

13.0 RECLAMATION AND CLOSURE COSTS

13.1 Bond Estimation

An updated guide for estimating reclamation bonds was issued by the USFS in April 2004. This guide is entitled *Training Guide for Reclamation Bond Estimation and Administration for Mineral Plans of Operation* authorized and administered under 30 CFR 228A (Guidance). This Guidance document explains the requirements for reclamation bonds as “Any operator required to file a plan of operations shall, when required by the authorized officer, furnish a bond conditioned upon compliance with 228.8(g), prior to approval of such plan of operations.”

The reclamation bond amount needs to be an estimate of both the direct and indirect costs required to reclaim the mineral operation. This estimate should be adjusted as the level of information changes. The basic premise of the estimate is that if the operator is unable to complete the reclamation, the USFS would have to perform the work.

The Guidance lists specific requirements for bond estimation:

- Determine the period of operation covered by the bond.
- What is being reclaimed?
- What are the standards to be met?
- What are the reclamation tasks?
- Estimate direct reclamation costs.
- Estimate indirect costs.
- Summarize and review the estimate.

13.1.1 Direct Cost Determination

The labor portion of the direct cost calculation was updated using the current Davis-Bacon General Wage Decision for Pima County. Modification 12 for AZ20030016, AZ20030002, AZ20030001, and AZ20030012, dated December 22, 2006, was referenced to update these labor costs. Equipment rental rates and mobilization and demobilization estimates were obtained from equipment rental cost bids provided by vendors in the Tucson area. Operating costs used in the bond estimate are provided in Appendix A.

Equipment productivities are determined from the adjusted production rate table in the Caterpillar Handbook Nos. 32 and 36. Monthly rental costs were divided by 160 to determine hourly rental costs, and the Caterpillar handbook was used to determine hourly operating costs. A suggested diesel fuel price of \$3.20 per gallon (2006 Heavy Estimator) was used when calculating the operating costs. Productivity factors can be found in Appendix B.

13.1.2 Indirect Cost Determination

Indirect operating costs were determined using the following percentages:

- | | |
|---------------------------|---------------------------|
| • Insurance | 1% of total direct costs |
| • Workers Compensation | 10% of total labor |
| • Contract Administration | 15% of total direct costs |
| • Bond | 1% of total direct costs |

- Profit 10% of total direct costs

13.2 Period of Operation Covered

The Guidance referenced in Section 13.1.1 specifies that bond estimates must cover the peak reclamation cost in the respective period. Since the potential for underestimation exists for large, complex mining operations, the cost estimate should also be based on anticipated reclamation work as approved in the plan of operations. This will occur during the specific bond period when the following combination exists:

- Greatest area of disturbance;
- Most equipment, facilities, or materials are on-site;
- Largest volume of materials have to be moved for backfilling/regrading;
- Greatest volume of exposure of materials, facilities, or equipment needing special handling;
- Greatest disturbance of resources requiring high cost reclamation or mitigation; and
- The operation, monitoring, and maintenance costs needed in both the short and long-term to ensure public safety and to prevent environmental damage are the most costly.

Since the Rosemont facility has not yet been established, bond estimates were based on the greatest disturbance area anticipated on an annual basis and at the conclusion of operations. The estimated disturbance areas and costs associated for reclaiming the facilities on an annual “early closure” scenario are provided in Table 13-1. The areas associated with Table 13-1 are shown in Figures 35-43, with costing details provided in Appendix C.

Table 13-1: Annual “Early Closure” Costing

Year	Disturbed Area (acres)	Estimated Road/Utility Corridor and Buffer (acres)	Early Closure Reclamation (acres)	Cost of Reclamation (\$ million)
Year -1	1,197	560	1,271	14.0
Year 1	1,668	560	1,039	15.6
Year 2	2,067	629	1,344	16.3
Year 3	2,370	790	1,572	17.4
Year 4	2,614	790	1,648	18.6
Year 5	2,863	790	2,067	19.8
Years 6-10	3,447	790	2,454	23.4
Years 11-15	3,547	790	2,569	13.2
Years 16-19	3,625	790	2,743	18.0

Based on a bid by Brandenburg Industrial Service Company, the company who performed demolition activities at the BHP San Manuel Smelter, an anticipated \$5.3 million will be spent on demolition of the plant site facilities. A copy of this bid is provided in Appendix D.

The greatest anticipated cost on an annualized “early closure” basis is found in Years 6-10. Costs expended in these years include the closure of the heap leach facility and ponds. A portion of the cost includes regrading and capping the leach pad, including associated solutions

management activities. Costs for solutions management are detailed in Appendix E. Miscellaneous reclamation costs are provided in Appendix F.

The average reclamation cost per acre for the annualized “early closure” basis is just over \$10,000.

Concurrent reclamation activities are planned for the Rosemont facility, and an overall reclamation cost estimate was prepared for operating the facility for 19 years. Table 13-2 and Figures 3 through 11 and Figure 19 present this overall reclamation scenario.

Table 13-2: Overall Reclamation Costing

Year	Disturbed Area (acres)	Estimated Road/Utility Corridor and Buffer (acres)	Concurrent Reclamation (acres)	Cost of Reclamation (\$ million)
Year -1	1,197	560	-	-
Year 1	1,668	560	162	0.8
Year 2	2,067	629	187	0.7
Year 3	2,370	790	185	0.7
Year 4	2,614	790	130	0.4
Year 5	2,863	790	159	0.6
Years 6-10	3,447	790	495	2.2
Years 11-15	3,547	790	435	1.6
Years 16-19	3,625	790	1628	16.8
Total	3,625	790	3,381	23.8

The total area reclaimed is approximately 3,625 acres while the total area shown as Anticipated Project Disturbance in Section 2 Table 1 of the Mine Plan of Operations is 4,415 acres. The difference in acreage (810 acres) can be accounted for as the unreclaimed pit area, construction buffer areas around the plant site, and the roadways and utility corridors not scheduled for reclamation. These areas have not been included in the reclamation cost estimate.

13.3 Area Specific Reclamation

Table 13-3 below specifies each of the areas being reclaimed and the activities planned for each area.

Table 13-3: Reclamation Activities Summary Table

ROSEMONT COPPER PROJECT – LIFE OF MINE			July 2007
Area	Approximate Size (ac)	Activity	Clarification
Rosemont Open Pit	135	Safety Berm	A safety berm of waste rock will be constructed around the lower end of the pit (5 feet high, 2.5:1 sideslopes)
		Soil Amendments & Seeding	Portions of the pit backfill area.
Perimeter Berm	400	Ripping, Regrading & Cover	The perimeter berm will be graded to a 3:1 slope, topsoil added as appropriate, and the area ripped.
		Soil Amendments & Seeding	The Wheeler Method will be applied to the top surface.
Waste Rock Storage	1,600	Ripping, Regrading & Cover	The top surface of the Waste Rock Storage Facility will be graded to promote drainage and ripped to a depth of 1 foot.
		Soil Amendments & Seeding	The Wheeler Method will be applied to the top surface.
Leach Pad	210	Solution Evaporation	Remaining solution will be evaporated.
		Demolition	Support equipment such as pumps, pipes, powerline, etc. will be removed to an on-site landfill.
		Cover	The leach pad will be covered with waste rock.
Tailings Starter Buttress	330	Ripping, Regrading & Cover	The buttress will be regraded to a 3.5:1 overall slope, covered with topsoil, and ripped as appropriate.
		Soil Amendments & Seeding	The Wheeler Method will be applied.
Tailings Surface	540	Ripping, Regrading & Cover	The top surface will be graded to drain and covered.
		Soil Amendments & Seeding	The Wheeler Method will be applied.
PWTS, Raffinate, PLS, and	20	Liner Removal	The pond will be emptied and sludge will be hauled to the

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ROSEMONT COPPER PROJECT – LIFE OF MINE			July 2007
Area	Approximate Size (ac)	Activity	Clarification
Stormwater Ponds			Leach Pad or tailings. Edges of the embankment liner will be folded and welded together. The Raffinate and PLS Pond will be covered by waste rock and positive drainage will be restored. The ponds will be removed and the remaining surface will be regraded to promote drainage. The PWTS pond will be graded to drain.
		Demolition	The liners and embankments will be removed as needed to eliminate the potential for ponding.
		Burial	The Raffinate, PLS, and Stormwater pond at the leach pad will be buried in place by the waste rock dump.
		Ripping, Regrading & Cover	If the ponds are not buried they will be regraded to drain, and the slopes ripped, covered, and reseeded as appropriate.
Access Roads, Utility Corridors, and Buffer Areas	425	Soil Amendments & Seeding	The edges area will be scarified and seeded.
		Demolition	Culverts will be removed as appropriate.
		Ripping, Regrading & Backfilling	Road surfaces will be ripped. Natural drainage patterns will be reestablished and sediment control structures will be established as appropriate.
Haul Roads	Unknown	Demolition	Culverts will be removed.
		Ripping, Regrading & Backfilling	Road surfaces will be ripped. Natural drainage patterns will be reestablished and sediment control structures will be established.
		Soil Amendments & Seeding	The area will be scarified and seeded.

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ROSEMONT COPPER PROJECT – LIFE OF MINE			July 2007
Area	Approximate Size (ac)	Activity	Clarification
Plant Site	120	Demolition	Buildings and infrastructure will be dismantled and removed from site (Brandenburg quotation).
		Ripping, Regrading & Backfilling	Site will be graded to promote drainage (outside of foundation areas). Concrete foundations and parking lot areas will be broken and buried in-place with cover material, final surface graded to drain.
		Soil Amendments & Seeding	The area will be scarified and seeded.
Powerline and Fresh Water System - access roads and structures	Unknown	Demolition	Buildings and infrastructure will be dismantled and removed from site.
		Ripping, Regrading & Backfilling	Site will be graded to promote drainage (outside of foundation areas). Concrete foundations will be broken and buried in-place or hauled off-site depending upon location, final surface graded to drain.
		Soil Amendments & Seeding	The area will be scarified and seeded.
Topsoil Stockpiles	200	Ripping, Regrading & Backfilling	The areas will be regraded.
		Soil Amendments & Seeding	The area will be scarified and seeded.
Settling and Stormwater Basins	2	Ripping, Regrading & Backfilling	The areas will be graded to promote positive drainage.
		Soil Amendments & Seeding	The area will be scarified and seeded.

Table 13-3: Reclamation Activities Summary Table

ROSEMONT COPPER PROJECT – LIFE OF MINE		July 2007	
Area	Approximate Size (ac)	Activity	Clarification
Miscellaneous Items		Water Supply Line Removal	The pipes will be dismantled and removed from property.
		Tank Removal	The tanks owned by contractors will be dismantled and removed by the respective contractors.
		Powerline Removal	Lines and power poles will be removed as discussed with power providers.
		Equipment Mobilization / Demobilization	Includes mobilization and demobilization of all equipment used during reclamation.
		Production, Monitoring, and Dewatering Well Closure	All wells will be closed in accordance with standard well closure methods per state guidelines.
		Post Closure Monitoring	Includes a technician and analytical test work.
		Bulk Chemical Removal	All hazardous bulk chemicals will be used or removed from the property.
		Testing	Before burial of the foundation concrete (Tank Farm, Truck-Shop, and SX/EW) will be tested for hazardous constituents.
		Substations	The area will be regraded, scarified, and seeded.
		Misc. Exploration Roads	Any existing exploration roads that must be closed will be itemized and the cost estimate updated.
Reclamation Supervisor	A supervisor will be on-site for the year of reclamation.		

13.4 Standards of Reclamation

The standards that will be met include:

- Demolition – removal and disposal of non-contaminated facilities, equipment, and materials. In some cases, inert materials such as concrete foundation materials or pond liners may be disposed of in cells constructed at the site.
- Facility design – engineered facilities that will be constructed for reclamation will have associated design standards. At this point, facilities to remain on USFS land include a constructed wetland, a diversion structure, and dumps. These facilities will be constructed as needed during operations for water control and mitigation. Only the cost of performing earthwork activities for these structures is included.
- Water quality – water quality standards (federal and state) that will be met by site discharges will be determined by permit requirements. Groundwater standards will be addressed by the state aquifer protection permit (APP) requirements, and surface water requirements will be addressed through the National Pollution Elimination Discharge Permit (NPDES) by either an individual or general permit.
- Landform – post-mining land slopes, drainages, and contours will be designed to minimize erosion and manage runoff.
- Stability – physical stability includes components that will address erosion. Chemical stability is not addressed by this plan since the chemistry associated with the operation has not been fully developed. It is anticipated that solutions will be managed prior to closure and any reagents or other operating chemicals will be removed prior to commencing reclamation.
- Revegetation – seed mixes that are appropriate for the area have been specified. Revegetation activities will include the application of seeds to supplement the natural revegetation process. The current plan is to monitor revegetation efforts to meet the Natural Resource Conservation Standards for Rangeland Health.
- Mitigation – mitigation requirements have not been established for the Project and are therefore not included herein.
- Monitoring and Maintenance – reclamation protection and monitoring requirements have been added to address on-going costs.
- Safety – public safety concerns are addressed by placing berms and/or fencing around the open pit and regrading slopes associated with the waste rock and tailings storage areas.
- Permitting – this plan does not address permitting.

13.5 Tasks Covered in Cost Estimates

In this section, the activities, equipment, materials, and personnel needed for reclamation are described. The Guidance specifies typical reclamation tasks. These tasks fall into the following eight categories:

- Interim Operations and Maintenance – since operations for this site have not yet started, interim operations and maintenance costs have not been estimated.
- Hazardous Materials – hazardous materials that may be used in this process are considered products until they are placed in the operation. At the end of the operational

period, any chemicals remaining in product tanks will be available for resale or return to the vendor. Solutions containing copper can be sold rather than disposed of.

- Water Treatment – water will be evaporated as a solutions management option.
- Demolition Removal, and Disposal of Uncontaminated Structures, Equipment and Materials – the demolition and disposal activities were estimated based on a bid provided by Brandenburg Industrial Service Company.
- Earthwork – earthwork has been based on current plans.
- Revegetation – the amount of revegetation being performed has been calculated using current facility plans. Costs were estimated for the Wheeler method which was used in a 1997 bond estimate accepted by the Forest Service in the Tonto National Forest. Should the Wheeler Method be deemed inappropriate in the future, the higher cost of this method should cover any alternatives.
- Mitigation – this plan does not address mitigation.
- Long-term Operation, Maintenance, and Monitoring – the level and estimated cost of these activities was estimated based on current permitting standards.

13.6 Summary

The direct and indirect cost estimates per area have been summarized in Table 13-4 on the following page. Cost summary tables can be found in Appendix C.

Table 13-4: Reclamation Cost Summary per Activity Area

Task	Approx. Reclamation Area ² (acres)	Hazardous Materials Cost (\$)	Water Quality (\$)	Demolition/Cleanup Cost (\$)	Equipment Cost (\$)	Labor Cost (\$)	Revegetation Cost (\$)	Long-term Operation, Maintenance, and Monitoring Cost (\$)	Subtotal Direct Cost (\$)	Indirect Cost (\$)	Total Cost (\$)
Rosemont Open Pit	135				41,300	5,000	24,300		70,600	19,600	90,100
Perimeter Berm	402				1,340,800	133,200	199,000		1,673,000	465,000	2,138,000
Waste Rock Storage	1,600				4,178,900	564,400	790,400		5,533,700	1,550,500	7,084,200
Tailings Starter Buttress	3600				948,300	85,700	178,800		1,212,700	336,000	1,548,800
Tailings	540				1,148,500	155,300	266,700		1,570,500	439,600	2,010,100
Process Ponds	20		321,400	29,700	61,800	8,300	99,800		521,000	141,500	662,500
Roads	Unknown										
Plant Site	120	210,000		5,192,300	960,600	129,000	83,200		6,575,100	1,788,200	8,363,300
Topsoil Stockpiles	200				75,600	10,800	99,000		185,400	51,100	236,500
Stormwater Basins	2				4,100	600	700		5,400	1,500	6,900
Miscellaneous Reclamation Costs	0	25,200		150,000	69,400	103,100	714,000	346,800	1,408,500	390,600	1,799,100
Total	3,379	\$ 235,200	\$ 321,400	\$ 5,372,000	\$ 8,829,300	\$ 1,195,400	\$ 2,455,900	\$ 346,800	\$ 18,755,900	\$ 5,183,600	\$ 23,939,500

² Acreage variance from Westland Resources' Mine Plan of Operations due to rounding.