3.0 IDENTIFICATION OF RESPONSE ACTION OBJECTIVES

This section establishes the fundamental basis for the selection of response actions to be implemented within the ROW, including: 1) any statutory limits (value or time frame) applicable to implementation of the response action; 2) the overall scope, goals and objectives of the response actions; and 3) the schedule for implementation of response activities.

3.1 STATUTORY LIMITS

UPRR is the sponsor of the proposed CERCLA response action. Thus, the statutory limits (ceiling and duration) for fund-financed removal actions do not apply.

A proposed non-time critical removal action that costs more than $30 million or is more than $10 million and is 50% greater in cost than the least-costly, protective, Applicable or Relevant and Appropriate Requirement (ARAR) compliant alternative, may trigger review by the EPA National Remedy Review Board (NRRB). If necessary, EPA will ensure that proposed cleanup strategies receive appropriate NRRB review.

3.2 SCOPE, GOALS AND OBJECTIVES

3.2.1 Scope of the Response Action

As indicated earlier, the Wallace-Mullan Branch ROW extends approximately 71.5 miles across the panhandle of northern Idaho. The ROW varies in width from 50 feet to 300 feet. In addition to the rails, ties, and other track materials (OTM), the railroad infrastructure includes numerous bridges, culverts, miscellaneous loading/unloading structures, and a number of building remnants. There are also a number of areas where adjacent land owners have acquired lease rights or have encroached onto the ROW and have constructed buildings, fences, mine waste facilities and other works unrelated to the railroad.

This EE/CA addresses the main line and related sidings of the Wallace-Mullan Branch ROW. The 7.9 mile section of the ROW within the BHSS has been addressed as part of the BHSS ROD and is excluded from this EE/CA. The response action does not address: any spurs or connecting branch lines outside of the Wallace-Mullan Branch ROW; non-siding areas of the Wallace Yard outside a 26-foot-wide corridor bracketing the main line; and the areas of the Hecla Mine tailings impoundment and the Morning Mine Rock Dump that may encroach on the ROW. These areas will be addressed within the Bunker Hill Basin Wide RI/FS and/or other response actions.

3.2.2 Goals and Objectives of the Response Actions

The goals of the EE/CA are to effectively address the identified contamination within the ROW in a manner that is protective of human health and the environment and in compliance with ARARs to the extent practicable. The objectives of the response actions considered within the EE/CA are to minimize the potential for direct exposure to Mine Waste, and limit the potential for environmental transport of contaminants. The analysis presented herein builds upon the knowledge gained through investigation, design and implementation of remedial actions within the 7.9-mile segment of that portion of the ROW that passes through the BHSS.

3.2.3 Compliance with ARARs and Other Criteria

Section 300.415(i) of the NCP, implementing the CERCLA statute, requires that removal actions conducted pursuant to CERCLA section 106 attain ARARs under Federal or State environmental laws or facility siting laws, to the extent practicable. Governmental entities may determine practicability in relation to the scope of the proposed removal action. Tables 3-1 through 3-3 identify potential ARARs for this response action. Final ARARs will be identified as part of the response action design process. A brief discussion of the potential ARARs is presented below.

The proposed response actions contemplated in this EE/CA are limited to actions along the Wallace-Mullan Branch main line and related siding areas. Although these actions will reduce the potential for release of hazardous substances from the ROW, they are not intended to address possible discharges of hazardous substances from the lateral zones of the ROW into wetlands or surface waters or to make such possible discharges meet water quality standards. Accordingly, sections 301 and 303 of the Clean Water Act, 33 United States Code (U.S.C.) §§1251, 1253, will not be considered to constitute ARARs for these actions. Although there will be some attendant benefits to capping certain areas of the ROW and, therefore, reducing hydraulic conductivity and infiltration of rainfall and snow melt, the proposed removal actions are not intended to address groundwater contamination. Therefore, the Safe Drinking Water Act, 41 U.S.C. §§300 *et seq.*, will not be considered an ARAR for this action.

The applicability or relevance of the Resource Conservation and Recovery Act (RCRA), U.S.C. §§9601 *et seq.*, or the RCRA-authorized State program, to this project is also limited. Certain wastes produced through the extraction and beneficiation of minerals have been excluded from RCRA regulation pursuant to 42 U.S.C. §§6921(b)(3)(A)(ii). Such wastes, known as "Bevill exempt", may include mine tailings and other Mine Waste components with elevated concentrations of lead, zinc and cadmium along the ROW. Even if the Mine Waste of concern are not Bevill exempt, management of these wastes may still be exempt from compliance with Land Disposal Restrictions (LDRs) or RCRA minimum technology requirements for land disposal. The need to comply with such RCRA requirements may be triggered when wastes are moved from one "area of contamination" (AOC) to another. Wastes left in place or consolidated within one AOC are not subject to such RCRA requirements. For purposes of this response activity concerning Mine Waste and track salvage in the Coeur d'Alene Basin, the removal and consolidation of Mine Waste and debris from track salvage along or adjacent to the UPRR Wallace-Mullan Branch ROW may be considered as occurring within the same AOC. Therefore, RCRA LDR requirements do not constitute applicable requirements for the removal and disposal/consolidation of these wastes as contemplated in this EE/CA. For the consolidation of these wastes at discrete locations within the AOC, individual elements of RCRA Subpart N, 40 Code of Federal Register (C.F.R.) §§264.300 *et.seq.*, IDAPA 16.01.05.008, may be relevant and appropriate. For the consolidation of these wastes within the Central Impoundment Area (CIA) of the BHSS, EPA has established criteria prohibiting the placement of Principal Threat Materials (PTM). PTMs are those materials that have the highest potential for impact to human health and the environment. Protection of human health and the environment will be assured by properly disposing the minor fraction of materials to be excavated along the ROW that constitute PTM, in compliance with the Off-Site Disposal Rule, 42 U.S.C. §§9621(d)(3), 40 C.F.R. §§300.440, and all other applicable requirements.

Aside from response actions concerning Mine Waste, certain RCRA regulations may be ARARs for any salvage or other response actions concerning rails, ties and other track materials. In particular, RCRA treatment standards for hazardous debris, 40 C.F.R. §§268.45, Idaho Administrative Procedures Act (IDAPA) 16.01.05.011, may be ARARs for actions preceding

disposal or reuse and/or recycling of track materials. However, under Subpart A of RCRA, 40 C.F.R. §§261.3(f)(2), IDAPA 16.01.05.05, EPA (or the State of Idaho, under the State's RCRA-authorized program) may determine that such debris is no longer contaminated with hazardous waste, so the RCRA requirements do not apply. Such determination may be made following completion of actions that will be incorporated into a Salvage Work Plan that will be developed as part of the design of the response actions.

Under the Clean Air Act, 42 U.S.C. §§7401 *et seq.*, and the Idaho Air Pollution Act, §§16.01 *et. seq.*, there may be, respectively, chemical-specific ARARs for emission of lead and particulates, and action-specified ARARs for control of fugitive dust during remediation. Additional ARARs and other criteria are identified in Table 3-1, 3-2 and 3-3.

A number of potential ARARs have already been identified as substantive requirements set out in the ICC (now STB) Decision (November 28, 1994) (the Decision), regarding abandonment of the ROW. The Decision addresses salvage of the track structure, which is a necessary precursor to the implementation of the response actions for the rail line ballast and adjacent portion of the ROW. The essence of these ICC requirements are as follows:

> "Railroad infrastructure, including rails and ties, shall not be salvaged until there has been consultation with the Idaho Division of Environmental Quality (IDEQ) and the EPA, to ensure that such salvage activities will be in compliance with CERCLA (42 U.S.C. 9601 *et. seq.*), RCRA (42 U.S.C. 6901 *et. seq.*), and other applicable laws and regulations."

A number of the potential ARARs are affected by the division of jurisdiction between the Coeur d'Alene Reservation and the State of Idaho, particularly as to the ownership of waters within the reservation. While litigation is ongoing regarding the ownership issue, with the U.S., Coeur d'Alene Tribe and State of Idaho asserting different positions, the ARARs reflect the U.S.'s understanding and the current judicial determination. In July 1998, a Federal district court recognized the Tribe's ownership of the bed and banks of the lower third of Coeur d'Alene Lake, enjoining the State from assertion of jurisdiction for this area.

3.3 RESPONSE ACTIVITIES SCHEDULE

As indicated previously, the primary focus of the response action is to address the potential direct contact exposure pathway as well as to mitigate potential environmental impacts that may occur as a result of the salvage of the rails, ties, and OTM. Salvage of the railroad infrastructure will be the first component of the response action. After salvage, it will be undesirable to leave those areas subject to flooding exposed for a substantial length of time, due to the increased potential for mobilization of the ballast materials. Given these considerations, the conceptual schedule for the response action is as follows:

- Start of Salvage Operations — May, 1999
- Implementation of Flood Damage Repair — June, 1999
- Implementation of Removal Activities and Placement of Barriers — July, 1999

- Continuation of Removal Activities and Placement of Barriers — May, 2000
- Installation of Trail Amenities — July, 2000
- Completion of Response Action — October, 2000

The above schedule is dependent upon successful completion of negotiations toward a settlement of the Natural Resource Damage claims of the federal, state and Tribal trustees, and EPA's and the State's CERCLA claims. The timing of the response action is also dependent upon obtaining all necessary approvals from the STB for removal and salvage of the existing track infrastructure. The above schedule is also subject to weather and/or other similar unforeseeable delays.

4.0 IDENTIFICATION AND ANALYSIS OF RESPONSE ACTIONS

As stated previously, the ROW is a long corridor of relatively narrow width (50 ft - 300 ft), that passes through a variety of settings, conditions, and terrain. In order to best meet the response action objectives (RAOs) and the EE/CA criteria of implementability, effectiveness, and cost, it will be necessary to implement an assortment of response actions that will vary with the settings and conditions. Consideration of differing conditions will be pertinent when evaluating potential response actions for areas of the ROW that are in the flood plain versus those areas that are isolated from the potential effects of flooding. Given the linear nature of the ROW, it will also be important to recognize conditions in areas immediately adjacent to the ROW when developing and screening alternatives.

4.1 IDENTIFICATION OF POSSIBLE RESPONSE ACTIONS

The goals of the EE/CA are to effectively address the identified contamination within the ROW in a manner that is protective of human health and the environment and in compliance with ARARs to the extent practicable. The objectives of the response actions considered within the EE/CA are to minimize the potential for direct exposure to Mine Waste, and limit the potential for environmental transport of Mine Waste related contaminants. The analysis presented herein builds upon the knowledge gained through investigation, design and implementation of remedial actions within the 7.9-mile segment of the ROW that passes through the BHSS.

The list of response actions utilized within the BHSS serves as the starting point for the alternatives analysis presented within this EE/CA. That list was reviewed for completeness relative to the varying conditions, settings, and terrain found along the ROW. No additional categories of response actions were identified that warranted consideration. However, the range of actions considered within a given category should be broad enough to accommodate the diversity of conditions found along the length of the ROW. For example, the types of response actions considered under the category of “protective barriers” range from vegetation to asphaltic concrete pavement (ACP), and may include supplemental activities such as flood protection armoring depending upon the conditions and setting. The following presents brief descriptions of the categories of the response actions being considered:

No action

- Leaving the existing main line and siding rail beds and ROW lateral zones in their current condition

Institutional Controls (ICs)

- Establishment of controls to govern future access to and use of the ROW, installation of physical barricades and warning signs, and providing educational programs for potential ROW users

Protective Barriers

- Physical actions, including installation of protective barriers (ACP, gravel, soil, vegetation) to contain Mine Waste (in-place or in localized consolidation areas) and thereby prevent direct contact and control mobilization.

Removals and Disposal/Consolidation

- Excavation of Mine Waste with disposal and/or consolidation on-site (areas where hazardous substances have come to be located) and off-site.

Treatment

- Implementation of physical, chemical or biological processes to reduce the toxicity, mobility, and/or volume of contaminated materials.

4.2 INITIAL SCREENING OF POSSIBLE RESPONSE ACTIONS

The initial screening of potential response actions for this EE/CA was conducted by performing general evaluations of the alternatives relative to the following criteria as specified within the EE/CA Guidance:

Implementability

- Technical viability and feasibility
- Availability of labor, material and equipment resources
- Agency and community acceptability

Effectiveness

- Degree to which the response action contributes to protectiveness of human health and the environment and achievement of RAOs
- Long-term reliability and short term effectiveness
- Compliance with ARARs

Cost

- Relative (to each other) capital and operation and maintenance (O&M) costs (low, moderate or high) based on by past experience, independent estimates and engineering judgment

The results of the initial screening provide a basis for determining which of the possible response actions should be retained for further evaluation. The following presents a brief summary of the potential actions considered for a given response action category and the results of the initial screening of those actions. The individual response actions are described under the subheading of "scope" and screening results are described under the screening criteria subheadings of “implementability”, “effectiveness” and “cost”. The initial screening analysis is summarized in Table 4-1. Compliance with ARARs is addressed in Section 4.4 “Analysis of Alternatives”.

4.2.1 No Action

Scope

- Leave the ROW in its existing condition - this option is included to establish a baseline against which to compare other possible actions.

Implementability

- Readily implementable; however, unacceptable to agencies and communities because the no action alternative is not protective of human health and the environment

Effectiveness

- Not effective for protection of human health and the environment because exposure pathways for contaminants of concern are not mitigated

Cost
- Minimal capital or O&M costs

Retention for further consideration
- Rejected as a response alternative

4.2.2 ICs

Scope
- Imposition of controls for the use of and access to the ROW
- Installation of physical barricades
- Provide educational programs and health monitoring as necessary for potential ROW users

Implementability
- Readily implementable if ROW remains under control of a coordinated operating entity
- Limited acceptability by agencies and communities if the ICs cannot be implemented in an enforceable and consistent manner
- May require establishment of new local ordinances or regulations

Effectiveness
- Limited effectiveness in minimizing direct contact with Mine Waste
- Ineffective in restricting contaminant mobilization
- Increases the effectiveness of other physical actions

Cost
- Low capital and moderate O&M costs

Retention for further consideration
- Rejected as a primary response alternative; would not meet objectives in absence of other actions
- Viable only in conjunction with other physical response actions

4.2.3 Protective Barriers

Scope
- Placement of protective barriers of clean, durable material over areas of Mine Waste, or localized consolidation of Mine Waste under a secure barrier.
    - Vegetation
    - Soil or growth medium with vegetation (hereinafter referred to as vegetated soil barriers)
    - Gravel
    - ACP
    - Armoring for flood/erosion protection
        - Rip rap (alone or in combination with riparian vegetation)
        - Vegetation (trees, grasses)

Implementability
- Implementable for all identified types of barrier materials

Effectiveness

- Barrier materials may be effective in preventing direct contact and restricting contaminant mobilization by wind and water erosion if appropriately matched with land use and properly designed, constructed, and maintained
- ACP is effective for areas of high traffic due to its durability and; if properly maintained, it is also effective in inhibiting infiltration of rainfall and snow melt
- Rip rap is very effective in minimizing rail bed and embankment erosion but may result in other hydraulic changes
- Vegetation can be effective in limiting access, controlling direct contact, restricting infiltration, and reinforcing soil barrier materials against wear and erosion
- Protective barriers above Harrison may be subject to re-contamination by Mine Waste components through fluvial processes until upstream source controls are implemented

Relative Cost

- Soil or gravel barriers
  - Moderate capital cost
  - Low to moderate O&M costs
- ACP barriers
  - Moderate to high capital costs
  - Low to moderate O&M costs
- Rip rap barriers
  - Moderate to high capital costs
  - Low to moderate O&M costs
- Vegetation
  - Low capital cost
  - Low to moderate O&M costs

Retention for further consideration

- All retained as viable primary response actions

4.2.4 Removal and Disposal/Consolidation

4.2.4.1 Removal

Scope

- Excavation of Mine Waste contaminated materials using construction equipment
  - From localized areas to address identifiable accumulations of Mine Waste materials having elevated contaminant concentrations
  - From areas outside of the ordinary high water mark of active waterways or wetlands that are accessible to construction equipment

Implementability

- Removals from areas of the ROW outside the flood plain are implementable in most areas using construction equipment because the volume of Mine Waste contaminated materials is likely limited to relatively small quantities of ballast, and replacement materials may not be necessary
- Removals from areas of the ROW within the flood plain may presently be less practical due to limited access for excavation equipment and trucks and physical limits on excavation

Effectiveness

- Removals from areas outside the flood plain are effective in preventing direct contact and eliminating the potential for contaminant mobilization because the potential for recontamination through flooding is not present
- Certain areas along the ROW may be susceptible to recontamination due to mobilization of adjacent Mine Waste components
- Without implementation of effective source control in the Upper Basin, removals from areas within the flood plain may not be effective in the long term because excavated areas may be subject to recontamination from off-ROW sources
- Removal of material containing elevated metal concentrations would be effective in reducing acute hazards associated with potential direct contact and/or remobilization

Relative Cost

- Ballast and Mine Waste removals from limited areas outside the flood plain
  - Moderate capital costs
  - Low O&M costs
- Mine Waste removals from areas within the flood plain
  - Moderate to High capital costs depending upon volume
  - High O&M costs

Retention for further consideration

- Limited removals of Mine Waste contaminated material are retained as a viable primary response action in selected areas of the ROW and in conjunction with other response actions
- Large-scale removals of Mine Waste within the flood plain portion of the ROW are not retained due to implementability and effectiveness concerns

4.2.4.2 Disposal/Consolidation

Scope

- On-site
  - Construction of a new on-site disposal facility
  - Localized consolidation areas within ROW under an ACP barrier
  - New on-site interim storage or disposal facility
  - An existing on-site disposal facility or consolidation area
- Off-site (suitable commercial facility)
  - Transport of excavated materials to an appropriate facility at some location outside the Coeur d'Alene Basin

Implementability

- On-site
  - Localized consolidation within the ROW is implementable, provided that the volume of material to be consolidated is consistent with available space and the response action for the consolidation area includes an ACP barrier
  - Construction of an interim storage facility may be implementable subject to available capacity, existing land uses and community acceptance
  - Construction of a new disposal facility within the AOC may be feasible, subject to available capacity, existing land use and community acceptance
  - Placement of excavated materials in existing disposal facilities or consolidation areas is implementable subject to available capacity, closure schedule, existing

land use, waste acceptance requirements and community acceptance
    - On-site transportation of large volumes of contaminated materials increases the short-term exposure potential to workers and residents along the transportation route as well as increasing traffic and wear and tear on local roads
- Off-site
    - Implementable
    - Off-site transportation of large volumes of contaminated materials increases the short-term exposure potential to workers and residents along the transportation route as well as increasing traffic and wear and tear on local roads

Effectiveness
- On-site
    - Localized consolidation and containment within the ROW is effective provided there is proper maintenance for long-term reliability
    - Construction of an interim storage may be effective short-term but does not offer a long-term solution for the management of materials
    - Construction of a new disposal facility may be effective depending upon construction, operation, closure and maintenance
    - Placement of excavated materials in an existing disposal facility or consolidation area can be effective depending upon construction, operation, closure and maintenance
    - Transportation of contaminated materials may present short-term impacts that could be controlled by engineering practices and/or community specific considerations
- Off-site
    - Placement of excavated materials in an existing disposal facility or consolidation area can be effective depending upon construction, operation, closure and maintenance
    - Transportation of contaminated materials may present short-term impacts that could be controlled by engineering practices and/or community specific considerations

Relative Cost
- On-site
    - Localized consolidation and containment within the ROW would present low capital costs and low O&M costs
    - Construction of an interim storage facility would present moderate to high capital costs and high O&M depending upon transportation distances to the storage facility and final resolution of the material
    - Construction of a new disposal facility would have moderate to high capital costs depending upon construction requirements and haul distances; future O&M costs will be low
    - Capital costs for placement of materials in an existing disposal facility or consolidation area such as the CIA would range from low to moderate depending upon the haul distance from the excavation point to the impoundment; future O&M costs would be low
- Off-site
    - Capital costs would be high to very high depending upon the contaminant concentrations of the material and the haul distance to the facility
    - Future O&M costs would be included in the capital costs

Retention for further consideration

- On-site
  - Retained for further analysis where the characteristics of the materials allow for on-site disposal or consolidation
- Off-site
  - Retained for further analysis under circumstances where the characteristics of the materials do not allow for on-site disposal/consolidation options

4.2.5 Treatment

Scope

- Fixation, stabilization, and/or solidification of Mine Waste contaminated materials through the addition, mixing, and curing of appropriate chemicals or other reagents
  - Cement, tri-sodium phosphate, proprietary reagent admixtures, etc.
  - Can be conducted in-situ for volumes of relatively uniform materials found at shallow depths, or at a central treatment area, using screens, conveyors, a pugmill and other materials handling equipment for larger volumes of varied materials that extend to greater depths

Implementability

- Implementable for small volumes of excavated materials, prior to disposal, using conventional equipment and materials
- Not implementable in-situ, given the coarseness of much of the Mine Waste contaminated material (i.e. ballast) and the depth of contamination in the flood plain
- May be acceptable to agencies and to communities (with treatability study)

Effectiveness

- Can be effective in reducing the toxicity and mobility of contaminants, if materials to be treated are adequately prepared
- Ineffective in reducing the volume of contaminated material
  - Most treatment processes for contaminated solids result in an increase in total volume
- The long-term effectiveness of treatment may be negated if areas in which materials are treated in-situ are subject to weathering, or are subsequently recontaminated by redeposition of off-ROW Mine Waste materials

Cost

- Capital costs would be moderate to high depending upon the volume of material to be treated and the complexity of the treatment process required
- Future O&M costs would be low for materials treated and then properly disposed of

Retention for further consideration

- Neither in-situ nor larger-scale treatment of excavated materials are considered practicable, given the large volume of lower-concentration Mine Waste materials present within the flood plain portion of the ROW and the effectiveness concerns associated with in-situ treatment
- Rejected as a viable category of primary response actions

4.3 IDENTIFICATION OF RESPONSE ALTERNATIVES

The categories of possible response actions that survived the initial screening, as described in Section 4.2 above, are as follows:

- ICs
- Protective barriers
- Selective removals and disposal/consolidation

Application of these surviving response actions, individually or in combination, within the various settings and conditions that are found along the ROW, may take one or more forms. The range of potential actions for an alternative is presented below along with a brief discussion of the alternatives applicability along the ROW.

4.3.1 ICs

ICs include:

- Controls on access to and use of the ROW
- Signs and notices
- Physical barricades
- Restrictions on activities that might disrupt protective barriers to avoid adverse effects to the environment
- Educational programs and health monitoring, if necessary.

ICs are appropriate for the length of the ROW. The application of ICs would likely be more intensive in areas where the ROW passes through communities or populated areas where adjacent land users could more readily be impacted by contamination within the ROW. The design of any ICs must complement any physical components of the response action. For example, if barriers are implemented, then the ICs would address future maintenance of the barriers. ICs are also appropriate in non-populated areas to discourage access to areas which present unacceptable health risks or to protect sensitive environments.

4.3.2 Protective Barriers

Protective barriers include:

- Vegetation, either existing or planted
- Vegetated soil barriers
- Gravel barriers
- ACP
- Rip rap barrier or reinforcement with vegetation

Placement of barriers may be appropriate for all or a portion of the ROW width depending upon the setting, the condition, and the anticipated exposure scenarios at a given ROW location. Barrier materials must be consistent with the anticipated future land use.

Vegetation alone as a barrier is appropriate over broad areas of the flood plain where it is not practicable to use other barrier materials and where direct exposure scenarios are limited. Dense vegetation either is present or could be established and used as a barrier in larger portions of the ROW away from the rail bed. Vegetation can also be used as a means to limit access.

Vegetated soil or gravel barriers are appropriate in areas of the ROW where residential

exposure scenarios are found. Vegetated soil or gravel barriers would be used within communities, adjacent to residential areas, siding areas, road crossing, and other similar areas. Vegetated soil or gravel barriers are not generally appropriate within flood plain portions of the ROW and those portions of the ROW where heavy pedestrian or bicycle traffic is expected. These materials do not exhibit sufficient durability for such activities.

The ballast along the track portion of the ROW generally contains higher concentrations of contaminants. Protective barriers over the ballast need to limit infiltration into the ballast and thereby limit future potential for transport of contaminants from the ballast. As discussed previously, the ROW may be converted for use as a recreational trail. In this scenario the mainline ballast portion of the ROW would become the primary pathway for the trail. Accordingly, the protective barrier along the mainline ballast will need to be durable relative to the anticipated use. Given these considerations ACP would be an appropriate barrier for the mainline ballast portions of the ROW.

Rip rap generally would not be considered as a primary barrier material. Rip rap may be placed in conjunction with other barriers as a means of increasing the long-term effectiveness of the barrier by protecting it against potential flood damage.

4.3.3 Removals and Disposal/Consolidation

Removals include:

- Excavation of identifiable accumulations of Mine Waste materials with relatively high lead and/or other heavy metal concentrations (i.e. concentrates)
- Removal of accumulations of railroad debris (used ties, etc.) and underlying soils that may have been impacted by contaminants associated with such debris
- Excavation of localized areas where such removals are necessary or desirable to maintain the existing surface grade or establish drainage paths
- Aesthetic tie-in at barrier perimeters

Removals are most applicable to sidings, Plummer Junction, and loadout facilities where the potential for the presence of concentrates is greatest. Removals would also be applicable to those areas of the ROW where the Mine Waste is limited to the ballast. In such areas, removal of the ballast would eliminate future exposure concerns. These areas are limited to the far western portion of the ROW, along Lake Coeur d'Alene, and in the uplands portion on the east side of Plummer. There may also be some smaller areas where removals are appropriate within certain communities where the ROW has historically been sheltered from the influences of flooding.

Disposal/Consolidation alternatives include:

- Localized consolidation and containment within the ROW
- Construction of an on-site interim storage facility
- Construction of new on-site disposal facilities
- Disposal in existing on-site disposal facilities or other on-site consolidation areas
- Offsite disposal of material that is not suitable for on-site disposal

Disposal of removed materials will best be accomplished at an existing on-site disposal facility such as the CIA or other consolidation area, if such disposal can be coordinated with the schedule for closure of the facility. The possibility also exists for localized consolidation of small volumes of materials within the ROW under an ACP barrier. Given the scope of the removal

alternative, such localized consolidation options may only be appropriate for mainline ballast that could be located under a durable ACP barrier.

4.4 ANALYSIS OF ALTERNATIVES

In the following subsections, a further evaluation is presented of those response action alternatives that survived the initial screening and were further developed in Section 4.3. The evaluation presented below further assesses the feasibility of the respective alternatives for application to the various settings and conditions along the length of the ROW. The detailed analysis of alternatives is summarized in Table 4.2.

4.4.1 ICs

ICs would place restrictions on access and use of portions of the ROW, either in lieu of or in addition to implementation of physical response actions. Such ICs would serve to enhance the overall protectiveness of the physical response action in areas where the potential for public exposure to Mine Waste contaminated materials is likely. ICs are applicable over that portion of the ROW where Mine Waste remains in-place.

4.4.1.1 Implementability

The near and long-term implementability of ICs is significantly influenced by the level of control that will be in-place along the ROW. There are two scenarios that affect this future level of control, development of a recreational corridor under a CITU (the Trail Scenario) or abandonment and reversion of the ROW (the Reversion Scenario). As discussed previously, the determination of which scenario will be applicable to the ROW is dependent upon the issuance of a CITU by the STB or, in the absence of a CITU, the completion of the abandonment process by UPRR as approved by the STB. The considerations and decisions associated with the issuance of the CITU are not part of the CERCLA decision process being addressed by this EE/CA. However, the EE/CA has considered the potential future use and ownership status of the ROW in the evaluation of the response alternatives.

Under the Reversion Scenario, the ownership of the ROW may revert to the persons or entities that hold the revisionary property interests. In this scenario, the IC programs would have to be developed and implemented by local, county and/or regional governments in those areas of the ROW where Mine Waste remain in place. ICs would not be required in a Reversion Scenario where Mine Wastes are removed entirely from the ROW. However, the near and long-term practicability and effectiveness of such an approach is uncertain, since there may be gaps and inconsistencies in the scope of the controls and a lack of uniformity and enforceability along the entire ROW.

Under the Trail scenario, the ROW would remain intact under the control of a coordinated operating entity and therefore, the near and long-term implementability and effectiveness of ICs would be more certain and less problematic.

ICs consist of a number of options. While these options are more readily implementable under the Trail Scenario, they could potentially be implemented for the Reversion Scenario. The following presents a discussion of the relative merits and applicability of these various ICs:

Education - Most implementable with the local residents of the area, where there

would be greater opportunity for educational interaction and ongoing reinforcement through repeat presentations and updates. Similarly, education is applicable and would have the greatest benefit in the populated areas, where the transmission of information would be more likely to be perpetuated by the recipients, particularly warnings being passed on from parents to children. The education programs could also include focused case management including health monitoring by health authorities if necessary.

Signs and Notices - Would be equally implementable to all groups of ROW users. Such ICs could be location or condition specific. They could also be time specific, to reflect changing conditions. Signs and notices, however, may require periodic renewal and updating to remain current.

Physical Barricades - Would be implementable and could be tailored to suit particular settings and conditions. In addition, physical barricades would offer greater permanence than signs and notices but may be less flexible in accommodating changing conditions.

Controls on Use of and Access to the ROW - Would be readily implementable if the ROW remains under the control of a coordinated operating entity (i.e. the Trail Scenario). Such controls would include building and use restrictions, access control, etc. In the Reversion Scenario, controls could be imposed by governmental entities through ordinances and regulations; however, such controls depend on the jurisdiction of a governmental entity and support by governmental/political authorities.

Given the above discussions, the implementability of ICs can be summarized as follows:

- ICs would be more easily and consistently implementable in the Trail scenario where the ROW remains intact under a coordinated operating entity.
- In a Reversion Scenario, ICs could only be implemented through the jurisdiction of a governmental entity. Such ICs may not be uniformly implemented over the entire ROW.
- ICs are expected to receive limited acceptance by the regulatory agencies, if the ICs cannot be consistently implemented over the entire ROW. The implementability of ICs that depend upon establishment of new ordinances or regulations must be considered to be uncertain.

4.4.1.2 Effectiveness

ICs are not effective in terms of improving conditions along the ROW, but can be effective in terms of reducing the potential for exposure to contaminants that may remain within the ROW. Similar to the discussion above with respect to implementability, ICs would also be most effective if the ROW were to remain intact under the control of a coordinated operating entity (i.e., the Trail Scenario). Such a scenario would allow for uniformity in the application and enforcement of ICs throughout the length of the ROW. The following presents a discussion of the relative effectiveness of the various ICs being considered:

Education - Would provide the greatest long-term effectiveness because it could be

periodically supplemented to reflect possible changing conditions. Education would likely be most effective with the local residents. As the most significant repeat users of the ROW, local residents would readily become familiar with conditions, risks, and appropriate precautions. This education would also be helpful in mitigating possible exposures to contaminants in those areas outside of the ROW that may be accessed by ROW users. Education would be less effective with visitors to the area, due to limited interaction and familiarity. Overall, the effectiveness of education would depend upon the continual wide dissemination of information.

Signs and Notices - Would be effective in reinforcing education and to alert visitors to potential risks and use restrictions that may exist along the ROW. Information conveyed through signs and notices could be global in nature but would likely be most effective if it were location specific. A problem with global warnings is the "out of sight, out of mind" syndrome. Location specific signs would draw the attention of ROW users to specific conditions. As with education, signs and notices would also be helpful in mitigating risks that may be present in off-ROW areas. To remain effective, signs and notices would require periodic renewal to reflect changing conditions.

Physical Barricades - Would provide more control than signs of unauthorized/ undesirable public access to an area. Fences physically restrain persons more effectively than signs and require a conscientious intent and effort to circumvent. Physical barriers would be most effective in terms of directing or confining activities to areas that have the least risk. Physical barriers would, however, require periodic maintenance to remain effective.

Controls on Use of and Access to the ROW - Effective in reducing short-term and long-term exposures provided that an appropriate controlling entity is in place to monitor and enforce the established controls. Such controls would be most effective in the populated areas where they can more effectively be monitored. In the Reversion Scenario, such controls would be more difficult to enforce and, therefore, may not be effective within those portions of the ROW that become private property. Controls would be most effective when applied in conjunction with education.

Based on the above discussion the effectiveness of ICs can be summarized as follows:

- The types of ICs that are appropriate and their effectiveness will depend upon the future status of the ROW and the ability of a coordinated operating entity to maintain and enforce the controls. Existing ICs on the ROW include signage and controls on land use of the ROW.

- ICs similar to those being considered within this EE/CA have been implemented within the BHSS, both independently and in support of physical remedies. Education of the local population and health monitoring have been effective measures in reducing the potential for exposures to contamination within the BHSS. Legal restrictions and permitting requirements have also been effective. For example, the BHSS ICs program addresses access to utilities located below barriers in ROW settings through education, training, and the establishment of procedures help to maintain the integrity of the barriers.

- ICs may reduce, through posted warnings, fences, and other access restrictions the number of people who enter a potentially contaminated area and/or who come in contact with contaminated media. ICs will not provide any specific physical barrier against direct contact.

- Although ICs may assist in reducing direct exposure concerns, they would be of no benefit in reducing the toxicity, mobility, or volume of contaminants.

4.4.1.3 Cost

The costs associated with implementation and maintenance of ICs will be largely dependent upon the scope of the program and the extent to which the program can be built upon the foundation of an existing program (e.g., the ICs program administered by Panhandle Health District within the BHSS). It is expected that there would be some physical components of an ICs program (fences, barricades, signs, etc.), for which costs can be estimated. The costs of other components of an ICs program (development and implementation of educational programs, imposition of property deed restrictions, establishment and enforcement of rules and regulations to control activities within the ROW, etc.) are less quantifiable. Approximate direct capital unit costs for possible physical components of an ICs program are presented below:

- Fencing - unit costs will depend primarily upon fencing type and materials
  - open rail (treated wood) $9.00 - $11.25/lf
  - chain link $13.75/lf
  - stockade (sawn lumber) $14.15/lf
  - hostile vegetation $ 5.00/lf

- Concrete no-post barriers $37.50/lf

- Signs - unit costs will depend primarily upon size and materials of the sign body
  - 18" x 24" aluminum w/ 10' steel post $90/ea
  - decorative etched wood $250/ea
  - laminated fiberglass (depending on size) up to $1,500/ea

Indirect capital costs for these component actions would not be expected to exceed approximately 10% of the direct capital cost amounts. Ongoing O&M costs for these components should be minimal, if weather resistant materials (as contemplated in the above direct costs) are used. Inspections and incidental repairs, as necessary, could readily be conducted in conjunction with other O&M activities along the ROW, at little if any incremental cost.

The relative cost of an IC program can be summarized as follows:

- Depending upon the nature of the ICs and whether new ICs become part of an existing network of ICs already present along the ROW, the cost of an ICs program would be moderate.

4.4.1.4 Conclusions

ICs, if properly established and enforced in conjunction with other physical response actions, would effectively increase the protectiveness and durability of such response actions.

The benefits of ICs would be maximized if they were implemented uniformly throughout the length of the ROW.

4.4.2 Protective Barriers

Protective barriers would provide for containment and isolation of Mine Waste. Barriers would consist of the maintenance of existing vegetation in areas of the ROW where it is well established or placement of new protective barriers of vegetated soil, gravel, rip rap, or ACP over specified areas of concern. Vegetated soil or gravel barriers would be used within communities where there is a high potential for residential exposure scenarios. Most containment of contaminated materials would be conducted in-situ, with the appropriate barrier layer being placed directly over the contaminated material in its current location. In selected locations, localized accumulations of contaminated ballast or other similar materials may be excavated and consolidated under a protective barrier that may be placed in another location.

Protective barriers would also serve to create clean rest stops at strategic locations along the ROW. These rest stops could be used as part of risk management to focus recreational users or other persons accessing the trail toward clean zones and away from those larger ROW and non-ROW flood plain areas where barrier placement is not presently considered practicable. Existing flood plain vegetation may also discourage routine access to those areas.

ACP would provide a durable surface for a trail pathway and be an appropriate low infiltration barrier. ACP would be applicable to that portion of the mainline rail bed where contaminated ballast remains in place. ACP could also be used as a barrier for other high traffic portions of the ROW associated with a trail, such as parking lots, other access points, and viewing areas.

4.4.2.1 Implementability

Barriers could be implemented under most ownership and land-use scenarios. However, barriers would be most readily implementable if the ROW were to remain under the control of a coordinated operating entity. The Trail Scenario would facilitate the implementation of consistent maintenance procedures and control of activities that might disrupt the barriers as opposed to the Reversion Scenario.

Implementability of protective barriers would be dependent upon the physical setting of the proposed barrier locations. Protective barriers may not be practical in those areas of the ROW that consist of steep, uneven terrain and/or are heavily wooded. Areas within the active portion of the river channel and flood plain comprise a significant portion of the ROW, and it would not presently be practical to implement barrier construction in those areas, primarily due to a lack of access for construction vehicles. Barrier placement within the flood plain may also present concerns regarding alteration of wetland habitat. By comparison, barrier placement would be readily implementable in urban areas.

All of the protective barriers identified in Section 4.3 are physically implementable, except as described above. Therefore, comparison of protective barriers is more a function of effectiveness and cost than implementability. However, as discussed below, there is some variability in the implementability of the various protective barrier alternatives.

Vegetation on Existing Soil - Implementable where suitable surface soils already exist

or where vegetation is already established or could be enhanced. Vegetation could also be established in presently non-vegetated areas that had suitable conditions for plant growth.

Vegetated Soil Barrier - Suitable where a new barrier is required and a vegetated surface is desirable for aesthetic or land-use reasons, or to reinforce the soil barrier against erosion. This type of barrier would be readily implementable and may result in greater public acceptance than other barrier materials in portions of the ROW directly adjacent to residential development or public parks.

Gravel Barriers - Implementable but are better suited to non-residential areas. Such areas might include access corridors within and between communities, commercial areas, and more remote locations along the ROW.

Rip Rap Armoring - Implementable but its applicability is limited to embankment erosion prevention rather than as a ballast barrier. For rip rap placement within the river channel, compliance with the substantive requirements of the Clean Water Act (404 Permit issues) is required. Rip rap (which may also include riparian vegetation) would be most suitable on those ROW embankments that are susceptible to erosion from flooding.

ACP - ACP would be most suitable in portions of the ROW that may be used for pedestrian or bicycle traffic or in high-use parking areas (e.g., at major community points of access to the ROW). ACP also provides for a low infiltration barrier where ballast is to be left in place.

Based on the above discussion, the implementability of protective barriers can be summarized as follows:

- Protective barriers are readily implementable using locally available construction equipment for all the identified types of barrier materials in areas of the ROW that are outside the routinely active portions of the flood plain. Barriers placed in areas of the ROW that are within the routinely active portions of the flood plain would be subject to erosion and/or recontamination at the next flood event until effective source control is implemented in upstream areas.

- Barriers, other than rip rap, placed in areas of the ROW that are steeply sloped, if placement could be achieved, would likely be unstable and prone to failure.

- Protective barriers may be generally acceptable to the regulatory agencies for the remainder of the ROW, with supplementary response actions being required in certain areas to address specific concerns.

- Acceptability of protective barriers to the residents of the communities through which the ROW passes will be assessed during the EE/CA public comment period.

4.4.2.2 Effectiveness

Protective barriers will prevent direct contact, ingestion, and inhalation of contaminants by

potential receptors. Barriers will also mitigate the potential for mobilization of contaminants by wind and water erosion. However, the permanence and, therefore, the long-term effectiveness of protective barriers may depend upon implementation and enforcement of ICs and long term maintenance.

Subject to implementation of appropriate best management practices (BMPs) during removal of the track structure and during barrier placement, protective barriers are compliant with ARARs. Barrier placement adjacent to or along wetlands or waterways could be accomplished in conformance with Federal and State and Tribal requirements. Also, it is not anticipated that barrier placement would impact or obscure any historical features of the ROW. Where the presence of any endangered species is of concern, barrier placement would be conducted using procedures that will mitigate any impact on such species.

The relative effectiveness of protective barriers will depend upon selection of appropriate barrier materials, the potential for recontamination, and performance of periodic maintenance and repair to preserve the integrity of the barriers. The relative effectiveness of the protective barrier alternatives is as follows:

Vegetation of Existing Soil - Effective when Mine Waste contaminant concentrations are relatively low and where the potential for future disturbance of the area is expected to be low. These conditions are expected to be encountered where public access is not anticipated to be extensive and where regular maintenance is considered to be either not necessary or not problematic, such as in the more remote areas of the ROW. The effectiveness of these actions would be enhanced where ICs can be imposed to control intrusive activities that might disrupt the vegetation cover.

Vegetated Soil Barriers - A vegetated soil barrier would effectively provide a clean separation from underlying Mine Waste contaminated materials, as well as all the benefits of natural vegetation. Vegetated soil barriers are appropriate to areas where regular public access is anticipated, and where a physical barrier is warranted to prevent direct contact or mobilization of Mine Wastes. Vegetation of the barrier will increase the barrier's durability and enhance the aesthetics of the barrier in an urbanized area. Vegetated soil barriers would not be an effective barrier where heavy traffic, such as a pathway, is anticipated.

Gravel Barriers - Gravel barriers would provide for the same human health and environmental protection as a vegetated soil barriers. Gravel would not be as resistant to erosion as rip rap, ACP or vegetated soil barriers nor would gravel provide a infiltration barrier against infiltration as ACP would. However, gravel would be suitable for areas where a medium durability barrier is warranted, where the surface aesthetics of vegetation are not a significant requirement and where there is access for maintenance.

Rip Rap Armoring - would be similar in performance to gravel barriers for preventing human health exposures. However, the significantly increased particle size and angularity of rip rap will enhance the durability of the barrier in areas of potentially severe erosive forces (e.g., river banks) and increase protection against contaminant mobilization. The rugged characteristics of rip rap material are also appropriate for creating a more hostile environment in certain areas in order to discourage public access to the area. Rip rap placed immediately adjacent to and/or in the stream

channel will be particularly vulnerable to recontamination during floods. Rip rap barriers would be less dependent than gravel or soil barriers on implementation and enforcement of ICs to preserve long-term effectiveness. However, periodic maintenance and repair will be required, particularly after flood events.

ACP - Provides the most durable barrier, within the expected lifespan of the pavement. ACP is best suited in areas where a low infiltration barrier is desired and which are subject to trail related traffic. Under a Trail scenario, pedestrian traffic would be along the rail bed alignment, which is also where the Mine Waste contaminated ballast is located and, thus, where a low infiltration barrier is warranted. Other applications for ACP might include areas where Mine Waste contaminated materials are to be contained in-situ or where small volumes of materials from other nearby areas are to be consolidated and contained. ACP would also be effective in parking areas at designated access points to the ROW. The effectiveness of ACP would not be compromised by inundation and possible resultant deposition of contaminants from off-site sources. Such deposits could readily be cleaned from the ACP surface.

The effectiveness of protective barriers along the ROW can be summarized as follows:

- Barriers, if properly installed and maintained, will provide good overall protection for human health and the environment.

- The effectiveness of barriers in flood prone areas above Harrison may be subject to re-contamination through fluvial processes until upstream source controls are implemented.

- Barriers will provide a physical barrier against direct contact, ingestion, and inhalation exposures. They will also mitigate physical mobilization of underlying contaminants due to wind and water erosion.

- Subject to implementation of appropriate BMPs during removal of the track structure and during barrier placement, protective barriers are compliant with ARARs.

- Long-term effectiveness of protective barriers will be dependent, to some degree, upon the choice of barrier material and maintenance of the barriers, as well as implementation of ICs to limit and/or control disturbance of the barriers by ROW users or during utilities installation in the area.

- Short-term effectiveness of barriers would be good, provided that adequate precautions (i.e., BMPs) are taken to avoid undue mobilization of contaminants during barrier placement, particularly if materials are to be collected from a variety of areas and consolidated under a common barrier.

- Protective barriers are effective in reducing the mobility of contaminants, but not in reducing the toxicity or volume of contaminants.

- Barriers may not be effective in areas where land ownership is private and there are no land use controls to ensure the long-term integrity of the barrier.

4.4.2.3 Cost

As discussed in the previous section, a variety of protective barrier materials may be used to address the range of possible needs and conditions along the ROW. The corresponding unit costs for supply and placement of the various barrier materials also varies. Approximate direct capital unit costs for the different barrier materials being considered are as follows (in units of dollars per thousand square feet [$/KSF]):

- Vegetation on existing soil $60/KSF
  - hydroseeding w/ mixture of seed, fertilizer and mulch
- Vegetated soil or grouting medium barrier $600/KSF
  - 12" thick barrier w/ hydroseed as above
- Gravel Barrier $450/KSF
  - 12" thick barrier of ¾" minus crushed road base gravel
- Rip Rap Armoring $2,600/KSF
  - 18" thick rip rap blanket
  - geotextile filter layer (10 oz/sy)
  - 6" thick sand cushion/filter layer
- Asphalt Concrete Pavement $1,100/KSF
  - 2½" thick pavement
  - 4" thick road base layer (¾" minus crushed gravel)

Indirect capital costs for protective barriers will vary depending upon the degree of sophistication of the barrier. Engineering, design, and construction management of ACP and rip rap armoring may be approximately 15% to 20% of direct costs, respectively, while indirect capital costs associated with gravel and soil barriers would be expected to be approximately 10% of direct costs. Indirect costs associated with an existing vegetation barrier would be minimal, if any.

Ongoing O&M costs for protective barriers would be expected to be low to moderate, with the expectation that inspections, maintenance, and repairs, as necessary, would be included with other regular O&M activities conducted along the ROW. Depending upon aesthetic requirements, vegetated barriers may require periodic mowing and weed control, which are estimated to cost approximately $13.20/KSF/year to $30/KSF/year if mowed twice per month for six months per year.

For gravel barriers, periodic grading and occasional placement of additional material may be necessary to restore localized erosion areas, but the required frequency of such maintenance activities is difficult to predict. An allowance of $80/KSF/year to $110/KSF/year is expected to be adequate.

For rip rap armoring, periodic stone replacement may be necessary after storm events, but major O&M commitments are not expected to be necessary. An allowance of $200/KSF/year to $300/KSF/year is considered adequate.

To prolong the service life of ACP barriers, periodic crack sealing will be necessary to preserve the impermeable qualities of the surface and to avoid moisture infiltration to the underlying base gravels that could result in frost heaving. The estimated average cost of crack sealing is approximately $32.00/KSF/year. Eventually, pavement resurfacing will also become necessary. It is expected that the frequency of such resurfacing will be approximately every 20 years, and that the unit cost of this work will be approximately $330/KSF. Based on a 20-year resurfacing cycle, the average annual cost of resurfacing is estimated to be approximately $16.50/KSF and the present value of such work is approximately $124/KSF.

The relative cost of the protective barrier alternatives can be summarized as follows:

- Direct costs per unit area would be dependent upon the material employed for the containment barrier and the construction conditions (access, staging areas, etc.) under which it is placed in a given area.

- Soil or gravel barriers would entail moderate capital cost and low to moderate O&M costs.

- ACP barriers would entail moderate to high capital costs, but low to moderate long-term O&M costs.

- Rip rap barriers would entail moderate to high capital costs and low to moderate O&M costs.

- Vegetative reinforcement of embankment armoring would entail low to moderate capital costs and low O&M costs.

- Indirect costs (engineering, construction supervision, etc.) would be higher for rip rap and ACP barriers than for soil or gravel barriers.

4.4.2.4 Conclusions

In-situ containment and isolation of Mine Waste contaminated materials beneath a suitable protective barrier is considered to be an efficient and cost-effective means of protecting human health and the environment along the ROW in combination with ICs. Selection of an appropriate barrier material, where necessary, should reflect consideration of the setting, conditions, and anticipated future use of the particular area of the ROW where the barrier is to be applied.

4.4.3 Removal and Disposal/Consolidation

4.4.3.1 Removals

Removals would include excavation and disposal of potential accumulations of concentrates and, potentially, ballast from localized areas of the ROW located outside the routinely active portions of the flood plain, where recontamination would not be an issue. Removals to address the presence of concentrates would be applied to areas where concentrates can be identified or where there is a high probability of past spillage or leakage of these materials. Based on knowledge of rail line operations, previous work at BHSS, and ROW soil sampling, areas with a high probability of the presence of concentrates are sidings, loadout

areas and junctions.

Knowledge of line construction, along with sampling results, indicates that for the ROW segment from Harrison to Plummer the presence of Mine Waste is limited to those materials placed as ballast. This may also be true for a segment of the ROW within Osburn, where the ROW has been sheltered from floods by development of the community. For these areas, removal of the ballast, as well as removal of any identified accumulations of concentrates wherever they may be found, would result in the elimination of direct exposure, recontamination, and future transport concerns. Removal of ballast from these limited areas is also feasible from a disposal perspective.

4.4.3.1.1 Implementability

The implementability of removals can be summarized as follows:

- Removal of identified accumulations of highly contaminated materials (i.e. concentrates) is implementable using construction equipment.

- Removals of larger volumes of materials (main line or siding ballast) from certain areas are also expected to be implementable, provided that reasonable access is available for trucks and equipment. The ability to conduct removals would be hampered in isolated areas where the rail bed embankment is the only access route to the work area and where there are no convenient staging areas.

- Prior to initiating removal activities with large excavation equipment, or salvage of rails, ties, and OTM, it may be necessary to proceed with some hand work to remove small accumulations of concentrates from confined areas (e.g., from between the ties), in order to avoid inadvertently mobilizing such materials during the larger-scale removal activities.

- Removal and transport of contaminated materials from selected locations, in order to meet specific objectives, would be expected to be acceptable to the regulatory agencies.

- Acceptability by local communities of selected removals can be assessed during the public comment period.

4.4.3.1.2 Effectiveness

Removal and disposal of Mine Waste contaminated materials would be effective in providing long-term protection of human health and the environment. However, within the CDR flood plain, removal areas could be subject to subsequent redeposition of Mine Waste contaminated materials from off ROW sources (e.g., fluvial deposition during flood events, or wind-blown dust from adjacent contaminated areas). The effectiveness of removals in these flood prone areas would be diminished or negated until up-stream source controls are implemented.

Removals throughout the ROW of accumulations concentrates would also be effective. These actions, which would typically be conducted at junctions, siding or loading/unloading areas of the ROW, would provide a substantial reduction in exposure risks.

More extensive removals in siding areas may also be effective. Such actions would include removal of all siding ballast, as contaminant concentrations in the siding areas would be expected to be elevated compared to other areas of the ROW. Possible removals from outside the ballast section in siding areas might also be effective, depending on contaminant concentration data. However, the long-term effectiveness of such removals may be adversely affected in those areas subject to flooding and recontamination. Most of the ROW south of Harrison and west of the Lake Coeur d'Alene is isolated from flooding impacts and there is minimal risk of recontamination in these areas. Therefore, removal of siding ballast, and even mainline ballast, from this section of the ROW would be effective.

Selective removals in localized areas would also be effective where such actions were conducted in conjunction with barrier placement to facilitate preservation of existing surface drainage paths. Such removals would allow installation of protective barriers without producing conditions that could result in ponding of runoff behind a raised barrier, inundation, or erosion of the barrier and/or exposure of underlying contaminated materials. Providing for continuation of positive surface drainage will reduce O&M requirements and enhance the long-term effectiveness of the protective barrier. Similar selective removals may also be appropriate to facilitate blending of the surface of protective barriers into the surrounding terrain, thereby enhancing the aesthetics of the barrier.

Provided that appropriate BMPs are implemented during removal activities, such actions would be in compliance with ARARs. It is anticipated that most removal activities would be limited to the rail bed portion of the ROW. Work near any sensitive habitat could be scheduled to avoid disturbance of endangered or threatened species or other species of interest. Limited work at river or tributary crossings could also be implemented in a manner consistent with Federal, State or Tribal requirements. Historic structures such as bridges or trestles are not intended to be salvaged and their physical integrity would not be threatened by removal activities.

The effectiveness of removals can be summarized as follows:

- Removals (assuming proper disposition) would be effective in mitigating concerns regarding direct exposure and the mobility of contaminated materials but would not reduce the overall volume or toxicity of such materials.

- Removal and disposal of localized, surficial accumulations of concentrates ("hot spots") would be effective in increasing the human health and environmental protectiveness of the overall response action. Hot spot removals reduce the potential for mobilization of such materials and contamination/recontamination of other areas, as well as reducing the direct exposure potential.

- Provided that appropriate BMPs are implemented during removal activities, such actions would be in compliance with ARARs.

- Selective removals may also be effective in facilitating or enhancing continuation of established surface drainage pathways that cross the ROW or allowing barrier layers to be blended into the surrounding terrain. Such selective removals provide a way to accommodate the placement of barrier materials, without raising the finished grade above pre-existing conditions.

- Removals from areas of the ROW outside the flood plain would be effective in the

long- and short- term, provided that BMPs are implemented during removals.

- The potential for spillage of materials containing contaminants that could result from hauling large volumes of contaminated materials over public roads and through established communities to a disposal facility impacts short-term effectiveness.

4.4.3.1.3 Cost

Removals are expected to be limited to localized, small volumes of concentrates ("hot spots"), ballast from siding areas, and the mainline ballast from the portion of the ROW from Harrison to Plummer Junction. There may also be justification for incidental removals associated with barrier placement in various locations to facilitate maintenance of established surface drainage routes and to enhance the aesthetics of the response actions in residential areas.

It is anticipated that excavation will be conducted with earthmoving equipment (e.g., front-end loaders for general excavation and hydraulic excavators for confined areas or areas with problematic access). Transportation of excavated materials for disposal would employ standard highway-legal dump trucks (12 cy tandem trucks for short hauls and/or for areas with limited access, and 20 cy semi-trailers for longer haul situations). Health and safety precautions, appropriate to the materials being handled and the exposure risks of the situation, would be implemented. Proper decontamination procedures will be followed to prevent tracking of contaminated materials from trucks onto local rights-of-way or previously remediated areas.

Excavation costs are not expected to vary significantly between locations along the ROW. The most significant variation in cost will be in the transportation component, due to the varying haul distances from the different portions of the ROW to prospective disposal areas. The average unit direct costs for excavation and loading into trucks are expected to be approximately $2.00/cy for front-end loader work, and $2.30/cy for hydraulic excavator work. Removal of hot spots, because of the very small quantity of such materials at any one location, may be conducted with hand tools and the material placed in special containers for transport to the disposal facility. Unit cost for this work may exceed $100/cy; however, because of the small overall volume, the total cost of hot spot removal is not expected to be a major component of the overall program cost.

Transportation costs to haul excavated material to existing on-site disposal areas will depend primarily on average haul distances, the type of roads over which the trucks can travel and thus the average travel speed, and the size of truck that can be used depending on site access. The estimated range of direct unit costs for transport of material from the four geographic sections of the ROW are as follows:

- Upper Basin $3.50 - $6.90/cy
  - average 20 mile round trip primarily on highways
  - 12 cy tandem dump trucks

- Lower Basin $3.50 - $9.90/cy
  - average 45 mile round trip on combination of highway and back roads
  - 20 cy semi-trailer trucks

- East Shore of Lake Coeur d’Alene $16.60 - $19.40/cy

- average 85 mile round trip, with limited access in vicinity of work area
- 12 cy tandem dump trucks

- Upland Areas West of Lake Coeur d'Alene $24.00 - $29.00/cy
  - average 150 mile round trip primarily on highways at higher speeds
  - 20 cy semi-trailer trucks

The relative costs of removals can be summarized as follows:

- Direct costs per unit volume for removals from areas of the ROW outside the flood plain would be expected to be low to moderate, depending upon availability of access to the area and the volume of material to be excavated from any given location.

- Removal of small volumes of material from relatively inaccessible areas would entail higher direct costs due to small-scale inefficiencies.

- Direct costs for removals from areas of the ROW within the flood plain would be expected to be moderate to high, due to diminished access and trafficability for vehicles and equipment in such areas.

- Indirect costs would be expected to be low for removals from areas of the ROW outside the flood plain, and higher for removals from within the flood plain.

- Removals from within the flood plain would require implementation of more extensive BMPs and more intensive planning and supervision to guard against unacceptable short-term impacts.

- O&M costs for removals from areas of the ROW outside the flood plain would be expected to be low.

- Where the contaminated source material is completely removed from an area further actions would or may be necessary to maintain the protectiveness of the action.

- Where the removals are implemented in order to facilitate or enhance surface drainage, periodic minor maintenance may be necessary in order to preserve the gains achieved through the original actions.

4.4.3.2 Disposal/Consolidation

As discussed in Section 4.3 disposal/consolidation alternatives for contaminated material removed from the ROW include the following options:

- Localized consolidation and containment within the ROW
- Construction of an on-site interim storage facility
- Construction of new on-site disposal facilities
- Disposal in an existing on-site disposal facility or consolidation area
- Offsite disposal of material that is not suitable for on-site disposal

4.4.3.2.1 Implementability

The implementability of the various on-site options as well as offsite disposal is summarized below.

- Localized consolidation and containment within the ROW is implementable provided that the volume of material to be consolidated is consistent with capacity available within the ROW and the response actions for the consolidation area includes an ACP barrier.

- The implementability of the construction of either an on-site interim storage facility or new disposal facility is dependent upon the identification of a suitable area that will provide the needed capacity and will be compatible with adjacent land uses and community acceptance. ARARs may also impose significant restrictions on the siting of a new disposal or interim storage facility. Adjacent land use and community acceptance must also be considered in the siting of a new disposal or storage facility.

- The feasibility of disposal within existing on-site disposal facilities or consolidation area will have to consider available capacity of these facilities, closure schedules, waste acceptance requirements and local community acceptance. Within these constraints this option would be implementable.

- Off-site disposal in an existing permitted repository would be implementable. Given permitting and siting considerations, offsite disposal in a new facility may not be practical.

- The acceptability of on-site disposal in existing disposal facilities and consolidation areas to community members can be determined during the public comment period. Localized containment situations are expected to be acceptable, provided that they are neither visually obtrusive nor construed to represent a significant, uncontrolled potential risk to a community.

4.4.3.2.2 Effectiveness

In general, the effectiveness of all of the disposal/consolidation options is similar. Considerations relative to the evaluation of effectiveness are summarized as follows:

- Proper disposal or interim storage would be effective in reducing the mobility of contaminated materials but would not reduce the overall volume or toxicity of such materials. By reducing the mobility (and the accessibility) of contaminants, disposal would be effective in increasing the overall protectiveness of the response action to human health and the environment.

- Disposal and interim storage would be compliant with ARARs, subject to implementation of appropriate BMPs during excavation and transportation of excavated materials to the disposal or interim storage facility.

- Consolidation of contaminated materials in a secure area or disposal facility would

be effective in the long term, provided that there is appropriate maintenance of the disposal facility or area to ensure continued security.

- Interim storage would not be effective in the long-term as it does not provide for a final resolution for the waste.

4.4.3.2.3 Relative Cost

Where contaminated materials are locally consolidated under a pavement barrier, disposal costs would be negligible, since the materials disposed of in such locations would serve to provide the base for the paved barrier and the costs would be considered incidental to construction of the barrier.

Costs associated with a new on-site disposal or interim storage facility could vary significantly depending on the location and design criteria of such a facility. In general there would be costs associated with facility construction, waste placement, closure, retrieval and final disposal.

At an existing on-site disposal facility, it is expected that there would be no fee for disposal of the excavated materials provided that there are no significant modifications or expansions required to accommodate the materials. However, it is anticipated that there could be incremental direct cost associated with disposal in these on-site facilities.

Fees for disposal of contaminated materials in an off-site repository could be very high, depending upon the concentrations of contaminants in the material and the need for treatment. Tipping fees at such facilities can range from $100 to $200 per cy.

The relative cost of the disposal alternatives can be summarized as follows:

- Direct and indirect costs associated with consolidation of materials within the ROW under a containment barrier would be slightly higher, due to the need for design of a secure containment and oversight of the construction. However, the overall indirect costs of such disposal actions are also expected to be relatively low.

- The costs associated with a new on-site disposal or interim storage facility could vary significantly but would be expected to be relatively high.

- Direct costs for disposal in an on-site existing disposal facility or consolidation area would be expected to be low to moderate, assuming that no significant modifications to the facility are required.

- Direct costs per unit volume for off-site disposal would be very high relative to the other options.

- Operation and maintenance costs associated with disposal of contaminated materials would be expected to be relatively low.

4.4.3.3 Conclusions

Selective removal and disposal of Mine Waste components from key areas of the ROW, in preparation for implementation of other response actions, will serve to enhance the effectiveness and acceptability of those response actions. The extent to which such removals are implemented should reflect consideration of final disposal location, community acceptance, transportation impacts, the available disposal capacity and the cost of disposal, as well as the potential human health and environmental benefits of the actions.

Based on implementation, effectiveness, and relative cost, on-site management of removal materials in a new on-site interim storage facility is eliminated from further consideration. The implementability and relative cost of a new on-site disposal facility would also eliminate this alternative from further consideration. On-site disposal in an existing on-site facility is the best alternative for materials that have characteristics suitable for on-site disposal. Localized consolidation and containment is also a realistic alternative for a limited volume of material. Off-site disposal is a viable alternative for those materials that have characteristics that do not allow for on-site disposal.

5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

In the preceding section, response action alternatives carried forward from the screening process were further analyzed in terms of the EE/CA Guidance criteria of implementability, effectiveness, and cost. Additional detail as to the performance of specific alternatives was also provided.

The comparative analysis in this section builds upon the preceding analyses by examining the performance of a particular response action relative to the other alternative response actions. The relative performance of the various response actions is evaluated at two levels. At the response action alternative level, consideration is given to which alternative would be most suitable in the context of the varied conditions and settings along the ROW (for example, comparison of ICs against the other response action alternatives, containment and removal and disposal/consolidation). Within an alternative, further comparison is provided as to how well a specific option satisfies the fundamental requirements of implementability, effectiveness, and cost. The comparative analysis is provided in Table 5.

6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

The detailed and comparative analysis presented in Sections 4 and 5 respectively of this EE/CA identified the following response action alternatives as being most appropriate for implementation along the ROW:

- ICs
- Protective barriers
- Selective removal and disposal/consolidation

These analyses identified the conditions and settings under which one or more of the above response action alternatives would be considered protective and in compliance with ARARs, and provided a further level of detail by identifying those specific actions that would be most implementable, effective and cost effective. For example, within the response action alternative of protective barriers, the analyses examined whether vegetated soil, gravel or ACP would be most appropriate in a given setting. In this manner, the detailed and comparative analyses have provided the basis for prescribing a comprehensive response action that addresses the varying conditions, settings and contemplated future uses found along the length of the ROW.

Given the nature and configuration of the ROW, its position within and between communities, and its historical use as a rail corridor through the valley, continued use of the ROW as a traffic corridor by pedestrians or even vehicles is likely. As discussed previously, conversion of the ROW to a recreational trail is under consideration. The probability of future traffic on the ROW is further increased in portions of the Lower Basin where the ROW may be one of the reasonable access routes to areas of potential future off-ROW response actions or restoration. Recognizing these probabilities, recommendations for response action alternatives must consider this potential future use.

Response actions are intended to address contamination within the ROW. However, recommendations for response actions must also consider the possible future influence of off-ROW conditions within the Coeur d'Alene Basin. Recent and historical flood events have redistributed Mine Waste components from off-ROW sources throughout the flood plain. Because large portions of the ROW lie within the flood plain, the potential for post-response action recontamination of portions of the ROW will remain until these off-ROW source areas are addressed.

For the purposes of this EE/CA, the recommended response actions have been grouped by alternative. The portions of the ROW for which a given alternative is recommended is also identified. In addition, a brief summary of the recommended comprehensive response action is provided to describe the interrelationship of the various components.

6.1 ICs

ICs will be most effective in regulating access to and use of the ROW. Application of ICs will also serve to enhance the effectiveness and protectiveness of other physical actions. The following institutional controls are recommended at varying levels of implementation along the ROW:

- Controls on Use of and Access to the ROW
- Educational Programs

- Signage
- Fencing/Barricades

6.1.1 Controls on Use of and Access of the ROW

Broad controls on the use of and access to the ROW should be implemented. Such controls are primarily recommended to reinforce the long-term effectiveness of other proposed physical actions. It is recognized that land use controls would be most implementable if the ROW were to remain under the jurisdiction of a coordinated operating entity. As discussed previously, there are ongoing discussions regarding the feasibility of converting the ROW to a recreational trail. Conversion of the ROW to a trail would put the ROW under the ownership and corresponding jurisdiction of a coordinated operating entity and make controls on access to and use of the ROW, as well as a variety of other ICs and physical response actions, more implementable and effective. Although conversion of the ROW to a trail cannot be recommended as a response action, it is broadly supported by this analysis as a means to implement and maintain ICs and the other recommended actions.

Additionally, to ensure that the physical components of the response action (barriers, drainage facilities, erosion protection works, etc.) remain intact and function as intended, procedures and regulations should be established to govern (or prohibit as necessary) activities within the ROW that would disrupt or compromise the integrity and protectiveness of the barriers. A regular program of inspection, maintenance, and repair must be implemented. Such governing procedures and regulations, along with the inspection/maintenance/repair program, will be implemented throughout the length of the ROW, consistent with the nature of the response action in respective locations.

6.1.2 Educational Programs

Educational programs should be implemented throughout the length of the ROW. These programs will increase general public awareness of conditions and potential hazards and alert ROW users of location-specific issues. Recommended mechanisms for educational programs include:

- Specific training for workers or other personnel who could routinely come into contact with Mine Waste contamination found within the ROW, or access contaminated areas via the ROW;

- Printed information (mailings, pamphlets, news articles, etc.) for area residents and other potential ROW users; and

- Public information presentations, prior to and during implementation of response actions.

In addition to initial implementation of education programs, follow-up activities will be conducted, particularly if there is evidence of cases of excess lead absorption as a result of activities within the ROW. In such instances, focused case management including health monitoring by health authorities would be warranted. If the ROW is converted to a trail or other public use, education programs should be continued and expanded to also address a broader audience in the form of pamphlets, brochures and signs aimed at trail users. On-going worker training is also recommended for those who would be responsible for barrier maintenance, including staff that would be responsible for trail maintenance if trail development occurs. Given

the use of the ROW as a utility corridor or crossing, training is also recommended for utility or infrastructure workers who would routinely come in contact with Mine Waste materials or would potentially disrupt barriers.

6.1.3 Signage

Signs are recommended at appropriate locations to provide location-specific warnings to ROW users of potential exposures to Mine Waste materials in portions of the ROW beyond protective barriers and/or in adjacent areas outside the ROW. Such signs would be most applicable in rural portions of the ROW, where access to flood plain or historic mining areas is likely to be more common. If the ROW were converted to public use, private property and no trespassing signs at the ROW boundaries would help to discourage ROW users from leaving the ROW.

In addition to informational signs, high-visibility fabrics could be integrated into the gravel barriers, as necessary, at key locations to alert workers, as well as ROW users, of underlying potential hazards to which they might be exposed by breaching the barriers.

6.1.4 Fencing/Barricades

Fencing or other similar barricades will be an appropriate and necessary institutional control if the ROW is converted to public use. In certain areas of the ROW, such as flood plain areas, where complete removal or capping of Mine Waste contamination on the ROW alone may be impracticable, contaminants may remain on the ROW after response actions are implemented. Additionally, the ROW passes through areas where off-ROW contamination and physical hazards may pose a threat to ROW users. Fencing and hostile vegetation is recommended for certain locations to provide a physical barrier against access to such potentially hazardous areas. The fencing could also serve to restrict off-ROW use not desired by adjacent landowners. Other physical obstructions, such as boulders, barricades, trees or other vegetation, could also be used to restrict vehicle access onto the ROW and reduce the potential for consequent damage to barriers.

6.2 PROTECTIVE BARRIERS

Placement of protective barriers as a means of containing potentially hazardous materials are appropriate in portions of the ROW where the potential for ongoing direct exposure to Mine Waste contaminated materials is greatest and where the potential for recontamination of placed barrier material is low. Such areas include:

- Portions of the ROW within and near communities;
- The elevated rail bed portion of the ROW; and
- Broad, flat portions of the ROW, such as sidings that are access/rest areas for future ROW users.

Selection of the appropriate barrier material will be compatible with the expected future use of the particular area and the intended function of the barrier. Based on these criteria, installation of protective barriers is recommended in various sections of the ROW as described below.

6.2.1 ACP - Main Line Rail Bed

ACP, 10 feet wide and complete with an appropriate base layer and shoulder caps of clean crushed gravel, is recommended as a barrier for the main line ballast material. The use of an ACP barrier is consistent with the expected future use of the main line rail bed as an access or recreation corridor and the historical use of tailings as a component of the ballast material. The ACP barrier would extend throughout the length of the ROW from Mullan to approximately Milepost 30, south of Harrison (response actions in the remainder of the ROW from this point onward to Plummer Junction are discussed in Section 6.3 below). The ACP barrier will provide durable, low infiltration containment of the higher concentration lead-bearing ballast material, as well as a desirable traffic surface suitable for a variety of uses, including a recreational trail, service vehicle access, etc.

6.2.2 Gravel/Soil Barriers - Residential

Gravel or vegetated soil barriers are recommended in portions of the ROW (exclusive of the main line rail bed) that pass through residential areas, where the proximity of dwellings and the ease of access would increase the incidence and duration of possible exposure. Accordingly, placement of protective barriers is recommended for the functional width of the ROW in Mullan, Golconda, Wallace, Silverton, Osburn, Elizabeth Park, Cataldo, Rose Lake, Lane, Medimont and Harrison. In many cases, the functional width of the ROW will be less than the full, legal width of the ROW. The functional width of the ROW (the portion of the ROW where the probability of use, and thus the need for user protection is greatest) will typically be comprised of the more central, essentially unobstructed and relatively level areas, rather than the portions of the ROW that are comprised of steep slopes, wetland or heavily vegetated areas, or the active channel of the river.

The specific choice of material for such barriers will be consistent with adjacent land uses (reflecting consideration of both durability and aesthetics criteria) and the desires of the communities. Vegetated soil barriers are recommended in areas adjacent to established parks or other pedestrian-use areas, and gravel barriers are generally recommended elsewhere. Areas where natural or cultivated vegetation is already well established may not require the addition of new barriers, as such vegetation may already provide an adequate barrier.

Similarly, the longitudinal extent of residential area barriers will reflect consideration of the probability that frequent access to and use of the ROW by area residents may diminish with increasing distance from a given community. To provide a realistic buffer beyond the strict limits of a community, protective barriers in residential areas would be extended along the ROW for a distance of 1,000 feet beyond the last residence in a community.

Within the community and for a distance of 500 feet beyond the last residence, the barrier thickness will be consistent with the one-foot thickness implemented in residential areas of the BHSS. In the portion of the buffer zone greater than 500 feet from the last residence (i.e., further than 500 feet but less than 1,000 feet beyond the last residence), a barrier thickness of six inches, consistent with recreational use is recommended. Protective barriers will be installed in such a manner that existing drainage patterns are not disrupted and that residential driveway access across the ROW is maintained.

6.2.3 Gravel/Soil Barriers - Rural Sidings

Much of the rail line outside the residential areas is essentially a narrow elevated corridor.

However, there are opportunities for direct access by ROW users to potentially contaminated areas within and outside the ROW. To discourage people from using potentially hazardous areas, development of the wider level areas of former siding areas at intermittent locations along the corridor is recommended to provide attractive stopping points between communities for ROW users. As discussed in Section 2.10 of this EE/CA, sampling and analysis of siding ballast has indicated elevated levels of lead contamination. Consequently, gravel or vegetated soil barriers will be installed in these areas where ROW users are more likely to be attracted. The specific choice of materials will reflect consideration of existing and expected land uses adjacent to and within the siding area. Consistent with the criteria for residential area barriers, siding area barriers will extend laterally over the functional width of the ROW and longitudinally over a distance sufficient to provide a reasonable area for development of a site for short-duration uses. A longitudinal extent of 1,000 feet, or the length of the siding whichever is less, is considered adequate for such purposes. The thickness of the siding barrier will be one foot.

6.3 REMOVAL AND DISPOSAL/CONSOLIDATION

Historical construction records and results of recent soil sampling within the ROW indicate that tailings were used as a component of the ballast material placed during the original construction of the line. During operation of the rail line, spillage of concentrates ("hot spots") was greatest in the loading/handling/staging areas of the ROW, including the sidings. Due to the influence of periodic flooding in the river, portions of the ROW within the flood plain exhibit the same characteristics as other areas of the flood plain; namely the extensive presence of flood transported sediments containing tailings. Because of this broad distribution of commingled sediments and tailings throughout the flood plain, there are only limited benefits to isolated removal actions within the general ROW as part of the response actions addressed within this EE/CA.

In many portions of the ROW within the Upper Basin, the rail bed was constructed over pre-existing accumulations of some components of Mine Waste, with such accumulations often extending to significant depths. On the other hand, in the section between Harrison and Plummer, the ROW is generally located out of the flood plain and largely in upland areas, and the ballast material is essentially the only source of Mine Waste within the ROW. Finally, in some localized areas of the ROW, placement of protective barriers over Mine Waste, as recommended in Section 6.2, would interfere with established surface drainage paths or result in unacceptable discontinuities with adjacent surfaces outside the ROW. In consideration of these factors, removals are recommended for the areas identified below. An estimate of the removal volumes is provided in Table 6.

- Areas where the potential for the presence of concentrates is greatest;
- Areas where the ballast material is essentially the only source of Mine Waste within the ROW;
- Areas where the lateral zones of the ROW are protected by residential development from possible future flood impacts and where development of a residential oasis is viable (e.g., the Osburn siding area); and
- Areas where protective barrier layers must be recessed into the native soils (“keyed in”) so that the finished surface will be compatible with adjacent areas or to preserve existing drainage paths.

If removals were to be conducted in active areas of the flood plain prior to addressing upstream source areas, there would be a significant potential for recontamination of the area. Such areas will be addressed under the broader scope of the Bunker Hill Basin-Wide RI/FS currently being conducted.

6.3.1 Concentrate Accumulations

As a first-priority response action, to eliminate acute exposure risks along the ROW, a program to remove identifiable accumulation of concentrates is recommended. Although localized accumulations of concentrates are expected to be found primarily in former loading/unloading areas of the ROW, such hot spots should be removed from wherever they are found. Experience has shown that these materials will be found in limited quantities, and that they will be located on the surface or near surface, rather than extending to depth.

6.3.2 Track and Tie Removal/Salvage

The existing tracks and ties help to reinforce and retain the underlying ballast material in place. Removal of the track and ties will temporarily reduce the containment provided by these components of the current structure and may increase the potential for mobilization of the ballast under overtopping flood conditions. Accordingly, salvage actions within flood prone areas would be conducted in a manner, as necessary, that will limit the period of time between removal of the track and ties and implementation of subsequent components of the response action for that area.

6.3.3 Sidings

To address the potential for higher exposure risks associated with possible spillage of concentrates in siding areas during rail car loading/unloading or shunting activities, all siding ballast materials would be removed and disposed of on-site in appropriate disposal facilities and/or consolidation areas as appropriate. Where removal of siding ballast results in the creation of a depression along the length of the siding, the depression should be backfilled to restore a uniform surface grade, consistent with the adjacent ground in the lateral zone of the ROW, in preparation for placement of protective barrier materials and development of a rest area for ROW users, as described under the heading “Gravel/Soil Barriers - Rural Sidings” in Section 6.2 above.

6.3.4 Upland Areas (Reservation)

Within the upland areas west of Lake Coeur d'Alene the ballast material and localized accumulations of concentrates are essentially the only sources of Mine Waste. This portion of the ROW is also generally outside the limits of the flood plain and not subject to recontamination from off-ROW sources. Accordingly, the main line ballast material within this area would be removed, along with any hot spots and siding area ballast. Such removals should also include any concentrates or ballast materials remaining from the 1955 abandonment of a portion of the main line in the vicinity of Plummer Junction.

6.3.5 Complementary to Barrier Placement

In addition to the categorized removals described above, additional selected removals are also recommended in certain localized areas of the ROW (primarily residential areas) to allow placement of protective barriers without compromising existing surface drainage paths, and to facilitate aesthetic blending of the barrier surface into the adjacent existing grades.

6.3.6 Disposal/Consolidation

The material to be removed will require secure disposal. Based on the evaluations presented in Sections 4 and 5 the recommended disposal alternatives are localized consolidation and containment within the ROW and disposal in an existing on-site disposal facility and/or consolidation area. Localized consolidation and containment within the ROW will have limited applicability due to capacity limitations. Disposal in existing on-site facilities and consolidation areas will be subject to closure schedules, waste acceptance criteria and procedures that address community concerns.

6.4 SUMMARY

In total, the recommended response actions for the ROW are compliant with the ARARS, address environmental and human health concerns, and preserve the corridor intact for future transportation uses. In summary, the key elements of the recommended response actions include:

- Removal of identifiable hot spots of concentrates from wherever they are found;
- Removal of ballast material from all sidings throughout the length of the ROW from Plummer to Mullan. This action will remove from the ROW the materials with the greatest probability of containing elevated concentrations of lead and other heavy metals;
- Removal of main line ballast from the ROW within the upland areas generally from Plummer to Harrison. Recognizing that there is little or no possibility of future recontamination of this area, this action is anticipated to be a final response for the areas addressed under this response action;
- Placement of an ACP barrier over the main line, rail bed ballast portion of the ROW from Mullan to approximately Milepost 30 south of Harrison. This action will provide a durable, low infiltration containment barrier over the portion of the Mine Waste material within the ROW that represents the most extensive human health exposure source and will facilitate possible future use of the ROW as a recreational trail;

- Placement of gravel or vegetated soil barriers in residential areas, sidings, road crossing and other designated areas. This action will protect the public from extensive exposure to any contamination remaining within the ROW; and

- Implementation of ICs consisting of establishment and enforcement of regulations governing land use and activities within the ROW, fencing, signage and a program of education and awareness for residents of the various communities along the route and visitors to the area. In combination, these ICs will ensure the integrity of the barriers and protect the public from possible exposure to off-site contamination.

Details of the respective response actions and the inter-relationships between actions will be developed during the design phase of the project.

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