PANDORA MINE MODIFICATIONS
RECLAMATION COST ESTIMATE
DENISON MINES (USA) CORP.
LA SAL MINES COMPLEX
SAN JUAN COUNTY, UTAH

Prepared for:

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PURPOSE AND INTENDED USES

The surety reclamation bond estimate was developed in an effort to provide Denison Mines with a cost estimate for determining the surety reclamation bond for the expanded development rock area at the Pandora Mine in accordance with the Plan of Operations Amendment for the La Sal Mines Complex, San Juan County and UDOM Rule R647-4-113: Surety.

METHODOLOGY

The bond estimate is divided into three areas of work: earthwork, demolition, and revegetation. Calculations and cost estimate spreadsheets are organized according to these three work areas. The cost estimate templates supplied by Denison Mines were used to estimate the costs for each of the three categories. The costs are totalled in a cost summary sheet supplied by Denison Mines that applies indirect costs and escalation to the sum of the three areas of work to develop the overall surety reclamation bond estimate.

The estimate was developed using RS Means CostWorks 2010 unit costs; these costs were tailored for Utah through application of a state-specific adjustment factor. Unit costs derived from RS Means were not specifically adjusted for other site-specific considerations such as current fuel prices or prevailing labor wages.

SCOPE

The bond estimate includes the following work scope activities, consistent with the draft Plan of Operations:

- Removal and disposal of two 36-inch corrugated metal pipe (CMP) culverts from the Pandora Mine Access Road
- Removal and disposal of one 36-inch reinforced concrete pipe (RCP) culvert from the Pandora Mine Site
- Construction of a riprap reinforced drainage channel from the Pandora Mine Site
- Grading approximately 38,000 cubic yards of development rock from a 1.5:1 slope to an approximate 3:1 slope
- Placement of stockpiled topsoil over the graded development rock area
- Ripping and broadcast seeding with BLM-approved seed mixes of the impacted areas to establish vegetation

ASSUMPTIONS

Several cost considerations have been identified that represent significant cost drivers. The following summarizes the general assumptions during development of the surety reclamation bond estimate:

- The work that the bond estimate is based on will not vary considerably from that shown in the Plan of Operations Amendment.
- No overtime was assumed; working day was defined as an 8-hour day Monday through Friday excluding major holidays.
- The bond estimate is based on current (2010) dollars.
- The bond estimate assumes that all the necessary equipment, labor, and material will be locally available for the project.
- Crew assemblies will not vary from those selected.

- The indirect costs and the escalation factor of 3.2 percent for 3 years were obtained from the surety estimate attached to the letter "Notice for addition of two vent holes (Vent 3-09 and Vent 4-09) at the Pandora Mine" dated August 2009. Depending on timing of award of construction contract, field mobilization and construction duration, costs due to escalation could vary.

The following site specific assumptions were made during development of the bond estimate:

- The existing 36-inch CMP culverts from the Pandora Mine Access Road will be removed and can be disposed of onsite. However, the ditch will remain and soil will be bermed on either side of drainage channel to prevent anyone from driving over the access road.
- The existing 36-inch RCP culvert from the Pandora Mine Site will be removed and can be disposed of onsite.
- The riprap reinforced drainage channel from the Pandora Mine Site will be constructed along the alignment of the existing 36-inch RCP culvert.
- Existing soil stockpile is of sufficient volume to place a vegetative cover over the graded waste rock pile.
- The graded surface of the development rock area will be covered with topsoil from onsite sources, ripped and seeded by broadcasting.
- No compaction or compaction testing will be required.
- No watering or fertilizing of seeded areas will be required.

ACCURACY

The costs presented in the bond estimate are considered Class 3 (Budget Authorization or Control) estimates with an accuracy range of +30%/-15% of estimated costs, according to the American Society for Testing and Materials (ASTM) Standard Classification for Cost Estimate Classification System (Designation E 2516-06). Class 3 estimates are generally supported by a discussion of the scope of the estimate and the uncertainties associated with each major cost item in the estimate. Special attention should be given to large cost items and items that are sensitive to change like equipment operating costs, materials costs or quantity estimates.

COST ESTIMATE TABLES AND CALCULATIONS

Bonding Calculations

Direct Costs

Subtotal Demolition and Removal	$6,467.98	
Subtotal Drainage Improvements	$32,367.57	
Subtotal Backfilling and Grading	$37,749.39	
Subtotal Revegetation	$63,685.91	
Subtotal Direct Costs	**$140,270.85**	
Indirect Costs		
Contingency	$14,027.00	10.0%
Subtotal	**$154,297.85**	
Management	$15,430.00	10.0%
Subtotal	**$169,727.85**	
Total Cost 2010	$169,727.85	
Escalation (3.2% every year for 3 years)	$16,821.00	
Reclamation Cost Escalated	$186,548.85	
Bond Amount (rounded to nearest $1,000)	$187,000.00	
Posted Bond	$0.00	
Difference Between Cost Estimate and Bond	-$187,000.00	
Percent Difference		

Ref.	Description	Materials	Means Costworks 2010 Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
Demo 36" CMP Culverts from the Pandora Mine Access Road																				
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31 23 16 42 0305	$1.47	BCY						112					BCY	1	112	BCY	$164.64
	Hauling, excavated, 22 CY truck, 5 MPH		31 23 23 20 5000	$3.41	LCY						88					BCY	1.2	106	LCY	$361.46
	Dozing material, 100' haul, 410 HP		31 23 16 32 3400	$1.79	LCY						54					BCY	1.2	65	LCY	$116.35
	Subtotal																			**$642.45**
Demo 36" CMP Culverts from the Pandora Mine Site																				
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31 23 16 42 0305	$1.47	BCY						1559					BCY	1	1559	BCY	$2,291.73
	Hauling, excavated, 22 CY truck, 5 MPH		31 23 23 20 5000	$3.41	LCY						147					BCY	1.2	177	LCY	$603.57
	Dozing material, 100' haul, 410 HP		31 23 16 32 3400	$1.79	LCY						1364					BCY	1.2	1637	LCY	$2,930.23
	Subtotal																			**$5,825.53**
	Total																			**$6,467.98**

BCY - bank cubic yard
CY - cubic yard
HP - horsepower
LCY - loose cubic yard
MPH - miles per hour

Description	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Labor Hourly Wage Rate	Hourly Cost	Total Eq. & Lab. Costs	Units	Material Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost**	Means Costworks 2009 Reference Number
Grade Rock Pile																			
Dozing material, 300' haul	N/A	$99.18	N/A	N/A	$57.77	N/A	$0.00	$156.95	$/HR	$0.00	N/A	45,458	LCY	189	LCY/HR	N/A	N/A	$37,749.39	31231 632 3450
Total																		**$37,749.39**	

* Hourly rates include overhead and profit
** Cost is rounded up to nearest $0.01
N/A - information not available
LCY - loose cubic yard
HR - hour

Ref.	Description	Materials	Means Costworks 2010 Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
Remove Stockpiled Topsoil and Spread																				
	Excavating, bulk bank measure, 3.5 CY, hydraulic excavator, crawler mounted		31231 642 0305	$1.44	BCY						6292					BCY	1	6292	BCY	$9,060.48
	Hauling, excavated, 22 CY truck, 5 MPH		31232 320 5000	$3.35	LCY						6292					BCY	1.1	6922	LCY	$23,188.70
	Dozing material, 100' haul, 410 HP		31231 632 3400	$1.75	BCY						6292					BCY	1.1	6922	LCY	$12,113.50
	Subtotal																			**$44,362.68**
Ripping																				
	Soil preparation, ripping, 0.5' deep, dozer with single shank ripper		31231 632 2400	$2.09	BCY						5647					BCY	1	5647	BCY	$11,802.23
	Subtotal																			**$11,802.23**
Seed																				
	Seeding, 0.45 pounds per MSF, tractor spre	Seed	32921 914 0500	$23.00	MSF					327						MSF	1	327	MSF	$7,521.00
	Subtotal																			**$7,521.00**
	Total																			**$63,685.91**

BCY - bank cubic yard
CY - cubic yard
HP - horsepower
LCY - loose cubic yard
MPH - miles per hour
MSF - 1,000 square feet
SY -square yard

Description	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Labor Hourly Wage Rate	Hourly Cost	Total Eq. & Lab. Costs	Units	Material Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost**	Means Costworks 2010 Reference Number
Drainage Channel through the Pandora Mine Site																			
Excavating, trench or continuous footing, common earth, 1 C.Y. excavator, 4' deep	N/A	$110.22	N/A	N/A	$66.45	N/A	$51.05	$227.72	$/HR	$0.00	N/A	93	BCY	50	BCY/HR	N/A	N/A	$423.56	31231 613 0120
Geotextile soil stabilization, geotextile fabric, woven, 200 lb. tensile strength	N/A	$0.00	N/A	N/A	$0.00	N/A	$102.10	$102.10	$/HR	$1.99	$/SY	1,425	SY	312.5	SY/HR	N/A	N/A	$3,301.33	31321 916 1500
Rip-rap and rock lining, random, broken stone, machine placed for slope protection	N/A	$110.22	N/A	N/A	$66.45	N/A	$51.05	$227.72	$/HR	$27.00	$/LCY	508	LCY	7.75	LCY/HR	N/A	N/A	$28,642.68	31371 310 0100
Total																		**$32,367.57**	

* Hourly rates include overhead and profit
** Cost is rounded up to nearest $0.01
N/A - information not available
LCY - loose cubic yard
HR - hour

PROJECT:	Pandora Mine Rec Bond Est.	COMPUTED BY :	EB	CHECKED BY:	
JOB NO.:		DATE :	4/22/2010	DATE CHECKED:	
CLIENT:				WRKSHT NO. :	DEMO-01

Description: Calculations for demolition in support of the reclamation bond for the Pandora Mine.

Assumed Material Properties

Soil Bulking factor:	**1.2**	*Conversion from BCY to LCY*
Soil Compaction Factor:	**1.1**	*Conversion from BCY to ECY*
Soil Compaction Factor:	**0.9**	*Conversion from LCY to ECY*

Demo 36-inch Culvert from the Pandora Mine Access Road

Assumptions

- Assume culvert will be removed and not replaced
- Assume access road is no longer needed but existing drainage ditch will remain.
- Assume demolished material can be placed on development rock area
- Assume a trapezoidal volume for the base excavated portion and a triangular volume for the side portion
- Assume no other culverts will be removed
- Assume majority of excavated material surrounding culvert will be used to create berms on either side of drainage channel to prevent anyone from driving over the access road.
- Assume culvert will be corrugated metal pipe (CMP)

Calculations

Estimated top length of base exacavation	40	FT	*Estimated from pdf drawing*
Estimated bottom length of base excavation	10	FT	*Estimated from pdf drawing*
Estimated depth of base excavation	6	FT	*Estimated from pdf drawing*
Estimated width of base excavation	12	FT	*Estimated from pdf drawing*
	1800	CF	
Estimated top length of side excavation	40		
Estimated bottom width of side excavation	12		
Estimated depth of side excavation	5		
Number of sides	2		
	1200	CF	
Estimated volume of cut	**112**	**BCY**	*Rounded up to nearest whole number*
Estimated buried length of culvert	70	LF	
Inside diameter of culvert	36	IN	
Outside diameter of culvert	45.5	IN	
Number of culverts	2	EA	
Estimated volume of culvert pipe	1582	CF	*Rounded up to nearest whole number*
	59	BCY	*Rounded up to nearest whole number*
Assumed crushed volume decrease	50%		
Estimated volume for haul	30	LCY	*Rounded up to nearest whole number*
Number of berms	2	EA	
Estimated width of berms on either side of ditch	12	FT	
Estimated height of berm	4	FT	
Estimated top length of berm	3	FT	
Slope of berm	3	H:1V	
Estimated bottom length of berm	27	FT	*Rounded up to nearest whole number*
Volume of berm	720	CF	*Rounded up to nearest whole number*
	27	BCY	*Rounded up to nearest whole number*
Total volume of berms	**54**	**BCY**	
Estimated volume remaining to be hauled off	**88**	**BCY**	
Estimated haul volume	**106**	**LCY**	*Rounded up to nearest whole number*
Estimated compaction volume	96	ECY	*Rounded up to nearest whole number*

PROJECT:	Pandora Mine Rec Bond Est.	COMPUTED BY :	EB	CHECKED BY:	
JOB NO.:		DATE :	4/22/2010	DATE CHECKED:	
CLIENT:				WRKSHT NO. :	DEMO-01

Description: Calculations for demolition in support of the reclamation bond for the Pandora Mine.

Demo 36-inch Culvert from the Pandora Mine Site

Assumptions

- Assume culvert will be removed and not replaced
- Assume demolished material can be placed on development rock area
- Assume a trapezoidal volume for the excavation of the culvert
- Assume drainage channel will be placed in same alignment as culvert

Calculations

Estimated length of culvert	465	FT	*Estimated from pdf drawing*
Number of culverts	1	EA	
Inside diameter of culvert	36	IN	
Outside diameter of culvert	45.5	IN	
Excavation side slopes:	2	:1	
Estimated cover on culvert	2	FT	
Estimated depth of culvert	5.8	FT	
Estimated bottom width of excavation	4	FT	
Estimated top width excavation	27.2	FT	*Estimated from pdf drawing*
	42073.2	CF	
Estimated volume of excavation	**1559**	**BCY**	*Rounded up to nearest whole number*
Estimated buried length of culvert	465	LF	
Inside diameter of culvert	36	IN	
Outside diameter of culvert	45.5	IN	
Number of culverts	1	EA	
Estimated volume of culvert pipe	5251	CF	*Rounded up to nearest whole number*
	195	BCY	*Rounded up to nearest whole number*
Assumed crushed volume decrease	75%		
Estimated volume for haul	147	LCY	*Rounded up to nearest whole number*
	123	BCY	
Estimated haul volume	**147**	**LCY**	*Rounded up to nearest whole number*
Estimated compaction volume	133	ECY	*Rounded up to nearest whole number*
Estimated volume for spreading excavated material	**1364**	**BCY**	

PROJECT:	Pandora Mine Rec Bond Est.	COMPUTED BY :	EB	CHECKED BY:	
JOB NO.:		DATE :	4/22/2010	DATE CHECKED:	
CLIENT:				WRKSHT NO. :	EARTH-01

Description: Earthwork calculations in support of the reclamation bond for the Pandora Mine.

Assumed Material Properties for Development Rock Material

Soil Bulking factor:	**1.2**	*Conversion from BCY to LCY*
Soil Compaction Factor:	**1.1**	*Conversion from BCY to ECY*
Soil Compaction Factor:	**0.9**	*Conversion from LCY to ECY*

BCY - bank cubic yard - in place volume prior to excavation
LCY - loose cubic yards - volume after excavation
ECY - embankment cubic yards (aka compacted cubic yards) - volume after compaction

Grade Development Rock Pile

Assumptions

- Material will be pushed with a dozer to rough grade
- No fine grading of surface will be conducted

Calculations

Estimated volume of cut	37881	BCY	*Based on CADD volume determination*
Estimated haul volume	45458	LCY	*Rounded up to nearest whole number*

Dozer Productivity Determination - 300' Push Distance

Hours per Shift, HR:	**8**	
Work Efficiency, %:	**0.83**	Assumes 50 minutes/hour
Slot Dozing Correction Factor:	**1.20**	
Visibility Correction Factor:	**1.0**	
Weight Correction Factor:	**0.87**	
Average Dozing Distance, FT:	**300**	

Work Efficiency	%	83%	
Operator Type		Average	
Operator Ability Correction Factor	Factor	0.75	
Grade		3	H:1V
	% Slope	33%	
Grade Factor		**1.6**	*Chart pg 1-45 CAT Handbook, Edition 31*
Material Type		Rock	
Material Correction Factor	Factor	0.6	
Slot Dozing Correction Factor	Factor	1.20	
Visibility Correction Factor	Factor	1.0	
Weight Correction Factor	Factor	0.87	
Combined Prod. Correction Factor	Factor	0.63	
Ideal Dozer Productivity	LCY/HR	**300.0**	*Chart on pg 1-42 CAT Handbook, Edition 31*
Adjusted Dozer Productivity	LCY/HR	189.0	

PROJECT:	Pandora Mine Rec Bond Est.	COMPUTED BY :	EB	CHECKED BY:	0
JOB NO.:		DATE :	4/22/2010	DATE CHECKED:	1/0/1900
CLIENT:				WRKSHT NO. :	EARTH-01

Description: Earthwork calculations in support of the reclamation bond for the Pandora Mine.

Drainage Channel through the Pandora Mine Site

Assumptions

- Assume drainage channel will be placed in same alignment as existing 36" RCP culvert
- Assume majority of excavation will be conducted during removal of existing 36" RCP culvert

Shape:	Triangular		
Side slopes:	2	:1	
Finished Channel Height:	4	FT	
Top width:	16	FT	
Additional width on either side of channel	2	FT	
Riprap channel length:	513	FT	
General riprap depth:	12	IN	
Specific riprap depth:	24	IN	
Length of specific riprap depth:	3	FT	
Riprap size. D50	8"		

Calculations

Excavation depth for 1' deep riprap:	5	FT	
Area of channel excavation for 1' deep riprap:	54	SF	*Includes sides*
Additional excavation for 1' deep riprap:	45	LF	
Excavation depth for 2' deep riprap:	6	FT	
Area of channel excavation for 2' deep riprap:	80	SF	*Includes sides*
Additional excavation for 2' deep riprap:	3	LF	
Volume of excavation:	2508	CF	
	93	**BCY**	*Rounded up to nearest whole number*
	112	LCY	*Rounded up to nearest whole number*
Perimeter of channel:	25	LF	
Total area of geotextile required:	12825	SF	*Rounded up to nearest whole number*
	1425	**SY**	*Rounded up to nearest whole number*
Volume of riprap for 1' deep riprap:	12750	CF	
Volume of riprap for 2' deep riprap:	150	CF	
Total volume of rip rap:	12900	CF	
	478	ECY	*Rounded up to nearest whole number*
Total volume of rip rap:	**507**	**LCY**	*Rounded up to nearest whole number*
Density of rip rap, TN/CY:	1.5	TN/CY	
Weight of rip rap:	760.5	TN	

PROJECT:	Pandora Mine Rec Bond Est.	COMPUTED BY :	EB
JOB NO.:		DATE :	4/22/2010
CLIENT:			

CHECKED BY:	
DATE CHECKED:	
WRKSHT NO. :	REVEG-01

Description: Calculations in support of the reclamation bond for the Pandora Mine.

Assumed Material Properties

Soil Bulking factor:	**1.1**	*Conversion from BCY to LCY*
Soil Compaction Factor:	**1.1**	*Conversion from BCY to ECY*
Soil Compaction Factor:	**1**	*Conversion from LCY to ECY*

Remove Stockpiled Topsoil and Spread

Assumptions

- Material will be moved with a hydraulic excavator
- Material will be spread with a dozer to rough grade. Dozer will provide some compaction to maintain slope.
- Assume existing soil stockpile will be removed and hauled to a nearby location for later use
- Assume soil stockpile has an area of 1.3 acres with an average thickness of 3 feet

Calculations

Area of soil stockpile	1.3	AC	*Based on CADD volume determination*
Assumed average depth of soil stockpile	3	FT	
Estimated soil stockpile volume	6292	BCY	*Rounded up to nearest whole number*
Estimated haul and spreading volume	6922	LCY	*Rounded up to nearest whole number*

Rip, and Seed

Assumptions

- Assumes surface of topsoil layer will be ripped
- Assumes broadcast with native seed will be applied over topsoil

Calculations

Estimated area of development rock area for grading	7	AC	*Based on CADD*
	33880	SY	*Rounded up to nearest whole number*
	305	**MSF**	*Rounded up to nearest whole number*
Estimated depth for ripping	0.5	FT	
Volume for ripping	5647	BCY	*Rounded up to nearest whole number*