

SECTION 7.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The eight alternatives were evaluated based upon criteria of effectiveness, implementability, and cost in accordance with the NCP. The criterion of effectiveness includes the protectiveness of human health and the environment; short-term effectiveness; long-term effectiveness, reduction in toxicity, mobility or volume; and, compliance with ARARs. Implementability is evaluated in terms of the technical feasibility, availability of services and materials, and administrative feasibility of each alternative. The cost of each alternative is presented as a capital cost for design and implementation. With the exception of Alternative 6, the evaluated alternatives would not require long-term operation and maintenance (O&M) for confirmatory monitoring, or periodic inspections and repairs. The comparative analysis of the eight alternatives is summarized in Table 9.

7.1 EFFECTIVENESS

The investigation and risk assessment have indicated that mercury species concentrations present inside the retort building, in the retort tailings, and in the soil around the retort building do not exceed ARAR or risk-based cleanup goals. Therefore, all eight alternatives would be effective in meeting the RAOs. The investigation has indicated that in the event the remaining retort tailings are eroded further and migrate downstream, they should not impact human health and the environment. This is because the retort tailings do not contain the mobile and toxic mercury species above ARAR or risk-based cleanup goals, and they would become even less concentrated with additional erosion and migration. However, Alternatives 6 through 8 would result in minimization and/or elimination of the downstream migration of retort tailings.

The retort tailings are undergoing natural reclamation. With time, the retort tailings will reach a condition of natural equilibrium (also known as 'natural reclamation'). Therefore, Alternatives 1 through 5 would provide long-term effectiveness in controlling erosion of downstream migration of the retort tailings. Therefore, natural reclamation meets relevant and appropriate components of the Arizona Mined Land Reclamation Rules, whereas Alternatives 6-8 would encompass additional relevant and appropriate components of the Arizona Mined Land Reclamation Rules.

Alternatives 6 through 8 will be effective in controlling erosion and downstream migration of the retort tailings in the short-term. Alternative 6 would require long-term inspection and monitoring

and the possibility of a catastrophic event such as a range fire or runoff event in excess of a 100 year flood event makes long-term effectiveness of Alternative 6 moderate. Alternatives 7 and 8 would result in the removal of the retort tailings from the drainage. Therefore, Alternatives 7 and 8 would provide short-term and long-term effectiveness in controlling erosion and migration of the retort tailings.

7.2 IMPLEMENTABILITY

No implementation concerns are associated with Alternative 1 because no action would be taken. Therefore, Alternative 1 would be technically feasible, with no hindrance by the unavailability of services and materials. The investigation has demonstrated that the Site does not contain concentrations of mercury species that exceed ARAR and risk-based cleanup goals. Alternative 1 would not limit access to the retort building.

In terms of technical feasibility and availability of services and materials, there are significant differences between Alternatives 2 and 3 and Alternatives 4 through 8. Alternatives 2 and 3 would include access limitations and would not require mobilization of heavy equipment. Therefore, these alternatives would disturb the local ecology the least. Alternatives 4 through 8 would require mobilization of heavy equipment and road improvements, which would have the affect of disturbing the local ecology. Alternatives 6 though 8 would require construction of equipment access roads downstream of the Site, which would result in the greatest disturbance to the local ecology and encompass the greatest number of action-specific ARARs. Alternatives 6 and 7 would require a large volume of borrow material for cover and erosion control, with Alternative 6 requiring the largest amount of material. Alternative 6 would also require long-term monitoring and maintenance of the cover.

7.3 COST

Cost estimates for each alternative are presented in Table 9 and in Table J-3 attached as Appendix J. The total estimated costs for the eight alternatives are as follows:

Alternative 1: \$0
Alternative 2: \$30,000 - \$50,000
Alternative 3: \$56,600 - \$89,900

Alternative 4: \$550,000 - \$825,000

Alternative 5: \$665,500 - \$998,250

Alternative 6: \$1,791,894 - \$2,449,362

Alternative 7: \$1,036,200 – \$1,466,960

Alternative 8: \$1,914,200 – \$2,608,100

Alternative 1 would have the least cost and Alternatives 6 and 8 would have the highest costs.