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BLACKHAWK ENGINEERING, INC.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (435) 637-2422

Mr. Wayne Western
Utah Division of Oil, Gas & Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

June 2, 2000

Re: Andalex Resources, Inc.
Centennial Project
ACT/007/019
Carbon County, Utah

Incoming.

Copy to Wayne
Bill

Dear Wayne,

Enclosed is a draft copy of the revised reclamation bond calculations for the Centennial Project. The revisions include those discussed at our on-site meeting.

Would you please look this over and let Mike Glasson know if this is O.K.? I will be out of town until 6/8/00. If you have any questions, please let Mike know, and I will get back with you as soon as I return. I appreciate your help and input on these calculations.

Respectfully,

Dan W. Guy

Formal Submittal
on its way
per telephone
conversation with
Mike Glasson on 6/6/2000.

cc: Mike Glasson

RECEIVED

JUN 8 2000

DIVISION OF
OIL, GAS AND MINING

Andalex Resources, Inc.

Centennial Project

Reclamation Cost Estimate

June 2000

RECLAMATION COST ESTIMATE

COST OF RECLAMATION

INTRODUCTION

Reclamation cost estimates for the Centennial Project have been recalculated per Division requirements listed in the 02/14/00 Midterm Review. Demolition and labor costs have been taken from the "Means Heavy Construction Data," 12th Annual Edition, 1998. Equipment productivity rates were taken from the "Caterpillar Performance Handbook", Edition 28, 1997.

Reclamation costs have been divided into the following major categories:

*Demolition / Disposal
Recontouring/Ground Preparation
Portal Sealing
Topsoiling
Reseeding
Monitoring*

The following assumptions have been used in these calculations:

- (1) All steel demolition costs include haulage to a recycling facility within 20 miles of the loadout. No salvage value is assumed;*
- (2) All exposed concrete will be broken up and buried on site. Calculations are based on haulage and disposal of the concrete in the proposed highwall and cut slope fill areas;*
- (3) Certain portable structures will be hauled off site as units; however, no salvage value is assumed;*
- (4) Calculations include removal and revegetation of the sediment ponds;*
- (5) Cost estimates taken from "Means Heavy Construction Cost Data" have not been adjusted;*
- (6) Earthwork calculations were performed per attached O.S.M. Bond Calculation Worksheets;*
- (7) Portal Sealing costs were based on costs provided by the Division, based on AML experience;*
- (8) Costs have been recalculated based on results of an on-site meeting with Mr. Wayne Western of the Division.*

The following is a list of labor and equipment rates, as well as disposal costs, used in these calculations:

<i>ITEM</i>	<i>COST / UNIT</i>	<i>SOURCE</i>	<i>REMARKS</i>
<u>Labor</u>	32.55/MH	Means	Includes O&P
<u>Demolition</u>			
Chain Link	2.42/LF	Means	Includes O&P
Concrete	39.65/CY	Means	Includes on-site Disposal
12" C.M.P.	6.15/LF	Means	Includes O&P
18" C.M.P.	8.00/LF	Means	Includes O&P
24" C.M.P.	8.95/LF	Means	Includes O&P
36" C.M.P.	11.95/LF	Means	Includes O&P
42" C.M.P.	15.00/LF	Means	Includes O&P
Small Buildings	0.24/CF	Means	Includes 20 mile Haul
Steel Structures	0.24/CF	Means	Includes 20 mile Haul
Disposal (Land Fill)	35.00/CY	Means	Approved Land Fill
<u>Earthmoving</u>			
D9R-9U Dozer	1.47/CY	Means	300' Haul
988 Cat Loader	1.82/CY	Means	Earth
Dump Truck - Cat 769D	0.83/CY	Means	1 Mile Round Trip
235 Cat Excavator	2.31/CY	Means	Includes O&P
D9R-9U Dozer	3.35/CY	Means	300' Haul
Grader/Scarifier	4.32/MSF	Means	Includes O&P
Tractor Spreader	22.00/MSF	Means	Includes O&P
Large Power Mulcher	22.00/MSF	Means	Includes O&P
<u>Equipment</u>			
D9R-9U Dozer	212.23/hr.	Cat Handbook/Means	
988 Cat Loader	210.47/hr.	Cat Handbook/Means	
Cat 769D Dump Truck	126.38/hr.	Cat Handbook/Means	
235 Cat Excavator	264.63/hr.	Cat Handbook/Means	
Hydraulic Hammer	25.45/hr.	Cat Handbook/Means	

SUMMARY OF RECLAMATION COSTS

<i>1- Demolition / Disposal</i>	-	\$223,177.88
<i>2- Recontouring / Ground Preparation</i>	-	263,076.26
<i>3- Portal Sealing</i>	-	34,000.00
<i>4- Topsoiling</i>	-	73,108.20
<i>5- Reseeding</i>	-	113,493.55
<i>6- Monitoring</i>	-	18,000.00
		<hr/>
<i>Projected Reclamation Costs</i>	=	\$724,855.89
<i>+ 5% Contingency</i>	=	36,242.80
<i>+ 5% Reclamation Management Costs</i>	=	36,242.80
<i>+ 5% Mobilization/Demobilization</i>	=	36,242.80
		<hr/>
<i>Sub- Total Reclamation Cost (2000 Dollars)</i>	=	\$833,584.29
<i>+ Inflation @ 3.27% for 4 Years</i>	=	114,498.43
<i>Total Inflated Reclamation Cost</i>	=	<u>\$948,082.72</u>

Total estimated reclamation cost in 2004 dollars is \$948,082.72. The reclamation bond presently posted for this site is \$1,080,000.00. Based on these calculations, the existing bond is adequate.

Concrete Demolition / Burial

(a) Assumptions:

- 1- Concrete will be broken up with a Balderson Hydraulic Hammer, Model H115, mounted on a Cat 235 Excavator;
- 2- The Hydraulic Hammer productivity was based on breakage of reinforced concrete taken from the Breaker Production Chart supplied by the Division.
- 3- Breakage productivity was reduced by 50% due to moving from location to location and size differential;
- 4- Operating costs of \$290.08/hr. for the excavator and hammer were taken from the 1998 Means "Heavy Construction Cost Index".
- 5- Disposal cost of \$6.50/c.y. for on-site disposal was taken directly from Means.

(b) Calculation:

Hydraulic Hammer Productivity	=	140 c.y./8 Hr.
50% Efficiency	=	70 c.y./8 Hr.
Production (Breakage) per hour	=	8.75 c.y./Hr.

Demolition Cost:

\$290.08/Hr. Divided by 8.75 cy / Hr.	=	\$33.15 /c.y.
Disposal Cost (On-Site)	=	\$6.50 /c.y.
TOTAL Concrete Cost	=	\$39.65 /c.y.

The following is a detailed summary of costs and justifications used in the reclamation cost estimate.

Andalex - Centennial Bond

Demolition

<u>STRUCTURE</u>	<u>SIZE</u>	<u>MATERIAL</u>	<u>DEMOLISH REMOVE</u>	<u>DISPOSAL</u>	<u>COST/UNIT</u>	<u>COST</u>
<u>ABERDEEN MINE</u>						
Loadout Bin	20'x20'x20'	Steel	Demolish	Haul	0.24/CF	1,920.00
Concrete	20'x28'x0.75'	Concrete	Demolish	On-Site	39.65/CY	616.78
Reclaim	8'x12'x150'	Steel	Demolish	Haul	0.24/CF	3,456.00
Conveyor	4'x4'x250'	Steel	Demolish	Haul	0.24/CF	960.00
Hopper	20x20x15'	Steel	Demolish	Haul	0.24/CF	1,440.00
Conveyor	5'x5'x260'	Steel	Demolish	Haul	0.24/CF	1,560.00
Tunnel	8'x12'x90'	Steel	Demolish	Haul	0.24/CF	2,073.60
Fan	8'x20'x20'	Steel	Remove	Haul	0.24/CF	768.00
Sub Transformers	2	Unit	Remove	Haul	100/EA	200.00
Sub. Fence	104'	Chain Link	Demolish	Haul	2.42/LF	251.68
Water Tank	941 CF	Steel	Remove	Haul	0.24/CF	225.84
4 Portal Structures	20'x20'x8'	Steel	Demolish	Haul	0.24/CF	3,072.00
Sub Total						<u>\$16,543.90</u>
<u>MAIN OFFICE</u>						
Office	32'x60'x16'	Mix	Demolish	Haul	0.24/CF	7,372.80
Concrete	47.15 CY	Concrete	Demolish	On-Site	39.65/CY	1,869.50
Trailer	8'x12'x70'	Unit	Remove	Haul	0.24/CF	1,612.80
Water Tank	706 CF	Unit	Remove	Haul	0.24/CF	169.44
Sub Total						<u>\$11,024.54</u>
<u>BATH HOUSE</u>						
Bathroom 1	14'x65'x8'	Mix	Demolish	Haul	0.24/CF	1,747.20
Bathroom 2	12'x50'x8'	Mix	Demolish	Haul	0.24/CF	1,152.00
Trailer	12'x42'x8'	Unit	Remove	Haul	0.24/CF	967.68
(2) Water Tanks	941 CF EA	Unit	Remove	Haul	0.24/CF	225.84
Concrete 1	14'x65'x0.50'	Concrete	Demolish	On-Site	39.65/CY	668.18
Concrete 2	12'x50'x0.50'	Concrete	Demolish	On-Site	39.65/CY	440.56
Sub Total						<u>\$5,201.46</u>
<u>UPPER PINNACLE</u>						
Sub. Trans.	3	Unit	Remove	Haul	100/EA	300.00
Sub-Fence	328'	Chain Link	Demolish	Haul	2.42/LF	793.76
Loadout Bin	20'x20'x24'	Steel	Demolish	Haul	0.24/CF	2,304.00
Concrete	20'x24'x0.75'	Concrete	Demolish	On-Site	39.65/CY	528.66
Conveyor	4'x4'x200'	Steel	Demolish	Haul	0.24/CF	768.00
Reclaim	8'x12'x100'	Steel	Demolish	Haul	0.24/CF	9,600.00
Hopper	10'x24'x24'	Steel	Demolish	Haul	0.24/CF	1,382.40

Conveyor	4'x5'x185'	Steel	Demolish	Haul	0.24/CF	888.00
Tunnel	8'x12'x90'	Steel	Demolish	Haul	0.24/CF	2,073.60
Water Tank	1412 CF	Steel	Remove	Haul	0.24/CF	338.88
Rock Dust Tank	1570 CF	Steel	Remove	Haul	0.24/CF	376.80
Trailer	10'x55'x8'	Unit	Remove	Haul	0.24/CF	1,056.00
Trailer	10'x50'x8'	Unit	Remove	Haul	0.24/CF	960.00
Trailer	10'x40'x8'	Unit	Remove	Haul	0.24/CF	768.00
4 Portal Structures	20'x20'x8'	Steel	Demolish	Haul	0.24/CF	3,072.00

Sub Total \$25,210.10

LOWER PINNACLE

Office	24'x42'x8'	Steel/Mix	Demolish	Haul	0.24/CF	1,935.36
Concrete	24'x42'x0.5'	Concrete	Demolish	On-Site	39.65/CY	740.14
3 Portal Structures	20'x20'x7'	Steel	Demolish	Haul	0.24/CF	2,016.00

Sub Total \$4,691.50

SHOP/WAREHOUSE

Building	150'x60'x18'	Steel/Mix	Demolish	Haul	0.24/CF	38,880.00
Concrete	150'x60'x1'	Concrete	Demolish	On-Site	39.65/CY	13,216.66

Sub Total \$52,096.66

APEX

Loadout	20'x20'x18'	Steel	Demolish	Haul	0.24/CF	1,728.00
Concrete	20'x20'x.75'	Concrete	Demolish	On-Site	39.65/CY	440.56
Conveyor	4'x4'x350'	Steel	Demolish	Haul	0.24/CF	1,344.00
Reclaim	8'x12'x170'	Steel	Demolish	Haul	0.24/CF	3,916.80
Hopper	24'x24'x16'	Steel	Demolish	Haul	0.24/CF	2,211.84
Conveyor	5'x4'x250'	Steel	Demolish	Haul	0.24/CF	1,200.00
Tunnel	8'x12'x125'	Steel	Demolish	Haul	0.24/CF	2,880.00
4 Portal Structures	20'x20'x6'	Steel	Demolish	Haul	0.24/CF	2,304.00
Water Tank	941 CF	Steel	Remove	Haul	0.24/CF	225.84
Shed	10'x50'x8'	Steel	Demolish	Haul	0.24/CF	960.00
2 Magazines	4'x4'x6'	Steel	Remove	Haul	0.24/CF	46.08
Sub-Trans.	2	Unit	Remove	Haul	100/EA	200.00
Sub-Fence	105'	Chain Link	Demolish	Haul	2.42/LF	254.10
Office	25'x40'x8'	Mix	Demolish	Haul	0.24/CF	1,920.00
Concrete	25'x40'x0.5'	Concrete	Demolish	On-Site	39.65/CY	734.25

Sub Total \$20,365.47

LEFT FORK

Fan	20'x25'x8'	Steel	Remove	Haul	0.24/CF	960.00
2 Portal Structures	20'x20'x8'	Steel	Demolish	Haul	0.24/CF	1,536.00

Sub Total \$2,496.00

CULVERTS

12" CMP	260 LF	Steel	Demolish	Haul	6.15/LF	1,599.00
18" CMP	1340 LF	Steel	Demolish	Haul	8.00/LF	10,720.00
24" CMP	330 LF	Steel	Demolish	Haul	8.95/LF	2,953.50
36" CMP	1885 LF	Steel	Demolish	Haul	11.95/LF	22,525.75
42" CMP	2950 LF	Steel	Demolish	Haul	15.00/LF	44,250.00

Sub Total \$82,048.25

Power Poles 35 *Wood* *Demolish* *Haul* 100/EA 3,500.00

Sub Total \$3,500.00

TOTAL DEMOLITION ESTIMATE \$223,177.88

EARTHWORK COSTS

(1) *General:*

The Centennial Minesite is located in a relatively narrow, winding canyon. The majority of the mine portal sites are located along the canyon walls and do contain cut slopes and highwalls. Reclamation plans call for complete elimination of highwalls and restoration of the natural drainage channel. The vast majority of the earthwork will be completed by a dozer, excavating material from the canyon bottom and pushing it to the highwalls and cut slopes.

Earthwork totals are based on the Mass Balance Summary for the Centennial Project Mine Plan and the Cross Sections on Plate 15 (Sheets 1 through 18). Based on the proposed sections, excavated material will not have to be moved more than 300' to balance the fill areas. Cost data and productivity are taken from "Means Heavy Construction Cost Data", 12th Annual Edition, 1998 and the "Caterpillar Performance Handbook", Edition 28, for a D9R-9U Dozer with a 300' haul for common earth. The calculated rate for earthmoving under the specific site conditions is \$1.84/cu.yd.

(2) Calculations:

<i>Dozer</i>	=	<i>D9R-9U</i>
<i>Average Push Distance</i>	=	<i>300'</i>
<i>Productivity</i>	=	<i>480 LCY/hr. @ 100%</i>
<i>Loose Material Weight</i>	=	<i>2300 lbs/cu.yd.</i>
<i>Bank Material Weight</i>	=	<i>2650 lbs/cu.yd.</i>
<i>Weight Correction</i>	=	<i>2300/2650 = 0.87</i>
<i>Operator (Average)</i>	=	<i>0.75</i>
<i>Job Efficiency (50 min./hr.)</i>	=	<i>0.83</i>
<i>Material (Difficult/Dry)</i>	=	<i>0.80</i>
<i>Average Grade (+15%)</i>	=	<i>0.69</i>

$$\text{Adjusted Production} - (480 \text{ LCY/hr.})(0.87)(0.75)(0.83)(0.80)(0.69) = \underline{144.00 \text{ LCY/hr.}}$$

$$\text{Cost/Cu.Yd.} = \$212.23/\text{hr.}/144.00 \text{ LCY/hr.} = \underline{1.47/\text{cu.yd.}}$$

<i>PROJECT</i>	<i>QUANTITY</i>	<i>EQUIPMENT</i>	<i>COST/UNIT</i>	<i>COST</i>
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RECONTOURING / GROUND PREPARATION

Cleanup Coal Piles

	2000 CY	D9 Dozer	1.47/CY	2,940.00
	2000CY	988 Loader	1.82/CY	3,640.00
	2000CY	769D Truck	0.83/CY	1,660.00

Recontour / Regrade

	*173,358 CY	D9 Dozer	1.47/CY	254,836.26
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* See Worksheet 4A, Appendix A

			<i>Sub-Total</i>	\$263,076.26
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PORTAL SEALING

	17 Portals		2000/Ea	34,000.00
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			<i>Sub-Total</i>	\$34,000.00
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TOPSOILING

Topsoil & Substitute Topsoil

	27,588 CY	988 Loader	1.82/CY	50,210.16
	27,588 CY	769D Truck	0.83/CY	22,898.04

			<i>Sub-Total</i>	\$73,108.20
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REVEGETATION

<i>Ground Prep.</i>	34.2 Ac.	<i>Grader/Scarifier</i>	188.18/Ac.	6,435.76
<i>Seeding</i>	34.2 Ac.	<i>Tractor Spreader</i>	958.32/Ac.	32,774.54
<i>Mulching/Fert.</i>	34.2 Ac.	<i>Large Power Mulcher</i>	958.32/Ac.	32,774.54
<i>Seed Mix</i>	34.2 Ac.	<i>Includes Trees/Shrubs</i>	550.00/Ac.	18,810.00

			<i>Sub-Total</i>	\$90,794.84
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RESEEDING

25% of Revegetation Cost = 22,698.71

Sub-Total \$22,698.71

MONITORING COSTS

120 Mandays @ 150.00/day = 18,000.00

Sub-Total \$18,000.00

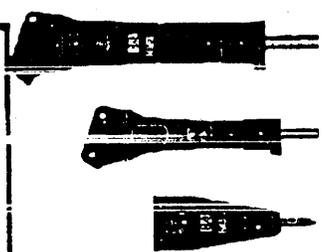
TOTAL COST = \$501,678.01



Breaker Production Chart

	Non-reinforced Concrete	Reinforced Concrete	Sedimentary Rock	Volcanic Rock
H115s	150 - 375 yd ³	140 - 240 yd ³	155 - 365 yd ³	75 - 150 yd ³
H120Cs	200 - 450 yd ³	160 - 300 yd ³	200 - 340 yd ³	110 - 200 yd ³
H130s	275 - 490 yd ³	200 - 350 yd ³	250 - 400 yd ³	135 - 275 yd ³
H140s	n/a	n/a	300 - 700 yd ³	150 - 350 yd ³
H160s	n/a	n/a	350 - 900 yd ³	200 - 600 yd ³
H180s	n/a	n/a	400 - 1600 yd ³	250 - 900 yd ³

Production Rates listed are based on 8 hour shift.
 The above figures are for guideline only and must not be used to guarantee any production figure to the customer, the actual working results may vary according to the quality and structure of the material to be broken, required degree of reduction, installation, condition of carrier, conditions at the work site, haulage of the broken material, skills of the operator, etc.



APPENDIX A
BOND CALCULATION WORKSHEETS

04/05/00

Project: _____
 Date: _____
 Prepared by: _____

**WORKSHEET 4A
 EARTHWORK QUANTITY**

Cross-Section/ Station	Distance Between Stations (ft)	End Area (ft ²)	Volume (yd ³)*	Adjust- ment Factor * (%)	Adjusted Volume (LCY)
-2+00	100	0	0	0.852	0
-1+00	400	520	963	0.852	1045
+3+00	400	480	7407	0.852	8,038
7+00	400	1736	11,415	0.852	17,814
11+00	400	2000	27,674	0.852	30,032
15+00	400	0	14,815	0.852	11,077
19+00	400	1168	8,652	0.852	9,389
23+00	400	1544	20,089	0.852	21,800
27+00	400	1320	21,215	0.852	23,023
31+00	400	520	13,630	0.852	14,790
35+00	400	880	10,370	0.852	11,254
39+00	400	760	12,148	0.852	13,183
43+00	400	80	6,222	0.852	6,752
44+00	100	0	148	0.852	161
TOTALS			159,748		173,358

* See discussion of material volume estimates in Chapter 2, Step 2, Part II. B. of the Handbook.
 Select adjustment factor based on the state of the material to be moved.

Data Source(s):

CENTENNIAL M.R.P. MASS BALANCE
 CROSS-SECTIONS - SHEETS 1 THRU 19.

**WORKSHEET 5
 PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE**

Earthmoving Activity:

ROUGH GRADE MINE SITE AREA.

Characterization of Dozer Used (type, size, etc.):

D9R-9U DOZER

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.):

300 LF AVERAGE PUSH DISTANCE AT 15% EFFECTIVE GRADE.

Productivity Calculations:

$$\begin{aligned} \text{Operating Adjustment Factor} = & \frac{0.75}{\text{operator factor}} \times \frac{0.80}{\text{material factor}} \times \frac{0.83}{\text{efficiency factor}} \times \frac{0.69}{\text{grade factor}} \\ & \times \frac{0.87}{\text{weight correction factor}} \times \frac{1.0}{\text{production method/blade factor}} \times \frac{1.0}{\text{visibility factor}} \times \frac{1.0}{\text{elevation factor}} = \underline{0.30} \end{aligned}$$

$$\text{Net Hourly Production} = \frac{480}{\text{normal hourly production}} \text{ LCY/hr} \times \frac{0.30}{\text{operating adjustment factor}} = \underline{144.} \text{ LCY/hr}$$

$$\text{Hours Required} = \frac{173,358}{\text{volume to be moved}} \text{ LCY} \div \frac{144}{\text{net hourly production}} \text{ LCY/hr} = \underline{1204} \text{ hr}$$

Data Source(s):

CATERPILLAR PERFORMANCE HANDBOOK, EDITION 28

Project: _____
Date: _____
Prepared by: _____

WORKSHEET 8
PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

LOADING / SPREADING TOPSOIL

Characterization of Loader Use (type, size, etc.):

988 CAT LOADER - 8 CY BUCKET

Description of Loader Use (origin, destination, grade, haul distance, etc.):

BASED ON 300 LF HAUL DISTANCE

Productivity Calculations:

$$\text{Cycle time} = \frac{1.1 \text{ min}}{\text{haul time (loaded)}} + \frac{0.9 \text{ min}}{\text{return time (empty)}} + \frac{0.65 \text{ min}}{\text{basic cycle time}} = 2.65 \text{ min}$$

$$\text{Net Bucket Capacity} = \frac{8.0 \text{ LCY}}{\text{heaped bucket capacity}} \times \frac{.85}{\text{bucket fill factor}^*} = 6.8 \text{ LCY}$$

$$\text{Hourly Production} = \frac{6.8 \text{ LCY}}{\text{net bucket capacity}} \div \frac{2.65 \text{ min}}{\text{cycle time}} \times \frac{.75}{\text{efficiency factor}} \times 60 \text{ min/hr} = 115.47 \text{ LCY/hr}$$

$$\text{Hours Required} = \frac{27,588 \text{ LCY}}{\text{volume to be moved}} \div \frac{115.47 \text{ LCY/hr}}{\text{hourly production}} = 238.92 \text{ hr}$$

* See loader section of equipment manual.

Data Source(s):

CATERPILLAR PERFORMANCE HANDBOOK, EDITION 28.

Project: _____
Date: _____
Prepared by: _____

WORKSHEET 9
PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

MOVING TOPSOIL FOR SPREADING.

Characterization of Truck Use (type, size, etc.):

CAT 769D TRUCK.

Description of Truck Use (origin, destination, grade, haul distance, capacity, etc.):

HAUL FROM TOPSOIL PILES. AVERAGE 600 METERS @ 10% GRADE.

Productivity Calculations:

$$\text{No. Loader Passes/Truck} = \frac{26 \text{ LCY}}{\text{truck capacity}} \div \frac{6.8 \text{ LCY}}{\text{loader bucket net capacity}} = \frac{3.8 \text{ (USE 4)}}{\text{(round down to nearest whole number)}} \text{ passes}$$

$$\text{Net Truck Capacity} = \frac{6.8 \text{ LCY}}{\text{loader bucket net capacity}} \times \frac{4}{\text{no. loader passes/truck}} = 27.2 \text{ LCY}$$

$$\text{Loading Time/Truck} = \frac{.65 \text{ min}}{\text{loader cycle time (from Worksheet 8 or 10)}} \times \frac{4}{\text{no. loader passes/truck}} = 2.6 \text{ min}$$

$$\text{Truck Cycle Time} = \frac{2.2 \text{ min}}{\text{haul time}} + \frac{1.2 \text{ min}}{\text{return time}} + \frac{2.6 \text{ min}}{\text{loading time}} + \frac{2.0 \text{ min}}{\text{dump and maneuver time}} = 8.0 \text{ min}$$

$$\text{No. Trucks Required} = \frac{8.0 \text{ min}}{\text{truck cycle time}} \div \frac{2.6 \text{ min}}{\text{total loading time}} = 3 \text{ trucks}$$

$$\text{Production Rate} = \frac{27.2 \text{ LCY}}{\text{net truck capacity}} \times \frac{3}{\text{no. trucks}} \div \frac{8.0 \text{ min}}{\text{truck cycle time}} = 10.2 \text{ LCY/min}$$

$$\text{Hourly Production} = \frac{10.2 \text{ LCY/min}}{\text{production rate}} \times 60 \text{ min/hr} \times \frac{.75}{\text{efficiency factor}} = 459 \text{ LCY/hr}$$

$$\text{Hours Required} = \frac{27,588 \text{ LCY}}{\text{volume to be moved}} \div \frac{459 \text{ LCY/hr}}{\text{hourly production}} = 60 \text{ hr}$$

* Use the average of the struck and heaped capacities.

Data Source(s):

WORKSHEET 15
OTHER RECLAMATION ACTIVITY COSTS

(Subsidence damage repair costs, water supply replacement costs, funds required to support long-term treatment of unanticipated acid or ferruginous mine drainage, etc.)

Description of Reclamation, Repair or Pollution Abatement Activity:

PORTAL SEALING

Assumptions:

17 PORTALS TO BE SEALED AND BACKFILLED
PORTALS AVERAGE 20' W x 7' H AND ARE BACKFILLED 25'
SEALS ARE DOUBLE-WALL WITH SOLID CONCRETE BLOCK.

Cost Estimate Calculations:

24 HRS. LABOR / SEAL @ 32.55 / hr.	= \$ 781.20
* 300 BLOCKS / SEAL @ 3.00 / ea.	= \$ 900.00
130 CY BACKFILL / SEAL @ 1.82 / CY.	= \$ 236.60
COST / SEAL	\$ 1917.80 (USE \$ 2000)
TOTAL COSTS =	\$ 34,000.00

Other Documentation or Notes:

(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

- * INCLUDES SAND / MORTAR
- ** BASED ON LOADER COSTS.

Data Source(s):

- 1- MEANS / CAT HANDBOOK
- 2- WORKSHEET 8 (APPENDIX A)
- 3- PAGE 2