CSMRI Site Proposed Plan

Proposed Plan for CSMRI Site

This Proposed Plan identifies the Preferred Alternative (off-site disposal at two separate landfills – Alternative 5B) for cleaning up soil at portions of the former CSMRI Facility, Golden, Colorado (Site) and provides the rationale for its selection. The Plan also includes summaries of other alternatives that were evaluated for use at the Site. This document was prepared by the Colorado School of Mines (the School) for review and comment by the Colorado Department of Public Health and Environment (CDPHE), the local community, and other stakeholders. The School, in consultation with CDPHE, will select a final remedy after reviewing and considering all of the information submitted during a 30-day public comment period. The School, in consultation with CDPHE, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

The School is issuing this Proposed Plan as part of its public participation responsibilities under the Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) process. The Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation/ Feasibility Study (RI/FS) report and other documents contained in the Administrative Record file for this Site. The School and CDPHE encourage the public to review these documents to gain a more comprehensive understanding of the Site and investigation activities that have been conducted at the Site.

Site History

Numerous mineral research projects were conducted at the Site from 1912 until approximately 1987. Some of these projects involved investigating methods to extract metals and radionuclides from mineral ores. The research projects utilized 17 buildings on the Site that were removed in the mid-1990s. A settling pond, located between the building complex and Clear Creek, was used to store wastewater generated in the laboratories and research facilities. Wastewater discharged from the buildings was transferred to the settling pond through a system of sumps and floor drains in the buildings.

In January 1992, a water main owned by the City of Golden broke on the Site and began discharging a large volume of water into the settling pond. The U.S.

Important Dates and Information

Public Comment Period:
May 15, 2007 through June 15, 2007
The School will accept written comment on the Proposed Plan during the public comment period. Comments should be addressed to Linn Havelick, Director of Environmental Health and Safety (see last page of this document for address and email information).

Public Meeting:
May 30, 2007 – 7:00 p.m. to 8:00 p.m.
The School will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments also will be accepted at the meeting. The meeting will be held at General Research Building, Room 201, 1310 Maple Street on the campus of the Colorado School of Mines, Golden, Colorado. An open house will be hosted at the same location by the School just prior to the public meeting between 5:00 p.m. and 7:00 p.m.

For more information, see the Administrative Record at the following location:
Arthur Lakes Library
Library Circulation Desk
Colorado School of Mines
1400 Illinois Street
Golden, Colorado 80401
(303) 273-3911
Hours: Mon -Thu 7:30 a.m. to 12:00 a.m.;
Fri 7:30 a.m. to 6:00 p.m.;
Sat 9:00 a.m. to 5:00 p.m.;
Sun 1:00 p.m. to 10:00 p.m.

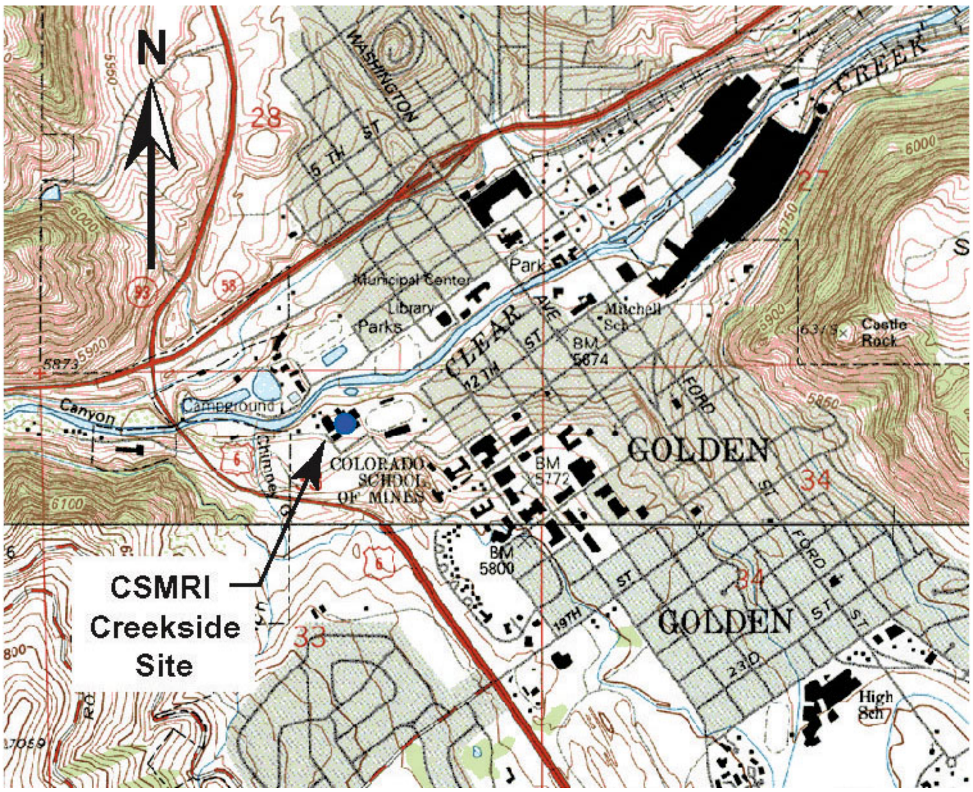
Environmental Protection Agency's (EPA) Emergency Response Branch responded in February 1992 and performed a number of activities to stabilize conditions at the Site, including:

- excavation of contaminated sediments and soil,
- stockpiling of the material (the Stockpile - 20,000 cubic yards of sediment and soil),
- decontamination of building drains,
- demolition and removal of several buildings,
- consolidation of existing drums and disposal of compressed gas cylinders,
- sampling of sediments and water, and
- closure of the settling pond

After site stabilization, EPA contacted a number of organizations that had made prior use of the Site and requested that the Stockpile be removed. EPA issued a

Unilateral Administrative Order (UAO) to a limited number of organizations in 1994. A *Removal Action Options Analysis* (RAOA) report (issued in 1995) that developed and evaluated disposal options was one outcome of the UAO. Ultimately, the School and the State of Colorado were the only organizations that implemented the preferred disposal option. The EPA removal action was completed in 1997. The School has been investigating the Site in consultation with CDPHE since the completion of the removal action.

In November/December 2002, all remaining concrete and asphalt were removed from the Site with some of the material shipped to a local landfill and the remainder sent to a recycling plant. This activity is documented in the *Concrete and Asphalt Removal and Disposal, Final Report, 2003*.



Site Location Map

Site Characteristics

Between December 2002 and January 2004, New Horizons Environmental Consultants, Inc. conducted a Remedial Investigation/Feasibility Study (RI/FS) at the Site for the School (2004 RIFS). The New Horizons RI produced valuable information on the nature and complicated extent of contaminants at the Site. New Horizons estimated 10,000 cubic yards of contaminated soil, with 9,500 yards averaging less than 3 pCi/g Radium 226 above background and 500 yards averaging greater than 3 pCi/g Radium 226. Following the selection of a proposed plan for off-site disposal of the contaminated soils, New Horizons began implementation of the plan. The plan called for disposal of 500 yards at a landfill in Idaho and 9,500 yards in a local landfill in Colorado. Implementation was halted after only a few weeks due to the discovery of more contaminated soils than had previously been estimated in the 2004 RIFS resulting in significant uncertainties as to volume and cost increases. Had New Horizons continued with its implementation plan, at least 9,500 cubic yards of soil would have been disposed of in Idaho at an approximate cost of over \$10 million, which would have been a \$7 million cost over-run. The School retained The S.M. Stoller Corporation to re-evaluate existing site data and formulate a strategy to move the project forward.

In 2006 Stoller performed supplemental RI activities to determine the nature and extent of impacts to the Site soils. This effort was successfully completed by performing the following tasks:

- Initial soil segregation: Based on data from the original RI, soil was segregated by metals content and activity. All soil with concentrations of Site Constituents of Potential Concern (COPCs) above the tentative Derived Concentration Guideline Levels (DCGLs) were placed in lined soil stockpiles. Table 1 lists the COPCs and tentative DCGLs.
- Segregation of soil above 100 pCi/g: All soil identified during the original RI as containing total activity above 100 pCi/g was segregated into a separate soil stockpile.
- Site-wide Gamma scan: Following initial soil removals, a site wide gamma scan was completed to identify areas of the Site with remaining elevated activity.
- Continuing soil segregation: Using a series of field and on-site laboratory instruments, soil was assessed for metals and Ra-226 content. All soil exceeding the tentative DCGLs was segregated to a soil stockpile.
- Final Gamma Scan: Upon completion of the soil segregation activity a final gamma scan of the entire Site was completed to assess the effectiveness of the characterization.
- Confirmatory sampling: Finally, to confirm the gamma scan, samples were collected and submitted to both the on-site and an off-site laboratory for final confirmatory data.

Two soil stockpiles were established for excavated materials: Stockpile A contains material over 100 pCi/g and contains approximately 200 cubic yards of material. Stockpile B contains the majority of the excavated material (less than 100 pCi/g but greater than the tentative DCGLs) and contains approximately 12,500 cubic yards of material. Characterizing the Site soils in this way had the additional cost-savings benefit of excavating soil that would have had to be excavated eventually during the implementation of the remedial options eligible for implementation in the findings of the 2004 RIFS, which concluded that the impacted material could not be left in place.

Table 1
COPCs and Tentative Site DCGLs

Constituent	Tentative DCGL
Metals	**mg/kg**
Arsenic	39
Lead	400
Mercury (total)	23
Molybdenum	390
Vanadium	550
Radioisotopes	**picoCuries/gram**
Radium 226	4.14
Radium 228	4.6
Thorium 228	6.47
Thorium 230	11.53
Thorium 232	3.88
Uranium 234	254.9
Uranium 235	4.97
Uranium 238	21.8

Scope of the Action

The proposed remedial alternative for offsite disposal is intended to be the final cleanup for the Site. The former settling pond and the softball field area at the Site have already been cleaned up and are considered closed. Site soil above cleanup levels is currently located in the on-site stockpiles. CDPHE has determined that the remaining Site soils (except for the Clay Pits and portions of the flood plain that will be excavated to Stockpile B in the spring of 2007) are below the tentative DCGLs. The remedial alternatives can be designed to address either of the two existing stockpiles (pile A or pile B) or both of the stockpiles. After cleanup, the Site will be returned to beneficial uses. An environmental covenant requiring radon mitigation systems for all buildings constructed on the Site will also be a part of the remedy.

Summary of Site Risks/Hazards

Acceptable exposures to known or suspected carcinogens are generally those that represent an excess upper-bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}. This translates to between one person in 10,000 or one person in 1,000,000 developing cancer because of exposure to the material. Of the materials found on Site, the radionuclides radium, thorium, and uranium are known carcinogens along with the metal arsenic (lead and mercury are suspected carcinogens but currently there is insufficient information to predict levels of risk for these metals). EPA uses the 10^{-6} risk level as the point of departure for determining remediation goals. However, the upper boundary of the risk range is not a discrete line at $1x10^{-6}$. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions.

The affected material (primarily metals) also presents other health concerns that are not associated with cancer. Noncarcinogens are evaluated by their systemic effect on target organs or systems. EPA defines acceptable human exposure levels (including sensitive subgroups) as those that do not cause adverse effects during a lifetime or part of a lifetime, incorporating an adequate margin of safety. This acceptable exposure level is best approximated by a hazard index (HI) of 1. If a HI is less than 1, adverse effects usually are not expected. As the HI increases beyond 1, the possibility of adverse health effects also increases.

Detailed information about possible health effects from the metals and radionuclides found on Site may be found at a number of websites including those listed below:

http://www.atsdr.cdc.gov/toxpro2.html
http://www.epa.gov/iriswebp/iris/index.html
http://www.intox.org/databank/pages/chemical.html

As part of the 2004 RI/FS, New Horizons conducted a baseline risk assessment to determine the current and future effects of contaminants on human health and the environment. A subsistence farmer was selected as the potential future receptor for the baseline risk assessment. After public comment, the subsistence farmer scenario was replaced with the urban resident scenario in the 2004 ROD. This had a small impact on the DCGLs for the Site, but for practical purposes, it made little difference because field excavation was likely to lead to the excavation of the same volumes of contaminated soil. The change in receptors had not materially altered the remedy selection or remedy performance. To provide an overall picture of relative risk, urban residential and recreational scenarios have been provided for comparison in this assessment. Although the ground water is not currently used as a drinking water source, it was assumed that it could be used for this purpose in the future. The ground water also discharges into Clear Creek, which is a source of drinking water. The possible incursion of neighborhood children onto the Site also was evaluated (of particular concern for the lead-affected soil). The results of the baseline risk assessment indicated that while there is no immediate risk from the Site (assuming security fencing is maintained), no further action at the Site would not be protective of human health and the environment over the long term.

The 2006 investigation method included the excavation and stockpiling of the impacted soils to determine the nature and extent of contamination because it was the most reliable and cost-effective method to determine the nature and extent under these Site circumstances. Excavation of the contaminated soils was also one of the necessary elements of the eligible remaining remedial alternatives that would have resulted in a protective remedy. The investigative excavation of the contaminated soils also altered the physical conditions of the Site by taking in-situ contamination and transferring it to one of two stockpiles on Site. The results of the additional investigation performed in 2006 - 2007 confirmed that the nature and extent of contamination were greater than that calculated by the 2004 RI/FS. The baseline risk is greater than that previously believed in 2004. Because the risk was great enough to reject the "No Action" alternative in 2004, and the risk is now known to be greater than before, there is no need to perform another baseline risk assessment. The main impacts to the 2004 risk assessment caused by the changed Site configuration are the temporary elimination of impacted soil from providing a source for groundwater contamination (the stockpiles are on a liner) and the locally increased risk resulting from all the Site-impacted soil being placed in stockpiles.

Human Health Risks/Hazards

The baseline risk assessment indicated that leaving the affected material in place would result in a risk to an on-site urban resident in the range of $6x10^{-4}$ to $1.3x10^{-3}$ (depends on location of residence). A recreational user would experience a risk in the range of $7.3x10^{-6}$ to $3.2x10^{-5}$ (assumes limited access to Site). Hazard indexes calculated for the Site range from less than one for the occasional recreational user to up to 3.2 for a full time resident.

Control or off-site disposal of the affected material would result in a significant reduction in risk to an on-site resident (for details see Section 8 of the RI/FS).

Ecological Risks/Hazards

Because of the extensive disruption of the Site from the previous investigation operations, there are minimal current risks to the environment. However, without control of the affected material the Site would be a long-term source of metals and radionuclide to the underlying ground water, which eventually flows into Clear Creek.

It is the School's current judgement that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Remedial Action Objectives

The Remedial Action Objectives (RAO's) for the Site include:

- Eliminate or minimize the pathway for dermal contact, inhalation, and ingestion of site specific radionuclides to human receptors, in order to achieve a level of protection in compliance with the National Contingency Plan levels of acceptable cancer risk (10^{-4} to 10^{-6}).
- Develop receptor-specific soil cleanup levels to limit unacceptable radiation doses for the radionuclides found in the affected material (i.e., soil).
- Minimize risk associated with radon gas either by source removal or by requiring the installation of radon mitigation systems in any structures constructed on Site.
- Prevent long term dermal, inhalation, and ingestion exposures to trace metal affected materials with concentrations greater than the CDPHE proposed Residential/Unrestricted Land-Use Standards or that generate hazard indexes greater than 1. Based on data gathered during the RI in 2006, arsenic and lead are the primary metals of concern in Stockpiles A and B.
- Address specific issues associated with the hazards resulting from the soil containing elevated concentrations of lead (possible access issues with neighborhood children).
- Prevent off-site migration of affected material that could result in the exposures described above. This includes the ground-water pathway.
- Implement remedial measures that limit ground- and surface-water concentrations to the maximum contaminant levels (MCLs) at the points of compliance and to non-zero maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act and under Colorado law. Although the affected ground water is not a current drinking water supply it eventually enters Clear Creek, which is used by downstream users for drinking water. Uranium is the primary groundwater contaminant of concern.
- Implement remedial actions that reduce exposures from ionizing radiation to levels that are as low as reasonably achievable (ALARA).
- Comply with soil-, location- and action-specific Applicable or Relevant and Appropriate Requirements (ARARs). (See Section 8.1 and Appendix I of RI/FS for ARAR discussion).

Summary of Remedial Alternatives

Alternative 1 – No Further Action

Estimated Capital Cost: $0
Estimated Operation and Maintenance Cost (Present Value): $4,070,000
Estimated Present Worth Cost: $460,000
Estimated Construction Timeframe: NA
Estimated Time to Achieve Remedial Action Objectives: Not Achieved

Alternative 1 provides a comparative baseline against which other alternatives can be evaluated. Under Alternative 1, the affected soils would remain in the lined stockpiles, and a comprehensive, long-term program would be required to monitor air quality, surface water quality, groundwater quality, and radiation dose. If this alternative were selected, enhanced storm-water controls would be needed and long-term maintenance of the Site perimeter would be required to limit access and minimize the potential for ingestion and dermal contact.

A major weakness in the no-further action alternative is the failure to provide adequate protection of human health and the environment. Contaminants would not be adequately controlled to limit migration.

Alternative 1 has an additional cost associated with the loss of property value. Appraisal information indicates that without site cleanup, the land value decreases by up to $460,000. The estimated present worth cost would be $4,520,000 if the land value loss were included.

Alternatives 4A and 4AA – Onsite solidification with engineered cap of Stockpile B, with Stockpile A being shipped offsite, or onsite solidification with engineered cap for both stockpiles

Estimated Capital Cost: $1,077,000 (4A);
$991,000 (4AA)
Estimated Operation and Maintenance (Present Value) Cost: $4,120,000 (both 4A and 4AA)
Estimated Present Worth Cost: $460,000
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve Remedial Action Objectives: RAOs only partially achieved, monitoring required for at least 100 years

Both versions of Alternative 4A require soil to be solidified and capped. Alternative 4A would have an offsite component, with Stockpile A being shipped to a specialized waste facility. Alternative 4A involves the consolidation and stabilization of onsite soils using concrete and fly ash. Alternative 4 assumes that the affected onsite material (13,000 cubic yards) will be solidified, placed onsite, and capped. Confirmation sampling has already confirmed all soil above DCGLs is in the two stockpiles, and limited additional sampling will be performed to ensure both metal and radionuclide limits are achieved beneath the stockpiles.

Alternative 4A will require a pilot test to determine the appropriate mixture of concrete, fly ash, and soil. After the proper mixture is determined, stockpiled materials will require segregation by soil type. Some crushing of cobbles may be required. An area at a high enough elevation to remain above groundwater fluctuations will be selected for the final placement of the solidified material. Operational concrete and fly ash will be stockpiled onsite, and a batch processor will be brought in to mix the materials. A water supply also will be required. Batches of material will be placed in lifts, and solidification will be verified with test cores.

Alternative 4AA would require the mixing of Stockpile A with Stockpile B to produce a uniform distribution of activity in the resulting soil pile.

After the solidification of the structure has been confirmed, a clay cap (depth of 3 feet) will be constructed over the structure to limit leaching effects. The structure and cap footprint would require institutional controls on about 1 acre of land. Long-term cap maintenance in the vicinity of the solidified matrix would be required. The remaining property would be available for unrestricted use although a limited groundwater monitoring program currently ongoing would continue to monitor the current metal concentrations and radionuclide activities. Some backfill would be required to bring the Site to a useable elevation and to provide storm-water control.

Alternative 4A has the additional cost associated with the loss of property value. Although a remediation process is completed, the land value may still decrease by up to $460,000.

Alternatives 4B and 4BB – Onsite disposal cell with engineered cap of Stockpile B, with Stockpile A being shipped offsite, or onsite disposal cell with engineered cap for both stockpiles

Estimated Capital Cost *$1,126,000 (4B);*
$1,038,000 (4BB)
Estimated Operation and Maintenance (Present Value) Cost: *$4,101,000 (both 4B & 4BB)*
Estimated Present Worth Cost: $460,000
Estimated Construction Timeframe: 7 months
Estimated Time to Achieve RAOs:
RAOs only partially achieved, monitoring required for at least 100 years

Alternative 4B requires the construction of an engineered disposal cell without solidification. An area above groundwater fluctuations would be selected for the construction of the cell. Allowing a material depth of 10 feet and a 4:1 slope into the cell to allow for equipment movement, the footprint of the cell would be about 1.5 acres. Geotechnical testing would be required to verify proper placement of the cell and a clay sub-liner would be installed. A geosynthetic liner will be installed over the clay to ensure containment. The affected material will then be moved from the stockpile(s) and placed in the cell. When all material is relocated to the cell, a clay cap (3 feet deep) will be installed over the material.

Again, institutional controls would be required for the cell to ensure the integrity of the cap and to monitor groundwater in the vicinity of the cell. Limited groundwater monitoring may be required to monitor the natural attenuation of current metal concentrations and radionuclide activities. Backfill would be required to bring the Site to a useable elevation and to provide storm-water control.

Alternative 4B has the additional cost associated with the loss of property value. Although a remediation process is completed, the land value may still decrease by up to $460,000. The estimated present worth cost would be $5,666,000 for Alternative 4B or $5,612,000 for Alternative 4BB if the land value loss were included.

Alternatives 5A and 5B – Off-site disposal at solid-waste landfill or combination of solid-waste and specialized landfills

Estimated Capital Cost: *$5,110,000 (5A);*
$800,000 (5B)
Estimated Operation and Maintenance (Present Value) Cost: *$68,000 (5A); $34,000 (5B)*
Estimated Present Worth Cost: $0
Estimated Construction Timeframe: 6 months (5A & 5B)
Estimated Time to Achieve RAOs: 5 years
(assumes natural attenuation of ground water)

Alternative 5 involves the load-out and transportation of the affected material in both stockpiles to an approved landfill. Alternative 5A assumes the material in both stockpiles would be mixed together and shipped to a special solid waste landfill. Alternative 5B assumes that Stockpile A would go to a special waste landfill and Stockpile B would go to the local solid waste landfill.

Estimated transport times were determined assuming the closest solid waste landfill for alternative 5B. Foothills Landfill on Colorado Highway 93 is approximately 8 miles north of the Site. Transportation times will increase if other facilities are selected.

Upon completion of the off-site disposal, all of the property would be available for residential and other use with an environmental covenant. Backfill material would be required to bring the Site to a useable elevation and for storm-water control and safety.

Because all of the affected material would be removed from the Site, Alternative 5 would not experience the loss in property value associated with the other alternatives.

Evaluation of the Alternatives

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The nine criteria fall into three groups. The first group, the threshold criteria, includes overall protection of human health and the environment and compliance with the ARARs. If an alternative does not meet these criteria, it is not eligible for future consideration. The second group, the balancing criteria, include long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-effectiveness, implementability, and cost. These criteria are weighed against each other to determine a preferred option. The last group, the modifying criteria, includes State and community acceptance. The modifying criteria are often used to make a final selection.

The following sections profile the relative performance of each of the alternatives against the other alternatives. The nine evaluation criteria are individually discussed in the following sections. Detailed discussion of the alternative evaluation can be found in Sections 7.0 and 8.0 of the RI/FS.

- *Overall protection of human health and the environment,*

Alternative 1, the no-further action alternative, does not provide adequate protection of human health and the environment because it does not adequately address the exposure pathways.

Alternatives 4A, 4B, and 5 effectively address the direct exposure pathways by either preventing access to the material using caps and a variety of containment options or by removing the material from the Site. A short-term groundwater-monitoring program may be required for Alternatives 4 and 5 because of residual metals and radionuclides remaining in the groundwater system. The solidified matrix or disposal cell associated with Alternative 4 would require long-term groundwater monitoring.

Alternative 5 would provide the most protection to human health and the environment in the vicinity of the Site.

- *Compliance with ARARs*

Alternative 1 does not meet the ARARs that have been identified for the Site. Alternative 4 is compliant with ARARs, except for reducing doses to less than 100 mrem/yr if institutional controls fail, either by consolidating and containing the affected material onsite or by removal of the affected material. Alternative 5 complies with ARARs and has the least uncertainty associated with the site-specific ARARs.

- *Long-term effectiveness and permanence*

Alternative 1 has no long-term effectiveness or permanence because the material would remain in place and be a continuing source of hazard and risk to human health and the environment. This alternative would have the largest remaining risk for the Site and surrounding area.

The remaining alternatives would sufficiently address residual risk. The alternatives that involve a cap would have a degree of uncertainty associated with long-term permanence. Cap breakdown could result in significant risks to human health and the environment. The provision in 40 CFR §192.02 requires the control measures to be effective for 1,000 years (at least 200 years) when certain radionuclides are involved. Long-term effectiveness of caps can be compromised by failure to implement institutional controls and the lack of maintenance. In addition to human activities, freeze-thaw cycles, vegetation, and burrowing animals can compromise cap material. The literature refers to problems with the leaching of mercury and arsenic from solidified matrixes (Alternative 4A). The magnitude of this effect would be site-specific but could be problematic in the long term.

Alternative 5, offsite disposal, has the least uncertainty associated with long-term effectiveness and permanence.

- *Reduction of toxicity, mobility, or volume through treatment*

Alternative 4A is the only alternative that addresses the material through treatment. Toxicity and mobility are addressed because the matrix prevents material migration and reduces toxicity through reduced bioavailability. Properly maintained, the solidified matrix would be expected to remain intact for an extended period of time. But as mentioned above, there is some question about the leaching of arsenic and mercury. While treatment associated with Alternative 4A does reduce the toxicity (through lessening bioavailability) and mobility of the material, the volume of material would actually increase.

Alternative 4B uses a cap to address toxicity and mobility by limiting contact and infiltration but the volume is not reduced. Alternative 5 produces no net reduction in metals or radionuclides, just relocation.

- *Short-term effectiveness*

All of the alternatives except Alternative 1 (no-further action) involve some short-term risk to workers and the surrounding community. A low to moderate risk would be associated with the truck traffic required to move equipment or material (i.e., traffic accidents). Access to State Highway 6 would limit the risk to the immediate neighborhood but could affect the local county (or counties).

Worker exposure would be the greatest for Alternative 4A because of the mixing and grinding operations. Alternatives 4B, 5A, and 5B would have lesser risk. Worker risks would be mitigated by material handling equipment and safety equipment.

Alternative 5 has the highest short-term risk for the surrounding community because of the number of loads of affected soil. The risk applies only to traffic accidents, not to exposure to affected soils. The remaining alternatives would have a lesser effect on the community because of limited transportation operations.

- *Implementability*

Alternative 1, no-further action, is relatively easy to implement technically because it is limited to maintenance and monitoring. However, the administrative feasibility for this alternative is low because of the continuing requirements of the monitoring and institutional control and possible licensing.

Alternatives 4A through 5 are technically feasible. Each alternative involves standard construction and earth-moving techniques. Alternative 4A has the most uncertainty because a concrete/soil mixture would need to be determined. Proper installation of a disposal cell can be problematic (Alternative 4B). Alternatives 4A through 5 are sensitive to weather conditions especially during the winter months. Administrative feasibility for Alternatives 4A thorough 5 is medium to high.

- *Cost*

The least expensive alternative is Alternative 5B (see Section 8.0 of the RI/FS). If the value of the land is considered, both versions of Alternative 5 have significantly less cost than the other alternatives because they allow unrestricted future use of the property.

- *State acceptance*

In preliminary discussions with CDPHE, the off-site disposal alternative (Alternative 5) was the preferred alternative. This also is the School's preferred alternative.

- *Community acceptance*

Comments received during and after a community outreach meeting conducted in December 2003 indicated that a significant number of community members supported the off-site disposal plan (Alternative 5).

Summary of the Preferred Alternative

The Preferred Alternative for cleaning up the Site is to excavate the affected material and dispose of it off-site (Alternative 5B) at two landfills.

The preferred alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The preferred alternative was selected over the other alternatives because it is expected to achieve substantial and long-term risk reduction for the Site. The alternative also allows residential future use of the property, which is the most protective and preferred type of cleanup. Radionuclides and metals in the ground water in the vicinity of the Site are expected to return to acceptable values after the stockpiles are disposed of offsite. Alternative 5 reduces the risk within a reasonable timeframe and at reasonable cost (compared to the other alternatives).

Based on the information available at this time, the School and CDPHE believe the Preferred Alternative would be protective of human health and the environment, comply with the ARARs, be cost effective, and provide a long-term effective and permanent solution. The Preferred Alternative can change in response to public comment or new information.

Community Participation

The School and CDPHE provide information regarding the cleanup of the Site to the public through public meetings, the Administrative Record file for the Site, and announcements published in the Denver Post and the Golden Transcript. The School and CDPHE encourage the public to gain a more comprehensive understanding of the Site and the remedial activities and investigations that have been conducted at the Site.

The dates for the public comment period, the date location and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan.

For further information about the Site please contact:

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