

10.0 Reclamation Cost Estimate

The following Table X provides an estimate for the reclamation and cleanup of all surface components of Royal Oak's Giant Mine. It has been largely developed from items that were addressed in Royal Oak's Giant Mine, Abandonment and Restoration (A&R) Plan, dated December 1998. Components in the table follow the structure of the RECLAIM Version 3.1 reclamation cost estimating model software developed for DIAND by Brodie Consulting Ltd.

Both 1997 and 1999 estimates are presented in the table. The 1997 estimate was developed by Brodie Consulting Ltd. as part of a report, *"Report on Giant Closure Cost Estimate"*, dated November 27, 1997. The 1999 estimate was developed by EBA Engineering Consultants Ltd. (EBA), and where possible, reflect 1999 costs based on local knowledge, experience, and discussions with local contractors and suppliers. In general, local rates tend to be closer to the high-end range provided in the RECLAIM program.

Where a rate could not be obtained due to specialties not locally available, best judgement was made to develop the rates for reclamation. This is the case for demolition and disposal of the buildings, electrical substations, and power lines. Revlyn Demolition and Recycling Ltd., based out of Edmonton, Alberta, was contacted in an attempt to estimate a rate that may reflect the conditions at Giant Mine. As expected, the contractor did not feel comfortable providing rates without having a better background of the mine and seeing the buildings that were to be demolished. The rates that were used for this estimate were based on a Memorandum from Giant Yellowknife Mines Limited with the subject, *"Mine Closure - Salvage & Restoration"*, dated August 16, 1982. The memorandum provides a breakdown of cost estimates for surface salvage and rehabilitation at Giant. Equipment rates that were used in the 1982 estimate were transposed to reflect 1999 rates and a pro-rated cost was established for these demolition items.

Reclamation components such as disposal of Chemicals, Wastes and Contaminated Soils are largely unknown since an extensive investigation has not been made to determine the quantity of these items. These items either reflect the cleanup estimate presented by Brodie, or make an estimate based on an aerial photograph of the mine site.

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An established quantity of cover soil has not been established at the time of preparing this estimate. The soil cover is assumed to be locally available based on geotechnical information previously collected at the mine and potential sites identified on aerial photographs. The suitability of this material will have to be determined if a local source of sufficient quantity can be identified through future testing.

The total capital cost is assumes that all work will be carried out concurrently and is presented in 1999 Canadian dollars. It does not include the cost for monitoring and maintenance since it is unknown how many years will be required for these items. The cost reflects current levels of technology and does not account for new technology or inflationary measures beyond the year 1999. The estimate assumes that there will not be an appreciable salvage value for any materials or equipment.

REHABILITATION ACTION ITEM: Open Pits

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 CONTROL ACCESS				
Signage	each	8	C\$150.00	C\$1,200
Create Berm	m3	38000	C\$7.55	C\$286,900
Block Roads	m3	1140	C\$4.00	C\$4,560
2.0 FLOOD PIT				
Ditch, material	m3	1500	C\$12.00	C\$18,000
3.0 BACKFILL A2 EXTENSION				
Fill material	m3	NA	NA	C\$0
3.1 BACKFILL BROCK/B4 PIT				
Fill material	m3	6500	C\$6.00	C\$39,000
Subtotal				C\$349,660

REHABILITATION ACTION ITEM: Quarries and Borrow Areas

1.0 COVER/CONTOUR SLOPES				
Vegetate	ha	NA	NA	C\$0
Subtotal				C\$0

REHABILITATION ACTION ITEM: Underground Mine

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 CONTROL ACCESS				
Signage	each	23	C\$150.00	C\$3,450
Cap Shaft (A, B, C)	m3	36	C\$1,200.00	C\$43,200
Cap 11 Raises	m3	100	C\$1,200.00	C\$120,000
Cap 6 Raises	m3		NA	C\$0
Cap Akaitcho Shaft	m3	NA	NA	C\$0
Backfill 5 Portals	m3	467	C\$7.55	C\$3,526
Cement 6 Portals	m3	76	C\$350.00	C\$26,600
Backfill Brock Adit	m3	17	C\$7.55	C\$128
Cement Brock Adit	m3	5	C\$350.00	C\$1,750
Block B3 Portal	m3	NA	NA	C\$0
Backfill Brock Shaft	m3	NA	NA	C\$0
Backfill B3 Raise	m3	NA	NA	C\$0
Backfill DWC Open Stope	m3	4500	C\$5.00	C\$22,500
2.0 STABILIZE GROUND				
Contour DWC Open Stope	m3	550	C\$2.50	C\$1,375
3.0 FLOOD MINE				
Plug Adits	each	NA	NA	C\$0
4.0 REMOVE HAZARDOUS MAT'L				
	each	1	C\$15,000.00	C\$15,000
Subtotal				C\$237,529

REHABILITATION ACTION ITEM: Tailings Impoundment - North, Central, South Po

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 STABILIZE EMBANKMENT				
Dams 3 and 11	m3	14000	C\$7.55	C\$105,700
2.0 COUNTOUR TAILINGS				
Grade Tailings, South Pond	m3	8000	C\$0.75	C\$6,000
Grade Tailings, Central Pond	m3	10000	C\$0.75	C\$7,500
Grade Tailings, North Pond	m3	20000	C\$0.75	C\$15,000
Place Soil Cover	m3	510000	C\$7.55	C\$3,850,500
Place Rock	m3	510000	C\$7.55	C\$3,850,500
Vegetate	ha	NA	NA	C\$0
3.0 DRAINAGE CHANNEL				
Excavate Channel	m3	10500	C\$6.54	C\$68,670
Rip Rap (unscreened mine waste)	m3	3500	C\$7.55	C\$26,425
4.0 STABILIZE DECANT SYSTEM				
Plug/backfill	m3	83	C\$350.00	C\$29,050
5.0 REMOVE TAILININGS LINE				
Pipe	m3	2800	C\$1.00	C\$2,800
Subtotal				C\$7,962,145

REHABILITATION ACTION ITEM: Tailings Impoundment - Northwest Tailings

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 COUNTOUR TAILINGS				
Grade Tailings	m3	31000	C\$0.75	C\$23,250
Vegetate	ha	46	C\$3,300.00	C\$151,800
2.0 SEEPAGE COLLECTION				
Dam	m3	1800	C\$7.67	C\$13,806
Ditches	m3	600	C\$6.54	C\$3,924
Pumphouses	each	2	C\$10,000.00	C\$20,000
3.0 DRAINAGE CHANNEL				
Excavate Channel	m3	7200	C\$6.54	C\$47,088
Rip Rap (unscreened mine waste)	m3	2400	C\$7.55	C\$18,120
4.0 STOP LOG SPILLWAY				
Drill/blast	m3	200	C\$12.00	C\$2,400
Concrete	m3	120	C\$1,000.00	C\$120,000
5.0 REMOVE TAILINGS LINE				
Pipe	m3	1200	C\$1.00	C\$1,200
Subtotal				C\$401,588

REHABILITATION ACTION ITEM: Tailings Impoundment - Historic Tailings Yellow

1.0 TEMPORARY ACCESS				
Road from mine waste rock	m3	175	C\$7.55	C\$1,321
2.0 STABILIZE EMBANKMENT				
Flatten slope	m3	270	C\$7.50	C\$2,025
3.0 COVER TAILINGS				
Rip Rap (screened mine waste)	m3	4700	C\$18.00	C\$84,600
Geotextile	m2	6100	C\$3.00	C\$18,300
Subtotal				C\$106,246

REHABILITATION ACTION ITEM: Buildings and Equipment

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 DISPOSE MOBILE EQUIP.				
Decontaminate & dispose	each	35	C\$1,000.00	C\$35,000
2.0 DECONTAMINATE BLDGS				
Asbestos	m2	1	*****	C\$400,000
3.0 REMOVE BUILDINGS				
MILL BLDGS				
Buildings, steel	m2	2040	C\$35.00	C\$71,400
Buildings, wood	m2	6240	C\$17.25	C\$107,640
Buildings, concrete	m2	307	C\$15.00	C\$4,605
ROASTER				
Buildings, steel	m2	762	C\$35.00	C\$26,670
Buildings, wood	m2	9096	C\$17.25	C\$156,906
Buildings, concrete	m2	480	C\$15.00	C\$7,200
A SHAFT				
Buildings, steel	m2	558	C\$35.00	C\$19,530
Buildings, wood	m2	2017	C\$17.25	C\$34,793
Buildings, concrete	m2	102	C\$15.00	C\$1,530
EXPLOSIVES LTD.				
Buildings, steel	m2	595	C\$35.00	C\$20,825
Buildings, concrete	m2	30	C\$15.00	C\$450
AKAITCHO				
Buildings, steel	m2	558	C\$35.00	C\$19,530
Buildings, wood	m2	1222	C\$17.25	C\$21,080
Buildings, concrete	m2	60	C\$15.00	C\$900
EFFLUENT TREATMENT PLANT				
Buildings, steel	m2	678	C\$35.00	C\$23,730
Buildings, concrete	m2	394	C\$15.00	C\$5,910
TAILINGS TREATMENT PLANT				
Buildings, steel	m2	1487	C\$35.00	C\$52,045
Buildings, concrete	m2	1227	C\$25.00	C\$30,675

REHABILITATION ACTION ITEM: Buildings and Equipment (Continued)

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
POWER LINES				
Akaitcho	m	5304	C\$5.20	C\$27,581
B3 to Tailings Plant	m	5395	C\$6.12	C\$33,017
Residential Area	m	2560	C\$7.55	C\$19,328
C" Area	m	3048	C\$6.02	C\$18,349
"A" Shaft Area	m	5120	C\$4.40	C\$22,528
ELECTRICAL SUBSTATIONS				
"B" Shaft Area	each	1	C\$7,896.00	C\$7,896
"A" Shaft Area	each	1	C\$22,564.00	C\$22,564
Residential Area	each	1	C\$9,270.00	C\$9,270
Main Electrical Substation	each	1	C\$18,117.00	C\$18,117
"A" SHAFT TANK FARM				
Remove/dispose	each	1	C\$14,629.00	C\$14,629
"A" BOILER PLANT				
Remove/dispose	each	1	C\$20,462.00	C\$20,462
REC HALL, CURLING RINK				
Remove/dispose	each	1	C\$15,344.00	C\$15,344
TOWNSITE				
Buildings, wood	m2	2750	C\$17.25	C\$47,438
Hazardous materials	m2	1	C\$10,000.00	C\$10,000
4.0 GRADE AND CONTOUR				
Grade Mill Area	ha	13.5	C\$3,750.00	C\$50,625
Place Soil Cover	m3	13000	C\$7.55	C\$98,150
Vegetate	ha	15	C\$1,100.00	C\$16,500
Grade B1 Pit	m3	10625	C\$7.55	C\$80,219
5.0 RECLAIM ROADS				
Scarify and install water breaks	ha	17	C\$3,750.00	C\$63,750
Vegetate	ha	17	C\$1,100.00	C\$18,700
Berms for access control	m3	1700	C\$5.00	C\$8,500
6.0 TOWNSITE				
Soil sampling	each	NA	NA	C\$0
Subtotal				C\$1,663,385

REHABILITATION ACTION ITEM: Chemicals and Contaminated soils

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 LABORATORY CHEMICALS	pallets	80	C\$2,000.00	C\$160,000
2.0 FUEL TANKS				
Sludges	kg	135000	C\$0.15	C\$20,250
3.0 GENERAL REFUSE				
Debris at NW Tailings	m3	7190	C\$3.40	C\$24,446
Debris at mill site	m3	7000	C\$3.40	C\$23,800
As2O3 pallets at NW Tailings	barrels	1000	C\$20.00	C\$20,000
4.0 CONTAMINATED SOILS				
Gas/diesel	m3	10000	C\$50.00	C\$500,000
Arsenic	m3	40500	C\$7.55	C\$305,775
Subtotal				C\$1,054,271

REHABILITATION ACTION ITEM: Water Management - Effluent Treatment Plant, S

1.0 COLLECTION DITCHES				
Excavate Channel	m3	1200	C\$6.54	C\$7,848
Rip Rap (unscreened mine waste)	m3	800	C\$5.00	C\$4,000
2.0 COVER SLUDGE				
Geosynthetic	m2	34000	C\$20.00	C\$680,000
Rockfill cover	m3	50000	C\$7.55	C\$377,500
3.0 CONSTRUCT SPILLWAY				
Excavation	m3	1750	C\$7.55	C\$13,213
Concrete	m3	120	C\$1,000.00	C\$120,000
4.0 REMOVE PIPELINES				
Fill decant with concrete	m3	62	C\$350.00	C\$21,700
Subtotal				C\$1,224,261

REHABILITATION ACTION ITEM: Baker Creek

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 CONSTRUCT CHANNELS				
Excavate Channel	m3	10170	C\$12.00	C\$122,040
Vegetate	ha	0.15	C\$50,000.00	C\$7,500
2.0 STABILIZE EX. CHANNELS				
Regrade slopes	m3	1440	C\$6.54	C\$9,418
Vegetate	ha	0.2	C\$50,000.00	C\$10,000
3.0 REMOVE CULVERTS				
Remove/dispose culverts	each	4	C\$500.00	C\$2,000
Subtotal				C\$150,958

REHABILITATION ACTION ITEM: Contractor Mobilization/Demobilization

1.0 MOBILIZE HEAVY EQUIP.				
Demolition Contractor	lump	1	C\$20,000.00	C\$20,000
Hazardous materials contractor	each	1	C\$10,000.00	C\$10,000
Asbestos Contractor	each	1	C\$20,000.00	C\$20,000
Subtotal				C\$50,000

REHABILITATION ACTION ITEM: Monitoring and Maintenance

Activity	Units	Quantity	Unit Cost	Cost
		1999	1999	1999
1.0 INSPECTIONS				
Visual Inspections	each	10	C\$3,000.00	C\$30,000
Water Sampling	each	20	C\$4,500.00	C\$90,000
Reporting	each	1	C\$4,000.00	C\$4,000
2.0 MAINTENANCE				
Security	month	1	C\$5,000.00	C\$5,000
Seepage Pumping	month	12	C\$1,000.00	C\$12,000
3.0 WATER TREATMENT				
Operate treatement plant	m3	156900	C\$1.04	C\$163,176
Subtotal				C\$304,176

Monitoring and Maintenance estimated to be 20 years

Estimated Present Value of monitoring and maintenance for 20 years C\$3,790,702

<u>Component Name</u>		<u>99 Total Cost</u>
Open Pits		C\$349,660
Borrow Areas		C\$0
Underground Mine		C\$237,529
Old Tailings System		C\$7,962,145
Northwest Tailings System		C\$401,588
Historic Tailings		C\$106,246
Buildings and Equipment		C\$1,663,385
Chemicals and Contaminated Soils		C\$1,054,271
Water Management - Effluent Treatment Plant		C\$1,224,261
Baker Creek		C\$150,958
Mobilization/demobilization		C\$50,000
Subtotal		<u>C\$13,200,043</u>
PROJECT MANAGEMENT	3% of subtotal	C\$396,001
ENGINEERING	3% of subtotal	C\$396,001
CONTINGENCY	10% of Subtotal	<u>C\$1,320,004</u>
TOTAL CAPITAL COST		<u>C\$15,312,050</u>

Notes:

1. Total capital cost is in 1999 Canadian dollars and does not include monitoring and maintenance for many years which will be required for monitoring and maintenance.
2. The total capital cost reflects current levels of technology and does not account for new measures beyond the year 1999.