot the bill? I believe there are a lot better places for the EPA to do their good. Thanks for listening.

**Response:**

The EPA is responsible for the protection of human health and the environment throughout the United States. St. Joe State Park is one of seven large mine tailings piles in St. Francois County that are considered potentially hazardous to human health and the environment. The fact that the Park is a used by the public and that Off Road Vehicle riding occurs at the park potentially raises the risk to human health.

The level of 1,200 parts per million in Joplin was based on Site-specific data. The level of 600 parts per million at St. Joe State Park is also based on site-specific data. The appropriate clean up level varies due to individual site characteristics such as different lead concentrations, lead bioavailability, and lead speciation.

**Comment:**

After attending the open meeting on April 16, 2009, I would like to make some comments on what was told by the EPA and the Health Department that night. The one comment that was said by the EPA official that night was, "if there is dust, it must be harmful". We were told that there was air quality monitoring done several times in the area and all of the results came up negative. So from this how could the dust be harmful?

All of the lead results that were given to us that night were from other areas in the state and these results were supposed to apply to this area also. We were given examples of people with high levels of lead from these other areas, but were never shown any positive results for St. Joe Park. I understand that the workers in the Park have been given blood tests for many years and none of them have come up positive for lead. These workers are there more than the people that use the park. What is the average time that a person will attend the park in a year? Just a guess on my part would be around 10 days/times per 24/7 for the year. There is a big difference between those numbers. Has there been or can EPA produce someone that has used the park and has damage from being exposed to lead? This is kind of like having a murder and not having a body or the murder weapon, but you went ahead and convicted the person of killing someone.

From all that was shown to us that night about lead in the area, how can EPA come up with a number of 600 ppm for St. Joe State Park? This number is kind of low for the results from the studies at the park. I think that the number should be raised above 600 ppm. There are areas with higher lead content and these areas only have to meet 1,200 parts per million. Why does one area have a higher number than another area? The EPA has done many studies in the Park and most of these studies come up with the people using the Park not being exposed to lead very much. If there was a lot of lead in the Park and people were exposed often during the year, the number should be higher, but how many times does a person visit the Park per year?

**Response:**

Dust is not currently monitored at St. Joe State Park, therefore, the risk presented from lead in dust is uncertain at this time.

The average number of visits per person per year is 3. However, EPA's duty is to protect all individuals, not the average visitor.

Six hundred parts per million lead was derived using statistics that utilize existing data on lead concentration, lead bioavailability, and park survey criteria. This number is much higher than the EPA screening level for lead of 400 ppm in residential yards.

**Comment:**

I would be severely disappointed if St. Joe State Park was closed or restrictions were put on off road recreation. In Missouri, St. Joe State Park is the premiere riding area. There is no other area that is as large or versatile for this type of recreation in our state.

**Response:**

The EPA has never intended to shut down the riding area. The goal of the EPA is to protect human health and the environment. Portions of the Site present an unacceptable risk to human health and the environment. The preferred alternative in the EE/CA addresses risk without shutting down the riding area.

**Comment:**

I'm writing you to express my opinion as a father of three boys who ride off-road vehicles at St. Joe State Park. My wife and I have read many documents and talked with numerous professionals about any lead dangers at the park, and do not feel there is any "high" risk from the mine tailings or surrounding areas. Lead is natural in this part of the state and has been found in our rivers, streams, lakes and even the water table since the early settlement. We do not want the EPA to impose any restrictions that limit the ORV area in any way.

**Response:**

St. Joe State Park is one of seven large mine tailings piles in St. Francois County that are considered potentially hazardous to human health and the environment. The goal of the EPA is to protect human health and the environment. Portions of the Site present an unacceptable risk to human health and the environment and must be remediated to less than or equal to 600 ppm lead. The fact that Off Road Vehicle riding occurs at the park potentially raises the risk to human health.

**Comment:**

I have thoroughly enjoyed the use of St. Joe State Park because the park is one of the few well managed public riding areas in Missouri. I have recently driven 5.5 hours from K.C. Missouri (for 1 day of riding) to enjoy the park. I understand that there is a concern for the health of those enjoying the State Park, but I believe that requirements such as the use of helmets will prevent ingestion of lead by any off-road rider. If there is still a concern for lead poisoning, signs should be posted in the staging area to inform all riders of the risk. I believe that off-road riders have the intelligence to make a safety decision on their own. It is something that all off-road riders have to do while riding.

Please consider the effects of reducing the size of one of our few public off-road riding areas. The loss could be devastating to the already crowded park.

**Response:**

The current lead levels at St. Joe State Park present a potential risk to all riders. Along with the cleanup of areas greater than or equal to 600 ppm lead, signs will be posted explaining the risk associated with riding on lead-mine tailings. The size of the riding area will not be reduced under the preferred alternative.

**Comment:**

I have read that there was some discussion about closing the sand section of this park. I wanted to take time to let you know I take my kids and wife there at least once a month.



We really enjoy riding there and would hate to see any changes. I am curious as to why this is being discussed? I have spoken to several workers there, they stated that they get checked for high lead levels several times a year, and to date, no one has any issues. If a person who has a full time job there has no issues, how would someone who rides there several times a year run into any?

**Response:**

The workers at the park are adults. The primary risk is associated with children six years or younger. Children are more vulnerable to lead poisoning than adults. For children, lead can damage the central nervous system, kidneys and reproductive system. At higher levels, it can cause comas, convulsions and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth, impaired hearing acuity, and possibly high blood pressure. A significant amount of lead that enters the body is stored in the bone for many years and can be considered an irreversible health effect.

**Comment:**

I have been going to St. Joe State Park for 10 years in the summers. I go every Saturday and Sunday and spend all of my time riding on the flats that you said has lead in it. The last time this was brought up I had my doctor check the lead level in my blood and it tested lower than normal. I think this should be our problem not yours and we ride at our own risk and I can give you proof of my blood test if you want it.

**Response:**

It is the EPA's responsibility to protect human health and the environment. This includes all areas throughout the United States. There is a potential risk associated with lead at St. Joe State Park, therefore EPA is committed to addressing the risk. Additionally, EPA can not make decisions based on individual blood tests.

**Comment:**

I understand that the EPA is soliciting comments on St. Joe State Park. There are some tailings in the creeks. Some of the blown sand can get in your clothes and skin. This is also one of the last places for a family to enjoy motorcycles in an area where the noise does not bother the neighborhood. I would ask that you keep this area open and accessible so that families can take advantage of this unique opportunity to use their off-road vehicle.

I would seriously consider benign neglect as appropriate treatment for this area. Please use the scarce resources from the EPA to clean up toxic wastes in heavily populated areas.

**Response:**

**The EPA has never intended to shut down the riding area. The goal of the EPA is to protect human health and the environment. Portions of the Site present an unacceptable risk to human health and the environment. The preferred alternative in the EE/CA addresses risk without shutting down the riding area.**

**ATTACHMENT 2**

**SITE MAP**

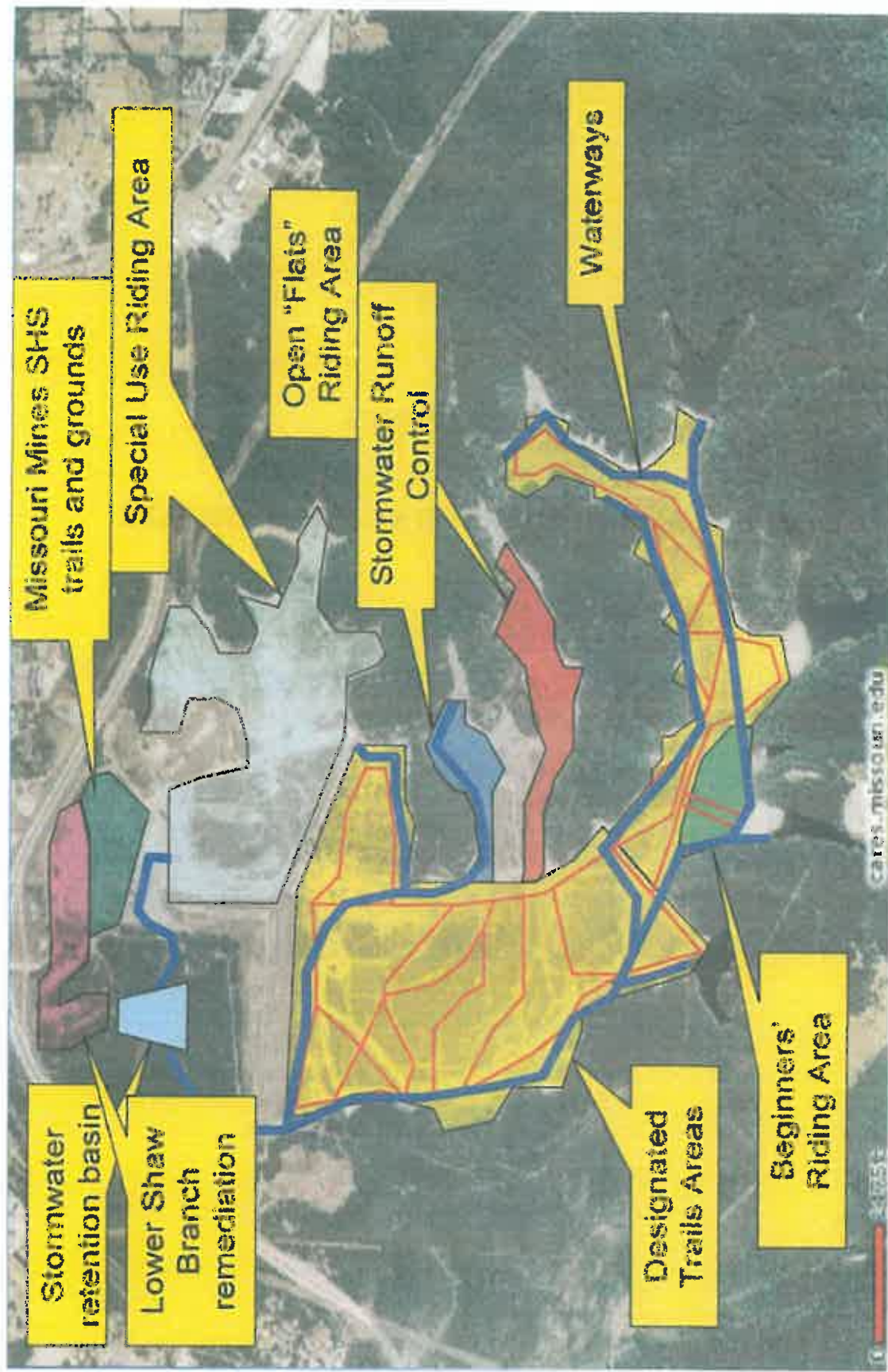


Figure 1. Federal Tailings Pile Site (MIDNIR, 2009)

## **ATTACHMENT 3**

### **SOIL CLEANUP GOALS FOR ST. JOE STATE PARK**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

NOV 19 2008

MEMORANDUM

SUBJECT: Soil Cleanup Goals for St. Joe State Park  
St. Francois County, Missouri

FROM: Mike Beringer *Mike Beringer*  
Toxicologist  
ENSV/EAMB

TO: Jason Gunter  
Remedial Project Manager  
SUPR/FPSE

As requested, we have derived soil cleanup goals for lead that are protective of human health at St. Joe State Park. The cleanup goals are specific to local children (3 to 7 years old) who visit the off-road vehicle riding areas and may be exposed to lead-contaminated soil via incidental ingestion and inhalation of airborne particulates. We also derived cleanup goals for residential children (0 to 84 months) who may be exposed to tailings tracked back to their home by a sibling or parent from the Park. Using a weight-of-evidence approach, we recommend a lead soil cleanup goal in the range of 500 to 600 mg/kg for St. Joe State Park. The basis for our recommendation and the approach used to derive cleanup goals are summarized below.

**1. Background Information**

In December 2003, the Doe Run Company completed a risk assessment that evaluated the current and future potential human health risks from mine-related materials at the Federal Tailings Pile Site (Newfields, 2003). This site is located entirely within St. Joe State Park. As a result of past lead mining activities, the Park is dominated by sand flats composed of fine-grained white to tan dolomitic tailings. Over the years, numerous tailings samples have been collected that document the widespread presence of lead contamination at the Park. The human health risk assessment (HHRA) indicates that lead concentrations in tailings samples ranged from 349 to 4,638 mg/kg, with an arithmetic mean of 885 mg/kg (Newfields, 2003). More recently, U.S. EPA Region 7 and the Missouri Department of Natural Resources (MNDR) collected 317 additional tailing samples in 2008 to more fully characterize the lead contamination in ORV riding areas. Lead concentrations ranged from 96 to 1,014 mg/kg and the arithmetic mean was 449 mg/kg. The results support previous investigations documenting lead contamination of mine tailings at St. Joe State Park.



The 8,238-acre Park is used for a variety of recreational activities, including off-road vehicle use, camping, picnicking, hiking, horseback riding, swimming, and fishing. Of the approximately 2,000 acres that are designated as an ORV riding area, about 800 acres are "sand-flats" or tailings and the remainder is wooded hillsides. Large numbers of visitors from the State of Missouri and several nearby states are attracted to the ORV riding areas. In 2003, about 800,000 individuals visited the Park, 52,053 daily permits were issued to recreational vehicles, and 61% of park visitors who were surveyed rode off-road vehicles (Morgan and Cole, 2004).

The previous human health risk assessment evaluated the potential health risks to adolescent and adult off-road vehicle riders from exposure to lead (Newfields, 2003). While the majority of ORV riders are older children and adults, there are children under 7 years of age who ride with others or drive their own vehicle (Morgan and Cole, 2004). It is important to consider children under the age of 7 (i.e., < 84 months) because they (1) tend to ingest larger amounts of soil and dust; (2) absorb a greater fraction of ingested lead; and (3) are more sensitive to the toxic effects of lead than are older children or adults. Thus, we derived cleanup goals that are protective for young children visiting off-road vehicle areas at St. Joe State Park and for young children exposed to mine tailings tracked back to their home by a sibling or parent from ORV riding at the Park.

## **2. Derivation of Cleanup Goals for Long-Term Exposure to Lead**

### **2.1 Integrated Exposure Uptake Biokinetic Model**

U.S. EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children was used to derive soil cleanup goals for lead for a range of exposure conditions. The IEUBK model is a computer-based deterministic simulation that estimates a plausible distribution of blood lead (PbB) concentrations for a hypothetical population of children (0 to 84 months) resulting from their exposure to environmental sources of lead, including soil, dust, air, drinking water, and diet (EPA, 1994a). It is important to note that the IEUBK model uses a multimedia approach that accounts for all major sources of environmental exposure to lead.

In this case, the IEUBK model was used to determine the Park or site soil concentration that would meet EPA's health protection goal of limiting exposure to site soil lead levels so that a child would have an estimated probability of no more than 5% of exceeding a 10 µg/dL blood lead level (EPA, 1994b, 1998a). For convenience, this is usually referred to as "P10." The basis for this goal ( $P10 \leq 5\%$ ) is that health effects associated with childhood lead exposure have been determined to occur at or below a blood lead concentration of 10 µg/dL (EPA, 1986, 1990; CDC, 1991).

## 2.2 Exposure Assumptions

In deriving cleanup goals, we assumed a 3 to 7 year old (36 to 84 months) local child would visit the off-road vehicle riding areas at St. Joe State Park (e.g., ride or pursue other activities in the area that could result in exposure to surface soil/dust and airborne lead-bearing particulates). This scenario accounts for exposure occurring at the Park, as well as exposure to background levels of lead in outdoor soil and indoor dust at a child's residence. We also evaluated a local child (0 to 84 months of age) who does not visit the Park, but may be exposed to soil/dust tracked back to the residence by siblings or parents who visit the ORV riding areas. In summary, cleanup goals were derived for three separate scenarios:

- (1) Child is exposed to lead in soil while visiting the ORV riding areas. Lead-bearing soil/dust (e.g., tailings) is transported back to the residence on shoes or clothing which increases indoor dust lead concentrations at the residence (track-in).
- (2) Child is exposed to lead in soil while visiting the ORV riding areas; however, track-in back to the residence from the Park does not occur.
- (3) Child does not visit the Park; however, exposure occurs to lead-bearing materials tracked back to the residence by siblings or parents.

As mentioned above, an estimated 800,000 individuals visited St. Joe State Park in 2003 and 61% of the park visitors surveyed rode ORVs (Morgan and Cole, 2004). This means that individual behavior will vary considerably, in terms of the number of hours per day, days per year, days per week, and consecutive days that individuals will ride off-road vehicles. A survey was conducted to better understand visitors at St. Joe State Park (Morgan and Cole, 2004); however, it does not provide information on individual ORV rider behavior, which is very important to adequately characterize potential health risks from lead exposure.

The survey does indicate that 0 to 6 year olds ride ORVs on average about 4 hours per visit (maximum of 10 hours) and 8 times per year (maximum of 35 trips). In addition, 7 to 15 year olds ride ORVs on average about 5 hours per visit (maximum of 12 hours) and 9 times per year (maximum of 60 trips). The results also demonstrate that local populations from Farmington and Park Hills visit the Park most frequently (Morgan and Cole, 2004).

Because there is significant uncertainty about individual ORV rider behavior, we evaluated a range of plausible exposure scenarios. This approach is consistent with EPA's "Assessing Intermittent or Variable Exposure at Lead Sites" (EPA, 2003) and is referred to as a matrix approach. For example, we derived cleanup goals assuming that ORV riders will visit the Park for 1, 2, 3, or 4 days per week. It is important to note that EPA guidance recommends that the IEUBK model not be applied to scenarios in which the exposure frequency is less than 1 day per week over a minimum duration of 90 days (EPA, 1994a). Three months is considered the minimum exposure duration to achieve a quasi-steady-state blood lead concentration and the reliability of the model has not been assessed for predicting blood lead concentrations for exposure durations shorter than 3 months. Thus, all cleanup goals assume that ORV riders visit



the Park every week for at least 13 consecutive weeks (or approximately 3 months).

The IEUBK model is typically used to evaluate lead exposures at a residence (i.e., a single location). In this case, young children will also be exposed to lead on an intermittent basis when riding off-road vehicles at St. Joe State Park. EPA lead risk assessment guidance recommends that separate calculations be made outside the model to obtain weighted average concentrations of lead in soil (EPA, 2003). Because the bioavailability of residential soil and Park soil differ (as discussed below), one cannot calculate an overall time-weighted average concentration of lead for residential yard and Park soil. As an alternative approach, the residential yard soil concentration was set equal to 200 mg/kg and the Park soil concentration was time-weighted by the number of days per week of ORV riding (e.g., 1/7, 2/7, 3/7, 4/7). This time-weighted concentration was entered into the IEUBK model Alternate Source Menu to calculate additional lead intake from soil ingestion due to ORV riding at the Park. The residential yard soil concentration of 200 mg/kg is based on the arithmetic mean concentration of background soil samples collected in St. Francois County and the surrounding 7 counties (USGS, 2008).

In accordance with EPA lead risk assessment guidance (EPA, 2003), we also evaluated higher soil ingestion rates because ORV riding will likely result in higher contact rates as compared to a typical residential exposure scenario. Once again, we used a matrix approach and assumed soil ingestion rates equal to the IEUBK default value for each age, 200 milligrams per day (mg/day), and 400 mg/day as an upper bound estimate.

Site-specific bioavailability data were also collected and used in deriving cleanup goals. More specifically, 46 soil samples were collected across St. Joe State Park and analyzed for *in vitro* bioaccessibility. These results were used to estimate the relative bioavailability (RBA) of lead and were converted to absolute bioavailability (ABA) values for use in the IEUBK model, using the approach outlined in U.S. EPA guidance (EPA, 2007a,b;  $ABA = RBA \times 50\%$ , where 50% is the IEUBK model default for ABA of lead in diet and drinking water). The soil lead ABA ranged from approximately 18% to 33% and the arithmetic mean was 24.25%. Overall, the results demonstrate that the soil lead at St. Joe State Park is less bioavailable than the IEUBK model default ABA value of 30% for soil and dust. In deriving cleanup goals, we assumed an absolute bioavailability of 24.25% for the ORV riding areas and the default value of 30% for residential soil and indoor dust.

Last of all, we assumed that young children ride ORVs for 4 or 8 hours per day and inhale an airborne lead concentration of  $4.2 \mu\text{g}/\text{m}^3$ . The air concentration is based on limited site-specific data, as discussed in the HHRA for the Federal Tailings Pile Site (Newfields, 2003). Inhalation lead intakes were estimated as the product of the airborne lead concentration, the hours per day at the Park, and the hourly ventilation rate of  $0.208 \text{ m}^3/\text{hour}$  (3 and 4 years old) and  $0.292 \text{ m}^3/\text{hour}$  (5 and 6 years old). The hourly ventilation rates were derived by dividing the IEUBK model default daily ventilation rates for each age by 24 hours per day. Inhalation lead intakes at the Park were included in the estimation of Alternate Source lead and, therefore, the

ABA for Park soil (24.25%) had to be applied to inhaled lead, rather than the model default value of 32% for airborne lead.

All remaining input parameters in the IEUBK model were set to EPA-specified default values, with the exception of updated dietary lead intake estimates (EPA, 2008). We also assumed no additional contribution of lead from local dietary sources, such as fruits, vegetables, meat, and fish.

### 2.3 Results

The results in Table 1 show the soil cleanup goals for an ORV rider (36 to 84 months old) range from 120 to 2,270 mg/kg. As expected, the cleanup goals that account for track-in of ORV soil (i.e., Scenario 1) are lower than the cleanup goals that assume no track-in occurs (i.e., Scenario 2). It is also evident that inhalation of particulates is a relatively minor exposure pathway as the cleanup goals for 8 hours are only slightly lower than 4 hours of ORV riding per day. The soil cleanup goals for a residential child (0 to 84 months) that does not visit the Park, but who is exposed to ORV tailings tracked back to the home, range from 620 to 1,880 mg/kg. For all three scenarios, soil cleanup goals decrease as the exposure frequency and soil ingestion rate increase.

## 3. Derivation of Cleanup Goals for Short-Term Exposure to Lead

### 3.1 International Commission on Radiological Protection Model

It is also likely that many ORV riders visit St. Joe State Park for a few days at a time or on an intermittent basis (less than weekly) throughout the year. However, the IEUBK model should not be applied to scenarios where the exposure frequency is less than 1 day per week over a minimum duration of 90 days (EPA, 1994a). As a result, the IEUBK model cannot be used to evaluate less than weekly or short-term exposure scenarios and the International Commission on Radiological Protection (ICRP) biokinetics model for lead was used for this purpose.

The ICRP model has not been validated by U.S. EPA as a regulatory model for lead risk assessment. However, the model can be used to evaluate exposure durations of one day and simulate blood lead concentration dynamics associated with highly intermittent daily exposures, as well as simulate age-dependent and particle size-dependent deposition and clearance of inhaled lead in the respiratory tract (ICRP, 1994; Leggett, 1993). These types of simulations can only be approximated with the IEUBK model because it simulates exposures in time steps of 1 year (i.e., age-year average exposures) and lumps the simulation of deposition, mechanical clearance, and absorption of inhaled lead into a single absorption term representing the combined processes of gastrointestinal and respiratory tract absorption of inhaled lead. Thus, the ICRP model for lead was used to derive soil cleanup goals that are protective for short-term, intermittent ORV use at St. Joe State Park.

The ICRP model used in this analysis consists of a systemic biokinetics model (Leggett, 1993) and a human respiratory tract model (ICRP, 1994). The Leggett model simulates age-dependent kinetics of tissue distribution and excretion of lead ingestion and inhalation intakes. The Leggett model was developed for the ICRP for calculating radiation doses from bone-seeking radionuclides, including radioisotopes of lead (Leggett, 1985, 1992a, b). The model has been used to develop cancer risk coefficients for internal radiation exposures to lead and other alkaline earth elements that have biokinetics similar to those of calcium (ICRP, 1993; EPA, 1998b). The model has also been used to predict blood lead concentrations expected from inhalation (Khoury and Diamond, 2003) and ingestion (Abrahams *et al.*, 2006; Lorenzana *et al.*, 2005; Pounds and Leggett, 1998) of lead in children for risk assessment applications.

The ICRP human respiratory tract model (HRTM) was developed for calculating radiation doses resulting from inhalation of radionuclide particulates (ICRP, 1994). The model simulates deposition, retention, and absorption of inhaled lead particulates, when specific parameters for lead clearance are used in the model. In this analysis, the ICRP HRTM was used because it provides a more physiological simulation (compared to the Leggett model) of the dependence of particle deposition on age, activity level, and particle sizes that are more likely to be relevant to the St. Joe State Park exposure scenarios (e.g., 1-10  $\mu\text{m}$  particles).

The ICRP model was used to generate soil cleanup goals for two health protection goals for the ORV rider only: (1) no greater than a 5% probability of young children having a blood lead concentration of 10  $\mu\text{g}/\text{dL}$  ( $P_{10} \leq 5\%$ ); and (2) no greater than a 5% probability of young children having a blood lead concentration of 20  $\mu\text{g}/\text{dL}$  ( $P_{20} \leq 5\%$ ). The health protection goal of  $P_{10} \leq 5\%$  reflects current U.S. EPA policy for exposures of at least 90 days (EPA, 1994b, 1998a). The  $P_{20} \leq 5\%$  goal was adopted for short-term exposures relevant to ORV riders at the Park ( $\leq 14$  days). Selection of a health protection goal applicable to acute elevations in blood lead concentrations is problematic because there is no consensus about health risks that might be associated with elevations in blood lead concentrations below 20  $\mu\text{g}/\text{dL}$  that persist for only a few days. The use of 20  $\mu\text{g}/\text{dL}$  in this analysis reflects the CDC recommendation that 20  $\mu\text{g}/\text{dL}$  should be a trigger level for medical evaluation (CDC, 1991) and is not intended to imply that 20  $\mu\text{g}/\text{dL}$  is a threshold for health effects in children exposed acutely to lead.

In addition, ICRP model simulations were used to predict blood lead concentrations associated with riding ORVs at the Park. The simulations predict maximum blood lead concentrations and the total number of days  $P_{10} > 5\%$  and  $P_{20} > 5\%$  for a variety of ORV rider exposure scenarios.

### 3.2. Exposure Assumptions

The exposure assumptions for ORV riders are the same as those used in the IEUBK model, except for the differences discussed below. The Park survey indicated that 0 to 6 year old children ride ORVs an average of 8 times per year and a maximum of 35 visits (Morgan and Cole, 2004). Because there are no data on the number of consecutive days that ORV riders visit St. Joe State Park, we used camping reservation data to select a range of plausible exposure scenarios for ORV riders. In 2007, campers stayed at the Park for an average of 2.6 days and the longest stay was 14 days (J. Yancy, personal communication, September 3, 2008). About 88% of the total reservations were for 3 days or less, while less than 2% of the total reservations were for 7 to 14 days. Based on this information and the survey data, cleanup goals were generated assuming that ORV riders visit the Park for 3, 7, 10, or 14 consecutive days.

In addition to ORV rider exposure at the Park, the ICRP model accounted for exposure to lead in residential soil, indoor dust, and other media (e.g., diet). Residential exposures to lead in environmental media were simulated with the ICRP model as a constant ingestion intake that approximated the IEUBK model predicted blood lead concentration profiles for 3 to 7 year old children exposed to a soil lead concentration of 200 mg/kg. This baseline simulation reproduces the average blood lead concentration predicted from the IEUBK model for 3 to 7 year olds ( $\approx 3.8$   $\mu\text{g/dL}$ ). Soil cleanup goals are based on ORV rider exposure occurring at age 3.5 years because the predicted residential baseline blood lead concentration is highest at this age.

Exposures to airborne lead at the Park were simulated in the ICRP model as a constant inhalation lead intake ( $\mu\text{g/day}$ ), which assumed an airborne lead concentration of  $4.2 \mu\text{g/m}^3$ , a ventilation rate of  $0.45 \text{ m}^3/\text{hr}$ , for an exposure duration of 4 or 8 hours/day. The ventilation rate represents a 50:50 weighting of estimated ventilation rates of 5-year old children sitting while awake ( $0.32 \text{ m}^3/\text{hr}$ ) and engaging in light exercise ( $0.57 \text{ m}^3/\text{hr}$ ) (from Table 8 of ICRP, 1994).

In the absence of data on particle sizes of airborne lead at the Park, the deposition of particle sizes of 1, 3, 5 and  $10 \mu\text{m}$  was evaluated to determine the effect on predicted blood lead concentration. The simulations show that varying particle size over the range of 1 to  $10 \mu\text{m}$  has a relatively small effect on the predicted blood lead concentrations, with exposure to  $5 \mu\text{m}$  particles resulting in the highest maximum blood concentration. Thus, the cleanup goals were generated assuming exposure to  $5 \mu\text{m}$  particles (Mass Median Aerodynamic Diameter or MMAD) while riding ORVs at St. Joe State Park.

The ICRP model simulates age-dependent absorption fractions of ingested lead that range from 45% for the ages 0 to 3 months, then declining to 30% at age 1 year and remaining constant at 30% for older ages. The absorption fraction for ages 3 to 7 years is identical to the IEUBK model default absorption fraction or absolute bioavailability of soil and dust at low ingestion intakes (30%). Inhaled lead deposited in the respiratory tract and mechanically cleared to the gastrointestinal tract was assumed to have an absolute bioavailability of 30% (the default value for the ICRP model for ages 3 to 7 years), rather than 24.25% for lead directly ingested as

surface dust or soil. The assumption of higher relative bioavailability was based on consideration of the relatively small particle size of the deposited lead ( $\leq 10 \mu\text{m}$ ) which will likely be absorbed to a greater extent.

### 3.3 Results

Soil lead cleanup goals for St. Joe State Park were derived by iterative simulation of soil lead concentrations until the following health protection goals were achieved: (1)  $P10 \leq 5\%$ , based on the mean blood lead concentration for the ORV rider exposure duration (MeanP10  $\leq 5\%$ ); (2)  $P20 \leq 5\%$ , based on the mean blood lead concentration for the ORV rider exposure duration (MeanP20  $\leq 5\%$ ); (3)  $P10 \leq 5\%$ , based on the maximum blood lead concentration for the ORV rider exposure duration (MaxP10  $\leq 5\%$ ); or (4)  $P20 \leq 5\%$ , based on the maximum blood lead concentration for the site exposure duration (MaxP20  $\leq 5\%$ ).

Tables 2 and 3 summarize the soil cleanup goals for a 3.5 year old riding an ORV for 4 or 8 hours/day, respectively. The cleanup goals decrease with increasing duration of exposure from 3 to 14 consecutive days, and with increasing soil ingestion rates from 100 to 400 mg/day. For an exposure of 4 hours/day, the cleanup goals based on the MeanP10  $\leq 5\%$  range from 124 mg/kg to 3,227 mg/kg, while the cleanup goals based on the MeanP20  $\leq 5\%$  range from 414 mg/kg to 10,188 mg/kg (see Table 2). For an exposure of 8 hours/day, the cleanup goals based on the MeanP10  $\leq 5\%$  range from 112 mg/kg to 3180 mg/kg, while the cleanup goals based on the MeanP20  $\leq 5\%$  range from 402 mg/kg to 10,156 mg/kg (see Table 3).

The soil cleanup goals increased in approximate proportion to the assumed soil ingestion rate. In other words, the cleanup goals increased by a factor of approximately 4 when the assumed site soil ingestion was decreased from 400 mg/day to 100 mg/day. Similarly, cleanup goals increased in approximate proportion to decreasing exposure duration as they increased by approximately 14/3 when the assumed site exposure duration was decreased from 14 days to 3 days. In addition, cleanup goals for exposures of 4 hr/day were 1 to 21% higher than those for exposures of 8 hr/day depending on the risk metric (compare Tables 2 with Table 3). The disproportionate effect of daily exposure time on the cleanup goals (as opposed to the nearly proportionate effect of soil ingestion rate or days of exposure), reflects the relatively small contribution of airborne lead to predicted blood lead concentration.

The ICRP model simulations were also used to predict blood lead concentrations associated with riding ORVs at the Park. The simulations predict maximum blood lead concentrations and the total number of days  $P10 > 5\%$  and  $P20 > 5\%$  for a variety of exposure scenarios for ORV riders at 3.5 years of age.

Table 4 summarizes predicted maximum blood lead concentrations and the total number of days  $P10 > 5\%$  and  $P20 > 5\%$  for a range of ORV rider exposure scenarios (e.g., soil lead concentrations of 500, 600 or 700 mg/kg; soil ingestion rates of 200 or 400 mg/day; exposure

durations of 3, 7, or 14 days). The maximum blood lead concentration for all scenarios evaluated is 23.1  $\mu\text{g/dL}$ . For this scenario, the blood lead concentration exceeds 4.6  $\mu\text{g/dL}$  for 55 days. This is equivalent to exceeding a 5% probability of 10  $\mu\text{g/dL}$ , assuming a Geometric Mean (GM) blood lead concentration equal to 4.6  $\mu\text{g/dL}$  and a Geometric Standard Deviation (GSD) equal to 1.6. The predicted blood concentration also exceeds 9.2  $\mu\text{g/dL}$  for a total of 24 days, which is equivalent to exceeding a 5% probability of 20  $\mu\text{g/dL}$ , assuming a GM blood lead concentration equal to 9.2  $\mu\text{g/dL}$  and a GSD equal to 1.6. Table 4 also shows that the predicted maximum blood lead concentration does not exceed 10  $\mu\text{g/dL}$  until an ORV rider visits the Park for at least 7 consecutive days and ingests 400 mg of soil per day.

#### 4. Uncertainties

There are a number of uncertainties associated with the soil cleanup goals for St. Joe State Park. This section discusses the main sources of uncertainty in deriving cleanup goals for the Park.

The soil ingestion rate of ORV riders has a significant impact on predicted blood lead levels and soil cleanup levels. While it is likely that riding off-road vehicles will result in increased incidental ingestion of soil and inhalation of particles that are mechanically cleared to the gastrointestinal tract, data are not available to establish a soil ingestion rate for this type of exposure scenario. This analysis used a range of soil ingestion rates, which is consistent with EPA lead risk assessment guidance (EPA, 2003), but we do note that a soil ingestion rate of 400 mg/day should be considered an upper bound estimate.

Based on the large number of individuals that ride ORVs at St. Joe State Park, there is undoubtedly a wide range of riding activity patterns (e.g., days per week, days per year, hours per day, etc.). In this assessment, we assumed that 3 to 7 year old ORV riders visit the Park every week for a minimum of 13 weeks. This is a significant uncertainty because there is no reliable information on individual rider behavior and exposure frequency has a significant impact on cleanup goals.

In deriving soil cleanup goals, we assumed a background residential soil lead concentration of 200 mg/kg, which is based on data for St. Francois County and the surrounding 7 counties. If lead concentrations in residential yard soil are lower or higher than this value, then soil cleanup goals for the Park will be impacted because they are based on cumulative exposure from the Park and a child's residence.

Another exposure uncertainty is the extent that Park soils are tracked into the home and the impacts on indoor dust concentrations. For the purpose of developing bounding estimates, the default outdoor soil to indoor dust mass transfer variable (i.e.,  $M_{SD}$ ) was used to estimate indoor dust lead concentrations from the time-weighted Park soil concentration. However, the IEUBK model default  $M_{SD}$  was not developed for a situation where a significant source of lead is distant from the house. It is unknown whether using the default  $M_{SD}$  under- or over-estimates

indoor dust lead concentrations for individuals who ride ORVs at St. Joe State Park.

The cleanup goals were derived assuming that soil and dust intake is not reduced at the residence on those days that children visit the Park. While this results in "double-counting" of lead soil and dust intake to a limited extent, it does not significantly impact the cleanup goals.

The IEUBK model can only provide an approximation of quasi-steady-state PbB concentrations during non-continuous exposure scenarios, such as riding ORVs, because the model assumes constant exposures during each age-year (EPA, 2003). As a result, the temporary increase in PbB lead concentration that occurs following intermittent exposure may be underestimated when using a time-weighted average approach.

A major uncertainty affecting the blood lead concentrations and cleanup goals predicted from the ICRP model are assumptions regarding absorption kinetics of lead deposited in the respiratory tract. Assumptions used in the simulations are based on recommendations by the ICRP for estimating radiation cancer risks from exposures to inhaled radionuclides of lead (ICRP 2001). If the rate of lead absorption is underestimated, this will result in an underestimation of the contribution of the inhalation pathway to blood lead concentration (i.e., when assessed over the relatively short time periods in this analysis) and, thereby, overestimation of soil cleanup goals.

## 5. Conclusions

Because there are significant uncertainties associated with deriving soil cleanup goals for St. Joe State Park, it is not possible to select one value that is protective of young children who visit ORV riding areas or who are exposed to Park soil that is tracked back to the home. Rather, we recommend that a range of cleanup goals be considered based on a weight-of-evidence approach.

The soil cleanup goals in Table 1 should be given the greatest weight because the IEUBK model is recommended as the primary tool for setting risk-based soil cleanup levels at lead sites (EPA, 1994a, 1998b). In addition, the cleanup goals are based on EPA's health protection goal ( $P10 \leq 5\%$ ) for long-term exposure to lead. We recommend initially considering the shaded values as a range of plausible cleanup goals from 470 mg/kg to 1,120 mg/kg. These values are based on riding ORVs for 2 days/week, for 4 or 8 hours/day, and assuming soil/dust ingestion rates equal to the IEUBK default values or 200 mg/day. We consider this a plausible range because local ORV riders may visit the Park every weekend during the warmest months of the year. Moreover, it is unlikely that parents will take 3 to 7 year old children to the Park to ride off-road vehicles for 3 or 4 days per week for 13 consecutive weeks.

Although the ICRP model is not considered a validated regulatory model by U.S. EPA for lead-risk assessment, the model provides a way of exploring the potential short-term dynamics of blood lead concentration that might result from highly intermittent exposures to soil

and airborne lead at the Park. Short-term elevations of blood lead could occur that might be problematic, even though longer-term averages predicted by the IEUBK model are below that level of concern. The cleanup goals based on the ICRP model (Tables 2 to 4) are more difficult to interpret from a regulatory perspective because health risks of acute elevations in blood lead concentrations below 20  $\mu\text{g}/\text{dL}$  are not well understood. A blood lead level of 20  $\mu\text{g}/\text{dL}$  was used to derive soil cleanup goals because CDC has recommended 20  $\mu\text{g}/\text{dL}$  as a trigger level for medical intervention (CDC, 1991). Use of this value does not imply that 20  $\mu\text{g}/\text{dL}$  is considered a threshold for health effects in children exposed acutely to lead. However, there is general agreement that a blood lead concentration above 20  $\mu\text{g}/\text{dL}$  should be avoided (Khoury and Diamond, 2003).

In evaluating the results in Tables 2 and 3, we placed greater weight on the cleanup goals for the MeanP10  $\leq 5\%$  and MeanP20  $\leq 5\%$ . These values based on the mean blood lead concentration for the ORV rider exposure duration, which is consistent with how the cleanup goals for long-term exposure were derived. We also consider the cleanup goals based on soil ingestion rates of 100 and 200 mg/day more relevant than 400 mg/day, which is an upper bound value. These values are shaded in Tables 2 and 3. The majority of values are greater than or within the range of plausible cleanup goals for long-term exposure (shaded values in Table 2), except for the 2 scenarios based on 10 and 14 days of consecutive exposure. However, there are likely very few, if any, cases where young children ride ORVs for 10 or 14 consecutive days.

Values in Table 4 that are considered most relevant for selecting a range of cleanup goals are found in the shaded cells. The results show that the maximum predicted blood lead concentration will exceed 10  $\mu\text{g}/\text{dL}$  if a 3.5-year-old child rides an off-road vehicle for 14 consecutive days, for 8 hours/day, and ingests 200 mg/day of Park soil, and the soil lead concentration exceeds 500 mg/kg. If a child is exposed to the same Park soil lead concentration (500 mg/kg) during 3 consecutive days of ORV riding, the maximum blood lead concentration would be 4.9  $\mu\text{g}/\text{dL}$  and the P10 would exceed 5% for a similar period of 3 days. Furthermore, at no time during or after the 3-day exposure to 500 mg/kg, would the P20 exceed 5%. Exposures to higher Park soil concentrations for longer periods result in more prolonged periods in which the P10 and/or P20 would exceed 5%. The P20 exceeds 5% with 7 days of consecutive exposure to lead at concentrations  $\geq 700$  mg/kg in Park soil. Based on these predictions, exposures to 500 mg/kg in Park soil lasting less than 3 consecutive days, and assuming a site soil ingestion rate of 200 mg/day, would not be expected to result in blood lead concentrations that would be of regulatory concern (i.e., P10  $> 5\%$ ). However, exposures for longer periods and to higher soil lead concentrations may produce short-term elevations of blood lead concentration in some children ( $>5\%$ ) above 10 or 20  $\mu\text{g}/\text{dL}$ .



After considering the long-term and short-term cleanup goals, as well as the predicted blood concentrations, we recommend a soil cleanup goal in the range of 500 to 600 mg/kg for St. Joe State Park. This evaluation is specific to scenarios associated with riding ORVs in St. Joe State Park. While the soil cleanup goals are protective of human health under the assumed exposure conditions, the final decision regarding an appropriate cleanup goal for the Park rests with the Superfund program.

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Attachments

Table 1. Soil Cleanup Goals for Long-Term Exposure

Off-Road Vehicle Rider Soil Cleanup Goals (36 to 84 month child)

Scenario 1: Yard Soil = 200 mg/kg with ORV Tailings Track-In

Soil/Dust Ingestion Rate (IR)	Riding Time (hours)	Exposure Frequency			
		1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUSK Model Default	4	1,840	770	530	390
IR = 200 mg/day-ORV	4	995	460	320	240
IR = 400 mg/day-ORV	4	545	270	175	130
IR = IEUSK Model Default	8	1,810	775	530	390
IR = 200 mg/day-ORV	8	980	470	305	220
IR = 400 mg/day-ORV	8	535	265	165	120

Off-Road Vehicle Rider Soil Cleanup Goals (36 to 84 month child)

Scenario 2: Yard Soil = 200 mg/kg without ORV Tailings Track-In

Soil/Dust Ingestion Rate (IR)	Riding Time (hours)	Exposure Frequency			
		1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUSK Model Default	4	2,270	1,130	730	540
IR = 200 mg/day-ORV	4	1,200	590	385	285
IR = 400 mg/day-ORV	4	660	295	195	140
IR = IEUSK Model Default	8	2,235	1,075	690	500
IR = 200 mg/day-ORV	8	1,180	590	385	285
IR = 400 mg/day-ORV	8	630	285	180	130

Residential Child Soil Cleanup Goals (0 to 84 month child)

Scenario 3: Yard Soil = 200 mg/kg with ORV Tailings Track-In

Soil/Dust Ingestion Rate (IR)	Exposure Frequency			
	1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUSK Model Default (Dust RBA = 60%)	1,600	660	455	330
IR = IEUSK Model Default (Dust RBA = 42.5%)	1,320	530	360	265

Table 2. Soil Cleanup Goals for 4 hr/day Park Exposure at Age 3.5 Years

Exposure Parameters			Cleanup Goals			
Exposure Frequency (hr/day)	Exposure Duration (days)	Soil Ingestion Rate (mg/day)	Mean P10 $\leq$ 5% (mg/kg)	Mean P20 $\leq$ 5% (mg/kg)	Maximum P10 $\leq$ 5% (mg/kg)	Maximum P20 $\leq$ 5% (mg/kg)
4	14	100	167	1,355	265	639
4	14	200	248	407	134	409
4	14	400	124	414	97	235
4	10	100	77	2,308	343	1,172
4	10	200	336	1,132	171	535
4	10	400	179	575	80	293
4	7	100	107	3,498	473	1,579
4	7	200	534	1,710	236	739
4	7	400	267	855	118	365
4	3	100	1,227	1,038	1,270	4,128
4	3	200	613	3,094	632	2,064
4	3	400	307	2,547	319	1,032

**Table 3. Soil Cleanup Goals for 8 hr/day Park Exposure at Age 3.5 Years**

Exposure Parameters			Cleanup Goals			
Exposure Frequency (hr/day)	Exposure Duration (days)	Soil Ingestion Rate (mg/day)	Mean P10 ± 5% (mg/kg)	Mean P20 ± 5% (mg/kg)	Maximum P10 ± 5% (mg/kg)	Maximum P20 ± 5% (mg/kg)
8	14	100	150	1,800	222	292
8	14	200	228	300	111	448
8	14	400	112	402	55	223
8	10	100	850	2,210	297	1,129
8	10	200	330	1,109	143	563
8	10	400	160	554	74	291
8	7	100	1,225	3,412	427	1,583
8	7	200	610	1,706	213	766
8	7	400	256	853	107	393
8	3	100	3,180	10,180	1,230	4,082
8	3	200	1,590	5,075	619	2,041
8	3	400	795	2,539	310	1,021

**Table 4. Blood Lead Concentration Profiles for Park Exposure at Age 3.5 Years<sup>1</sup>**

Exposure Frequency (hr/day)	Exposure Duration (days)	Soil Ingestion Rate (mg/day)	Soil Lead Concentration (mg/kg)	Maximum Blood Lead Concentration (µg/dL)	P10 > 5% (days)	P20 > 5% (days)
8	14	400	700	23.1	55	24
8	14	400	500	20.3	46	22
8	14	400	300	17.4	42	18
8	14	200	700	13.1	34	16
8	14	200	500	11.7	30	9
8	14	200	300	10.3	27	5
8	7	400	700	16.0	29	11
8	7	400	500	14.1	26	9
8	7	400	300	12.2	23	7
8	7	200	700	9.0	18	5
8	7	200	500	8.5	16	0
8	7	200	300	7.5	14	0
8	3	400	700	9.0	14	0
8	3	400	500	8.1	12	0
8	3	400	300	7.2	10	0
8	3	200	700	6.3	7	0
8	3	200	500	6.1	5	0
8	3	200	300	4.9	3	0

<sup>1</sup>Exposure to Park soil and airborne particulates occurred at age 3.5 years. The site air lead concentration was assumed to be 4.2 µg/m<sup>3</sup> (MMAD = 5 µm). Park soil ABA was assumed to be 24.25%.



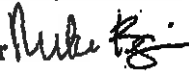
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7  
901 NORTH 5TH STREET  
KANSAS CITY, KANSAS 66101

DEC 10 2008

MEMORANDUM

**SUBJECT:** Revised Soil Cleanup Goals for St. Joe State Park  
St. Francois County, Missouri

**FROM:** Mike Beringer   
Toxicologist  
ENSV/EAMB

**TO:** Jason Gunter  
Remedial Project Manager  
SUPR/FPSE

In a November 19, 2008, memorandum, we provided soil cleanup goals for long-term and short-term exposure to lead at St. Joe State Park. Upon further review, we have determined that the long-term cleanup goals in Table 1 were incorrectly derived for Scenario 3. This scenario is applicable to a local residential child (0 to 84 months of age) who does not visit the Park, but is exposed to lead-bearing soil/dust tracked back to the residence by siblings or parents who visit off-road vehicle (ORV) riding areas.

We revised the cleanup goals for Scenario 3 so that they are now consistent with the approach used for Scenarios 1 and 2. More specifically, the residential yard soil concentration was set equal to 200 mg/kg and the tracked-in soil/dust concentration was time-weighted by the number of days per week of ORV riding (e.g., 1/7, 2/7, 3/7, 4/7). The time-weighted concentration was multiplied by the age-specific ingestion rate, the dust ingestion weighting factor of 55%, and the IEUBK model default outdoor soil to indoor dust transfer variable (i.e.,  $M_{SD}$ ) of 0.7 to obtain an indoor dust intake of lead. This result was entered into the Alternate Source Menu of the Integrated Exposure Uptake Biokinetic (IEUBK) Model to account for additional ingestion of lead-bearing soil/dust tracked in from the Park. We also assumed an absolute bioavailability of 24.25% for tracked-in material and 30% for background residential soil/indoor dust.

The revised cleanup goals for Scenario 3 range from 1,005 to 4,015 mg/kg (see attached Table 1). All other cleanup goals and predicted blood concentrations are unchanged from the November 19, 2008, memorandum. Last of all, the revised cleanup goals do not impact our previous conclusions and we continue to recommend a soil cleanup goal for lead in the range of 500 to 600 mg/kg for St. Joe State Park.

Attachment



**Table 1. Soil Cleanup Goals for Long-Term Exposure**

**Off-Road Vehicle Rider Soil Cleanup Goals (36 to 84 month child)**  
**Scenario 1: Yard Soil = 200 mg/kg with ORV Tailings Track-in**

Soil/Dust Ingestion Rate (IR)	Riding Time (hours)	Exposure Frequency			
		1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUBK Model Default	4	1,340	365	590	390
IR = 200 mg/day-ORV	4	905	430	320	240
IR = 400 mg/day-ORV	4	545	270	175	130
IR = IEUBK Model Default	8	1,340	365	590	390
IR = 200 mg/day-ORV	8	905	430	320	240
IR = 400 mg/day-ORV	8	545	265	165	120

**Off-Road Vehicle Rider Soil Cleanup Goals (36 to 84 month child)**  
**Scenario 2: Yard Soil = 200 mg/kg without ORV Tailings Track-in**

Soil/Dust Ingestion Rate (IR)	Riding Time (hours)	Exposure Frequency			
		1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUBK Model Default	4	2,270	1,120	790	540
IR = 200 mg/day-ORV	4	1,200	365	365	285
IR = 400 mg/day-ORV	4	300	265	195	140
IR = IEUBK Model Default	8	2,235	1,115	690	500
IR = 200 mg/day-ORV	8	1,180	365	365	285
IR = 400 mg/day-ORV	8	390	265	190	130

**Residential Child Soil Cleanup Goals (0 to 84 month child)**  
**Scenario 3: Yard Soil = 200 mg/kg with ORV Tailings Track-in**

Soil/Dust Ingestion Rate (IR)	Exposure Frequency			
	1 day/wk	2 days/wk	3 days/wk	4 days/wk
IR = IEUBK Model Default (Dust RBA = 48.5%)	4,015	2,010	1,340	1,005

## APPENDIX B

### Statement of Work for the Federal Tailings Pile Site

#### REMOVAL ACTION

##### I. *Purpose*

This Removal Action Statement of Work (SOW) sets forth removal action requirements for the Federal Tailings Pile Site (the Site). The Site includes the areas outlined in Attachment 2 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC). This SOW is an appendix to and is incorporated as part of the AOC entered into by Respondents and EPA, Docket No. CERCLA-07-2009-0012.

The Respondents (Doe Run Resources Corporation and the State of Missouri-Department of Natural Resources-Division of State Parks) shall conduct a removal action on the Site to stabilize erosion, reduce wind-blown mine tailings, and reduce the potential for exposure to hazardous substances which are present at the Site and which present a threat to human health and the environment. Hazardous substances present at the Site include lead and other metals which are contained in material deposited at the Site during the mining and processing of lead ores. The removal action shall comply with and be conducted in accordance with the Action Memorandum for the Site issued by EPA Region VII in September 2009, which is attached as Appendix A to the AOC.

Following completion of construction of the removal action, Respondents shall ensure that all post-removal actions needed to ensure the continued long-term integrity and effectiveness of the completed removal action as constructed by the Respondents and approved by EPA are performed.

##### II. *Removal Action Work Plan (Work Plan)*

Within 60 days of issuance of the AOC, Respondents shall prepare and submit for EPA review and approval a Work Plan which presents the plans and specifications for the removal action, and describes the proposed tasks and schedules associated with implementation of the action. The Work Plan shall be provided to EPA in both paper and electronic format. Electronic format text shall be provided in Microsoft Word software. One paper copy of the Work Plan shall also be provided to Mr. Gregory Bach with the Missouri Department of Natural Resources (MDNR). The Work Plan shall demonstrate sound engineering judgment and be reviewed and stamped with the seal of a registered professional engineer registered in the state of Missouri prior to submittal to EPA. The Work Plan shall provide the following:

**A. Management Chapter**

A clear and concise description of roles, relationships and assignment of responsibilities among the Work Respondents, Project Coordinator, Quality Assurance Officer, Construction Supervisor, and Construction Personnel.

**B. Construction Chapter**

The Work Plan shall include information necessary to implement the removal action, including:

1. Designs, plans and specifications, and other construction documents necessary to achieve erosional and geotechnical stability of the Site.
2. Field data collected, supporting calculations, designs, drawings and specifications which demonstrate that the construction will achieve long-term reduction in threat of release of hazardous substances. Among the design aspects to be addressed are the following:
  - a. specifications of materials (soil and rock) to be brought on site for final cover, including its gradation and total lead, cadmium, and zinc concentrations; cover soil shall contain no more than 25 percent rock by weight; cover rock type and gradation, screening techniques to minimize cover rock fines less than 1 inch diameter;
  - b. description of the revegetation strategy including seeding, fertilizer, proposed amendments, off-site soil sources, and any temporary seeding strategy; soil cover shall be a minimum of 6 inches thick on gently sloping and flat areas of the Site and as delineated in the EE/CA; seed mix shall consist of a mixture of perennial native grasses, legumes and forbs; cover soil shall be rolled and prepped as appropriate for seeding; seeding schedule; identification of fertilizers; application rates and times; identification of soil amendments and application rates; hydromulching;
  - c. description of construction methods, equipment, and personnel to accommodate the placement of cover material at the final grade; and
  - d. any assumptions made by the Respondents in developing design parameters shall be clearly stated and supported by

sound engineering practice;

3. Removal Action Schedule that describes each phase of the removal action. For each construction milestone the schedule shall provide specific time periods starting from the EPA-approval of the Work Plan to completion of the construction milestones and the project. Grading and cover placement shall be completed within two (2) years of the effective date of the AOC;
4. Detailed description of Site preparation activities, including access agreements, establishment of security and control, definition of clearing and grubbing limits, establishment of work and support areas, and definition of decontamination areas;
5. Description of construction quality control process necessary to successfully construct the design including grade control method and geotechnical sampling during construction;
6. Dewatering contingency plans and fluids management procedures including details for drainage ways, weirs, and retention basins;
7. Run-on and Run-off controls during construction, including location, frequency, and methods for collecting water samples which will ensure compliance with NPDES or other water quality standards;
8. Spill prevention and management;
9. Detailed description of on-site soil storage and waste processing methods;
10. Design of a dust suppression program to be used during site material handling activities, and description of the methods to be used to control fugitive dust and monitor air quality. The regrading and construction techniques must minimize the release of contaminants via airborne emissions and surface runoff. Chemical dust suppressants and/or water shall be used during Site activities to minimize generation of airborne emissions. Respondents must monitor the ambient air during stabilization and cover construction. Ambient air monitored during performance of the removal activities shall meet National Primary and Secondary Ambient Air Quality Standards and/or levels protective of human health as determined by EPA;
11. List of heavy equipment and operators dedicated to the project and a description of decontamination procedures for heavy equipment;

12. Identification of the method of transportation for any contaminated materials to be removed from the Site, manifesting requirements in accordance with federal and state Department of Transportation (DOT) regulations and material quantity accounting procedures. In addition, the Respondents shall provide written notice prior to any off-site shipment of hazardous material;
13. A description of how the removal action will comply with ARARs and meet substantive permitting requirements.

C. Quality Assurance Project Plan (QAPP) Chapter

For all chemical analyses, the Respondents shall discuss the field sampling protocol, frequency of sampling, parameters to be analyzed, and the name and certification requirements for all laboratories to be used. Chemical analysis will be conducted for at least the following activities:

1. compliance with ARARs (e.g., NPDES parameters);
2. analysis to document clean cover materials; and
3. analysis to confirm removal of tailings from Eaton Creek.

III. *Site Specific Health and Safety Plan (SSHP)*

The Respondents are responsible for developing and implementing a health and safety program that is in compliance with OSHA regulations and protocols. The SSHP shall cover both design data collection and construction activities. The SSHP shall be completed prior to intrusive field work. EPA will review the plan to assure that all necessary elements are included, but will not provide formal approval.

IV. *Execution*

The Respondents shall execute the Removal Action in accordance with the EPA-approved Work Plan. As specified in Section 104(a)(1) of CERCLA, as amended by SARA, EPA will provide oversight of the Respondent's activities throughout the Removal Action. Respondent shall support EPA's initiation and conduct of activities related to the implementation of oversight activities.

V. *Removal Action Report*

Respondents shall submit for EPA review and approval a *Removal Action Report* within sixty (60) days after the activities described herein have been accomplished. One copy shall also be provided to MDNR. The *Removal Action*

*Report* shall include as-built drawings of final constructed configurations; a description of measures taken on this portion of the Site; quality control and monitoring results during construction; documentation that a sufficient cover has been established, in compliance with ARARs set forth in the Action Memorandum and EE/CA; and empirical data, observations, photographs of Site construction, and calculations which demonstrate that the removal action will provide long-term erosional stability of the pile. The *Removal Action Report* shall be reviewed and stamped with the seal of a registered professional engineer registered in the state of Missouri. The *Removal Action Report* shall also include the following certification signed by a person who supervised or directed the preparation of the Report:

“Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved with the preparation of this 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.”

#### VI. *Post-Removal Site Control*

The Respondents shall provide long-term operations and maintenance of the tailings areas and retention basins to ensure the long-term effectiveness and integrity of the removal action as constructed by the Respondents and as described in the EPA approved *Removal Action Report*. At the same time that the Respondents submit to EPA the *Removal Action Report*, the Respondents shall also submit for EPA review and approval a *Post-Removal Site Control Plan* (the Plan) in both paper copy and electronic format. This Plan shall provide for all inspection, operation, and maintenance measures that are necessary to ensure the continued long-term effectiveness and integrity of the removal action for the Site. The Plan shall provide a schedule for the implementation of repair and maintenance work at the Site. Once approved by EPA, the Respondents shall implement the *Post-Removal Site Control Plan*.

The Plan shall describe timing and details of sampling inspection processes, steps to develop corrective actions, EPA notification process for non-routine issues, measures to enhance and repair vegetation growth, measures to repair rocked slopes, and land-use development. At a minimum, the Site shall be inspected by the Respondents every 6 months. The *Post-Removal Site Control Plan* shall be reviewed and stamped with the seal of a registered professional engineer registered in the state of Missouri.

The Respondents shall provide EPA with a written inspection report of the Site condition within thirty (30) days of the end of each 6-month Site inspection period. At a minimum, the inspection report shall provide a description of the condition of the rock cover, soil cover, vegetation, and Site security measures.

The report shall also provide all data results for samples collected at the Site and describe the details of any damage/deterioration to the cover materials. The Inspection Reports shall be certified in writing as described in Section V of this SOW.

VII. *Community Relations*

Because the community has an interest in the ultimate use of the properties, the Respondents shall provide copies of the final Work Plan, design documents, and other pertinent information to the EPA. EPA will then submit the information to the Site Repository, located at the St. Francois County Health Center. The Respondents shall also participate, as requested by the EPA, in meetings with the EPA and the community to discuss design and or construction issues.

VIII. *Monthly Progress Reports*

Throughout the course of the removal action until the *Removal Action Report* approval by EPA, the Respondents shall submit to the EPA written monthly progress reports in accordance with the AOC. The monthly progress reports shall include, at a minimum:

1. A description of the actions completed during the reporting period;
2. A description of actions scheduled for completion during the reporting period which were not completed along with a statement indicating why such actions were not completed and an anticipated completion date;
3. Copies of all sampling and test results received during the reporting Period;
4. Any proposed revisions to the project schedule for review and approval by EPA; and,
5. A description of the actions which are scheduled for completion during the next reporting period.

IX. *Schedule of Deliverables*

<u>Deliverable</u>	<u>Schedule</u>
Quality Assurance Project Plan	60 days after issuance of AOC
Removal Action Work Plan	60 days after issuance of AOC
Health and Safety Plan	60 days after issuance of AOC

<b>Notice to Proceed</b>	<b>Upon EPA approval of QAPP, RAWP and HASP</b>
<b>Removal Action</b>	<b>Within two years of the issuance of AOC</b>
<b>Removal Action Report</b>	<b>Within 60 days after the completion of the Removal Action.</b>
<b>Post-Removal Site Control Plan</b>	<b>Within 60 days after the completion of the Removal Action.</b>
<b>Monthly Progress Reports</b>	<b>End of each month after issuance of AOC</b>