UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 8

IN THE MATTER OF: Smurfit Stone Mill Site Missoula, Missoula County, Montana BNSF Railway Co. and Montana Rail Link, Inc., Respondents Proceeding Under Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622	CERCLA Docket No. CERCLA-08-2021-0004 **ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION**

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent (Settlement) is entered into voluntarily by the United States Environmental Protection Agency (EPA) and Montana Rail Link, Inc. and BNSF Railway Co. (Respondents). This Settlement provides for the performance of a removal action by Respondents and the payment of certain response costs incurred by the United States at or in connection with the Removal Action Area of the Smurfit Stone Mill Site (Site) generally located at 14377 Pulp Mill Road, Missoula, Montana, approximately 11 miles northwest of the City of Missoula, Montana, and approximately 3 miles south of the town of Frenchtown, Montana.

2. This Settlement 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 (CERCLA). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2923 (Jan. 29, 1987), and further delegated to Regional Administrators by EPA Delegation Nos. 14-14C (Administrative Actions through Consent Orders, Jan. 18, 2017) and 14-14D (Cost Recovery Non-Judicial Agreements and Administrative Consent Orders, Jan. 18, 2017). This authority was further redelegated by the Regional Administrator of EPA Region 8 to the undersigned EPA officials.

3. EPA has notified the State of Montana (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 has been negotiated in good faith and that the actions undertaken by Respondents in accordance with this Settlement 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, the validity of the findings of facts, conclusions of law, and determinations in Sections IV (Findings of Fact) and V (Conclusions of Law and Determinations) of this Settlement. Respondents agree to comply with and be bound by the terms of this Settlement and further agree that they will not contest the basis or validity of this Settlement or its terms.

II. PARTIES BOUND

5. This Settlement 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.

6. Respondents are jointly and severally liable for carrying out all activities required by this Settlement. In the event of the insolvency or other failure of either Respondent to implement the requirements of this Settlement, the remaining Respondent shall complete all such requirements.

7. Each undersigned representative of Respondents certifies that he or she is fully authorized to enter into the terms and conditions of this Settlement and to execute and legally bind that Respondent to this Settlement.

8. Respondents shall provide a copy of this Settlement to each contractor hired to perform the Work required by this Settlement and to each person representing either Respondent with respect to the Site or the Work, and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Settlement. Respondents or their contractors shall provide written notice of the Settlement to all subcontractors hired to perform any portion of the Work required by this Settlement. Respondents shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Work in accordance with the terms of this Settlement.

III. DEFINITIONS

9. Unless otherwise expressly provided in this Settlement, terms used in this Settlement that 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 or its attached appendices, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675.

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

"Effective Date" shall mean the effective date of this Settlement as provided in Section XXIX.

"EPA" shall mean the United States Environmental Protection Agency and its successor departments, agencies, or instrumentalities.

"EPA Hazardous Substance Superfund" shall mean the Hazardous Substance Superfund established by the Internal Revenue Code, 26 U.S.C. § 9507.

"Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing deliverables submitted pursuant to this Settlement, in overseeing implementation of the Work, or otherwise implementing, overseeing, or enforcing this Settlement, including but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Section IX (Property Requirements) (including, but not limited to, cost of attorney time and any monies paid to secure or enforce access, including, but not limited to, the amount of just compensation), Section XIII (Emergency Response and Notification of Releases), Paragraph 84 (Work Takeover), Paragraph 36 (Community Involvement Plan) including, but not limited to, the costs of any technical assistance grant under Section 117(e) of CERCLA, 42 U.S.C. § 9617(e), Section XV (Dispute Resolution), and all litigation costs. Future Response Costs shall also include Agency for Toxic Substances and Disease Registry (ATSDR) costs regarding the Removal Action Area.

"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. Rates are available online at https://www.epa.gov/superfund/superfund-interest-rates.

"MDEQ" shall mean the Montana Department of Environmental Quality and any successor departments or agencies of the State.

"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.

"Paragraph" shall mean a portion of this Settlement identified by an Arabic numeral or an upper or lower case letter.

"Parties" shall mean EPA and Respondents.

"Post-Removal Site Control" shall mean actions necessary to ensure the effectiveness and integrity of the removal action to be performed pursuant to this Settlement consistent with Sections 300.415(*l*) and 300.5 of the NCP and "Policy on Management of Post-Removal Site Control" (OSWER Directive No. 9360.2-02, Dec. 3, 1990).

"RCRA" shall mean the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992 (also known as the Resource Conservation and Recovery Act).

"Removal Action Area," for purposes of this action, shall mean the Railroad Spur owned by BNSF located within the EPA-deemed boundary of the Smurfit Stone Mill Superfund Site, encompassing approximately 2.8 acres, in Missoula County, Montana and depicted generally on the map attached as Appendix B.

"Removal Work Plan" or "Work Plan" shall mean the document describing the activities Respondents must perform to implement the removal action at the Removal Action Area pursuant to this Settlement, as set forth in Appendix C, and any modifications made thereto in accordance with this Settlement.

"Respondents" shall mean Montana Rail Link, Inc. and BNSF Railway Co.

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

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

"Site" shall mean the Smurfit Stone Mill Superfund Site, located at 14377 Pulp Mill Road, encompassing approximately 3,200 acres, in Missoula County, Montana and depicted generally on the map attached as Appendix A.

"Smurfit Stone Mill Site Special Account" shall mean the special account within the EPA Hazardous Substance Superfund, established for the Site by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3), and the administrative order on consent for remedial investigation/feasibility study between EPA and the West Rock CP LLP, the International Paper Company, and M2Green Redevelopment LLC, CERCLA docket number CERCLA-08-2016-0001.

"State" shall mean the State of Montana.

"Transfer" shall mean to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.

"United States" shall mean the United States of America and each department, agency, and instrumentality of the United States, including EPA.

"Waste Material" shall mean (a) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (d) any hazardous material under applicable Montana law.

"Work" shall mean all activities and obligations Respondents are required to perform under this Settlement except those required by Section XI (Record Retention).

IV. EPA'S FINDINGS OF FACT

10. The Site encompasses approximately 3,200 acres and is located 11 miles northwest of Missoula, and three miles south of Frenchtown, Montana. From approximately 1957 through 2010, various entities operated a pulp and paper mill at the Site. Portions of the Site sit within the 100-year flood plain.

11. EPA organized the Site into three operable units (OUs). OU1 is the comprised of approximately 1570 acres of agricultural land located along the perimeter of the Site to the north, south, and east.

12. OU2 is the former industrial area of the Site, comprising approximately 255 acres.

13. OU3 is the land formerly used for wastewater treatment and treated waste water holding and solid waste storage, as well as Site-wide ground water containing or impacted by hazardous substances from Site activities. OU3 also includes locations in the Clark Fork River where hazardous substances from Site activities have come to be located.

14. The core industrial footprint of the mill facility at the Site covers approximately 100 acres. Over 900 acres of the Site consist of a series of unlined ponds used to store both

treated and untreated wastewater effluent from the mill, as well as primary sludge recovered from untreated wastewater. Some ponds initially used to store wastewater were subsequently drained and used for landfilling of various solid wastes produced at the mill.

15. Site activities, including but not limited to the paper pulping process resulted in metals such as arsenic, lead, and manganese being released into surface water, as well as soils at the Site.

16. The use of chlorine for the bleaching of pulp produced chlorinated organic compounds, including dioxins and furans. These substances were released into the surface and groundwater, as well as soils at the Site.

17. Much of the remaining acreage of the Site is used for agricultural purposes, including cattle grazing, alfalfa, and grain crop production.

18. In January 1957, Missoula County granted the Northern Pacific Railway (NP) an easement for a spur line to cross the Missoula County Highway (Mullen Road).

19. Beginning in February 1957, NP began acquiring a strip of land located within what is now Operable Unit 1 (OU1) of the Site to build a short spur line off its mainline (Spur). NP used the Spur to transfer customer materials to and from the Site. NP went through various mergers and is now BNSF Railway Co.

20. In 1987, BNSF Railway Co. and Montana Rail Link, Inc. (MRL) entered into an agreement that gave MRL rights to use the Spur. Thereafter, MRL used the Spur to transport customer materials to and from the Site.

21. In 2016, Respondents conducted sampling for contaminants of concern. The sampling results showed elevated levels of dioxins and furans on a portion of the Spur.

22. Dioxins and furans are unintentional byproducts from sources such as wood or grass fires, waste burning, and pulp and paper bleaching. Dioxins and furans can accumulate in fish and reach levels that are unsafe for human consumption. Certain laboratory studies document that animals exposed to elevated levels of dioxins and furans in soils may exhibit changes in hormone systems, development of fetuses, and decreased ability to reproduce. Dioxins and furans may also cause immune suppression, chloracne, and developmental effects in children.

23. EPA's response costs associated with the Site have been paid through December 31, 2019.

24. The Site was proposed for inclusion on the National Priorities List (NPL) pursuant to CERCLA Section 105, 42 U.S.C. § 9605, on May 24, 2013.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

25. Based on the Findings of Fact set forth above, and the administrative record, EPA has determined that:

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

b. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substance(s)" 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). Respondents BNSF and Montana Rail Link are the "owner(s)" and/or "operator(s)" 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).

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

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

VI. SETTLEMENT AGREEMENT AND ORDER

26. Based upon the Findings of Fact, Conclusions of Law, and Determinations set forth above, and the administrative record, it is hereby Ordered and Agreed that Respondents shall comply with all provisions of this Settlement, including, but not limited to, all appendices to this Settlement and all documents incorporated by reference into this Settlement.

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

27. Respondents shall retain one or more contractors or subcontractors to perform the Work. Respondents have identified Alan Stine, P.G., Olympus Technical Services, Inc., 765 Colleen Street Helena, Montana 59601, (406) 443-3087, astine@olytech.com, as its primary contractor to perform the Work. Respondents shall notify EPA of the names, titles, addresses, telephone numbers, email addresses, and qualifications of any new or additional contractors or subcontractors retained to perform the Work at least 7 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 or subcontractor, Respondents shall retain a different contractor or subcontractor and shall notify EPA of that contractor's or subcontractor's name, title, contact information, and qualifications within 7 days after EPA's disapproval.

28. Respondents have designated Devin Clary, Director of Environmental, Montana Rail Link, 1010 International Drive, Missoula, MT 59808, (406) 523-1582 as their Project Coordinator, and EPA has not disapproved the Project Coordinator who shall be responsible for

administration of all actions by Respondents required by this Settlement. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during the Work. EPA retains the right to disapprove of the designated Project Coordinator who does not meet the requirements of Paragraph 27. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, title, contact information, and qualifications within 7 days following EPA's disapproval. Notice or communication relating to this Settlement from EPA to Respondents' Project Coordinator shall constitute notice or communication to all Respondents.

29. EPA has designated Allie Archer of the Region 8 Montana Office, as its Remedial Project Manager (RPM). DEQ has designated Keith Large as its State Project Officer (SPO) for the Site. EPA and Respondents shall have the right, subject to Paragraph 28, to change their respective designated RPM or Project Coordinator. Respondents shall notify EPA 7 days before such a change is made. The initial notification by Respondents may be made orally, but shall be promptly followed by a written notice.

30. The RPM shall be responsible for overseeing Respondents' implementation of this Settlement. The RPM shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement, 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.

VIII. WORK TO BE PERFORMED

31. Respondents shall perform all actions necessary to implement the Work Plan. The actions to be implemented are identified in the attached Work Plan and include, but are not limited to, the following: removal of the upper six inches of soil from the right-of-way (outside of the track structure), confirmation surface soil sampling, and proper disposal of removed soil.

32. For any regulation or guidance referenced in the Settlement, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Work only after Respondents receive notification from EPA of the modification, amendment, or replacement.

33. **Work Plan and Implementation.** Respondents have submitted, and EPA has approved, the Work Plan, which is attached hereto as Appendix C and incorporated into this Settlement. **Submission of Deliverables**

a. **General Requirements for Deliverables**

(1) Except as otherwise provided in this Settlement, Respondents shall direct all submissions required by this Settlement to the RPM at Allie Archer, US EPA Region 8, Montana Operations Office, Federal Building, 10 West 15th St., Suite 3200, Helena, MT 5962, archer.allie@epa.gov, (406) 457-5033, and to Keith Large at klarge@mt.gov. Respondents shall submit all deliverables required by this Settlement, the attached Removal Work Plan, or any approved work plan to EPA in accordance with the schedule set forth in such plan.

(2) Respondents shall submit all deliverables in electronic form. Technical specifications for sampling and monitoring data and spatial data are addressed in Paragraph 33.b. All other deliverables shall be submitted to EPA in the form specified in writing by the RPM. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5 x 11 inches, Respondents shall also provide EPA with paper copies of such exhibits.

b. **Technical Specifications for Deliverables**

(1) Sampling and monitoring data should be submitted in standard Regional Electronic Data Deliverable (EDD) format. Other delivery methods may be allowed if electronic direct submission presents a significant burden or as technology changes.

(2) Spatial data, including spatially-referenced data and geospatial data, should be submitted: (a) in the ESRI File Geodatabase format; and (b) as unprojected geographic coordinates in decimal degree format using North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) as the datum. If applicable, submissions should include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data should be accompanied by metadata, and such metadata should be compliant with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor (EME), complies with these FGDC and EPA metadata requirements and is available at https://www.epa.gov/geospatial/epa-metadata-editor.

(3) Each file must include an attribute name for each site unit or sub-unit submitted. Consult https://www.epa.gov/geospatial/geospatial-policies-and-standards for any further available guidance on attribute identification and naming.

(4) Spatial data submitted by Respondents does not, and is not intended to, define the boundaries of the Site.

34. **Health and Safety Plan.** The approved Work Plan includes a plan that ensures the protection of the public health and safety during performance of Work under this Settlement. This plan was prepared in accordance with "OSWER Integrated Health and Safety Program Operating Practices for OSWER Field Activities," Pub. 9285.0-OlC (Nov. 2002), available on the NSCEP database at https://www.epa.gov/nscep, and "EPA's Emergency Responder Health and Safety Manual," OSWER Directive 9285.3-12 (July 2005 and updates), available at https://www.epaosc.org/_HealthSafetyManual/manual-index.htm. In addition, the plan complies 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.

35. **Quality Assurance, Sampling, and Data Analysis**

a. Respondents shall use quality assurance, quality control, and other technical activities and chain of custody procedures for all samples consistent with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" EPA/240/B-01/003 (March 2001, reissued May 2006), "Guidance for Quality Assurance Project Plans (QA/G-5)" EPA/240/R-02/009 (December 2002), and "Uniform Federal Policy for Quality Assurance Project Plans," Parts 1-3, EPA/505/B-04/900A-900C (March 2005).

b. The approved Work Plan includes a Sampling and Analysis Plan. This plan consists of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP) that is consistent with the NCP and applicable guidance documents, including, but not limited to, "Guidance for Quality Assurance Project Plans (QA/G-5)" EPA/240/R-02/009 (December 2002), "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" EPA 240/B-01/003 (March 2001, reissued May 2006), and "Uniform Federal Policy for Quality Assurance Project Plans," Parts 1-3, EPA/505/B-04/900A-900C (March 2005).

c. Respondents shall ensure that EPA and State personnel and their authorized representatives are allowed access at reasonable times to all laboratories utilized by Respondents in implementing this Settlement. In addition, Respondents shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance, quality control, and technical activities that will satisfy the stated performance criteria as specified in the QAPP and that sampling and field activities are conducted in accordance with the Agency's "EPA QA Field Activities Procedure," CIO 2105-P-02.1 (9/23/2014) available at http://www.epa.gov/irmpoli8/epa-qa-field-activities-procedures. Respondents shall ensure that the laboratories they utilize for the analysis of samples taken pursuant to this Settlement meet the competency requirements set forth in EPA's "Policy to Assure Competency of Laboratories, Field Sampling, and Other Organizations Generating Environmental Measurement Data under Agency-Funded Acquisitions" available at http://www.epa.gov/measurements/documents-about-measurement-competency-under-acquisition-agreements and that the laboratories perform all analyses according to accepted EPA methods. Accepted EPA methods consist of, but are not limited to, methods that are documented in the EPA's Contract Laboratory Program (http://www.epa.gov/clp), SW 846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (https://www.epa.gov/hw-sw846), "Standard Methods for the Examination of Water and Wastewater" (http://www.standardmethods.org/), 40 C.F.R. Part 136, "Air Toxics - Monitoring Methods" (http://www3.epa.gov/ttnamti1/airtox.html).

d. However, upon approval by EPA, after a reasonable opportunity for review and comment by the State, Respondents may use other appropriate analytical method(s), as long as (i) quality assurance/quality control (QA/QC) criteria are contained in the method(s) and the method(s) are included in the QAPP, (ii) the analytical method(s) are at least as stringent as the methods listed above, and (iii) the method(s) have been approved for use by a nationally recognized organization responsible for verification and publication of analytical methods, e.g., EPA, ASTM, NIOSH, OSHA, etc. Respondents shall ensure that all laboratories they use for analysis of samples taken pursuant to this Settlement have a documented Quality System that complies with ASQ/ANSI E4:2014 "Quality management systems for environmental information and technology programs - Requirements with guidance for use" (American Society

for Quality, February 2014), and "EPA Requirements for Quality Management Plans (QA/R-2)" EPA/240/B-01/002 (March 2001, reissued May 2006), or equivalent documentation as determined by EPA. EPA may consider Environmental Response Laboratory Network (ERLN) laboratories, laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP), or laboratories that meet International Standardization Organization (ISO 17025) standards or other nationally recognized programs as meeting the Quality System requirements. Respondents shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Settlement are conducted in accordance with the procedures set forth in the QAPP approved by EPA.

e. Upon request, Respondents shall provide split or duplicate samples to EPA and the State or their authorized representatives. Respondents shall notify EPA and the State not less than 7 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA and the State shall have the right to take any additional samples that EPA or the State deem necessary in the implementation of the Work Plan. Upon request, EPA and the State shall provide to Respondents split or duplicate samples of any samples they take as part of EPA's oversight of Respondents' implementation of the Work.

f. Respondents shall submit to EPA the results of all sampling and/or tests or other data obtained or generated by or on behalf of Respondents with respect to the Removal Action Area and/or the implementation of this Settlement.

g. Respondents waive any objections to any data gathered, generated, or evaluated by EPA, the State or Respondents in the performance or oversight of the Work that has been verified according to the QA/QC procedures required by the Settlement or any EPA-approved Work Plans or Sampling and Analysis Plans. If Respondents object to any other data relating to the Work, Respondents shall submit to EPA a report that specifically identifies and explains its objections, describes the acceptable uses of the data, if any, and identifies any limitations to the use of the data. The report must be submitted to EPA within 15 days after the monthly progress report containing the data.

36. **Community Involvement Plan**. EPA has prepared a community involvement plan, in accordance with EPA guidance and the NCP. If requested by EPA, Respondents shall participate in community involvement activities concerning the Removal Action Area, including participation in (1) the preparation of information regarding the Work for dissemination to the public, with consideration given to including mass media and/or Internet notification, and (2) public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site. Respondents' support of EPA's community involvement activities may include providing online access to initial submissions and updates of deliverables to (1) any community advisory groups, (2) any technical assistance grant recipients and their advisors, and (3) other entities to provide them with a reasonable opportunity for review and comment. All community involvement activities conducted by Respondents at EPA's request are subject to EPA's oversight. Upon EPA's request, Respondents shall contribute Removal Action Area related materials to a community information repository established at or near the Site to house one copy of the administrative record.

37. **Post-Removal Site Control**. In accordance with the Removal Work Plan schedule, or as otherwise directed by EPA, Respondents shall submit a proposal for Post-Removal Site Control which may include, but not be limited to: revegetation and vegetation management plans to maintain the integrity of the removal action. Upon EPA approval, Respondents shall either conduct Post-Removal Site Control activities, or obtain a written commitment from another party for conduct of such activities, until such time as EPA determines that no further Post-Removal Site Control is necessary. Respondents shall provide EPA with documentation of all Post-Removal Site Control commitments.

38. **Progress Reports**. Respondents shall submit a written progress report to EPA concerning actions undertaken pursuant to this Settlement on a monthly basis, or as otherwise requested in writing by EPA, from the date of receipt of EPA's approval of the Removal Work Plan until issuance of Notice of Completion of Work pursuant to Section XXVII, 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.

39. **Final Report**. Within 30 days after completion of all Work required by this Settlement, other than continuing obligations listed in Paragraph 107 (notice of completion), Respondents shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Settlement. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports." The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Settlement, 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 responsible corporate official of a Respondent or Respondents' Project Coordinator: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than 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."

40. **Off-Site Shipments**

a. Respondents may ship hazardous substances, pollutants and contaminants associated with the Work to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondents will be deemed to be in compliance with CERCLA Section 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if

Respondents obtain a prior determination from EPA that the proposed receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).

b. Respondents may ship Waste Material associated with the Work to an out-of-state waste management facility only if, prior to any shipment, they provide written notice to the appropriate state environmental official in the receiving facility's state and to the OSC. This written notice requirement shall not apply to any off-Site shipments when the total quantity of all such shipments will not exceed ten cubic yards. The written notice must include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. Respondents also shall notify the state environmental official referenced above and the RPM of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. Respondents shall provide the written notice after the award of the contract for the removal action and before the Waste Material is shipped.

c. Respondents may ship Investigation Derived Waste (IDW) associated with the Work to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), 40 C.F.R. § 300.440, EPA's "Guide to Management of Investigation Derived Waste," OSWER 9345.3-03FS (Jan. 1992), and any IDW-specific requirements contained in the Action Memorandum. Wastes shipped off-Site to a laboratory for characterization, and RCRA hazardous wastes that meet the requirements for an exemption from RCRA under 40 C.F.R. § 261.4(e) shipped off-Site for treatability studies, are not subject to 40 C.F.R. § 300.440.

IX. PROPERTY REQUIREMENTS

41. If any portion of the Removal Action Area, or any other property where access is needed to implement this Settlement Agreement, is owned or controlled by Respondents, Respondents shall, commencing on the Effective Date, provide EPA, the State, and EPA and the State's representatives, including contractors, with access at all reasonable times to such property, for the purpose of conducting any activity related to this Settlement Agreement. The Removal Action Area includes an active rail spur. Access granted under this section is subject to any applicable Health and Safety Plan and any applicable railroad safety rules.

42. Where any action under the Removal Action Work Plan is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall use best efforts to obtain all necessary access agreements for itself, EPA, the State, and EPA and the State's representatives, including contractors, within thirty (30) days after Respondents become aware that such access is needed, or as otherwise specified in writing by the EPA RPM. Respondents shall notify EPA if after using best efforts they are unable to obtain such agreements. Respondents shall describe in writing their efforts to obtain access. If Respondents cannot obtain access, EPA may either (i) obtain access for Respondents or assist Respondents in gaining access, to the extent necessary to effectuate the response actions described herein, using such means as EPA determines appropriate; (ii) perform those tasks or activities with EPA contractors; or (iii) terminate the obligation under the Settlement Agreement that requires the access agreement in question. 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 XIV (Payment of Response Costs). If EPA performs those tasks with EPA contractors, Respondents shall perform all other tasks or activities not requiring access to that property, and shall reimburse EPA for all costs incurred in performing such tasks or activities. Respondents shall integrate the results of any such tasks or activities undertaken by EPA into tis its plans, reports and other deliverables.

43. **Best Efforts**. As used in this Section, "best efforts" means the efforts that a reasonable person in the position of Respondents would use so as to achieve the goal in a timely manner, including the cost of employing professional assistance and the payment of reasonable sums of money to secure access as required by this Section. If Respondents are unable to accomplish what is required through "best efforts," in a timely manner, they shall notify EPA, and include a description of the steps taken to comply with the requirements. If EPA deems it appropriate, it may assist Respondents, or take independent action, in obtaining such access. All costs incurred by the United States in providing such assistance or taking such action, including the cost of attorney time and the amount of monetary consideration or just compensation paid, constitute Future Response Costs to be reimbursed under Section XIV (Payment of Response Costs).

44. If EPA determines in a decision document prepared in accordance with the NCP that institutional controls in the form of state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices are needed, subject to the reservation in Paragraph 87, Respondents shall cooperate with EPA's and the State's efforts to secure and ensure compliance with such institutional controls.

45. In the event of any transfer of the property within the Site owned by Respondents, unless EPA otherwise consents in writing, Respondents shall continue to comply with their obligations under the Settlement, including their obligation to secure access and ensure compliance with any land, water, or other resource use restrictions regarding such property.

46. Notwithstanding any provision of the Settlement, EPA and the State retain all of their access authorities and rights, as well as all of their rights to require land, water, or other resource use restrictions, including enforcement authorities related thereto under CERCLA, RCRA, and any other applicable statute or regulations.

X. ACCESS TO INFORMATION

47. Respondents shall provide to EPA and the State, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as "Records") within Respondents' possession or control or that of their contractors or agents relating to activities at the Removal Action Area or to the implementation of this Settlement, 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 regarding the Work. Respondents shall also make available to EPA and the State, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

48. **Privileged and Protected Claims**

a. Respondents may assert all or part of a Record requested by EPA or the State is privileged or protected as provided under federal law, in lieu of providing the Record, provided Respondents comply with Paragraph 48.b, and except as provided in Paragraph 48.c.

b. If Respondents assert such a privilege or protection, they shall provide EPA and the State with the following information regarding such Record: its title; its date; the name, title, affiliation (e.g., company or firm), and address of the author, of each addressee, and of each recipient; a description of the Record's contents; and the privilege or protection asserted. If a claim of privilege or protection applies only to a portion of a Record, Respondents shall provide the Record to EPA in redacted form to mask the privileged or protected portion only. Respondents shall retain all Records that they claim to be privileged or protected until EPA hashad a reasonable opportunity to dispute the privilege or protection claim and any such dispute has been resolved in Respondents' favor.

c. Respondents may make no claim of privilege or protection regarding: (1) any data regarding the Removal Action Area, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological, or engineering data, or the portion of any other Record that evidences conditions at or around the Removal Action Area; or (2) the portion of any Record that Respondents are required to create or generate pursuant to this Settlement.

49. **Business Confidential Claims**. Respondents may assert that all or part of a Record provided to EPA and the State under this Section or Section XI (Record Retention) is business confidential 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). Respondents shall segregate and clearly identify all Records or parts thereof submitted under this Settlement for which Respondents assert business confidentiality claims. Records that Respondents claim to be confidential business information will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies Records when they are submitted to EPA and the State, or if EPA has notified Respondents that the Records 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 Records without further notice to Respondents.

50. Notwithstanding any provision of this Settlement, EPA and the State retain all of their information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

XI. RECORD RETENTION

51. Until ten (10) years after EPA provides Respondents with notice, pursuant to Section XXVII (Notice of Completion of Work), that all Work has been fully performed in accordance with this Settlement, Respondents shall preserve and retain all non-identical copies of Records (including Records in electronic form) now in their possession or control, or that come into their possession or control, that relate in any manner to their liability under CERCLA with regard to the Site, provided, however, that Respondents who are potentially liable as owners

or operators of the Site must retain, in addition, all Records that relate to the liability of any other person under CERCLA with respect to the Site. Each Respondent must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any Records (including Records in electronic form) now in their possession or control or that come into their possession or control that relate in any manner to the performance of the Work, provided, however, that each Respondent (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Work and not contained in the aforementioned Records required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

52. At the conclusion of the document retention period, Respondents shall notify EPA and the State at least 90 days prior to the destruction of any such Records, and, upon request by EPA or the State, and except as provided in Paragraph 48 (Privileged and Protected Claims), Respondents shall deliver any such Records to EPA or the State.

53. Each Respondent 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 (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA or the State and that it has fully complied with any and all EPA and State requests for information regarding the Site 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, and state law.

XII. COMPLIANCE WITH OTHER LAWS

54. Nothing in this Settlement limits Respondents' obligations to comply with the requirements of all applicable state and federal laws and regulations, except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and 40 C.F.R. §§ 300.400(e) and 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-site actions required pursuant to this Settlement 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 include ARARs selected by EPA in the Removal Work Plan.

55. No local, state, or federal permit shall be required for any portion of the Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work), including studies, if the action is selected and carried out in compliance with Section 121 of CERCLA, 42 U.S.C. § 9621. Where any portion of the Work that is not on-site requires a federal or state permit or approval, Respondents shall submit timely and complete applications and take all other actions necessary to obtain and to comply with all such permits or approvals. Respondents may seek relief under the provisions of Section XVI (Force Majeure) for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit or approval required for the Work, provided that they have submitted timely and complete applications and taken all other actions necessary to obtain all such permits or approvals. This

Settlement is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

56. **Emergency Response**. If any event occurs during performance of the Work that causes or threatens to cause a release of Waste Material on, at, or from the Removal Action Area that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate, or minimize such release or threat of release. Respondents shall take these actions in accordance with all applicable provisions of this Settlement, including, but not limited to, the Health and Safety Plan. Respondents shall also immediately notify the RPM or, in the event of her unavailability, Joe Vranka, at (406) 457-5039, the Region 8 phone duty officer at (303) 293-1788 and the State Project Officer of the incident or Removal Action Area conditions. In the event that Respondents fail to take appropriate response action as required by this Paragraph, and EPA takes such action instead, Respondents shall reimburse EPA for all costs of such response action not inconsistent with the NCP pursuant to Section XIV (Payment of Response Costs).

57. **Release Reporting**. Upon the occurrence of any event during performance of the Work that Respondents are required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, Respondents shall immediately orally notify the OSC or, in the event of his/her unavailability, Joe Vranka, at (406) 457-5039, the National Response Center at (800) 424-8802, the Region 8 phone duty officer at (303) 293-1788, and the State Project Officer. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

58. For any event covered under this Section, Respondents shall submit a written report to EPA within 7 days after the onset of such event, setting forth the action or event that occurred and the measures taken, and to be taken, to mitigate any release or threat of release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release or threat of release.

XIV. PAYMENT OF RESPONSE COSTS

59. **Payments for Future Response Costs**. Respondents shall pay to EPA all Future Response Costs not inconsistent with the NCP.

a. **Periodic Bills**. Respondents shall pay EPA all response costs not inconsistent with the NCP. On a periodic basis, EPA will send Respondents an electronic billing notification to the following email address:

mark.engdahl@bnsf.com

dclary@mtrail.com

The billing notification will include a standard regionally-prepared cost report with the direct and indirect costs incurred by EPA and its contractors. Payment shall be made to EPA on-line by www.mypay.gov. Pay.gov is the EPA's preferred method for receiving all payments due to the EPA, which accepts debit and credit cards and bank account ACH. On the www.pay.gov main page, enter sfo 1.1 in the search field to obtain EPA's Miscellaneous Payment Form- Cincinnati Finance Center. Complete the form with the bill number, the due date, Site name "Smurfit Stone Mill," and Site/Spill ID A804. Once the form is completed email an acknowledgement of payment to CINWD_AcctsReceivable@epa.gov.

Alternatively, Respondents may remit payment by Fedwire Electronic Funds Transfer (EFT) to:

Federal Reserve Bank of New York
ABA: 021030004
Account: 68010727
SWIFT address: FRNYUS33
Field Tag 4200: D 68010727 Environmental Protection Agency

and shall reference Site/Spill ID Number A804 and the EPA docket number for this action.

Respondents shall make all payments within 30 days of receipt of the electronic bill, except otherwise provided in Paragraph 61 of this Settlement Agreement. Respondents shall make payments using one of the payment methods set forth in the electronic billing notification.

Respondents may change their email billing address by providing notice of the new address to:

Financial Management Officer
US EPA Region 8 (MSD-FMPB)
1595 Wynkoop Street
Denver, Colorado 80202

If the electronic billing notification is undeliverable, EPA will mail a paper copy to the billing notification to Respondents to:

Mark Engdahl
Manager Environmental Remediation
BNSF Railway Company
800 N. Last Chance Gulch, Suite 101
Helena, Montana 59601
(404) 256-4048

And to:

Devin Clary
Director of Environmental
101 International Drive
Missoula, Montana 59808

At the time of payment, Respondents shall send notice that payment has been made by email to acctsreceivable.cinwd@epa.gov, and to:

Dana Anderson, NWD
EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

Maureen O'Reilly
US EPA Region 8 (SEM-PAC)
1595 Wynkoop Street
Denver, Colorado 80202-1129

b. **Deposit of Future Response Costs Payments**. The total amount to be paid by Respondents pursuant to Paragraph 59.a (Periodic Bills) shall be deposited by EPA in the Smurfit Stone Mill Site Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund, provided, however, that EPA may deposit a Future Response Costs payment directly into the EPA Hazardous Substance Superfund if, at the time the payment is received, EPA estimates that the Smurfit Stone Mill Site Special Account balance is sufficient to address currently anticipated future response actions to be conducted or financed by EPA at or in connection with the Site. Any decision by EPA to deposit a Future Response Costs payment directly into the EPA Hazardous Substance Superfund for this reason shall not be subject to challenge by Respondents pursuant to the dispute resolution provisions of this Settlement or in any other forum.

60. **Interest**. In the event that any payment for Future Response Costs is not made by the date required, Respondents shall pay Interest on the unpaid balance. The Interest on Future Response Costs shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Respondents' 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 XVII (Stipulated Penalties).

61. **Contesting Future Response Costs**. Respondents may initiate the procedures of Section XV (Dispute Resolution) regarding payment of any Future Response Costs billed under Paragraph 59 (Payments for Future Response Costs) if they determine that EPA has made a mathematical error or included a cost item that is not within the definition of Future Response Costs, or if they believe EPA incurred excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP. To initiate such dispute, Respondents shall submit a Notice of Dispute in writing to the RPM within 30 days after receipt of the bill. Any such Notice of Dispute shall specifically identify the contested Future Response Costs and the basis for objection. If Respondents submit a Notice of Dispute, Respondents shall within the 30-day period, also as a requirement for initiating the dispute, (a) pay all uncontested Future Response Costs to EPA in the manner described in Paragraph 59, and (b) establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the

Federal Deposit Insurance Corporation (FDIC) 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. If EPA prevails in the dispute, within 5 days after the resolution of the dispute, Respondents shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 59. If Respondents prevail concerning any aspect of the contested costs, Respondents shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to EPA in the manner described in Paragraph 59. Respondents shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XV (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondents' obligation to reimburse EPA for its Future Response Costs.

XV. DISPUTE RESOLUTION

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

63. **Informal Dispute Resolution**. If Respondents object to any EPA action taken pursuant to this Settlement, including billings for Future Response Costs, they shall send EPA a written Notice of Dispute describing the objection(s) within 7 days after such action. EPA and Respondents shall have 30 days from EPA's receipt of Respondents' Notice of Dispute to resolve the dispute through informal negotiations (the Negotiation Period). The Negotiation Period may be extended at the sole discretion of EPA. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Settlement.

64. **Formal Dispute Resolution**. If the Parties are unable to reach an agreement within the Negotiation Period, Respondents shall, within 20 days after the end of the Negotiation Period, submit a statement of position to the RPM. EPA may, within 20 days thereafter, submit a statement of position. Thereafter, an EPA management official at the Supervisory level or higher 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. 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.

65. Except as provided in Paragraph 61 (Contesting Future Response Costs) or as agreed by EPA, the invocation of formal dispute resolution procedures under this Section does not extend, postpone, or affect in any way any obligation of Respondents under this Settlement. Except as provided in Paragraph 74, stipulated penalties with respect to the disputed matter shall continue to accrue, but payment shall be stayed pending resolution of the dispute. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of

noncompliance with any applicable provision of this Settlement. In the event that Respondents do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XVII (Stipulated Penalties).

XVI. FORCE MAJEURE

66. "Force Majeure" for purposes of this Settlement, is defined as any event arising from causes beyond the control of Respondents, of any entity controlled by Respondents, or of Respondents' contractors that delays or prevents the performance of any obligation under this Settlement despite Respondents' best efforts to fulfill the obligation. The requirement that Respondents exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. "Force majeure" does not include financial inability to complete the Work or increased cost of performance.

67. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement for which Respondents intend or may intend to assert a claim of force majeure, Respondents shall notify EPA's RPM orally or, in his or her absence, the alternate EPA RPM, or, in the event both of EPA's designated representatives are unavailable, the Director of the Waste Management Division, EPA Region 8, within 7 days of when Respondents first knew that the event might cause a delay. Within 7 days thereafter, Respondents shall provide in writing to EPA 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; and a statement as to whether, in the opinion of Respondents, such event may cause or contribute to an endangerment to public health or welfare, or the environment. Respondents shall include with any notice all available documentation supporting their claim that the delay was attributable to a force majeure. Respondents shall be deemed to know of any circumstance of which Respondents, any entity controlled by Respondents, or Respondents' contractors knew or should have known. Failure to comply with the above requirements regarding an event shall preclude Respondents from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite the late or incomplete notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 66 and whether Respondents have exercised their best efforts under Paragraph 66, EPA may, in its unreviewable discretion, excuse in writing Respondents' failure to submit timely or complete notices under this Paragraph.

68. If EPA agrees that the delay or anticipated delay is attributable to a force majeure, the time for performance of the obligations under this Settlement that are affected by the force majeure 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 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, EPA will notify Respondents in writing of its decision. If EPA agrees that the delay is attributable to a force

majeure, EPA will notify Respondents in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure.

69. If Respondents elect to invoke the dispute resolution procedures set forth in Section XV (Dispute Resolution), they shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, Respondents shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Respondents complied with the requirements of Paragraphs 66 and 67. If Respondents carry this burden, the delay at issue shall be deemed not to be a violation by Respondents of the affected obligation of this Settlement identified to EPA.

70. The failure by EPA to timely complete any obligation under the Settlement is not a violation of the Settlement, provided, however, that if such failure prevents Respondents from meeting one or more deadlines under the Settlement, Respondents may seek relief under this Section.

XVII. STIPULATED PENALTIES

71. Respondents shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 72.a for failure to comply with the obligations specified in Paragraphs 72.b, unless excused under Section XVI (Force Majeure). "Comply" as used in the previous sentence include compliance by Respondents with all applicable requirements of this Settlement, within the deadlines established under this Settlement.

72. **Stipulated Penalty Amounts**

a. The following stipulated penalties shall accrue per violation per day for any noncompliance or failure to submit timely or adequate deliverables pursuant to this Settlement:

Penalty Per Violation Per Day	Period of Noncompliance
$500	1st through 14th day
$1,000	15th through 30th day
$2,500	31st day and beyond

b. **Obligations**

(1) Payment of any amount due under Section XIV (Payment of Response Costs).

(2) Establishment and maintenance of financial assurance in accordance with Section XXIII (Financial Assurance).

(3) Establishment of an escrow account to hold any disputed Future Response Costs under Paragraph 61 (Contesting Future Response Costs).

73. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 84 (Work Takeover), Respondents shall be liable for a stipulated penalty in the amount of $50,000. Stipulated penalties under this Paragraph are in addition to the remedies available to EPA under Paragraphs 84 (Work Takeover).

74. 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. Penalties shall continue to accrue during any dispute resolution period, and shall be paid within 15 days after the agreement or the receipt of EPA's decision or order. However, stipulated penalties shall not accrue: (a) with respect to a deficient submission under Paragraph 33 (Work Plan and Implementation), 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 (b) with respect to a decision by the EPA Management Official at the Supervisory level or higher, under Paragraph 64 (Formal 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 shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement.

75. Following EPA's determination that Respondents have failed to comply with a requirement of this Settlement, 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.

76. All penalties accruing under this Section shall be due and payable to EPA within 30 days after Respondents' receipt from EPA of a demand for payment of the penalties, unless Respondents invoke the Dispute Resolution procedures under Section XV (Dispute Resolution) within the 30-day period. All payments to EPA under this Section shall indicate that the payment is for stipulated penalties and shall be made in accordance with Paragraph 59 (Payments for Future Response Costs).

77. If Respondents fail to pay stipulated penalties when due, Respondents shall pay Interest on the unpaid stipulated penalties as follows: (a) if Respondents have timely invoked dispute resolution such that the obligation to pay stipulated penalties has been stayed pending the outcome of dispute resolution, Interest shall accrue from the date stipulated penalties are due pursuant to Paragraph 74 until the date of payment; and (b) if Respondents fail to timely invoke dispute resolution, Interest shall accrue from the date of demand under Paragraph 76 until the date of payment. If Respondents fail to pay stipulated penalties and Interest when due, the United States may institute proceedings to collect the penalties and Interest.

78. The payment of penalties and Interest, if any, shall not alter in any way Respondents' obligation to complete the performance of the Work required under this Settlement.

79. Nothing in this Settlement 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 or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(*l*) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(*l*), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), provided however, that EPA shall not seek civil penalties pursuant to Section 106(b) or Section 122(*l*) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided in this Settlement, except in the case of a willful violation of this Settlement or in the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 84 (Work Takeover).

80. 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.

XVIII. COVENANTS BY EPA

81. Except as provided in Section XIX (Reservations of Rights by EPA), 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 and Future Response Costs. These covenants shall take effect upon the Effective Date. These covenants are conditioned upon the complete and satisfactory performance by Respondents of their obligations under this Settlement. These covenants extend only to Respondents and do not extend to any other person.

XIX. RESERVATIONS OF RIGHTS BY EPA

82. Except as specifically provided in this Settlement, nothing in this Settlement 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 shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement, 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.

83. The covenants set forth in Section XVIII (Covenants by EPA) do not pertain to any matters other than those expressly identified therein. EPA reserves, and this Settlement is without prejudice to, all rights against Respondents with respect to all other matters, including, but not limited to:

a. liability for failure by Respondents to meet a requirement of this Settlement;

b. liability for costs not included within the definition of Future Response Costs;

c. liability for performance of response action other than the Work;

d. criminal liability;

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

f. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

g. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

h. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site not paid as Future Response Costs under this Settlement.

84. **Work Takeover**

a. In the event EPA determines that Respondents: (1) have ceased implementation of any portion of the Work; (2) are seriously or repeatedly deficient or late in their performance of the Work; or (3) are implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA may issue a written notice ("Work Takeover Notice") to Respondents. Any Work Takeover Notice issued by EPA (which writing may be electronic) will specify the grounds upon which such notice was issued and will provide Respondents a period of 3 days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the 3-day notice period specified in Paragraph 84.a, Respondents have not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portion(s) of the Work as EPA deems necessary ("Work Takeover"). EPA will notify Respondents in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 84.b.

c. Respondents may invoke the procedures set forth in Paragraph 64 (Formal Dispute Resolution) to dispute EPA's implementation of a Work Takeover under Paragraph 84.b. However, notwithstanding Respondents' invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Work Takeover under Paragraph 84.b until the earlier of (1) the date that Respondents remedy, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, or (2) the date that a written decision terminating such Work Takeover is rendered in accordance with Paragraph 64 (Formal Dispute Resolution).

d. Notwithstanding any other provision of this Settlement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XX. COVENANTS BY RESPONDENTS

85. 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, Future Response Costs, and this Settlement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the EPA Hazardous Substance Superfund through 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 claims under Sections 107 and 113 of CERCLA, Section 7002(a) of RCRA, 42 U.S.C. § 6972(a), or state law regarding the Work, Future Response Costs, and this Settlement;

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

86. These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to any of the reservations set forth in Section XIX (Reservations of Rights by EPA), other than in Paragraph 83.a (liability for failure to meet a requirement of the Settlement), 83.d (criminal liability), or 83.e (violations of federal/state law during or after implementation of the Work), but only to the extent that Respondents' claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

87. Respondents are common carriers by rail and the Removal Action Site is a part of the interstate transportation system. Respondents do not waive preemption under the Interstate Commerce Commission Termination Act of 1995 49 USC Section 10501(b), or other applicable federal law to the extent EPA seeks to take or require some action on the Removal Action Site that impacts Respondents' common carrier obligations.

88. Nothing in this Settlement 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).

89. Respondents reserve, and this Settlement is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, and brought pursuant to any statute other than CERCLA or RCRA and for which the waiver of sovereign immunity is found in a statute other than CERCLA or RCRA, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States, as that term is defined in 28 U.S.C. § 2671, while acting within the scope of his or her office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, the foregoing shall not include any claim based on EPA's selection of response actions, or the oversight or approval of Respondents' deliverables or activities.

90. Respondents agree not to seek judicial review of the final rule listing the Site on the NPL based on a claim that changed site conditions that resulted from the performance of the Work in any way affected the basis for listing the Site.

XXI. OTHER CLAIMS

91. By issuance of this Settlement, 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.

92. Except as expressly provided in Section XVIII (Covenants by EPA), nothing in this Settlement constitutes a satisfaction of or release from any claim or cause of action against Respondents or any person not a party to this Settlement, 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.

93. No action or decision by EPA pursuant to this Settlement 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).

XXII. EFFECT OF SETTLEMENT/CONTRIBUTION

94. Nothing in this Settlement shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Settlement. Except as provided in Section XX (Covenants by Respondents), each of the Parties expressly reserves any and all rights (including, but not limited to, pursuant to Section 113 of CERCLA, 42 U.S.C. § 9613), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto. Nothing in this Settlement diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

95. The Parties agree that this Settlement constitutes an administrative settlement pursuant to which each Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), and is 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, or as may be otherwise provided by law, for the "matters addressed" in this Settlement. The "matters addressed" in this Settlement are the Work on or relating to the Site and Future Response Costs.

96. The Parties further agree that this Settlement constitutes an administrative settlement pursuant to which each Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B).

97. Each Respondent shall, with respect to any suit or claim brought by it for matters related to this Settlement, notify EPA in writing no later than 60 days prior to the initiation of such suit or claim. Each Respondent also shall, with respect to any suit or claim brought against it for matters related to this Settlement, notify EPA in writing within 10 days after service of the complaint or claim upon it. In addition, each Respondent shall notify EPA within 10 days after service or receipt of any Motion for Summary Judgment and within 10 days after receipt of any order from a court setting a case for trial, for matters related to this Settlement.

98. In any subsequent administrative or judicial proceeding initiated by EPA, or by the United States on behalf of EPA, for injunctive relief, recovery of response costs, or other relief relating to the Site, Respondents shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenant by EPA set forth in Section XVIII (Covenants by EPA).

XXIII. INDEMNIFICATION

99. The United States does not assume any liability by entering into this Settlement or by virtue of any designation of Respondents as EPA's authorized representatives under Section 104(e) of CERCLA, 42 U.S.C. § 9604(e), and 40 C.F.R. 300.400(d)(3). Respondents shall indemnify, save, and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, and representatives for or 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, and any persons acting on Respondents' behalf or under their control, in carrying out activities pursuant to this Settlement. Further, Respondents agree to pay the United States all costs it incurs, 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. 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. Neither Respondents nor any such contractor shall be considered an agent of the United States.

100. 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.

101. Respondents covenant not to sue and agree not to assert any claims or causes of action 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.

XXIV. INSURANCE

102. No later than 7 days before commencing any on-site Work, Respondents or Respondents' contractor shall secure, and shall maintain until the first anniversary after issuance of Notice of Completion of Work pursuant to Section XXVII (Notice of Completion of Work), commercial general liability insurance with limits of liability of $1 million per occurrence, automobile liability insurance with limits of liability of $1 million per accident, and umbrella liability insurance with limits of liability of $5 million in excess of the required commercial general liability and automobile liability limits, naming EPA as an additional insured with respect to all liability arising out of the activities performed by or on behalf of Respondents pursuant to this Settlement. In addition, for the duration of the Settlement, Respondents shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondents shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Settlement, 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. 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 a lesser amount, Respondents need provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor. Respondents shall ensure that all submittals to EPA under this Paragraph identify the Site name, City, State, and the EPA docket number for this action.

XXV. MODIFICATION

103. The RPM may modify 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 may be modified in writing by mutual agreement of the parties.

104. If Respondents seek permission to deviate from the approved Work Plan or schedule, 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 any deliverable submitted by Respondents shall relieve Respondents of their obligation to obtain any formal approval required by this Settlement, or to comply with all requirements of this Settlement, unless it is formally modified.

XXVI. ADDITIONAL REMOVAL ACTION

106. If EPA determines that additional removal actions not included in the Removal Work Plan or other approved plan(s) are necessary to protect public health, welfare, or the environment at the Removal Action Area, and such additional removal actions are consistent with the Removal Work Plan, EPA will notify Respondents of that determination. Unless otherwise stated by EPA, within 30 days after 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. Upon EPA's approval of the plan pursuant to Paragraph 33 (Work Plan and Implementation), 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 XXV (Modification).

XXVII. 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, with the exception of any continuing obligations required by this Settlement, including payment of Future Response Costs, EPA will provide written notice to Respondents. If EPA determines that such Work has not been completed in accordance with this Settlement, EPA will notify Respondents, provide a list of the deficiencies, and require that Respondents modify the Removal Work Plan if appropriate in order to correct such deficiencies. Respondents shall implement the modified and approved Removal Work Plan and shall submit a modified Final Report in accordance with the EPA notice. Failure by Respondents to implement the approved modified Removal Work Plan shall be a violation of this Settlement.

XXVIII. INTEGRATION/APPENDICES

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

a. Appendix A is a map of the Site.

b. Appendix B is a map of the Removal Action Area.

c. Appendix C is the Work Plan.

XXIX. EFFECTIVE DATE

109. This Settlement shall be effective upon signature by the Regional Administrator or his/her delegatee.

IT IS SO AGREED AND ORDERED:

U.S. ENVIRONMENTAL PROTECTION AGENCY:

CHRISTOPHER THOMPSON
2021.02.25 20:51:08 -07'00'

Dated

Christopher Thompson
Associate Regional Counsel for Enforcement
Office of Regional Counsel
U.S. EPA Region 8

BETSY SMIDINGER
Digitally signed by BETSY SMIDINGER
Date: 2021.02.26 03:29:38 -07'00'

Dated

Betsy Smidinger
Director, Superfund and Emergency Management Division
U.S. EPA Region 8

Signature Page for Settlement Regarding Smurfit Stone Mill Superfund Site

FOR _____
BNSF Railway Company

1/12/2021
Dated

Allen Stegman
General Director Environmental
BNSF Railway Company
2500 Lou Menk Drive, AOB-3
Fort Worth, TX 76131

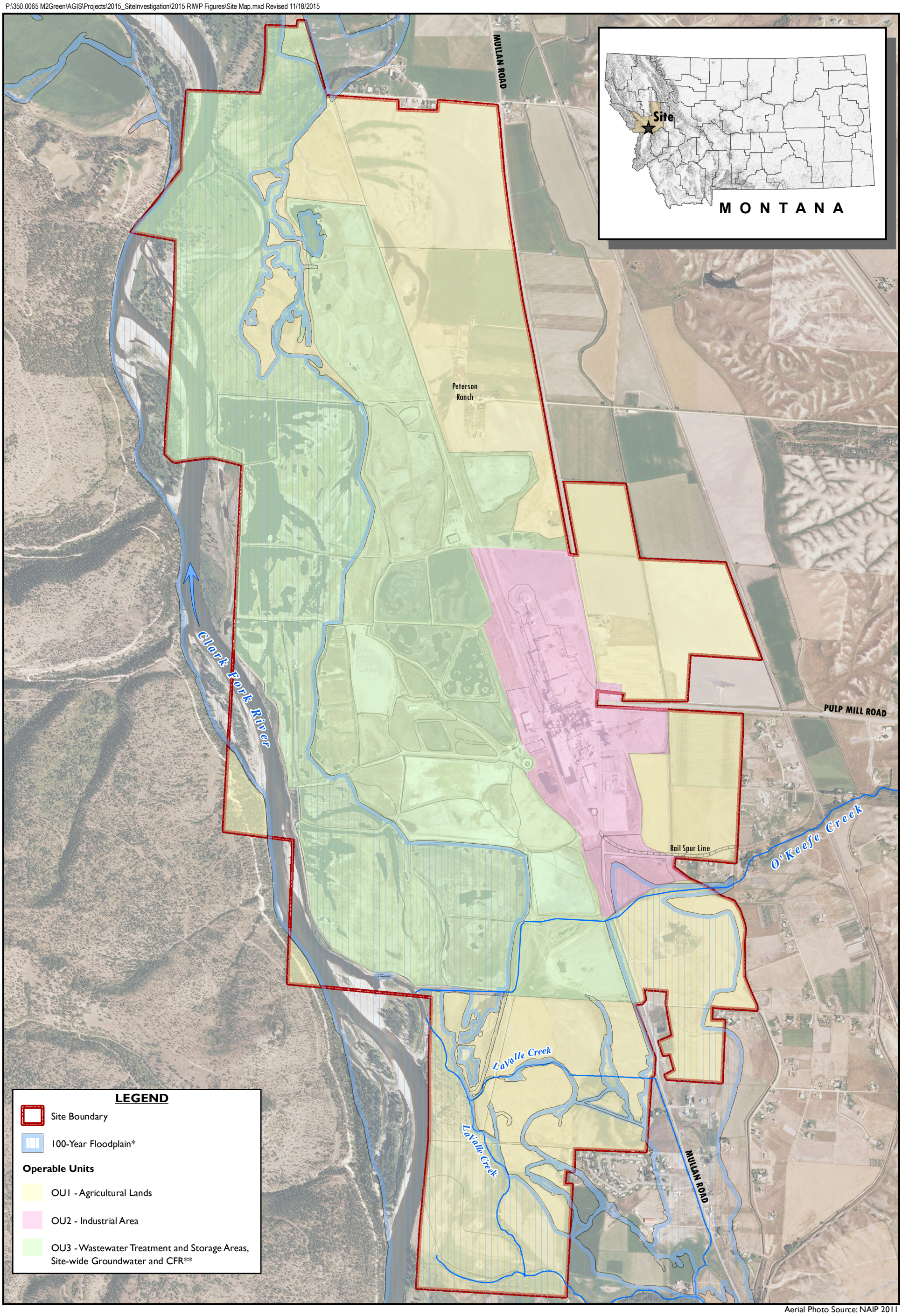
MONTANA RAIL LINK, INC.:

2-2-2021
Dated

Heather Mattson
Heather Mattson
VP Finance & Accounting
Montana Rail Link, Inc.
101 International Way
Missoula, MT 59808

APPENDIX A

P:\350.0065 M2Green\AGIS\Projects\2015_SiteInvestigation\2015 RIWP Figures\Site Map.mxd Revised 11/18/2015



Aerial Photo Source: NAIP 2011

N

0 Feet 1,600

*Floodplain Source:
As defined by the Federal Emergency Management Agency (FEMA) 2013 Digital Flood Insurance Rate Map (DFIRM). (NFIP 2013)

**Where Contaminant of Potential Concern from the Site have come to be located in the CFR

Appendix A
Site Map

APPENDIX B

N	0 300 600 Feet	Spur Track 7552 from 132 + 0316 COPC Assesment	Olympus Technical Services, Inc.	Aerial Photograph Showing Proposed Removal Area	FIGURE 4

a2089 Fig_3 Remvl WP.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX C

Removal Action Work Plan
Spur Track 752 from 123+0316

Prepared for:

101 International Drive
PO Box 16390
Missoula, MT 59808

November 4, 2020

Olympus WO# A2089

Olympus Technical Services, Inc.

765 Colleen St.
Helena, MT 69701
Phone: (406) 443-3087

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FIGURES

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APPENDICES

1.0 PURPOSE

The purpose of this work plan is to present the planned scope of work by Montana Rail Link, Inc. (MRL) and BNSF Railway Company (BNSF) for an independent soil removal action along spur track 7552 from 132+0316 (Spur) leading into the former Smurfit-Stone mill near Frenchtown, Missoula County, Montana. Surface soil samples collected from along the spur in November 2015 and analyzed for dioxins and furans (Olympus, 2016) indicated that the upper six inches of soil adjacent to the Spur contain dioxin/furan toxicity equivalent quotient (TEQ) concentrations that exceed the U.S. Environmental Protection Agency (EPA) regional screening level (RSL) based on an industrial exposure scenario (Olympus 2016). This removal action is focused towards the soil adjacent to the spur track with dioxin/furan concentrations that exceed the RSL.

EPA is the lead regulatory agency for the Smurfit-Stone Mill Frenchtown superfund site ("Site"). Montana Department of Environmental Quality (DEQ) is the supporting regulatory agency. Figure 1 presents and organizational chart for the lines of communication between the regulator and stakeholders for this project.

2.0 SPUR CONDITIONS AND BACKGROUND

2.1 Removal Evaluation

The Spur is located within the boundary of the Site as defined by EPA. A topographic map showing the location of the Spur is provided on Figure 2. The 3,200-acre Site is located 11 miles northwest of the City of Missoula in Missoula County, Montana. A large integrated paper and pulp mill was operated at the Site from 1957 through early 2010. The core industrial area of the Site occupies approximately 100 acres while the entire Site covers nearly 3,200 acres. Over 900 acres of the Site were used to store treated and untreated wastewater effluent, primary sludge recovered from untreated wastewater, and solid waste produced at the mill in unlined ponds. Approximately half of the unlined ponds contain freshwater emergent wetlands (EPA, 2012). Approximately 1,800 acres of the remaining acreage are used for agricultural purposes; 1,200 acres for cattle grazing and 600 acres for alfalfa and grain crop production (Montana County Rural Initiatives 2010).

A number of previous environmental investigations have taken place at the Site. EPA completed an environmental Site Inspection and Removal Assessment (SI/RA) on portions of the Site in 2011 to support a hazard ranking (HRS) score (EPA, 2012). EPA identified three source areas: Source Area 1 included settling ponds 3, 4, 5, and 17; Source Area 2 included the emergency spill Pond 8; and Source Area 3 included treated wastewater Holding Pond 2. EPA did not identify the Spur as a source area. In 2015, EPA entered into an Administrative Order on Consent (AOC) for the mill investigation with International Paper Company, M2Green Redevelopment, LLC, and WestRock CP, LLC, collectively referred to hereafter as Potential Responsible Parties (PRPs) (EPA, 2015). The AOC defines three operable units at the Site, as follows:

- Operable Unit 1 (OU1) – Agricultural Area Soils
- Operable Unit 2 (OU2) – Former Industrial Area Soils

- Operable Unit 3 (OU3) – Former Wastewater Treatment and Holding Ponds Area, and Site-Wide Groundwater, and any part of the Clark Fork River where hazardous substances from the Mill have come to be located.

In February 2017, EPA completed a Human Health Risk Assessment (HHRA) for OU1. The HHRA concluded that most contaminants in the OU1 surface soils were found to be present at concentrations below the Risk-Based Concentrations (RBCs) for the receptor in the conceptual site model expected to receive the highest exposure (hypothetical future residents). None of the contaminants identified as being detected at concentrations above the residential Screening Level (SL) were found to be present above background concentrations. On this basis, EPA deemed that risks to potential receptors exposed to surface soil are expected to be within or below acceptable risk limits. A TEQ concentration of 5.1 ng/kg was calculated as the RBC for residential surface soil in OU1.

In March 2017, EPA completed an Ecological Risk Assessment (ERA) for OU1. While dioxins and furans were initially considered Contaminants of Potential Ecological Concern (COPECs), the distribution and range of OU1 and background TEQ concentrations are similar. Dioxins and furans were not evaluated in detail as COPECs in the ERA. Only copper and selenium were evaluated in detail as COPECs.

Within the Site, the eastern half of the Spur is located within OU1 and the western half of the Spur is located within OU2. The remedial investigation work plan included in the AOC identified the following compounds as constituents of potential concern (COPC) for the Mill:

- dioxins/furans in OU1, OU2, and OU3;
- metals in OU1, OU2, and OU3;
- volatile organic compounds (VOCs) in OU2;
- semivolatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs) in OU2;
- polychlorinated biphenyls (PCBs) in OU2 and OU3; and,
- PAHs in OU1.

An investigation was conducted in 2015 to evaluate the presence of COPCs in Spur soil (Olympus, 2016). The Spur was divided into five approximately equal areas for composite soil sample collection and analysis. The sample areas ranged in size from 1,489 to 2,480 feet and are shown on Figure 3. Depth integrated samples were collected from the Spur and analyzed for metals, dioxins/furans, PAHs, and pH. The only organic compounds exceeding EPA Commercial/Industrial RSLs were dioxins/furans. Inorganic constituents did not exceed applicable EPA Commercial/Industrial RSL or DEQ background threshold values for inorganic constituents in surface soil (DEQ, 2013). Samples were collected to depths of up to 30-inches below ground surface (bgs) and analyzed as needed to identify the maximum depth at which screening levels were exceeded. Screening level exceedances were observed in all samples collected at depths of 0 to 2 inches bgs and in one sample collected over the depth interval of 2 to 6 inches bgs. Screening level exceedances were not observed in samples collected at depths greater than 6 inches bgs. Other COPCs, including PAHs and metals, were not detected at the site at concentrations above generic screening levels.

The purpose of the planned independent soil removal action is to remove soil containing dioxin/furan concentrations that exceed the EPA Commercial/Industrial RSL from the Spur. The track structure (ballast and ties) is to be left in place and not disturbed by the removal action.

The track structure is elevated above the adjacent right-of-way. Routine historical track maintenance has included ballast reworking.

2.2 Physical Location

The Spur consists of a 2,400-foot long section of service track that is parallel to La Casse Lane (east-west) between Mullan Road and La Casse Lane (north-south). The property includes the track structure and a 25-foot right-of-way on either side of the track centerline. The Spur is located to the east of the former mill in Section 24, Township 14 North, Range 21 West in Missoula County. The latitude and longitude of the Spur center, as measured in ESRI ArcMap, in decimal degrees is 46.95819 north and -114.19564, respectively. A property location Map is provided in Figure 2 and an aerial photograph of the area is shown in Figure 3.

2.3 Spur Characteristics

The Spur is located in an agricultural area to the east of the former mill. Topography is relatively flat with a 0.005 feet/feet slope to the west-southwest. The following information regarding hydrology and hydrogeologic conditions in this area is from the AOC (EPA, 2015).

The Spur is located within the Clark Fork River drainage. The Clark Fork River is located approximately 5,400 feet east of the Spur and flows to the north in this area. The nearest natural surface water body is O'Keefe Creek, which is an ephemeral stream that flows to the south-southwest in this area and is located from 300 to 1,300 feet south of the Spur. A north-south aligned irrigation ditch bisects the Spur. The irrigation ditch carries water seasonally.

The Spur is located within the northwestern portion of the Missoula Valley and is underlain by alluvial sediment. The Spur elevation ranges from 3060 to 3075 feet above mean sea level, with surrounding mountain ranges, including the Sapphire Range to the east, the Bitterroot Range to the south, the Rattlesnake Range to the north, and the Ninemile Divide to the west, rising to elevations ranging from 5,000 to 8,000 feet above mean sea level.

The depth to groundwater at the Site varies depending on location. In OU1 and OU2, groundwater occurs at approximately 25 feet bgs. Groundwater level fluctuates seasonally, with a fluctuation of less than two feet measured in 2014.

2.4 Release or Threatened Release of Hazardous Substance

EPA has determined that an actual and/or threated "release" of a hazardous substance from the Site has occurred (EPA, 2015). Historical mill operations are the primary source of COPCs that are found in soil and groundwater at the Site at concentrations exceeding EPA screening levels.

2.5 NPL Status

The Site has been proposed for placement on the EPA National Priority List (NPL) and investigation is ongoing to determine the nature and extent of contamination (EPA, 2016).

3.0 POTENTIAL THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

Soil sample analytical results from the 2015 investigation were compared to RSLs, which are conservative concentrations protective of human health. EPA derives RSLs from standardized equations that combine general exposure assumptions with toxicity data and are considered by EPA to be protective for humans over a 70-year exposure period (EPA, 2017).

Because dioxins/furans are a combination of many different chemical compounds, a TEQ is calculated to represent the total toxicity for each sample. The TEQ concentration is calculated by adjusting the concentrations of several of the dioxin/furan compounds to account for their toxicity and then summing the adjusted concentrations. This summed concentration (identified as a total TEQ) is then compared to the appropriate screening level. For dioxins/furans, the reference compound is 2,3,7,8-TCDD and the RSL for this compound (EPA, 2017), based on a commercial exposure scenario, is 22 nanograms/kilogram (ng/kg).

Five, five-point composite surface samples collected from the 0-2 inch bgs depth interval across the Spur contained dioxin/furan TEQs ranging from 39 to 84 ng/kg. The TEQ in all of the samples from that depth interval exceeds the EPA established RSL of 22 ng/kg. Five, five-point composite surface samples collected from the 2-6 inch bgs depth interval across the Spur contained dioxin/furan TEQs ranging from 5.7 to 23 ng/kg. Only one sample collected from the 2-6 inch bgs depth interval contained a TEQ that exceed the EPA RSL. Samples collected from depths greater than 6 inches bgs did not contain dioxin/furan TEQs above the RSL. Based on these data, soil in the 0-6 inch bgs depth interval contains dioxins/furans that exceeds concentrations that EPA considers to be protective of human health, given generic commercial exposure conditions.

Ecological screening levels to compare Spur data to have not been established for dioxins/furans and ecological risk has not been assessed.

4.0 PROPOSED ACTIONS

This section describes the proposed removal action intended to mitigate the conditions referenced in Section 3.0. The Data Quality Objectives are included as Table 1.

4.1 Proposed Action Description

The proposed action on the Spur involves removal of the upper six inches of soil from the approximate edge of ballast to the edge of the railroad right-of-way on both sides of the track structure, a width of approximately 14 feet on either side, at the locations shown on Figure 4. Utilities will be located and brush will be grubbed out of the project area prior to excavation activities. The track structure, including the rail lines and associated ballast, will be left in place and not disturbed.

Following soil removal, confirmation surface soil (0-2 inches bgs) samples will be collected from twelve 50-foot wide (excluding the undisturbed track structure area), 200-foot long sample areas

shown on Figure 5. The samples will consist of one, five-point composite sample collected from each segment. A duplicate sample and field blank will be collected for quality control purposes. The samples will be submitted to Pace Analytical and analyzed for dioxins and furans according to EPA Method 8290. Standard laboratory reporting turn-around time from sample drop-off is two weeks.

Confirmation samples will be collected in accordance with the Quality Assurance Project Plan/Sampling and Analysis Plan that was developed for the initial soil investigation (Olympus, 2015), which is provided in Appendix A, with the following exceptions:

- Confirmation samples will be analyzed for TEQ only,
- The five track segments identified in the QAPP for composite confirmation sampling will be further subdivided into 200-foot long sample areas,
- If confirmation sample concentrations are above EPA Industrial Soil RSLs, an additional 6-inch lift will be removed from the sample area and it will be resampled. This process will be repeated until confirmation soil samples are below the EPA Industrial Soil RSLs. If contamination above any EPA screening level remains in place within the Removal Action Work Area, MRL and BNSF will submit to EPA for approval a plan to ensure that all pathways to the remaining contamination will remain closed.

Excavated soil will be hauled to the Republic Landfill in Missoula, Montana for disposal. A profile will be established with Republic Landfill prior to disposal.

The project will result in approximately 2 acres of surface disturbance and best management practices, consistent with those required by a Storm Water Discharge Permit for Construction Activity, will be implemented to minimize the potential for any adverse impacts from stormwater runoff and for off-site sediment transport. Once soil removal is complete, the disturbed areas will be seeded with a native grass mix in accordance with the Applicable or Relevant and Appropriate Requirements (ARARs) provided in Appendix C.

The work will be completed under the guidance of a site health and safety plan provided in Appendix B.

4.2 Contribution To Remedial Performance

The removal action objectives for the Spur are to:

- Provide protection of human health and the environment through the removal of soil with concentrations of dioxins/furans above RSLs
- Dispose of excavated soil in a permitted landfill.

4.3 Project Schedule

Project activities are organized into three tasks for scheduling purposes as described below:

Task 1: Preliminary Coordination - Includes profiling of the soil at Republic. Task 1 will be initiated two weeks following receipt of the signed administrative settlement agreement and order on consent and is anticipated to require approximately two weeks to complete.

Task 2: Field Activities - Includes soil removal, hauling of excavated soil to Republic Landfill, confirmation soil sampling, and re-seeding. Task 2 will be initiated approximately four weeks after receipt of the signed administrative settlement agreement and order on consent and is anticipated to require approximately two weeks to complete.

Task 3: Storm Water Monitoring – Includes inspections until vegetation is established at ARAR required levels, provided in Appendix C. The schedule for completing this task will depend upon when the project is completed relative to seasonal conditions.

4.4 Data Management

MRL utilized M-Files Cloud Vault for document and information management. Scheduled backups are performed daily, and data is replicated to mitigate outages due to failures of server components or entire servers. Documents cannot be destroyed or deleted without set permissions.

Olympus manages all project data electronically in the designated project file, including documents, contracts, laboratory data, drawings, spreadsheets, databases, documentation of communication, and other electronic records. Project field activities will be recorded in a dedicated project field notebook. The field notebook(s) will be scanned to PDF and stored electronically on the Olympus' Helena server. The server is backed up twice daily and workstations back up once daily. Hard copies of field notes and project information will be filed in the Helena office for the life cycle of the project, and electronic files will be archived upon project completion. Data can be requested from MRL and would be retrieved and transmitted by Olympus.

5.0 REFERENCES

Montana County Rural Initiatives, 2010, Facts Related to Agriculture and Other Natural Resources Associated with the Smurfit Stone Mill. January 11, 2010.

Montana Department of Environmental Quality, 2013, Background concentrations of inorganic constituents in Montana surface soils, prepared for Montana Department of Environmental Quality by Hydrometrics, Inc.

Olympus Technical Services. 2015. Quality Assurance Project Plan/Sampling and Analysis Plan; Contaminants of Potential Concern Assessment; Spur Track 7552 from 132+0316. July 6, 2015

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Signatures of Approval
By signing below, I acknowledge having reviewed and approved this work plan.

Signature: _____ Date: _____
MRL Project Manager

Signature: _____ Date: _____
Quality Assurance Manager

Signature: _____ Date: _____

Name/Title: _____ Date: _____

Signature: _____ Date: _____

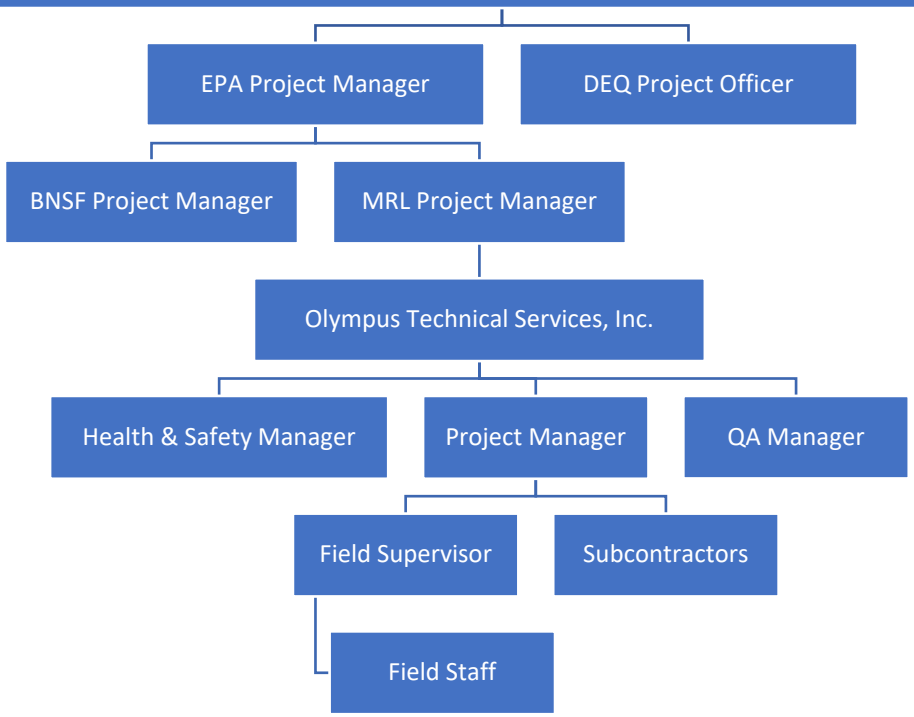
Name/Title: _____ Date: _____

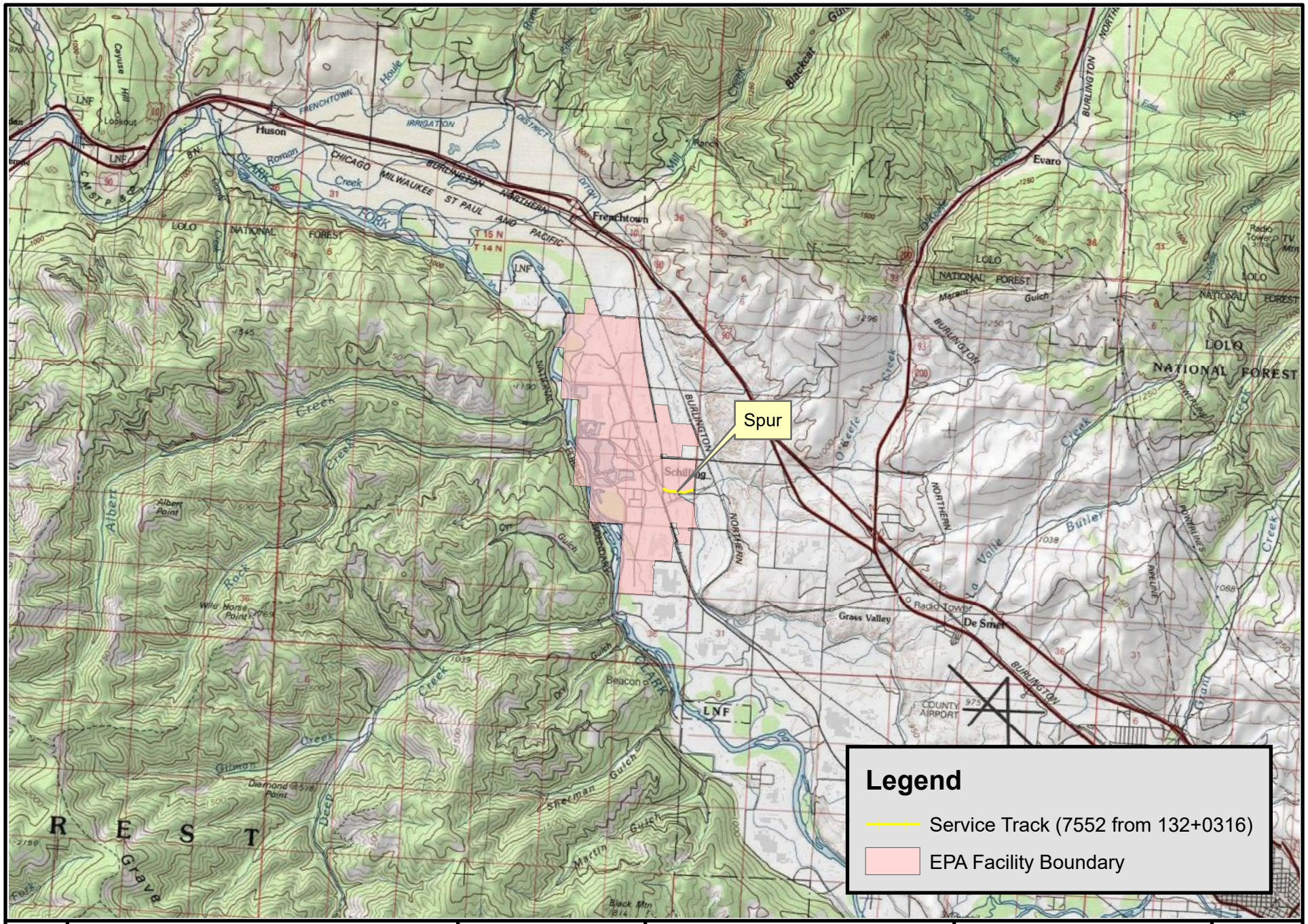
Signature: _____ Date: _____

Name/Title: _____ Date: _____

Distribution List
Devin Clary, Montana Rail Link
Mark Engdahl, BNSF Railway Company
Keith Large, Montana Department of Environmental Quality
Allie Archer, U.S. Environmental Protection Agency

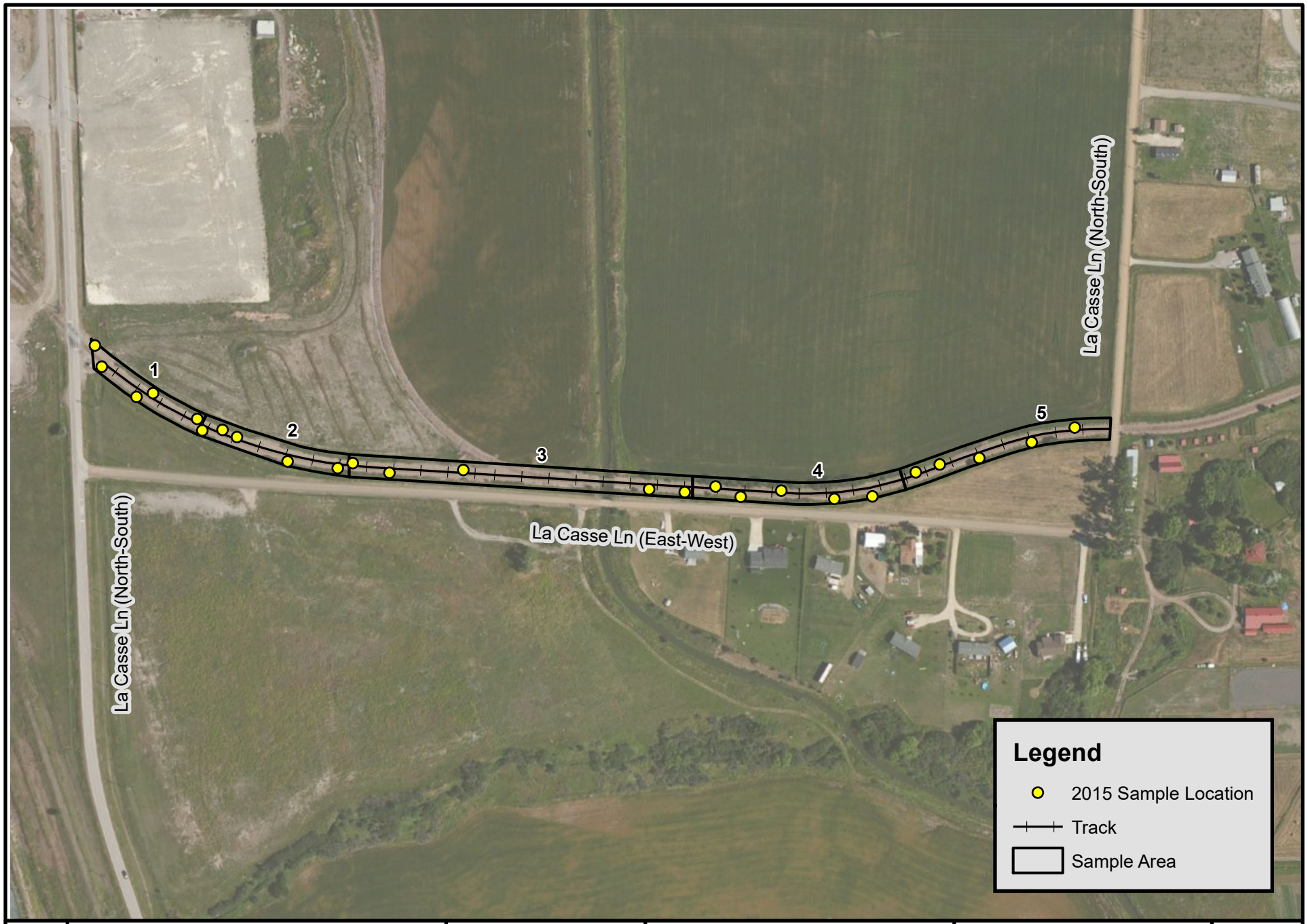
Figure 1. Project Organizational Chart





Spur Track 7552 from 132 + 0316 COPC Assesment	Olympus Technical Services, Inc.	Spur Location Map	FIGURE 2

a2089 Fig 1.mxd



0 300 600 Feet	Spur Track 7552 from 132 + 0316 COPC Assesment	Olympus Technical Services, Inc.	Aerial Photograph Showing 2015 Sample Areas	FIGURE 3

a2089 Fig_2.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N	0 300 600 Feet	Spur Track 7552 from 132 + 0316 COPC Assesment	Olympus Technical Services, Inc.	Aerial Photograph Showing Proposed Removal Area	FIGURE 4

a2089 Fig_3 Remvl WP.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 300 600 Feet

Spur Track 7552
from 132 + 0316
COPC Assesment

Olympus Technical Services, Inc.

Proposed Composite
Sampling Areas

FIGURE
5

a2089 Fig_4.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Table 1. Data Quality Objectives, Smurfit-Stone Mill Facility, Operable Unit 1 and 2

STEP 1: State the Problem

Concentration of dioxins and furans present in surface soil were detected above the EPA Commercial/Industrial RSLs. The proposed surface soil removal action would reduce the concentrations to less than the Commercial/Industrial RSLs based on initial investigation sampling.

The planning team is identified in section 3.0 of the QAPP found in Appendix A with a revision of Randy Gustin has been replaced by Devin Clary.

Project schedule is discussed in Section 4.3 of the Removal Action work plan.

Necessary resources (funding, laboratory support, subcontractor construction/excavation support) are readily available, and therefore there are no constraints for this project.

STEP 2: Identify the Goals of the Study

The purpose of the removal action is to remove dioxins/furans present in surface soil detected at concentrations above the EPA Commercial/Industrial TEQ screening levels in soil.

Principal Study Question:

Does the remaining soil contain concentrations of dioxin/furan that exceed EPA commercial/industrial TEQ RSLs?

Alternative Actions:

If yes, remove an additional 6-inch lift of soil and resample.

If no, no further action required.

STEP 3: Identify Information Inputs

The following information will be used to determine if the dioxin/furan concentrations in the remaining soil are above TEQ screening levels:

- The EPA commercial RSL of 22 ng/kg
- A defensible set of analytical data generated using approved analytical methods with reporting limits at or below the EPA commercial RSL of 22 ng/kg.
- The performance and acceptance criteria for the analytical data are detailed in Section 7.2 through 7.9 of the QAPP (Appendix A).
- Appropriate sampling methods are readily available and are detailed in Section 4.0.
- Appropriate analytical methods are readily available and are detailed in Section 10.0 and Table 1 of the QAPP (Appendix A).

STEP 4: Define the Boundaries of the Study

Target Population:

- Final depth confirmation soil samples collected during the removal action.

Spatial Boundaries:

- Spur track 752 from 123+0316 with a 25-foot buffer on either side of the track from 0-2 inches below the excavated surface.

Temporal Boundary:

- The sample collected is from a single point in time; however, the measured dioxin/furan concentrations in soil are not influenced by temporal constraints.

Practical Constraints:

- If the Removal Action Work Plan is being implemented in its entirety, there should be no constraints on the sample collection activities anticipated pursuant to the QAPP.

Decision Unit

- A single 200-ft long, 50 ft wide segment of the excavation along the track spur.

STEP 5: Develop the Analytic Approach

The analytical results of the dioxin/furan analysis will be used to calculate the TEQ. The dioxin/furan TEQ of final depth confirmation samples will be compared to the reference compound 2,3,7,8-TCDD, which has an EPA established RSL of 22 ng/kg.

STEP 6: Specify Performance or Acceptance Criteria

The calculated TEQ is not dependent upon statistical reduction or treatment of the data. The defensible set of analytical data generated using approved analytical methods will be used as reported to calculate TEQ and compare to the EPA RSL.

STEP 7: Develop the Plan for Obtaining Data

Section 4.0 of the Removal Action Work Plan details the Proposed Actions for confirmation sampling.

Appendix A

Quality Assurance Project Plan/Sampling & Analysis Plan
Contaminants of Potential Concern Assessment
Spur Track 7552 from 132+0316
July 6, 2015

Quality Assurance Project Plan/
Sampling & Analysis Plan
Contaminants of Potential Concern Assessment
Spur Track 7552 from 132+0316

Prepared for:

MONTANA RAIL LINK

101 International Drive
PO Box 16390
Missoula, MT 59808

Prepared By:

Olympus Technical Services
765 Colleen Street
Helena, Montana

July 6, 2015

Spur Track 7552 from 132+0316

Quality Assurance Project Plan/Sampling and Analysis Plan

July 6, 2015

Prepared by: _____ Date: July 6, 2015

Andrew Hess, Geologist

Olympus Technical Services, Inc.

Reviewed by: _____ Date: July 6, 2015

Alan Stine, Principal Hydrogeologist

Olympus Technical Services, Inc.

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Acronyms

AAR	Analysis Results Report
BGS	Below Ground Surface
BTV	Background Threshold Value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chain of Custody
COPC	Chemical of Potential Concern
DEQ	Montana Department of Environmental Quality
DQO	Data Quality Objective
EIC	Employee in Charge
EPA	United States Environmental Protection Agency
HASP	Health and Safety Plan
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MRL	Montana Rail Link
MS	Matrix Spike
MS/MSD	Matrix Spike and Matrix Spike Duplicate
PA	Preliminary Analysis
PAH	Polycyclic Aromatic Hydrocarbons
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAQC	Quality Assurance/Quality Control
QC	Quality Control

RSL	Regional Screening Levels
RPD	Relative Percent Difference
SAP	Sampling and Analytical Plan
SOPs	Standard Operating Procedures
VSP	Visual Sample Plan Version 7.4 Software
°C	Degress Celsius

1.0 INTRODUCTION

Olympus Technical Services, Inc. (Olympus) has prepared this Quality Assurance Project Plan and Sample and Analysis Plan (QAPP/SAP) on behalf of Montana Rail Link (MRL) for assessment of Contaminants of Potential Concern (COPC) along the spur track 7552 from 132+0316 leading into the former Smurfit-Stone Mill Facility (Mill) near Frenchtown, Missoula County, Montana (Site).

This SAP has been prepared in general accordance with US Environmental Protection Agency (EPA) guidance for conducting site investigations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This SAP includes

- a summary of background information on the Site,
- a description of project personnel and responsibilities,
- data quality objectives for the investigation,
- a schedule of activities,
- quality objectives,
- a description of field investigation activities that will be conducted including a field activities plan, sample locations and rational,
- analytical methods,
- a QAPP,
- field quality control samples,
- and reporting procedures.

2.0 SITE BACKGROUND INFORMATION

2.1 Site Description and Location

The Site consists of a 2,500 foot long section of service track that runs parallel (east-west) to La Casse Lane between Mullan Road and La Casse Lane north-south. The Site is located to the east of the Mill in Section 24, Township 14 North, Range 21 West in Missoula County. The latitude and longitude of the Site center, as measured in ESRI ArcMap, in decimal degrees is 46.95819 north and -114.19564, respectively. A Site Location Map is provided in Figure 1 and a Site Aerial Photograph is shown in Figure 2.

2.2 Former Smurfit-Stone Mill Facility

The Site is located within the boundary of the Mill as defined by the land parcels that once constituted the Mill boundary. The 3,200 acre Mill is located 11 miles northwest of the City of Missoula in Missoula County, Montana. The Mill facility address is 14377 Pulp Mill Road,

Missoula in Section 24, Township 14 North, Range 21 West. The latitude and longitude of the center of the Mill in decimal degrees is 46.9629 North and -114.1993 West, respectively.

The Mill operated as a large integrated paper and pulp mill from 1957 through early 2010. The Site and the Mill lie within the Clark Fork River valley. The Valley is generally flat with an elevation range from approximately 3,070 feet near the core industrial area to 3,040 feet at the Clark Fork River in the northwest corner of the Mill. The core industrial area of the Mill occupies approximately 100 acres while the entire Mill facility covers nearly 3,200 acres. Over 900 acres of the facility were used to store treated and untreated wastewater effluent, primary sludge recovered from untreated wastewater, and solid waste produced at the mill in unlined ponds. Approximately half of the unlined ponds contain freshwater emergent wetlands (EPA, 2012). Approximate 1,800 acres of the remaining acreage is used for agricultural purposes; 1,200 acres used for cattle grazing and 600 for alfalfa and grain crop production (Montana County Rural Initiatives 2010).

Various previous environmental investigations have taken place at the Site. Of specific interest to this investigation is the Preliminary Analysis (PA) conducted by URS Operating Services, Inc. in 2011 and 2012. The PA identified waste types generated at the Mill and subsequently a list of COPCs. COPCs in surface soil identified in that report are used as the COPCs for this investigation.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section identifies key individuals and their responsibilities for all major aspects of the project.

MRL's Project Manager for this project is Mr. Randy Gustin. Mr. Alan Stine, P.G. of Olympus. will serve as Consultant Team Project Manager and will work closely with the MRL Project Manager regarding execution of the project requirements. Mr. Stine will be the primary liaison between MRL and Olympus.

Mr. Andrew Hess of Olympus will serve as Consultant Investigation Field Team Leader for this project. The Field Team Leader is responsible for coordinating and leading the daily sampling activities. Specific Field Team Leader responsibilities may include the following:

- Daily coordination with the Consultant Team Project Manager on technical issues.
- Health and safety coordination for the Site in adherence with the Health and Safety Plan (HASP) developed for the project (Appendix A).
- Implementation and adherence of field activity work plans, schedule compliance, and management-developed study requirements.
- Implementation of quality control (QC) for all data provided by field staff.
- Adherence to the work schedule provided by the Consultant Team Project Manager.
- Coordination and oversight of subcontractor work.

- Identification of problems in the field and discussion with the Consultant Team Project Manager.

Quality Assurance (QA) responsibilities are assigned to Mr. Kevin Rauch, P.E. of Olympus. The QA Officer (QAO) will remain independent of direct project management or involvement in daily operations. The QAO is responsible for assuring that the QA program, as outlined in the QAPP/SAP, is implemented. QAO responsibilities may include:

- Reviewing and updating the QAPP/SAP, as well as other QA plans and procedures, if necessary and as appropriate.

- Distributing updates to the QAPP/SAP as appropriate.

- Providing QA technical assistance to project staff.

Mr. Sean Ronan, Chemist with Olympus, will serve as Project Chemist. The Project Chemist responsibilities include the following:

- Reviewing laboratory analytical data to ensure conformance with QA procedures, performing data validation and verification, and approving analytical data.

- Identifying, reporting, and recommending solutions for nonconforming sampling or analytical activities or data.

- Communicating with the laboratory regarding chemical sampling and analysis, laboratory reports, verification, and validation of data.

Sampling activities will be performed by a qualified Geologist or Engineer from Olympus' staff. The employee will be familiar with the Site, this QAPP/SAP, the HASP and will have been trained on specific sampling procedures as outlined in Olympus' Standard Operating Procedures (SOPs) (Appendix B).

Specialized equipment required for this project includes a truck-mounted Geoprobe. The Geoprobe uses direct-push percussion advancement to produce Macrocore soil borings. This equipment and an operator will be provided by Stantec out of their Butte, Montana office.

Pace Analytical Services, Inc. (Pace) will perform the chemical analysis of samples using United States Environmental Protection Adgency (EPA) approved methods. All laboratories will be required to meet the analytical method performance criteria specified in the QAPP/SAP. The Pace Analytical project manager (Kang Khang) and quality assurance manager (Melanie Ollila) will be responsible for confirming that activities inside of the respective laboratories meet project requirements including:

- Providing early notification for any discrepancies or problems with Chain of Custody (COC) or sample delivery,

- Ensuring that all laboratory resources will be available on an as-needed basis. If required, developing an alternative plan in conjunction with the Olympus project manager.

- Providing written response to all inquiries into sample collection, custody, sample handling, or analytical performance.
- Verifying that analysis methods are being followed for their respective products.
- Verifying the quality and completeness of analytical reports.
- Inspecting, reviewing, and signing all final analytical reports before that are released to Olympus.

All employees working on Site, including Olympus employees and subcontractor employees, will have 40 hour Hazardous Waste Operations (HazWoper) training, be current on their 8 hour HazWoper refresher course, and will have current railroad worker protection training. All field personnel will become familiar with this document and will have the required training to safely perform the field activities discussed in the QAPP/SAP.

The Consultant Team Project Manager will assure that all personnel have the appropriate training and maintain copies of the training certificates. A copy of the site-specific HASP and copies of training certificates for onsite personnel will be kept at the Site during field activities.

4.0 INVESTIGATION OBJECTIVES

4.1 Problem Definition/Data Quality Objectives

Data Quality Objectives (DQOs) are statements that define the type, quality, quantity, purpose, and use of data to be collected. The design of a study is closely tied to the DQOs, which serve as the basis for decisions such as the number and location of samples to be collected and the chemical analyses to be performed.

EPA has published a number of guidance documents on QAPPs in general and the DQO process specifically (EPA 2001, EPA 2002, EPA 2006), and this QAPP has been developed in accordance with those guidance documents. In brief, the DQO process follows a seven-step procedure, as follows:

1. State the problem that the study is designed to address.
2. Identify the decisions to be made with the data obtained.
3. Identify the types of data inputs needed to make the decision.
4. Define the bounds (in space and time) of the study.
5. Define the decision rule, which will be used to make decisions.
6. Define the acceptable limits on decision errors.
7. Optimize the design for obtaining data in an iterative fashion using information and DQOs identified in Steps 1-6.

Following these seven steps helps to ensure that the project plan is carefully thought out and that the data collected will provide sufficient information to support key decisions. The following sections summarize the application of the DQO process to the design of the sampling plan for this investigation.

4.1.1 DQO 1: Test for COPCs Related to the Mill

DQO 1 (Test for COPCs) Step 1 – State the Problem

The historical railroad activities on the Spur Track 7552 from 132+0316 consisted of railcar switching and transit to and from the Mill, but did not include known railroad maintenance or locomotive fueling facilities. Adjacent industrial uses, such as the Mill, might have introduced COPCs.

A preliminary assessment of the Mill conducted by URS Operating Services identified the following COPCs for that facility:

- arsenic
- cadmium
- lead
- manganese
- zinc
- dioxins
- furans
- polycyclic aromatic hydrocarbons (PAHs)

The purpose of this investigation is to test for the presence of COPCs at the Site at concentrations that exceed regulatory action or screening levels. The purpose of this DQO is to specifically test the 0-2 inch below ground surface (bgs) interval of surface soil for COPCs at concentrations exceeding regulatory action or screening levels.

DQO 1 (Test for COPCs) Step 2 – Identify the Decision

This step identifies the questions the study will attempt to resolve and the actions that may result from resolving these questions. The key question is as follows:

Do COPCs related to the Mill exist in the 0-2 inch bgs interval of surface soil at the Site at concentrations above EPA Regional Screening Levels (RSLs) or regional Montana Department of Environmental Quality (DEQ) Background Threshold Values (BTVs)?

The concentrations of target analytes in surface soil samples collected at the Site will be compared to RSLs to evaluate whether or not each analyte is present at concentrations above

the RSL. For COPCs whose BTV is higher than its RSL, the concentrations of target analytes in soil samples collected at the Site will also be compared to the BTV.

Possible actions that may be taken based on these comparisons are:

- If a target analyte is present in representative Site surface soil samples at a concentration above its RSL, depth-integrated samples collected during this investigation will also be analyzed for COPCs.

- Any target analyte not present in representative Site soil samples at a concentration below its RSL will not require further investigation.

DQO 1 (Test for COPCs) Step 3 – Identify Inputs to the Decision

Soil samples will be collected and analyzed for the COPCs to provide data for comparison to RSLs and BTVs. The information inputs are:

- Concentrations of the target analytes in surface soil as measured by laboratory analytical methods identified in Table 1.

- Comparison to EPA RSLs.

- Comparison to DEQ BTVs.

DQO 1 (Test for COPCs) Step 4 – Define the Study Boundaries

The purpose of this step is to define the spatial and temporal boundaries of the study. The lateral boundaries are defined by the track structure and adjacent property associated with service track operations, as depicted on Figure 2. The vertical boundary is established as a depth of 0-2 inches bgs. This depth interval is intended to focus on the presence of COPCs related to aerial deposition from the Mill.

DQO 1 (Test for COPCs) Step 5 – Develop a Decision Rule

Decisions regarding the presence of target analytes in soil will be made on a per-sample basis and will be based on comparing sample analytical results to RSLs and BTVs.

DQO 1 (Test for COPCs) Step 6 – Specify the Tolerable Limits on Decision Errors

The tolerable limits on decision errors, which are used to establish performance goals for the data collection design, are specified in this step. Decision makers are interested in knowing the true value of the constituent concentrations. Because analytical data can only estimate these values, decisions based on measurement data could be in error (decision error).

Two types of decision errors are of concern for this investigation:

- False Acceptance: Deciding the soil requires further action when, in fact, it does not.

- False Rejection: Deciding the soil does not require further action when, in fact, it does.

Total study error is the combination of sampling design error and measurement error. Because it is impossible to completely eliminate total study error, basing decisions on sample concentrations may lead to a decision error. Sampling design and measurement errors will be minimized by following the procedures outlined in this QAPP/SAP and the attached Standard Operating Procedures (SOPs) (i.e., collection of field Quality Control (QC) samples to assess precision and bias of the results).

DQO 1 (Test for COPCs) Step 7 – Optimize the Design for Obtaining Data

The detailed plan for collecting data for comparison to RSLs and BTVs, which was prepared using these DQOs as the basis for the plan design, is presented in Section 8.0 of this QAPP/SAP. The distribution of sample locations is based on collecting samples representative of the entire length of the service track. The length of track was divided into five approximately equal area segments, from which composite soil samples will be collected. In order to prevent bias in selection of subsample locations, they were selected on a random basis using Visual Sample Plan (VSP) software, which has been developed by the EPA to address a variety of sample design issues, including identification of random sample point locations.

4.1.2 DQO 2: Evaluate whether COPCs occur at depth at locations where COPC concentrations exceed RSLs or BTVs in soil samples collected from the 0-2 inch below ground surface depth interval.

DQO 2 (COPC Depth Distribution Evaluation) Step 1 – State the Problem

The primary potential mechanism for transport of COPCs from the Mill to the Site is aerial deposition and DQO 1 is designed to evaluate if COPCs exceed RSLs and BTVs in soil samples collected at the ground surface. If COPCs exceed RSLs and BTVs in those samples, then additional sampling and analysis is needed to evaluate vertical distribution of COPCs.

DQO 2 (COPC Depth Distribution Evaluation) Step 2 – Identify the Decision

The key question that must be answered to evaluate whether COPCs occur at concentrations above RSLs and BTVs in soil below the ground surface may be stated as follow:

If COPCs exceed RSLs or BTVs in soil samples collected from depths of 0-2 inches bgs, do the COPCs also occur at concentrations exceeding RSLs or BTVs at greater depths?

Possible actions that may be taken based on these comparisons are:

- If a target analyte is present in representative Site soil samples collected at greater than 2 inches bgs at a concentration above its RSL, the need for additional sampling will evaluated.

- Any target analyte not present in representative Site soil samples at a concentration below its RSL will not require further investigation.

DQO 2 (COPC Depth Distribution Evaluation) Step 3 – Identify Inputs to the Decision

Soil samples will be collected and analyzed for the COPCs to provide data for comparison to RSLs and BTVs. The information inputs are:

- Concentrations of the target analytes in surface and subsurface soil as measured by laboratory analytical methods identified in Table 1.

- Comparison to EPA RSLs.

- Comparison to DEQ BTVs.

DQO 2 (COPC Depth Distribution Evaluation) Step 4 – Define the Study Boundaries

The lateral boundaries are defined by the track structure and immediately adjacent area, as depicted on Figure 2. The vertical boundary is established as a depth of 2-6 inches bgs to evaluate the presence of COPCs immediately below ground surface and 24-30 inches bgs to evaluate the presence of COPCs at the top of the subsurface soil interval. For risk assessment purposes, surface soil is considered to be represented by the depth interval of 0-24 inches bgs while subsurface soil is considered to be soil at depths greater than 24 inches bgs.

DQO 2 (COPC Depth Distribution Evaluation) Step 5 – Develop a Decision Rule

Decisions regarding the presence of target analytes in soil will be made on a per-sample basis and will be based on comparison to RSLs and BTVs.

DQO 2 (COPC Depth Distribution Evaluation) Step 6 – Specify the Tolerable Limits on Decision Errors

The tolerable limits on decision errors, which are used to establish performance goals for the data collection design, are specified in this step. Decision makers are interested in knowing the true value of the constituent concentrations. Because analytical data can only estimate these values, decisions based on measurement data could be in error (decision error).

Two types of decision errors are of concern for this investigation:

1. False Acceptance: Deciding the soil requires further action when, in fact, it does not.

2. False Rejection: Deciding the soil does not require further action when, in fact, it does.

Total study error is the combination of sampling design error and measurement error. Because it is impossible to completely eliminate total study error, basing decisions on sample concentrations may lead to a decision error. Sampling design and measurement errors will be minimized by following the procedures outlined in this QAPP/SAP and the attached SOPs (i.e., collection of field QC samples to assess precision and bias of the results).

DQO 2 (COPC Depth Distribution Evaluation) Step 7 – Optimize the Design for Obtaining Data

The detailed plan for collecting data for comparison to RSLs and BTVs, which was prepared using these DQOs as the basis for the plan design, is present in Section 8.0 of this QAPP/SAP. The distribution of sample locations is based on collecting samples representative of the entire length of the service track. The length of track was divided into five approximately equal area segments, from which composite soil samples will be collected. In order to prevent bias in selection of subsample locations, they were selected using on a random basis using VSP.

5.0 SCHEDULE OF ACTIVITIES

The investigation is anticipated to occur during July 2015. Following the acceptance of this QAPP/SAP, field activities are anticipated to occur within two weeks. Analysis is anticipated to take between 15 days and one month depending on the results of the surface soil samples. Final reporting is anticipated to be complete by August 31, 2015.

6.0 HEALTH AND SAFETY

All field work will be conducted in conformance with the site-specific HASP. Daily field staff meetings will be held on-site prior to beginning of each work day.

7.0 QUALITY OBJECTIVES AND CRITERIA

7.1 Quality Objectives

The extent of soil COPCs at the Site is unknown. The goal is this investigation is to collect data of sufficient quantity and quality to evaluate the concentrations of COPCs relative to EPA and DEQ screening levels. As presented in Section 4.1, the EPA DQO planning process has been employed to focus data collection appropriately to answer specific questions and collect decision quality data to accomplish this goal.

Data validation and verification techniques include accepting or rejecting the analytical data based on data quality acceptance criteria and requirements specified by the method, the laboratory, the QAPP/SAP, and the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (EPA, 2010) and the EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA, 2008). Precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters will be used to evaluate the quality of analytical data and determine whether the DQOs of the project were met. The PARCC parameters are discussed in the following sections.

7.2 Performance Criteria

To conduct the investigation, soil samples will be collected from direct-push boreholes along the length of the service track. The soil samples will be submitted for laboratory analysis for COPCs using the analytical methods detailed in Table 1. Table 1 identifies each parameter, the analytical method, the laboratory reporting limit for each concentration, and the screening levels where applicable. The investigative sampling results will be compared to these screening levels.

7.3 Decision Errors

Two types of decision errors are of concern for this QAPP/SAP:

1. False Acceptance: Deciding the media require action when, in fact, they do not.

2. False Rejection: Deciding the media do not require action when, in fact, they do.

Most potential decision errors are typically associated with field sample variability and collection procedures. Analytical error is usually a much smaller portion of the total error associated with an environmental measurement; however, the laboratory must report the analytical data at

levels low enough to allow comparison to established soil and surface water action levels. Any decision regarding the level of soil chemicals of interest must be made while considering the reduction of the source area. A goal of this QAPP/SAP is to provide sufficient planning and methodologies to minimize either error. Further discussion regarding the sampling design, including justification for the density and location of sampling points, is presented in Section 8.0.

7.4 Precision

Precision is the reproducibility of measurements under a given set of conditions, representing random error. For large datasets, precision is expressed as the variability of a group of measurements compared to their average value (that is, the standard deviation). For duplicate or replicate measurements, precision is expressed as the relative percent difference (RPD) of a data pair and is calculated using the following equation (where A and B are the reported concentrations for duplicate sample analysis):

$$RPD = \frac{|A - B|}{\frac{(A + B)}{2}} \times 100$$

Field precision will be assessed through the collection and analysis of field replicate soil samples.

Analytical laboratory precision will be assessed using the calculated RPD between the following data:

- Matrix spike and matrix spike duplicate (MS/MSD) sample data

Laboratory precision will also be assessed through analysis of duplicate samples as specified by the analytical methods.

7.5 Bias (Accuracy)

Accuracy is the degree of agreement of a measurement or an average of measurements with an accepted reference or “true” value, and is a measure of bias in the system. The accuracy of a measurement system is affected by errors introduced through the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques. Accuracy will be evaluated using the percent recovery calculated using the following equation:

$$Percent\ Recovery = \frac{|A - B|}{C} \times 100$$

Where:

A is the target analyte concentration determined analytically from the spiked sample.

B is the background level determined by a separate analysis of the unspiked sample.

C is the concentration of spike added.

Accuracy requirements for the project COPCs may be an issue where laboratory detection and reporting limits for COPCs are near or above anticipated decision levels (RSLs and BTVs). For this investigation, the only COPC that meets that condition is 2,3,7,8-TCDD. Although accuracy of the field program cannot be assessed quantitatively, the following criteria will be used for a qualitative accuracy assessment for this project: sample handling, shipping, preservation, and holding time.

Laboratory accuracy will be assessed quantitatively through the analysis of MS/MSD samples and other laboratory QC samples, which include surrogate spikes (organic analyses only) and response factors for calibration standards and internal standard recoveries.

Bias is a consistent tendency in direction of analytical results from the true value caused by systematic errors in the procedure. For example, an assay that consistently tends to underestimate concentrations of a metal in soil is a biased assay. Components that may contribute to bias include method bias, laboratory bias, and sample bias. Method bias is the difference between the average sample results obtained from several laboratories using the same method. Laboratory bias is the difference (generally unknown) between a laboratory's average value (over time) for a test item and the average that would be achieved by a reference laboratory if it undertook the same measurements on the same test item. Sample bias is introduced by a procedure that creates a systematic error by incorporating items from the wrong population or by favoring some elements of a population.

MS/MSD samples and field replicate samples will be used to estimate precision and accuracy internally for this field program. If analysis suggests that the data may be biased, the direction of bias will be established to determine whether the data are still acceptable for use in remedial decision making.

7.6 Representativeness

Representativeness is a qualitative expression of the degree to which sample data accurately and precisely represent a characteristic of a population, a sampling point, or an environmental condition. Representativeness is maximized by ensuring that, for a given project, the number and location of sampling points and the sample collection and analysis techniques are appropriate for the specific investigation, and that the sampling and analysis program provides information that reflects “true” site conditions.

Representativeness of field data depends on the proper design of the data collection procedures. The sampling and field measurement procedures to be used for project data collection are based on existing site knowledge, the physical setting, past land use and operation, EPA guidance, and literature-reported methods. These procedures are described in this QAPP/SAP. Representativeness of the field data will be evaluated by assessing whether this QAPP/SAP was followed during sample collection. In addition, the analytical results from equipment blank samples and field replicate samples will be used to evaluate the representativeness of field sampling procedures.

Laboratory data will be evaluated for representativeness by assessing whether the laboratory followed the specified analytical criteria in this QAPP/SAP and the SOPs, evaluating holding time criteria, and evaluating the results of method, instrument, trip, and equipment blank samples and field replicate samples.

7.7 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under correct normal conditions. Completeness will be calculated using the following equation:

$$Completeness = \frac{Number\ of\ valid\ data\ points}{Total\ number\ of\ measurements} \times 10$$

Field data completeness is a quantitative measure of the actual number of samples collected compared to those samples scheduled for collection. The field data completeness goal for this project is 95 percent.

Laboratory data completeness is a quantitative measure of the percentage of valid data for all analyses as determined by the precision, accuracy, and holding time criteria evaluation. Completeness will be calculated using the completeness equation by dividing the total number of valid data points by the total number of data points. The laboratory completeness goal for this project is 95 percent.

7.8 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one dataset may be compared to another. Comparability depends on similar QA objectives and is achieved through the use of standardized methods for sample collection and analysis, the use of standardized units of measure, normalizing results to standard conditions, and the use of standard and comprehensive reporting formats as defined by this QAPP/SAP.

Field data comparability depends on the use of similar and standard sampling methodology and the use of standard units of measure between different investigations at a site. For this investigation, field data will be collected using standard sampling and measurement procedures. Field data will be recorded in the field logbook or on the applicable field forms (i.e., sample forms or chain-of-custody forms). Comparability of MRL-generated field data will be evaluated internally by reviewing the field documentation to determine whether the field data collection procedures and sample collection, handling, and shipping protocols specified in this QAPP/SAP were followed.

Like field data, laboratory data comparability depends on the use of similar sampling and analytical methodology and standard units of measure between different investigations at a specific site. For this investigation, standard sampling and analytical methodologies that are similar to those previously used for sampling activities at the Mill will be followed, to the extent possible. Laboratory data comparability will be assessed by evaluating whether the analytical methodologies presented in this QAPP/SAP were followed.

7.9 Method Sensitivity

Sensitivity is an index of the ability of any analytical method or other detection procedure to make quantitative determinations at very low levels. Three types of sensitivity are common to these types of investigations: field data sensitivity, laboratory data sensitivity, and method sensitivity. Field instruments will not be used in this investigation and field data sensitivity is not addresses herein.

Laboratory data sensitivity depends on equipment maintenance, calibration, performance, and operator, as well as collection or extraction methods and sample handling. However, laboratories can usually provide lower detection limits with a higher degree of confidence than can field measurements, given the controlled environment for the equipment and technician.

Method sensitivity (detection limit) is the minimum concentration of an analyte that can be reliably distinguished from background “noise” for a specific analytical method. Any given method has a number of detection limits: instrument detection limit, method detection limit (MDL), practical quantification limit, and the limit of quantification. The methods selected for identifying and quantifying contamination in soil will be effective for all of the COPCs together. Laboratories report their MDLs and provide qualifiers for certain results if the value is uncertain.

8.0 SAMPLING DESIGN

The sampling design and approach is based on an understanding of the data required to fulfill the DQOs for the Site. Sampling is designed to support the goal of comparing the concentrations of COPCs in Site surface soil, and potentially subsurface soil, to RSLs and BTVs.

The Site has been divided into five approximately equal composite soil sample areas as shown on Figure 2. The areas range in size from 22,015 to 25,708 square feet. Five-point composite samples will be collected from each area. VSP (V 7.4) software was used to randomly generate 5 subsample point locations, and the corresponding latitude and longitudes, within each sample area. The subsample locations are shown on Figure 2 and the latitude and longitude coordinate are presented in Table 2. The subsample points will be located in the field using a GPS device. If a point falls within the track structure, the sample point will be moved outside of the track structure, approximately 1-2 feet from the edge of the closest railroad tie.

Depth-integrated samples will be collected at each subsample location at intervals of 0-2 inches bgs, 2-6 inches bgs, and 24-30 inches bgs. The samples will be composited such that three composite samples will be generated from each area, one representing each of the specified depth intervals.

All 5 composite samples representing the 0-2 inch bgs depth interval will be submitted for laboratory analyses for the COPCs identified in Table 1. These samples are intended to address DQO 1, i.e. do COPCs related to the Mill exist at the Site at concentrations above RSLs or BTVs. Samples submitted for PAH analysis will be expedited.

All 10 composite samples collected from the depth intervals of 2-6 inches bgs and 24-30 inches bgs will be submitted to the laboratories and held for potential analysis pending the results of the 0-2 inch sample intervals. These samples are intended to address DQO 2, i.e. if COPCs exceed RSLs or BTVs in soil samples collected from depths of 0-2 inches bgs, verify whether the COPCs also occur at concentrations exceeding RSLs or BTVs at greater depths. All Samples collected for PAH analysis will be extracted, but only the 0-2 inch BGS depth interval will be analyzed initially. Extracting the samples allows analysis to take place within holding times in case follow up analysis of deeper samples is necessary based on the analytical results of the 0-2 inch BGS samples.

Surface soil samples in the 0-2 inch bgs depth interval collected for metals analysis will be sieved to obtain a less than (<) 250 micron (No. 60 sieve) fraction prior to analysis. As part of

sample preparation, sieving will be completed in accordance with the appropriate sample preparation procedure. Preparation of samples will use a dry procedure with provisions in place to prevent loss of fine dust.

9.0 FIELD SAMPLING ACTIVITIES

Field personnel are scheduled to travel to the Site on July 20, 2015. Access to the Site will be coordinated with MRL and a MRL Employee in Charge (EIC) will be designated before arrival to provide track protection for the day. All samples are anticipated to be collected in one day. If necessary, samples will also be collected on the following day.

The following SOPs will guide field sampling activities and are attached in Appendix B

- SOP-G1: Field Logbook/Photographs
- SOP-G2: Sample Packaging and Shipping
- SOP-G3: Field Quality Control Samples
- SOP-G4: Sample Custody
- SOP-G5: Soil and Water Sampling Field Equipment Decontamination
- SOP-G6 Management of Investigative-Derived Waste
- SOP-SS1: Sample Collection from Soil Borings, Excavations, and Hand Dug Pits
- SOP-SS6: Compositing Soil Samples

9.1 Field Notes and Photographs

Field notes and photographs will be collected in accordance with Olympus SOP G-1 “Field Logbook/Photographs”. This project will be assigned a bound logbook with a unique document number (A-2089). Notes will be recorded legibly in indelible ink in waterproof bound field notebooks. The title page of each field logbook will contain the following:

- Olympus address information
- Logbook number
- Project name, location, and number

Daily entries in the logbook will include the following information:

- Date
- Personnel onsite (including visitors)
- Weather conditions

- Type(s) of field equipment used
- Field equipment calibration methods (if applicable)

At a minimum, the following sample information will be recorded:

1. Sample location and number,
2. Sample type (e.g., soil composite) and amount collected,
3. Date and time of sample collection,
4. Split samples taken by other parties. Note the type of sample, sample location, time/date, name of person, person's company, and other pertinent information,
5. Sampling method, particularly and deviations from the SOP and/or SAP,
6. Soil classification in accordance with the visual-manual procedure for soil description, using the Unified Soil Classification System.
7. Documentation or reference of preparation procedures for reagents or supplies that will become an integral part of the sample (e.g., filters and preserving reagents), and
8. Sample preservation, handling, packaging, labeling, shipping information (e.g., weight), the shipping agent, and the laboratory where the samples will be sent.

The following information will be included in the field notebook for each photograph taken:

1. The photographer's name, the date, the time of the photography and the general direction faced,
2. A brief description of the subject and the fieldwork portrayed in the picture, and
3. Sequential number of the photograph.

Photographs will be downloaded to an office computer as soon as practicable.

9.2 Utility Locates

Prior to sampling activities underground utilities will be located by calling Montana811 call center at least 3 days prior to Site work. Any utilities on Site will be identified and marked and the markings will be maintained throughout the project. Olympus will work with MRL to identify any private railroad utilities that may exist at the Site.

9.3 Sample Locations

A sampling strategy has been developed that will test for the presence of COPCs above RSLs at the Site, and if they do the sampling strategy will identify the general area and depth interval at which COPCs exist over RSLs. The Site has been divided into five approximately equal areas as shown in Figure 2. VSP version 7.4 software was used to randomly generate 5 points, and the corresponding latitude and longitudes, within each sample area. These points will be located

in the field using a GPS device as accurately as possible. If a point falls within the track structure, that sample point will be moved outside of the track structure 1-2 feet from the edge of the closest railroad tie. Three samples will be collected from each sample point from 0-2 inches bgs, 2-6 inches bgs, and 24-30 inches bgs.

9.4 Drilling

Samples will be collected from holes bored by Stantec's truck mounted direct push percussion advancement Geoprobe drill rig. Soil Borings will be conducted in accordance with Olympus' SOP SS-1 "Sample Collection from Soil Borings". A rod attached to the Geoprobe will be lined with one disposable Geoprobe Macro Core Liner (liner) and advanced to 30 inches or until refusal. Samples will then be collected from the core of those borings. Upon retrieval the Geoprobe rod and liner containing the core, the liner will be placed in a holding device to maintain sampling intervals. Following sampling procedures borings will be backfilled with core material not used for sampling and, if necessary, bentonite chips will be used to fill void space created by drilling.

To avoid potential cross contamination, the Geoprobe rod will be decontaminated between every boring. One disposable Geoprobe Macro Core Liner will be used for each boring. In the event of a refusal, decontamination will take place as it would with a normal boring but no sample will be collected. The sample point will be moved no more than 6" (unless the presence of an obstacle necessitates moving further) and another boring will be advanced and sampled. All equipment will be decontaminated before leaving the Site.

9.5 Sampling

Samples will be collected in accordance with Olympus' SOP SS-1 "Collection from Soil Borings" and SOP SS-6 "Compositing Soil Samples". Following recovery of the Geoprobe rod and liner, the sampler will describe the soil in the logbook. Equal amounts of soil from each of the 5-points within a sample area at each depth interval will be mixed in 3 stainless steel bowls (one for each depth interval) using a stainless steel utensil until homogenization is visually observed. The sample will then be placed into laboratory supplied sample jars and labeled in accordance with SOP-G4 and Table 2. Labels will include the project number, the sample identification number, the date and time the sample was collected, the samplers name or initials, any preservatives that were used, and sample matrix. The sample identification number will consist of the Olympus project number (A2089), followed by the composite sample location identifier (from Figure 2), and followed by the depth interval. The depth interval will use the following designation:

0002- 0-2 inches bgs
0206 2-6 inches bgs
2430 24-30 inches bgs

For example: A2089-1-0206

QA/QC samples will be given the designation of sample location 6 (since there are only 5 sample locations). The field rinsate sample will be identified with a suffix to the regular sample number of RIN rather than the depth interval, i.e. A2089-6-RIN.

All soil cuttings that are not collected for analysis will be placed back into the boring. Sample jars will be immediately placed in a single zip-lock bag which will then be sealed and placed into a laboratory supplied cooler on ice.

Each sample will be collected in four laboratory supplied jars; one jar will be designated for PAH analysis, one jar for Dioxin/Furan analysis, one jar for pH analysis, and one jar for metals analysis. All sample jars collected for PAH will immediately be submitted for analysis. The holding time for PAH analysis is less than the time required to analyze of the 0-2 inch bgs samples. Samples collected from the 0-2 inch bgs depth interval for Dioxin/Furan and Metals will also immediately be submitted for analysis. Samples collected from 2-6 inch and 24-30 inch bgs depth intervals for Dioxin/Furan and Metals will be submitted to the laboratory but will be held for potential analysis pending results of the 0-2 inch bgs sample analyses. If Dioxin/Furan or Metals COPC exceedances are confirmed in samples submitted from the 0-2 inch bgs depth interval, the samples from the corresponding sample area at the lower two depth intervals will be analyzed. Holding time limitations for Dioxin/Furan and Metals are adequate to allow time for the analysis of the 0-2 inch bgs sample to be completed and evaluated prior to deciding whether analyses of the deeper samples is necessary.

MRL and EPA will be notified five working days in advance of sampling so that they can be present to oversee the work if desired.

9.6 Field Quality Control Samples

Quality assurance/quality control (QA/QC) samples will be collected at a frequency of one for every twenty field samples. Only fifteen samples are planned for this investigation, so one blind field replicate and one equipment rinsate blank will be collected. The QA/QC samples will be analyzed for the same COPCs as the samples.

Field replicates are collected in an identical fashion and consecutively over a minimal period of time to provide a measure of the total analytical bias (field and laboratory variance). One field replicate sample will be generated by splitting a sample from one sampling area into two samples. The field replicate will be labeled in a similar fashion as the other samples to prevent the laboratory from recognizing it as a replicate. When submitting laboratory reports Olympus will identify which sample is a field replicate and the corresponding sample.

An equipment rinsate blank will be collected to identify possible contamination from the sampling environment or equipment. An equipment rinsate blank will be generated by running deionized water over the Geoprobe rod. This water sample will be preserved in the field in accordance with laboratory specifications and labeled in accordance with section 9.5.

9.7 Chain of Custody

A stringent, established chain of custody (COC) program will ensure the highest degree of control in sample handling. COC records ensure that samples are traceable and accounted for from the time they are collected. The COC will initially be completed in the field as samples are collected. At a minimum it will include:

- the project number
- the date and time each individual sample was collected,

- the sampler name,
- preservatives used in the sampling process,
- any pertinent field observations,
- the sample identification number,
- the sample matrix
- the desired analysis for each individual sample,
- the sample container type,
- the number of containers for each sample,
- the presence of a temperature blank,
- the location from which the samples were collected,
- and the laboratory that will be performing the analysis.

The COC will be completed by the person in charge of sampling. That person will be personally responsible for the care and custody of the samples until they are shipped.

When transferring the sample possession, including the process of shipping the samples to the laboratory, the individuals relinquishing and receiving the samples will sign the COC with the date and time of their relinquishment and receipt. The COC will travel with the samples in the shipping container to laboratory after it has been relinquished by the sampler.

The COC will also serve as a laboratory request form indicating the analysis that is desired for each sample.

A signed chain-of-custody form will be obtained from the laboratory custodian after the samples have been received and sample condition recorded. For samples shipped by commercial carrier, the waybill (shipping document) will serve as an extension of the chain-of-custody. The waybill and signed chain-of-custody document will be retained and placed the project file.

Upon receipt in the laboratory, samples will be checked carefully to ensure that sample containers are not broken or leaking, proper preservation methods have been followed [including receipt at 4 degrees Celsius (°C) ± 2°C when applicable], and labels and custody seals are intact. Each chain-of-custody form will be verified for accuracy and completeness, and any discrepancies will be brought to the attention of Olympus. If there are no discrepancies, the chain-of-custody form will be signed and a copy will be returned to Olympus. From the time of receipt, the laboratory will use its standard internal chain-of-custody procedures to ensure that the samples are tracked through completion of the analytical process.

If the samples and documentation are acceptable, each sample container will be assigned a unique laboratory identification number and entered into the laboratory's sample tracking system. Sample tracking will be documented in the laboratory information management system.

Other information that will be recorded includes date and time of sampling, sample description, and required analytical tests.

When sample login has been completed, the samples will be transferred to limited-access, temperature-controlled storage areas (coolers or refrigerators). The sample storage areas will be kept at 4°C ± 2°C, and temperatures will be recorded daily with thermometers calibrated against National Institute of Standards and Technology thermometers. Storage blanks will be used to assess the cleanliness of sample storage areas.

Sample custody will be maintained within the laboratory's secure facility until disposal. Following sample analysis and throughout the holding time, the laboratory will archive any remaining sample material for all samples (100 percent). Prior to soil sample disposal, the laboratory will contact Olympus to confirm authorization for disposal. The laboratory will be responsible for sample disposal, which will be conducted in accordance with all applicable local, state, and federal regulations. Disposal of all samples will be documented, and the laboratory will maintain records in the project file.

9.8 Packaging

Sample packaging and shipping will be completed in accordance with Olympus' SOP-G2 "Sampling Packaging and Shipping." Once a sample has been collected into a laboratory supplied jar, labeled, and sealed, the jar will be placed into a 2-ml thick (or thicker) zip-lock polyethylene bag. The jar will be situated in the bag so that the label is visible and the bag will be sealed. These bagged samples will be placed into a laboratory supplied container, such as a cooler, on ice. Ice will be triple bagged to prevent leakage from ice melt. A laboratory supplied water temperature blank will accompany each container.

Once sampling is complete, the samples inside of each container will be secured with noncombustible, absorbent, cushioning materials. The COC will be completed and signed by the sampler, secured in a plastic zip-lock bag, and taped to the underside of the lid of the container. The COC shall list only those samples within the container. Fiber tape will be used to secure the lid and any drains on the container and the container will be sealed with several chain-of-custody seals. If more than one cooler is sent, the laboratory shall be notified that the entire sample set shall be treated as one batch for QA/QC purposes.

The container will be labeled and addressed and shipped by overnight carrier to the Laboratory.

10.0 ANALYTICAL METHODS

This section describes the analytical methods, the MDLs, and the Method Reporting Limits used during acquisition of chemical data for this investigation.

10.1 Analytical Methodology

All samples will be prepared and analyzed in accordance with the methods listed in Table 1. Laboratory testing procedures will be conducted in accordance with the laboratory's SOPs. The analyses will be performed by Pace Analytical Services Inc. at the following laboratory:

Minneapolis Laboratory
1700 Elm Street

Minneapolis, Mn 55414
Telephone: 612-607-1700

With the exception of pH analysis which will be performed at the following laboratory:

Billings Laboratory
150 North 9th Street
Billings, MT 59101
Telephone: 406-254-7226 Fax: 406-254-1389

10.2 Method Detection Limits and Method Reporting Limits

The MDL is defined as the minimum analyte concentration that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. MDLs are laboratory-dependent; Table 1 provides specific MDLs provided by and for Pace.

The Method Reporting Limit is the lowest concentration that can be reliably achieved within limits of precision and accuracy during routine operating conditions and is based on the MDL for each analyte. Like MDLs, Method Reporting Limits are laboratory specific. Method Reporting Limits for each analytical method are listed in Table 1; the laboratory is required to meet all Method Reporting Limits. The laboratory's lowest calibration standard concentration is required to be at or below the Method Reporting Limit for each target analyte. Table 1 lists the highest acceptable Method Reporting Limit for each analyte, considering the data quality requirements for this investigation.

10.3 Reporting Requirements

Method blanks with non-detections will be reported as less than the Method Reporting Limit. For all other samples, the following will apply:

- Target analyte non-detections will be reported (at a minimum) as less than the Method Reporting Limit.
- If target analytes are detected at or above the Method Reporting Limit, they will be reported as quantified.
- If non-target analytes are detected during analysis by EPA Method 8270C, the lab will report up to ten tentatively identified compounds for each sample.

Additional reporting requirements for definitive data will be required if a sample must be diluted and reanalyzed to bring the concentration of a single compound of interest within the linear calibration range of the instrument, resulting in non-detect values for other originally detected target analytes. The Olympus Project Chemist and QAO will be notified immediately regarding the failure of target analytes to meet Method Reporting Limits to assess potential corrective action. The decision to implement corrective action will be based on whether there are any analytical alternatives or clean-up steps that would improve the detection limits and whether the elevated detection limits would adversely affect the use of data. Any data that do not meet the Method Reporting Limits due to sample dilution will be included in the case narrative, and the supporting documentation (including chromatograms for organic analyses) will be included in the data packages.

11.0 QUALITY ASSURANCE PROJECT PLAN

Data generated during this sampling event will be evaluated for Quality Assurance and Quality Control (QAQC). This section presents the policies, organization, objectives, and specific activities that collectively comprise the QAPP.

11.1 Field Quality Control Samples

For field sampling, QC samples are used to assess sample collection techniques and environmental conditions during sample collection and transport. For this project, field QC samples will include replicate samples and rinsate blanks.

Replicate samples will be used to assess variability in the sample medium and sampling and analytical precision. A replicate sample pair is a single grab or composite sample that is split into two samples during collection. The sample material will be thoroughly homogenized before it is split into the investigative and replicate samples.

For each replicate sample pair, one sample is labeled with the sample identification and the other is labeled with the replicate sample identification in accordance with the SAP prescribed naming convention. This sample pair is submitted to the same laboratory as two separate samples. Precision will be evaluated by calculating the RPD between the field replicate samples. The RPD will be calculated for field replicate pairs for those analytes whose measured values are greater than the method reporting limit. The RPD is expected to be less than 35 percent for replicate soil sample pairs. An RPD higher than 35 percent may indicate a high level of heterogeneity in the matrix, problems with sample handling, or incorrect sampling procedures.

Equipment rinsate blanks consist of analyte- and reagent-free water poured through decontaminated sampling equipment, collected in a clean sample jar, preserved, as needed, and analyzed for the same parameters as the associated soil or water samples. Equipment rinsate blanks are used to evaluate the effectiveness of sample equipment decontamination and data validation protocols include steps for evaluating equipment rinsate blank results, including application of data qualifiers when blank results indicate the potential for cross-contamination of field samples. Equipment-rinsate blanks are analyzed as regular field samples for the same suite of analytical parameters as the associated samples.

A temperature blank is used to monitor temperature preservation of samples transported to the analytical laboratory. The temperature blank consists of distilled water stored in a jar that is included with each sample cooler submitted for chemical analysis. Upon receipt by the analytical laboratory, the sample custodian will measure and record the temperature of the blank sample. The project criterion for temperature is within the range of 2° to 6° C.

11.2 Instrument/Equipment Testing and Inspection

The Olympus Program Manager will be responsible for oversight on the proper operation of all equipment, especially as it pertains to decontamination activities. The Project Manager will have a thorough knowledge of the applicable SOPs. Should any equipment appear to be malfunctioning, not up to standard, or be contaminated the project manager will be responsible for ratification and/or developing an alternative, but equally suitable, method of collecting quality samples.

Laboratory instrument calibration is necessary to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet the required quantitation limits. Calibration establishes the dynamic range of an instrument, establishes response factors to be used for quantitation, and demonstrates instrument sensitivity. Criteria for calibration are specific to the instrument and the analytical method. Laboratory instruments will be calibrated in accordance with the analytical method and the laboratory SOPs.

11.3 Laboratory Program

The objectives of the laboratory QC program are to:

- Ensure that procedures are documented, including any changes in administrative or technical procedures.
- Ensure that analytical procedures are validated and conducted according to method guidelines and laboratory SOPs.
- Monitor the performance of the laboratory using a systematic inspection program.
- Ensure that data are properly reported and archived.

Laboratory QC consists of two distinct components, a laboratory and a matrix component. The laboratory component measures the performance of the laboratory analytical process during sample analyses, while the matrix component measures the effects of a specific medium on the method performance. The QC samples that will be used to assess these two components are described below. Corrective actions for instrument calibrations or QC sample data that are out of compliance are typically described in the laboratory-specific QA/QC program.

The laboratory will conduct internal QC checks for analytical methods in accordance with the individual method requirements and the laboratory SOPs. The laboratory will notify the Consultant Team Project Manager or Consultant Project Chemist in writing before making corrective action changes to procedures described in this QAPP/SAP, or to the laboratory standard analytical methodology.

The laboratory will, at a minimum, analyze internal QC samples at the frequency specified by the analytical method and the laboratory's internal quality program. Method-specific QC procedures, frequency of QC sample analysis, acceptance criteria (control limits), and corrective actions identified in the lab SOPs provided by Pace will be in accordance with industry standards. The following sections discuss holding times and the QC samples used by the lab to assess data quality.

11.4 Sample Holding Time

Sample holding time refers to the length of time that a sample or sample extract can be expected to remain representative of environmental conditions. Holding times for the proposed analyses are listed in Table 1. Samples will not be analyzed outside specified method holding times without approval of the Consultant Project Chemist. After sample analysis, the laboratory will archive all remaining sample material for all samples (100 percent) through the duration of the holding time. Disposal of remaining sample volume after the holding time has elapsed will be the responsibility of Pace.

11.5 Laboratory Quality Control Samples

11.5.1 Matrix Spikes and Matrix Spike Duplicates

Matrix spikes/matrix spike duplicates (MS/MSDs) measure matrix-specific method performance and will be used to assess accuracy and precision. MS/MSD samples will be used to assess the influence of the sample media (media interference) on the analysis. Matrix spike percent recoveries will be calculated to assess analytical accuracy. Matrix spikes recovery limits are specified by EPA National Functional Guidelines (EPA 2014). Should matrix spikes occur outside of these limits, sample results will be qualified accordingly.

11.5.2 Method Blanks

Method blanks use laboratory grade pure water to identify contamination in the laboratory processes. The water will be prepared and analyzed as a sample would be. No analytes should occur in method blank sample above the method reporting limits. Method blanks will be analyzed at the frequency specified by the analytical method.

11.5.3 Laboratory Duplicates

Laboratory duplicates are splits of field samples which indicate laboratory precision. To evaluate precision, the RPD between the investigative samples and its duplicate will be calculated and compared to the project acceptance criteria. Laboratory duplicates will be analyzed at the frequency specified by the analytical method.

11.5.4 Laboratory Control Samples

Laboratory Control Samples (LCS) are interference free matrices with known analyte concentrations. LCS serves as a monitoring method for evaluating the overall performance of the analytical process. Control limits for LCS will be set by the LCS provider. LCS will be analyzed as specified by the analytical method.

12.0 DATA MANAGEMENT

12.1 Data QAQC Review

Following the receipt of laboratory analytical data, the Project Chemist will perform a data quality review. The review process will follow EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (EPA, 2014a) and EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (EPA, 2014b). A formal QAQC review report will be prepared by the program manager with the findings of the review.

Olympus' quality assurance manager will perform a follow up review of the analytical results and the QAQC review report. Laboratory data generated in accordance with this QAPP/SAP will be considered usable for Site soil characterization.

12.2 REPORTING

An Analysis Results Report (ARR) will be drafted following the receipt of the analytical results. The ARR will be submitted to MRL within one month of the receipt of all analytical data from Pace. The report will include a description of field sampling activities, figures showing sample locations, tables with the analytical results, laboratory analytical reports, data verification results, and a discussion regarding analytical results relative to the regulatory action/screening levels.

11.0 REFERENCES

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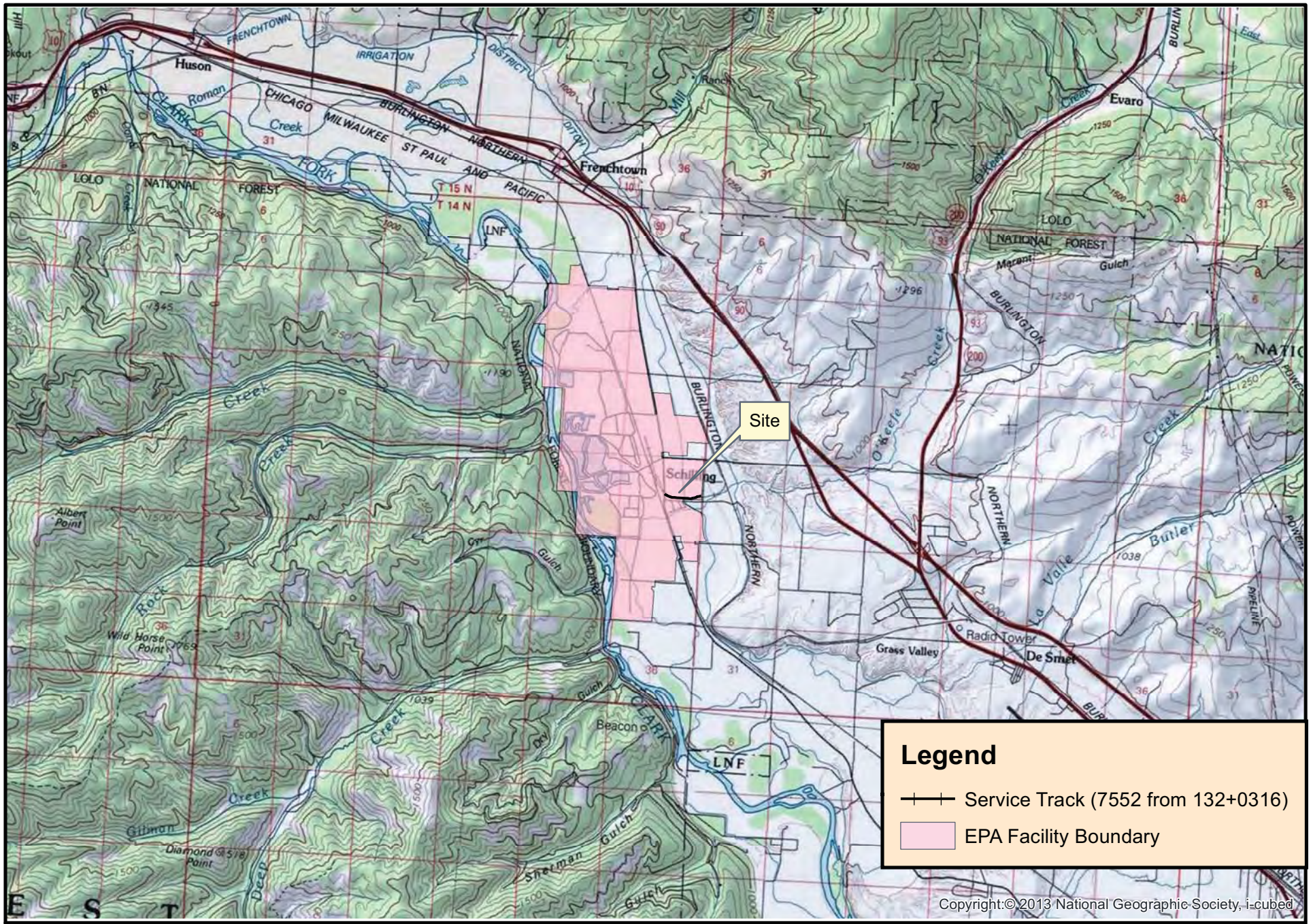
Figures



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0 250 500 Feet

Montana Rail Link
COPC Assesment
Fomer Smurfit Stone Mill Site

Olympus Technical Services, Inc.

Site Aerial Photograph

FIGURE 2

a2089 Fig 2.mxd

Tables

Table 1. Sample Analytical Methods, Preservation, Holding Times, Container Types, MDLs, RSLs, and BTVs

Analyte	CAS No.	Analytical Method	Preservation	Holding Time	Sample Size/ Sample Container	Method Detection Limit (mg/kg)	Reporting Limit (mg/kg)	RSL Resident Soil (mg/kg)	RSL Industrial Soil (mg/kg)	BTVs (mg/kg)
METALS										
Arsenic	7440-38-2	EPA 6010 (ICP)	Cool to 4ºC	6 months	One 4oz Clear Glass	1.67E-01	1.0E+00	6.8E-01	3.0E+00	22.5E+00
Cadmium	7440-43-9					7.5E-02	1.5E-01	7.1E+00	9.8E+01	7.0E-01
Lead	7439-92-1					7.2E-02	1.0E+00	4.0E+02	8.0E+02	29.8E+00
Manganese	7439-96-5					1.23E+00	2.5E-01	1.8E+02	2.6e+03	8.8E+02
Zinc	7440-66-6					3.10E-01	1.0E+00	2.3E+03	3.5E+04	11.8E+01
DIOXIN/FURAN										
2,3,7,8-TCDF	51207-31-9	EPA 8290	Cool to 4ºC	30 Days	One 4oz Clear Glass	4.99E-04	1.0E-03	NA	NA	
2,3,7,8-TCDD	1746-01-6					**4.71E-04**	**1.0E-03**	**4.8E-06**	**2.2E-05**	
1,2,3,7,8-PeCDF	57117-41-6					2.5E-03	5.0E-03	NA	NA	
2,3,4,7,8-PeCDF	57117-31-4					2.50E-04	5.0E-03	NA	NA	
1,2,3,7,8-PeCDD	40321-76-4					2.90E-04	5.0E-03	NA	NA	
1,2,3,4,7,8-HxCDF	70648-26-9					5.51E-04	5.0E-03	NA	NA	
1,2,3,6,7,8-HxCDF	57117-44-9					5.79E-04	5.0E-03	NA	NA	
2,3,4,6,7,8-HxCDF	60851-34-5					4.59E-04	5.0E-03	NA	NA	
1,2,3,7,8,9-HxCDF	72918-21-9					3.80E-04	5.0E-03	NA	NA	
1,2,3,4,7,8-HxCDD	39227-28-6					8.21E-04	5.0E-03	NA	NA	
1,2,3,6,7,8-HxCDD	57653-85-7					9.38E-04	5.0E-03	NA	NA	
1,2,3,7,8,9-HxCDD	19408-74-3					6.75E-04	5.0E-03	NA	NA	
1,2,3,4,6,7,8-HpCDF	67562-39-4					6.5E-04	5.0E-03	NA	NA	
1,2,3,4,7,8,9-HpCDF	55673-89-7					5.6E-04	5.0E-03	NA	NA	
1,2,3,4,6,7,8-HpCDD	35822-46-9					9.48E-04	5.0E-03	NA	NA	
OCDF	39001-02-0					1.302E-03	1.0E-02	NA	NA	
OCDD	3268-87-9					1.456E-03	1.0E-02	NA	NA	
Total TCDF	55722-27-5					4.99E-04	1.0E-03	NA	NA	
Total TCDD	41903-57-5					4.71E-04	1.0E-03	NA	NA	
Total PeCDF	30402-15-4					2.75E-03	1.0E-02	NA	NA	
Total PeCDD	36088-22-9					2.90E-04	5.0E-03	NA	NA	
Total HxCDF	55684-94-1					1.968E-03	2.0E-02	NA	NA	
Total HxCDD	34465-46-8					2.435E-03	1.5E-02	NA	NA	
Total HpCDF	38998-75-3					1.210E-03	1.0E-02	NA	NA	
Total HpCDD	37871-00-4					9.48E-04	5.0E-03	NA	NA	
TEQ	WHO 2005 TEF		CALCULATION							

Analyte	CAS No.	Analytical Method	Preservation	Holding Time	Sample Size/ Sample Container	Method Detection Limit (mg/kg)	Reporting Limit (mg/kg)	RSL Resident Soil (mg/kg)	RSL Industrial Soil (mg/kg)
PAH									
Acenaphthene	83-32-9	EPA 8270 (low level)	Cool to 4ºC	14 Days	One 4oz Clear Glass	1.0E-03	1.0E-02	3.6E+02	4.5E+03
Acenaphthylene	208-96-8					1.37E-03	1.0E-02	NA	NA
Anthracene	120-12-7					5.0E-03	1.0E-02	1.8E+03	2.3E+04
Benzo(a)anthracene	56-55-3					5.0E-03	1.0E-02	1.6E-01	2.9E+00
Benzo(a)pyrene	50-32-8					5.0E-03	1.0E-02	1.6E-02	2.9E-01
Benzo(b)fluoranthene	205-99-2					5.7E-04	1.0E-02	1.6E-01	2.9E+00
Benzo(e)pyrene	192-97-2					5.1E-04	1.0E-02	NA	NA
Benzo(g,h,i)perylene	191-24-2					5.0E-03	1.0E-02	NA	NA
Benzo(k)fluoranthene	207-08-9					8.7E-04	1.0E-02	1.6E+00	2.9E+01
Chrysene	218-01-9					7.6E-04	1.0E-02	1.6E+01	2.9E+02
Dibenz(a,h)anthracene	53-70-3					5.0E-03	1.0E-02	1.6E-02	2.9E-01
Fluoranthene	206-44-0					7.2E-04	1.0E-02	2.4E+02	3.0E+03
Fluorene	86-73-7					1.22E-03	1.0E-02	2.4E+02	3.0E+03
Indeno(1,2,3-cd)pyrene	193-39-5					5.0E-03	1.0E-02	1.6E-01	2.9E+00
Naphthalene	91-20-3					1.24E-03	1.0E-02	3.8E+00	1.7E+01
Phenanthrene	85-01-8					6.5E-04	1.0E-02	NA	NA
Pyrene	129-00-0					6.0E-04	1.0E-02	NA	NA
pH									
pH	NA	USDA 21A or ASA 10-3.2	Cool to 4ºC	NA	One 4oz Clear Glass	NA			

RSL - EPA Regional Screening Level (June 2015)
BTV- Background Threshold Value
CAS- Chemical Abstract sercive
TEQ - Toxic Equivalency Quotient
WHO- World Health Organization
TEF- Toxic Equivalency Factor
NA – Not available

Sample Area	Sample Depth and Corresponding Sample ID	Boring Point ID	Latitude	Longitude	Point Type
1	0"-2": A2089-1-0002 2"-6": A2089-1-0206 24"-30": A2089-1-2430	A1-S1	46.95835	-114.19641	Random
		A1-S2	46.95821	-114.19631	
		A1-S3	46.95809	-114.19569	
		A1-S4	46.95799	-114.19560	
		A1-S5	46.95794	-114.19528	
2	0"-2": A2089-2-0002 2"-6": A2089-2-0206 24"-30": A2089-2-2430	A2-S1	46.95792	-114.19493	
		A2-S2	46.95791	-114.19481	
		A2-S3	46.95778	-114.19432	
		A2-S4	46.95782	-114.19359	
		A2-S5	46.95782	-114.19335	
3	0"-2": A2089-3-0002 2"-6": A2089-3-0206 24"-30": A2089-3-2430	A3-S1	46.95779	-114.19301	
		A3-S2	46.95787	-114.19236	
		A3-S3	46.95780	-114.19184	
		A3-S4	46.95783	-114.19158	
		A3-S5	46.95791	-114.19132	
4	0"-2": A2089-4-0002 2"-6": A2089-4-0206 24"-30": A2089-4-2430	A4-S1	46.95779	-114.19106	
		A4-S2	46.95784	-114.19032	
		A4-S3	46.95787	-114.19008	
		A4-S4	46.95785	-114.18968	
		A4-S5	46.95793	-114.18934	
5	0"-2": A2089-5-0002 2"-6": A2089-5-0206 24"-30": A2089-5-2430	A5-S1	46.95819	-114.18834	
		A5-S2	46.95825	-114.18829	
		A5-S3	46.95833	-114.18806	
		A5-S4	46.95828	-114.18777	
		A5-S5	46.95835	-114.18742	

Appendix A

Health and Safety Plan

Olympus Technical Services, Inc.

Site Health and Safety Plan

THIS HEALTH AND SAFETY PLAN IS TO BE USED IN CONJUNCTION WITH
OLYMPUS' CORPORATE HEALTH AND SAFETY PLAN

DATE OF COMPLETION 6.2015 OLYMPUS PROJECT No A2089

EMERGENCY INFORMATION (Attach map to nearest hospital)

Emergency Numbers

Fire 911 Ambulance 911 Hospital 911

Project Manager/Phone Number Andrew Hess/ (970) 729 0496

Project Health and Safety Officer/Phone Number Andrew Hess/ (970) 729 0496

Olympus Site Supervisor/Phone Number Andrew Hess/ (970) 729 0496

Site Health and Safety Officer/Phone Number Andrew Hess/ (970) 729 0496

Client Contact/Phone Number MRL, Randy Gustin, 406-523-1442

Site Address Intersection of Mullan Road and La Casse Lane near Frenchtown, MT

Location of Health and Safety Equipment Olympus Vehicle

SITE DESCRIPTION (Include location, area affected, topography, access, site control, boundaries & site map)

The Site consists of a 2,500 foot long section of service track that runs parallel (east-west) to La Casse Lane between Mullan Road and La Casse Lane north-south. The Site is located to the east of the Mill facility in Section 24, Township 14 North, Range 21 West in Missoula County. The site is a service track from the main MRL line to the former Smurfit Stone Mill.

PROJECT PLAN (Include job tasks, hazardous substance information forms(s), & equipment being used on/near site)

The main task associated with this project includes collecting samples along the 2,500 foot section of track from 25 randomly generated sample points. Tasks associated with this work include:
-Travel to and from the Site,
-Boring 25 holes to 30 inches using a Geoprobe,
-Collecting samples from boring cuttings,
-Filling the borings with unused cutting and/or bentonite chips.

Several Hazardous substances could potential be encountered including Dioxins, Furans, Lead Arsenic, Cadmium, Manganese, Zinc, and PAHs. ToxFAQs for each substance are included in this H&S plan. The main exposure threat for these chemicals at the Site is via the inhalation or ingestion of dust particles. The weather will be closely monitored prior to and during field activities. Should excessive dust become a concern due to wind or dryness dust control will be utilized or field activities will be postponed.

Geoprobe activities will be provided by a trained technician from Stantec. Utility locates will be obtained no less than 3 days prior to any drilling activity.

Proper PPE for sampling, working with equipment, and working on a railroad site will be used at all times. This includes, at a minimum, hard toe safety boots, reflective vest, hard hat, proper vision and hearing protection, and proper hand protection for various tasks.

HAZARD EVALUATION

Job Hazard Analysis must be completed prior to starting any task. Job Hazard Analysis Forms are attached to this Health and Safety Plan.

Physical hazards associated with the work may include, but are not limited to:

- Chemical exposure
- Operating heavy equipment (noise, dust, overhead equipment falling, high-pressure pneumatic lines), applicable to both operators and ground personnel
- Underground and aboveground utilities
- Permit required confined spaces including tanks, vaults, sewers, etc.
- Open excavations, trenching/sloping/shoring
- Equipment hauling, equipment handling, and lifting
- Use of hand and small power tools
- Hot work (welding, cutting, and grinding)
- Lockout/Tagout
- Fall protection (>6 feet elevated surface)
- Heat exhaustion in summer and exposure to cold in fall/winter/spring
- Traffic control - onsite and nearby service and public roads
- Train movement and fouling of railroad tracks
- Slip, trip, and fall, pinch point, sharp surfaces, and noise >85 dB
- Work only in areas with proper illumination or bring sufficient lighting to assess area for hazards.

SAFETY TRAINING

All employees working on Site will have 40 hour Hazardous Waste Operations (HazWoper) training and be current on the 8 hour refresher course. All employees will also have current railroad worker protection training. Personnel operating the Geoprobe will have the appropriate training.

POTENTIAL CHEMICAL HAZARDS

Potential chemical exposure to Dioxin, Furans, Lead, Arsenic, Cadmium, Manganese, Zinc, and PAHs. Exposure potential is extremely low at the Site. Exposure pathways are via inhalation and ingestion of dust particles.

FIRE/EXPLOSION HAZARDS

Flash Point [ ] Dangerous - 100° F or Less LEL: _____

[ ] Moderate - 100° F to 200° F UEL: _____

[X] Low - 200° F or Above Other: _____

POSSIBLE HAZARDOUS REACTIONS

Stable: [X] Unstable: [ ] Pyroforic: [ ] Oxidizer: [ ] Water: [ ] Hazardous Polymerization: [ ] Toxic Gas Generation: [ ]

Reaction Results From: _____

Type of Decomposition:_____ Decomposes To:_____

PPE PROTECTION

Job Tasks	Level of Protection
All Field Work	Hard toe safety boots, hearing and vision protection, hard hat, reflective safety vest,
Geoprobe	Proper hand and hearing protection.
Sampling	Proper hand protection

DECONTAMINATION/PPE DISPOSAL All PPE will be disposed of in 6mil bags and discarded as normal waste. All equipment utilized on Site will be decontaminated before leaving the Site.

AIR MONITORING

YES [ ] NO [X] To Be Done By:_____

(A) On entry before job begins YES [ ] NO [ ] (B) During time in hazardous waste location YES [ ] NO [ ]

CONFINED SPACE ENTRY (If yes, Confined Space Entry Permit must be filled out)

EXCAVATION, TRENCHING AND SHORING

FALL HAZARDS/FALL PROTECTION

ELECTRICAL HAZARDS

HOT WORK (If yes, Hot Work Permit must be filled out)

LOCKOUT/TAGOUT

COMMENTS/OTHER:

DAILY SITE HEALTH AND SAFETY MEETING REPORT

Date:________________________________ Job Number: ________________________________
Project Name:________________________________
Field Location:________________________________
Site Supervisor: ________________________________Site Health & Safety officer:________________________________

Introduction of People .... ( )
Work Scope .... ( )
Level of Entry .... ( )
PPE to be Used .... ( )
Identify Hazards .... ( )
Equipment Being Used .... ( )
Site Specific Safety Rules .... ( )

Emergency Information

Telephone Numbers .... ( )
Telephone Location .... ( )
Hospital Directions/Map .... ( )
Escape Route .... ( )
Fire Extinguisher .... ( )
First Aid Kit .... ( )
Eyewash .... ( )

General

Restrooms .... ( )
Work Zones Delineated .... ( )
Decon/Demob Requirements .... ( )
Onsite Personnel meet Requirements
for Medical, Fit Test, & Training .... ( )
Personnel have read
Site Health & Safety Plan .... ( )
Communication Procedures .... ( )

If Applicable

MSDS Onsite/Available .... ( )
Respirator Fit Testing .... ( )
Confined Entry Permit .... ( )
Monitoring Equipment Calibrated .... ( )
Excavation, trenching, and shoring .... ( )
Fall Protection .... ( )
Electrical hazards .... ( )
Hot Work Permit .... ( )
Lockout/Tagout .... ( )
Job Hazard Analysis (see reverse side)
for job hazards not identified in
Site Health and Safety Plan .... ( )

SAFETY ISSUES DISCUSSED

____
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PERSONNEL PRESENT

Print	Signature

Job Hazard Analysis Form

Analyst:		Date:	
Task Description:			
Hazard Type and Description:			
Consequence:			
Hazard Controls:			
Rationale or Comment:			

Lead – ToxFAQs™

CAS # 7439-92-1

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high-levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services (DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

Lead

CAS # 7439-92-1

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- Avoid exposure to sources of lead.
- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children.
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (µg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC has updated its recommendations on children's blood lead levels. Experts now use an upper reference level value of 97.5% of the population distribution for children's blood lead. In 2012-2015, the value to identify children with blood lead levels that are much higher than most children have, is 5 micrograms per deciliter (µg/dL). EPA limits lead in drinking water to 15 µg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHLORINATED DIBENZO-p-DIOXINS (CDDs)

Division of Toxicology and Environmental Medicine ToxFAQs™ February 1999

This fact sheet answers the most frequently asked health questions (FAQs) about dibenzo-p-dioxins. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chlorinated dibenzo-p-dioxins (CDDs) (75 chemicals) occurs mainly from eating food that contains the chemicals. One chemical in this group, 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD, has been shown to be very toxic in animal studies. It causes effects on the skin and may cause cancer in people. This chemical has been found in at least 91 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are CDDs?

CDDs are a family of 75 chemically related compounds commonly known as chlorinated dioxins. One of these compounds is called 2,3,7,8-TCDD. It is one of the most toxic of the CDDs and is the one most studied.

In the pure form, CDDs are crystals or colorless solids. CDDs enter the environment as mixtures containing a number of individual components. 2,3,7,8-TCDD is odorless and the odors of the other CDDs are not known.

CDDs are not intentionally manufactured by industry except for research purposes. They (mainly 2,3,7,8-TCDD) may be formed during the chlorine bleaching process at pulp and paper mills. CDDs are also formed during chlorination by waste and drinking water treatment plants. They can occur as contaminants in the manufacture of certain organic chemicals. CDDs are released into the air in emissions from municipal solid waste and industrial incinerators.

What happens to CDDs when they enter the environment?

❑ When released into the air, some CDDs may be transported long distances, even around the globe.

❑ When released in waste waters, some CDDs are broken down by sunlight, some evaporate to air, but most attach to soil and settle to the bottom sediment in water.

❑ CDD concentrations may build up in the food chain, resulting in measurable levels in animals.

How might I be exposed to CDDs?

❑ Eating food, primarily meat, dairy products, and fish, makes up more than 90% of the intake of CDDs for the general population.

❑ Breathing low levels in air and drinking low levels in water.

❑ Skin contact with certain pesticides and herbicides.

❑ Living near an uncontrolled hazardous waste site containing CDDs or incinerators releasing CDDs.

❑ Working in industries involved in producing certain pesticides containing CDDs as impurities, working at paper and pulp mills, or operating incinerators.

How can CDDs affect my health?

The most noted health effect in people exposed to large amounts of 2,3,7,8-TCDD is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Other skin effects noted in people exposed to high doses of 2,3,7,8-TCDD include skin rashes, discoloration, and excessive body hair. Changes in blood and urine that may indicate liver damage also are seen in people. Exposure to high concentrations of CDDs may induce longterm alterations in glucose metabolism and subtle changes in hormonal levels.

In certain animal species, 2,3,7,8-TCDD is especially harmful and can cause death after a single exposure. Exposure to lower levels can cause a variety of effects in

animals, such as weight loss, liver damage, and disruption of the endocrine system. In many species of animals, 2,3,7,8-TCDD weakens the immune system and causes a decrease in the system's ability to fight bacteria and viruses. In other animal studies, exposure to 2,3,7,8-TCDD has caused reproductive damage and birth defects. Some animal species exposed to CDDs during pregnancy had miscarriages and the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy often had severe birth defects including skeletal deformities, kidney defects, and weakened immune responses.

How likely are CDDs to cause cancer?

Several studies suggest that exposure to 2,3,7,8-TCDD increases the risk of several types of cancer in people. Animal studies have also shown an increased risk of cancer from exposure to 2,3,7,8-TCDD.
The World Health Organization (WHO) has determined that 2,3,7,8-TCDD is a human carcinogen.
The Department of Health and Human Services (DHHS) has determined that 2,3,7,8-TCDD may reasonably be anticipated to cause cancer.

How can CDDs affect children?

Very few studies have looked at the effects of CDDs on children. Chloracne has been seen in children exposed to high levels of CDDs. We don't know if CDDs affect the ability of people to have children or if it causes birth defects, but given the effects observed in animal studies, this cannot be ruled out.

How can families reduce the risk of exposure to CDDs?

❏ Children should avoid playing in soils near uncontrolled hazardous waste sites.
❏ Discourage children from eating dirt or putting toys or other objects in their mouths.
❏ Everyone should wash hands frequently if playing or working near uncontrolled hazardous waste sites.
❏ For new mothers and young children, restrict eating foods from the proximity of uncontrolled sites with known CDDs.
❏ Children and adults should eat a balanced diet preferably containing low to moderate amounts of animal fats including meat and dairy products, and fish that contain lower amounts of CDDs and eat larger amounts of fruits, vegetables, and grains.

Is there a medical test to determine whether I've been exposed to CDDs?

Tests are available to measure CDD levels in body fat, blood, and breast milk, but these tests are not routinely available. Most people have low levels of CDDs in their body fat and blood, and levels considerably above these levels indicate past exposure to above-normal levels of 2,3,7,8-TCDD. Although CDDs stay in body fat for a long time, tests cannot be used to determine when exposure occurred.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.00003 micrograms of 2,3,7,8-TCDD per liter of drinking water (0.00003 µg/L). Discharges, spills, or accidental releases of 1 pound or more of 2,3,7,8-TCDD must be reported to EPA. The Food and Drug Administration (FDA) recommends against eating fish and shellfish with levels of 2,3,7,8-TCDD greater than 50 parts per trillion (50 ppt).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-62, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Cadmium- ToxFAQs™

CAS # 7440-43-9

This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the kidneys, lungs, and bones. Cadmium has been found in at least 1,014 of the 1,669 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is cadmium?

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- Cadmium enters soil, water, and air from mining, industry, and burning coal and household wastes.
- Cadmium does not break down in the environment, but can change forms.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- Some forms of cadmium dissolve in water.
- Cadmium binds strongly to soil particles.
- Fish, plants, and animals take up cadmium from the environment.

How might I be exposed to cadmium?

- Eating foods containing cadmium; low levels are found in all foods (highest levels are found in leafy vegetables, grains, legumes, and kidney meat).
- Smoking cigarettes or breathing cigarette smoke.
- Breathing contaminated workplace air.
- Drinking contaminated water.
- Living near industrial facilities which release cadmium into the air.

How can cadmium affect my health?

Breathing high levels of cadmium can severely damage the lungs. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea.

Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease. Other long-term effects are lung damage and fragile bones.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have determined that cadmium and cadmium compounds are human carcinogens. The EPA determined that cadmium is a probable human carcinogen (group B1).

Cadmium

CAS # 7440-43-9

How can cadmium affect children?

The health effects in children are expected to be similar to the effects seen in adults (kidney and lung damage depending on the route of exposure).

A few studies in animals indicate that younger animals absorb more cadmium than adults. Animal studies also indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.

We don't know if cadmium causes birth defects in people. Studies in animals exposed to high levels of cadmium during pregnancy have resulted in harmful effects to the young. Young animals exposed to cadmium before birth have shown effects on behavior and learning. There is also some information from animal studies that high enough exposures to cadmium before birth can reduce body weights and affect the skeleton in the developing young.

How can families reduce the risk of exposure to cadmium?

- Do not allow children to play with batteries. Dispose of nickel-cadmium batteries properly.
- Cadmium is a component of tobacco smoke. Avoid smoking and smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.
- A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to determine whether I've been exposed to cadmium?

Cadmium can be measured in blood, urine, hair, or nails. Urinary cadmium has been shown to accurately reflect the amount of cadmium in the body.

The amount of cadmium in your blood shows your recent exposure to cadmium. The amount of cadmium in your urine shows both your recent and your past exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to cadmium in drinking water at concentrations of 0.04 milligrams per liter (0.04 mg/L) for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.005 mg/L cadmium is not expected to cause any adverse effects.

The Food and Drug Administration (FDA) has determined that the cadmium concentration in bottled drinking water should not exceed 0.005 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 5 µg/m^3 for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. Toxicological Profile for Cadmium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Arsenic - ToxFAQs™

CAS # 7440-38-2

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic

compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys.

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

- If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.
- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Arsenic (Update). Atlanta, GA: U.S. Department of Health and Human Services. Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636

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ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ZINC

CAS # 7440-66-6

Division of Toxicology ToxFAQs™ August 2005

This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Zinc is a naturally occurring element. Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Low levels of zinc are essential for maintaining good health. Exposure to large amounts of zinc can be harmful. It can cause stomach cramps, anemia, and changes in cholesterol levels. Zinc has been found in at least 985 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is zinc?

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass, and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dyes, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

- ❏ Some is released into the environment by natural processes, but most comes from human activities like mining, steel production, coal burning, and burning of waste.
- ❏ It attaches to soil, sediments, and dust particles in the air.
- ❏ Rain and snow remove zinc dust particles from the air.
- ❏ Depending on the type of soil, some zinc compounds can move into the groundwater and into lakes, streams, and rivers.
- ❏ Most of the zinc in soil stays bound to soil particles and does not dissolve in water.
- ❏ It builds up in fish and other organisms, but it does not build up in plants.

How might I be exposed to zinc?

- ❏ Ingesting small amounts present in your food and water.
- ❏ Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
- ❏ Eating too many dietary supplements that contain zinc.
- ❏ Working on any of the following jobs: construction, painting, automobile mechanics, mining, smelting, and welding; manufacture of brass, bronze, or other zinc-containing alloys; manufacture of galvanized metals; and manufacture of machine parts, rubber, paint, linoleum, oilcloths, batteries, some kind of glass, ceramics, and dyes.

How can zinc affect my health?

Zinc is an essential element in our diet. Too little zinc can cause problems, but too much zinc is also harmful.

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol. We do not know if high levels of zinc affect reproduction in humans. Rats that were fed large amounts of zinc became infertile.

Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever. We do not know the long-term effects of breathing high levels of zinc.

Putting low levels of zinc acetate and zinc chloride on the skin of rabbits, guinea pigs, and mice caused skin irritation. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified zinc for carcinogenicity. Based on incomplete information from human and animal studies, the EPA has determined that zinc is not classifiable as to its human carcinogenicity.

How can zinc affect children?

Zinc is essential for proper growth and development of young children. It is likely that children exposed to very high levels of zinc will have similar effects as adults. We do not know whether children are more susceptible to the effects of excessive intake of zinc than the adults.

We do not know if excess zinc can cause developmental effects in humans. Animal studies have found decreased weight in the offspring of animals that ingested very high amounts of zinc.

How can families reduce the risks of exposure to zinc?

❑ Children living near waste sites that contain zinc may be exposed to higher levels of zinc through breathing contaminated air, drinking contaminated drinking water, touching or eating contaminated soil.

❑ Discourage your children from eating soil or putting their hands in their mouths and teach them to wash their hands frequently and before eating.

❑ If you use medicines or vitamin supplements containing zinc, make sure you use them appropriately and keep them out of the reach of children.

Is there a medical test to determine whether I've been exposed to zinc?

There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water should contain no more than 5 milligrams per liter of water (5 mg/L) because of taste. The EPA requires that any release of 1,000 pounds (or in some cases 5,000 pounds) into the environment be reported to the agency.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set an average limit of 1 mg/m^3 for zinc chloride fumes and 5 mg/m^3 for zinc oxide (dusts and fumes) in workplace air during an 8-hour workday, 40-hour workweek.

Similarly, the National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Polycyclic Aromatic Hydrocarbons (PAHs) - ToxFAQs™

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.
- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

ATSDR

CS249955-AD

Polycyclic Aromatic Hydrocarbons

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

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Manganese - ToxFAQs™

CAS # 7439-96-5

This fact sheet answers the most frequently asked health questions (FAQs) about manganese. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Manganese is a trace element and eating a small amount from food or water is needed to stay healthy. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the brain. Manganese has been found in at least 869 of the 1,669 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is manganese?

Manganese is a naturally occurring metal that is found in many types of rocks. Pure manganese is silver-colored, but does not occur naturally. It combines with other substances such as oxygen, sulfur, or chlorine. Manganese occurs naturally in most foods and may be added to some foods.

Manganese is used principally in steel production to improve hardness, stiffness, and strength. It may also be used as an additive in gasoline to improve the octane rating of the gas.

What happens to manganese when it enters the environment?

- Manganese can be released to the air, soil, and water from the manufacture, use, and disposal of manganese-based products.
- Manganese cannot break down in the environment. It can only change its form or become attached to or separated from particles.
- In water, manganese tends to attach to particles in the water or settle into the sediment.
- The chemical state of manganese and the type of soil determine how fast it moves through the soil and how much is retained in the soil.
- The manganese-containing gasoline additive may degrade in the environment quickly when exposed to sunlight, releasing manganese.

How might I be exposed to manganese?

- The primary way you can be exposed to manganese is by eating food or manganese-containing nutritional supplements. Vegetarians, who consume foods rich in manganese such as grains, beans and nuts, as well as heavy tea drinkers, may have a higher intake of manganese than the average person.
- Certain occupations like welding or working in a factory where steel is made may increase your chances of being exposed to high levels of manganese.
- Manganese is routinely contained in groundwater, drinking water, and soil at low levels. Drinking water containing manganese or swimming or bathing in water containing manganese may expose you to low levels of this chemical.

How can manganese affect my health?

Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy.

The most common health problems in workers exposed to high levels of manganese involve the nervous system. These health effects include behavioral changes and other nervous system effects, which include movements that may become slow and clumsy. This combination of symptoms when sufficiently severe is referred to as "manganism". Other less severe nervous system effects such as slowed hand movements have been observed in some workers exposed to lower concentrations in the work place.

Manganese

CAS # 7439-96-5

Exposure to high levels of manganese in air can cause lung irritation and reproductive effects.

Nervous system and reproductive effects have been observed in animals after high oral doses of manganese.

How likely is manganese to cause cancer?

The EPA concluded that existing scientific information cannot determine whether or not excess manganese can cause cancer.

How can manganese affect children?

Studies in children have suggested that extremely high levels of manganese exposure may produce undesirable effects on brain development, including changes in behavior and decreases in the ability to learn and remember. We do not know for certain that these changes were caused by manganese alone. We do not know if these changes are temporary or permanent. We do not know whether children are more sensitive than adults to the effects of manganese, but there is some indication from experiments in laboratory animals that they may be.

Studies of manganese workers have not found increases in birth defects or low birth weight in their offspring. No birth defects were observed in animals exposed to manganese.

How can families reduce the risk of exposure to manganese?

- Children are not likely to be exposed to harmful amounts of manganese in the diet. However, higher-than-usual amounts of manganese may be absorbed if their diet is low in iron. It is important to provide your child with a well-balanced diet.
- Workers exposed to high levels of airborne manganese in certain occupational settings may accumulate manganese dust on their work clothes. Manganese-contaminated work clothing should be removed before getting into your car or entering your home to help reduce the exposure hazard for yourself and your family.

Is there a medical test to determine whether I've been exposed to manganese?

Several tests are available to measure manganese in blood, urine, hair, or feces. Because manganese is normally present in our body, some is always found in tissues or fluids.

Because excess manganese is usually removed from the body within a few days, past exposures are difficult to measure with common laboratory tests.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to manganese in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has established that lifetime exposure to 0.3 mg/L manganese is not expected to cause any adverse effects.

The Food and Drug Administration (FDA) has determined that the manganese concentration in bottled drinking water should not exceed 0.05 mg/L.

The Occupational Health and Safety Administration (OSHA) has established a ceiling limit (concentration that should not be exceeded at any time during exposure) of 5 mg/m^3 for manganese in workplace air.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. Toxicological Profile for Manganese. Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636.

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Appendix B

Standard Operating Procedures

SOP-G1:	Field Logbook/Photographs
SOP-G2:	Sample Packaging and Shipping
SOP-G3:	Field Quality Control Samples
SOP-G4:	Sample Custody
SOP-G5:	Soil and Water Sampling Field Equipment Decontamination
SOP-G6:	Management of Investigative-Derived Waste
SOP-SS1:	Sample Collection from Soil Borings, Excavations, and Hand Dug Pits
SOP-SS6:	Compositing Soil Samples

STANDARD OPERATING PROCEDURE G-1

FIELD LOGBOOK/PHOTOGRAPHS

Standard Operating Procedure
Field Logbook/Photographs (G-1)

Field Logbook

A separate field logbook should be used for each project (e.g., each project or portion of a project). Each logbook shall have a unique document control number (Olympus work order number with a field logbook number and ranges of dates for projects with multiple logbooks). The logbooks will be bound and have consecutively numbered pages. The information recorded in these logbooks shall be written in indelible ink. The author will initial and date entries at the end of each day and a line shall be drawn through the remainder of the page. All corrections will consist of a single line-out deletion in indelible ink, followed by the author's initials and the date. No bound field logbooks will be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document. These bound logbooks, at a minimum, shall include the following entries:

1. A purpose and description of the proposed field task,
2. Time and date fieldwork started,
3. Location and description of the work area, including sketches if possible, map references and photographs, and sketches of well construction details, soils, pits, etc.,
4. Names and titles of field personnel,
5. Name, address and phone number of any field contacts,
6. Meteorological conditions at the beginning of fieldwork and any ensuing changes in these conditions,
7. Details of the fieldwork performed and field data sheets used (including document control numbers), with special attention to any deviations from the task-specific Sampling and Analysis Plan (SAP) or Standard Operating Procedures(SOPs),
8. All field measurements made,
9. Any field laboratory analytical results, and
10. Personnel and equipment decontamination procedures.

For any field sampling work, at a minimum, the following entries should be made:

1. Sample location and number,
2. Sample type (e.g., ground water) and amount collected,
3. Date and time of sample collection,
4. Split samples taken by other parties. Note the type of sample, sample location, time/date, name of person, person's company, any other pertinent information,
5. Sampling method, particularly and deviations from the SOP,
6. Suspected waste composition, including an estimate of the hazard level as being low or medium,
7. Documentation or reference of preparation procedures for reagents or supplies that will become an integral part of the sample (e.g., filters and preserving reagents), and
8. Sample preservation, handling, packaging, labeling, shipping information (e.g., weight), the shipping agent, and the laboratory where the samples will be sent.

Field logbooks are used by multiple employees both in the field (collection of notes) and in the office (interpretation of data and reporting). Since field logbooks regularly leave the office and are handled by multiple parties, there is ample opportunity for them to get misplaced, lost, or accidently destroyed. Misplacement, loss, or accidental destruction of a project logbook can

result in loss of valuable project data that is difficult or impossible to retrieve or duplicate. Therefore, a field logbook must be scanned and appended to a running electronic file (pdf) of the logbook each time it is returned to the office.

Photographs

Photographs taken of field activities should include a measured scale in the picture, when practical. The following items shall be recorded in the bound field logbook for each photograph taken:

1. The photographer's name, the date, the time of the photography and the general direction faced,
2. A brief description of the subject and the fieldwork portrayed in the picture, and
3. Sequential number of the photograph.

Digital photographs shall be downloaded to a field (i.e., laptop) computer daily, or to an office computer as soon as practicable. Digital photographs shall be stored in a folder on a server where they can be backed up. Once it is verified that the photos have been successfully downloaded to a computer, they should be deleted from the camera.

STANDARD OPERATING PROCEDURE G-2

SAMPLE PACKAGING AND SHIPPING

Standard Operating Procedure
Sample Packaging and Shipping (G-2)

The following steps shall be followed when packaging and shipping environmental samples:

1. Collect the sample as stated in appropriate standard operating procedure (SOP) or field sampling plan.
2. Attach the identification tag to the sample container. Place sample container in a 2-ml thick (or thicker) zip-lock polyethylene bag, one sample per bag. Position the sample container so the identification tag can be read through the bag, then seal the bag.
3. Place one or more bagged samples into a strong outside water-tight container, such as an ice chest or a DOT-approved fiberboard box.
4. Add ice and/or blue ice if required by the appropriate SOP. Ice shall be triple bagged in ziplock bags to prevent leakage as the ice melts. If the samples must be kept cool, then a temperature blank should be included in the cooler. The temperature blank shall be a jar of water labeled “Temperature Blank”. The jar shall be placed with the ice in the cooler at the beginning of sampling. The presence of a temperature blank shall be recorded on the chain-of-custody.
5. Secure containers with noncombustible, absorbent, cushioning materials.
6. Secure the properly completed chain-of-custody form (see SOP G-4) to the inside of the ice chest lid in a plastic bag. The chain-of-custody form shall list only those samples contained in the ice chest.
7. Tape ice chest drain and ice chest closed using fiberglass or packing tape and seal with several chain-of-custody seals.
8. Complete the air bill and Shipper's Certification for Restricted Articles/Dangerous Goods if required.
9. Label and address the container.

Note: Bagging of samples and lining of coolers will not be necessary if samplers transport samples directly to the laboratory.

STANDARD OPERATING PROCEDURE G-3

FIELD QUALITY CONTROL SAMPLES

Standard Operating Procedure
Field Quality Control Samples (G-3)

Field Quality Control (QC) is a part of the project Quality Assurance/Quality Control program and is described in detail in the project-specific Quality Assurance Project Plan (QAPP). This Standard Operating Procedure (SOP) describes the purpose, preparation and collection frequency of field QC blanks and duplicate samples for aqueous matrices. Table G-3.1 summarizes the field QC sampling requirements described in this SOP.

At least one set of field QC samples will be prepared for each sampling event if required by the QAPP. An event is defined by any of the following conditions:

1. The beginning of a new sampling round,
2. A significant change in either the sample type, matrix, or location, or
3. A change in any sample analysis parameter.

If the number of field QC samples taken does not equal to an integer multiple of the interval specified in QAPP, use the next higher multiple. For example, if a frequency of 1 in 20 is indicated and 28 field samples are collected, then two field QC samples will be prepared.

All field QC samples shall be packaged and shipped with field samples to the laboratory in accordance to procedures outlined in SOP-G-2. Sample custody will be maintained according to procedures outlined in SOP-G-4. The text below describes the field QC samples for the aqueous matrix.

Field QC Samples

Trip Blank

A trip blank will be used to help identify cross contamination in a shipment of aqueous samples for analyzing volatile organic compounds (VOCs) only. Trip blanks will be prepared by the appropriate laboratory and in the appropriate containers using distilled/deionized (DS/DI) water. Trip blanks will be transported unopened to and from the field with field samples. If required by the QAPP, one trip blank will be prepared for and sent with each shipment of samples for analyzing VOCs.

Equipment Rinsate Blank

Equipment rinsate blanks will be used to help identify possible contamination from the sampling environment or from sampling equipment, such as a bailer, collection container, or filter apparatus. Equipment rinsate blanks for field-filtered samples will be prepared by processing a representative amount of DS/DI water through the decontaminated sample collection equipment and filtering apparatus with a filter, then transferring the water to an appropriate sample container, and adding any necessary preservatives.

Equipment rinsate blanks for non-field filtered samples will be prepared by processing a representative amount of laboratory DS/DI water through the decontaminated sample collection equipment, then transferring the water to an appropriate sample container, and adding any necessary preservatives.

Field Blank

Field blanks provide a measure of various cross-contamination sources, decontamination efficiency, and other potential errors that can be introduced from sources other than the sample. A field blank is prepared by the same protocols as a normal sample, but is not exposed to any sampling equipment. A field blank is prepared in the field and consists of a representative amount of DS/DI and/or reagent-grade (analyte-free) water and any necessary preservatives. A field blank is contained in a sample bottle randomly chosen from each lot of bottles received from the supplier. Field blanks are required for all inorganic or organic constituents. Field blanks will be collected for each type of sample bottle at a frequency of 1 per 20 samples or once per sampling event, whichever is more frequent.

Field Duplicate

Field duplicates are co-located samples collected identically and consecutively over a minimum period of time and provide a measure of the total analytical bias (field and laboratory variance), including bias resulting from the heterogeneity of the replicate sample set itself. Field duplicates consist of two samples (one sample and one replicate) collected consecutively at the same location and placed in different bottles for separate analysis. Each duplicate will have its own sample number. The two samples will be sent to the laboratory and analyzed for identical chemical parameters.

TABLE G-3.1
FIELD QC SAMPLING REQUIREMENTS

QC Sample	Sample Location	Preparation Method
Equipment Rinsate Blank	Field	DI/DS water through sampling equipment and preserved.
Field Blank	Field	DI/DS water not exposed to sampling equipment.
Field Duplicate	Field	Co-located samples collected identically and consecutively.
Trip Blanks	Laboratory	DI/DS Water

STANDARD OPERATING PROCEDURE G-4

SAMPLE CUSTODY

Standard Operating Procedure
Sample Custody (G-4)

A stringent, established program of sample chain-of-custody procedures shall be followed during field sample collection and handling activities to account for each sample. Preprinted labels will be used to maintain the highest degree of control in sample handling. The preprinted labels(with spaces provided) will ensure that all necessary information is retained with the sample chain-of-custody records, and shipping manifest will be utilized to maintain control over access to the sample destination after shipment from the sample collection site.

SAMPLE CONTROL FORMS

Sample Label

Each sample collected at the site shall be identified with a sample label. The following information shall be recorded on the label:

1. Project number,
2. Sample identification (well number for groundwater samples, soil boring number, sample number, and sample depth for soil samples, etc.),
3. Date and time sample was taken,
4. Sampler's name or initials,
5. Preservative added, and
6. Remarks, including pertinent field observations.

Chain of Custody Record

Chain-of-custody records ensure that samples are traceable from the time of collection until introduced as evidence in legal proceedings. A sample is in a person's custody if any of the following criteria are met:

1. The sample is in the person's possession.
2. The sample is in the person's view after being in possession.
3. The sample has been locked up to prevent tampering after it was in the person's possession.
4. The sample was in the person's possession, then was transferred to a designated secure area.

The chain-of-custody record is completed in the field by the individual physically in charge of the sample collection. The chain-of-custody record may be completed concurrently with the field sample data sheet or before shipping samples to the laboratory. The sampler is personally responsible for the care and custody of the sample until it is shipped.

When transferring the sample possession, the individuals relinquishing and receiving the sample will sign, date, and write the time of day on the chain-of-custody record. The chain-of-custody record is enclosed with the sample after it has been signed by the sampler.

The chain-of-custody record also serves as the laboratory request form. As shown on the attached sample chain-of-custody form, a space is included on the form to list the analyses requested for each set of samples. The presence of a temperature blank shall be recorded on the chain-of-custody form.

Field sample data is to be recorded in the field notebook. The field data correlates the assigned sample bottle designation to a specific well or sample location, or to other distinguishing features or attributes (i.e., dummy sample, duplicate sample, sample blank, etc.).

STANDARD OPERATING PROCEDURE G-5

SOIL AND WATER SAMPLING FIELD EQUIPMENT DECONTAMINATION

Standard Operating Procedure
Soil and Water Sampling Field Equipment Decontamination (G-5)

To prevent potential cross-contamination of samples, all reusable soil and water sampling equipment and pumps shall be decontaminated. The sample personnel shall set up the area used to decontaminate soil and water sampling equipment in the manner shown on Figure G-5-1. This area will be located upwind from the specific sampling area. The personnel performing the decontamination procedures will wear protective clothing as specified in the site-specific Health and Safety Plan.

PROCEDURES USED TO DECONTAMINATE EQUIPMENT USED FOR COLLECTION OF SOIL SAMPLES DESTINED FOR INORGANICS ANALYSIS

Table G-5.1 lists the equipment that shall be used to decontaminate the sampling equipment and the decontamination station where it will be used. The specific procedures for decontaminating sampling equipment used to collect samples destined for inorganics analysis include the following:

1. At Station No. 1, first wash the contaminated equipment in a tub containing tap water to remove solid material. Follow with a second wash in a tub containing water mixed with a detergent, such as Alconox.
2. Move the equipment to the wash tub in Station No. 2. Rinse the equipment with clean water, wash with 0.1 Normal nitric acid (HNO_3), then rinse with distilled/deionized (DS/DI) water.
3. At Station No. 3, place the clean equipment on plastic sheeting until it is used again.

   After decontaminating all the sampling equipment, the disposable gloves and used plastic from Station No. 3 shall be placed in garbage bags and disposed in a trash collection facility. The wash and rise water from Station Nos. 1 and 2 will be disposed in accordance with the site-specific SAP. At the end of each day, all sampling equipment shall be stored in large plastic bags.

PROCEDURES USED TO DECONTAMINATE EQUIPMENT USED FOR COLLECTION OF SAMPLES DESTINED FOR ORGANICS ANALYSIS

Table G-5.2 lists the equipment and supplies that shall be used to decontaminate the sampling equipment and the decontamination station where it will be used. The specific procedures for decontaminating the sampling equipment used in collection of samples for organic analysis include the following:

1. At Station No. 1, Tub No. 1, wash and scrub with a detergent such as Alconox, or use a pressurized steam cleaner to remove solid material. Collect the waste water for disposal in accordance with the site-specific SAP.
2. At Station No. 1, Tub No. 2, double rinse the equipment with DS/DI water.
3. At Station No. 2, rinse the equipment with methanol followed by a double rinse with DS/DI water.
4. At Station No. 3, lay the equipment on the clean plastic to air dry.
5. Wrap the equipment in clean plastic until reuse.

The disposable gloves and used plastic from Station No. 3 shall be placed in garbage bags and disposed in the trash collection containers. The wash and rinse waters from Stations No. 1 and 2 will be disposed in accordance with the site-specific SAP.

DECONTAMINATION OF SAMPLING PUMPS

When using field decontamination, it is advisable to begin sampling with the well containing the lowest anticipated analyte concentration. Successive samples should be obtained from wells anticipated to have increasing analyte concentrations. Use of dedicated pump equipment is preferable when feasible. Table G-5.3 lists the decontamination equipment required.

When pumps (e.g., submersible or bladder) are submerged below the water surface to collect water samples, they should be cleaned and flushed between uses. This cleaning process consists of an external detergent wash and high-pressure tap water rinse, or steam cleaning, of pump casing, tubing and cables, followed by a flush of potable water through the pump. This flushing can be accomplished by pouring clean tap water from a carboy into the end of the discharge tube and working it down to the inside of the pump. The procedure should be repeated; then the tubing and inside of the pump should be rinsed with DS/DI water.

Surface pumps (e.g., peristaltic or diaphragm) used for well evacuation need not be cleaned between well locations. However, a new length of tubing must be used for each well and discarded after use. The pump and hose should always be placed on clean polyethylene sheeting to avoid contact with the ground surface.

TABLE G-5.1

DECONTAMINATION MATERIALS FOR EQUIPMENT USED TO COLLECT SAMPLES FOR INORGANICS ANALYSIS

Equipment List for Decontamination

Item	Quantity
3-gallon plastic tubs	3
5-gallon plastic container, tap water	a
5-gallon carboy, DS/DI water	a
Alconox	a
0.1 Normal Nitric Acid	a
Hard-bristle brushes	2
Plastic sheeting or garbage bags	a
Personal protective equipment	a,b
Paper towels	a
55-gallon drum(s)	a
Drum labels	a
Spray paint	a

Equipment at Decontamination Stations

Station No. 1
- Alconox
- Tap water
- Two 3-gallon plastic washtubs
- Scrub brush
- DS/DI water

Station No. 2
- 3-gallon plastic washtub
- DS/DI water
- 0.1 Normal Nitric Acid

Station No. 3
- Plastic sheeting or garbage bag

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a Quantity depends on the size of the sampling effort and is, therefore, left to the discretion of the sampler.

b Type of protective equipment as specified in the site-specific Health and Safety Plan.

TABLE G-5.2

DECONTAMINATION MATERIALS FOR EQUIPMENT USED TO COLLECT SAMPLES DESTINED FOR ORGANICS ANALYSIS

Equipment List for Decontamination

Item	Quantity
3-gallon plastic tubs	3
5-gallon plastic container, tap water	a
5-gallon carboy, DS/DI water	a
Alconox	a
Hard-bristle brushes	2
Methanol	a
Plastic sheeting or garbage bags	a
Personal protective equipment	a,b
Paper Towels	a
55-gallon drum(s)	a
Drum labels	a
Spray paint	a

Equipment at Decontamination Stations

Station No. 1
- Alconox
- Tap water
- Two 3-gallon plastic washtubs
- Scrub brush
- DS/DI water

Station No. 2
- 3-gallon plastic washtub
- Methanol and DS/DI water

Station No. 3
- Plastic sheeting or garbage bag

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a Quantity depends on the size of the sampling effort and is, therefore, left to the discretion of the sampler.

b Type of protective equipment as specified in the site-specific Health and Safety Plan.

TABLE G-5.3

DECONTAMINATION EQUIPMENT FOR SAMPLING PUMPS

Equipment List for Decontamination of Submersible Pumps

Item	Quantity
Alconox	a
Tap water	a
Hard-bristle brushes	1
Plastic sheeting or garbage bags	a
Personal protective equipment	a,b
Plastic container such as 13-gallon trash can	1
55-gallon drum(s)	a
Drum labels	a
Steam cleaner	Optional

Equipment List for Decontamination of Surface Pumps

Item	Quanity
Polyethylene tubing	a
Plastic sheeting or garbage bags	a

a Quantity depends on the size of the sampling effort and is, therefore, left to the discretion of the sampler.

b Type of protective equipment as specified in the site-specific Health and Safety Plan.

STANDARD OPERATING PROCEDURE G-6

MANAGEMENT OF INVESTIGATIVE-DERIVED WASTE

Standard Operating Procedure
Management of Investigative Derived Waste (G-6)

Prior to the field sampling event, review the Sampling and Analysis Plan to understand how wastes generated during the investigation should be handled. This standard operating procedure is applicable to non-hazardous wastes. If hazardous wastes may be generated, please consult with the project manager and the project specific SAP.

SOIL

Whenever possible, soils excavated from test pits should be placed back in the test pit in the reverse order that it was excavated. To determine appropriate methods for handing of drill cuttings from soil borings or monitoring well installation, soils exhumed from the borehole should be monitored for staining and field screened for VOCs using a PID in accordance with standard operating procedures. Based on the PID screening, cuttings with organic vapor concentrations greater than 100 ppm should be containerized in labeled 55-gallon drums (or roll-off containers if large volumes of cuttings are anticipated) pending further characterization. Alternatively, project personnel may elect to containerize all drill cuttings based on the presence of known contamination and anticipated contaminant concentrations. Containerized soil must be properly labeled, documented and disposed of in accordance with state and federal regulations based on soil analytical results. Soil that does not appear to be contaminated based on observations by field personnel and PID screening may be spread on the ground near the point of origin.

GROUNDWATER

Groundwater purged from a well during development or sampling that has a sheen or contains free product must be containerized in an appropriately labeled 55-gallon drums or tank pending receipt of analytical results. A drum should be dedicated to each well sampled so that the analytical results of the groundwater sample from the well can be used to characterize the water in the drum. If groundwater from several wells is placed in a drum, the water in the drum should be sampled for adequate characterization. The containerized water must be disposed of in accordance with state and federal regulations based on the analytical results. Groundwater that does not have a sheen or contain free product or other know contamination may be discharged to the ground surface in the vicinity of the well location for evaporation and infiltration. All surface discharge areas should not allow for migration of discharge water to a surface water body.

RINSEATE WATER ORIGINATING FROM DECONTAMINATION

All source water for sampling equipment decontamination purposes will be distilled water. For larger equipment when power washing procedures are used for decontamination, potable water will be used. Decontamination will be conducted in a specified area that limits the spread of decontamination water. Decontamination water will be discharged to the ground in the vicinity of the source of dirt and mud to evaporate and infiltrate.

STANDARD OPERATING PROCEDURE SS-1

SAMPLE COLLECTION FROM SOIL BORINGS, EXCAVATIONS AND HAND-DUG PITS

STANDARD OPERATING PROCEDURE SS-1
SAMPLE COLLECTION FROM SOIL BORINGS, EXCAVATIONS, AND HAND DUG PITS

SOIL BORING PROCEDURES

The following procedures are designed to be used during the operation of auger type drill rigs during soil sampling operations. The procedures listed below may be modified in the field by the agreement of the lead site sampler and drill operators based on field and site conditions after appropriate annotations have been made in the appropriate bound field logbook. **Prior to any subsurface work, have utilities (gas and electric, telephone, sewer, etc.) located by a regional one-call service or the utility companies as needed.**

1. Locate the site as directed in the site-specific Sampling and Analysis Plan (SAP).

2. Drillers prepare rig for operation. This includes; but is not limited to, decontamination of the drill rig tools and sampling equipment, leveling the rig, preparing the downhole tool, preparing the auger "flights", and establishing the drill over the location.

3. Mount the split tube to the drive stem.

4. Prior to using the split spoon sampler, sample the surface increment to a depth in accordance with the site-specific SAP.

5. Place split spoon sampler on the ground surface and advance sampler to the desired depth using the rig hammer.

6. After driving the split spoon sampler its entire length or upon refusal of advancement, recover the split spoon sampler. Refusal is defined as 100 blows with the rig hammer and less than 6 inches advancement of the split spoon sampler. Less than 100 blows may be defined as refusal if there is no split spoon advancement. This decision will be made at the discretion of the field sampler.

7. After recovery of the split spoon sampler, open the spoon and place the spoon containing the soil sample into a holding device, maintaining the intervals as sampled.

8. Sampling personnel will then describe the soil sample based on the site-specific SAP instructions, and fill out the appropriate bound file logbooks, field profile sheets, field site sheets, and quality assurance/quality control documentation.

9. Decontaminate the split spoon sampler.

10. Repeat steps 3 to 9 until sampling is completed.

11. The drill rig tools and sampling equipment will be decontaminated prior to moving onto the next site. The drill rig will be left in a safe and secure fashion at the end of each shift.

STANDARD OPERATING PROCEDURE SS-6

COMPOSITING SOIL SAMPLES

STANDARD OPERATING PROCEDURE SS-6
COMPOSITING SOIL SAMPLES

INTRODUCTION

Compositing methods will be used when it is desirable to obtain a single sample representing the mean or average characteristics of a soil interval. This technique is good for obtaining average soil contaminant values; however, it tends to mask or obscure variations within the soil column. This procedure applies to samples taken for inorganic analysis. Volatile or semi-volatile organic compounds are lost using these methods and thus shall not be sampled in this manner.

METHOD

The procedure applies primarily to split spoon sampling, but can be adapted to suit other sampling methods. After the spoon is withdrawn from the boring and opened, and the upper several inches of potentially disturbed material is removed and discarded, the sample shall be split lengthwise with a stainless steel knife. One-half of the sample is transferred to a large stainless steel mixing bowl or pan. The other lengthwise half is placed in a glass sample jar and retained as a sample split for that depth interval. This procedure is repeated until the desired number of discrete split spoon samples have been collected for the composite.

The material in the mixing bowl or pan is then broken up and mixed thoroughly with a stainless steel spoon or trowel. Careful observation of the soil will indicate when homogenization is complete. The soil is then spread evenly in the bottom of the bowl or pan. The soil mass is quartered, and an equal-volume subsample taken from each quarter. These subsamples are placed in the sample jar to be sent to the laboratory for analysis. The remainder of the homogenized soil composite is saved and archived as a split.

Appendix B

Site Health and Safety Plan

Olympus Technical Services, Inc.

Site Health and Safety Plan

THIS HEALTH AND SAFETY PLAN IS TO BE USED IN CONJUNCTION WITH
OLYMPUS' CORPORATE HEALTH AND SAFETY PLAN

DATE OF COMPLETION October 2017 OLYMPUS PROJECT No A2089

EMERGENCY INFORMATION (Attach map to nearest hospital)

Emergency Numbers

Fire 911 Ambulance 911 Hospital 911

Project Manager/Phone Number Andrew Hess/ (970) 729 0496

Project Health and Safety Officer/Phone Number Andrew Hess/ (970) 729 0496

Olympus Site Supervisor/Phone Number Andrew Hess/ (970) 729 0496

Site Health and Safety Officer/Phone Number Andrew Hess/ (970) 729 0496

Client Contact/Phone Number MRL, Randy Gustin, 406-523-1442

Site Address Intersection of Mullan Road and La Casse Lane near Frenchtown, MT

Location of Health and Safety Equipment Olympus Vehicle

SITE DESCRIPTION (Include location, area affected, topography, access, site control, boundaries & site map)

The Site consists of a 2,500 foot long section of service track that runs parallel (east-west) to La Casse Lane between Mullan Road and La Casse Lane north-south. The Site is located to the east of the Mill facility in Section 24, Township 14 North, Range 21 West in Missoula County. The site is a service track from the main MRL line to the former Smurfit Stone Mill.

PROJECT PLAN (Include job tasks, hazardous substance information forms(s), & equipment being used on/near site)

This project involves excavating surface soil (0-6 inches below ground surface) from the railroad right-of-way along the 2,500 foot section of track. Tasks associated with this work include:
-Travel to and from the Site,
-Excavating and loading of surface soil using track mounted excavators and wheeled loaders into haul trucks,
-Hauling excavated soil to the Republic Landfill in Missoula,
-Collecting confirmation soil samples from the base of the excavation, and
-Seeding the excavation once it is complete.

Hazardous substances that could potentially be encountered including Dioxins and Furans. ToxFAQs for theses substances are attached to this H&S plan. The main exposure threat for these chemicals at the Site is via the inhalation or ingestion of dust particles. The weather will be closely monitored prior to and during field activities. Should excessive dust become a concern due to wind or dryness, dust control will be utilized or field activities will be postponed.

Utility locates will be obtained no less than 3 days prior to excavating.

Proper PPE for sampling, working with equipment, and working on a railroad site will be used at all times. This includes, at a minimum, hard toe safety boots, reflective vest, hard hat, proper vision and hearing protection, and proper hand protection for various tasks.

HAZARD EVALUATION

Job Hazard Analysis must be completed prior to starting any task. Job Hazard Analysis Forms are attached to this Health and Safety Plan.

Physical hazards associated with the work may include, but are not limited to:

- Chemical exposure
- Operating heavy equipment (noise, dust, overhead equipment falling, high-pressure pneumatic lines), applicable to both operators and ground personnel
- Underground and aboveground utilities
- Equipment hauling, equipment handling, and lifting
- Use of hand and small power tools
- Heat exhaustion in summer and exposure to cold in fall/winter/spring
- Traffic control - onsite and nearby service and public roads
- Train movement and fouling of railroad tracks
- Slip, trip, and fall, pinch point, sharp surfaces, and noise >85 dB
- Work only in areas with proper illumination or bring sufficient lighting to assess area for hazards.

SAFETY TRAINING

All employees working on Site will have 40 hour Hazardous Waste Operations (HazWoper) training and be current on the 8 hour refresher course. All employees will also have current railroad worker protection training.

POTENTIAL CHEMICAL HAZARDS

Previous sampling has indicated that potential chemical exposure to dioxin and furans, while present, , Lead, Arsenic, Cadmium, Manganese, Zinc, and PAHs. Exposure potential is extremely low at the Site. Exposure pathways are via inhalation and ingestion of dust particles.

FIRE/EXPLOSION HAZARDS

Flash Point [ ] Dangerous - 100° F or Less LEL: _____

[ ] Moderate - 100° F to 200° F UEL: _____

[X] Low - 200° F or Above Other: _____

POSSIBLE HAZARDOUS REACTIONS

Stable: [X] Unstable: [ ] Pyroforic: [ ] Oxidizer: [ ] Water: [ ] Hazardous Polymerization: [ ] Toxic Gas Generation: [ ]

Reaction Results From: _____

Type of Decomposition: _____ Decomposes To: _____

PPE PROTECTION

Job Tasks	Level of Protection
All Field Work	Hard toe safety boots, hearing and vision protection, hard hat, reflective safety vest,
Geoprobe	Proper hand and hearing protection.
Sampling	Proper hand protection

DECONTAMINATION/PPE DISPOSAL All equipment utilized on Site will be dry decontaminated before leaving the Site.

AIR MONITORING YES [ ] NO [X] To Be Done By:_____

(A) On entry before job begins YES [ ] NO [ ] (B) During time in hazardous waste location YES [ ] NO [ ]

CONFINED SPACE ENTRY (If yes, Confined Space Entry Permit must be filled out)

NA

EXCAVATION, TRENCHING AND SHORING

Excavation will be to a depth of approximately 6 inches below ground surface and trenching and shoring will not be needed.

FALL HAZARDS/FALL PROTECTION

NA

ELECTRICAL HAZARDS

NA

HOT WORK (If yes, Hot Work Permit must be filled out)

NA

LOCKOUT/TAGOUT

NA

COMMENTS/OTHER:

DAILY SITE HEALTH AND SAFETY MEETING REPORT

Date:_____ Job Number: _____
Project Name:_____
Field Location:_____
Site Supervisor: _____Site Health & Safety officer:_____

Introduction of People.....( )
Work Scope .....( )
Level of Entry.....( )
PPE to be Used .....( )
Identify Hazards.....( )
Equipment Being Used .....( )
Site Specific Safety Rules.....( )

Emergency Information

Telephone Numbers .....( )
Telephone Location .....( )
Hospital Directions/Map.....( )
Escape Route .....( )
Fire Extinguisher.....( )
First Aid Kit .....( )
Eyewash .....( )

General

Restrooms .....( )
Work Zones Delineated .....( )
Decon/Demob Requirements .....( )
Onsite Personnel meet Requirements
for Medical, Fit Test, & Training .....( )
Personnel have read
Site Health & Safety Plan.....( )
Communication Procedures .....( )

If Applicable

MSDS Onsite/Available .....( )
Respirator Fit Testing .....( )
Confined Entry Permit.....( )
Monitoring Equipment Calibrated .....( )
Excavation, trenching, and shoring.....( )
Fall Protection.....( )
Electrical hazards .....( )
Hot Work Permit .....( )
Lockout/Tagout.....( )
Job Hazard Analysis (see reverse side)
for job hazards not identified in
Site Health and Safety Plan .....( )

SAFETY ISSUES DISCUSSED

_____
_____
_____
_____
_____
_____
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_____
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_____
_____
_____
_____

PERSONNEL PRESENT

Print	Signature

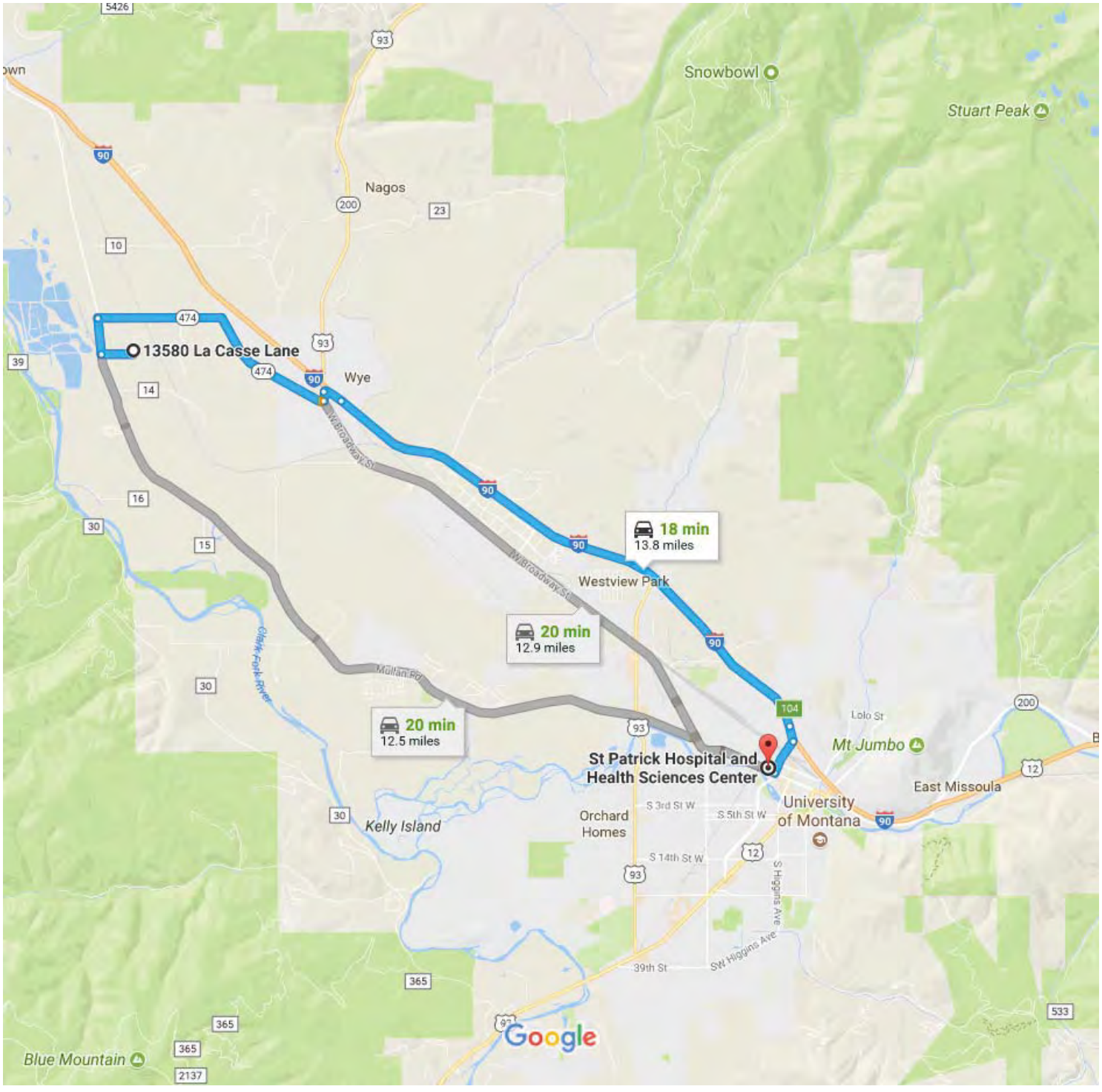
Job Hazard Analysis Form

Analyst:		Date:	
Task Description:			
Hazard Type and Description:			
Consequence:			
Hazard Controls:			
Rationale or Comment:			

Google Maps

13580 La Casse Ln, Missoula, MT 59808 to St Patrick Hospital and Health Sciences Center

Drive 13.8 miles, 18 min



Map data ©2017 Google United States 1 mi

13580 La Casse Ln

Missoula, MT 59808

Get on I-90 E/US-93 S in Wye from MT-474 E

8 min (5.1 mi)

1. Head south on La Casse Ln

0.5 mi

2. Turn right onto Fas 263/Mullan Rd

0.5 mi

3. Turn right onto MT-474 E

3.6 mi

4. Turn left onto W Broadway St

0.1 mi

5. Slight right to merge onto I-90 E/US-93 S

0.3 mi

Follow I-90 E to Old U.S. 93 W/N Orange St in Missoula. Take exit 104 from I-90 E

8 min (8.1 mi)

6. Merge onto I-90 E/US-93 S
   Continue to follow I-90 E

7.9 mi

7. Take exit 104 for Orange St

0.2 mi

Continue on Old U.S. 93 W. Drive to W Broadway St

3 min (0.6 mi)

8. Turn right onto Old U.S. 93 W/N Orange St
   Continue to follow Old U.S. 93 W

0.5 mi

9. Turn right onto W Broadway St
   Destination will be on the right

0.1 mi

St Patrick Hospital and Health Sciences Center

500 W Broadway St, Missoula, MT 59802

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHLORINATED DIBENZO-p-DIOXINS (CDDs)

Division of Toxicology and Environmental Medicine ToxFAQs™ February 1999

This fact sheet answers the most frequently asked health questions (FAQs) about dibenzo-p-dioxins. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chlorinated dibenzo-p-dioxins (CDDs) (75 chemicals) occurs mainly from eating food that contains the chemicals. One chemical in this group, 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD, has been shown to be very toxic in animal studies. It causes effects on the skin and may cause cancer in people. This chemical has been found in at least 91 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are CDDs?

CDDs are a family of 75 chemically related compounds commonly known as chlorinated dioxins. One of these compounds is called 2,3,7,8-TCDD. It is one of the most toxic of the CDDs and is the one most studied.

In the pure form, CDDs are crystals or colorless solids. CDDs enter the environment as mixtures containing a number of individual components. 2,3,7,8-TCDD is odorless and the odors of the other CDDs are not known.

CDDs are not intentionally manufactured by industry except for research purposes. They (mainly 2,3,7,8-TCDD) may be formed during the chlorine bleaching process at pulp and paper mills. CDDs are also formed during chlorination by waste and drinking water treatment plants. They can occur as contaminants in the manufacture of certain organic chemicals. CDDs are released into the air in emissions from municipal solid waste and industrial incinerators.

What happens to CDDs when they enter the environment?

❑ When released into the air, some CDDs may be transported long distances, even around the globe.

❑ When released in waste waters, some CDDs are broken down by sunlight, some evaporate to air, but most attach to soil and settle to the bottom sediment in water.

❑ CDD concentrations may build up in the food chain, resulting in measurable levels in animals.

How might I be exposed to CDDs?

❑ Eating food, primarily meat, dairy products, and fish, makes up more than 90% of the intake of CDDs for the general population.

❑ Breathing low levels in air and drinking low levels in water.

❑ Skin contact with certain pesticides and herbicides.

❑ Living near an uncontrolled hazardous waste site containing CDDs or incinerators releasing CDDs.

❑ Working in industries involved in producing certain pesticides containing CDDs as impurities, working at paper and pulp mills, or operating incinerators.

How can CDDs affect my health?

The most noted health effect in people exposed to large amounts of 2,3,7,8-TCDD is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Other skin effects noted in people exposed to high doses of 2,3,7,8-TCDD include skin rashes, discoloration, and excessive body hair. Changes in blood and urine that may indicate liver damage also are seen in people. Exposure to high concentrations of CDDs may induce longterm alterations in glucose metabolism and subtle changes in hormonal levels.

In certain animal species, 2,3,7,8-TCDD is especially harmful and can cause death after a single exposure. Exposure to lower levels can cause a variety of effects in

animals, such as weight loss, liver damage, and disruption of the endocrine system. In many species of animals, 2,3,7,8-TCDD weakens the immune system and causes a decrease in the system's ability to fight bacteria and viruses. In other animal studies, exposure to 2,3,7,8-TCDD has caused reproductive damage and birth defects. Some animal species exposed to CDDs during pregnancy had miscarriages and the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy often had severe birth defects including skeletal deformities, kidney defects, and weakened immune responses.

How likely are CDDs to cause cancer?

Several studies suggest that exposure to 2,3,7,8-TCDD increases the risk of several types of cancer in people. Animal studies have also shown an increased risk of cancer from exposure to 2,3,7,8-TCDD.
The World Health Organization (WHO) has determined that 2,3,7,8-TCDD is a human carcinogen.
The Department of Health and Human Services (DHHS) has determined that 2,3,7,8-TCDD may reasonably be anticipated to cause cancer.

How can CDDs affect children?

Very few studies have looked at the effects of CDDs on children. Chloracne has been seen in children exposed to high levels of CDDs. We don't know if CDDs affect the ability of people to have children or if it causes birth defects, but given the effects observed in animal studies, this cannot be ruled out.

How can families reduce the risk of exposure to CDDs?

❑ Children should avoid playing in soils near uncontrolled hazardous waste sites.
❑ Discourage children from eating dirt or putting toys or other objects in their mouths.
❑ Everyone should wash hands frequently if playing or working near uncontrolled hazardous waste sites.
❑ For new mothers and young children, restrict eating foods from the proximity of uncontrolled sites with known CDDs.
❑ Children and adults should eat a balanced diet preferably containing low to moderate amounts of animal fats including meat and dairy products, and fish that contain lower amounts of CDDs and eat larger amounts of fruits, vegetables, and grains.

Is there a medical test to determine whether I've been exposed to CDDs?

Tests are available to measure CDD levels in body fat, blood, and breast milk, but these tests are not routinely available. Most people have low levels of CDDs in their body fat and blood, and levels considerably above these levels indicate past exposure to above-normal levels of 2,3,7,8-TCDD. Although CDDs stay in body fat for a long time, tests cannot be used to determine when exposure occurred.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.00003 micrograms of 2,3,7,8-TCDD per liter of drinking water (0.00003 µg/L). Discharges, spills, or accidental releases of 1 pound or more of 2,3,7,8-TCDD must be reported to EPA. The Food and Drug Administration (FDA) recommends against eating fish and shellfish with levels of 2,3,7,8-TCDD greater than 50 parts per trillion (50 ppt).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-62, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CHLORODIBENZOFURANS (CDFs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1995**

This fact sheet answers the most frequently asked health questions (FAQs) about chlorodibenzofurans (CDFs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to chlorodibenzofurans (CDFs) occurs mainly by eating certain contaminated foods. In people, exposure to CDFs is most likely to cause skin and eye irritation, and increased vulnerability to respiratory infection and nervous system effects. This chemical has been found in at least 51 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What are chlorodibenzofurans (CDFs)?

(Pronounced klôr′ō dī bĕn′-zō fyŏor′ôn′)

Chlorinated dibenzofurans, or CDFs, are a family of chemicals that contain one to eight chlorine atoms attached to the carbon atoms of the parent chemical, dibenzofuran. There are 135 different types of CDFs with varying harmful health and environmental effects. The compounds that contain chlorine atoms at the 2,3,7,8-positions of the dibenzofuran molecule are known to be especially harmful.

Not all of the different types have been found in large enough quantities to study the physical properties. However, of those that have been studied, they do not dissolve in water easily and appear to be in the form of colorless solids.

There is no known use for these chemicals. Other than for research purposes, they are not deliberately produced by industry. Most CDFs are produced in small amounts as undesirable by-products of certain processes, such as manufacturing other chemicals or bleaching at paper and pulp mills. CDFs can also be released from incinerators.

What happens to CDFs when they enter the environment?

- CDFs exist in the air as solid particles and sometimes vapors.
- They can enter the environment from car exhausts or from burning coal, wood, or oil for home heating, and the production of electricity.
- Vaporized CDFs are broken down by other chemicals in the atmosphere.
- They can be removed from the air in snow and rain.
- They attach to soil and sediment in lakes and rivers.
- They are not likely to move into groundwater from soil.
- They accumulate in fish to tens of thousands times higher levels than in the water or sediment.
- They also build up in other animals, birds, and people that are exposed to CDFs in their food.

How might I be exposed to CDFs?

- Eating contaminated foods, such as meat, fish, and milk (90% of daily exposure, which is only a few picograms [pg], results from eating contaminated food).
- Breathing air or drinking water that is contaminated, or coming in contact with contaminated soil.
- Using products such as milk cartons, coffee filters, and tampons could result in very low exposures.
- Breathing contaminated workplace air.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

How can CDFs affect my health?

Very little is known about the health effects in people or animals from breathing or touching CDFs. A study in mice showed that skin exposure to low levels over several weeks produced effects similar to those from ingesting CDFs.

Most of the information on the adverse health effects comes from studies in people who were accidentally exposed to food contaminated with CDFs. The amounts that these people were exposed to were much higher than are likely from environmental exposures or from a normal diet.

CDFs caused skin and eye irritations, including severe acne, darkened skin color, and swollen eyelids with discharge from the eyes. CDF poisoning also caused vomiting and diarrhea, anemia, more frequent lung infections, numbness, effects on the nervous system, and mild changes in the liver. Children born to exposed mothers had skin irritation and more difficulty learning.

Many of the same effects that occurred in people also occurred in laboratory animals that ate CDFs. Animals also had severe weight loss, and their stomachs, livers, kidneys, and immune systems were seriously injured. Some animals had birth defects and testicular damage, and in severe cases, some animals died. These effects in animals were seen when they were fed large amounts of CDFs over a short time, or small amounts over several weeks or months.

How likely are CDFs to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified CDFs for carcinogenicity.

It is not definitely known if CDFs cause cancer in people. There are no cancer studies in animals that ate or breathed CDFs. One study found that when CDFs were applied to the skin of animals, they did not cause cancer, but when they were applied with another compound called MNNG, which is known to initiate tumors, cancer did develop.

Is there a medical test to show whether I've been exposed to CDFs?

There are tests available to measure CDFs in your blood, body fat, and breast milk. The tests can tell you if you have been exposed, but they can't tell you the exact amount of CDFs or for how long you were exposed. The tests also cannot predict whether you will experience harmful health effects. Nearly everyone in the United States and other industrialized countries has been exposed to low levels of CDFs because they are in the environment.

Has the federal government made recommendations to protect human health?

There are no federal guidelines or recommendations for protecting human health or the environment from exposure to CDFs.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogenicity: Ability to cause cancer.

Picogram (pg): One trillionth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for chlorodibenzofurans. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Appendix C

Applicable or Relevant and Appropriate Requirements

Appendix C Applicable or Relevant and Appropriate Requirements (ARARs) Removal Action Work Plan Smurfit-Stone Mill/Frenchtown				
Standard, Requirement, Criteria or Limitation	**Citation**	**Description**	**Status**	**Compliance Measures**
Montana Stormwater Runoff Control Regulations	ARM 17.30.1115(2)(a)	Requires plans to mitigate storm water impacts associated with construction activity. Triggering action will be digging or excavation associated with removal action.	Applicable	Not required to submit notice of intent to conduct construction, but must establish best management practices (BMPs) and take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment.
Transportation of Hazardous or Contaminated Waste	ARM 17.50.523	Specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle Triggering action will be the excavation and transport of contaminated material.	Applicable	Take steps to ensure prevent spills or leaks from transport vehicles while transport vehicles are on-site.
Reclamation, Protection of Air Resources	ARM 17.24.761	Specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities. Some of these measures could be considered relevant and appropriate to control fugitive dust emissions in connection with excavation, earth moving and transportation activities conducted as part of the action at the Site. Such measures include, for example, paving, watering, chemically stabilizing, or frequently compacting and scraping roads, promptly removing rock, soil or other dust forming debris from roads, restricting vehicle speeds, revegetating, mulching, or otherwise stabilizing the surface of areas adjoining roads, restricting	Relevant and Appropriate	The proposed action involves handling impacted soil. Removal actions at the site will include wetting and other best management practices (BMPs) related to fugitive dust control. Removal actions will be halted if significant dust is generated and will not

		unauthorized vehicle travel, minimizing the area of disturbed land, and promptly revegetating regraded lands. Triggering action will be digging or excavation associated with removal action.		resume until adequate dust control measures are in place. Dust control measures will ensure that air standards will not be exceeded during the removal action.
Planting of Vegetation post removal	82-4-233, MCA	Requires vegetation as is necessary to establish a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area except that introduced species may be used in the revegetation process where desirable and necessary to achieve the approved postmining land use plan.	Relevant and Appropriate	The operator shall establish on regraded areas and on all other disturbed areas, except water areas, surface areas of roads, and other constructed features approved as part of the post removal use (in this case, railroad right of way), a vegetative cover that is in accordance with the approved revegetation plan
Revegetation measurements	ARM 17.24.726(1)(5) and (6)	sets forth vegetation production, cover, diversity, density, and utility requirements. Triggering action will be the reseeding and reclamation of areas disturbed by the removal action	Relevant and Appropriate	Success of revegetation must be judged on the effectiveness of the vegetation for the approved post-removal land use (industrial, railroad corridor), the extent of cover compared to the cover occurring in the natural vegetation, and the requirements of MCA 82-4-233.