1079825 - R8 SDMS

Mia Wood/ENF/R8/USEPA/US
03/31/2008 01:46 PM

To Mia Wood/ENF/R8/USEPA/US@EPA
cc
bcc
Subject Richardson Flats CD/ROD

Rodney Vargas/TMS/R8/USEPA/US
03/18/2008 11:33 AM

To Mia Wood/ENF/R8/USEPA/US@EPA
cc
Subject Richardson Flats Doc #1060057

Hi Mia,
Sorry it took so long but SDMS was down for awhile, but I believe the attached document is what you are looking for, let me know if it's not.
Rodney

Richardson Flats Doc No. 1060057.pdf

SDMS Document ID
1060057

"Lill, Corrine (ENRD)" <CLill@ENRD.USDOJ.GOV>
10/17/2007 04:42 PM

To <kmurray@chapman.com>, Peggy Livingston/ENF/R8/USEPA/US@EPA
cc "Elmer, Mark (ENRD)" <MElmer@ENRD.USDOJ.GOV>
bcc
Subject Richardson Flat - CD & Appendix A

Dear Counsel,

Mark Elmer asked me to email you the Consent Decree with Attachments as entered by the Court on October 4, 2007 in the Richardson Flat matter.

Due to file size, I will have to send these in multiple emails.

If you have any problems with opening the attached files, please let me know. Thank you.

Corrine A. Lill, CP
Paralegal Specialist
U.S. Department of Justice
ENRD/EES
1961 Stout Street, 8th Floor
Denver, CO 80294
Phone: 303-844-1379
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<<#190093-v1-park_city_mines_-_docket_5_-_CD_Appendix_A_part_2.PDF>>
<<#190092-v1-park_city_mines_-_docket_5_-_CD_Appendix_A_part_1.PDF>>
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"Lill, Corrine (ENRD)" <CLill@ENRD.USDOJ.GOV>

10/17/2007 04:44 PM

To <kmurray@chapman.com>, Peggy Livingston/ENF/R8/USEPA/US@EPA
cc "Elmer, Mark (ENRD)" <MElmer@ENRD.USDOJ.GOV>
bcc
Subject Richardson Flat - Remaining Appendices

Here are CD appendices B - F.

<<#190098-v1-park_city_mines_-_docket_5_-_CD_Appendix_F.PDF>>
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FILED IN UNITED STATES DISTRICT COURT, DISTRICT OF UTAH
AUG 28 2007
D. MARK JONES, CLERK
BY: DEPUTY CLERK

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF UTAH, CENTRAL DIVISION

FILED
U.S. DISTRICT COURT
2007 OCT -4 P 2:35
DISTRICT OF UTAH
BY: DEPUTY CLERK
ORIGINAL

UNITED STATES OF AMERICA,

Plaintiff,

v.

UNITED PARK CITY MINES COMPANY,

Defendant.

Civil Action No.
2:07 CV 642 BSJ

RD/RA CONSENT DECREE

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I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks: (1) reimbursement of costs to be incurred by EPA and the Department of Justice for response actions at the Richardson Flat Tailings Site, CERCLIS ID # UTD980952840 (i.e. Future Response Costs), together with accrued interest; and (2) performance of studies and response actions by the defendant at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. §9621(f)(1)(F), EPA notified the State of Utah (the "State") on February 16, 2006 of negotiations with potentially responsible parties regarding the implementation of the remedial design and remedial action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the United States Fish and Wildlife Service on February 16, 2006 of negotiations with potentially responsible parties regarding the release of hazardous substances that may have resulted in injury to the natural resources under Federal trusteeship and encouraged the trustee to participate in the negotiation of this Consent Decree.

E. The defendant that has entered into this Consent Decree ("Settling Defendant") does not admit any liability to the Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor does it acknowledge that the release or threatened release of hazardous substances at or from the Site constitutes an imminent or substantial endangerment to the public health or welfare or the environment.

F. The Site was originally proposed for inclusion on the National Priorities List ("NPL") on June 24, 1988. Due to scoring issues and comments received from Settling Defendant and others during the public comment period, the Site was removed from NPL consideration in February 1991. The Site was re-proposed for the NPL on February 7, 1992. No action has been taken with regard to this proposed listing.

G. Settling Defendant entered into an Administrative Order on Consent on September 28, 2000, which called for Settling Defendant to conduct a Focused Remedial Investigation and Focused Feasibility Study for the Site.

H. Settling Defendant completed its Focused Remedial Investigation ("RI") Report and its Focused Feasibility Study Report on September 2, 2004.

I. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published a proposed plan for remedial action on September 4, 2004 in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public

on the proposed plan for remedial action and conducted a public meeting on September 28, 2004. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Assistant Regional Administrator, Office of Ecosystems Protection and Remediation, EPA Region 8, based the selection of the response action.

J. The decision by EPA on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on July 6, 2005, with which the State has given its concurrence. The ROD includes EPA's explanation for any significant differences between the final plan and the proposed plan as well as a responsiveness summary to the public comments.

K. Notice of the final plan was published in accordance with Section 117(b) of CERCLA.

L. Based on the information presently available to EPA, EPA believes that the Work will be properly and promptly conducted by the Settling Defendant if conducted in accordance with the requirements of this Consent Decree and its appendices.

M. Solely for the purposes of Section 113(j) of CERCLA, the Remedial Action selected by the ROD and the Work to be performed by the Settling Defendant shall constitute a response action taken or ordered by the President.

N. Settling Defendant has resolved its liability for Plaintiff's Past Response Costs (as defined below) relating to the Site pursuant to a separate Consent Decree entered on November 28, 2006 in Case No. 2:06CV00745 PGC in the United States District Court for the District of Utah, Central Division.

O. The Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over the Settling Defendant. Solely for the purposes of this Consent Decree and the underlying complaint, Settling Defendant waives all objections and defenses that it may have to jurisdiction of the Court or to venue in this District. Settling Defendant agrees not to challenge the validity of the terms and conditions set forth in this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon, and inures to the benefit of, the United States and Settling Defendant, including Settling Defendant's successors and assigns. Any change in ownership or corporate status of Settling Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Settling Defendant's responsibilities under this Consent Decree.

3. Settling Defendant shall provide a copy of this Consent Decree to each contractor hired to perform the Work (as defined below) required by this Consent Decree and to each person representing Settling Defendant 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 Consent Decree. Settling Defendant or its contractors shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Work required by this Consent Decree. Settling Defendant shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work contemplated herein in accordance with this Consent Decree. With regard to the activities undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with the Settling Defendant within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

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

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

"Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section XXIX. APPENDICES). In the event of conflict between this Decree and any appendix, this Decree shall control.

"Day" shall mean a calendar day unless expressly stated to be a Working Day. "Working Day" shall mean a day other than a Saturday, Sunday, or State or Federal holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or State or Federal holiday, the period shall run until the close of business of the next Working Day.

"Effective Date" shall be the effective date of this Consent Decree as provided in Paragraph 103.

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

"Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs on or after March 2, 2006 that relate to (i) negotiating this Consent Decree; (ii) reviewing or developing plans, reports and other items pursuant to this Consent Decree; (iii) verifying the Work; or (iv) otherwise implementing, overseeing, or enforcing this Consent Decree, including but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, and the costs incurred pursuant to Sections VII, IX (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement institutional controls including, but not limited to, the amount of just compensation), XV, and Paragraph 86 of Section XXI.

"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.

"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.

"Operation and Maintenance" or "O & M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Statement of Work and/or the Remedial Design/Remedial Action Work Plan.

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

"Parties" shall mean the United States and the Settling Defendant.

"Past Response Costs" shall mean all costs, including but not limited to direct and indirect costs, that EPA or DOJ on behalf of EPA has paid at or in connection with the Site through March 1, 2006, plus accrued Interest on all such costs through such date.

"Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in the ROD and the Statement of Work.

"Plaintiff" shall mean the United States.

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

"Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the Site signed on July 6, 2005, by the Assistant Regional Administrator, Office of Ecosystems Protection and Remediation, EPA Region 8, and all attachments thereto. The ROD is attached as Appendix A.

"Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken by the Settling Defendant to implement the ROD, in accordance with the Statement of Work and the Remedial Design/Remedial Action Work Plan and other plans approved by EPA.

"Remedial Design/Remedial Action Work Plan" shall mean the document referred to in Paragraph 11 of this Consent Decree and any amendments thereto.

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

"Settling Defendant" shall mean United Park City Mines Company, and its successors and assigns.

"Site" shall mean the Richardson Flat Tailings Site, CERCLIS ID # UTD980952840, which is located approximately 1.5 miles northeast of Park City, Utah and is part of a 650 acre property owned by UPCM. The Site is the location of a mine tailings impoundment that covers approximately 160 acres in the northwest corner of UPCM's property and includes diversion ditches, wetlands and other features. The Site is depicted generally on the map attached as Appendix B.

"State" shall mean the State of Utah.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, Remedial Action, and Operation and Maintenance at the Site, as set forth in Appendix C to this Consent Decree and any modifications thereto made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractor retained by the Settling Defendant to supervise and direct the implementation of the Work under this Consent Decree.

"United States" shall mean the United States of America.

"UPCM" shall mean United Park City Mines Company, and its successors and assigns or the Settling Defendant.

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

"Work" shall mean all activities Settling Defendant is required to perform under this Consent Decree, except those required by Section XXV. RETENTION OF RECORDS.

"Work Milestones" shall mean the construction milestones to be identified and defined in the forthcoming Remedial Design/Remedial Action Work Plan (along with a budgeted cost for each milestone), which are to be used in connection with the reduction of the amount of the Performance Guarantee as described in Paragraph 47.a.

V. GENERAL PROVISIONS

5. Objectives of the Parties. The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment at the Site by the design and implementation of response actions at the Site by the Settling Defendant, to reimburse Future Response Costs of the Plaintiff, and to resolve the claims of Plaintiff against Settling Defendant (except Plaintiff's claim for Past Response Costs, which, as mentioned above, have been resolved separately) as provided in this Consent Decree.

6. Commitments by Settling Defendant. Settling Defendant shall finance and perform the Work in accordance with this Consent Decree, the ROD, and SOW, and all work plans and other plans, standards, specifications, and schedules set forth herein or developed by Settling Defendant and approved by EPA pursuant to this Consent Decree. Settling Defendant shall also reimburse the United States for Future Response Costs as provided in this Consent Decree.

7. Compliance With Applicable Law. All activities undertaken by Settling Defendant pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendant must also comply with all applicable or relevant and appropriate requirements of all Federal and state environmental laws as set forth in the ROD and the Remedial Design/Remedial Action Work Plan. The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be considered to be consistent with the NCP.

8. Permits

   a) As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit, including without limitation any permit required by the Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1387, 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). Where any portion of the Work that is not on-site requires a federal or state permit or approval, Settling Defendant shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

   b) The Settling Defendant may seek relief under the provisions of Section XVIII. FORCE MAJEURE of this Consent Decree for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Work.

   c) This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

9. Notice to Successors-in-Title

   a) Within 30 days after the entry of this Consent Decree, Settling Defendant shall file with the Recorder's Office, Summit County, State of Utah, notice to all

successors-in-title that the property is part of the Site, that EPA selected a remedy for the Site on July 6, 2005, and that Settling Defendant has entered into a Consent Decree requiring implementation of the remedy. Such notice shall be in substantially the same form as that attached hereto as Appendix D. Settling Defendant shall provide EPA with a certified copy of the recorded notice within 30 days of recording such notice.

b) At least 21 days prior to conveying any interest in property located within the Site including, but not limited to, fee interests, leasehold interests, and mortgage interests, the Settling Defendant shall give the grantee written notice of (i) this Consent Decree, (ii) any instrument by which an interest in real property has been conveyed that confers a right of access to the Site (hereinafter referred to as "access easements") pursuant to Section IX. ACCESS AND INSTITUTIONAL CONTROLS, and (iii) any instrument by which an interest in real property has been conveyed that confers a right to enforce restrictions on the use of such property (hereinafter referred to as "restrictive easements") pursuant to Section IX. ACCESS AND INSTITUTIONAL CONTROLS. Such notice shall be in substantially the same form as that attached hereto as Appendix E. In lieu of the foregoing, Settling Defendant may record (i) the Consent Decree, (ii) any access easements pursuant to Section IX. ACCESS AND INSTITUTIONAL CONTROLS, and (iii) any restrictive easements pursuant to Section IX. ACCESS AND INSTITUTIONAL CONTROLS with the Recorder's Office, Summit County, State of Utah.

c) At least 21 days prior to making such a conveyance, the Settling Defendant shall also give written notice to EPA and the State of the proposed conveyance, including the name and address of the grantee, and the date on which notice of the Consent Decree, access easements, and/or restrictive easements was given to the grantee.

d) In the event of any such conveyance, Settling Defendant's obligations under this Consent Decree, including, but not limited to, its obligation to provide or secure access and institutional controls, as well as abide by such institutional controls, pursuant to Section IX (Access and Institutional Controls) of this Consent Decree, shall continue to be met by the Settling Defendant. In no event shall the conveyance release or otherwise affect the liability of the Settling Defendant to comply with all provisions of this Consent Decree, absent the prior written consent of EPA. If the United States approves, the grantee may perform some or all of the Work under this Consent Decree.

VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANT

10. Selection of Supervising Contractor

a) All aspects of the Work to be performed by Settling Defendant pursuant to Sections VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANT, VII. REMEDY REVIEW, VIII. QUALITY ASSURANCE, SAMPLING, AND

DATA ANALYSIS, and XV. EMERGENCY RESPONSE of this Consent Decree shall be under the direction and supervision of the Supervising Contractor. EPA hereby approves Kerry Gee, an officer of Settling Defendant, as the Supervising Contractor.

b) If at any time, Settling Defendant proposes to change its Supervising Contractor, Settling Defendant shall give notice of the proposal to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Consent Decree. Approval of a new Supervising Contractor shall not be unreasonably withheld.

c) If EPA disapproves a proposed Supervising Contractor, EPA will notify Settling Defendant in writing. Settling Defendant shall submit to EPA a list of contractors, including the qualifications of each contractor, that would be acceptable to it within 30 days of receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Settling Defendant may select any contractor from that list that is not disapproved and shall notify EPA of the name of the contractor selected within 21 days of EPA's authorization to proceed.

d) If EPA fails to provide written notice of its authorization to proceed or disapproval as provided in this Paragraph and this failure prevents Settling Defendant from meeting one or more deadlines in this Consent Decree or in a plan approved by EPA pursuant to this Consent Decree, Settling Defendant may seek relief under the provisions of Section XIX. DISPUTE RESOLUTION of this Consent Decree.

11. Remedial Design/Remedial Action Work Plan.

a) Within 60 days of the Effective Date, Settling Defendant shall submit to EPA a work plan for the design and performance of the Remedial Action at the Site ("Remedial Design/Remedial Action Work Plan"). The Remedial Design/Remedial Action Work Plan shall provide for design and implementation of the remedy set forth in the ROD and achievement of the Performance Standards, in accordance with this Consent Decree, the ROD, and the SOW. Upon its approval by EPA, the Remedial Design/Remedial Action Work Plan shall be incorporated into and become enforceable under this Consent Decree.

b) The Remedial Design/Remedial Action Work Plan shall include (1) a schedule for completion of the Remedial Action; (2) a Health and Safety Plan (HASP); (3) a Quality Assurance Project Plan (QAPP); (4) final plans and specifications; (5) an Operation and Maintenance Plan (OMP); (6) a contingency plan; (7) tentative identification of contractors and other members of the Remedial Action team; and (8) procedures and plans for the decontamination of equipment and the disposal of contaminated materials.

c) Upon approval of the Remedial Design/Remedial Action Work Plan by EPA, Settling Defendant shall implement the activities required under the Remedial Design/Remedial Action Work Plan. The Settling Defendant shall submit to EPA all plans, submittals, or other deliverables required under the approved Remedial Design/Remedial Action Work Plan in accordance with the approved schedule for review and approval pursuant to Section XI (EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS).

12. Modification of the SOW or Related Work Plans

a) If EPA determines that modification to the work specified in the SOW and/or in any work plan developed pursuant to the SOW is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, EPA may require by written demand that such modification be incorporated into the SOW and/or such work plans; provided, however, that a modification may be required pursuant to this Paragraph only to the extent that it is consistent with the scope of the remedy selected in the ROD.

b) If Settling Defendant objects to any modification determined by EPA to be necessary pursuant to this Paragraph, it may seek dispute resolution pursuant to Section XIX, DISPUTE RESOLUTION, Paragraph 65 (record review). The SOW and/or any work plan developed pursuant to the SOW shall be modified in accordance with final resolution of the dispute.

c) Settling Defendant shall implement any work required by any modifications incorporated in the SOW and/or in any work plan developed pursuant to the SOW in accordance with this Paragraph.

d) If Settling Defendant desires to deviate from the Remedial Design/Remedial Action Work Plan, or any schedule or plan relating thereto, Settling Defendant may not proceed with the requested deviation until receiving written approval from EPA.

e) Nothing in this Paragraph shall be construed to limit EPA's authority to require performance of further response actions as otherwise provided in this Consent Decree.

13. Settling Defendant acknowledges and agrees that nothing in this Consent Decree, the SOW, or any work plan developed under the SOW constitutes a warranty or representation of any kind by Plaintiff that compliance with the work requirements set forth in the SOW or any work plan developed under the SOW will achieve the Performance Standards.

14. Off-site Shipments

a) Settling Defendant shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and

to the EPA Project Coordinator of such shipment of Waste Material. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

i) Settling Defendant shall include in the written notification the following information, where available: (A) the name and location of the facility to which the Waste Material is to be shipped; (B) the type and quantity of the Waste Material to be shipped; (C) the expected schedule for the shipment of the Waste Material; and (D) the method of transportation. Settling Defendant shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

ii) The identity of the receiving facility and state will be determined by Settling Defendant following the award of the contract for Remedial Action construction. Settling Defendant shall provide the information required by Paragraph 14(a) as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

b) Before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-site location, Settling Defendant shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3) and 40 C.F.R. 300.440. Settling Defendant shall send hazardous substances, pollutants, or contaminants from the Site only to an off-site facility that complies with the requirements of the statutory provision and regulations cited in the preceding sentence.

c) Subject to EPA written approval (as described below), Settling Defendant is authorized, until EPA issues the Certification of Completion of the Remedial Action (as provided in Section XIV), but not obligated, to accept mine waste (whether or not owned by Settling Defendant) at the Site from off-Site locations within the Silver Creek Watershed. As to each discrete source area of such material, Settling Defendant shall provide EPA's Project Coordinator with written or oral notification of its desire to accept mine waste or similarly impacted material at the Site, and await EPA's written approval (which may be in electronic form), before placing any such material at the Site.

VII. REMEDY REVIEW

15. Periodic Review. Settling Defendant shall conduct studies and investigations as requested by EPA, in order to permit EPA to conduct reviews of whether the Remedial Action is protective of human health and the environment at least every five years as required by Section 121(c) of CERCLA and any applicable regulations.

16. EPA Selection of Further Response Actions. If EPA determines, at any time, that the Remedial Action is not protective of human health and the environment, EPA may select

further response actions for the Site in accordance with the requirements of CERCLA and the NCP.

17. Opportunity To Comment. Settling Defendant and, if required by Sections 113(k)(2) or 117 of CERCLA, the public, will be provided with an opportunity to comment on any further response actions proposed by EPA as a result of the review conducted pursuant to Section 121(c) of CERCLA and to submit written comments for the record during the comment period.

18. Settling Defendant's Obligation To Perform Further Response Actions. If EPA selects further response actions for the Site, Settling Defendant shall undertake such further response actions but only to the extent that the reopener conditions in Paragraph 82 or Paragraph 83 (United States' reservations of liability based on unknown conditions or new information) are satisfied. Settling Defendant may invoke the procedures set forth in Section XIX. DISPUTE RESOLUTION to dispute (1) EPA's determination that the reopener conditions of Paragraph 82 or Paragraph 83 of Section XXI. COVENANTS NOT TO SUE BY PLAINTIFF are satisfied, (2) EPA's determination that the Remedial Action is not protective of human health and the environment, or (3) EPA's selection of the further response actions. Disputes pertaining to whether the Remedial Action is *protective or to EPA's selection of further response actions* shall be resolved pursuant to Paragraph 65 (record review).

19. Submissions of Plans. If Settling Defendant is required to perform the further response actions pursuant to Paragraph 18, it shall submit a plan for such work to EPA for approval in accordance with the procedures set forth in VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANT and shall implement the plan approved by EPA in accordance with the provisions of this Decree.

VIII. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

20. Settling Defendant shall use quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance and monitoring samples taken in connection with any work performed pursuant to this Consent Decree in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001) "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998), and subsequent amendments to such guidelines upon notification by EPA to Settling Defendant of such amendment. Amended guidelines shall apply only to procedures conducted after such notification. Prior to the commencement of any monitoring project under this Consent Decree, Settling Defendant shall have submitted to EPA for approval a Quality Assurance Project Plan ("QAPP") that is consistent with the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Decree. Settling Defendant shall allow EPA personnel and its authorized representatives access at reasonable times to all laboratories utilized by Settling Defendant in implementing this Consent Decree. In addition, Settling Defendant shall require that such laboratories shall analyze all samples submitted by EPA pursuant to the

QAPP for quality assurance monitoring. Settling Defendant shall require that the laboratories it utilizes for the analysis of samples taken pursuant to this Decree perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the "Contract Lab Program Statement of Work for Inorganic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis," dated February 1988, and any amendments made thereto during the course of the implementation of this Decree; however, upon approval by EPA, after opportunity for review and comment by the State, the Settling Defendant may use other analytical methods which are as stringent as or more stringent than the CLP- approved methods. Settling Defendant shall require that all laboratories it uses for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA equivalent QA/QC program. Settling Defendant shall use only laboratories that have a documented Quality System which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements. Settling Defendant shall require that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Decree will be conducted in accordance with the procedures set forth in the QAPP approved by EPA.

21. Upon request, Settling Defendant shall allow split or duplicate samples to be taken by EPA or its authorized representatives. Settling Defendant shall notify EPA in writing (which may be in electronic form) not less than 14 days in advance of any sample collection activity unless shorter notice is agreed to in writing (which may be in electronic form) by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Settling Defendant to take split or duplicate samples of any samples it takes as part of the Plaintiff's oversight of Settling Defendant's implementation of the Work.

22. Settling Defendant shall submit to EPA copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Settling Defendant with respect to the Site and/or the implementation of this Consent Decree unless EPA agrees otherwise.

23. Notwithstanding any provision of this Consent Decree, the United States hereby retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

IX. ACCESS AND INSTITUTIONAL CONTROLS

24. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by the Settling Defendant, such Settling Defendant shall:

a) commencing on the date of lodging of this Consent Decree, provide the United States and its representatives, including EPA and its contractors with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Consent Decree including, but not limited to, the following activities:

i) Monitoring the Work;

ii) Verifying any data or information submitted to the United States;

iii) Conducting investigations relating to contamination at or near the Site;

iv) Obtaining samples;

v) Assessing the need for, planning, or implementing additional response actions at or near the Site;

vi) Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans;

vii) Implementing the Work pursuant to the conditions set forth in Paragraph 86 of this Consent Decree;

viii) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendant or its agents, consistent with XXIV. ACCESS TO INFORMATION;

ix) Assessing Settling Defendant's compliance with this Consent Decree; and

x) Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Decree;

b) commencing on the date of lodging of this Consent Decree, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree; and

c) execute and record in the Recorder's Office of Summit County, State of Utah, an easement, running with the land, that (i) grants EPA a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 24(a) of this Consent Decree, and (ii) grants EPA the right to enforce the land/water use restrictions listed in Paragraph 24(b) of this Consent Decree, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree.

d) Settling Defendant shall, within 45 days of the Effective Date, submit to EPA for review and approval with respect to such property:

i) A draft easement, in substantially the form attached hereto as Appendix F, that is enforceable under the laws of the State of Utah, and

ii) A current title insurance commitment or some other evidence of title acceptable to EPA, which shows title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Settling Defendant is unable to obtain release or subordination of such prior liens or encumbrances).

e) Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Settling Defendant shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, record the easement with the Recorder's Office of Summit County. Within 30 days of recording the easement, Settling Defendant shall provide EPA with evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps. If the easement is to be conveyed to the United States, the easement and title evidence shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as required by 40 U.S.C. § 255.

25. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by persons other than Settling Defendant, Settling Defendant shall use its best efforts to secure from such persons:

a) an agreement to provide access thereto for Settling Defendant, the United States and its representatives, including EPA and its contractors, for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 24(a) of this Consent Decree;

b) an agreement, enforceable by Settling Defendant and the United States, to refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree; and

c) the execution and recordation in the Recorder's Office of Summit County, State of Utah, of an easement, running with the land, that (i) grants EPA a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 24(a) of this Consent Decree, and (ii) grants EPA the right to enforce the land/water use restrictions listed in Paragraph 24(b) of this Consent Decree, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or

ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree.

d) Within 45 days of entry of this Consent Decree, Settling Defendant shall submit to EPA for review and approval with respect to such property:

i) A draft easement, in substantially the form attached hereto as Appendix F, that is enforceable under the laws of the State of Utah, and

ii) A current title insurance commitment, or some other evidence of title acceptable to EPA, which shows title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Settling Defendant is unable to obtain release or subordination of such prior liens or encumbrances).

e) Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Settling Defendant shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, record the easement with the Recorder's Office of Summit County. Within 30 days of recording the easement, Settling Defendant shall provide EPA with evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps. If the easement is to be conveyed to the United States, the easement and title evidence shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as required by 40 U.S.C. § 255.

26. For the purposes of Paragraphs 24 and 25 of this Consent Decree, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, restrictive easements, and/or an agreement to release or subordinate a prior lien or encumbrance. If (a) any access or land/water use restriction agreements required by Paragraphs 25(a) or 25(b) of this Consent Decree are not obtained within 45 days of the date of entry of this Consent Decree, (b) or any access easements or restrictive easements required by Paragraph 25(c) of this Consent Decree are not submitted to EPA in draft form within 45 days of the date of entry of this Consent Decree, or (c) Settling Defendant is unable to obtain an agreement pursuant to Paragraph 24(c)(1) or Paragraph 25(c)(1) from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the easement being created pursuant to this consent decree within 45 days of the date of entry of this consent decree, Settling Defendant shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Settling Defendant have taken to attempt to comply with Paragraph 24 or 25 of this Consent Decree. The United States may, as it deems appropriate, assist Settling Defendant in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land, or in obtaining the release or subordination of a prior lien or encumbrance. Settling Defendant shall reimburse the United States in accordance with

the procedures in Section XVI. PAYMENTS FOR RESPONSE COSTS, for all reasonable costs incurred, direct or indirect, by the United States in obtaining such access, land/water use restrictions, and/or the release/subordination of prior liens or encumbrances including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

27. If EPA determines that land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, Settling Defendant shall cooperate with EPA's efforts to secure such governmental controls.

28. Notwithstanding any provision of this Consent Decree, the United States retains all of its access authorities and rights, as well as all of its rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

X. REPORTING REQUIREMENTS

29. In addition to any other requirement of this Consent Decree, Settling Defendant shall submit to EPA and the State copies of written quarterly progress reports that:

a) describe the actions which have been taken toward achieving compliance with this Consent Decree during the previous three months;

b) include a summary of all results of sampling and tests and all other data received or generated by Settling Defendant or its contractors or agents in the previous three months;

c) identify all work plans, plans and other deliverables required by this Consent Decree completed and submitted during the previous three months;

d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next three months and provide other information relating to the progress of construction;

e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays;

f) include any modifications to the work plans or other schedules that Settling Defendant has proposed to EPA or that have been approved by EPA; and

g) describe all activities undertaken in support of the Community Relations Plan during the previous three months and those to be undertaken in the next three months. Settling Defendant shall submit these progress reports to EPA and the State by the 20th of each April, July, October, and January following the lodging

of this Consent Decree until EPA notifies Settling Defendant pursuant to Paragraph 49(b) of Section XIV, CERTIFICATION OF COMPLETION. If requested by EPA, Settling Defendant shall also provide briefings for EPA to discuss the progress of the Work.

30. Settling Defendant shall notify EPA of any change in the schedule described in the quarterly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than seven days prior to the performance of the activity.

31. Upon the occurrence of any event during performance of the Work that Settling Defendant is required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA), Settling Defendant shall within 24 hours of its first becoming aware of such event orally notify the EPA Project Coordinator or, in the event that the EPA Project Coordinator is not available, the Emergency Response Section, Region 8, United States Environmental Protection Agency. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

32. Within 20 days of Settling Defendant first becoming aware of such an event, Settling Defendant shall furnish to Plaintiff a written report, signed by Settling Defendant's Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Settling Defendant shall submit a report setting forth all actions taken in response thereto.

33. Settling Defendant shall submit two copies of all plans, reports, and data required by the Remedial Design/Remedial Action Work Plan or any other approved plans to EPA in accordance with the schedules set forth in such plans. Settling Defendant shall simultaneously submit copies of all such plans, reports and data to the State. Upon request by EPA Settling Defendant shall submit in electronic form all portions of any report or other deliverable Settling Defendant is required to submit pursuant to the provisions of this Consent Decree.

34. All reports and other documents submitted by Settling Defendant to EPA (other than the quarterly progress reports referred to above) which purport to document Settling Defendant's compliance with the terms of this Consent Decree shall be signed by an authorized representative of Settling Defendant.

XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

35. After review of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Decree, EPA shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Settling Defendant modify the submission; or (e) any combination of the above. However, EPA shall not modify ta submission without first providing Settling Defendant at least one notice of deficiency and an opportunity to cure within 14 days,

except where to do so would cause serious disruption to the Work or where previous submission(s) have been disapproved due to material defects and the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

36. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Paragraph 35 (a), (b), or (c), Settling Defendant shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA subject only to its right to invoke the Dispute Resolution procedures set forth in Section XIX. DISPUTE RESOLUTION with respect to the modifications or conditions made by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph 35 (c) and the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XX. STIPULATED PENALTIES.

37. Resubmission of Plans

a) Upon receipt of a notice of disapproval pursuant to Paragraph 35(d), Settling Defendant shall, within 14 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any stipulated penalties applicable to the submission, as provided in XX. STIPULATED PENALTIES, shall accrue during the 14-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect.

b) Notwithstanding the receipt of such notice, Settling Defendant shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Settling Defendant of any liability for stipulated penalties under Section XX. STIPULATED PENALTIES.

c) In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require Settling Defendant to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to modify or develop the plan, report or other item. Settling Defendant shall implement any such plan, report, or item as modified or developed by EPA, subject only to its right to invoke the procedures set forth in Section XIX. DISPUTE RESOLUTION.

d) If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Settling Defendant shall be deemed to have failed to submit such plan, report, or item timely and adequately unless Settling Defendant invokes the dispute resolution procedures set forth in Section XIX. DISPUTE RESOLUTION and EPA's action is overturned pursuant to that Section. The provisions of Section XIX. DISPUTE RESOLUTION and Section XX. STIPULATED PENALTIES shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for

such violation from the date on which the initial submission was originally required, as provided in Section XX. STIPULATED PENALTIES.

38. All plans, reports, and other items required to be submitted to EPA under this Consent Decree shall, upon approval or modification by EPA, be enforceable under this Consent Decree. In the event EPA approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

XII. PROJECT COORDINATORS

39. EPA hereby designates Kathryn Hernandez as its Project Coordinator. Settling Defendant hereby designates, and EPA approves, Kerry Gee as its Project Coordinator. If a Project Coordinator initially designated is changed, the identity of the successor will be given to the other Party at least 5 working days before the change occurs unless impracticable, but in no event later than the actual day the change is made. Settling Defendant's Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. Settling Defendant's Project Coordinator shall not be an attorney for Settling Defendant in this matter. He or she may, however, assign other representatives, including other contractors, to serve as a Site representative for oversight of performance of daily operations during remedial activities.

40. Plaintiff may designate other representatives, including, but not limited to, EPA employees, and federal contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Decree. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and an On-Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator Coordinator shall have authority, consistent with the National Contingency Plan, to halt any Work required by this Consent Decree and to take any necessary response action when s/he determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

41. EPA's Project Coordinator and the Settling Defendant's Project Coordinator will meet, at EPA's discretion by telephone or in person, at a minimum on a quarterly basis.

XIII. PERFORMANCE GUARANTEE

42. In order to ensure the full and final completion of the Work, Settling Defendant shall establish and maintain a Performance Guarantee for the benefit of EPA in the amount of $4,300,000 (hereinafter "Estimated Cost of the Work") in one or more of the following forms, which must be satisfactory in form and substance to EPA:

    a) A surety bond unconditionally guaranteeing payment and/or performance of the Work that is issued by a surety company among those listed as acceptable sureties on Federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b) One or more irrevocable letters of credit, payable to or at the direction of EPA, that is issued by one or more financial institution(s) (i) that has the authority to issue letters of credit and (ii) whose letter-of-credit operations are regulated and examined by a U.S. Federal or State agency;

c) A trust fund established for the benefit of EPA that is administered by a trustee (i) that has the authority to act as a trustee and (ii) whose trust operations are regulated and examined by a U.S. Federal or State agency;

d) A policy of insurance that (i) provides EPA with acceptable rights as a beneficiary thereof; and (ii) is issued by an insurance carrier (a) that has the authority to issue insurance policies in the applicable jurisdiction(s) and (b) whose insurance operations are regulated and examined by a State agency;

e) A demonstration by Settling Defendant that it meets the financial test criteria of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work, provided that all other requirements of 40 C.F.R. § 264.143(f) are satisfied; or

f) A written guarantee to fund or perform the Work executed in favor of EPA by one or more of the following: (i) a direct or indirect parent company of Settling Defendant, or (ii) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Settling Defendant; provided, however, that any company providing such a guarantee must demonstrate to the satisfaction of EPA that it satisfies the financial test requirements of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work that it proposes to guarantee hereunder.

43. Settling Defendant has selected, and EPA has approved, as an initial Performance Guarantee one or more irrevocable letters of credit, payable to or at the direction of EPA, that will be issued by one or more financial institution(s) (i) with authority to issue letters of credit and (ii) whose letter-of-credit operations are regulated and examined by a United States federal or state agency. Within thirty days after the Effective Date, Settling Defendant shall execute or otherwise finalize all instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding and such Performance Guarantee(s) shall thereupon be fully effective. Within forty-five days of the Effective Date, Settling Defendant shall submit all executed and/or otherwise finalized instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding to the EPA Financial Analyst listed in Section XXVI ("Notices and Submissions") of this Consent Decree, with a copy to the United States and EPA as specified in Section XXVI.

44. If at any time during the effective period of this Consent Decree, the Settling Defendant provides a Performance Guarantee for completion of the Work by means of a demonstration or guarantee pursuant to Paragraph 42(e) or Paragraph 42(f) above, Settling Defendant shall also comply with the other relevant requirements of 40 C.F.R. §264.143(f), 40 C.F.R. § 264.151(f), and 40 C.F.R. § 264.151(h)(1) relating to these methods unless otherwise provided in this Consent Decree, including but not limited to

(i) the initial submission of required financial reports and statements from the relevant entity's chief financial officer and independent certified public accountant; (ii) the annual re-submission of such reports and statements within ninety days after the close of each such entity's fiscal year; and (iii) the notification of EPA within ninety days after the close of any fiscal year in which such entity no longer satisfies the financial test requirements set forth at 40 C.F.R. § 264.143(f)(1). For purposes of the Performance Guarantee methods specified in this Section XIII, references in 40 C.F.R. Part 264, Subpart H, to "closure," "post-closure," and "plugging and abandonment" shall be deemed to refer to the Work required under this Consent Decree, and the terms "current closure cost estimate" "current post-closure cost estimate," and "current plugging and abandonment cost estimate" shall be deemed to refer to the Estimated Cost of the Work.

45. In the event that EPA determines at any time that a Performance Guarantee provided by any Settling Defendant pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, or in the event that any Settling Defendant becomes aware of information indicating that a Performance Guarantee provided pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, Settling Defendant(s), within thirty days of receipt of notice of EPA's determination or, as the case may be, within thirty days of any Settling Defendant becoming aware of such information, shall obtain and present to EPA for approval a proposal for a revised or alternative form of Performance Guarantee listed in Paragraph 42 of this Consent Decree that satisfies all requirements set forth in this Section XIII. In seeking approval for a revised or alternative form of Performance Guarantee, Settling Defendants shall follow the procedures set forth in Paragraph 47(b)(ii) of this Consent Decree. Settling Defendant's inability to post a Performance Guarantee for completion of the Work shall in no way excuse performance of any other requirements of this Consent Decree, including, without limitation, the obligation of Settling Defendant to complete the Work in strict accordance with the terms hereof.

46. The commencement of any Work Takeover pursuant to Paragraph 86 of this Consent Decree shall trigger EPA's right to receive the benefit of any Performance Guarantee(s) in effect as of such time, as provided pursuant to Paragraph 42, and at such time EPA shall have immediate access to resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, as needed to continue and complete the Work assumed by EPA under the Work Takeover. If for any reason EPA is unable to promptly secure the resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, necessary to continue and complete the Work assumed by EPA under the Work Takeover, or in the event that the Performance Guarantee involves a demonstration of satisfaction of the financial test criteria pursuant to Paragraph 42(e), Settling Defendant shall immediately upon written demand from EPA deposit into an account specified by EPA, in immediately available funds and without setoff, counterclaim, or condition of any kind, a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed as of such date, as determined by EPA.

47. Modification of Amount and/or Form of Performance Guarantee

a) Reduction of Amount of Performance Guarantee. On November 1, 2007, and on November 1 of each year thereafter, Settling Defendant may petition EPA in writing to request a reduction in the amount of the Performance Guarantee(s) provided pursuant to this Section on the basis that it has completed one or more Work Milestones. This request shall identify the Work Milestones that Settling Defendant believes it has completed and shall contain sufficient information to allow EPA to verify the claim. For each Work Milestone that EPA determines has been completed, EPA shall allow Settling Defendant to reduce the amount of the Performance Guarantee(s) required by this Section by the corresponding budgeted cost set forth in the RD/RA Work Plan for that Work Milestone. EPA's agreement pursuant to this provision that a Work Milestone has been completed shall be for the sole purpose of reducing the amount of the Performance Guarantee(s) that Settling Defendant must maintain under this section. In seeking approval for a revised or alternative form of Performance Guarantee, Settling Defendant shall folllow the procedures set forth in Paragraph 47(b) of this Consent Decree. If EPA decides to accept such a proposal, EPA shall notify the Settling Defendant of such decision in writing. After receiving EPA's written acceptance, Settling Defendant may reduce the amount of the Performance Guarantee(s) in accordance with and to the extent permitted by such written acceptance. In the event of a dispute, Settling Defendant may reduce the amount of the Performance Guarantee required hereunder only in accordance with a final administrative or judicial decision resolving such dispute. No change to the form or terms of any Performance Guarantee provided under this Section, other than a reduction in amount, is authorized except as provided in Paragraph 47(b) of this Consent Decree.

b) Change of Form of Performance Guarantee

i) If, after entry of this Consent Decree, Settling Defendant desires to change the form or terms of any Performance Guarantee(s) provided pursuant to this Section, Settling Defendant may, on any anniversary date of entry of this Consent Decree, or at any other time agreed to by the Parties, petition EPA in writing to request a change in the form of the Performance Guarantee(s) provided hereunder. The submission of such proposed revised or alternative form of Performance Guarantee shall be as provided in Paragraph 47(b)(ii) of this Consent Decree. Any decision made by EPA on a petition submitted under this subparagraph (b)(i) shall be made in EPA's sole and unreviewable discretion, and such decision shall not be subject to challenge by Settling Defendant pursuant to the dispute resolution provisions of this Consent Decree or in any other forum.

ii) Settling Defendant shall submit a written proposal for a revised or alternative form of Performance Guarantee to EPA which shall specify, at a minimum, the estimated cost of the remaining Work to be performed, the basis upon which such cost was calculated, and the proposed revised form

of Performance Guarantee, including all proposed instruments or other documents required in order to make the proposed Performance Guarantee legally binding. The proposed revised or alternative form of Performance Guarantee must satisfy all requirements set forth or incorporated by reference in this Section. Settling Defendant shall submit such proposed revised or alternative form of Performance Guarantee to the EPA Financial Analyst listed in Section XXVI. NOTICES AND SUBMISSIONS of this Consent Decree. EPA shall notify Settling Defendant in writing of its decision to accept or reject a revised or alternative Performance Guarantee submitted pursuant to this subparagraph. Within ten days after receiving a written decision approving the proposed revised or alternative Performance Guarantee(s), Settling Defendant shall execute and/or otherwise finalize all instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding in a form substantially identical to the documents submitted to EPA as part of the proposal, and such Performance Guarantee(s) shall thereupon be fully effective. Settling Defendant shall submit all executed and/or otherwise finalized instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding to the EPA Financial Analyst listed in Section XXVI. NOTICES AND SUBMISSIONS within thirty days of receiving a written decision approving the proposed revised or alternative Performance Guarantee(s) in accordance with Section XXVI. NOTICES AND SUBMISSIONS of this Consent Decree and to the United States and EPA as specified in Section XXVI. NOTICES AND SUBMISSIONS.

c) Release of Performance Guarantee. If Settling Defendant receives written notice from EPA in accordance with Paragraph 48 hereof that the Work has been fully and finally completed in accordance with the terms of this Consent Decree, or if EPA otherwise so notifies Settling Defendant in writing, Settling Defendant may thereafter release, cancel, or discontinue the Performance Guarantee(s) provided pursuant to this Section. Settling Defendant shall not release, cancel, or discontinue any Performance Guarantee provided pursuant to this Section except as provided in this subparagraph. In the event of a dispute, Settling Defendant may release, cancel, or discontinue the Performance Guarantee(s) required hereunder only in accordance with a final administrative or judicial decision resolving such dispute.

XIV. CERTIFICATION OF COMPLETION

48. Completion of the Remedial Action

a) Within 90 days after Settling Defendant concludes that the Remedial Action has been fully performed and the Performance Standards have been attained, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Remedial Action has been fully performed and

the Performance Standards have been attained, it shall within 30 days of the inspection submit a written report to EPA, with a copy to the State, pursuant to XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS, requesting certification of completion of the Remedial Action. In the report, with the exception of the wedge buttress and cover (which will be certified by a professional engineer), a registered professional engineer or professional geologist and Settling Defendant's Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall include as-built drawings signed and stamped by a professional engineer or geologist. The report shall contain the following statement, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this Consent Decree to complete the Remedial Action and achieve the Performance Standards, provided, however, that EPA may require Settling Defendant to perform such activities pursuant to this Paragraph only to the extent that such activities are consistent with the scope of the remedy selected in the ROD. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the Remedial Design/Remedial Action Work Plan or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS. Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to its right to invoke the dispute resolution procedures set forth in Section XIX. DISPUTE RESOLUTION.

b) If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with this Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing to Settling Defendant. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXI. COVENANTS NOT TO SUE BY PLAINTIFF. Certification of

Completion of the Remedial Action shall not affect Settling Defendant's obligations under this Consent Decree.

49. Completion of the Work

a) Within 90 days after Settling Defendant concludes that all phases of the Work (excluding perpetual O & M), have been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work has been fully performed, Settling Defendant shall submit to EPA a written report by a registered professional engineer or professional geologist stating that the Work has been completed in full satisfaction of the requirements of this Consent Decree. With respect to those portions of the Work involving the wedge buttress and cover, the report shall be written by a professional engineer. With respect to any other portions of the Work, the report may be written by a professional engineer or professional geologist. The report shall contain the following statement, signed by a responsible corporate official of a Settling Defendant or Settling Defendant's Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If, after review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this Consent Decree to complete the Work, provided, however, that EPA may require Settling Defendant to perform such activities pursuant to this Paragraph only to the extent that such activities are consistent with the scope of the remedy selected in the ROD and SOW. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the Remedial Design/Remedial Action Work Plan or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS. Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to its right to invoke the dispute resolution procedures set forth in Section XIX. DISPUTE RESOLUTION.

b) If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work has been performed in

accordance with this Consent Decree, EPA will so notify Settling Defendant in writing.

XV. EMERGENCY RESPONSE

50. In the event of any action or occurrence during the performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Defendant shall, subject to Paragraph 51, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, the EPA National Response Center at1-800-424-8802. Settling Defendant shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the Remedial Design/Remedial Action Work Plan. In the event that Settling Defendant fails to take appropriate response action as required by this Section, and EPA takes such action instead, Settling Defendant shall reimburse EPA all costs of the response action not inconsistent with the NCP pursuant to Section XVI. PAYMENTS FOR RESPONSE COSTS.

51. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States a) to take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or b) to direct or order such action, or seek an order from the Court, to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, subject to Section XXI. COVENANTS NOT TO SUE BY PLAINTIFF.

XVI. PAYMENTS FOR RESPONSE COSTS

52. Payments for Future Response Costs

a) Settling Defendant shall pay to EPA all Future Response Costs not inconsistent with the National Contingency Plan. On a periodic basis the United States will send Settling Defendant a bill requiring payment that includes a regionally prepared financial summary, which shall serve as the basis for payment demands. Settling Defendant shall make all payments within 30 days of Settling Defendant's receipt of each bill requiring payment, except as otherwise provided in Paragraph 53. Settling Defendant shall make all payments required by this Paragraph by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party making the payment, Richardson Flat Special Account, Site Specific Identification Number 0894, and DOJ Case Number 90-11-3-08764. Settling Defendant shall send the check(s) to:

Regular Mail:

Mellon Bank
Attn: Superfund Accounting
Lockbox 360859
Pittsburgh, PA 15251-6859

Express Mail:

U.S. EPA, 360859
Mellon Client Service Center, Room 154-0670
500 Ross Street
Pittsburgh, PA 15251-6859

For wire transfer, payment must be sent directly to the Federal Reserve Bank in New York City with the following information:

Federal Reserve Bank of New York
ABA = 02103004
Account = 68010727
TREAS NYC/CTR/
33 Liberty Street
New York, NY 10045

b) At the time of payment, Settling Defendant 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, OH 45268

c) The total amount to be paid by Settling Defendant pursuant to Subparagraph 52(a) shall be deposited in the Richardson Flat Tailings Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

53. Settling Defendant may contest payment of any Future Response Costs under Paragraph 52 if it determines that the United States has made an accounting error or if it alleges that a cost item that is included represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 30 days of receipt of the bill and must be sent to the United States pursuant to Section XXVI. NOTICES AND SUBMISSIONS. Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Settling Defendant shall within the 30 day period pay all uncontested Future Response Costs to the United States in the manner described in Paragraph 52. Simultaneously, Settling Defendant shall establish an

interest-bearing escrow account in a federally-insured bank duly chartered in the State of Utah and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Settling Defendant shall send to the United States, as provided in Section XXVI. NOTICES AND SUBMISSIONS, a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Settling Defendant shall initiate the Dispute Resolution procedures in Section XIX. DISPUTE RESOLUTION. If the United States prevails in the dispute, within 15 days of the resolution of the dispute, Settling Defendant shall pay the sums due (with accrued interest) to the United States in the manner described in Paragraph 52. If Settling Defendant prevails concerning any aspect of the contested costs, Settling Defendant shall pay that portion of the costs (plus associated accrued Interest) for which it did not prevail to the United States in the manner described in Paragraph 52; Settling Defendant 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 XIX. DISPUTE RESOLUTION shall be the exclusive mechanisms for resolving disputes regarding Settling Defendant's obligation to reimburse the United States for its Future Response Costs.

54. In the event that the payments required by Paragraph 52 are not made within 30 days of Settling Defendant's receipt of the bill, Settling Defendant 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 Settling Defendant's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiffs by virtue of Settling Defendant's failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 69. Settling Defendant shall make all payments required by this Paragraph in the manner described in Paragraph 52.

XVII. INDEMNIFICATION AND INSURANCE

55. Settling Defendant's Indemnification of the United States

a) The United States does not assume any liability by entering into this agreement or by virtue of any designation of Settling Defendant as EPA's authorized representative under Section 104(e) of CERCLA. Settling Defendant shall indemnify, save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or 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 Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Settling Defendant as EPA's authorized representative under Section 104(e) of CERCLA. Further, the Settling Defendant agrees to pay the United States all

costs the United States incurs including, but not limited to, reasonable 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 Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf and under its control, in carrying out activities pursuant to this Consent Decree. The United States shall not be held out as a party to any contract entered into by or on behalf of Settling Defendant in carrying out activities pursuant to this Consent Decree. Neither Settling Defendant nor any such contractor shall be considered an agent of the United States.

b) The United States shall give Settling Defendant notice of any claim for which the United States plans to seek indemnification pursuant to this Paragraph and shall consult with Settling Defendant prior to settling such claim.

56. Settling Defendant waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Settling Defendant 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, Settling Defendant 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 Settling Defendant and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

57. No later than 15 days before commencing any on-Site Work, Settling Defendant shall secure, and shall maintain until the first anniversary of EPA's Certification of Completion of the Remedial Action pursuant to Subparagraph 48(b) of Section XIV, CERTIFICATION OF COMPLETION, comprehensive general liability insurance with limits of one (1) million dollars, combined single limit, and automobile liability insurance with limits of one (1) million dollars, combined single limit, naming the United States as an additional insured. In addition, for the duration of this Consent Decree, Settling Defendant shall satisfy, or shall ensure that its 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 Settling Defendant in furtherance of this Consent Decree. Prior to commencement of the Work under this Consent Decree, Settling Defendant shall provide to EPA certificates of such insurance and a copy of each insurance policy. Settling Defendant shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Settling Defendant demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Settling Defendant need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

XVIII. FORCE MAJEURE

58. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Settling Defendant, of any entity controlled by Settling Defendant, or of Settling Defendant's contractors, that delays or prevents the performance of any obligation under this Consent Decree despite Settling Defendant's best efforts to fulfill the obligation. The requirement that Settling Defendant exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability to complete the Work or a failure to attain the Performance Standards.

59. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Settling Defendant shall notify orally EPA's Project Coordinator or, in his or her absence, the Assistant Regional Administrator, Office of Ecosystems Protection and Remediation, EPA Region 8, within five days of when Settling Defendant first knew that the event might cause a delay. Within twenty days thereafter, Settling Defendant 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; Settling Defendant's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of Settling Defendant, such event may cause or contribute to an endangerment to public health, welfare or the environment. The Settling Defendant shall include with any notice all available documentation supporting its claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Settling Defendant from asserting any claim of force majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. Settling Defendant shall be deemed to know of any circumstance of which Settling Defendant, any entity controlled by Settling Defendant, or Settling Defendant's contractors knew or should have known.

60. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Settling Defendant in writing of its decision. If EPA agrees that the delay is attributable to a force majeure event, EPA will notify Settling Defendant in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

61. If Settling Defendant elects to invoke the dispute resolution procedures set forth in Section XIX. DISPUTE RESOLUTION, it shall do so no later than 15 days after receipt

of EPA's notice. In any such proceeding, Settling Defendant 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 event, 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 Settling Defendant complied with the requirements of Paragraphs 58 and 59, above. If Settling Defendant carries this burden, the delay at issue shall be deemed not to be a violation by Settling Defendant of the affected obligation of this Consent Decree identified to EPA and the Court.

XIX. DISPUTE RESOLUTION

62. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of the Settling Defendant that have not been disputed in accordance with this Section.

63. Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

64. Statements of Position

a) In the event that the parties cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within 21 days after the conclusion of the informal negotiation period, Settling Defendant invokes the formal dispute resolution procedures of this Section by serving on the United States a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon by the Settling Defendant. The Statement of Position shall specify the Settling Defendant's position as to whether formal dispute resolution should proceed under Paragraph 65 or Paragraph 66.

b) Within 21 days after receipt of Settling Defendant's Statement of Position, EPA will serve on Settling Defendant its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 65 or Paragraph 66. Within seven days after receipt of EPA's Statement of Position, Settling Defendant may submit a Reply.

c) If there is disagreement between EPA and the Settling Defendant as to whether dispute resolution should proceed under Paragraph 65 or Paragraph 66, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if the Settling Defendant ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraph 65 or Paragraph 66.

65. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute by Settling Defendant regarding the validity of the ROD's provisions.

a) An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b) The Assistant Regional Administrator for the Office of Ecosystems Protection and Remediation, EPA Region 8, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 65(a). This decision shall be binding upon the Settling Defendant, subject only to the right to seek judicial review pursuant to Paragraph 65(c) and (d).

c) Any administrative decision made by EPA pursuant to Paragraph 65(b) shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by the Settling Defendant with the Court and served on all Parties within 14 days of receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States may file a response to Settling Defendant's motion.

d) In proceedings on any dispute governed by this Paragraph, Settling Defendant shall have the burden of demonstrating that the decision of the Assistant Regional Administrator for the Office of Ecosystems Protection and Remediation is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 65(a).

66. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a) Following receipt of Settling Defendant's Statement of Position submitted pursuant to Paragraph 64, the Assistant Regional Administrator for the Office of Enforcement, Compliance, and Environmental Justice, EPA Region 8, will issue a final decision resolving the dispute. The decision of the Assistant Regional Administrator for the Office of Enforcement, Compliance, and Environmental Justice shall be binding on the Settling Defendant unless, within 14 days of receipt of the decision, the Settling Defendant files with the Court and serves on the Parties a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to Settling Defendant's motion.

b) Notwithstanding Paragraph M of Section I. BACKGROUND of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law.

67. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of the Settling Defendant under this Consent Decree, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 76. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree. In the event that the Settling Defendant does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XX. STIPULATED PENALTIES.

XX. STIPULATED PENALTIES

68. Settling Defendant shall be liable for stipulated penalties in the amounts set forth in Paragraphs 69 and 70 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XVIII. FORCE MAJEURE or Paragraph 79. "Compliance" by Settling Defendant shall include completion of the activities under this Consent Decree, the Remedial Design/Remedial Action Work Plan, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

69. Stipulated Penalty Amounts

The following stipulated penalties shall accrue per violation per day for any noncompliance with this Consent Decree other than those violations subject to Paragraph 70, which shall be governed by that Paragraph:

Penalty Per Violation Per Day - Work	Period of Noncompliance
$ 250	1st through 14th day
$ 500	15th through 30th day
$ 20,000	31st day and beyond

70. Reports

The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to Section X. REPORTING REQUIREMENTS:

Penalty Per Violation Per Day - Reports	Period of Noncompliance
$ 150	1st through 14th day
$ 250	15th through 30th day
$ 5,000	31st day and beyond

71. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 86 of Section XXI (Covenants Not to Sue by Plaintiff), Settling Defendant shall be liable for a stipulated penalty in the amount of $20,000.

72. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (1) with respect to a deficient submission under Section XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS, during the period, if any, beginning on the day after EPA's receipt of such submission until the date that EPA notifies Settling Defendant of any deficiency; (2) with respect to a decision by the Assistant Regional Administrator for the Office of Ecosystems Protection and Remediation or for the Office of Enforcement, Compliance, and Environmental Justice, EPA Region 8, under Paragraph 65(b) or 66(a) of Section XIX. DISPUTE RESOLUTION, during the period, if any, beginning on the day after the date that Settling Defendant's reply to EPA's Statement of Position is received until the date that the Director issues a final decision regarding such dispute; or (3) with respect to judicial review by this Court of any dispute under Section XIX. DISPUTE RESOLUTION, during the period, if any, beginning on the day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

73. Following EPA's determination that Settling Defendant has failed to comply with a requirement of this Consent Decree, EPA will give Settling Defendant written notification of the same and describe the noncompliance. EPA may send the Settling

Defendant a written demand for the payment of penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified the Settling Defendant of a violation.

74. All penalties accruing under this Section shall be due and payable to the United States within 30 days of the Settling Defendant's receipt from EPA of a demand for payment of the penalties, unless Settling Defendant invokes the Dispute Resolution procedures under Section XIX. DISPUTE RESOLUTION. All payments to the United States under this Section shall be paid by certified or cashier's check(s) made payable to "EPA Hazardous Substances Superfund," shall be mailed to Mellon Bank, EPA Region 8, Attn: Superfund Accounting, Lockbox 360859, Pittsburgh, Pennsylvania 15251-6859, shall indicate that the payment is for stipulated penalties, and shall reference the EPA Region and Site/Spill ID # 0894, the DOJ Case Number 90-11-3-08764, and the name and address of the party making payment. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to the United States as provided in XXVI. NOTICES AND SUBMISSIONS.

75. The payment of penalties shall not alter in any way Settling Defendant's obligation to complete the performance of the Work required under this Consent Decree.

76. Penalties shall continue to accrue as provided in Paragraph 71 during any dispute resolution period, but need not be paid until the following:

a) If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 30 days of the agreement or the receipt of EPA's decision or order;

b) If the dispute is appealed to this Court and the United States prevails in whole or in part, Settling Defendant shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

c) If the District Court's decision is appealed by any Party, Settling Defendant shall pay all accrued penalties determined by the District Court to be owing to the United into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Settling Defendant to the extent that it prevails.

77. If Settling Defendant fails to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as interest. Settling Defendant shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 73.

78. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Settling Defendant's violation of this Decree or of the statutes and regulations

upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, provided, however, that the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of the Consent Decree.

79. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Consent Decree.

XXI. COVENANTS NOT TO SUE BY PLAINTIFF

80. In consideration of the actions that will be performed and the payments that will be made by the Settling Defendant under the terms of the Consent Decree, and except as specifically provided in Paragraphs 82, 83, and 85 of this Section, the United States covenants not to sue or to take administrative action against Settling Defendant and its officers, directors and employees to the extent that the liability of such officers, directors, and employees arises *solely* from their status as officers, directors, or employees pursuant to (i) Sections 106, 107(a), or 113(f) of CERCLA, 42 U.S.C. §§ 9606, 9607(a), or 9613(f); and (ii) Section 7003 of RCRA, 42 U.S.C. § 6973, relating to the Site. These covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 48(b) of Section XIV. CERTIFICATION OF COMPLETION. These covenants not to sue are conditioned upon the satisfactory performance by Settling Defendant of its obligations under this Consent Decree. Except as provided herein, these covenants not to sue extend only to the Settling Defendant and do not extend to any other person.

81. Subject to the reservations of rights in Paragraphs 82, 83, and 85, the covenants not to sue set forth in this Section shall inure to the benefit of Settling Defendant and its successors and assigns, and shall be binding upon and enforceable against the United States.

82. United States' Pre-certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendant:

a) to perform further response actions relating to the Site, or

b) to reimburse the United States for additional costs of response

if, prior to Certification of Completion of the Remedial Action:

i) conditions at the Site, previously unknown to EPA, are discovered, or

ii) information, previously unknown to EPA, is received, in whole or in part, and EPA determines that these previously unknown conditions or this information together with any other relevant information indicates that the Remedial Action is not protective of human health or the environment.

83. United States' Post-certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendant:

a) to perform further response actions relating to the Site, or

b) to reimburse the United States for additional costs of response

if, subsequent to Certification of Completion of the Remedial Action:

i) conditions at the Site, previously unknown to EPA, are discovered, or

ii) information, previously unknown to EPA, is received, in whole or in part, and EPA determines that these previously unknown conditions or this information together with any other relevant information indicates that the Remedial Action is not protective of human health or the environment.

84. For purposes of Paragraph 82, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date the ROD was signed and set forth in the Record of Decision for the Site and the administrative record supporting the Record of Decision. For purposes of Paragraph 83, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date of Certification of Completion of the Remedial Action and set forth in the Record of Decision, the administrative record supporting the Record of Decision, the post-ROD administrative record, or in any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the Remedial Action.

85. General reservations of rights. The United States reserves, and this Consent Decree is without prejudice to, all rights against Settling Defendant with respect to all matters not expressly included within Plaintiff's covenant not to sue. Notwithstanding any other provision of this Consent Decree, the United States reserves all rights against Settling Defendant with respect to:

a) claims based on a failure by Settling Defendant to meet a requirement of this Consent Decree;

b) liability arising from the past, present, or future disposal, release, or threat of release of Waste Material outside of the Site;

c) liability based upon the Settling Defendant's transportation, treatment, storage, or disposal, or the arrangement for the transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, other than as provided in the ROD, as part of the Work, or as otherwise ordered by EPA, after signature of this Consent Decree by the Settling Defendant;

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

e) criminal liability;

f) liability for violations of federal or state law which occur during or after implementation of the Remedial Action; and

g) liability, prior to Certification of Completion of the Remedial Action, for additional response actions that EPA determines are necessary to achieve Performance Standards, but that cannot be required pursuant to Paragraph 11.c) (Modification of the SOW or Related Work Plans).

86. Work Takeover.

a) In the event EPA determines that Settling Defendant has (i) ceased implementation of any portion of the Work, or (ii) is seriously or repeatedly deficient or late in its performance of the Work, or (iii) is implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA may issue a written notice ("Work Takeover Notice") to the Settling Defendant. Any Work Takeover Notice issued by EPA will specify the grounds upon which such notice was issued and will provide Settling Defendant a period of 10 days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b) If, after the expiration of the 10-day notice period specified in Paragraph 85(a), Settling Defendant has 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 portions of the Work as EPA deems necessary ("Work Takeover"). EPA shall notify Settling Defendant in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 85(b).

c) Settling Defendant may invoke the procedures set forth in Section XIX, DISPUTE RESOLUTION, Paragraph 65, to dispute EPA's implementation of a Work Takeover under Paragraph 86(b). However, notwithstanding Settling Defendant's invocation 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 85(b) until the earlier of (i) the date that Settling Defendant remedies, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice or (ii) the date that a final decision is rendered in accordance with Section XIX (Dispute Resolution), Paragraph 65, requiring EPA to terminate such Work Takeover.

d) After commencement and for the duration of any Work Takeover, EPA shall have immediate access to and benefit of any performance guarantee(s) provided pursuant to Section XIII of this Consent Decree, in accordance with the provisions of Paragraph 46 of that Section. If and to the extent that EPA is unable

to secure the resources granted under any such performance guarantee(s) and the Settling Defendant fails to remit a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed, all in accordance with the provisions of Paragraph 46, any unreimbursed costs incurred by EPA in performing Work under the Work Takeover shall be considered Future Response Costs that Settling Defendant shall pay pursuant to Section XVI. PAYMENTS FOR RESPONSE COSTS.

87. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by law.

XXII. COVENANTS BY SETTLING DEFENDANT

88. Covenant Not to Sue. Subject to the reservations in Paragraph 89, Settling Defendant hereby covenants not to sue and agrees not to assert any claims or causes of action against the United States with respect to the Site and Future Response Costs as defined herein or this Consent Decree, including, but not limited to:

a) any direct or indirect claim for reimbursement for costs of performing the Work or the payment of Future Response Costs from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law;

b) any claims against the United States, including any department, agency or instrumentality of the United States under CERCLA Sections 107 or 113 related to the Site, or

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

Except as provided in Paragraph 91 (Waiver of Claims Against *De Micromis* Parties) and Paragraph 95 (Waiver of Claim Splitting Defenses), these covenants not to sue shall not apply in the event that the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 82, 83, or 85 (b) – (d), but only to the extent that Settling Defendant's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

89. The Settling Defendant reserves, and this Consent Decree is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, 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 while acting within the scope of his 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, any such claim shall not include a claim for any damages caused, in whole or

in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of the Settling Defendant's plans or activities. The foregoing applies only to claims which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

90. Nothing in this Consent Decree shall be deemed to constitute 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).

91. Settling Defendant agrees not to assert any claims and to waive all claims or causes of action that it may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Settling Defendant with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if:

a) the materials contributed by such person to the Site containing hazardous substances did not exceed the greater of (i) 0.002% of the total volume of waste at the Site, or (ii) 110 gallons of liquid materials or 200 pounds of solid materials.

b) This waiver shall not apply to any claim or cause of action Settling Defendant may have against the Atlantic Richfield Corporation, ASARCO, Park City Ventures, Noranda, or any entities related thereto, or against any person meeting the above criteria if EPA has otherwise determined that the materials contributed to the Site by such person contributed or could contribute significantly to the costs of response at the Site.

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

92. Except as provided in Paragraph 91 (Waiver of Claims Against De Micromis Parties), nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Except as provided in Paragraph 91 (Waiver of Claims Against De Micromis Parties), each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), 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.

93. The Parties agree, and by entering this Consent Decree this Court finds, that the Settling Defendant is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2) for matters addressed in this Consent Decree. For purposes of this Consent Decree, "matters addressed in this Consent Decree" are defined as all response actions taken or to be taken, and all response costs incurred or to be incurred by the United States or any other person,

with respect to the Site. The "matters addressed" in this settlement do not include those response costs or response actions as to which the United States has reserved its rights under this Consent Decree (except for claims for failure to comply with this Decree), in the event that the United States asserts rights against Settling Defendant coming within the scope of such reservations.

94. The Settling Defendant agrees that with respect to any suit or claim for contribution brought by it for matters related to this Consent Decree it will notify the United States in writing no later than 30 days prior to the initiation of such suit or claim. The Settling Defendant also agrees that with respect to any suit or claim for contribution brought against it for matters related to this Consent Decree it will notify in writing the United States within 14 days of service of the complaint on it. In addition, Settling Defendant shall notify the United States within 14 days of service or receipt of any Motion for Summary Judgment and within 14 days of receipt of any order from a court setting a case for trial. Notwithstanding the foregoing, no failure to provide notice to the United States shall compromise or abrogate the protections provided by Paragraph 93 above.

95. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendant shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claimsplitting, or other defenses based upon any contention that the claims raised by the United States 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 covenants not to sue set forth in Section XXI. COVENANTS NOT TO SUE BY PLAINTIFF.

XXIV. ACCESS TO INFORMATION

96. Settling Defendant shall provide to EPA, upon request, copies of all documents and information within its possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Consent Decree, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Settling Defendant shall also make available to EPA, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

97. Business Confidential and Privileged Documents

a) Settling Defendant may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiff under this Consent Decree to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies

documents or information when they are submitted to EPA, or if EPA has notified Settling Defendant that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Settling Defendant.

b) Settling Defendant may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege in lieu of providing documents, it shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information; and (6) the privilege asserted by Settling Defendant. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

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

XXV. RETENTION OF RECORDS

99. Until 10 years after the Settling Defendant's receipt of EPA's notification pursuant to Paragraph 49(b) of Section XIV. CERTIFICATION OF COMPLETION, Settling Defendant shall preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, provided, however, that Settling Defendant must retain, in addition, all documents and records that relate to the liability of any other person under CERCLA with respect to the Site. Settling Defendant 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 documents or records (including documents or records in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work, provided, however, that each Settling Defendant (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 documents required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

100. At the conclusion of this document retention period, Settling Defendant shall notify the United States at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States, Settling Defendant shall deliver any such records or documents to EPA. Settling Defendant may assert that certain documents, records and

other information are privileged under the attorney client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege, it shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Settling Defendant. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

101. Settling Defendant hereby certifies that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by the United States or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Section 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.

XXVI. NOTICES AND SUBMISSIONS

102. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, EPA, and the Settling Defendant, respectively.

As to the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611
Re: DJ # 90-11-3-08764

And

Assistant Regional Administrator 8 EPR
United States Environmental Protection Agency
Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

As to EPA:

Kathryn Hernandez
EPA Project Coordinator
United States Environmental Protection Agency, Region 8
(8EPR-SR)
1595 Wynkoop Street
Denver, CO 80202-1129

With a copy to:

Maureen O'Reilly
EPA Enforcement Specialist
Richardson Flat Superfund Site
United States Environmental Protection Agency, Region 8
(8ENF-RC)
1595 Wynkoop St.
Denver, CO 80202-1129

For any submission required by Sec. XIII, PERFORMANCE GUARANTEE, to

Daniela Golden
EPA Financial Analyst
United States Environmental Protection Agency, Region 8
(8ENF-RC)
1595 Wynkoop St.
Denver, CO 80202-1129

As to Settling Defendant:

United Park City Mines Company
Attn: Kerry Gee
P.O. Box 1450
Park City, Utah 84060

With a copy to:

Chapman and Cutler LLP
Attn: Kevin R. Murray, Esq.
1000 Kearns Bldg.
136 South Main Street
Salt Lake City, Utah 84104-1645

XXVII. EFFECTIVE DATE

103. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein.

XXVIII. RETENTION OF JURISDICTION

104. This Court retains jurisdiction over both the subject matter of this Consent Decree and the Settling Defendant for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XIX. DISPUTE RESOLUTION hereof.

XXIX. APPENDICES

105. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the ROD.

"Appendix B" is a map of the Site.

"Appendix C" is the Statement of Work.

"Appendix D" is the notice to successors-in-title.

"Appendix E" is the notice to prospective purchasers.

"Appendix F" is the draft easement referenced in Paragraphs 24(d) and 25(d).

XXX. COMMUNITY RELATIONS

106. Settling Defendant shall propose to EPA its participation in the community relations plan to be developed by EPA. EPA will determine the appropriate role for the Settling Defendant under the Plan. Settling Defendant shall also cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Settling Defendant shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XXXI. MODIFICATION

107. Schedules specified in this Consent Decree for completion of the Work may be modified by agreement of EPA and Settling Defendant. All such modifications shall be made in writing.

108. Except as provided in Paragraph 12 (Modification of the SOW or Related Work Plans), no material modifications shall be made to the SOW without written notification to and written approval of the United States, Settling Defendant, and the Court, if such modifications fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. 300.435(c)(2). Prior to providing its approval to any modification, the United States will provide the State with a reasonable opportunity to review and

comment on the proposed modification. Modifications to the SOW that do not materially alter that document, or material modifications to the SOW that do not fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R.300.435(c)(2), may be made by written agreement between EPA and the Settling Defendant.

109. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

110. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendant consents to the entry of this Consent Decree without further notice.

111. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXIII. SIGNATORIES/SERVICE

112. Each undersigned representative of a Settling Defendant to this Consent Decree and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document.

113. Settling Defendant hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified Settling Defendant in writing that it no longer supports entry of the Consent Decree.

114. Settling Defendant shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree. Settling Defendant hereby agrees to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons. The parties agree that Settling Defendant need not file an answer to the complaint in this action unless or until the court expressly declines to enter this Consent Decree.

XXXIV. FINAL JUDGMENT

115. This Consent Decree and its appendices constitute the final, complete, and exclusive agreement and understanding among the parties with respect to the settlement embodied in the Consent Decree. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Consent Decree.

116. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States and Settling Defendant. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS 4th DAY OF October, 2007.

United States District Judge

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. United Park City Mines Company, et al., relating to the Richardson Flat Tailings Site.

FOR THE UNITED STATES OF AMERICA:

U.S. DEPARTMENT OF JUSTICE

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division

W. BENJAMIN FISHEROW
Deputy Section Chief
Environmental Enforcement Section
U.S. Department of Justice
Washington, D.C. 20530

8/15/07
Date

MARK C. ELMER, Trial Attorney
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
1961 Stout Street, 8th Floor
Denver, CO 80294

8/20/07
Date

UNITED STATES ATTORNEY'S OFFICE
FOR THE DISTRICT OF UTAH

BRETT L. TOLMAN
United States Attorney

Daniel D. Price

Aug. 28, 2007
Date

DANIEL D. PRICE
Assistant United States Attorney
District of Utah
U.S. Department of Justice
185 South State Street, Suite 400
Salt Lake City, UT 84111

U.S. ENVIRONMENTAL PROTECTION AGENCY

Sharon L Kercher
SHARON KERCHER
Director
RCRA/CERCLA Technical Enforcement Program
U.S. Environmental Protection Agency
1595 Wynkoop St. (8ENF-RC)
Denver, CO 80202-1129

2 August 2007
Date

Matt Zahn for
DAVID J. JANIK
Acting Director
Legal Enforcement Program
U.S. Environmental Protection Agency, Region 8
1595 Wynkooop Street (8ENF-L)
Denver, CO 80202-1129

8/2/07
Date

Margaret J (Peggy) Livingston
MARGARET J (PEGGY) LIVINGSTON
Senior Enforcement Attorney
U.S. Environmental Protection Agency, Region 8
1595 Wynkooop Street (8ENF-L)
Denver, CO 80202-1129

July 27, 2007
Date

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. United Park City Mines Company, et al., relating to the Richardson Flat Tailings Site.

FOR UNITED PARK CITY MINES CO.:

7-23-07
Date

Kerry Gee
Vice President
United Park City Mines Company
P.O. Box 1450
Park City, Utah 84060

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Kevin R. Murray
Counsel for United Park City Mines Company
Chapman and Cutler LLP
1000 Kearns Bldg.
136 South Main Street
Salt Lake City, Utah 84104-1645

Ph. Number: (801) 320-6700

APPENDIX A

Appendix A to RD/RA Consent Decree, U.S. v. United Park City Mines Company

Richardson Flat Tailings Site
Park City, Utah

Record of Decision

DECLARATION OF THE RECORD OF DECISION

SITE NAME AND LOCATION

The Richardson Flat Tailings Site (Site) is located is located 1.5 miles northeast of Park City, Utah, and is part of a 650 acre property owned by United Park City Mines (UPCM) Company. The Site is a tailings impoundment that covers 160 acres in the northwest corner of the UPCM property, a small portion of the much larger Upper Silver Creek Watershed. The U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information system (CERCLIS) Site Identification Number is UT980952840.

STAEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedy for the Richardson Flat Tailings Site. This ROD has been developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, 42 U.S. Code (USC) §9601 et. seq. as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan(NCP), 40 CFR Part 300. The decision is based on the Administrative Record for the Site.

This remedy was selected by EPA Region 8. The Utah Department of Environmental Quality (UDEQ) concurs with the selected remedy.

ASSESSMENT OF THE SITE

The response action selected in the ROD is necessary to protect public health and the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health or welfare or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy addresses mine tailings located in several areas of the Site, including the main impoundment, a section south of the diversion ditch, and the wetlands below the embankment. Other media addressed through the selected remedy are sediments and surface water located within the Site boundary. The mine tailings and other media are not considered principal threat waste; therefore, appropriate remedial actions for the waste include excavation of the tailings and containment of the tailings through capping. Additionally, the selected remedy allows for future disposal of mine tailings from the Park City area within the tailings impoundment and placement of restrictions on future land and groundwater use.

Major Components

- Tailings in critical areas outside the impoundment (Area B) are excavated and moved inside the impoundment
- Existing soil cover is augmented to achieve a depth of at least 18 inches of soil above tailings
- Sediments in diversion ditch are covered with clean gravel
- Contaminated sediments and soils in the wetland below the embankment are excavated and material is placed within the impoundment. Wetlands will be restored.
- Mine waste from the Park City area is placed within the impoundment and covered with 18 inches of soil above the tailings. Disposal of mine waste will cease once the remedy has been implemented
- Embankment is fortified to prevent catastrophic failure
- Institutional controls (easements and land use restrictions) are implemented to protect soil cover and prevent ground water use
- Surface water monitoring is ongoing

STAUTORY DETERMINATIONS

The selected remedy is protective of human health, and welfare, and the environment, complies with federal and state requirements that are applicable or relevant and appropriate for the remedial action, is cost effective and utilizes permanent solutions and alternative treatment technologies to the extent practicable.

Because this remedy will result in hazardous substances or pollutants or contaminants remaining on Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record for this Site.

- Chemicals of Concern (COC's) and their respective concentrations. (Section 7.1.1 and Section 7.2.1)
- Baseline risk represented by the COCs. (Section 7)
- Cleanup levels established for COCs and the basis for the levels. (Section 7.2.5)
- Whether source materials constituting principal threats are found at the Site. (Section 11)

- Current and reasonably anticipated future land use assumptions and current and beneficial uses of groundwater used in the baseline risk assessment and ROD. (Section 6)
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy. (Section 12.4)
- Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected. (Section 12.3)
- Key factors that led to selecting the remedy. (Section 12.1)

AUTHORIZING SIGNATURE

This Record of Decision documents the selected remedial action to address the contamination at the Richardson Flat Tailing site.

The following authorized official at EPA Region 8 approves the selected remedy as described in this ROD.

Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation
U.S. Environmental Protection Agency, Region 8

Date

The following authorized official at the State of Utah concurs with the selected remedy for the Richardson Flat Tailings site as described in this ROD.

_____ _____

Dianne R. Nielson, Ph.D.
Executive Director
Utah Department of Environmental Quality

Date

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DECISION SUMMARY

SECTION 1

SITE NAME, LOCATION AND DESCRIPTION

The Richardson Flat Tailings (RFT) site (Site) is located 1.5 miles northeast of Park City, Utah, and is part of a 650 acre property owned by United Park City Mines (UPCM) Company (Figure 1). The Site is a tailings impoundment that covers 160 acres in the northwest corner of the UPCM property, a small portion of the much larger Upper Silver Creek Watershed (Figure 2). Silver Creek is the primary surface water source found in the area and is comprised of runoff from three significant drainages in the watershed, including Ontario Canyon, Empire Canyon and Deer Valley (Figure 3). Silver Creek is currently listed on Utah's 303(d) list for zinc and cadmium and is targeted for total maximum daily load (TMDL) development. Historic mining activities in the canyons left behind six active Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites, including Empire Canyon, Silver Creek Tailings, and Silver Maple Claims, each one impacting Silver Creek in some way. While zinc and cadmium are the primary heavy metals found in Silver Creek, lead and arsenic are the main contaminants in the sediments and soils of the watershed. Because of the volume of mining activity throughout the district and the dynamics of the watershed hydrogeology, it is difficult to target any one site as the main source of contamination affecting Silver Creek and the environmental media within the watershed. The overall remedial goal for the watershed is to clean up the surrounding sites, including the Site, thereby eliminating current and future hazards to human health and welfare and the surrounding environment.

The RFT site is a geometrically closed basin, bound by highway 248 to the north, a main embankment to the west, and diversion ditches to the south and the northeast (Figure 4). Silver Creek can be found on the northwest border of the Site, separated from the Site by a small stretch of wetlands and riparian vegetation. The impoundment was used as a mine tailings reservoir prior to 1950. The Site now houses approximately seven million tons of sand-sized carbonaceous particles and minerals containing zinc, silver, lead, and other metals. Use of the Site by UPCM ended in 1982. To date, the Site is not listed on the National Priorities List (NPL). The Site was considered for listing in both 1988 and 1992. UPCM, the primary potentially responsible party (PRP), has taken responsibility for funding the majority of the remedial action at the Site.

SECTION 2

SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 HISTORICAL LAND USE

In 1953, UPCM was formed through the consolidation of Silver King Coalition Mines Company and Park Utah Consolidated Mines Company. At that time, the Site was already being used as an impoundment for mine tailings consisting primarily of sand-sized carbonaceous particles and minerals containing lead, zinc, silver and other metals. Additionally, tailings were transported to and placed in several distinct low elevation areas in the southeast portion of the Site just outside of the main impoundment.

In 1970, with renewed mining activity in the area, Park City Ventures (PCV), a joint venture partnership between Anaconda Copper Company and American Smelting Company (ASARCO), entered into a lease agreement with UPCM. This agreement allowed PCV to deposit additional mine tailings at the Site; however, the Site had to be partially reconstructed. Dames and Moore provided PCV with design, construction and operation specifications which were approved by the State of Utah. These specifications included installation of a large embankment along the western edge of the impoundment, and construction of containment dike structures along the southern and eastern boarders of the Site for additional tailings storage. PCV also created a diversion ditch system along the higher slopes north of the impoundment and outside of the containment dikes along the east and south perimeters of the impoundment to collect surface run off. As part of the approval process for the renewed use of the Site, the State of Utah required installation of groundwater monitoring wells near the base of the main embankment.

Over the course of PVC's use of the Site, about 450,000 tons of tailings were deposited at the Site through a slurry pipeline that originated at their mill facility. Dames and Moore had recommended that the tailings be deposited around the perimeter of the Site, moving towards the center of the Site over time. However, PVC chose to deposit the tailings from the slurry pipeline in one constant area in the center of the impoundment, creating a steep, cone-like structure in the middle of the impoundment. After PVC discontinued their use of the Site in 1982, high winds caused tailings from the cone-shaped feature to become airborne, creating a potentially significant exposure pathway. These operations shaped the topography of the impoundment which still exists today.

From 1980 to 1982, Noranda Mining, Inc. leased the mining and milling operations and placed an additional 70,000 tons of tailings at the Site. Since then no further use of the Site has occurred, but UPCM began taking actions aimed at improving environmental conditions of the Site almost immediately after operations stopped. This work continued intermittently through the mid-1990s. These actions are described in the Site Characteristics Section of this Record of Decision (ROD).

2.2 INVESTIGATION HISTORY

EPA became aware of the Site in the mid-1980s. After initial site assessment work, EPA proposed the Site for listing on the NPL in 1988. After considering public comment, EPA did not pursue the Site for listing on the NPL. By 1992, the Hazard Ranking System (HRS) had been revised and EPA again proposed the Site for listing on the NPL. Ultimately, EPA decided not to pursue final listing on the NPL, and the Site remains proposed for the NPL at this time.

Subsequent to the second NPL proposal, the EPA Region 8 Superfund Emergency Response Branch conducted an investigation under the "Make Sites Safe" Initiative in 1993. This investigation concluded that conditions of the Site did not warrant emergency removal actions, but may present unacceptable risks to human health and the environment and should be addressed through long-term remedial action.

Throughout the 1990s, EPA and the Utah Department of Environmental Quality (UDEQ) were hoping UPCM would address the Site through the Utah Voluntary Cleanup Program. UPCM decided against this, but at the same time continued to voluntarily take steps to improve environmental conditions at the Site. Additionally, UPCM began collecting hydrogeologic data, which was used to better understand the groundwater flow and depth of tailings at the Site.

In 1999, EPA, UDEQ, UPCM, Park City Municipal Corporation, and other stakeholders formed the Upper Silver Creek Watershed Stakeholder's Group (USCWSG). This community-based organization was formed to help EPA address Superfund-related environmental issues in the Park City area in a cooperative fashion, including issues related to the Site. The USCWSG has been very successful and several investigations and cleanups have occurred in Park City as a result. Early in USCWSG's history, UPCM and EPA agreed to address the Site as an "NPL equivalent" site, using the same process for investigation and cleanup that is required for a NPL Site.

2.2 ENFORCEMENT HISTORY

EPA and UPCM signed an Administrative Order on Consent (AOC) on September 28, 2000 which called for UPCM to conduct a Remedial Investigation/ Focused Feasibility Study (RI/FFS) for the Site. EPA and UPCM have continuously worked well together since the inception of the USCWSG, and because of this, EPA was able to employ increasingly reduced oversight for the RI/FFS as it progressed. The RI/FFS conducted by UPCM provided the data and information used in this ROD.

EPA conducted two Potentially Responsible Party (PRP) Searches for the Site that identified several parties that may have some liability for cleanup of the Site. The Site owner, UPCM, has conducted the RI/FFS pursuant to an Administrative Order on Consent (AOC). EPA has been facilitating the allocation of costs of investigation and cleanup between the PRP's and UPCM has indicated its willingness to enter into a Consent Decree (CD) with EPA for conduct of remedial design and remedial action.

SECTION 3

COMMUNITY PARTICIPATION

EPA recently published a Proposed Plan describing the preferred remedy at the Site. The Proposed Plan, released for public comment on September 4, 2004, was followed by a public meeting held on September 28, 2004. The public comment period on the proposed plan ran from September 5, 2004 to October 4, 2004. All comments received during this period are addressed in the Responsiveness Summary of this ROD

Throughout the 1980's and early 1990s, there was significant opposition to cleanup of the Site under CERCLA authority. Public participation consisted primarily of comments on the proposed listings and letters to EPA urging that neither site be listed on the NPL.

Since the formation of the USCWSG in 1999, community participation in Park City has increased and improved. The USCWSG meets regularly, in well-advertised open meetings. The participants receive updates on individual sites in the watershed and discuss issues in a cooperative format. The USCWSG has developed a web-site, funded by UPCM, which details actions related to the environmental investigations and cleanup. The EPA project manager discusses the Site periodically with the local radio talk show and the local newspaper reporter. An information repository, which includes the Administrative Record (AR) for the Site, was established at the Park City Library and Education Center. Numerous public meetings have occurred on both general issues and to fulfill requirements for particular sites in the watershed. Fact Sheets are produced annually with updates on progress. Throughout conduct of the RI/FFS at the Site, UPCM and EPA have provided information to the public through all of these routes.

SECTION 4

SCOPE AND ROLE OF RESPONSE ACTION

The Site is one of several historic mining sites in the Upper Silver Creek Watershed. At present, six of these sites are listed in the CERCLIS database, and several more are being considered for future Superfund action. The past and present impacts to surface water and sediment in Silver Creek result from the cumulative contributions of these sites over decades. Because of the high density of sites in a relatively small area, as well as the long history involved, it is often difficult to apportion specific problems to a particular site or time period. For example, sites upstream of Richardson Flat, such as Empire Canyon or Prospector Square, have impacted surface water and sediment conditions at and below Richardson Flat. However, it is difficult to determine exactly what contribution each made. For this reason, EPA has sought to investigate and remediate the Upper Silver Creek Watershed as a whole, rather than trying to investigate each site seperately. This ensures that remedies selected for the individual sites are complementary to each other and work toward the goal of cleaning up the entire watershed. This ROD addresses only the actions necessary to address actual and potential impacts specific to the Site, but it is part of a broader strategy to clean up the entire Silver Creek Watershed in a consistent, efficient manner.

The remedy selected by EPA and documented in this ROD includes remedial actions necessary to protect human health or welfare or the environment. The ROD is based primarily upon information set forth in the RI/FFS recently conducted by UPCM. An important purpose of the RI/FFS and associated risk assessment was to evaluate the efficacy of these voluntary actions and the risks posed by the Site in its *current* condition. For instance, there is a soil cover across the tailings impoundment that was put in place by UPCM in the 1990s. The RI/FFS evaluated the soil cover and showed it protects groundwater and other media at the site from becoming heavily contaminated. The risk assessment determined that under the current conditions, threats to human health are low. However, it is clear that in the absence of this soil cover, both human and ecological receptors would be exposed to high concentrations of heavy metals and contaminants would be free to migrate from the Site, thereby increasing the risk to human health and the environment. Thus, decisions on remedial actions must consider not only the risks posed by current conditions, but also the risks posed if current conditions changed. The selected remedy will enhance and ensure the integrity of the soil cover, reinforce the tailings embankment, and protect surface and ground waters from additional metals loading by containing the low level threat waste, thereby mitigating and abating the actual and potential risks to human health or welfare or the environment at the Site. Further, institutional controls will minimize potential, future, uncontrolled, human contact with contamination in any of the Site media.

SECTION 5

SUMMARY OF SITE CHARACTERISTICS

This section summarizes the information obtained through the investigations and feasibility studies. It includes a description of the Site conceptual model on which the investigations, risk assessments and response actions are based. The major characteristics of the Site and the nature and extent of contamination are summarized below. More detailed information is available in the Administrative Record for the Site.

5.1 SITE CONCEPTUAL MODEL

The illustrated site conceptual model depicted in Figure 5 is a representation of the location, and movement of contamination at the Site and any potential impacts that may occur to human health, the environment, or beneficial uses of resources. Presently, the tailings in the main impoundment (Area A) and the tailings south of the diversion ditch (Area B) are considered the primary waste sources. Impacted media at the Site include sediments in the south diversion ditch and the wetland area, and the surface waters. Surface water sources include the wetlands area, Silver Creek, the site pond, and intermittent flow in the diversion ditches and unnamed drainages. Seasonally, accumulated precipitation and snow melt can be found on the surface of the main impoundment. There is a clay layer underlying the tailings in Area A and Area B, so infiltration of groundwater into the underlying aquifer is limited. Additionally, heavy metal releases from the tailings are currently contained to a certain degree by a low permeability soil cap that was placed there by UPCM in the 1990's. Therefore, potential exposure to future Site users including high and low-intensity recreational visitors is limited. However, these possible exposure pathways include ingestion of soils/tailings and sediment, dermal exposure to surface water, and inhalation of particulates in air. The ecological exposure pathways and receptors are described in detail in Section 7.2, Ecological Risk.

5.2 OVERVIEW OF THE RICHARDSON FLAT TAILINGS SITE

The Site is located in a broad valley with undeveloped rangeland. The Site is about 6,570 feet above mean sea level and is characterized by a cool, dry, semi-arid climate (RMC, 2003). Meteorological stations located in Park City, Utah and Kamas, Utah estimate an annual precipitation of about 20 inches of water, an average low temperature of about 30°F, and an average high temperature of about 57°F (RMC, 2003).

5.2.1 Site Features

As described in the Site History, mine tailings have been deposited at the Site since 1950. For two decades, tailings were systematically deposited in the impoundment via a slurry line and eventually filled in all low lying areas (Area A). In 1970, PCV took over the use of the impoundment, which required several structural changes and improvements, including

enlargement of the main embankment in the northwestern corner of the Site, construction of containment dikes along the southern and eastern borders of the impoundment, and construction of a diversion ditch system outside the impoundment along the east and south perimeters. On the south end of the impoundment, the diversion ditch was cut through an area of existing tailings, resulting in some tailings being located outside (south of) the present day boundaries of the impoundment (Area B). These additions, as well as the tailings south of the diversion ditch, make up the main surface features of the Site. The Study Area Boundary includes the tailings south of the diversion ditch and the main impoundment. The Site characteristics can be found in Figure 4.

Impoundment and Containment Dikes

The majority of the tailings at the Site are contained in the impoundment basin, with a large earth embankment in place along the western edge of the Site (Area A). The "main embankment" is vegetated and is approximately 40 feet wide at the top, 800 feet long, and has a maximum height of 25 feet. A series of man-made dikes contain the tailings along the southern and eastern perimeter of the impoundment. The northern edge of the impoundment is naturally higher than the perimeter dikes.

Off-Impoundment Tailings

Additional tailings materials are present outside and to the south of the current impoundment area (Area B). During historic operations of the tailings pond, tailings accumulated in three naturally low-lying areas adjacent to the impoundment. Starting in 1983, UPCM covered these off-impoundment tailings with a low-permeability, vegetated soil cover. However, recent surveys of off-impoundment cover soils indicate that, at some locations, soil cover is thin or absent, leaving exposed surface tailings (RMC, 2001a). In addition to these off-impoundment tailings deposits, prevailing winds from the southeast carried tailings from the main impoundment and deposited them in the surrounding areas.

Diversion Ditches and Drainages

A diversion ditch system borders the north, south, and east sides of the impoundment to prevent surface water runoff from the surrounding land from entering the impoundment. Precipitation falling on the impoundment area creates a limited volume of seasonal surface water. The north diversion ditch collects snowmelt and storm water runoff from upslope, undisturbed areas north of the impoundment and carries it in an easterly direction towards the origin of the south diversion ditch. An unnamed ephemeral drainage to the southeast of the impoundment also enters the south diversion ditch at this point. Additional water from spring snowmelt and storm water runoff enters the south diversion ditch from other areas lying south of the impoundment at a point near the southeast corner of the diversion ditch structure.

Site Wetlands and Pond

Water in the south diversion ditch flows from east to west and ultimately empties into Silver

Creek near the north border of the Site. Before its confluence with Silver Creek, water from the south diversion ditch enters a small one acre pond (RMC, 2003). Water exiting the pond flows in a discrete channel where it mixes with flow from Silver Creek in a wetlands area below the main embankment (RMC, 2003). Near the northwestern corner of the wetlands area, Silver Creek flows into the wetland beneath the rail trail bridge. Water flow exits the wetlands area back into Silver Creek via a concrete box culvert under State Highway 248 (RMC, 2003).

Silver Creek

Silver Creek flows approximately 500 feet from the main embankment along the west edge of the Site. The headwaters of Silver Creek are comprised of three signifigant drainages in the Upper Silver Creek Watershed; the Ontario Canyon, the Empire Canyon and Deer Valley. Flows from Ontario and Empire Canyons occur in the late spring to early summer months in response to snowmelt and rainfall, while Deer Valley flows appear to be perennial and originate from snowmelt and springs (RMC, 2000b). The largest contributor to water flow in Silver Creek near the Site is the Pace-Homer (Dority Springs) Ditch, which derives most of its flow from ground water (USEPA, 2001). The outflow from the Pace-Homer Ditch enters Silver Creek at several locations below the Prospector Square area. Significant riparian zones and wetlands exist near the Site in areas that consist of accumulated tailings piles.

5.2.2 Hydrogeology

Ground water of concern at the Site occurs in shallow aquifers below the original ground surface. These aquifers are primarily fed from local surface water recharge and are small and local in nature. They generally flow from southeast to northwest toward Silver Creek. Below these shallow aquifers, at varying depths, lies the bedrock aquifer of the Keetley Volcanics, which contains varying amounts of ground water depending upon local conditions. The hydraulic gradient in all aquifers is generally upward, but the connection between the bedrock aquifer and the shallow aquifers is weak.

The Site is located in a low gradient valley surrounded by small hills. The erosion and weathering of these hills, also part of the Keetley Volcanics, formed the original soil surface upon which the tailings were placed, as well as the soils used to cover the impoundment after its closure. These soils are rich in clay and exhibit a very low permeability, making them very important to the ground water and surface water hydrology of the Site. Beneath the tailings, the original ground surface acts as a confining unit for ground water movement, preventing water in the tailings from infiltrating downward into the shallow aquifers, as well as preventing water in the shallow aquifers from moving upward into the tailings. On the surface, the soils used to cover the tailings function as a nearly impermeable cap, effectively preventing infiltration of surface water into the tailings. The tailings are effectively encapsulated above and below by low permeability, clay rich soil. At present, the surface of the impoundment is convex and forms a closed basin, so precipitation that falls directly on the impoundment remains there until it evaporates or is used by plants. Spring snow melt and heavy rains cause a large, temporary area of ponded water on the east side of the impoundment. This ponded area remains for a significant duration after snow melt, with little recharge from precipitation, which shows the effectiveness of the cover soil in

preventing significant infiltration into the tailings. The very small amount of water that does infiltrate into the tailings eventually seeps through the main embankment into a small wetland.

The diversion ditch is also critical to the Site's hydrology. The diversion ditch serves as a barrier to both surface water and shallow ground water and captures water that flows toward the impoundment. The captured water is channeled around the impoundment, through a small retention pond, and into the small wetland at the foot of the main embankment. Here it mixes with water from Silver Creek and the small amount of water seeping through the embankment. All of this water is eventually used by plants in the wetland or flows north away from the Site as surface water or shallow ground water in the alluvium of Silver Creek.

5.3 SAMPLING STRATEGY

Sampling events for the RI took place in 2001 and 2002. The RI was designed to augment existing data that were collected in previous Site investigations and to collect additional data for the Ecological Risk Assessment. During these events each media was sampled as a separate entity. Samples were collected from the various site media, including surface water, ground water, Area A and B tailings, Area A and B soil cover, and lastly, sediments in the south diversion ditch and wetlands area.

Surface and Ground Water Sources

Surface water

Sample locations were chosen to provide sufficient data to characterize seasonal water quality and quantity in the South Diversion ditch and the two unnamed drainages flowing into the South Diversion Ditch, and Silver Creek. Data were also collected to determine the effects of the Site on Silver Creek and the metal concentrations in the surface water of the South Diversion Ditch. When sampling was not limited due to lack of flow, data was collected monthly at each location through one complete seasonal time period. All dissolved metal concentration data were screened against Utah Water Quality Standards. The most stringent of these standards are the Class 3A Aquatic Wildlife Chronic Criteria (AWCC). These standards are dependent on hardness and are adjusted appropriately for an average hardness measured at each sample location.

Ground water

Due to the amount of historic ground water data, additional data collection required the addition of two new monitoring wells which were installed adjacent to Silver Creek up and down gradient of the Site. These were established to determine any shallow alluvial groundwater impacts caused by the tailings. Samples were also taken from established wells close to the South Diversion ditch to determine the metals concentrations within the ground water associated with the Area B tailings, and to determine the hydraulic gradient

Tailings

Area A

Three test pits were created within Area A to sample the tailings. The test pits allowed for observation and documentation of the physical characteristics and spatial configuration of the interface. Additionally, at each location, five discrete samples were collected at one foot vertical

increments to a depth of five feet below the soil cover. Acid/base potential data was used to assess the geochemical characteristics of the tailings materials.

Area B
Sampling in this area was completed first to determine the extent of the tailings outside of the main impoundment. The sample data were used in combination with areal photographs and historical information to determine the study area boundary. Backhoe test pits (63 total) and a series of hand tool excavations were completed in order to gather analytical and visual samples. Visual samples were used to establish the location of the tailings/clay layer interface. This sample data was also used to assess the thickness of the soil cover on top of the tailings in Area B. Analytical data was used to confirm the visual data. At seven sample locations one sample was taken from the tailings and one sample was taken from the clay layer below the tailings.

Soil cover
Area A
Soil samples (41 samples total, 0-2" each) were collected for analysis. The holes were dug down until tailings were collected from below the main impoundment soil cover to determine the depth of the soil cover and the chemistry of the surface soils. Samples were analyzed for lead and arsenic while 20% of the samples were analyzed for RCRA metals plus copper and zinc.

Area B
The same excavation and hand tool sampling techniques that were described in the Area B tailings section were used to determine soil cover thickness in this area. Additionally, this area was sampled to assess the extent and impact of windblown tailings. A series of samples were collected from three transects (28 total) and analyzed for lead and arsenic.

South Diversion Ditch Sediments
Six locations were chosen for sediment sample collection. Data were used to identify the source of zinc loading to the surface water found in the diversion ditch and to evaluate ecological risk.

Background Soils
Background surface soil samples (0-2") were collected from areas that have not been affected by tailings, found at least a mile away from the Site in all directions. All samples were analyzed for lead and arsenic, while 2 samples were analyzed for RCRA metals plus copper and zinc.

Study Area Boundary
Study area boundary samples were collected from two areas south of the tailings found outside the impoundment, and on the west and east perimeter of the main impoundment. These samples analyzed for lead and arsenic to aid in determining the study area boundary.

Ecological Sampling
Additional sampling was necessary to facilitate the completion of a thorough ecological risk assessment. Surface water and sediment sample data were collected from locations in the wetland area, site pond, and South Diversion Ditch. Vegetation samples and fish and macroinvertebrate samples were also taken. An analysis of these samples was necessary to complete the ecological

risk assessment.

5.4 KNOWN AND SUSPECTED SOURCES OF CONTAMINATION

As previously described, the Silver Creek watershed is contaminated with heavy metals resulting from years of heavy mining activity in the Park City District. Surface water from the Site enters Silver Creek after passing through a wetland area in the northwest corner of the Site. There are three main sources of contamination at the Site: (1) the tailings contained within the tailings impoundment (Area A), (2) the tailings south of the diversion ditch (Area B) and (3) the tailings within the wetland area.

Metal contamination resulting from wind blown tailings distribution was investigated. Soil samples were taken along three transects (running west to east) that were oriented perpendicular to the prevailing wind direction. One transect was located north of the impoundment while the remaining two were located south of the impoundment. These samples were collected to determine the extent of wind blown tailings contamination and to aid in the study area boundary determination. The samples were analyzed for arsenic and lead and for eight RCRA metals, including zinc. Samples taken along transect two (south of the impoundment) had higher concentrations of lead than transects one and three. It is possible that these sample locations were not covered with top soil, while the other sample locations were. Sample locations with the highest concentrations of lead are included in the study area boundary.

5.5 TYPES OF CONTAMINATION AND AFFECTED MEDIA

The Site is contaminated with heavy metals, primarily zinc, lead and arsenic which are associated with the tailings found in the three locations described in Section 5.4. The media that are affected by these metals include the sediments and surface water of the south diversion ditch, the site wetland, and Silver Creek.

Surface water

Conclusions drawn from the sample data show that zinc exceeds the water quality criteria in some parts of the South Diversion Ditch, however, surface water zinc concentrations are below the criteria where the diversion ditch meets the wetland area. A Comparison of surface water data collected from Silver Creek to the AWCC shows that zinc exceeds the criteria at both sample locations. Peak concentrations of zinc appear during spring run-off conditions.

Ground water

Data gathered from the monitoring wells were used to determine the metals concentrations within the ground water associated with the Area B tailings, and to determine the hydraulic gradient. After data gathered from these two areas were compared to Primary and Secondary Drinking Water Standards (PDWS and SDWS) and Treatment Technology Requirement (TTR) they were also compared to each other to determine whether the Site tailings are contributing zinc or other metals to the Silver Creek alluvial aquifer. Results show that ground water within the Area B tailings had lower concentrations of metals than the Silver Creek alluvial aquifer. Dissolved zinc concentrations from the Area B tailings are approximately 500 times lower than the zinc

concentrations measured in the up gradient Silver Creek alluvial aquifer. Lastly, there is no hydraulic connection between ground water stored in the Area A tailings and the underlying aquifers.

Tailings Metals Concentrations

Area A

The average lead concentration in the Area A tailings was 4,530 ppm, while the average arsenic value was 265 ppm.

Area B

The average lead and arsenic concentrations in the tailings above the clay layer were 10,434 ppm and 412 ppm respectively, while the average lead and arsenic concentrations in the clay layer below the tailings were 52 ppm and 9 ppm. Average lead and arsenic concentrations in the clay layer below the tailings in Area B are well below the background soil concentration.

Area A and B tailings data analysis

Based on the data presented above it appears that there are higher metals concentrations in the tailings in Area B as compared to Area A. However, metal concentrations in the clay layer below the tailings in Area B are lower than in background soil concentrations. Furthermore, the composition of the clay layer below Area B tailings is the same as the composition of the clay layer below the main impoundment. This leads to the conclusion that the clay layer below the tailings is serving as an adequate barrier to metals migration in Area B and A.

Soil Cover

Area A

Sample data indicate that the range of thickness of the soil cover is 0.5 to 4 feet. Analytical results show the average lead concentration to be 385 ppm, while the average arsenic concentration was 22 ppm. As there are no regulatory criteria for metals in soils, this data was used to analyze the risk of surficial soil exposure to recreational users and ecological receptors at the Site.

Area B

A series of samples were collected from three transects (28 total) and analyzed for lead and arsenic. Five of the samples were analyzed for eight RCRA metals plus zinc and copper. In conclusion, Transect 2 had a higher average concentration of lead and arsenic (1,446 ppm Pb, 75 ppm As) than transects 1 and 3, however, samples taken from this area may not have been covered by soil, causing the results to represent concentrations of lead and arsenic associated with the tailings that were already there, rather than concentrations associated with windblown tailings.

South Diversion Ditch Sediments

Analytical results show that the average concentrations for lead, arsenic and zinc are 2,578 ppm, 138 ppm and 7,878 ppm respectively. Concentrations are highest in the sample location found in the lower portion of the diversion ditch just east of the site pond.

Background Soils
The average lead concentration for the background soils is 43.3 ppm. The average arsenic concentration is 9 ppm. None of the background soil samples had elevated metals concentrations.

Study Area Boundary
Study area boundary samples were collected from two areas south of the tailings found outside the impoundment, and on the west and east perimeter of the main impoundment. These were analyzed for lead and arsenic to aid in determining the study area boundary. Analytical sample results were used to delineate the Study area Boundary. The boundary is drawn where background lead concentrations appear in the sample results.

Ecological Sampling
Additional sampling was necessary to facilitate the completion of a thorough ecological risk assessment. Surface water and sediment sample data was collected from locations in the wetland area, Site pond, and South Diversion Ditch. Vegetation samples and fish and macroinvertebrate samples were also taken. The resulting data was used to determine risk to ecological receptors in the Site area. A summary of the Ecological Risk Assessment including the findings from the ecological sampling is presented in section 7.2.

5.6 LOCATION OF CONTAMINATION AND POTENTIAL ROUTES OF MIGRATION

5.6.1 Surface water and Sediments

Sediments and surface water impacted by the tailings in Area A and B are found in the South Diversion Ditch and in the Wetland area. The contamination in these media is potentially affecting ecological receptors found in the area. Importantly, metal concentrations in the surface water of Silver Creek are lower than metals concentrations found in the surface water of the diversion ditch. Therefore, contaminated surface water found within the wetland is not adversely affecting Silver Creek.

South Diversion Ditch
Elevated concentrations of lead, arsenic, zinc and some cadmium were found in all water and sediment samples taken. The South Diversion Ditch is a dynamic environment, where elevated concentrations of metals, particularly zinc, fluctuate with seasonal runoff and correspond with peak groundwater elevation. Likely sources of elevated metals concentration found in surface water and sediments in the Diversion Ditch include the tailings located in the bottom if the ditch, the small pond area south of the Site, or from the tailings in Areas A or B.

Wetlands
Although concentrations of metals in the surface water and sediment of the wetland area are lower than those of the South Diversion Ditch, they are very likely to have impacts on the ecological environment at the Site. The average concentrations of lead, arsenic and zinc are just below those in the South Diversion Ditch. There is a mixing of surface waters that occurs in the wetland area; while water from Silver Creek enters the northern portion of the wetland, surface water also flows in from the Diversion Ditch in the southern portion of the wetland. Sample results indicate that

water entering the wetland area from Silver Creek contains higher metals concentrations than the surface water of the South Diversion Ditch.

5.6.2 Ground water

- Ground water sampling results indicate that the Site ground water has much lower concentrations of metals than the ground water within the Silver Creek alluvial ground water. A large amount of this ground water is captured in the South Diversion Ditch. Based on this data, it does not appear that the Site ground water is impacting the Silver Creek alluvial aquifer.
- As a result of the native clay layer found beneath the Area A tailings there is no hydraulic connection between the ground water associated with these tailings and the shallow alluvial aquifers or the underlying Keetley Volcanic aquifers.
- Sample results from ground water within the wetland area indicate that there are no significant impacts from the contamination found in the wetland, the embankment or the Area A tailings.

5.6.2 Soils

In the previous sections on Background Soils and Soil Cover (Section 5.5) it is made clear that impacts to the soils at the Site are minimal. Most contamination is in the form of tailings that were deposited within Area A and in some small areas within Area B. Migration of metals away from these small areas within Area B is extremely limited. Most of the small tailings deposits within Area B have been previously covered with topsoil. Any soils within Area B that have high concentrations of metals are included in the Study Area Boundary are addressed by the selected remedy.

SECTION 6

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

This section describes the current and reasonably anticipated future land uses and current and potential beneficial ground and surface water uses at the Site.

Current Land Use

The Site is located in a rural area within a broad valley of mostly undeveloped rangeland within the Silver Creek Watershed, approximately two miles outside the Park City limits. The Deer Valley and Park City ski resorts sit at the top of the watershed and serve as recreational use areas for skiers in the winter and bikers/hikers in the warmer months. As Silver Creek passes through Park City and into the surrounding suburban areas, the land use is primarily residential and commercial, changing to recreational and agricultural in the areas surrounding Richardson Flat. Most of the land around the Site is undeveloped open space.

Mining activities at the Site ceased in 1982. Since that time, the Site has not been used and has remained open space. A small recreational trail skirts the Site along Silver Creek. There are a few small industrial operations in the vicinity of the Site, including a concrete plant on a nearby parcel. Park City and other resort-like residential developments are expanding in the general area, but none are closer than one mile away.

Reasonably Anticipated Future Land Use

The Site, and much of the surrounding area, is privately owned by UPCM. UPCM has consistently indicated a desire to retain title and limit future use to recreational activities at the Site. While no final decision has been made, uses that range from open space wildlife habitat to athletic fields are currently being discussed. Any type of recreational use is consistent with surrounding land uses, and both Park City and Summit County have indicated general agreement with recreational proposals. Park City is proactive in obtaining and preserving open space. There is no indication that higher uses of the land, such as residential, are reasonably foreseeable.

Ground and Surface Water Uses

The surface water features at the Site, including the south diversion ditch, the wetlands area below the embankment, the Site pond and Silver Creek are used as habitat by a limited number of vegetative species, fish, and wildlife. All of the surface water and shallow ground water on the Site eventually discharges to Silver Creek. Silver Creek is classified by the State of Utah as a potential drinking water source, a recreational use feature, a cold water fishery, and a potential irrigation source. At present, Silver Creek is used for irrigation and recreational fishing only, and no changes are expected. The State of Utah is considering issuing an advisory against fishing due to elevated metal levels in Silver Creek. Silver Creek is listed on the State's Clean Water Act Section 303(d) list of impaired water bodies because zinc and cadmium levels exceed chronic standards for protection of aquatic wildlife.

Silver Creek has been impacted by the legacy of mining activities, though the remedial investigation confirmed that the Site is not, at present, a significant contributor of metals to the creek. The goal is to remediate the entire watershed, improving the ecological quality of the area, thereby allowing for continued beneficial use of the watershed and the Site by a variety of living organisms.

Ground water in the immediate area is used only for private wells, and no wells are known to be located within a half mile of the Site. Most area drinking water wells are finished in the deeper consolidated sedimentary rocks that can sustain aquifers and produce sufficient yields for culinary wells. In the Site area, these formations are very deep and are covered by the Keetley volcanics. The volcanic rocks are generally not suitable to sustain aquifers and serve as more of a confining unit. The shallow ground water at the Site is generally associated with the alluvial system of Silver Creek. This water is very high in solids and is also often contaminated due to water quality in Silver Creek and tailings that are present along the Creek in many areas. There are no known uses for this water at this time.

SECTION 7

SUMMARY OF SITE RISKS

A baseline human health risk assessment (BHHRA) and a baseline ecological risk assessment (BERA) were performed to evaluate the potential for adverse human health and ecological effects that might occur from exposure to Site-related contaminants. Current and future risks were estimated for the baseline scenario (i.e., risks that might exist if no remediation or institutional controls were applied). The BHHRA and the BERA aided in drafting the remediation goals by providing a basis for taking action at the Site. The Chemicals of Concern and the exposure pathways were also identified through these risk assessments.

7.1 HUMAN HEALTH RISK ASSESSMENT

7.1.1 Identification of Chemicals of Concern

The BHHRA identified two contaminants, lead and arsenic, as chemicals of potential concern (COPC's) at the Site through a four step selection process. Risks to human health posed by exposure to these chemicals have been studied extensively through risk assessments completed at other Superfund sites in Utah and throughout the country. Currently, the Site has a soil cover that has a depth of 4 feet in some areas. Because of this soil cover, exposure pathways to these COPC's are limited or interrupted. However, if the integrity of this soil cover were threatened in any way by forces of nature or human intervention, the exposure pathways could become complete. Because of the high human health risk associated with lead and arsenic, and because of the potential exposure to recreational Site visitors if a remedy were not in place, lead and arsenic were selected as chemicals of concern (COC's) and risk drivers for the Site. The COC's are summarized in Tables 7-1,7-2, and 7-3.

7.1.2 Exposure Assessment

The exposure assessment identifies scenarios through which people could be affected by the COCs in Site media and estimates the extent of exposure Site users could endure. The conceptual site model illustrates the media and exposure pathways that were evaluated in the BHHRA (Figure 5). Media selected for evaluation in the BHHRA were soil/tailings, surface water, sediment, and air particulates. Because land use will be limited to recreational visitors, two separate recreational use scenarios were considered. An evaluation of the exposure pathways is also presented in Figure 6.

Low intensity User
The first scenario includes low intensity users, such as hikers, bikers and picnickers, ranging in age from young children to adults. Exposure pathways evaluated were ingestion of soil/tailings, surface water and sediment, dermal exposure to surface water and inhalation of particulates in air.

High Intensity User
Scenario two includes high intensity users such as horseback riders, ATV users, dirt bikers and

team sports players. High intensity users were assumed to exclude younger children and include teenagers and adults. The exposure pathways a high intensity user may be subjected to include ingestion of soil/tailings and inhalation of particulates in air.

7.1.3 Toxicity Assessment

The purpose of the toxicity assessment is to review and summarize the potential for each COC to cause adverse effects in exposed individuals. The toxic effects of a chemical generally depend on the inherent toxicity of a chemical, the route of exposure (ingestion, inhalation, and dermal), and the duration of exposure (subchronic, chronic or lifetime).

There is a positive relationship between dose (chemical intake through an exposure pathway), and adverse effect, so as dose increases the type and severity of adverse reponse also increases. Chemical toxicological information derived from either animal or human studies is used to estimate toxicity criteria which are numerical expressions between dose (exposure) and response (adverse health effects). Toxicity criteria are developed for the assessment of carcinogenic and non-carcinogenic health effects. Toxicity criteria include the EPA online Integrated Risk Information System (IRIS) and EPA's Health Effects Assessment Summary Tables (HEAST).

Toxicity criteria for carcinogens are provided as cancer slope factors (CSF's) in units of risk per milligram of chemical per kilogram of body weight per day (mg/kg-day). CSF's are based on the assumption that no threshold exists for carcinogenic effects and that any dose is associated with some finite carcinogenic risk. The chemical-specific CSF is multiplied by the estimated chemical intake to provide an upper-bound estimate of the increased likelihood of cancer resulting from exposure to the chemical. This risk would be in addition to any background risk of developing cancer over a lifetime due to other causes. Consequently, the risk estimates in the BHHRA are referred to as incremental or excess lifetime cancer risks. Based on data from IRIS and other published data, arsenic is classified as a known human carcinogen (EPA weight of Evidence A). Table 7-4 shows the cancer toxicity criteria for ingestion of arsenic. Lead toxicity is evaluated using other methodologies such as the Integrated Exposure Uptake Biokinetic (IEUBK) model. Estimated blood lead levels are compared to target blood-lead concentrations to assess possible risks.

Toxicity criteria for noncarcinogens are provided as reference doses (RfDs) and represent the daily exposure to a chemical that would be without adverse effects, even if the exposure occurred continuously over a lifetime. The RfD is provided in units of milligrams per kilogram per day (mg/kg-day) for comparison with chemical intake into the body. Chemical intakes that are less than the RfD are not likely to be of concern even to sensitive individuals. Chemical intakes that are greater than the RfD indicate a possibility for adverse effects. Noncancer toxicity values for COCs for ingestion/dermal exposures are presented in Table 7-5.

EPA has not published toxicity criteria for lead. This is because available data suggest that there is no threshold for adverse effects even at exposure levels that might be considered background. Any significant increase in exposure above background levels could represent a cause for concern. Instead of evaluating risk using typical intake calculations and toxicity criteria, EPA has

developed other methodologies for evaluating lead exposures. One such methodology is the Integrated Exposure Uptake Biokinetic (IEUBK) model, a computer model used to predict blood-lead levels in children exposed to lead from a variety of sources, including soil, dust, ground water, air, diet, lead-based paint, and maternal blood. Estimated blood-lead levels are compared to target blood-lead concentrations to assess possible risks. The IEUBK model is intended for use only for children up to the age of seven, as these are the most sensitive receptors to lead exposure. The model assumes daily exposure in a residential setting.

There are circumstances in which adjustments to toxicity criteria should be made to account for the relative bioavailability of a chemical due to its chemical form or its reactive form or the particular medium in which it is found. The issue of bioavailability is especially important when dealing with media from mining sites because metals in these media may exist in insoluble media. These chemical and physical properties may tend to influence (usually decrease) the adsorption or bioavailability of the metals when ingested. Because no site specific data are available for the bioavailability of arsenic in soils/tailings the default value of 0.8 was applied to the arsenic toxicity criteria.

Adverse Effects of Arsenic Exposure

Noncancer Effects

Oral exposure to acute and chronic ingestion of lower levels of arsenic often include diarrhea, vomiting, decreased blood cell formation, injury to blood vessels, damage to kidney and liver, and impaired nerve function. The most diagnostic sign of chronic arsenic exposure is an unusual pattern of skin abnormalities, including dark and white spots and a pattern of small "corns," especially on the palms and soles (ATSDR 1991).

Carcinogenic Effects

There have been a number of epidemiological studies in humans which indicate that chronic inhalation exposure to arsenic is associated with increased risk of lung cancer (USEPA 1984, ATSDR 1991). In addition, there is strong evidence from a number of human studies that oral exposure to arsenic increases the risk of skin cancer (USEPA 1984, ATSDR 1991). The most common type of cancer is squamous cell carcinoma, which appears to develop from some skin corns. Although the evidence is limited, there are some reports which indicate that chronic oral arsenic exposure may also increase risk of internal cancers, including cancer of the liver, bladder and lung, and that inhalation exposure may also increase risk of gastrointestinal, renal or bladder cancers (ATSDR 1991).

Adverse Effects of Lead Exposure

Noncancer Effects

Excess exposure to lead can result in a wide variety of adverse effects in humans. Chronic low-level exposure is usually of greater concern for young children than older children or adults. The effect of lead that is usually considered to be of greatest concern in children is impairment of the nervous system. The effects of chronic low-level exposure on the nervous system are subtle and normally cannot be detected in individuals, but only in studies of groups of children. Common measurement endpoints include various types of tests of intelligence, attention span, hand-eye coordination, etc. Such effects on the nervous system are long-lasting and may be permanent.

Additionally, studies in animals reveal that high blood lead levels during pregnancy can cause fetotoxic and teratogenic effects. Further, a characteristic effect of chronic high lead exposure is anemia stemming from lead-induced inhibition of heme synthesis and a decrease in red blood cell life span.

Cancer Effects
Studies in animals indicate that chronic oral exposure to very high doses of lead salts may cause an increased frequency of tumors of the kidney (USEPA 1989b, ACGIH 1995). However, there is only limited evidence suggesting that lead may be carcinogenic in humans, and the noncarcinogenic effects on the nervous system are usually considered to be the most important and sensitive endpoints of lead toxicity (USEPA 1988).

7.1.4 Risk Characterization

The BHHRA characterized the risk to low and high intensity recreational users through exposure to the COCs at the Site.

7.1.4.1 Evaluation of Carcinogenic Risk

For carcinogens, risks are generally expressed as the probability of an individual developing cancer over a lifetime as a result of exposure to the Site-related contaminants. This is described as "excess lifetime cancer risk" because it is an addition to the risk of cancer from other causes. Exposure to Site COPCs was evaluated by multiplying chemical specific exposure estimates (i.e. average lifetime dose) by the chemical and route specific CSF. The result was a unitless measure of probability (e.g., 1E-4) of an individual developing cancer as a result of chemical exposures at the Site. A cancer risk of 1E-04 refers to an increased chance of one in ten thousand of developing cancer as a result of site related exposure to a carcinogen over the expected duration. Typically, the USEPA considers remedial action at a site when estimated total excess cancer risk to any current or future population exceeds the range between one in ten thousand (1E-04) and one in a million (1E-06). Estimated carcinogenic risks for reasonable maximum exposure (RME) scenarios are presented in tables 7-6 and 7-7. Estimates of average risks are presented in the BHHRA.

Low Intensity Users
RME excess cancer risks were calculated for potential low intensity recreational users, which include hikers, bikers and picnickers. Risks were evaluated for the ingestion, inhalation and dermal exposure pathways. Risk from inhalation and ingestion of sediments, soils/tailings and surface water and dermal exposure to surface water were estimated to fall below EPA's threshold cancer risk of 1E-06. Risk from ingestion of soil/tailings was estimated to be 2E-05 for the RME scenario. This risk falls into EPA's acceptable range of 1E-04 and 1E-06.

High Intensity Users
RME excess cancer risks were calculated for high intensity recreational users which include horseback riders, ATV users, dirt-bikers, and sports (soccer, baseball) players. Risks were

evaluated for the ingestion of soil/tailings and the inhalation of soil as dust exposure pathways. Risk from inhalation of soil as dust was estimated to fall well below the threshold cancer risk of 1E-06. Risk from ingestion of soil/tailings was estimated to be 1.1E-05, which falls into EPA's acceptable range of 1E-04 and 1E-06.

7.1.4.2 Evaluation of Noncarcinogenic risks

The potential for noncarcinogenic effects due to exposure to a particular chemical is expressed as the hazard quotient (HQ). An HQ was calculated by dividing the dose (estimated chemical intake) of a chemical by the RfD. The HQ calculation assumes that there is a threshold level of exposure below which no adverse effects will occur. An HQ less than one indicates that there is little potential for adverse noncancer effects, even in sensitive individuals, while an HQ greater than one indicates the potential for adverse noncancer effects.
The hazard index (HI) is equal to the sum of all the HQs. A HI less than one indicates there is little potential for adverse effect from exposure to all COCs at a site. An HI greater than one indicates the potential for adverse noncancer effects from exposure to all COCs, assuming that all chemicals have the same toxic effect and that toxic effects would be additive. Estimated RME noncancer hazards for populations evaluated in the BRA are presented in Tables 7-8 and 7-9. Please refer to the BHHRA for estimates of average noncancer hazards across the Site.

Low Intensity Users
Noncancer hazards were quantified for exposure to arsenic via ingestion of soils/tailings, surface water and sediment. The risk associated with inhalation of soil as dust and dermal contact with surface water was also considered. The HI was the sum of all HQs associated with the Site for the low intensity user. The RME HI was 9.2E-02 related to arsenic exposure through the various pathways. This falls below EPA's acceptable range for exposure to non-carcinogenic contaminants, which means that it is not a human health concern by EPA's standards

High Intensity Users
Noncancer hazards were quantified for exposure to arsenic via ingestion of soils/tailings, and inhalation of soil as dust for the high intensity recreational user. The HI, the sum of the HQs, HI was 5.8E-02, which falls below EPA's acceptable range for exposure to non-carcinogenic contaminants, which means that it is not a human health concern by EPA's standards

7.1.4.3 Evaluation of Risks from Lead

Risks from lead are usually evaluated by estimation of the blood levels in exposed individuals and compared to blood lead levels within an appropriate health based guideline. The USEPA and CDC have set a goal that there should be no more than a 5% chance that a child should have a blood level over 10μg/dL. The BHHRA used the IEUBK model to first evaluate risks to a hypothetical nearby resident of a child's age (0-6 years). Second, risks to a residential child engaged in low-intensity recreational activities at the Site were evaluated. The risk to residential children engaged in recreational activity is higher than the risk to children who live nearby but don't engage in recreational activity. However, the geometric mean values are relatively low, and children engaging in recreational activities have less than a 5% chance of exceeding a blood lead

level of 10μg/dL.

Risks for exposure to lead in Site media were also evaluated for teenage and adult recreational visitors using the Bowers model. Low and high intensity recreational visitor exposure scenarios were examined. Results showed that high or low-intensity recreational use at this Site is not predicted to cause high blood lead levels which exceed a target concentration of 11.1μg/dL. The 11.1μg/dL standard is a health criterion based on the blood lead concentration that is acceptable for a pregnant adult.

7.1.5 Assessment of Uncertainties

Several assumptions used in the evaluation of lead risks at this Site may introduce uncertainty into the presented findings. Although in most cases, assumptions employed in the risk assessment process to deal with uncertainties are intentionally conservative; that is, they are more likely to lead to an overestimate rather than an underestimate of risk, it is nevertheless important to take these uncertainties into account when interpreting the risk conclusions derived for this Site. Uncertainties presented in the risk assessment include: uncertainty in lead concentrations estimates, uncertainty in lead absorption from soil, and uncertainty in the modeling approach.

Uncertainty in Lead Concentration Estimates

Evaluation of human health risk at any particular location requires accurate information on the average concentration level of a COPC at that location. Because estimating the mean is more difficult when aggregating data over a large exposure area, such as the Site, the true mean could be underestimated. Here, the 95th Upper Confidence Limit soil lead concentration was used to evaluate risks from lead. This approach is reasonable for use at the Site where lead concentrations in onsite soil/tailing materials range from 14 to 5,875 mg/kg. This conservative approach for estimating exposure to lead at the site may *overestimate* the actual risks from lead for the Site, ensuring that all of the risk estimates are more likely to be high than low.

Risks from exposure to lead were evaluated based on surficial soil data. This decision was based on the assumptions that recreational users are most likely to be exposed to surficial soils based on their activities. Based on the depth distribution observed for lead, risks from exposure to subsurface soils will be similar or less than those observed for surface soils. However, if concentrations for lead are ever found to increase as a function of depth, the risks based on surface soil exposure will *underestimate* risks for those individuals exposed to buried materials. The maximum lead concentration in soil/tailings observed at the Site at any depth is 21,380 mg/kg.

Uncertainty in Lead Absorption from Soil

Another important source of uncertainty regarding the risk from lead in soil is the degree of absorption (RBA) within the gastrointestinal tract. For the risk assessment performed at the Site, a default relative bioavailability factor for lead of 0.60 has been applied. This introduces uncertainty, and causes either an over or underestimation of risk because the selected value is not based on actual measurements for site soils. Soils are complex by nature and may have numerous

attributes which influence overall absorptions characteristics.

Uncertainty in Modeling Approach

All predictive models, including the IEUBK model and the ISE model, are subject to a number of limitations. First, there is inherent difficulty in providing the models with reliable estimates of human exposure to lead-contaminated media. For example, exposure to soil and dust is difficult to quantify because human intake of these media is likely to be highly variable, and it is very difficult to derive accurate measurements of actual intake rates. Second, it is often difficult to obtain reliable estimates of key pharmacokinetic parameters in humans (e.g., absorption fraction, distribution and clearance rates), since direct observations in humans are limited. Finally, the absorption, distribution and clearance of lead in the human body is an extremely complicated process, and any mathematical model intended to simulate the actual processes is likely to be an over-simplification. Consequently, model calculations and predictions are generally rather uncertain.

The Bowers model used to assess lead exposures in youths and adults requires a composite toxicokinetic parameter (the biokinetic slope factor) to predict the effect of exposure on blood lead levels. This value is derived mainly from studies in adult males, and it is not certain that the value is accurate for youths or for women (especially pregnant women). Also, the exposures being modeled with the Bowers model are intermittent rather than continuous, so blood lead levels in the exposed populations are expected to show temporal variability. Toxicity data are not adequate to estimate the level of health risk associated with occasional (rather than continuous) elevations in blood lead level due to intermittent exposures to elevated lead levels in the environment. However, since the observed lead levels in soil/tailings result in predicted blood lead levels that are well below the established level of concern, these uncertainties in the modeling approach do not cast serious doubt on the accuracy of the conclusion that lead levels at this Site are not of concern to older children or adults.

7.2 ECOLOGICAL RISK ASSESSMENT

Tailings released to the environment from ore milling operations generally contain metals that can, depending on the concentration and level of exposure, be toxic to ecological receptors. In accord with the eight-step process recommended by USEPA for evaluating ecological risks the ecological risk assessment process at this Site was initiated by performing a Screening-Level Ecological Risk Assessment (SLERA) (USEPA, 2003a), which was followed by the Baseline Ecological Risk Assessment (BERA, January, 2004). These ecological risk assessments were completed to describe the likelihood, nature, and extent of adverse effects to ecological receptors resulting from present and potential exposure to the COCs at the Site. The SLERA was intended to provide a preliminary evaluation of the potential for adverse effects to three classes of ecological receptors (aquatic, terrestrial, wildlife). Because a SLERA normally uses a number of simplifying assumptions and approaches and is intentionally conservative, the SLERA was not intended to support any final quantitative conclusions about the magnitude of the potential ecological risks. The SLERA was also used to identify additional data that needed to be gathered in order to complete the BERA. Once the additional data was compiled it became possible to

perform a more complete risk assessment, addressing the COC's and the risks posed through the various ecological exposure pathways within the exposure areas of the Site. The BERA was conducted using the problem formulation approach, which is an iterative process that allows risk assessors to refine the assessment as new information becomes available and to make qualitative conclusions about Site risks by using a weight of evidence evaluation. The various methods used to assess exposure and risk under the problem formulation approach as well as a description of the combined results of the SLERA and the BERA are described in the sections that follow.

7.2.1 Identification of Chemicals of Concern

Chemicals of concern (COCs) at the Site were identified through a weight of evidence evaluation that began in the SLERA. In this process, the maximum concentration of each detected metal was compared to the screening level benchmark (SL) for that metal. If this concentration was greater than the SL, the chemical was considered a chemical of potential concern (COPC) and was retained for further evaluation in the BERA. Additionally, the Site was divided into exposure areas for the purpose of the risk assessment. These areas are based on the Site characteristics and include Silver Creek (upstream and downstream), Site diversion ditches, the wetlands area, Site pond, and Area A and Area B tailings. By examining the ecological receptors and the COPCs associated with the environmental media within each exposure area, a risk management decision was made to determine the COCs for the Site. As a result of this approach, the following COCs are described based on the environmental media and the ecological receptor associated with that media. Cadmium and zinc (dissolved) were the COCs identified for surface water and aquatic receptors at the Site. Within the bulk sediment, cadmium, copper, mercury and zinc were considered COCs if benthic organisms were the receptors. Lead associated with the sediment was found to be a COC if waterfowl were the ecological receptors. The COCs, arsenic and zinc (dissolved), associated with sediment porewater could be toxic to benthic organisms. Lastly, aluminum, lead, mercury and zinc were named COCs and considered toxic to plants and soil invertebrates in contact with the soils and tailings at the Site. The COCs are summarized in Tables 7-10 through 7-14. These COC's have the potential to adversely affect growth, diversity, reproduction and survival of the various species that populate the Site.

7.2.2 Exposure Assessment

When examining exposure to ecological receptors at the Site it is important to note that in accordance with the State of Utah surface water code, the Weber River from the Stoddard diversion to its headwaters (including Silver Creek) is classified as a cold water fishery (3A) and is protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in the food chain. Because the Site provides possible habitat for fish, aquatic invertebrates, terrestrial plants, terrestrial invertebrates, mammals, birds, reptiles and amphibians, those were the receptors included in the SLERA.

Figure 7 presents the ecological conceptual site model (CSM) for the Site. As indicated in the Ecological CSM, ecological receptors that may be exposed at the Site include aquatic receptors (fish and benthic macroinvertebrates), amphibians and reptiles, terrestrial receptors (plants and soil invertebrates), and wildlife receptors (birds and mammals). Each receptor class may be

exposed to chemical contamination via contact with one or more environmental media, including surface water, sediment, seeps, aquatic food items, soil/tailings, and terrestrial food items. However, not all of these exposure pathways are likely to be of equal concern. Pathways that were supported by adequate data became the primary focus of the BERA and were included in the quantitative risk evaluation. An explanation of the elimination of certain pathways can be found in the BERA and for the purposes of this ROD, only the pathways of high ecological concern are described below.

Aquatic Receptors (Fish)

The main pathways of exposure for fish and benthic invertebrates are direct contact with surface water and sediment. Each of these pathways were evaluated quantitatively.

Terrestrial Receptors (Plants and Invertebrates)

The primary exposure pathway for both terrestrial plants and soil invertebrates is direct contact with contaminated soils. This pathway was evaluated in the SLERA; however, additional data were not collected for the BERA, so further analysis of this pathway was not conducted. It is assumed from the SLERA that direct contact with contaminated soils is a complete pathway and one of potentially high risk to terrestrial receptors.

Wildlife Receptors (Birds and Mammals)

Birds and mammals may be exposed by ingestion of food web items (either from the terrestrial environment and/or from the aquatic environment). Wildlife receptors may also ingest soil or sediment during feeding, especially for soil- or sediment-dwelling prey items. Although these exposure pathways are complete and of potential concern (USEPA, 2003a), no new data are available for contaminant concentrations in soil or in terrestrial food items, and it is expected that remedial actions planned for the site will largely address potential risks to terrestrial (upland) wildlife receptors from exposures to contaminants on the main impoundment and in off-impoundment areas (RMC, 2003). Therefore, quantitative risk characterization for the BERA focused on exposures of aquatic/semi-aquatic wildlife receptors in the wetlands area, and risks to upland terrestrial wildlife receptors were not re-evaluated in the BERA.

7.2.3 Ecological Effects Assessment

Assessment and measurement endpoints are part of the problem formulation approach used to examine ecological risk at the Site. Again, the problem formulation method is an approach to risk assessment that is designed to provide risk managers with adequate qualitative and quantitative information. As a result, risk managers can make decisions that lead to protection of the ecological environment.

Assessment endpoints are explicit statements of the characteristics of the ecological system that are to be protected. Assessment endpoints are either measured directly or are evaluated through indirect measures. Measurement endpoints represent quantifiable ecological characteristics that

can be measured, interpreted, and related to the valued ecological components chosen as the assessment endpoints (USEPA 1992, 1997).

Table 7-15 presents the assessment and measurement endpoints used to interpret potential ecological risks for the Site that were evaluated in the BERA. These measurement endpoints can be divided into three basic categories: (1) hazard quotients (HQs), (2) site-specific toxicity tests, and (3) observations of population and community demographics.

Hazard Quotients

Hazard Quotients (HQ's) are generally used by the EPA to determine whether remedial action is warranted. For example, in human health risk assessment for non-carcinogenic effects, remedial action is warranted if the HQ for a COC is greater than 1 for a particular site user. However, for the purposes of the BERA, HQs were used as one part of the weight-of-evidence evaluation along with the other factors including toxicity testing and population observations. A HQ is the ratio of the estimated exposure of a receptor at the Site to a "benchmark" exposure that is believed to be without significant risk of unacceptable adverse effect:

HQ = Exposure / Benchmark

Exposure may be expressed in a variety of ways, including:

- Concentration in an environmental medium (water, sediment, soil, diet)
- Concentration in the tissues of an exposed receptor
- Amount of chemical ingested by a receptor

In all cases, the benchmark toxicity value must be of the same type as the exposure estimate.

If the value of an HQ is less than or equal to 1, risk of unacceptable adverse effects in the exposed individual is judged to be acceptable. If the HQ exceeds 1, the risk of adverse effect in the exposed individual is of potential concern.

When interpreting HQ results for ecological receptors, it is important to remember that the assessment endpoint is usually based on the sustainability of exposed populations, and risks to some individuals in a population may be acceptable if the population is expected to remain healthy and stable. In these cases, population risk is best characterized by quantifying the fraction of all individuals that have HQ values greater than 1 and by the magnitude of the exceedences. In interpreting HQ values and distributions of HQ values, it is always important to bear in mind that the values are predictions, and are subject to the uncertainties that are inherent in both the estimates of exposure and the estimates of toxicity benchmarks. Therefore, HQ values should be interpreted as estimates rather than highly precise values and should be viewed as part of the weight-of-evidence along with the results of site-specific toxicity testing and direct observations on the structure and function of the aquatic community (see below).

Site-Specific Toxicity Tests

Site-specific toxicity tests measure the response of receptors that are exposed to Site media. This may be done either in the field or in the laboratory using media collected on the site. The chief advantage of this approach is that site-specific conditions which can influence toxicity are usually accounted for. A potential disadvantage is that, if toxic effects occur when test organisms are exposed to a Site medium, it is usually not possible to specify which chemical or combination of chemicals is responsible for the effect. Rather, the results of the toxicity testing reflect the combined effect of the mixture of chemicals present in the Site medium. In addition, it is often difficult to test the full range of environmental conditions which may occur at the Site across time and space, either in the field or in the laboratory, so these studies are not always adequate to identify the boundary between exposures that are acceptable and those that are not.

Population and Community Demographic Observations

A third approach for evaluating impacts of environmental contamination on ecological receptors is to make direct observations on the receptors in the field, seeking to determine whether any receptor population has unusual numbers of individuals (either lower or higher than expected), or whether the diversity (number of different species) of a particular category of receptors (e.g., plants, benthic organisms, small mammals, birds) is different than expected. The chief advantage of this approach is that direct observation of community status does not require making the numerous assumptions and estimates needed in the HQ approach. However, there are also a number of important limitations to this approach. The most important of these is that both the abundance and diversity of an ecological population depend on many site-specific factors (habitat suitability, availability of food, predator pressure, natural population cycles, meteorological conditions, etc.), and it is often difficult to know what the expected (non-impacted) abundance and diversity of an ecological population should be in a particular area. This problem is generally approached by seeking an appropriate "reference area" (either the site itself before the impact occurred, or some similar site that has not been impacted), and comparing the observed abundance and diversity in the reference area to that for the site.

7.2.4 Risk Characterization

As noted above, each of the measurement endpoints has advantages but also has limitations. For this reason, conclusions based on only one method of evaluation may be misleading. Therefore, the best approach for deriving reliable conclusions is to combine the findings across all of the methods for which data are available, taking the relative strengths and weaknesses of each method into account. If the methods all yield similar conclusions, confidence in the conclusion is greatly increased. If different methods yield different conclusions, a careful review must be performed to identify the basis of the discrepancy and to decide which approach provides the most reliable information.

Risk to Aquatic Receptors

As discussed above, aquatic receptors (fish, benthic invertebrates) may be exposed to Site contaminants in surface water and sediment at a number of exposure areas including Silver Creek, the south diversion ditch, the wetlands area, Site pond, and an unnamed drainage which flows into the south diversion ditch. Evaluation of potential risks by the HQ approach, site-specific toxicity testing, and population surveys are summarized below.

Risk to Aquatic Receptors		
Exposure Pathway	**Line of Evidence**	**Findings**
Direct Contact with Surface Water	Estimated HQs from measured surface water concentrations	Surface water concentrations of cadmium and zinc in Silver Creek are probably adversely impacting aquatic receptors. Zinc may also be of concern to aquatic receptors in the Site diversion ditch and wetlands area. Concentrations of several metals may be above a chronic level of concern in the unnamed drainage which flows into the Site diversion ditch.
Direct Contact with Sediment	Estimated HQs from measured bulk sediment concentrations	Wide-spread, and potentially severe, toxicity to benthic invertebrates may be occurring in Silver Creek, the site diversion ditch, the wetlands area, and the site pond due to multiple metals in bulk sediment.
	Estimated HQs from measured sediment porewater concentrations	Sediment porewater concentrations of arsenic and zinc (antimony, cadmium and lead to a lesser extent) in the wetlands area, especially in the northern portion of the wetlands, may be of concern to benthic invertebrates.
	Sediment toxicity tests (*Hyalella azteca*)	Statistically significant decreases in survival were seen for 5 of 8 stations in the wetlands area. 100% mortality was seen in 3 sampling stations located in the northern part of the wetlands area.
All exposure pathways combined	Tissue burden evaluation	Measured tissue levels of zinc suggest that benthic invertebrates and snails in the wetlands area may be adversely impacted due to site exposures. Fish in the Site pond may also be adversely impacted based on the elevated tissue levels of aluminum, lead, and zinc.
	Aquatic community evaluation	No recent data are available.

Weight of evidence conclusions
Based on these lines of evidence, metals in the wetlands area and the Site diversion ditch are probably having an adverse effect on aquatic receptors (fish and aquatic invertebrates). Antimony, arsenic, cadmium, lead, and zinc found in sediment, sediment porewater or surface water may adversly impact the aquatic receptors in the exposure areas mentioned above.

For Silver Creek, dissolved metals (especially cadmium and zinc) are likely to pose a significant risk to aquatic receptors. Because risks are elevated in surface water collected upstream of the Site, it is evident that sources in addition to the Site contribute to the toxicity. The headwaters of Silver Creek originate in the mountains south of Park City, a location that is influenced by several historic mining operations such as the Little Bell and Daly Mines. According to the findings of the Upper Silver Creek watershed evaluation (USEPA, 2001a), the Silver Maple Claims (Pace-Homer Ditch) was the largest contributor of zinc for the lower reaches of Silver Creek. Zinc loads from the Site south diversion ditch are reported to contribute only 0.03 lbs/day to Silver Creek (USEPA, 2001a). Based on this information, it appears that the Site is currently only a minor contributor to the current level of metal contamination in Silver Creek. However, if the metals present in sediments and/or surface water are reduced in Silver Creek as a result of off-site clean up activities, it may be possible that discharges from the Site could recontaminate these media and become a more dominant influence on metal loading in the future.

Risk to Wildlife Receptors

The SLERA evaluated risks to terrestrial and aquatic/semi-aquatic wildlife and concluded that ingestion exposures from most media were potentially above a level of concern. Because no new data are available for contaminant levels in soils or terrestrial food web items, and because it is expected remedial activities will address concerns over soil-related pathways, terrestrial (upland) wildlife exposures were not re-evaluated. New data for surface water, sediment, and aquatic food web items were gathered, therefore, exposures of aquatic/semi-aquatic wildlife from these pathways were quantitatively evaluated as described below.

Selection of representative species
It is not feasible to evaluate exposures and risks for each aquatic/semi-aquatic avian and mammalian species potentially present at the Site. For this reason, several species were selected to serve as representative species (surrogates) of several different semi-aquatic feeding guilds. Selection criteria for representative wildlife species include trophic level, feeding habits, and the availability of life history information. Representative wildlife receptors selected for the Site include:

Wildlife Receptors and Exposure Pathways Evaluated		
Feeding Guild	**Representative Species**	**Exposure Pathways Evaluated**
Mammalian piscivore	Mink	Ingestion of surface water, sediment, and fish
Avian piscivore	Belted Kingfisher	
Avian omnivore	Mallard Duck	Ingestion of surface water, sediment, aquatic invertebrates, and aquatic plants
Avian insectivore	Cliff Swallow	Ingestion of surface water, sediment, and emerging aquatic insects

Weight of evidence conclusions
Based on the estimated HQs and Hazard Indexes (HIs) from ingested dose, it was concluded that incidental ingestion of lead, manganese and zinc in sediments from the wetlands area, the south diversion ditch, and Site pond are likely to be causing adverse effects in waterfowl and other birds which feed in these areas. Concentrations of lead, and possibly zinc and manganese, in aquatic food items may also cause adverse effects in birds that consume fish, aquatic invertebrates, or aquatic plants from the Site

Risk to Wildlife Receptors		
Exposure Pathway	**Line of Evidence**	**Findings**
Ingestion of surface water, sediment, and aquatic food items	Estimated HQs and HIs from ingested dose (calculated from measured data)	Risks to birds are likely to be of potential concern in the wetlands, diversion ditch, and pond, primarily from lead in sediment and also from these lead in aquatic food items. Risks to the cliff swallow may be above a level of concern from manganese and zinc in aquatic invertebrates and sediment. However, correlation of manganese in sediment compared to manganese in invertebrates is inconsistent, so predicted risks may not be site-related or may reflect an overly conservative TRV.

7.2.5 Ecological Cleanup Levels

A review of the lines of evidence and numerical calculations presented in the BERA suggests that lead is a clear driver of ecological risk at the RFT Site. HIs for incidental ingestion of lead in sediment by wildlife receptors (primarily waterfowl) are generally higher than those for other COCs, pathways, and receptors. In this regard, lead can be used to establish a cleanup standard

that is conservative. Rather than establishing cleanup levels for all COCs, a cleanup level that is protective relative to incidental ingestion of lead in sediment by wildlife is considered sufficiently protective of other COCs, pathways, and receptors.

EPA selected an ecological cleanup level of 310 ppm lead in sediment. This value is based on a low-end threshold Toxicity Reference Value (TRV) from the species sensitivity distribution (SSD) for all birds, and hence it is likely to be the most appropriate value to ensure protection of all waterfowl. This approach assumes that the variability in TRVs between different species of waterfowl is similar to the variability for other types of birds. While there is considerable uncertainty, it is expected that attainment of this numerical level would reduce HI's for lead in sediment to less than one.

7.2.6 Uncertainties

Quantitative evaluation of ecological risks is generally limited by uncertainty regarding a number of important data. This lack of knowledge is usually circumvented by making estimates based on whatever limited data are available, or by making assumptions based on professional judgment when no reliable data are available. Because of these assumptions and estimates, the results of the risk calculations are themselves uncertain, and it is important for risk managers and the public to keep this in mind when interpreting the results of a risk assessment. Uncertainties related to the BERA are summarized in Table 7-16.

7.3 HUMAN HEALTH AND ECOLOGICAL RISK CONCLUSIONS

The BHHRA, which is based on present conditions at the Site, determined there are currently no unacceptable risks from lead and arsenic to the targeted use population (recreational visitors) at the Site. However, remedial action is necessary to maintain and improve the soil cover that was placed on the tailings. Disturbances to the present soil cover could allow for exposure to the underlying tailings.

There is substantial risk to ecological receptors at the Site from exposure to zinc, cadmium, lead and arsenic found in the various environmental media at the Site. Exposure pathways include direct contact with the sediments within the South Diversion Ditch and the wetlands area. These exposure areas also present risks to ecological receptors through contact or ingestion of surface water and sediment porewater found at the Site.

SECTION 8

REMEDIAL ACTION OBJECTIVES

8.1 NEED FOR REMEDIAL ACTION

The measures undertaken voluntarily by UPCM over the past two decades have significantly reduced the risks presented by contaminants at the Site. These measures, while incomplete, have effectively isolated most of the contaminated materials from the environment and generally made the Site safe for recreational use. However, the ecological risks identified and described in the previous sections, along with the physical conditions present at the Site, necessitate additional remedial action. In its current state, the Site presents unacceptable risks to aquatic wildlife receptors, both in the wetland below the embankment and in the south diversion ditch. Similarly, the Site's physical characteristics create the potential for significant migration of heavy metals off the Site and into Silver Creek, as well as the potential for future exposure to recreational users. The Remedial Action Objectives (RAOs) for the Site focus on mitigating existing ecological risks and maintaining or improving the physical conditions to prevent or minimize future releases and exposures.

8.2 REMEDIAL ACTION OBJECTIVES

To address the existing and potential risks, as well as accommodate the anticipated future recreational and ecological use of the Site, EPA has developed nine RAOs:

1. Reduce risks to wildlife receptors in the wetland area and south diversion ditch such that hazard indexes for lead are less than or equal to one.
2. Ensure that recreational users, including children, continue to have no more than a 5% chance of exceeding a blood lead level of 10 micrograms per deciliter from exposure to lead in soils
3. Ensure that recreational users, including children, continue to have no more than 1×10^{-4} chance of contracting cancer from exposure to arsenic in soils.
4. Eliminate the risk of catastrophic failure of the tailings impoundment.
5. Ensure that surface water discharged from the Site meets applicable Utah water quality standards.
6. Eliminate the possibility of future ground water use and withdrawal at the Site.
7. Allow for a variety of future recreational uses.
8. Allow for future disposal of mine tailings from the Park City area within the tailings impoundment until the remedy is complete.
9. Minimize post-cleanup disturbance of tailings and contaminated soil. Provide controls that ensure any necessary disturbance at the Site follows prescribed methods.

SECTION 9

DESCRIPTION OF ALTERNATIVES

In the FFS, four specific alternatives for remedial action, as well as a No Action alternative, were brought forward for detailed analysis. These alternatives are described in the subsections below.

9.1 DESCRIPTION OF REMEDY COMPONENTS

9.1.1 Alternative 1- No Action

It is a requirement of CERCLA and the NCP that the EPA evaluate the consequences of taking no action at the Site. This alternative is designed to establish a baseline of current conditions upon which other alternatives can be compared. Alternative 1 does not provide any additional protection of human health or the environment.

9.1.2 Alternative 2- Soil Cover, Institutional Controls and Wedge Buttress

Alternative 2 entails increasing the depth of cover over tailings in the Study Area, implementing institutional controls to manage human contact with Site materials, and installing a wedge buttress to a portion of the main embankment of the tailings impoundment. The South Diversion Ditch and wetland areas will be left undisturbed.

Major Components

- All tailings are left in current location
- Existing soil cover is augmented to achieve a depth of at least 18 inches of soil above tailings both inside and outside the impoundment
- Embankment is fortified to prevent catastrophic failure
- Institutional controls (easements and land use restrictions) to protect soil cover and prevent ground water use
- Ongoing surface water monitoring
- Mine waste from the Park City area will be placed inside the impoundment before the soil cover is augmented.

9.1.3 Alternative 3- Source Removal, Soil Cover and Wedge Buttress

Alternative 3 includes source removal and covering of Area B tailings, placing clean soil over the tailings impoundment, installation of a wedge buttress, covering of contaminated sediments in the diversion ditch, removing contaminated sediments in the wetland, and placing of restrictions on future land and groundwater use.

Major Components

- Tailings in critical areas outside the impoundment (Area B) are excavated and moved inside the impoundment
- Existing soil cover is augmented to achieve a depth of at least 18 inches of soil above tailings
- Sediments in diversion ditch are covered with clean gravel
- Contaminated sediments and soils in the wetland below the embankment are excavated and material is placed within the impoundment
- Mine waste from the Park City area is placed within the impoundment during implementation of the remedy
- Embankment is fortified to prevent catastrophic failure
- Institutional controls (easements and land use restrictions) to protect soil cover and prevent ground water use
- Ongoing surface water monitoring

9.1.4 Alternative 4- Excavation, Treatment and Offsite Disposal

This alternative entails excavating the contaminated material from the impoundment and from an area south of the diversion ditch, stabilizing it onsite, and disposing of it in a non-hazardous waste (Subtitle D) or hazardous waste (Subtitle C) landfill. Following treatment, the material would be tested using Toxicity Characteristic Leaching Procedure (TCLP) methods and disposed of in the proper landfill depending on its classification as either hazardous or non-hazardous waste. Once treatment and disposal processes are complete the site would be reclaimed by grading the area, applying six inches of topsoil and seeding the new soil with a native mix.

Major Components

- All tailings are excavated
- Tailings treated on-site through stabilization process to limit release of metals
- Tailings disposed of at off-site landfill

9.1.5 Alternative 5- Excavation, Treatment and Onsite Disposal

This alternative would include excavating the contaminated material from the impoundment and south of the diversion ditch and stabilizing it in a temporary treatment facility located adjacent to the impoundment. The treated materials would then be disposed of in a repository space within the impoundment. Upon completion of treatment and disposal activities the impoundment would be reclaimed. The Site will be graded to prevent surface water accumulation, thus reducing infiltration. Following the remedial activities, 18 inches of soil will be applied, including 12 inches of a low permeability soil and 6 inches of top soil. The top soil will be seeded with a native mix.

Major Components

- All tailings are excavated
- Tailings treated on-site through stabilization process to limit release of metals
- Tailings replaced into impoundment and covered with 18 inches of soil
- Institutional controls (easements and land use restrictions) to protect soil cover and prevent ground water use
- Ongoing surface water monitoring

9.2 COMMON ELEMENTS AND DISTINGUISHING FEATURES OF EACH ALTERNATIVE

Alternatives 1, 2, and 3 all involve managing the tailings in place to varying degrees, with alternatives 2 and 3 adding increased levels of response. The RI has shown that the existing soil cover and the Site's hydrogeologic setting have effectively isolated the tailings from the environment, so it is clear that each of these alternatives, even the No Action Alternative, will be effective to some degree. This type of managed repository for low-toxicity mine wastes is standard industry practice and can be considered a presumptive remedy. The design requirements for all alternatives are small and the time to implement each alternative is no more than two years.

Alternative 3 is distinguished from Alternative 2 by the increased protectiveness and risk reduction achieved by (1) excavating wastes in critical areas outside the impoundment, and (2) covering the diversion ditch sediments with gravel. Both alternatives 2 and 3 provide the opportunity for placement of mine waste from other locations in the Upper Silver Creek Watershed at the Site.

Alternatives 4 and 5 both involve excavation and treatment of all contaminated materials. These alternatives add additional protectiveness and limit future maintenance and management requirements such as monitoring. The design requirements for these alternatives are larger, involve significant bench and pilot testing, and the time to implement these alternatives are in excess of five years. Alternative 5 is distinguished from Alternative 4 in that treated wastes will remain on-site, as opposed to being disposed of in an off-site landfill.

9.3 EXPECTED OUTCOMES OF EACH ALTERNATIVE

Alternative 1 - No Action

- Immediately safe for recreational use
- Ecological risks not addressed
- Potential for increased future releases and exposures, including catastrophic failure of embankment

- No additional improvements in water quality
- Potential for unacceptable future ground water exposures

Alternative 2 - Soil Cover, Institutional Controls and Wedge Buttress

- Ready for recreational use in approximately two years
- Ecological risks not addressed
- Potential for catastrophic failure of embankment eliminated
- Site could be used for disposal of mine waste from other locations in the Watershed during implementation of the remedy
- Limited additional improvements in water quality
- Future ground water use restricted and potential for future exposures eliminated
- Ongoing monitoring and management required

Alternative 3 - Source Removal, Soil Cover and Wedge Buttress

- Ready for recreational use in approximately two years
- Ecological risks mitigated
- Potential for catastrophic failure of embankment eliminated
- Site could be used for disposal of mine waste from other locations in the Watershed during implementation of the remedy
- Significant improvements in water quality
- Future ground water use restricted and potential for future exposures eliminated
- Ongoing monitoring and management required

Alternative 4 - Excavation, Treatment and Offsite Disposal

- Ready for unlimited use no sooner than five years
- Ecological risks mitigated
- Potential for catastrophic failure of embankment eliminated
- Significant improvements in water quality
- Potential for future ground water exposures eliminated
- No future Site management or monitoring

Alternative 5 - Excavation, Treatment and Onsite Disposal

- Ultimate land-use potential unknown, but no use sooner than five years
- Ecological risks mitigated
- Potential for catastrophic failure of embankment eliminated
- Significant improvements in water quality
- Potential for future ground water exposures likely eliminated
- Limited Site management and monitoring required

SECTION 10

SUMMARY OF COMPARATIVE ANALYSIS

The NCP sets forth nine criteria for use in a detailed, comparative analysis of alternatives. This section summarizes the detailed analysis found in the FFS with specific discussion for each criterion followed by a summary and ranking table (10-1, 10-2).

10.1 QUALITATIVE EVALUATION OF EACH CRITERION

Overall Protection of Human Health and the Environment

This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled.

Alternatives 1 and 2 do not provide adequate protection of human health and the environment. Neither alternative addresses risks posed by contaminated sediments in the diversion ditch and wetland areas. Alternative 1 also does not improve physical conditions at the Site, making future releases and exposures likely.

Alternatives 3, 4, and 5 all provide adequate protection of human health and the environment. Alternative 3 addresses risks posed by contaminated sediments in the diversion ditch and wetland areas through a combination of source removal and containment. Alternatives 4 and 5 provide additional protectiveness through treatment of contaminated wastes and soils. Alternatives 3, 4, and 5 also improve physical conditions at the Site, minimizing or eliminating the potential for future releases. Alternative 3 accomplishes this with a wedge buttress, soil cover, and institutional controls to better contain the tailings. Alternatives 4 and 5 accomplish this primarily through treatment of contaminated wastes and soils.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP Section 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, they nonetheless address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well-suited to the particular site. Again, only those State standards that are identified in a timely manner and that are more stringent than Federal requirements may be relevant and appropriate.

Site ARAR's are summarized in Table 10-3. Alternatives 1 and 2 will not comply with all of the ARAR's, while alternatives 3, 4 and 5 will. Additionally, the Action Specific hazardous waste ARAR's dealing with federally-defined hazardous wastes under RCRA are not applicable to Bevill-exempt waste, but may be relevant and appropriate. The majority of the mine waste at Richardson, and most mining waste that is transported from other Park City mining areas is considered Bevill-exempt under federal exemptions. Therefore, the action specific ARAR's apply to any waste associated with the site that is not Bevill-exempt.

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of the remedy to maintain reliable protection of human health and the environment over time, once cleanup levels are met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Due to UPCM's prior voluntary efforts, each alternative provides some degree of long-term protection, though Alternatives 1 and 2 do not adequately address all risks posed by the Site. Alternatives 2 and 3 improve upon Alternative 1 through the use of physical improvements and institutional controls to reduce the risk of future releases from the Site, with Alternative 3 including provisions that address the risks posed by the diversion ditch and wetlands. However, both these alternatives require on-going institutional controls and monitoring to ensure their continued efficacy. Alternatives 4 and 5 largely eliminate this concern through treatment of all contaminated wastes and soils.

Reduction of Toxicity, Mobility, or Volume through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Only Alternatives 4 and 5 contain provisions for active treatment. Both alternatives would reduce, though not eliminate, the toxicity and mobility of the contaminants through stabilization treatment technologies in a similar fashion. The technologies considered are proven for mine wastes, but their effectiveness varies from site to site based upon the physical characteristics of the waste. However, neither alternative would reduce the volume of material required to be managed, which may actually increase slightly due to the addition of necessary reagents.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to the workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Each alternative can be implemented safely with proper engineering controls, though the degree of short-term risk varies considerably among the alternatives.

Alternatives 2 and 3 can be completed in a relatively short-time period of approximately two or three construction seasons. These alternatives involve only limited on-site earthmoving and any risks would be limited to workers and trespassers. These risks are easily controlled through institution of safe work practices and engineering controls.

Alternatives 4 and 5 would take substantially more time to complete - perhaps in excess of ten years. Both alternatives not only include more earthwork than Alternatives 2 and 3, but both also involve the operation of treatment systems and the use of slightly toxic reagents. These factors serve to increase the risk to workers. Alternative 4 also involves off-site transportation and disposal, which increases the risk to the community as waste is hauled via highway. Again, these risks could be managed, though not as easily, or likely as effectively, as those in Alternatives 2 and 3.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operations.

All of the alternatives involve technology that is relatively basic. Alternatives 2 and 3 involve only on-site earth moving, and all of the resources are available locally. Alternatives 4 and 5 are somewhat more difficult to implement due to the inclusion of treatment technologies. However, these technologies are well established, and all of the resources necessary for implementation are readily available.

Cost

The estimated present worth costs for the alternatives, not including Alternative 1, range from $2,295,398 for Alternative 2 to $343,234,058 for Alternative 5. Alternatives 4 and 5 both involve on-site treatment, are considerably more expensive than Alternatives 2 and 3, which do not involve treatment. Cost summaries are found in Tables 10-2.

State Acceptance

The UDEQ has expressed its support for Alternatives 3, 4, and 5. However, UDEQ also recognizes that Alternatives 4 and 5 are significantly more costly.

Community Acceptance

This criterion considers whether or not the local community agrees with EPA's analyses and preferred remedial alternative. Comments received on the Proposed Plan are important indicators of community acceptance. This is a balancing criterion.

During the Proposed Plan public comment period, one set of written comments was received that related to the transportation of waste from other areas within the Watershed to the Site. Specifically, the comments were directed to the chosen transportation route. Some comments on the preferred alternative were made by Utah Department of Fish and Wildlife and they are addressed in the Responsiveness Summary. All verbal questions raised at the public meeting were addressed at the meeting by EPA staff. A transcript of the meeting is available on the website and in the information repository.

10.2 SUMMARY AND RANKING TABLE

A comparison summary and the rankings are found in table 10-1 and 10-2.

SECTION 11

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address principal threats posed by a site wherever practical. A principal threat concept is applied to the characterization of "source material" at a Superfund site. A source material is material that includes or contains hazardous substances or pollutants, or contaminants that act as a reservoir for migration of contamination to ground water, surface water, or air, or acts as a source for direct exposure. EPA has defined principal threat wastes as those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur.

The waste at the Site is considered a high volume, low toxicity source material in that the risk levels at the Site under the current conditions are near or within the acceptable range. This is true for existing conditions, as well as for reasonably anticipated future recreational land uses. Similarly, past experience at similar mining-related sites has shown that low-toxicity mine wastes can be reliably contained. As such, though treatment was considered as an alternative, no materials at the Site were considered principle threat wastes.

SECTION 12

THE SELECTED REMEDY

12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

Several basic questions guide the development of the ROD and the ultimate selection of a remedy:

- What risks does the Site present?
- To what degree and how will those risks be mitigated?
- Which alternative best meets the nine remedy selection criteria set forth by the NCP?

EPA has considered these questions, as set forth in the previous sections of the ROD and in the supporting FFS, and has determined that Alternative 3, "Source Removal, Soil Cover and Wedge Buttress," is the selected remedy for the Site. Alternative 3 mitigates risks to a sufficient degree, meets all threshold standards and criteria, and has the best balance of tradeoffs with respect to balancing and modifying criteria. Alternatives 1 and 2 do not sufficiently mitigate risks and are not satisfactory candidates for a final remedy. Alternatives 4 and 5 sufficiently mitigate risks, meet all threshold standards and criteria, and offer increased protection of human health and the environment, but the costs of implementation are dramatically higher than Alternative 3. The greater costs are not justified by the relatively small improvements in overall protection of human health and the environment offered by Alternatives 4 and 5.

12.2 DETAILED DESCRIPTION OF THE SELECTED REMEDY

The selected remedy has several key components that are described in detail below:

Source Removal

Tailings and contaminated soils in Area B and in the wetland below the main embankment will be excavated and relocated to the low-lying area within the impoundment. The areas of concern will be over-excavated by 6 inches or to the depth required for removal of visible mine tailings and materials with lead concentrations greater than 310 ppm lead. Areas selected for excavation include: (1) contaminated materials in low-lying portions (subject to seasonal ponding or interaction with shallow ground water) of Area B, and (2) all of the sediments in the wetland below the impoundment. The wetland will not be excavated until upstream source areas along Silver Creek, specifically Empire Canyon, Silver Maple Claims, and the "flood plain" tailings just above the Site, are remediated. This is to ensure that clean areas are not re-contaminated, and is consistent with the overall cleanup plan for the Upper Silver Creek Watershed.

Soil Cover

A minimum 12 inch thick low permeability soil cover will be placed on all areas where tailings or contaminated materials are left in-place, including the impoundment. The cover will build upon

the existing soil cover and utilize similar materials. The cover would be placed in 6 inch lifts and compacted. Upon completion of the impermeable soil cover, 6 inches of topsoil cover will be added to provide for an 18 inch soil cover in total. The final surface would be graded to control surface storm water runoff and drainage and re-vegetated with a native seed mix to minimize erosion. Drainage swales and runoff channels may be installed where required to direct surface runoff toward the diversion ditch. Where applicable storm water runoff control structures will be constructed using erosion resistant materials such as geotextile fabric and rip-rap.

Wedge Buttress

A wedge buttress will be installed along the over-steepened portion of the embankment (for about 400 feet of the total embankment length of 800 feet). Fill will be placed along the toe of the embankment to a height of approximately 10 feet above the toe and extending horizontally out from the embankment face approximately 30 feet, or to other dimensions designed to provide an increase in stability of at least 50%. Prior to construction, the upper soil and existing vegetation and organic matter will be removed. Drain material and a filter blanket (if required) will be placed prior to the buttress fill. Seep water currently emanating from the embankment will be diverted to the South Diversion Ditch. The buttress fill material will be compacted to at least 95% of the maximum dry density as determined by ASTM D-698 at moisture content within two (2) percent of optimum. At the end of construction the buttress fill will be protected from erosion by re-vegetation.

Sediment Cover

Clean gravel (12 inches) will be placed over sediments in the south diversion ditch.

Institutional Controls

Two primary institutional controls (ICs) will be implemented to mitigate potential risks and ensure the long-term efficacy of the remedy:

1. Ground water use restrictions within the Site boundary. The goal is to preclude any use of shallow ground water, as well as eliminate any significant alteration of the existing hydrogeologic system, such as mixing of aquifers. This IC will be in the form of a deed restriction and will be the responsibility of the owner of the Site.

2. Land use restrictions within the Site boundary. The goal is to preclude non-recreational uses and to ensure the soil cover, or similar protections, are maintained. This IC will be in the form of an Environmental Covenant and will be the responsibility of the owner of the Site.

Placement of Additional Mine Waste at the Site

There are several reasons why the Richardson Flat Site is an appropriate location for the placement and consolidation of mine wastes from cleanups conducted at other locations in the Watershed. First, the nature of the mine wastes found throughout the watershed is similar.

Second, the volume of waste from other locations is extremely small relative to the volume of wastes already present in the impoundment. The impacts from such a small contribution would be negligible. Lastly, the RI has shown that the mine tailings at the Site are well contained and present no unacceptable risks to human health. The selected remedy will ensure conditions remain this way and that all other Site risks are addressed. These factors make the Site an acceptable long term repository, and, in conjunction with these factors anoff-site rule determination was made and agreed upon in date.

Monitoring

Water quality samples will be collected at the mouth of the diversion ditch quarterly for two years after construction completion to ensure discharges into Silver Creek meet applicable water quality standards.

12.3 SUMMARY OF THE ESTIMATED REMEDY COSTS

A summary of the selected remedy costs can be found in table 12-1. The present worth cost of this remedy is $3,675,868 and is presented in detail in table 12-2.

12.4 EXPECTED OUTCOMES OF THE SELECTED REMEDY

Land Use

The selected remedy allows for a variety of recreational uses. Such uses may include low-intensity uses, such as open space, or more high-intensity uses such as athletic fields. Any construction/development activities occurring on the soil cover must be designed to maintain at least 18 inches of clean soil (12 inches of low permeability soil plus 6 inches of topsoil) between the tailings and the surface and minimize infiltration through the use of low-permeability clay or other engineering controls. Future changes in land use may be contemplated but would require a reassessment of risk.

In the short-term, the selected remedy allows for placement of mine wastes from other cleanup locations in the Watershed at the Site. This will reduce the cost to implement other cleanups (by eliminating the need to haul wastes to a landfill) and aid in the overall cleanup of the Watershed. Only select locations in the impoundment (generally low spots that require fill) will be used for this purpose.

Ground Water and Surface Water Use

The selected remedy restricts ground water use only within the impoundment. This shallow ground water is very low in volume and of poor quality and will not be considered a potential drinking water source. Deeper ground water below and around the impoundment that may be considered a future drinking water source is not affected.

All surface water from the Site discharges to Silver Creek and is expected to be acceptable for all

designated uses of the creek. No drinking water uses are expected.

Final Cleanup Levels and Residual Risk

Several media are affected at the Site, but the nature of the Site and the remedy mean that most cleanup decisions were based upon physical characteristics of the Site rather than media-specific concentrations of COCs:

- In surface water, discharges from the south diversion ditch are expected to be consistently below the appropriate water quality standards for protection of aquatic wildlife. For zinc, the most critical metal, this value is dependent upon water hardness, but is generally between 0.1 and 0.8 ppm. Water discharging from the Site is expected to continue to be of better quality than Silver Creek, and will create a net improvement in water quality downstream. Surface water conditions in the wetland are contingent upon upstream remediation activities and are impossible to predict at this time. No human health risk is associated with surface water from the Site.
- In sediments, all contaminated sediments are expected to be addressed. All sediments in the diversion ditch will be covered with clean fill. All sediments in the wetland will be excavated and replaced with clean fill as necessary. Again, this is based upon the physical dimensions of these features, rather than on concentrations within the media. To ensure that all contaminated sediments are removed in the wetland, a remediation goal of 310 ppm lead was established. Soils will be over-excavated, and sampling will be conducted to ensure no sediments remain with concentrations of greater than 310 ppm lead. This is expected to bring all HI's for aquatic wildlife below one. It is impossible to predict eventual sediment concentrations as the system comes to equilibrium over time, but they are expected to be of equal quality or of improved quality than sediments in Silver Creek and protective of aquatic wildlife.
- In soils, all contamination (e.g. the entire impoundment and a few small areas outside of the impoundment) will be covered with at least eighteen inches of clean soil (12 inches of low permeability soil plus 6 inches of topsoil), so there should be no appreciable residual human health risk due to incidental exposure if the soil cover is maintained. As an additional measure, soils will be sampled and no soils with concentrations greater than 500 ppm lead will be left exposed. Such a level is far below any calculated remediation goals for recreational uses. Some risks will be associated with potential disturbance of buried tailings, but these are considered minimal and manageable with ICs.
- In ground water, only water within the impoundment is affected. This water is not expected to be used as a drinking water source, but IC's will prevent any exposure.

Socioeconomic impacts

- No significant socioeconomic impacts are expected.

SECTION 13

STATUTORY DETERMINATIONS

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions to the extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off site disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy ensures both short-term and long-term protection of human health and the environment in several ways:

Protection of Human Health

- The baseline human health risk assessment, as discussed in Section 7 of this ROD, shows that the Site, under current and reasonably anticipated future uses, presents no unacceptable risks to human health.
- Remedial actions will ensure that these conditions are not significantly altered in the future. The existing soil cover will be enhanced to ensure that the mine tailings do not migrate and that future exposure to mine tailings does not occur. The impoundment wall will be buttressed to ensure that no catastrophic failure occurs. Institutional controls will be established to ensure that only recreational uses are allowed, that ground water within the impoundment is not extracted, and that the soil cover remains intact.
- Implementation of the remedy is simple and straightforward, and engineering controls will be implemented to ensure that workers are protected.

Protection of the Environment

- The RI showed that surface water discharged from the Site currently meets the appropriate Utah Water Quality Standards for all metals. The Site is only a minor contributor to metal loading in Silver Creek. Remedial actions will ensure that metals discharged from the Site will be further reduced, helping to further enhance water quality in Silver Creek. Area B tailings, which apparently influence water quality in the diversion ditch, will be excavated and placed inside the impoundment. The impoundment will be graded to further reduce infiltration into tailings.
- The BERA, as discussed in Section 7 of this ROD, showed that contaminated sediments in the wetland and diversion ditch present unacceptable risks to aquatic receptors and wildlife. In the diversion ditch, the sediments will be covered with clean fill material, breaking the exposure pathway. In the wetland, which is a natural and critical habitat, the

contaminated sediments in the entire wetland will be removed and the wetland restored. These actions are expected to reduce risks to acceptable levels.

- Future land uses, all recreational in nature, are expected to largely preserve the habitat value the Site provides.
- Engineering controls will be established to ensure no cross-media contamination during implementation. Remedial actions will ensure no future migration of contamination, either within or between media. The existing Site conditions and enhanced soil cover will isolate and contain the tailings. The buttress on the impoundment will ensure no catastrophic failures and release occur. A well-ban will ensure no cross contamination of aquifers or discharge of contaminated water.

13.2 COMPLIANCE WITH APPLICABLE, RELEVANT AND APPROPRIATE REQUIREMENTS

The selected remedy is compliant with all ARARs associated with the Site. Site ARARs are summarized in Table 10-1. The Action Specific hazardous waste ARAR's are not applicable to Bevill-exempt waste. The majority of the mine waste at Richardson, and any mine waste that is transported from other Park City mining areas to the Site most likely is or will be Bevill-exempt. Therefore, the action specific hazardus waste ARAR's apply to any waste associated with the site that is not Bevill-exempt.

13.3 COST EFFECTIVENESS

The NCP mandates that the selected remedy be cost-effective. It does not mandate that the most cost-effective alternative be selected, only that the alternative that is selected meets a few basic criteria for cost-effectiveness. The nature of the Site (high volume of waste, low toxicity waste, limited number of suitable cleanup technologies) makes this determination somewhat simple. The five alternatives evaluated can be broken down into three basic categories:

- No Action (Alternative 1)
- Containment-Based (Alternatives 2 and 3)
- Treatment-Based (Alternatives 4 and 5)

Alternatives 1 and 2 did not meet minimum standards for protectiveness, and hence cannot be considered cost effective. Alternatives 4 and 5, while adding increased protectiveness and satisfying the statutory preference for treatment, increase the costs relative to Alternative 3 up to two orders of magnitude – hundreds of millions of dollars. The relatively small increase in protectiveness for such a large cost increase is not warranted. Alternative 3 is somewhat more expensive than Alternative 2, but addresses all Site risks. It is simple to implement and the basic technology is consistently used for tailings pile closures. The overall effectiveness of Alternative 3 is clearly proportional to its overall effectiveness. Tables 13-1, 13-2, 13-3 and 13-4 summarize the costs of each alternative besides alternative 1, the No Action Alternative.

13.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT FOR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE (MEP)

The selected remedy represents the best balance of trade-offs among the alternatives evaluated. Because the waste at the Site is comprised of naturally occurring inorganic minerals and metals, it is impossible to completely rid it of toxicity through treatment. It cannot be burned or significantly altered. Because of this, some degree of containment must be contemplated for the materials whether they are treated or not – either on-site or off-site containment. All of the alternatives, with the exception of the No Action alternative, include containment components, and are thus not fundamentally different in this regard. Alternatives 4 and 5, while they may be considered slightly more "permanent" than Alternative 3 because of the reduction in toxicity and use of a managed, off-site landfill, are far more costly to implement. Clearly, on-site containment is the most permanent solution that is practicable.

No resource recovery technologies are applicable for the Site. The tailings have already been processed for metal recovery during initial mining, and current economic conditions do not warrant further metal recovery at the very high cost such actions would require.

13.5 PREFERENCE FOR TREATMENT AS A PRINCIPLE ELEMENT

As stated in Section 11, there are no principle threat wastes present at the Site. The waste is high volume, low toxicity. As such, there is no waste that is particularly critical to treat. The waste can be treated, but the exceedingly high cost with relatively low reduction in toxicity is not warranted. Because of this, treatment is not a principle element of the selected remedy.

13.6 FIVE-YEAR REVIEW REQUIREMENTS

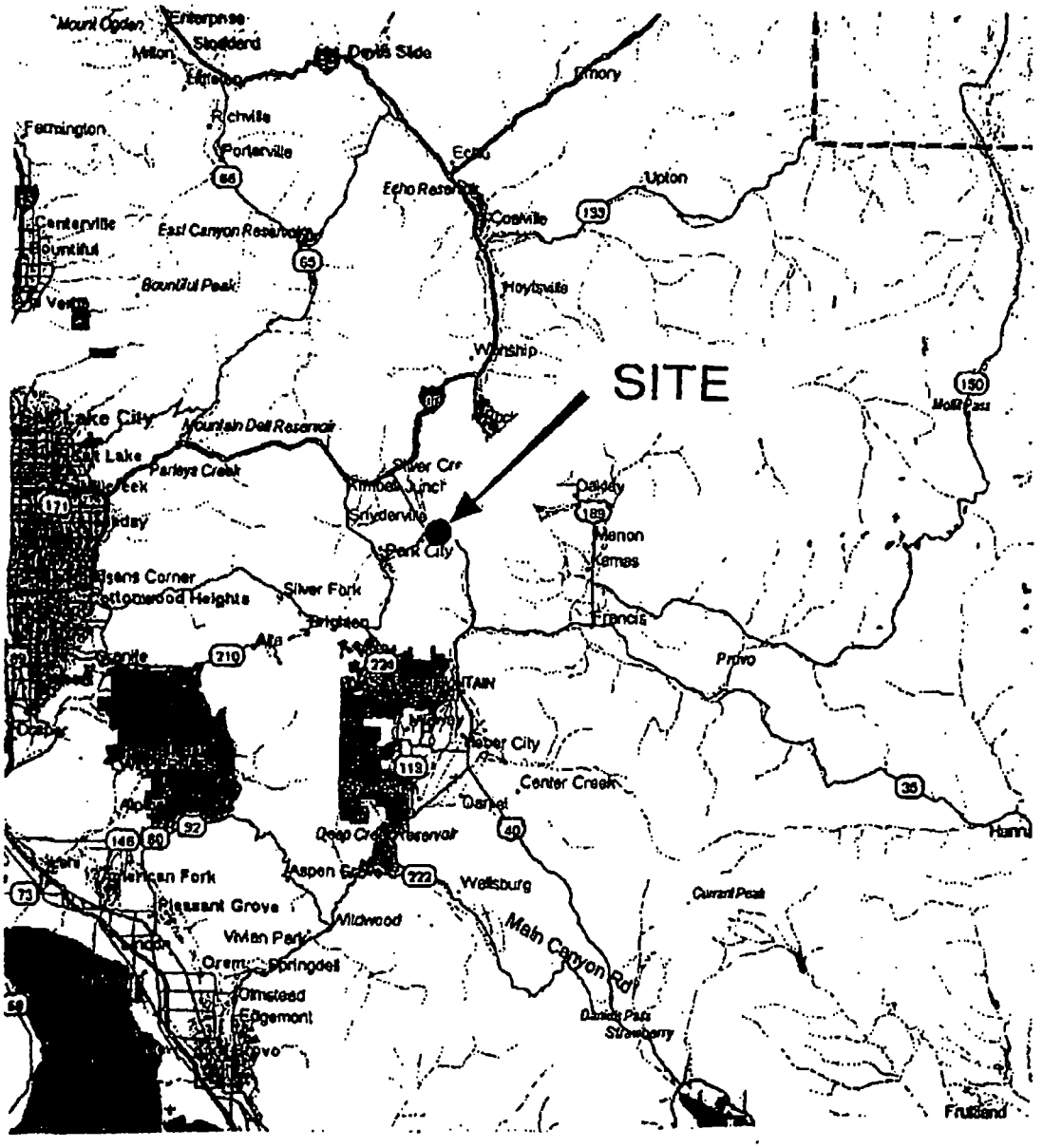
Because the selected remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure the remedy is, or will be, protective of human health and the environment. Such reviews will continue every five years indefinitely to ensure the remedy remains protective over time.

SECTION 14

DOCUMENTATION OF SIGNIFICANT CHANGES

The proposed plan was released for public comment in September of 2004. It identified as the preferred alternative the same alternative as the selected remedy identified in this ROD. This remedy includes removing small potions of tailings in Area B and disposing of them within the impoundment, installing a wedge buttress to support the main embankment, removal of sediments within the wetland area and finally capping the main impoundment. The preferred alternative did not change between the issuance of the proposed plan and the ROD.

APPENDIX A
FIGURES FOR THE RECORD OF DECISION



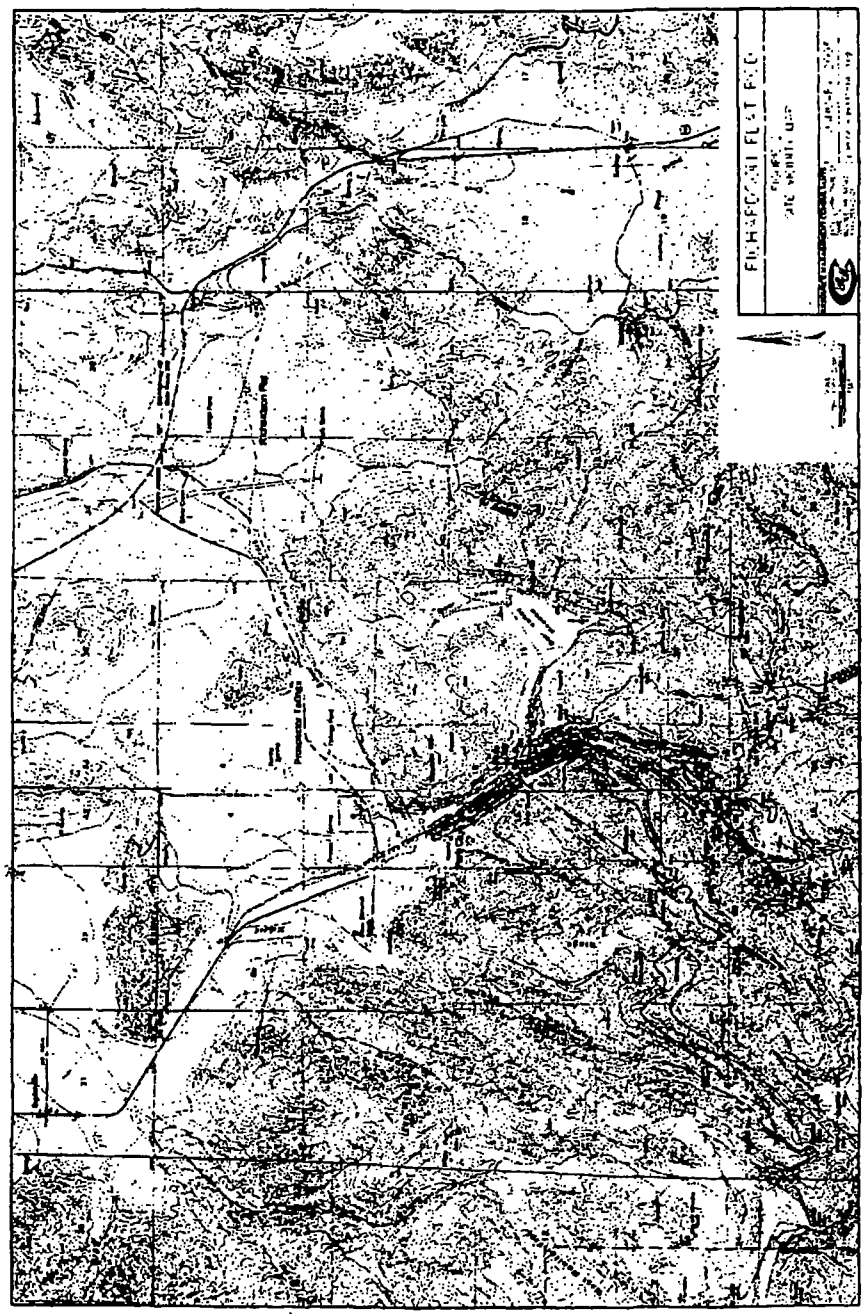
RICHARDSON FLAT RI

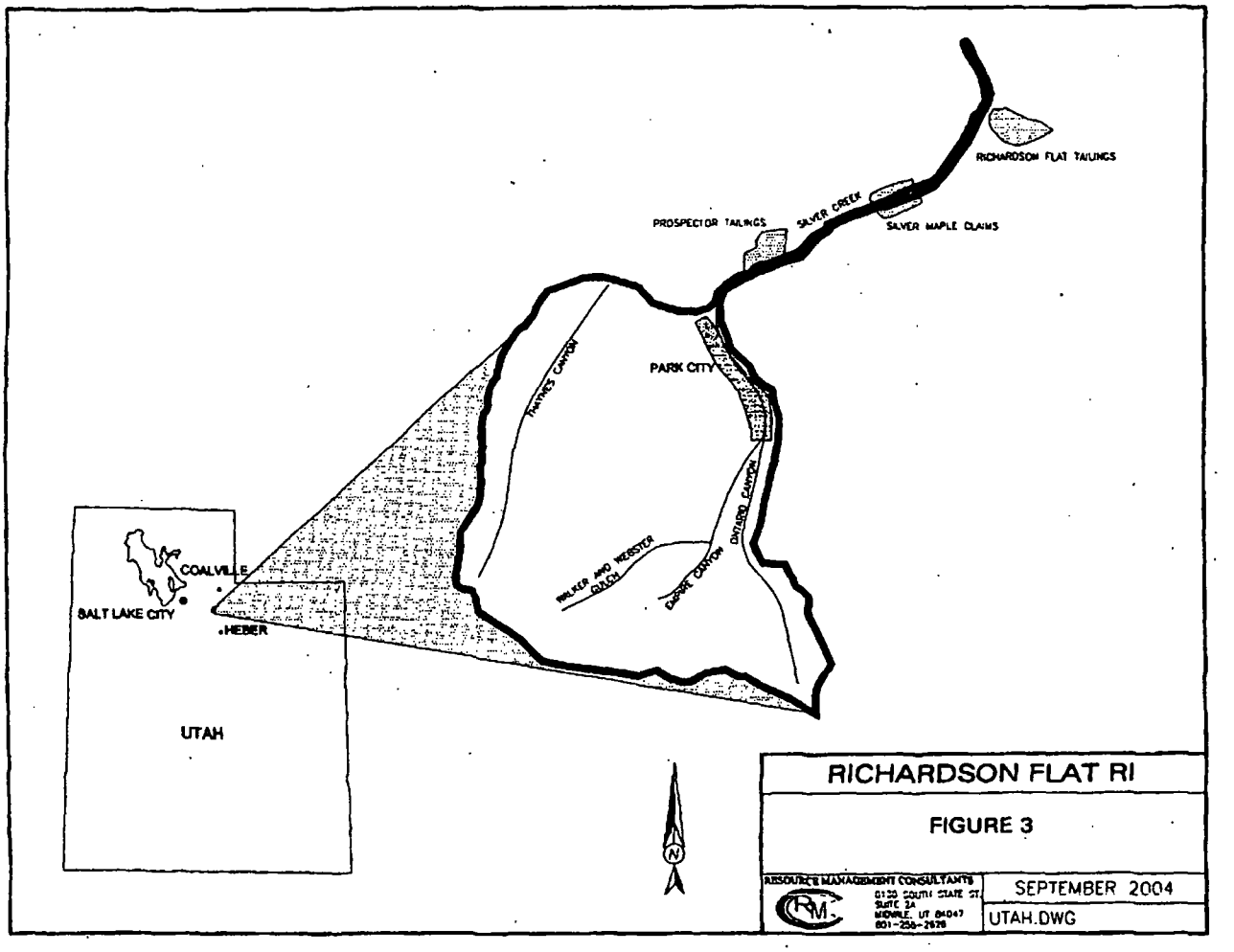
FIGURE 1
SITE LOCATION MAP

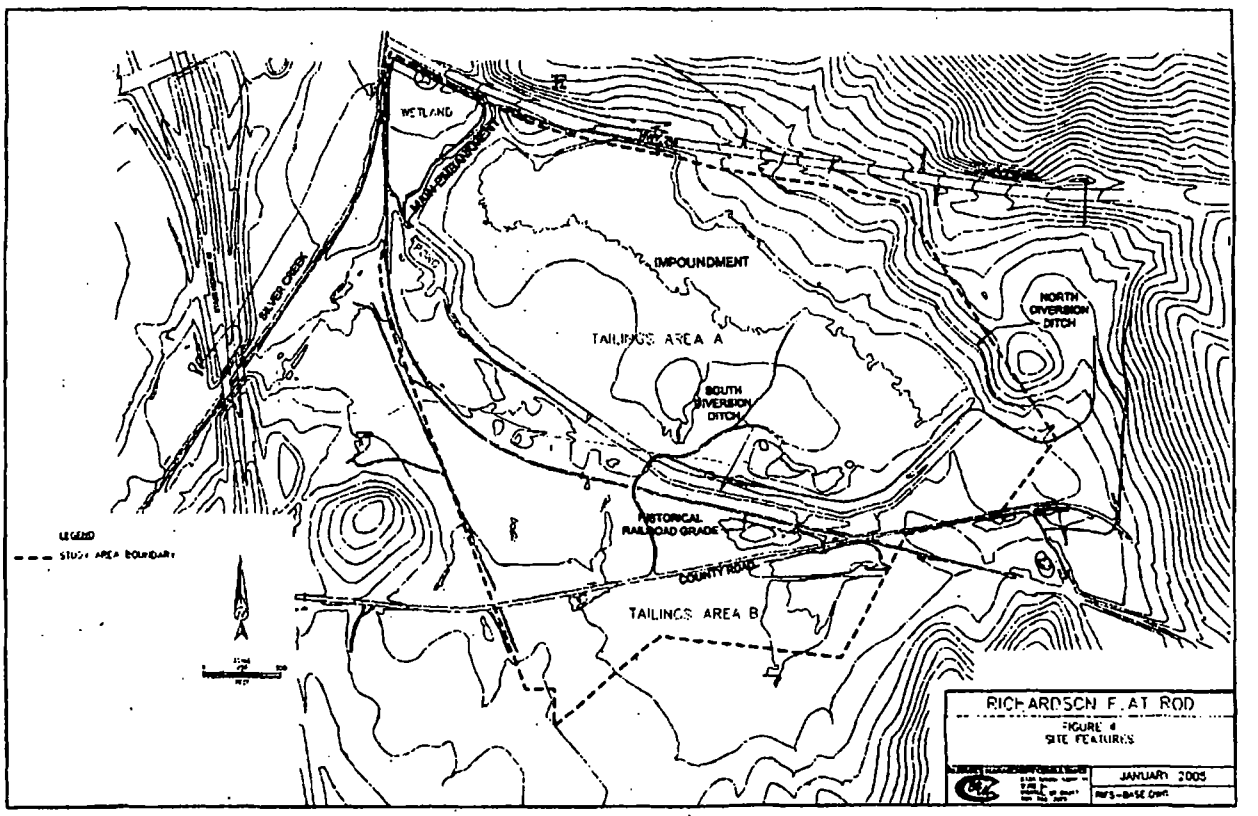
RESOURCE MANAGEMENT CONSULTANTS
8138 SOUTH STATE ST
SUITE 2A
MIDVALE, UT 84047
801-255-2826

SEPTEMBER 2004

ri-site-location-map-dwg




RICHARDSON FLAT TAILINGS
SILVER CREEK
SILVER MAPLE CLAIMS
PROSPECTOR TAILINGS
PARK CITY
TAILINGS CANYON
DAILARD CANYON
WALKER AND WEBSTER GULCH
DAGNIE CANYON
COALVILLE
SALT LAKE CITY
HEBER
UTAH
N
RICHARDSON FLAT RI
FIGURE 3
RESOURCE MANAGEMENT CONSULTANTS
6120 SOUTH STATE ST.
SUITE 2A
MIDVALE, UT 84047
801-256-2626
SEPTEMBER 2004
UTAH.DWG


WETLAND
IMPOUNDMENT
TAILINGS AREA A
NORTH DIVERSION DITCH
SOUTH DIVERSION DITCH
HISTORICAL RAILROAD GRADE
COUNTY ROAD
TAILINGS AREA B
LEGEND
STUDY AREA BOUNDARY
RICHARDSON FLAT ROD
FIGURE 4
SITE FEATURES
JANUARY 2005

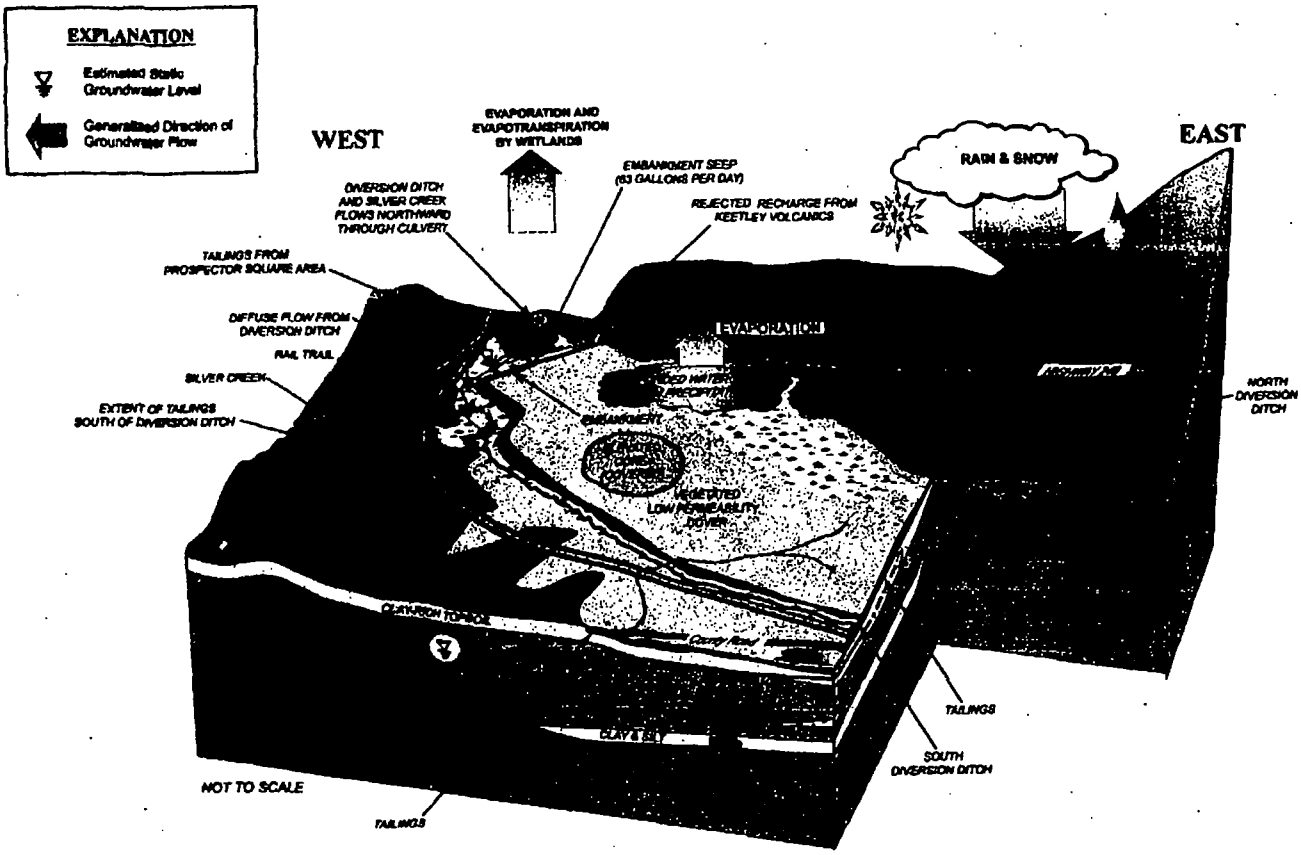


FIGURE 5

UNITED PARK CITY MINES COMPANY
CONCEPTUAL SITE MODEL
RICHARDSON FLAT

Figure 6: Conceptual Site Model for Recreational Exposure to COPCs

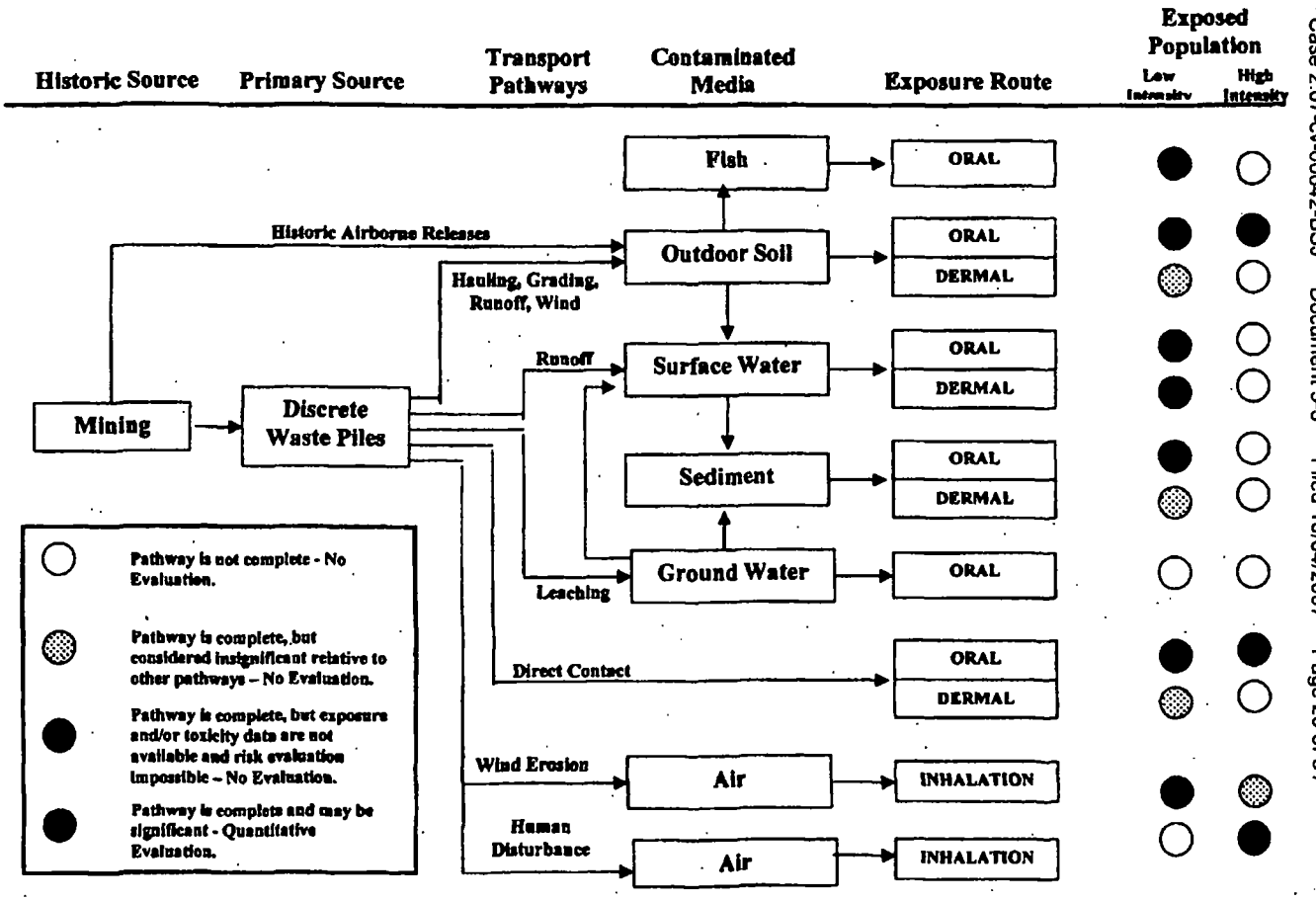
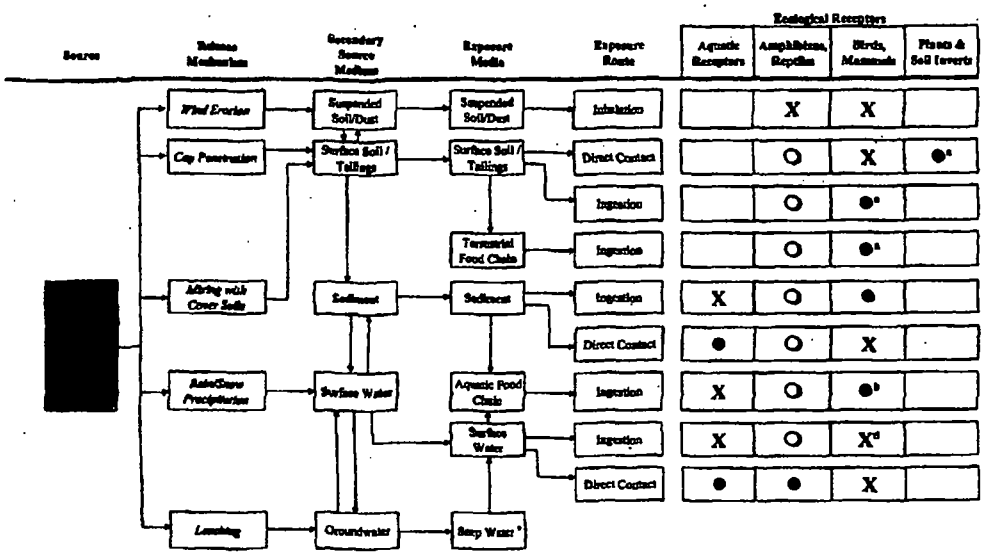


Figure 7
Richardson Flat Ecological Site Conceptual Model



LEGEND:

	Pathway not complete - no evaluation
X	Pathway complete, but considered insignificant relative to other pathways of concern
O	Pathway complete, but exposure/toxicity data are not available and quantitative risk characterization is not possible
●	Pathway complete and exposure/toxicity data are adequate for quantitative risk characterization

Footnotes:

a Terrestrial exposure for plants & soil invertebrates and wildlife will not be evaluated further in the Baseline ERA based on the expectation that additional remedial activities will address potential exposure pathways.

b Measured aquatic food item concentrations (fish, benthic invertebrates/snails, aquatic plants) are available.

c Water seeping from the toe of the main embankment may influence the wetlands area.
Measured surface water and sediment data from the wetlands area will be used to assess potential impacts from seep water in the wetlands.

d Risks to wildlife from ingestion of surface water are expected to be minor based on results provided in the SLERA.
However, because new surface water data are available, this pathway will be included in the quantitative risk characterization.

Fig 4-1 Ecos SCM.xls, 1/30/2004

APPENDIX B
TABLES FOR THE RECORD OF DECISION

Table 7-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Sediment: Ingestion	Arsenic	101	310	mg/kg	12/12	200	mg/kg	95% UCL
	Lead	1,880	6,520	mg/kg	12/12	3,500	mg/kg	AM

Key:

mg/kg: milligrams per kilogram
95% UCL: 95% Upper Confidence Limit of Arithmetic Mean
MAX: Maximum Concentration
AM: Arithmetic Mean

Table 7-2
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Time frame: Current
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Surface Water - Ingestion/ dermal exposure	Arsenic	0.025	0.75	mg/L	99/291	0.012	mg/L	95% UCL
	Lead	260	0.0015	mg/L	211/425	0.13	mg/L	AM

Key

mg/L: milligrams per liter
95% UCL: 95% Upper Confidence Limit
MAX: Maximum Concentration

Table 7-3
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Time frame: Current
Medium: Soil & Tailings
Exposure Medium: Soil & Tailings

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil& Tailings: Ingestion	Arsenic	2.5	2400	mg/kg	59/64	55	mg/kg	95% UCL
	Lead	14	5900	mg/kg	62/62	660	mg/kg	AM

Key

mg/kg: milligrams per kilogram
95% UCL: 95% Upper Confidence Limit
AM: Arithmetic Mean

Table 7-4
Cancer Toxicity Data Summary

Pathway: Ingestion

Chemical of Concern	Oral Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline Description	Source	Date
Arsenic	1.5	(mg/kg)/day	A	Region 3 RBC Table	8/28/2001
Lead	NA	NA	NA	NA	NA

KEY

EPA Group:
A- Human carcinogen
B1 -Probable human carcinogen - Indicates that limited human data are available
B2 -Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans
C -Possible human carcinogen
D -Not classifiable as a human carcinogen
E -Evidence of noncarcinogenicity

RBC- Risk Based Concentration
NA: Not Applicable

Table 7-5
Non-Cancer Toxicity Data Summary

Pathway: Ingestion

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Arsenic	Chronic	3.0E-04	mg/kg-day	—	skin	—	Region 3 RBC Table	8/28/01
Lead[a]	—	—	—	—	—	—	—	—

Key

(1) The dermal RfD was assumed to equal the oral RfD. No adjustment factor was applied

(2) Toxicity values were pulled from the EPA Region 3 RBC Table

a There are no established criteria for lead; evaluation is made using blood lead levels

Table 7-6
Risk Characterization Summary – Carcinogens

Scenario Timeframe: Future
Receptor Population: Low Intensity Recreational User
Receptor Age: Child-Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/Tailings	Soil/Tailings	Ingestion	Arsenic	2E-05	---	NE	2E-05
	Dust	Inhalation	Arsenic	---	3.5E-10	NE	3.5E-10
						Soil risk total=	2E-05
Sediment	Sediment	Ingestion	Arsenic	3E-06	---	NE	3E-06
						Sediment Risk Total=	3E-06
Surface Water	Surface Water	Ingestion	Arsenic	1.8E-07	NA	---	2.0E-07
		Surface Water Direct Contact	Arsenic	---	NA	3E-08	3.0E-08
						Surface Water Risk Total	4E-07
						Total Risk =	2E-05

Key
NA: Route of exposure is not applicable to this medium.
NE: Not evaluated

Table 7-7
Risk Characterization Summary – Carcinogens

Scenario Timeframe: Future
Receptor Population: High Intensity Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/Tailings	Soil/Tailings	Soil On-site-Direct Contact	Arsenic	1.1E-05	--	NE	1.1E-05
	Dust	Soil on-site inhalation of soil as dust	Arsenic	--	6.1E-07	NE	6.1E-07
						Total Risk =	1.1E-05

Key
NE: Not Evaluated

Table 7-8
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Low Intensity Recreational User
Receptor Age: Child-Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/ Tailings	Soil/ tailings	Ingestion	Arsenic	Liver	8.0E-02	N/A	—	8.0E-02
	Dust	Inhalation	Arsenic	Liver	—	1.0E-07	—	1.0E-07
							Soil/tailings Hazard Index Total =	**8.0E-02**
Sediment	Sediment	Ingestion	Arsenic	Liver	—	—	—	1.0E-02
							Sediment Hazard Index Total	**1.0E-02**
Surface Water	Surface Water	Ingestion	Arsenic	Liver	9.0E-04	N/A	—	9.0E-04
		Dermal contact	Arsenic	Liver	—	N/A	2.0E-04	2.0E-04
							Surface Water Hazard Index Total =	**1.1E-03**
							Total Risk=	**9.0E-02**

Key

— : Toxicity criteria are not available to quantitatively address this route of exposure.
N/A: Route of exposure is not applicable to this medium.

Table 7-9
Risk Characterization Summary –Non-carcinogens

Scenario Timeframe: Future
Receptor Population: High Intensity Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/Tailings	Soil/Tailings	Ingestion	Arsenic	6.0E-02	--	NE	6.0E-02
	Dust	Inhalation	Arsenic	--	3.0E-04	NE	3.0E-04
						Total Risk =	6.0E-02

Key
N/A: Route of exposure is not applicable to this medium.

Table 7-10
Occurrence, Distribution, and Selection of Chemicals of Concern (COC)

Exposure Medium: Surface Water, Dissolved (Aquatic Receptors)

Chemical of Potential Concern	Min Conc.[1] (ug/L)	Max Conc.[1] (ug/L)	Mean Conc. (ug/L)	95 % UCL of the Mean[2] (ug/L)	Bkg Conc. (ug/L)	Screening Toxicity Value (ug/L)	Screening Toxicity Value Source[3]	HQ Value[4]	COC Flag (Y/N)
Cadmium	1.0	46.3	4.3	5.2	N/A	0.22[5]	NAWQC Chronic	210	Y
Zinc	10	83,000	1,143	1,749	N/A	103[5]	NAWQC Chronic	806	Y

Key
Conc. = Concentration
N/A = Not Applicable

Notes
[1] Minimum/ maximum detected concentration above the sample quantitation limit (SQL).
[2] The 95% Upper Confidence Limit (UCL) represents the RME concentration.
[3] NAWQC Chronic = USEPA National Ambient Water Quality Criteria for chronic exposures.
[4] Hazard Quotient (HQ) is defined as Maximum Concentration/ Screening Toxicity Value.
[5] Chronic NAWQC value is hardness-dependent; calculated based on the lowest measured hardness in site surface water samples (85 mg/L).

Table 7-11
Occurrence, Distribution, and Selection of Chemicals of Concern (COC)

Exposure Medium: Bulk Sediment (Benthic Invertebrates)

Chemical of Potential Concern	Min Conc.[1] (mg/kg)	Max Conc.[1] (mg/kg)	Mean Conc. (mg/kg)	95 % UCL of the Mean (mg/kg)	Bkg Conc. (mg/kg)	Screening Toxicity Value (mg/kg)	Screening Toxicity Value Source[3]	HQ Value[4]	COC Flag (Y/N)
Cadmium	0.78	179	47.2	96.7	N/A	0.99	TEC	181	Y
Copper	20	2,559	440	681	N/A	32	TEC	80	Y
Mercury	0.05	6.2	1.5	2.9	N/A	0.18	TEC	34	Y
Nickel	9.0	97	25	29	N/A	23	TEC	4.2	N
Zinc	118	44,560	9,538	19,302	N/A	121	TEC	368	Y

Key
Conc. = Concentration
N/A = Not Applicable

Notes
[1] Minimum/ maximum detected concentration above the sample quantitation limit (SQL).
[2] The 95% Upper Confidence Limit (UCL) represents the RME concentration.
[3] TEC = Consensus-based Threshold Effect Concentration (MacDonald et al., 2000)
[4] Hazard Quotient (HQ) is defined as Maximum Concentration/ Screening Toxicity Value.

Table 7-12
Occurrence, Distribution, and Selection of Chemicals of Concern (COC)

Exposure Medium: Sediment Porewater, Dissolved (Benthic organisms)

Chemical of Potential Concern	Min Conc.[1] (ug/L)	Max Conc.[1] (ug/L)	Mean Conc. (ug/L)	95 % UCL of the Mean[2] (ug/L)	Bkg Conc. (ug/L)	Screening Toxicity Value (ug/L)	Screening Toxicity Value Source[3]	HQ Value[4]	COC Flag (Y/N)
Arsenic	11	720	254	720[5]	N/A	150	NAWQC Chronic	4.8	Y
Zinc	230	2,700	1,310	2,700[5]	N/A	342	NAWQC Chronic	7.9	Y

Key
Conc. = Concentration
N/A = Not Applicable

Notes
[1] Minimum/ maximum detected concentration above the sample quantitation limit (SQL).
[2] The 95% Upper Confidence Limit (UCL) represents the RME concentration.
[3] NAWQC Chronic = USEPA National Ambient Water Quality Criteria for chronic exposures.
[4] Hazard Quotient (HQ) is defined as Maximum Concentration/ Screening Toxicity Value.
[5] 95UCL on the mean is greater than the maximum, maximum value is shown.
[6] Chronic NAWQC value is hardness-dependent; calculated based on the lowest measured hardness in site sediment porewater samples (351 mg/L).

Table 7-13
Occurrence, Distribution, and Selection of Chemicals of Concern (COC)

Exposure Medium: Sediment (Waterfowl)

Chemical of Potential Concern	Min Conc.[1] (ppm)	Max Conc.[1] (ppm)	Mean Conc. (ppm)	95 % UCL of the Mean [2] (ppm)	Bkg Conc. (ppm)	Screening Toxicity Value (mg/kg/d)	Screening Toxicity Value Source [3]	HQ Value [4]	COC Flag (Y/N)
Lead	641	42,990	6,407	9,641	N/A	1.63	EcoSSL Avian TRV	93 [5]	Y

Key
Conc. = Concentration
N/A = Not Applicable

Notes
[1] Minimum/ maximum detected concentration above the sample quantitation limit (SQL).
[2] The 95% Upper Confidence Limit (UCL) represents the RME concentration.
[3] Selected Ecological Soil Screening Level (EcoSSL) Toxicity Reference Value (TRV) for birds.
[4] Hazard Quotient (HQ) is defined as Maximum Concentration/ Screening Toxicity Value.
[5] Ingested Dose from sediment (mg/kg/d) calculated from maximum sediment concentration using exposure factors for the mallard duck.

Table 7-14
Occurrence, Distribution, and Selection of Chemicals of Concern (COC)

Exposure Medium: Soil/Tailings (Plants, Soil Invertebrates)

Chemical of Potential Concern	Min Conc.[1] (ppm)	Max Conc.[1] (ppm)	Mean Conc. (ppm)	95 % UCL of the Mean [2] (ppm)	Mean Bkg Conc. (ppm)	Screening Toxicity Value (ppm)	Screening Toxicity Value Source [3]	HQ Value [4]	COC Flag (Y/N)
Aluminum	813	32,700	10,662	18,066	N/A	50	Plant SSL	654	Y
Lead	13	31,600	1,666	3,206	42	50	Plant SSL	632	Y
Mercury	0.11	85	5	7.3	0.08	0.1	Invert. SSL	850	Y
Zinc	47	33,800	4,085	15,255	104	50	Plant SSL	676	Y

Key
Conc. = Concentration
N/A = Not Applicable

Notes
[1] Minimum/ maximum detected concentration above the sample quantitation limit (SQL).
[2] The 95% Upper Confidence Limit (UCL) represents the RME concentration.
[3] Soil Screening Level (SSL), lowest of plant SSL or soil invertebrate SSL.
[4] Hazard Quotient (HQ) is defined as Maximum Concentration/ Screening Toxicity Value.

Table 7-15
Ecological Exposure Pathways of Concern

Exposure Medium	Sensitive Environment Flag (Y or N)	Receptor	Endangered/ Threatened Species Flag (Y or N)	Exposure Routes	Assessment Endpoints	Measurement Endpoints
Sediment/Sediment porewater	N	Benthic organisms	N	Ingestion and direct contact with chemicals in sediment	Protection of aquatic invertebrates and fish from adverse effects related to exposure to chemicals in surface water and sediment	· Comparison of sampling location-specific chemical concentrations in sediment to benthic macroinvertebrate toxicity benchmarks. · Comparison of sampling location-specific chemical concentrations in sediment porewater to benthic macroinvertebrate toxicity benchmarks. · Evaluate the toxicity of site sediment to *Hyalella azteca* (growth and survival) through laboratory testing.
Surface Water	N	Fish	N	Ingestion and direct contact with chemicals in surface water		· Comparison of sampling location specific chemical concentrations in surface water to National Ambient Water Quality Criteria.
Soil/Tailings	N	soil invertebrates	N	Ingestion and direct contact with chemicals in wetland soils	Survival of terrestrial invertebrate community	· Comparison of sampling location specific chemical concentrations in soil to terrestrial toxicity benchmarks
		Terrestrial plants	N	Uptake of chemicals via root systems	Maintenance/enhancement of native site vegetation	
Dietary Intake	N	Wildlife (birds and mammals)	N	Ingestion of food chain items	Protection of wildlife from adverse effects to growth, reproduction, or survival related to exposure to chemicals in surface water, sediment, and aquatic food items.	· Comparison of reach-specific chemical doses estimated from exposure point concentrations (EPCs) in surface water, sediment, and aquatic food items to toxicity reference values (TRVs) for wildlife.

Table 7-16
Summary of Uncertainties

Assessment Component	Description	Likely Direction of Error	Likely Magnitude of Error
Nature and Extent of Contamination	Samples collected may not be fully representative of variability in space or time, especially if the number of samples is small.	Unknown	Probably small
	Analytical results may be imprecise.	Unknown	Probably small
Exposure Assessment	Some exposure pathways were not evaluated.	Underestimate of risk	Probably small
	Some chemicals were not evaluated because chemical was never detected, but detection limit was too high to detect the chemical if it were present at a level of concern.	Underestimate of risk	Usually small
	Exposure parameters for wildlife receptors are based on studies at other sites.	Unknown	Probably small
	Exposure point concentrations for wildlife receptors are based on a conservative estimate of the mean concentration in the exposure area.	Overestimate of risks	Possibly significant
	Absorption from site media is assumed to be the same as in laboratory studies.	Overestimate of risks	Possibly significant
Toxicity Assessment	Many chemicals lack reliable toxicity benchmarks for some receptors for some media; these chemicals are not evaluated.	Underestimation of risk	Probably small in most cases
	Available toxicity benchmarks are often based on limited data, and values must be extrapolated across species.	Unknown	Unknown, could be significant
	Wildlife receptors selected as representative species may not capture the full range of sensitivities in site receptors.	Unknown	Probably small
	Aquatic toxicity benchmarks are based on a wide range of species, some of which do not occur at this site.	Likely to overestimate risk	Probably small
Risk Characterization	Interactions between chemicals are difficult to account for; effects of one chemical may increase, decrease, or have no effect on other chemicals.	Unknown	Unknown, but probably small
	Estimation of population-level effects from HQ calculations is difficult and subject to professional judgement.	Unknown	Unknown, probably small in most cases

Table 10-1
Summary and Comparative Analysis of Final Alternatives

Criteria	Alternative 1 No Action	Alternative 2 Soil Cover/Institutional Controls and Wedge Buttress	Alternative 3 Soil Cover/Source Removal and Wedge Buttress	Alternative 4 Excavation, Treatment and Offsite Disposal	Alternative 5 Excavation, Treatment and Onsite Disposal
OVERALL PROTECTIVENESS					
Human Health- Direct contact and inhalation.	Based on results of [illegible] human health exposures at the Site are within acceptable limits.	The cover reduces direct contact, inhalation and ingestion of contaminated soil and meets human health requirements.	The cover reduces direct contact, inhalation and ingestion of contaminated soil and meets human health requirements. Potential for contact reduced by a reduction in extent of tailings. Some protection to [illegible] environment by partial source removal.	Removal, treatment and offsite disposal of contaminated material reduces and eliminates the risk of direct contact, inhalation and ingestion of contaminated soil and meets human health requirements.	Removal, treatment and onsite disposal of contaminated material reduces and potentially eliminates the risk of direct contact, inhalation and ingestion of contaminated soil and meets human health requirements.
Environmental Protection	Site exposures remain. There is likely to be some dissolution over time in water.	The soil cover reduces some ecological risk and will help to reduce surface water infiltration into the contaminated material and hence will improve groundwater quality. The source material stays in place.	The soil cover reduces some ecological risk and will help to reduce surface water infiltration into the contaminated material. Most material will be located in the geometrically confined impoundment. Removal of groundwater and surfacewater contamination source areas will improve water quality.	Site contamination is removed and the environmental quality of Site is improved.	Site contamination is treated and the environmental quality of Site is improved.
COMPLIANCE WITH ARARS					
Chemical-specific ARAR	Not satisfied	Environmental protection is met, however all contamination remains onsite.	Air quality protection is met, however all contamination remains onsite but is located in a controlled location in a closed impoundment. Surface water and groundwater quality is improved.	Air quality protection is met and all contamination is removed from the Site. Surface water and groundwater standards are met.	Air quality protection is met and contamination is treated onsite. Surface water and groundwater standards are met.
Location-specific ARAR	Not satisfied	Location-specific ARARs are met	Location-specific ARARs are met	Location-specific ARARs are met	Location-specific ARARs are met
Action-specific ARAR	Not applicable	Federal and State regulations will be met during remedial activities	Federal and State regulations will be met during remedial activities	Federal and State regulations will be met during remedial activities	Federal and State regulations will be met during remedial activities
Other advantageous	Would allow contact, however human health risks are within acceptable limits.	protects against inhalation/direct contact.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
LONG-TERM EFFECTIVENESS AND PERMANENCE					
Magnitude of residual risk	Source not removed. Existing risk will remain.	Source not removed. Existing risk will be reduced by the soil cover.	Source is partially removed. Existing risk will remain but will be reduced as most materials will be placed in controlled location in a confined impoundment and covered. Surface water and groundwater quality is improved.	Contaminated materials are removed from the Site. No residual risk.	Contaminated materials are treated and left onsite. Magnitude of residual risk is significantly reduced. No residual risk
Adequacy and reliability of controls	No controls over remaining contamination. No reliability.	Soil cover integrity will be maintained by institutional controls and monitoring. Reliability will be maintained through cover design and enforcement of institutional controls.	Soil cover integrity will be maintained by institutional controls and monitoring. Reliability will be maintained through design and enforcement of institutional controls as well as placement of tailings in geometrically confined impoundment.	None required, contaminated material will be removed from Site.	Site and treated materials will be monitored to insure that Site is not affecting human health and the environment.
REDUCTION OF TOXICITY, MOBILITY OR VOLUME					
Treatment process used	None used	None used	None used	Solidification/fixation	Solidification/fixation
Amount destroyed or treated	None	None	None	[illegible] cubic yards	[illegible] cubic yards
Reduction of toxicity, mobility or volume treatment	None	Mobility is reduced by soil cover.	Mobility is reduced by moving some contaminated materials into the geometrically confined impoundment with a soil cover. Remaining materials will be covered.	Mobility is reduced by treatment and disposal in a regulated facility. Increase in volume with a decrease in toxicity.	Mobility is reduced by treatment. Increase in volume with a decrease in toxicity.
Statutory preference for treatment	Does not satisfy	Does not satisfy	Does not satisfy	Satisfied	Satisfied
SHORT TERM EFFECTIVENESS					
Community protection	Risk not increased by remedy implementation.	Risk not increased by remedy implementation	Risk not increased if action specific ARARs are met during remediation.	Risk not increased if action specific ARARs are met during remediation. Transportation may increase community risks due to increase in truck traffic.	Risk not increased if action specific ARARs are met during remediation.
Worker protection	No risk to workers	Risk is minimal since contaminated material is not being handled.	Workers will be handling contaminated material during onsite transport, contact with contaminated fugitive dust is possible during excavation and disposal.	Workers will be handling contaminated material during onsite transport and treatment, contact with contaminated fugitive dust is possible during excavation and disposal.	Workers will be handling contaminated material during onsite transport and treatment, contact with contaminated fugitive dust is possible during excavation and disposal.
Environmental impacts	Continued impact from existing conditions	Dust generated during remedial activities.	Dust generated during remedial activities.	Dust generated during remedial activities. Potential effects from ditch excavation.	Dust generated during remedial activities. Potential effects from ditch excavation.
Time until action is complete	N/A	One to two construction seasons.	One to two construction seasons.	One to two construction seasons.	One to two construction seasons.
IMPLEMENTABILITY					
Ability to construct and operate	No construction or operation required.	Standard excavation and transportation technologies are easily implemented. Standard institutional controls easily implemented. Cover soil is stockpiled onsite and available locally.	Standard excavation and transportation technologies are easily implemented. Remedial contractors are locally available. Cover soil is stockpiled onsite and available locally.	Standard excavation and transportation technologies are easily implemented. Remedial contractors are locally available. Cover soil is stockpiled onsite and available locally. Bench-scale testing will need be conducted. Treatment contractors and disposal facilities are available.	Standard excavation and transportation technologies are easily implemented. Remedial contractors are locally available. Cover soil is stockpiled onsite and available locally. Bench-scale testing will need be conducted. Treatment contractors and disposal facilities are available.
Ease of additional remediation, if needed	Easy, as no remediation has been done in this alternative	Would impact original remedy.	Would impact original remedy.	Would impact original remedy.	Would impact original remedy.
Ability to monitor effectiveness	No monitoring required.	Periodic monitoring required.	Periodic monitoring required.	Periodic monitoring required until verification that site is not affecting human or environmental health.	Periodic monitoring required until verification that site is not affecting human or environmental health.
Ability to obtain approval from other agencies	Very difficult to obtain "no action" from agencies.	Difficult to obtain approval since ground water source contamination is left in place. High level of coordination with state and federal agencies will be required for long-term monitoring and compliance.	Less difficult than Alternative 2 since ground water source contamination is removed. Moderate level of coordination with state and federal agencies will be required for long-term monitoring and compliance.	Less difficult than Alternatives 2 and 3 since contamination is removed. Moderate level of coordination with state and federal agencies will be required for short-term monitoring and compliance. Agency coordination will be required for disposal	More difficult than Alternatives 3 and 4 since contamination remains onsite. Moderate level of coordination with state and federal agencies will be required for short-term monitoring and compliance. Agency coordination will be required for disposal and site closure.
Availability of services and capacities	No services or capacities required.	No disposal required. All services available.	No disposal required. All services available.	Disposal types and capacities need to be determined, but should be available. Large scale transportation logistics will be required.	Final volumes need to be determined, but buildup of impoundment height should provide sufficient storage capacity.
Availability of technology	None required	Required technology available.	Required technology available.	Specialized treatment technology is required but available.	Specialized treatment technology is required but available.
COST					
Direct Capital Cost	$0	[illegible]	[illegible]	[illegible]	[illegible]
Indirect Costs Including O&M	$0	[illegible]	[illegible]	[illegible]	[illegible]
Total Cost	$0	[illegible]	[illegible]	[illegible]	[illegible]

Notes
[illegible]
ARAR - Applicable or Relevant and Appropriate Requirements
O&M - Operations, maintenance and monitoring

Table 10-2

Ranking of Final Alternatives

Criteria	Ranking Weight (1)	Alternative 1 No Action		Alternative 2 Soil Cover Institutional Controls		Alternative 3 Source Removal, Soil Cover and Wedge Buttress		Alternative 4 Excavation, Treatment and Offsite Disposal		Alternative 5 Excavation, Treatment and Onsite Disposal	
		Rank (2)	Weight Factored Rank (3)	Rank (2)	Weight Factored Rank (3)	Rank (2)	Weight Factored Rank (3)	Rank (2)	Weight Factored Rank (3)	Rank (2)	Weight Factored Rank (3)
OVERALL PROTECTIVENESS											
Human Health	10	1	10	4	40	4	40	5	50	5	50
Environmental protection	10	1	10	2	20	4	40	5	50	5	50
COMPLIANCE WITH ARARS											
Chemical-specific ARAR	8	1	8	2	16	3	24	5	40	5	40
Location-specific ARAR	5	1	5	2	10	4	20	5	25	4	20
Action-specific ARAR	5	1	5	3	15	4	20	5	25	4	20
Other criteria/guidance	5	1	5	2	10	2	10	5	25	4	20
LONG-TERM EFFECTIVENESS AND PERMANENCE											
Magnitude of residual risk	9	1	9	3	27	4	36	5	45	5	45
Adequacy and reliability of controls	8	1	8	3	24	4	32	5	40	5	40
REDUCTION OF TOXICITY, MOBILITY OR VOLUME											
Treatment process used	5	1	5	1	5	1	5	5	25	5	25
Amount destroyed or treated	5	1	5	1	5	1	5	4	20	4	20
Reduction of toxicity, mobility or volume treatment	7	1	7	2	14	3	21	5	35	4	28
Statutory preference for treatment	10	1	10	1	10	1	10	5	50	5	50
SHORT TERM EFFECTIVENESS											
Community protection	5	1	5	4	20	4	20	1	5	2	10
Worker protection	4	1	4	4	16	4	16	1	4	2	8
Environmental impacts	5	1	5	2	10	4	20	1	5	2	10
Time until action is complete	3	1	2	4	8	3	6	1	2	2	4
IMPLEMENTABILITY											
Ability to construct and operate	9	5	45	4	36	4	36	1	9	2	18
Ease of additional remediation, if needed	5	4	20	3	15	4	20	5	25	1	5
Ability to monitor effectiveness	6	5	30	3	18	5	30	5	30	4	24
Ability to obtain approval from other agencies	5	1	5	2	10	4	20	5	25	4	20
Availability of services and capacities	3	4	12	3	9	4	12	5	15	2	6
Availability of equipment, specialists and materials	3	4	12	5	15	4	12	5	15	2	6
Availability of technology	3	4	12	5	15	4	12	5	15	2	6
RANKING TOTALS		43	239	63	368	79	467	94	580	80	525
COST											
Present worth cost		$0.00		$2,295,397.99		$4,362,729.43		$343,234,057.83		$144,708,705.72	

(1) - Each criteria has been ranked on an overall project importance weight of 1-10 with 1 signifying the least importance and 10 signifying the greatest importance.

(2) - The compliance of each criteria has been ranked on an alternative by alternative basis on a scale of 1-5 with 1 signifying the least compliance and 5 signifying the greatest compliance.

(3) - Ranking weight multiplied by the compliance rank for each alternative.

Table 10-3
Chemical Specific ARARs

Requirement	Citation	Description	Determination	Comment
Definitions and General Requirements of Utah Water Quality Act	UAC R317-1	Provides definitions and general requirements for waste discharges to waters of the State of Utah	Applicable	Substantive standards are applicable to point source discharges of contaminants into Silver Creek (if any), but permitting requirements would be preempted by operation of 42 USC 9621(e)(1).
Utah Surface Water Quality Standards	UAC R317-2-6 UAC R317-2-13 UAC R317-2-14	Establishes use designations for Silver Creek (as tributary to the Weber River): Class 1C - Protected for domestic purposes with prior treatment processes as required by Utah Div. of Drinking Water. Class 2B - Protected for secondary contact recreation such as boating, wading. Class 3A - Protected for cold water species of game fish and aquatic life. Class 4 - Protected for agricultural uses and stock watering	Applicable	Substantive standards are applicable to point source discharges of contaminants into Silver Creek (if any), but permitting requirements would be preempted by operation of 42 USC 9621(e)(1).
Groundwater Quality	UAC R317-6	Establishes state groundwater quality standards	Applicable	Substantive standards are applicable to discharges of contaminants to ground water discharges (if any), but permitting requirements would be preempted by 42 USC 9621(e)(1).
Solid and Hazardous Waste	UAC R315-2-4(b)(7)	Criteria for the Identification and Listing of Hazardous Waste	Applicable	Mine tailings are not a solid waste and a hazardous waste if they do not cause a public health hazard or are otherwise determined to be a hazardous waste.
Solid and Hazardous Waste	UAC R311-211-3	Corrective Action Cleanup Standards Policy -UST and CERCLA sites	Applicable	RPM will establish appropriate cleanup standards based on the factors set forth in R311-211-3.
Utah Storm Water Rules	UAC R317-8-3.9	Establishes state storm water requirements	Applicable	Requires implementation of best management practices to address storm water management at the Site.

Table 10-3 (continued)
Location Specific ARARs

Requirement	Citation	Description	Determination	Comment
Protection of Wetlands	33 USC § 1344	Prohibits discharge of dredged or fill materials into waters of the United States.	Relevant and Appropriate	Although 404 permit is not required, the remedy should seek to avoid, restore, or mitigate impacts to jurisdictional wetlands as appropriate.
Historic Sites, Building and Antiquities Act	16 USC §§ 461-467	Requires protection of landmarks listed on National Registry	Applicable	Proposed activities will not adversely affect any listed landmark
National Historic Preservation	16 USC § 470	Requires protection of district, site, building, structure or object eligible for inclusion in national register of historic places	Applicable	Proposed activities will not adversely affect any such district, site, building, structure or object
Archeological and Historic Preservation Act	16 USC § 469	Requires preservation of significant historical and archeological data	Applicable	Proposed activities will not adversely affect archeological data or landmarks
Fish and Wildlife Coordination Act	16 USC § 662	Requires that actions taken in areas that may affect streams and rivers be undertaken in a manner that protects fish and wildlife	Applicable	USFWS has been consulted with regard to actions impacting Silver Creek
Endangered Species Act	16 USC § 1531	Requires protection of endangered and threatened species	Applicable	USFWS has been consulted with regard to protection of endangered and threatened species.
Migratory Bird Treaty Act	16 USC § 703 *et seq*	Requires protection of migratory nongame birds	Applicable	USFWS has been consulted with regard to protection of migratory nongame birds.
RCRA Subtitle D Solid Waste Requirements	UAC R315-303-3(4)	Establishes closure requirements for permitted solid waste landfills.	Relevant/Appropriate	Relevant and appropriate to onsite repository under Alternatives 3 and 5, to the extent technically practicable.
Air Quality	UAC R307-205-6	Emission Standards	Applicable	Requires management practices to limit fugitive emissions from tailings piles.

Table 10-3 (continued)
Action Specific ARARs

Requirement	Citation	Description	Determination	Comment
Abandoned wells	UAC R655-4	Standards for drilling and abandonment of wells.	Applicable	Applicable to the drilling or closing of wells that are abandoned or installed as part of the remedy.
Utah Storm Water Rules	UAC R317-8-3.9	Establishes state storm water requirements	Applicable	Requires implementation of best management practices to address storm water management at the Site.
Criteria for Classification of Solid Waste and Disposal Facilities and Practices	40 CFR Part 257.3	Establishes Criteria for use in determining which solid waste facilities and practices could adversely affect human health and the environment	Applicable	
Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Establishes Standards for Generators of Hazardous Waste	Applicable	Applicable to any waste that is not Bevill-exempt.
General Facilities Standards	UAC R315-8-2	Location Standards	Applicable	Applicable to any waste that is not Bevill-exempt.
Closure and Post Closure	UAC R315-8-6	Closure Plan/Performance Standards	Applicable	Applicable to any waste that is not Bevill-exempt.

Table 10-3 (continued)
Action Specific ARARs

Waste Piles	*UAC R315-8-12*	*Waste piles performance standards*	*Applicable*	*Applicable to any waste that is not Bevill-exempt.*
Landfills	UAC R315-8-14	Performance standards for landfills	Applicable	Applicable to any waste that is not Bevill-exempt.
Risk Based Closure Standards	UAC R315-101	Establishes risk-based closure and corrective action standards	Applicable	Applicable to any waste that is not Bevill-exempt.
Corrective Action Cleanup Standards Policy	UAC R311-211	Lists general criteria in Establishing clean up standards	Applicable	
OSHA	29 USC § 651	Regulates workers health and safety	Applicable	
Utah Ground Water Quality Protection Rules	UAC R317-6	Contaminants that remain on site must not present a leaching threat to ground water	Applicable	
Standards Applicable to Hazardous Waste Transporters	40 CFR Part 263	Regulates Transportation of Hazardous Waste	Applicable	Relevant and appropriate to any waste that is not Bevill-exempt.

Table12-1
Cost Alternative 3
Source Removal/ Soil Cover and Wedge Buttress

Direct Capital Costs	Quantity	Unit	Cost	Total Cost	
Diversion Ditch					
Place 1' gravel cover	956	cyd	$12.00	$11,472.00	
Signs	20	sign	$50.00	$1,000.00	
		Subtotal		$12,472.00	
Tailings South of Diversion Ditch					
Site preparation (clearing, grubbing..)	50	ac	$1,000.00	$50,000.00	
Excavate and haul to impoundment (partial source removal)	178,268	cy	$5.75	$1,025,029.50	
Place soil cover (bring up to 12", haul, spread, compact)	27,492	cy	$4.80	$131,961.60	
Place topsoil (.5') excavated and covered areas	40,082	cy	$4.80	$192,297.60	
Dust control	20	days	$735.00	$14,700.00	
Reconstruct tributary channel	1,481	cy	$7.50	$11,107.50	
Grading (stormwater runoff control)	24	hrs	$140.00	$3,360.00	
Revegetation	50	ac	$500.00	$25,000.00	
		Subtotal		$1,453,456.20	
Wetland					
Place fill for trackhoe access	3,040	cy	$4.80	$14,592.00	
Excavate and haul to impoundment	13,440	cy	$5.75	$77,280.00	
Restoration	10,400	cy	$10.00	$104,000.00	
Silver Creek diversion	500	cy	$7.50	$3,750.00	
Revegetation	7	ac	$500.00	$3,250.00	
		Subtotal		$202,872.00	
Impoundment					
Site preparation (clearing, grubbing..)	115	ac	$1,000.00	$115,000.00	
Place tailings from TSDD and Wetland (grade and compact)	191,742	cy	$1.50	$287,613.00	
Place soil cover (bring up to 12", haul, spread, compact)	136,853	cy	$4.80	$656,894.40	
Construct drainage channel (to SDD)	1,556	cy	$7.50	$11,670.00	
Place topsoil (.5')	79,218	cy	$4.80	$380,246.40	
Dust control	20	days	$735.00	$14,700.00	
Grading (stormwater runoff control)	80	hrs	$140.00	$11,200.00	
revegetation	115	ac	$500.00	$57,500.00	
		Subtotal		$1,534,823.80	
Embankment (wedge buttress)					
Site preparation (clearing, grubbing..)	0.75	ac	$1,000.00	$750.00	
Place drain material	1,210	cy	$8.00	$9,680.00	
Place buttress material (includes compaction of lifts)	7,200	cy	$6.00	$43,200.00	
Dust control	6	days	$735.00	$4,410.00	
Erosion protection (stormwater runoff control)	300	cy	$7.50	$2,250.00	
Revegetation	0.75	ac	$750.00	$562.50	
		Subtotal		$60,852.50	
Long-Term Operation and Maintenance Costs					
O&M	15	yr	$4,000.00	$60,000.00	
Annual Sampling	15	yr	$2,000.00	$30,000.00	
Reporting	15	yr	$5,000.00	$75,000.00	
Develop Institutional Controls	1		$5,000.00	$5,000.00	
Institutional Controls Monitoring and Repair (fencing, signs)	15	yr	$5,000.00	$75,000.00	
		Subtotal		$245,000.00	
			Total Direct Costs		$3,509,476.50
Indirect Capital Costs					
Engineering Design and Project Administration				$50,000.00	
Monitoring Plan				$4,000.00	
Construction Oversight (2.5 % of Direct Capital Cost)				$87,736.91	
Contingency (15 % of Direct Capital Cost)				$526,421.48	
Health and Safety (1 % of Capital Costs)				$35,094.77	
EPA Oversight				$50,000.00	
		Subtotal		$753,253.16	
			Total Indirect Costs		$753,253.16
	TOTAL COSTS				$4,262,729.65

Table13-4
Cost Alternative 3
Source Removal/ Soil Cover and Wedge Buttress

Direct Capital Costs	Quantity	Unit	Cost	Total Cost
Diversion Ditch				
Place 1' gravel cover	956	cyd	$12.00	$11,472.00
Signs	20	sign	$50.00	$1,000.00
		Subtotal		$12,472.00
Tailings South of Diversion Ditch				
Site preparation (clearing, grubbing..)	50	ac	$1,000.00	$50,000.00
Excavate and haul to impoundment (partial source removal)	178,266	cy	$5.75	$1,025,029.50
Place soil cover (bring up to 12", haul, spread, compact)	27,492	cy	$4.80	$131,961.60
Place topsoil (.5') excavated and covered areas	40,082	cy	$4.80	$192,297.60
Dust control	20	days	$735.00	$14,700.00
Reconstruct tributary channel	1,481	cy	$7.50	$11,107.50
Grading (stormwater runoff control)	24	hrs	$140.00	$3,360.00
Revegetation	50	ac	$500.00	$25,000.00
		Subtotal		$1,453,456.20
Wetland				
Place fill for trackhoe access	3,040	cy	$4.80	$14,592.00
Excavate and haul to impoundment	13,440	cy	$5.75	$77,280.00
Restoration	10,400	cy	$10.00	$104,000.00
Silver Creek diversion	500	cy	$7.50	$3,750.00
Revegetation	7	ac	$500.00	$3,250.00
		Subtotal		$202,872.00
Impoundment				
Site preparation (clearing, grubbing..)	115	ac	$1,000.00	$115,000.00
Place tailings from TSDD and Wetland (grade and compact)	191,742	cy	$1.50	$287,613.00
Place soil cover (bring up to 12", haul, spread, compact)	136,853	cy	$4.80	$656,894.40
Construct drainage channel (to SDD)	1,558	cy	$7.50	$11,670.00
Place topsoil (.5')	79,218	cy	$4.80	$380,246.40
Dust control	20	days	$735.00	$14,700.00
Grading (stormwater runoff control)	80	hrs	$140.00	$11,200.00
revegetation	115	ac	$500.00	$57,500.00
		Subtotal		$1,534,823.80
Embankment (wedge buttress)				
Site preparation (clearing, grubbing..)	0.75	ac	$1,000.00	$750.00
Place drain material	1,210	cy	$8.00	$9,680.00
Place buttress material (includes compaction of lifts)	7,200	cy	$6.00	$43,200.00
Dust control	6	days	$735.00	$4,410.00
Erosion protection (stormwater runoff control)	300	cy	$7.50	$2,250.00
Revegetation	0.75	ac	$750.00	$562.50
		Subtotal		$60,852.50
Long-Term Operation and Maintenance Costs				
O&M	15	yr	$4,000.00	$60,000.00
Annual Sampling	15	yr	$2,000.00	$30,000.00
Reporting	15	yr	$5,000.00	$75,000.00
Develop Institutional Controls	1		$5,000.00	$5,000.00
Institutional Controls Monitoring and Repair (fencing, signs)	15	yr	$5,000.00	$75,000.00
		Subtotal		$245,000.00
			Total Direct Costs	$3,509,476.50
Indirect Capital Costs				
Engineering Design and Project Administration				$50,000.00
Monitoring Plan				$4,000.00
Construction Oversight (2.5 % of Direct Capital Cost)				$87,736.91
Contingency (15 % of Direct Capital Cost)				$526,421.48
Health and Safety (1 % of Capital Costs)				$35,094.77
EPA Oversight				$50,000.00
		Subtotal		$753,253.16
			Total Indirect Costs	$753,253.16
TOTAL COSTS				$4,262,729.65

Table 12-2
Present Worth Cost
Alternative 3

Year	Capitol Costs	Annual O&M Costs	Periodic Costs	Total Costs	Discount Factor at 7%	Total Present Value Cost at 7%
0	803,546.00		5,000.00	808,546.00	1.00	808,546.00
1	803,546.00	16,000.00		819,546.00	0.94	766,275.51
2	803,546.00	16,000.00		819,546.00	0.87	715,463.66
3	803,546.00	16,000.00		819,546.00	0.82	668,749.54
4	803,546.00	16,000.00		819,546.00	0.76	625,313.60
5		16,000.00		16,000.00	0.71	11,408.00
6		16,000.00		16,000.00	0.67	10,656.00
7		16,000.00		16,000.00	0.62	9,968.00
8		16,000.00		16,000.00	0.58	9,312.00
9		16,000.00		16,000.00	0.54	8,704.00
10		16,000.00		16,000.00	0.51	8,128.00
11		16,000.00		16,000.00	0.48	7,600.00
12		16,000.00		16,000.00	0.44	7,104.00
13		16,000.00		16,000.00	0.42	6,640.00
14		16,000.00		16,000.00	0.39	6,208.00
15		16,000.00		16,000.00	0.36	5,792.00
Total	4,017,730.00	240,000.00	5,000.00	4,262,730.00		3,675,868.30

assumes spreading the capitol costs over 5 years
15 years of O&M

Table 13-1
Cost Alternative 2
Soil Cover/Institutional Controls

Direct Capital Costs	Quantity	Unit	Cost	Total Cost	
Diversion Ditch					
Place 1' gravel cover	956	cyd	$12.00	$11,472.00	
Signs	20	sign	$50.00	$1,000.00	
		Subtotal		$12,472.00	
Tailings South of Diversion Ditch					
Site preparation (clearing, grubbing..)	50	ac	$1,000.00	$50,000.00	
Place soil cover (bring up to 12")	40,062	cy	$5.75	$230,356.50	
Place topsoil (.5')	40,062	cy	$4.80	$192,297.60	
Dust control	20	days	$735.00	$14,700.00	
Reconstruct tributary channel	1,481	cy	$7.50	$11,107.50	
revegetation	50	ac	$500.00	$25,000.00	
		Subtotal		$523,461.60	
Impoundment					
Site preparation (clearing, grubbing..)	115	ac	$1,000.00	$115,000.00	
Place soil cover (bring up to 12")	79,218	cy	$5.75	$455,503.50	
Place topsoil (.5')	79,218	cy	$4.80	$380,246.40	
Construct drainage channel (to SDD)	1,667	cy	$7.50	$12,502.50	
Dust control	20	days	$735.00	$14,700.00	
Grading (stormwater runoff control)	80	hrs	$140.00	$11,200.00	
revegetation	115	ac	$500.00	$57,500.00	
		Subtotal		$1,046,652.40	
Embankment (wedge buttress)					
Site preparation (clearing, grubbing..)	0.75	ac	$1,000.00	$750.00	
Place drain material	1,170	cy	$8.00	$9,360.00	
Place buttress material (includes compaction of lifts)	7,200	cy	$6.00	$43,200.00	
Dust control	6	days	$735.00	$4,410.00	
Erosion protection (stormwater runoff control)	300	cy	$12.00	$3,600.00	
Revegetation	0.75	ac	$500.00	$375.00	
		Subtotal		$61,695.00	
Long-Term Operation and Maintenance Costs					
O&M	15	yr	$4,000.00	$60,000.00	
Annual Sampling	15	yr	$2,000.00	$30,000.00	
Reporting	15	yr	$5,000.00	$75,000.00	
Develop Institutional Controls	1		$10,000.00	$10,000.00	
Institutional Controls Monitoring and Repair (fencing, signs)	15	yr	$2,000.00	$30,000.00	
		Subtotal		$205,000.00	
			Total Direct Costs		$1,849,281.00
Indirect Capital Costs					
Engineering Design and Project Administration				$50,000.00	
Monitoring Plan				$4,000.00	
Construction Oversight (2.5 % of Direct Capital Cost)				$46,232.03	
Contingency (15 % of Direct Capital Cost)				$277,392.15	
Health and Safety (1 % of Capital Costs)				$18,492.81	
EPA Oversight				$50,000.00	
		Subtotal		$446,116.99	
			Total Indirect Costs		$446,116.99
TOTAL COSTS					$2,295,397.99

Table 13-2
Cost Alternative 4
Excavation, Treatment and Offsite Disposal

Direct Capital Costs	Quantity	Unit	Cost	Total Cost
Diversion Ditch (removal)				
Remove sediments and tailings haul to treatment	232,638	cy	$6.00	$1,395,816.00
revegetation	2	ac	$500.00	$1,000.00
		Subtotal		$1,396,816.00
Tailings South of Diversion Ditch				
Site preparation (clearing, grubbing..)	50	ac	$1,000.00	$50,000.00
Excavate and haul to treatment/loadout (tails, base and exs. cover)	394,744	cy	$5.75	$2,269,778.00
Place topsoil	40,062	cy	$4.80	$192,297.60
Dust control	20	days	$735.00	$14,700.00
Reconstruct tributary channel	1,481	cy	$7.50	$11,107.50
Grading (reclamation and stormwater runoff control)	40	hrs	$140.00	$5,600.00
revegetation	50	ac	$500.00	$25,000.00
		Subtotal		$2,568,483.10
Impoundment				
Site preparation (clearing, grubbing..)	115	ac	$1,000.00	$115,000.00
Excavate tailings, base and existing cover, haul to loadout	2,353,609	cy	$5.75	$13,533,251.75
Place topsoil	93,993	cy	$4.80	$451,166.40
Reconstruct original channel	3,911	cy	$7.50	$29,332.50
Dust control	30	days	$735.00	$22,050.00
Grading (stormwater runoff control)	40	hrs	$140.00	$5,600.00
revegetation	115	ac	$500.00	$57,500.00
		Subtotal		$14,213,900.65
Embankment				
excavate and haul	65,290	cy	$5.75	$375,417.50
Dust control	8	days	$735.00	$5,880.00
Erosion protection (stormwater runoff control)	500	cy	$7.50	$3,750.00
Revegetation	2	ac	$500.00	$1,000.00
		Subtotal		$386,047.50
Wetland				
Place fill for trackhoe access	3,040	cy	$4.80	$14,592.00
Excavate and haul to treatment/loadout	13,440	cy	$5.75	$77,280.00
Wetland restoration	10,365	cy	$10.00	$103,650.00
Silver Creek diversion	500	cy	$7.50	$3,750.00
		Subtotal		$199,272.00
Stabilization and disposal - ECDC				
Dust control	30	days	$735.00	$22,050.00
Erosion protection (stormwater runoff control)	1,000	cy	$7.50	$7,500.00
Stabilization	2,980,988	cy	$30.00	$89,429,640.00
Load to trucks	4,471,482	cy	$1.50	$6,707,223.00
Haul to landfill (43 ton belly dump trucks)	4,471,482	cy	$9.00	$40,243,338.00
disposal fees	4,471,482	cy	$30.00	$134,144,460.00
Sample analysis	250	sample	$150.00	$37,500.00
		Subtotal		$270,591,711.00
Long-Term Operation and Maintenance Costs				
O&M	15	yr	$4,000.00	$60,000.00
Annual Sampling	15	yr	$2,000.00	$30,000.00
Reporting	15	yr	$5,000.00	$75,000.00
Develop Institutional Controls	1		$10,000.00	$10,000.00
Institutional Controls Monitoring and Repair	15	yr	$2,000.00	$30,000.00
		Subtotal		$205,000.00
			Total Direct Costs	$289,561,230.25
Indirect Capital Costs				
Engineering Design and Project Administration				$50,000.00
Monitoring Plan				$4,000.00
Construction Oversight (2.5 % of Direct Capital Cost)				$7,239,030.76
Contingency (15 % of Direct Capital Cost)				$43,434,184.54
Health and Safety (1 % of Capital Costs)				$2,895,612.30
EPA Oversight				$50,000.00
		Subtotal		$53,672,827.60
			Total Indirect Costs	$53,672,827.60
TOTAL COSTS				$343,234,057.85

Table 13-3
Cost Alternative 5
Onsite Treatment and Disposal

Direct Capital Costs	Quantity	Unit	Cost	Total Cost
Diversion Ditch				
Remove sediments and tailings haul to treatment	232,636	cy	$8.00	$1,395,816.00
revegetation	2	ac	$500.00	$1,000.00
		Subtotal		$1,396,816.00
Tailings South of Diversion Ditch				
Site preparation (clearing, grubbing..)	50	ac	$1,000.00	$50,000.00
Excavate and haul to treatment (talls and ass. cover)	394,744	cy	$5.75	$2,269,778.00
Place topsoil	40,062	cy	$4.80	$192,297.60
Dust control	20	days	$735.00	$14,700.00
Reconstruct tributary channel	1,481	lf	$7.50	$11,107.50
Grading (reclamation and stormwater runoff control)	40	hrs	$140.00	$5,600.00
revegetation	50	ac	$500.00	$25,000.00
		Subtotal		$2,568,483.10
Impoundment				
Site preparation (clearing, grubbing..)	115	ac	$1,000.00	$115,000.00
Excavate tailings and existing cover, haul to loadout	2,353,609	cy	$5.75	$13,533,251.75
Place topsoil	93,993	cy	$4.80	$451,166.40
replace treated materials	4,471,482	cy	$1.50	$6,707,223.00
construct drainage channel (center to SDD)	3,911	cy	$7.50	$29,332.50
Dust control	30	days	$735.00	$22,050.00
Grading (stormwater runoff control)	40	hrs	$140.00	$5,600.00
revegetation	115	ac	$500.00	$57,500.00
		Subtotal		$20,921,123.65
Embankment				
excavate and haul	65,290	cy	$5.75	$375,417.50
Dust control	8	days	$735.00	$5,880.00
Erosion protection (stormwater runoff control)	500	cy	$7.50	$3,750.00
Revegetation	2	ac	$500.00	$1,000.00
		Subtotal		$386,047.50
Wetland				
Place fill for trackhoe access	3,040	cy	$4.80	$14,592.00
Excavate and haul to treatment/loadout	13,440	cy	$5.75	$77,280.00
Wetland restoration	10,365	cy	$10.00	$103,650.00
Silver Creek diversion	500	cy	$7.50	$3,750.00
		Subtotal		$199,272.00
Stabilization and Disposal - Onsite				
Dust control	60	days	$735.00	$44,100.00
Erosion protection (stormwater runoff control)	1,000	cy	$7.50	$7,500.00
Stabilization	2,980,988	cy	$30.00	$89,429,640.00
Load to trucks, haul to impoundment	4,471,482	cy	$1.50	$6,707,223.00
Sample analysis	250	sample	$150.00	$37,500.00
		Subtotal		$96,225,963.00
Long-Term Operation and Maintanance Costs				
O&M	15	yr	$4,000.00	$60,000.00
Annual Sampling	15	yr	$2,000.00	$30,000.00
Reporting	15	yr	$5,000.00	$75,000.00
Develop Institutional Controls	1		$10,000.00	$10,000.00
Institutional Controls Monitoring and Repair	15	yr	$2,000.00	$30,000.00
		Subtotal		$205,000.00
			Total Direct Costs	$121,902,705.25
Indirect Capital Costs				
Engineering Design and Project Administration				$50,000.00
Monitoring Plan				$4,000.00
Construction Oversight (2.5 % of Direct Capital Cost)				$3,047,567.63
Contingency (15 % of Direct Capital Cost)				$18,285,405.79
Health and Safety (1 % of Capital Costs)				$1,219,027.05
EPA Oversight				$200,000.00
		Subtotal		$22,806,000.47
			Total Indirect Costs	$22,806,000.47
TOTAL COSTS				$144,708,705.72

APPENDIX C

RESPONSIVENESS SUMMARY

1.1 Stakeholder Issues and EPA Responses

During the Public Comment Period for the Proposed Plan, comments were received from UPCM, the Marsac Corridor Association and Utah Department of Fish and Wildlife. Their comments and EPA's response to these comments are in the following sections.

1.1.2 Comments Received From United Park City Mines

Remedy Selection. United Park supports the remedy selected in the Proposed Plan. Like EPA, United Park believes that Alternative 3 provides more than adequate protection of human health and the environment, will prove to be effective (both in the long and short terms), will be cost-effective, and will otherwise address the remaining environmental conditions necessary to achieve final closure of the Site.

Possible Wetlands Operable Unit. The Proposed Plan states that the timing of remediation as to the small wetland area between the impoundment and Silver Creek will be delayed until upstream remediation and reclamation efforts are complete. United Park's understanding is that the wetland area will be remediated following remediation of several upstream areas, some of which are located on United Park property. In any event, because the timing for the remediation of the wetland area will not be linked to the remediation process for the remainder of the Site, United Park suggests that EPA consider designating the wetland area as a separate operable unit. EPA has the discretion to designate multiple operable units with respect to the Site. Doing so here makes sense in part because it will facilitate negotiation of the anticipated Consent Decree, enabling EPA and United Park to define construction completion as to each operable unit.

EPA Response: While EPA understands this is an option that would allow the Site to be archived by OU more quickly, EPA feels strongly that the timing of cleanup throughout the Watershed will work to everyone's advantage. By cleaning up the upstream sites along Silver Creek in a time efficient manner, the Site wetlands can then be excavated according to the plan set forth in this ROD. It is critical to EPA that the entire Silver Creek Watershed be addressed and by further dividing sites by OU or through some other approach, EPA believes this will slow the process down rather that expedite it.

Site Impacts on Silver Creek. There are a number of statements in the Proposed Plan suggesting that the Site is presently having a significant impact on water quality in Silver Creek. *See* page A-2 (first paragraph) (linking Site to other sites that are all impacting Silver Creek); page A-3 and A-4 (remediation of Site will play direct role in watershed remediation). United Park finds these statements confusing. The Remedial Investigation ("RI") for the Site determined that surface waters leaving the Site present no significant impact on water quality in Silver Creek. While it is true that surface waters in areas upstream of the south diversion ditch exhibit elevated metal concentrations, the water in the south diversion ditch outfall has consistently met surface water quality standards. The remedial action proposed for the Site is more appropriately described at addressing *potential future* impacts the Site may have on Silver Creek. While United Park recognizes that many of the issues addressing Silver Creek arose generally from historic mining operations, United Park believes it is inappropriate to group the Site with other

areas in the Silver Creek Watershed that may have actual present impacts on water quality in Silver Creek.

EPA Response: EPA recognizes that the data from the Remedial Investigation relating to the Site's impact on Silver Creek support this statement. It was written in the Proposed Plan that historic mining activities throughout the Upper Silver Creek Watershed have adversely affected Silver Creek. In Section 12, The Selected Remedy, and in Section 5, Summary of Site Characteristics, it is made clear that water from the Site that enters Silver Creek is of better quality than Silver Creek itself. It is accurate to state that the selected remedy will be protective of human health and the environment in that it will minimize any future exposures or impacts contamination at the Site may present.

Human and Ecological Risks. United Park believes that the Proposed Plan mischaracterizes the results and findings of the human health and ecological risk assessments relating to the Site. More specifically, the discussion in the Proposed Plan under Human Health Risks (page A-4) states that "if the necessary cleanup action is not taken . . . there is a risk to future recreational users at the Site because of lead and arsenic present in the tailings." In fact, the Baseline Human Health Risk Assessment ("BHHRA") conducted by EPA concluded no significant risk to recreational users of the Site from the existing soils and mine tailings unless the soil cover is somehow disturbed. With respect to the ecological risk assessment discussion, the Proposed Plan states that the Ecological Risk Assessment ("ERA") determined that ecological receptors are potentially exposed to metals in several ways, as summarized in the chart on page A-4 of the Proposed Plan. It would be more accurate to state that the ERA concluded contaminated sediment in the wetland area is the primary ecological risk driver, although surface water in a portion of the south diversion ditch may also present some risk, to a lesser degree. This conclusion is supported by Table 7-8 in the ERA.

EPA Response: Again, it is EPA's intent to make it clear that if the necessary remedial actions are not taken at the Site, which include both enhancing the soil cover and ensuring that it will remain intact in the future, potential risks to human health and the environment exist. EPA agrees with the comment addressing sediments as the primary risk driver at the Site.

Future Consolidation of Material. United Park understands the practical benefits that could arise from the future use of the Site as a consolidation area for mining materials and impacted soils. However, United Park notes the potential complications related to defining completion of construction for purposes of the remedial action described in the Proposed Plan. United Park suggests that one way to address this concern would be for EPA to provide in the ROD that: (i) any materials so consolidated at the Site during implementation of the remedial action will simply be incorporated into the remedial action and covered with the required amount of clean cover material and revegetated; and (ii) any material to be consolidated after completion of construction will be subject to institutional controls requiring that mine wastes or impacted soils consolidated at the Site after the remedial action is completed would be covered with the required amount of clean material and revegetated. This will allow United Park to achieve a state of completion with the remediation while providing maximum flexibility for the future consolidation of material from the Watershed and any potential reuse of the property.

EPA Response: EPA agrees with this comment; evidence of incoorporation of this comment into the ROD can be found in the Remedy Selection section.

1.1.3 Comments Received from the Marsac Corridor Association

One component of the remedy allows for waste to be transported from Empire Canyon and deposited at Richardson Flat. The Marsac Corridor Association (MCA) is a group of homeowners that live in the neighborhood through which trucks carrying the waste would drive. The members of the MCA had two specific comments: 1) The waste in Empire Canyon should be left in place, and 2) If the waste must be moved, it should be transported up the Mine Road and down Royal Street, rather than using only the Mine Road and Lower Marsac.

EPA Response: EPA understands MCA's concerns and has considered its comments. It is our perspective that the waste may be left in place or moved to Richardson Flat. Factors such as space to contain the waste, the cost of transportation, and potential migration of waste left in place will be considered by the parties involved in order to make a decision about the fate of the waste in Empire Canyon. EPA understands that this is a local issue and one that will be resolved through discussion and consideration amongst the stakeholders. These stakeholders include Park City, UPCM, MCA and other concerned public. A public hearing will be held by Park City in the upcoming future to resolve this issue.

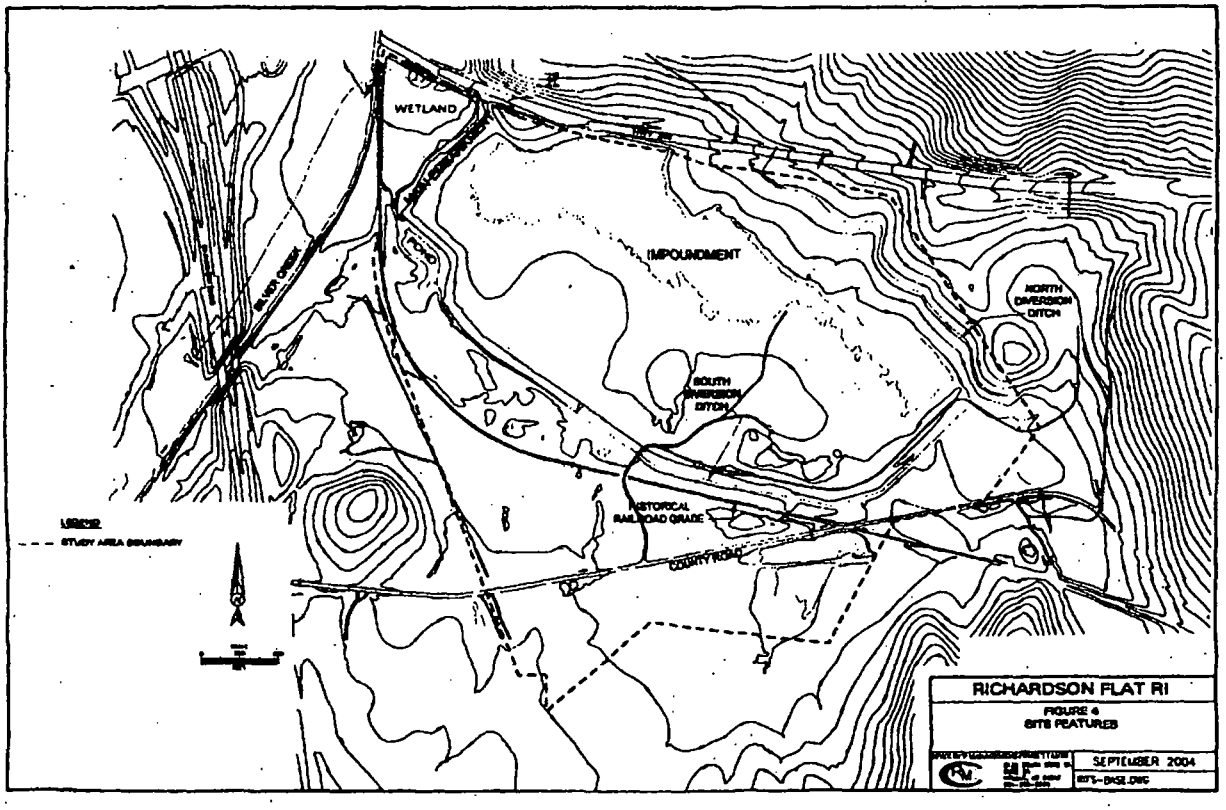
1.1.4 Comments Received from United States Fish and Wildlife Service (the Service) Utah Field Office

The Service submitted comments concerning the remedy's protectiveness in relation to ecological receptors at the Site. The Service's primary concern is that the sediments found in the South Diversion Ditch, the pond at its terminus and in the wetland at the base of the embankment are not being addressed in a manner efficient enough to substantially minimize risk to ecological receptors at the site. The Service proposes excavation of the sediments in all three areas.

EPA Response: The sediments within the wetland area will be excavated and placed within the impoundment through the selected remedy. EPA understands that the wetland is a naturally occuring ecological phenomenon that existed before the impoundment was created. Therefore, the remedy should allow for the restoration of the wetland as a habitat for ecological receptors at the Site. However, the diversion ditch and small pond are engineered features at the site that were constructed to help contain the tailings in the impoundment and minimize groundwater infiltration from Area B into the main impoundment. Therefore, these areas will be sufficiently remediated through the described mechanisms (placement of 18 inches of gravel over contaminated sediments). While this action does not create habitat or restore habitat, it will minimize risk to ecological receptors at the Site. The requirements set forth in the NCP are met. Lastly, this does not preclude continued negotiation concerning the restoration of these features between UPCM and EPA surrounding Natural Resource Damages. These damages are currently being addressed, and they are a complicated issue. It is possible these damages could be mitigated through the restoration of other areas within the Watershed. So, until a settlement concerning these damages has been reached the exposure pathways will be interrupted with gravel and risk to ecological receptors will be minimized in the diversion ditch and the pond at its terminus as it is described in the selected remedy.

APPENDIX B

Appendix B


WETLAND
IMPOUNDMENT
NORTH DIVERSION DITCH
SOUTH DIVERSION DITCH
HISTORICAL RAILROAD GRADE
COUNTY ROAD
STUDY AREA BOUNDARY
RICHARDSON FLAT RI
FIGURE 4
SITE FEATURES
SEPTEMBER 2004

APPENDIX C

APPENDIX C
STATEMENT OF WORK FOR
REMEDIAL DESIGN AND REMEDIAL ACTION (RD/RA)
RICHARDSON FLAT SITE, SUMMIT COUNTY, UTAH

EPA ID No. UT980952840

I. INTRODUCTION

1.1 PURPOSE OF THE STATEMENT OF WORK

The purpose of this statement of work (SOW) is to describe in general terms the requirements for the Remedial Design/Remedial Action (RD/RA) being implemented for the Richardson Flat site ("Site"), Park City, Utah, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA). Implementation of the RD/RA shall be performed by United Park City Mines (UPCM), a Potentially Responsible Party (PRP).

This SOW outlines the processes, standards, and deliverables that UPCM will use to design, construct, maintain, and evaluate the Remedial Action (RA) for the Site in Park City, Utah. The United States Environmental Protection Agency (EPA) set forth the selected remedy and remedial action requirements in the site-wide Record of Decision (ROD) dated July 6, 2005. This SOW is Appendix C to a Consent Decree (RD/RA Consent Decree) in which UPCM has agreed to implement the remedy described in the ROD.

1.2 OBJECTIVES

The primary objective of this SOW is to ensure that the selected remedy is implemented in compliance with the terms of the 2005 ROD and the RD/RA Consent Decree.

1.3 SITE DESCRIPTION

The Site is situated in a small valley in Summit County, Utah, located 1.5 miles northeast of Park City, Utah. The Site lies within the northwest quarter of Section 1 and northeast quarter of Section 2, Township 2 South, Range 4 East, Summit County, Utah, and is part of a 650 acre property owned by United Park City Mines (UPCM) Company. The Site is a tailings impoundment that covers 160 acres in the northwest corner of the UPCM property, a small portion of the much larger Upper Silver Creek Watershed. The Study Area Boundary as determined in the Focused Remedial Investigation (RI, RMC, 2004a) contains the tailings impoundment as well as adjacent areas impacted by historical use of the Site. Approximately 263 acres are contained within the Study Area Boundary. Silver Creek is the primary surface water source found in the area and is comprised of runoff from three significant drainages in the watershed, including Ontario Canyon, Empire Canyon and Deer Valley. The overall remedial goal for the watershed is to clean up the surrounding area, including the Richardson Flat Site, thereby eliminating current and future hazards to human health and the environment.

The Site is located at an elevation of approximately 6,600 feet above sea level and consists of a geometrically closed tailings impoundment contained by a main earthen dam on the west side, a containment dike system defining its southern and eastern perimeters, highway 248 on the north and two surface water run-off diversion ditches, south and east sides outside of the containment dike system. The South Diversion Ditch (SDD) flows into a wetland abutting Silver Creek. The area surrounding the impoundment consists of valley bottom topography surrounded by rolling hills. Silver Creek can be found on the northwest border of the Site, separated from the Site by a small stretch of wetlands and riparian vegetation. The impoundment was used as a mine tailings reservoir prior to 1950. The Site now houses approximately seven million tons of sand-sized carbonaceous particles and minerals containing zinc, silver, lead, and other metals. UPCM's active use of the Site for tailings disposal ended in 1982.

1.4 PERFORMANCE STANDARDS

The term "Performance Standards" refers to clean up standards, standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all ARARs. The Performance Standards for the Site are set forth in the ROD, this SOW, and the EPA-approved Remedial Design/Remedial Action Work Plan ("RD/RA Work Plan"). The RD/RA Work Plan details the specific performance criteria which apply to design and construction of the selected remedy described in the ROD. UPCM shall implement the RA to meet all performance standards set forth in the ROD, this SOW, and the EPA-approved RD/RA Work Plan.

1.5 SUMMARY OF PREVIOUS INVESTIGATIONS

Since the 1970s, Park City Ventures (PCV), Noranda, EPA, and UPCM have conducted numerous environmental investigations relating to the Site. Because past investigation activities by PCV, Noranda and UPCM were performed without EPA oversight and with an unknown degree of Quality Assurance/Quality Control (QA/QC), the results from such investigations were incorporated into the Focused RI as screening level data. The Focused RI (RMC, 2004a), conducted in accordance with EPA-approved Sampling and Analysis Plan (SAP, RMC, 2001 and 2003), characterized the Site for selecting an appropriate remedy. The Focused Feasibility Study (FFS, RMC, 2004b) reviewed a range of alternatives based on National Contingency Plan (NCP) criteria including protection of Human Health and the Environment, Compliance with ARARs, Reduction of Toxicity, Mobility or Volume through Treatment, Effectiveness, Implementability and Cost. The Remedy described in the ROD (EPA, 2005) is based on the analysis conducted in the FFS (RMC, 2004b).

Surface water from the Site enters Silver Creek after passing through a wetland area in the northwest corner of the Site. There are three main sources of contamination at the Site: (1) the tailings contained within the tailings impoundment (Area A), (2) the tailings south of the diversion ditch (Area B) and (3) the tailings within the wetland area. There is a soil cover across the tailings impoundment (Area A) that was put in place by UPCM in the 1990s. The Focused RI/FFS evaluated the soil cover and showed it protects groundwater and other media at the Site

from becoming heavily contaminated. The risk assessment determined that under the current conditions, threats to human health are low. The selected remedy is intended to enhance and ensure the integrity of the soil cover, reinforce the tailings embankment, and protect surface and ground waters from additional metals loading by containing the low level threat waste, thereby mitigating and abating the actual and potential risks to human health or welfare or the environment at the Site. Further, institutional controls will minimize potential, future, uncontrolled, human contact with contamination in any of the Site media.

1.6 RECORD OF DECISION

The ROD, dated July 6, 2005, presents the selected remedy for the Richardson Flat Tailings Site. The ROD was developed in accordance with the requirements of CERCLA 1980, 42 U.S. Code (USC) §9601 et seq. as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. The decision is based on the Administrative Record for the Site. The remedy was selected by EPA Region 8 with concurrence from the Utah Department of Environmental Quality (UDEQ).

The response action selected in the ROD is necessary to protect public health and the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health or welfare or the environment.

II. SCOPE OF WORK TO BE PERFORMED

The scope of work includes all activities required to implement the remedial action described in the ROD and the EPA-approved final Remedial Design, operation and maintenance (O&M).

2.1 REMEDIAL ACTION OBJECTIVES

In the ROD, EPA established nine Remedial Action Objectives (RAOs) that, if achieved, are intended to render the Site safe for its intended uses. These RAOs are:

1. Reduce risks to wildlife receptors in the wetland area and south diversion ditch such that hazard indexes for lead are less than or equal to one.
2. Ensure that recreational users, including children, continue to have no more than a 5% chance of exceeding a blood lead level of 10 micrograms per deciliter from exposure to lead in soils.
3. Ensure that recreational users, including children, continue to have no more than 1×10^{-4} chance of contracting cancer from exposure to arsenic in soils.
4. Eliminate the risk of catastrophic failure of the tailings impoundment.
5. Ensure that surface water discharged from the Site meets applicable Utah water quality standards.
6. Eliminate the possibility of future ground water use and withdrawal at the Site.
7. Allow for a variety of future recreational uses.
8. Allow for future disposal of mine tailings from the Park City area within the tailings impoundment until the remedy is complete.
9. Minimize post-cleanup disturbance of tailings and contaminated soil. Provide controls that ensure any necessary disturbance at the Site follows prescribed methods.

2.2 SUMMARY OF THE SELECTED REMEDY

As described in the ROD, EPA evaluated several remedial alternatives for their ability to achieve the Site RAOs and to satisfy the nine remedy selection criteria established in the NCP. EPA determined that the selected remedy was capable of meeting all RAOs and best satisfied the nine criteria. The ROD describes the selected remedy in more detail. The selected remedy contains the following basic elements:

- Removal of contaminated materials in selected areas south of the South Diversion Ditch (Area B). Excavation would extend to the visual interface between the tailings and native soils or to a depth where a clay soil cover can be placed;
- Removal of contaminated materials in the wetland west of the main embankment. This would include excavation of contaminated material to achieve the Site's EPA selected ecological

cleanup level of no more than 310 parts per million (ppm) lead in sediment. This activity will be performed only after remedial activities are completed on upstream contaminant sources in Silver Creek;

- Placing excavated materials in the impoundment. The impoundment will be used by UPCM and others to accommodate similar Bevill-exempt mine waste materials in the upper Silver Creek watershed;
- Placement of a twelve-inch thick (minimum), low permeability soil cover on areas where tailings are left in-place including the impoundment. The cover would be placed in six-inch lifts and machine compacted. Upon completion of the low permeability soil cover, a six-inch topsoil cover would be placed. The final surface cover will be a minimum of eighteen inches and surface will be graded to control surface stormwater runoff and drainage;
- UPCM will remove contaminated sediments in the ditch and pond;
- Installation of a rock wedge buttress along the oversteepened portion of the embankment (for about 400 feet of the total embankment length of 800 feet);
- Regrading and revegetation of areas affected by remedial activities at the Site. Areas in which tailings were removed would be restored, where possible, to existing topographic conditions;
- Well-ban or other mechanism described in a deed restriction to address ground water use;
- Appropriate land use restrictions to preclude non-recreational uses and ensure maintenance of the soil cover; and
- Monitoring Site vegetation, erosion, and surface water on a quarterly basis for two years, as further addressed in Section 2.4 of this SOW. Surface water will be monitored for zinc, cadmium and lead (total and dissolved) and hardness, (1) at the mouth of the diversion ditch and (2) within Silver Creek above and below the Site to determine whether there are any changes in loading from the Site.

2.3 RD/RA STRATEGY, DELIVERABLES, AND OTHER TASKS

Much of the remediation work at Richardson Flat is directed towards improving or maintaining surface water quality and stopping any migration of contaminants into the environment through

ecological receptors. In order to design, construct, maintain, and evaluate the RA to EPA's approval and ensure the RA meets the RAOs, a remediation strategy will be followed.

With the exception of those areas where existing tailings will be covered, such as the main impoundment, the areas where tailings will be removed are all areas where the presence of tailings may have an impact on surface water quality. Because of this, initial remediation must commence in the most upstream areas. In the case of the Area B tailings, the area located easterly of the old airstrip and south of the County road must be remediated first. Water in this area flows generally from the west easterly towards the large pond in the southeast portion of the site.

Once this area is remediated, remediation can be implemented in the area of the southeast pond then move towards the Rail Trail and Southern Diversion Ditch (SDD). At this point in time, remediation efforts must be focused on the easternmost section of the SDD. This ditch flows from east to west. Area B remediation must follow this course as well. As remediation progresses through the SDD, those sections of the Area B tailings to be remediated that lie adjacent to the SDD can be remediated.

This upstream to downstream remediation procedure will assure that remediated areas will not be recontaminated from upstream remediation construction. This is the basis for waiting to complete the wetland remediation at the toe of the embankment until upstream Silver Creek sites are remediated.

A Remedial Design/Remedial Action Work Plan will be generated by UPCM for review and approval by EPA. This document will contain descriptions of the work to be performed and will describe each remediation task as reflected in the remediation strategy outlined above. It will also contain Sampling Plans, Quality Assurance Plans, Health and Safety Plans, a general Stormwater Management Plan and any other information needed to assure that the RA meets the RAOs.

Prior to the commencement of construction of any remediation task, UPCM will meet with EPA's RPM to discuss the work to be performed for each particular task. At these meetings, UPCM will provide a detailed description of the work to be performed as well as construction plans that graphically describe the work to be performed and measures taken to assure that proper erosion control measures are implemented. Any sampling activity will also be outlined. The EPA RPM will review these plans and have the ability to provide input at the meeting. During the construction, UPCM will provide weekly verbal or email progress updates if requested by the EPA RPM. Once any task is complete, UPCM will obtain the EPA RPM's approval before moving on to the next task. Construction of more than one task may be underway at any time. UPCM will provide graphic plans of the work as completed. These plans and any written documentation can be the basis for discussions concerning financial assurance and proof that a task has been completed.

2.4 OPERATION AND MAINTENANCE

O&M begins after EPA issues a Certification of Completion of the Remedial Action. In general, O&M consists of all activities described in the EPA-approved final O&M Plan including surface and groundwater monitoring, monitoring and maintenance of the on-site repository system and administration of institutional controls.

Following EPA's Certification of Completion of the RA, UPCM will continue monitoring surface and groundwater quality. Such groundwater and surface water quality monitoring shall be considered part of O&M and shall continue at a minimum for two years after construction or until it is demonstrated that all water quality standards have been achieved at all surface water sampling sites at Richardson Flat that may impact Silver Creek, using the protocols established in the EPA-approved final O&M Plan. If monitoring during this two-year period indicates that surface water contamination levels are above water quality standards (UAC R317-2-14) at the mouth of the diversion ditch or if there is an increased load to Silver Creek from the Site, UPCM shall continue monitoring if so directed by EPA until surface water contamination levels test below water quality standards for a period of two years. All activities necessary to maintain the

integrity and monitor the effectiveness of the repository shall continue for 30 years after EPA approval of the Final Construction Completion Report.

2.5 PERIODIC REVIEW

UPCM shall conduct any studies and investigations requested by the EPA in order to permit EPA to conduct periodic reviews, as specified in the Consent Decree.

Because the selected remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure the remedy is, or will be, protective of human health and the environment. Such reviews will continue every five years indefinitely to ensure the remedy remains protective over time.

III. REMEDIAL ACTION CLOSEOUT

This section describes the activities and reports which follow certification that all Performance Standards specified in the ROD have been met by the Remedial Action.

3.1 CERTIFICATION OF COMPLETION OF THE REMEDIAL ACTION

Remedial Action shall not be deemed completed until EPA has issued a certification of completion of the Remedial Action pursuant to this section.

Within 90 days after UPCM concludes that all phases of the Remedial Action (before O&M) have been fully performed, UPCM shall schedule and conduct a pre-certification inspection to be attended by UPCM, EPA and DEQ. After the pre-certification inspection, if UPCM still believes that the Remedial Action has been fully performed, UPCM shall submit a written report by a registered engineer stating that the Remedial Action has been completed in full satisfaction of the requirements of the Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of UPCM or UPCM Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If, after review of the written report, EPA, after reasonable opportunity for review and comment by DEQ, determines that any portion of the Remedial Action has not been completed in accordance with this Consent Decree, EPA will notify UPCM in writing of the activities that must be undertaken to complete the Remedial Action. EPA will set forth in the notice a schedule for the performance of such activities consistent with the Consent Decree, the SOW, or require UPCM to submit a schedule to EPA for approval. UPCM shall perform all activities described in the notice in accordance with the specifications and schedules established therein. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by UPCM and after a reasonable opportunity for review and comment by DEQ, that the Remedial Action has been fully performed in accordance with the Consent Decree, EPA will so notify UPCM in writing.

3.2 FINAL O&M PLAN

UPCM shall submit the draft O&M Plan to EPA and the State for review concurrently. The O&M Plan shall describe the long term ground water and surface water monitoring required at the Site to ensure continued maintenance of the performance standards for ground water and surface water and protection of the Site repository system. The final O&M Plan shall incorporate comments provided by EPA on the draft O&M Plan.

IV. DELIVERABLES

UPCM will prepare the following deliverables and submit them to EPA for approval:

1. Remedial Design/Remedial Action Plan (RD/RA Work Plan). The RD/RA Work Plan will include design elements and activities for implementing the remedial alternative approved by the EPA and required to meet the Remedial Action Objectives.

2. Field Construction Plans (FCP). A FCP will be provided to the EPA RPM that details the construction efforts to be undertaken for a particular task. This will include stormwater management efforts to be undertaken for the particular task.

3. Task Completion Report (TCR). A TCR will be provided to the EPA RPM following the completion of a remediation task. This report will contain a detailed description of the work completed which will include plans and results from any sampling efforts undertaken.

4. Field Sampling Plan (FSP). A FSP will be prepared to address sampling associated with remedial construction and final closure confirmation sampling. The FSP will be included as an appendix to the RD/RA Work Plan.

5. Health and Safety Plan (HASP). A HASP will be prepared to address health and safety during remedial activities. The HASP will be included as an appendix to the RD/RA Work Plan.

6. Quarterly Progress Reports (QPR). Progress reports will be initiated at the start of the first quarter following the acceptance of this SOW and will continue on a quarterly basis thereafter (e.g. Jan-March, April-June, etc.). Progress reports will be submitted to EPA on the 10th day of the first month of the quarter (or the next business day if the 10th day falls on a weekend or holiday) and will summarize the previous quarter's activities, provide available data and discuss planned activities for the next quarter.

7. Data Validation Reports (DVR). Data validation reports will be prepared as separate submittals and identify qualified data as a result of the validation process.

8. Final Report (FR). A Final Report detailing the results of remediation will be prepared. This report will detail the final remedies and the results of characterization to determine if the remedies are complete.

9. O&M Plan. A draft and final O&M Plan will be prepared upon completion of the Remedial Action. The O&M Plan will describe long-term monitoring required at the Site to ensure continued maintenance of the Performance Standard for surface water and protection of the Site repository system.

IV. SCHEDULE OF DELIVERABLE AND SUBMITTAL TIMEFRAMES

DELIVERABLE	DUE DATE
Remedial Design Remedial Action Planning Documents	
Draft RD/RA Work Plan	60 days from the court's entry of the CD
Draft Field Construction Plan	60 days from the court's entry of the CD
Draft Health and Safety Plan	60 days from the court's entry of the CD
Draft Sampling and Analysis Plan	60 days from the court's entry of the CD
Draft Quality Assurance Project Plan	60 days from the court's entry of the CD
Draft Field Sampling Plan	60 days from the court's entry of the CD
Final RD Work Plan, SAP, QAPP, HSP	60 days from PRPs receipt of EPA comments on drafts
Remedial Action Support Plans	
Draft Operations & Maintenance Plan	Concurrent with Final RD/RA Work Plan
Final Operations & Maintenance Plan	30 days after EPA approval of final RD/RA Work Plan
Remedial Action Requirements	
Final Update of Remedial Design Planning Docs	30 days after EPA approval of draft RD/RA Work Plan
Remedial Action Construction Oversight	During all construction activities

Pre-certification Inspection	Within 90 days of completion of construction of remedy
Certification Inspection	Within 90 days of completion of Remedial Action
Project Closeout Reporting	
Periodic Review Reports	Concurrent with EPA Periodic Reviews, no less often than each five years from the date of initiation of the RA, as specified by EPA.
Regular Reporting	
Quarterly Progress Reports	By the 10th of the month after the Previous reporting period until all Portions of the RD/RA are complete
O&M Monitoring	Quarterly, on or before the tenth day following the conclusion of the reporting period

V. REFERENCES

Resource Management Consultants, Inc (RMC), 2004a, Focused Remedial Investigation (RI) Report for Richardson Flat, Site ID Number: UT980952840.

Resource Management Consultants, Inc (RMC), 2004b, Focused Feasibility Study Report (FOCUSED FS) for Richardson Flat, Site ID Number: UT980952840

United States Environmental Protection Agency (EPA), 2005, Record of Decision, Richardson Flat tailings Site.

APPENDIX D

APPENDIX D

WHEN RECORDED MAIL TO:
Kevin R Murray, Esq.
Chapman and Cutler LLP
201 South Main, Suite 2000
Salt Lake City, UT 84111

Parcel Nos.

NOTICE OF CONSENT DECREE

Pursuant to this Notice of Consent Decree, ("Notice"), United Park City Mines ("United Park"), a Delaware corporation and owner of certain real property located in Summit County, Utah, as further defined on Exhibit A attached hereto and incorporated herein by reference (the "Property"), hereby provides notice of the matters described herein to all subsequent owners, operators, and other persons who hereafter come to have any interest in the Property as described herein:

1. The Property was originally proposed for inclusion on the National Priorities List ("NPL") on June 24, 1988 but was removed from NPL consideration in February 1991.

2. The Property was re-proposed for the NPL on February 7, 1992 but no action has been taken with regard to this proposed listing.

3. United Park has performed various investigations and studies relating to environmental conditions associated with the Property.

4. The U.S. Environmental Protection Agency adopted on July 6, 2005 a final Record of Decision ("ROD") requiring that certain remedial actions be implemented at the Property.

5. The United States, on behalf of the Administrator of the EPA, filed a complaint in the United States District Court for the District of Utah against United Park (United States of America v. United Park City Mines Company, Civil No. _____) alleging that United Park is a liable party pursuant to Sections 106 and 107 or CERCLA, 42 U.S.C. §§ 9606 and 9607, and seeking *inter alia*, injunctive relief and compensation for its future response costs associated with the Property (the "Litigation").

6. United Park entered into a certain Consent Decree to settle the claims brought in the Litigation, which Consent Decree approved and entered by the Court on _____, ____, 2007 in the Litigation.

7. Pursuant to the Consent Decree, United Park has agreed, among other things, to undertake, perform, and finance certain response actions relating to the Property.

APPENDIX E

APPENDIX E

Date:_____

_____
_____
_____

Dear Sir or Madam:

As required by Paragraph 9(b) of the RD/RA Consent Decree, this letter shall serve as notice that the Property described in Exhibit A [to be attached] hereto is located within the boundaries of the Richardson Flat Tailings site and is subject to certain environmental terms, covenants and conditions, as contained in the following:

1. the RD/RA Consent Decree for the Richardson Flat Tailings Site, [to be] attached hereto as Exhibit B;

2. an easement, granting access rights to the Property to United States Environmental Protection Agency and Utah Department of Environmental Quality, [to be] attached hereto as Exhibit C;

3. an environmental covenant containing institutional controls and restrictions on use of the Property, [to be] attached hereto as Exhibit D.

As a successor-in-title to the Property, the foregoing environmental terms, covenants and conditions may impact your use and enjoyment of the Property and we encourage you to review the requirements these documents prior to your acquisition of any interest in the Property.

Sincerely,

_____
on behalf of United Park City Mines Company

APPENDIX F

APPENDIX F

WHEN RECORDED MAIL TO:
Kevin R Murray, Esq.
Chapman and Cutler LLP
201 South Main, Suite 2000
Salt Lake City, UT 84111

Parcel Nos.

GRANT OF EASEMENT

Pursuant to this Grant of Environmental Easement ("Easement"), United Park City Mines ("United Park"), a Delaware corporation and owner of certain real property located in Summit County, Utah, as further defined on Exhibit A attached hereto and incorporated herein by reference (the "Property"), hereby grants to the United States of America ("United States") acting through the United States Environmental Protection Agency ("EPA") and the State of Utah acting through the Department of Environmental Quality ("UDEQ") an easement pertaining to the Property pursuant to the terms and conditions described herein.

RECITALS

1. The Property was originally proposed for inclusion on the National Priorities List ("NPL") on June 24, 1988 but was removed from NPL consideration in February 1991;

2. The Property was re-proposed for the NPL on February 7, 1992 but no action has been taken with regard to this proposed listing;

3. United Park has performed various investigations and studies relating to environmental conditions associated with the Property;

4. The U.S. Environmental Protection Agency adopted on July 6, 2005 a final Record of Decision ("ROD") requiring that certain remedial actions be implemented at the Property;

5. The United States, on behalf of the Administrator of the EPA, filed a complaint in the United States District Court for the District of Utah against United Park (United States of America v. United Park City Mines Company, Civil No. _____) alleging that United Park is a liable party pursuant to Sections 106 and 107 or CERCLA, 42 U.S.C. §§ 9606 and 9607, and seeking *inter alia*, injunctive relief and compensation for its future response costs associated with the Property (the "Litigation");

6. United Park entered into a certain Consent Decree to settle the claims brought in the Litigation, which Consent Decree approved and entered by the Court on _____, ____, 2007 in the Litigation;

7. Pursuant to the Consent Decree, United Park has agreed, among other things, to undertake, perform, and finance certain response actions relating to the Property;

8. Pursuant to the Consent Decree, United Park has agreed to provide certain access to the Property to EPA and UDEQ as provided herein.

NOW, THEREFORE, United Park hereby grants an easement to the United States and the State of Utah, and their representatives (including contractors), for access at all reasonable times to the Property for the purpose of conducting any activity related to the Consent Decree including, but not limited to, the following activities as further described and defined in the Consent Decree:

i) Monitoring the Work;

ii) Verifying any data or information submitted to the United States;

iii) Conducting investigations relating to contamination at or near the Property;

iv) Obtaining samples;

v) Assessing the need for, planning, or implementing additional response actions at or near the Property;

vi) Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans;

vii) Implementing the Work pursuant to the conditions set forth in Paragraph 85 of the Consent Decree;

viii) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by United Park or its agents, consistent with Section XXIV of the Consent Decree;

ix) Assessing United Park's compliance with the Consent Decree; and

x) Determining whether the Property or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to the Consent Decree.

This Easement shall run with the land and shall be binding upon United Park and its successors and assigns and shall inure to the benefit of the United States and the State of Utah.

DATED this ____ day of _____, 2007.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

United Park City Mines Company

By: _____
[name]
[title]

STATE OF UTAH)
) ss.
COUNTY OF SUMMIT)

The foregoing Notice and Easement was subscribed, sworn to and acknowledged before me this ____ day of _____, 2007 by _____, acting in his capacity as _____ of United Park City Mines Company, a Delaware corporation.

NOTARY PUBLIC

_____

My commission expires:

_____

Residing at:

_____

EXHIBIT A

LEGAL DESCRIPTION

RICHARDSON FLAT - SITE PARCEL 1
JANUARY 23, 2002

A parcel of land located in the east half of Section 2 and Section 1, Township 2 South, Range 4 East, Salt Lake Base and Meridian.

Beginning at a point South 00°44'33" East 2315.11 feet along section line and West 2124.91 feet from the northeast corner of Section 1, Township 2 South, Range 4 East, Salt Lake Base and Meridian; and running thence South 36°45'45" West 616.47 feet; thence South 77°35'22" West 605.69 feet; thence South 27°48'26" West 924.31 feet; thence North 82°38'01" West 1191.60 feet; thence South 49°29'05" West 912.70 feet to a point on the west line of Section 1; thence along section line North 00°34'37" East 241.07 feet; thence South 89°58'53" West 188.10 feet; thence North 19°56'15" West 2478.15 feet to a point on a 1482.41 foot radius curve to the right of which the radius point bears North 70°03'45" East; thence northwesterly along the arc of said curve 466.75 feet through a central angle of 18°02'25"; thence North 14°54'13" East 322.55 feet; thence North 24°31'36" East 280.95 feet; thence North 35°00'22" East 150.75 feet; thence North 30°16'10" East 171.57 feet; thence North 27°39'30" East 146.38 feet; thence North 31°42'44" East 163.77 feet to a point on the southerly right-of-way line of Highway U-189; thence along the southerly right-of-way line of Highway U-189 the following six (6) courses: 1) 853.85 feet along the arc of a 5829.58 foot radius curve to the left (chord bears South 71°03'34" East 853.09 feet) to a right-of-way monument; thence 2) 636.69 feet along the arc of a 5829.58 foot radius curve to the left (chord bears South 78°23'49" East 636.37 feet) to a right-of-way monument; thence 3) South 71°22'30" East 227.84 feet to a right-of-way monument; thence 4) South 81°31'35" East 700.17 feet to a right-of-way monument; thence 5) South 76°56'20" East 501.58 feet to a right-of-way monument; thence 6) South 81°29'38" East 39.69 feet; thence South 32°35'26" East 1843.40 feet to the point of beginning.

Description contains 258.10 acres, more or less.