

BROOK MINING CO., LLC.
BROOK MINE
2015 BOND
TFN 6 2/025

Brook Mine 2015 Bond December 2015

DEQ Exhibit 31



BROOK MINING CO., LLC.
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Mine
Bond

December 2015

Item#: WUNV20712PP
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RAMACO

Brook Mine

Brook Mine 2015 Bond

Prepared by:
WWC Engineering



December 2015

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Bond Estimate

DEQ 31-002

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A. Summary

The following summarizes the reclamation performance bond cost estimate for RAMACO's Brook Mine. This bond estimate was established in accordance with Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) Guideline 12 and includes all activities necessary for complete reclamation of the Brook Mine after the first year of mine operation (year 0). This submittal includes all activities necessary for:

- Reclamation of all disturbed lands,
- Environmental monitoring,
- Project management and miscellaneous costs, and
- Labor and equipment overhead and contractor profit.

The submittal presented herein employs assumptions that are based on best professional judgment given the data currently available. The total bond estimate puts the costs to perform the required work by an independent contractor at **\$371,957** during which the Brook Mine would be reclaimed to a condition agreed upon by WDEQ/LQD that would take the site to its approved postmining land uses.

B. Bond Calculation

A summary of the reclamation bond is provided in **Table 1**. Reclamation activities included in this summary include area bond, incremental bond and other miscellaneous items associated with surface coal mine bond estimates.

C. Area Bond

It is anticipated that at the end of year 0 of mining only preliminary topsoil removal of pit TR-1 and a staging area will have occurred. Therefore there is no area bond cost. **Exhibit 1** depicts the projected reclamation areas for the end of the year 0. Details of the area bond calculations are provided in **Table 2**.



D. Incremental Bond

The incremental bond covers all costs beyond those detailed in the area bond. Costs included in the incremental bond are miscellaneous overburden redistribution, demolition, removal of monitoring structures, scarification of all compacted surfaces, topsoil redistribution, and revegetation.

Minor overburden redistribution will be required for the reclamation of SP-4 and SP-8 sediment ponds. It is assumed the cost for reclamation of the sediment ponds will include the reclamation of the associated collector ditches. **Table 3** displays the overburden redistribution calculations. The location of the sediment ponds is depicted in **Exhibit 1**. Dozer and scrapers likely will be used to complete this reclamation activity.

No demolition/removal costs are expected for culverts or other associated mining structures for year 0 of the mining sequence. **Table 4** displays demolition costs associated with year 0 of mining.

The details for reclamation of groundwater monitoring, borehole sites and surface water monitoring sites are included in **Table 5**.

The estimated acreage for scarification of planned disturbance through year 0 is included in **Table 6**. Scarification of compacted surfaces will likely be completed with a motor grader, in accordance with WDEQ Guideline 12.

The redistribution of topsoil will likely be completed with scrapers and/or a combination of trucks, loaders, and dozers. A topsoil depth of 16 inches was used as the replacement depth for estimating purposes based on the depth presented in the Reclamation Plan. The volumes of topsoil redistribution are provided in **Table 7**. Topsoil redistribution is depicted in **Exhibit 1**.

The revegetation of all disturbed areas is detailed in **Table 8**. Revegetation costs were estimated at \$700 per acre based on other coal bond estimates. Once the mine is in operation a better value will be determined.



E. Miscellaneous Contingency Items

In accordance with the recommendations of WDEQ Guideline 12 several additional miscellaneous items will be part of the overall project cost. These costs include: project design by design firm; contractor profit, overhead, mobilization and demobilization; preconstruction investigation and stabilization; project management; on site monitoring; site security and liability insurance; project administration and accounting; and unknown costs. These miscellaneous items are detailed in **Table 9**.

F. Total Bond Estimate

The total estimated bond for the Brook Mine is depicted in **Table 1**. This total cost includes all direct and indirect costs in accordance with WDEQ Guideline 12. **Exhibit 1** depicts the areas requiring reclamation for year 0 for the Brook Mine.

G. References

Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD). (2013, October). *Guideline Number 12: Standardized Reclamation Performance Bond Format and Cost Calculation Methods*. Retrieved 2014, from [http://deq.state.wy.us/lqd/downloads/Guidelines/Guideline_12_\(2_2014\).pdf](http://deq.state.wy.us/lqd/downloads/Guidelines/Guideline_12_(2_2014).pdf)



Table 1. Reclamation Bond Summary through the end of Year 0.

Item	Cost	
Area Bond		
Backfill	\$	-
Rough Grading Backfill	\$	-
Finish Grading	\$	-
Area Bond Subtotal	\$	-
Incremental Bond		
Overburden Redistribution	\$	33,043
Demolition	\$	-
Environmental Monitoring	\$	43,366
Scarification	\$	2,162
Topsoil	\$	87,186
Revegetation	\$	21,560
Incremental Bond Subtotal	\$	187,318
Reclamation Bond Subtotal	\$	187,318
Miscellaneous Contingency	\$	184,639
Total Estimated Bond	\$	371,957



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Table 2. Area Bond Estimate

Description	Unit	Base Quantity	Swell Factor	Final Quantity	Unit Cost	Subtotal	Comments
Pit TR-1 Backfill (Reclaimed Fill)	yd ³	0	100%	0	\$ 2.19	\$ -	WDEQ/LQD Guideline 12, Appendix A, 992 Loader and 777 Truck, 1000 ft. distance, level grade. Also includes WDEQ/LQD Guideline 12, Appendix E, D9T Dozer, 200 ft. distance, level grade.
Pit TR-1 Backfill (Consolidated Interburden)	yd ³	0	116%	0	\$ 2.19	\$ -	"
Total				0	\$ 2.19	\$ -	"
Rough Grading Backfill	ac	-	-	0	\$ 64.66	\$ -	WDEQ/LQD Guideline 12, Appendix M, 854G Rubber Tire Dozer
Final Grading	ac	-	-	0	\$ 76.54	\$ -	WDEQ/LQD Guideline 12, Appendix G, 16M Motor Grader
Total Area Bond Estimate						\$ -	

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Table 3. Overburden Redistribution Estimate

Description	Unit	Base Quantity	Swell Factor	Final Quantity	Unit Cost	Subtotal	Comments
Sediment Ponds							
Sediment Pond SP-4	yd ³	6,479	100%	6,479	\$ 1.37	\$ 8,889.19	WDEQ/LQD Guideline 12, Appendix E, D9T Dozer, 500 ft. distance, level grade.
Sediment Pond SP-8	yd ⁴	17,605	100%	17,605	\$ 1.37	\$ 24,154.06	WDEQ/LQD Guideline 12, Appendix E, D9T Dozer, 500 ft. distance, level grade.
Total				24,084		\$ 33,043.25	
Total Overburden Redistribution Estimate						\$ 33,043.25	

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Table 4. Demolition Estimate

Description	Unit	Final Quantity	Unit Cost	Subtotal	Comments
Fences	lf	NA	\$ 2.08	-	WDEQ/LQD Guideline 12, Appendix H.
Powerlines	lf	NA	\$ 0.38	-	"
Hard-surfaced roads	ac	NA	\$857.76	-	WDEQ/LQD Guideline 12, Appendix I.
Bridges	ea	NA		-	"
Abandoned Equipment	ea	NA		-	
Railroad	lf	NA	\$ 9.32	-	WDEQ/LQD Guideline 12, Appendix K.
Facility Buildings	-	NA		-	WDEQ/LQD Guideline 12, Appendix K.
Mineral Handling Facilities	-	NA		-	WDEQ/LQD Guideline 12, Appendix K.
Culverts¹					
Culverts	lf	NA	\$ 6.77	-	WDEQ/LQD Guideline 12, Appendix J.

Total Demolition Estimate \$ -

Note: NA: Not Available

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Table 5. Environmental Monitoring Reclamation Costs ¹

Groundwater Monitoring and Borehole Sites					
Location ID	Depth (ft)	Unit Cost	Site Cost ²	Seed Cost ²	Subtotal
SM 578510-CRN-1	91	\$ 2.50	\$ 25.00	\$ 5.00	\$ 257.50
SM 578510-MST-1	146	\$ 2.50	\$ 25.00	\$ 5.00	\$ 395.00
SM 578511-CRN-1	128	\$ 2.50	\$ 25.00	\$ 5.00	\$ 350.00
SM 578511-MST-1	157	\$ 2.50	\$ 25.00	\$ 5.00	\$ 422.50
SM 578512-CRN-1	62	\$ 2.50	\$ 25.00	\$ 5.00	\$ 185.00
SM 578512-MST-1	114	\$ 2.50	\$ 25.00	\$ 5.00	\$ 315.00
SM 578513-CRN-1	116	\$ 2.50	\$ 25.00	\$ 5.00	\$ 320.00
SM 578513-MST-1	142	\$ 2.50	\$ 25.00	\$ 5.00	\$ 385.00
SM 578418-CRN-1	153	\$ 2.50	\$ 25.00	\$ 5.00	\$ 412.50
SM 578418-MST-1	183	\$ 2.50	\$ 25.00	\$ 5.00	\$ 487.50
SM 578409-CRN-1	109	\$ 2.50	\$ 10.00	\$ 2.00	\$ 284.50
SM 578409-CRN-OB-1	110	\$ 2.50	\$ 10.00	\$ 2.00	\$ 287.00
SM 578409-MST-1	122	\$ 2.50	\$ 10.00	\$ 2.00	\$ 317.00
SM 578409-MST-OB-1	122	\$ 2.50	\$ 10.00	\$ 2.00	\$ 317.00
SM 578409-UNB-1	142	\$ 2.50	\$ 10.00	\$ 2.00	\$ 367.00
SM 578415-CRN-MST	182	\$ 2.50	\$ 50.00	\$ 10.00	\$ 515.00
SM 578512-AL-1	22	\$ 2.50	\$ 50.00	\$ 10.00	\$ 115.00
SM 578513-AL-1	22	\$ 2.50	\$ 50.00	\$ 10.00	\$ 115.00
SM 578418-AL-1	27	\$ 2.50	\$ 50.00	\$ 10.00	\$ 127.50
R-13-011	222	\$ 2.00	\$ 50.00	\$ 10.00	\$ 504.00
R-13-012	202	\$ 2.00	\$ 50.00	\$ 10.00	\$ 464.00
R-13-016	904	\$ 2.00	\$ 50.00	\$ 10.00	\$ 1,868.00
R-13-018	141	\$ 2.00	\$ 50.00	\$ 10.00	\$ 342.00
R-13-019	210	\$ 2.00	\$ 50.00	\$ 10.00	\$ 480.00
R-13-020	302	\$ 2.00	\$ 50.00	\$ 10.00	\$ 664.00
R-13-023	202	\$ 2.00	\$ 50.00	\$ 10.00	\$ 464.00
R-13-024	983	\$ 2.00	\$ 50.00	\$ 10.00	\$ 2,026.00
R-13-025	422	\$ 2.00	\$ 50.00	\$ 10.00	\$ 904.00
R-13-026	842	\$ 2.00	\$ 50.00	\$ 10.00	\$ 1,744.00
Ambre 01	429	\$ 2.00	\$ 50.00	\$ 10.00	\$ 918.00
Ambre 02	120	\$ 2.00	\$ 50.00	\$ 10.00	\$ 300.00
Ambre 03	96	\$ 2.00	\$ 50.00	\$ 10.00	\$ 252.00
Ambre 04	120	\$ 2.00	\$ 50.00	\$ 10.00	\$ 300.00
Ambre 05	385	\$ 2.00	\$ 50.00	\$ 10.00	\$ 830.00
Ambre 06	421	\$ 2.00	\$ 50.00	\$ 10.00	\$ 902.00
Ambre 07	290	\$ 2.00	\$ 50.00	\$ 10.00	\$ 640.00
Ambre 09	421	\$ 2.00	\$ 50.00	\$ 10.00	\$ 902.00
Ambre 10	325	\$ 2.00	\$ 50.00	\$ 10.00	\$ 710.00
Ambre 11	501	\$ 2.00	\$ 50.00	\$ 10.00	\$ 1,062.00
R-12006	300	\$ 2.00	\$ 50.00	\$ 10.00	\$ 660.00
R-12008	201	\$ 2.00	\$ 50.00	\$ 10.00	\$ 462.00
R-12009A	65	\$ 2.00	\$ 50.00	\$ 10.00	\$ 190.00
R-12010	120	\$ 2.00	\$ 50.00	\$ 10.00	\$ 300.00
R-12011	92	\$ 2.00	\$ 50.00	\$ 10.00	\$ 244.00
R-12012	136	\$ 2.00	\$ 50.00	\$ 10.00	\$ 332.00
R-12013	300	\$ 2.00	\$ 50.00	\$ 10.00	\$ 660.00
R-12014	220	\$ 2.00	\$ 50.00	\$ 10.00	\$ 500.00

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Table 5. Environmental Monitoring Reclamation Costs Cont. ¹

Groundwater Monitoring and Borehole Sites					
Location ID	Depth (ft)	Unit Cost	Site Cost ²	Seed Cost ²	Subtotal
R-12015	221	\$ 2.00	\$ 50.00	\$ 10.00	\$ 502.00
R-12018D	142	\$ 2.00	\$ 50.00	\$ 10.00	\$ 344.00
R-12019D	140	\$ 2.00	\$ 50.00	\$ 10.00	\$ 340.00
Sub-total					\$ 26,785.00
22% contingency					\$ 5,892.70
Groundwater Monitoring and Borehole Site Total:					\$ 32,677.70
Surface Water Monitoring Sites					
SM578418-SW-1					\$ 2,672.16
SM578512-SW-1					\$ 2,672.16
SM578409-SW-1					\$ 2,672.16
SM578415-SW-1					\$ 2,672.16
Surface Water Monitoring Site Total:					\$ 10,688.64
Total Environmental Monitoring Estimate:					\$ 43,366.34

Notes: ¹ Bond estimate based on WDEQ Guideline 12.

² Site and seed cost divided among well clusters.



Table 6. Scarification Estimate

Description	Unit	Final Quantity	Unit Cost	Subtotal	Comments
Currently affected area	ac	0	\$ 70.20	\$ -	WDEQ/LQD Guideline 12, Appendix P.
Planned disturbance through Year 0	ac	30.8	\$ 70.20	\$ 2,162.16	"
Total Scarification Estimate				\$ 2,162.16	

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Table 7. Topsoil Estimate

Description	Unit	Base Quantity	Unit	Final Quantity ¹	Unit Cost	Subtotal	Comments
Pit TR-1	ac	20.7	yd ³	44,528	\$ 1.73	\$ 77,118.04	WDEQ/LQD Guideline 12, Appendix C, 637G Scraper, 1,500 ft. average distance, level grade with 15% increase for topsoil.
Sediment Ponds							
SP-4	ac	0.7	yd ³	1,506	\$ 1.27	\$ 1,904.81	WDEQ/LQD Guideline 12, Appendix C, 637G Scraper, 500 ft. distance, level grade with 15% increase for topsoil.
SP-8	ac	2.1	yd ⁴	4,517	\$ 1.27	\$ 5,714.43	WDEQ/LQD Guideline 12, Appendix C, 637G Scraper, 500 ft. distance, level grade with 15% increase for topsoil.
Overburden Stock Piles							
OB-3	ac	0.9	yd ³	1,936	\$ 1.27	\$ 2,449.04	WDEQ/LQD Guideline 12, Appendix C, 637G Scraper, 500 ft. distance, level grade with 15% increase for topsoil.
Total Topsoil Estimate \$						87,186.32	

Note: ¹ Topsoil depth of 16 inches was used based on Reclamation Plan for volume calculations in all areas.

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Table 8. Revegetation Estimate

Description	Unit	Final Quantity	Unit Cost	Subtotal	Comments
Planned disturbance through Year 0	ac	30.8	\$700.00	\$ 21,560.00	Estimate including revegetation of topsoil piles footprints.
Total Revegetation Estimate				\$ 21,560.00	

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Table 9. Miscellaneous Contingency Items

Item	Cost	Description
Independent design firm for final reclamation design	\$ -	WDEQ/LQD Guideline 12, LQD and WMA agreed to flat \$250,000 for project design regardless of project size. Cost reduced based on project size.
Contractor profit, overhead, mobilization and demobilization costs	\$ 25,287.94	WDEQ/LQD Guideline 12, LQD is presently using 13.5 percent for these items.
Preconstruction investigation and stabilization	\$ 2,809.77	WDEQ/LQD Guideline 12, LQD is presently using 1.5 percent for these items.
Independent firm to manage the final reclamation project (5.5 percent)	\$ 10,302.49	WDEQ/LQD Guideline 12, Appendix R sliding scale.
On site monitoring program for ten years after completion of final reclamation project	\$ 1,873.18	WDEQ/LQD Guideline 12, LQD is presently using 1 percent for these items.
Costs for on site security during the final reclamation project and liability insurance cost during the final reclamation project and over the full bonding period (6 months).	\$ 125,000.00	WDEQ/LQD Guideline 12, LQD and WMA agreed to \$250,000 per year of project life would be adequate.
Long-term administration and accounting cost	\$ 10,000.00	WDEQ/LQD Guideline 12, LQD and WMA agreed to range of \$315,000 to \$505,000 depending on project size. Cost reduced based on project size.
Unknown costs	\$ 9,365.90	WDEQ/LQD Guideline 12, LQD is presently using 5 percent for these items.
Total Contingency Estimate	\$ 184,639.29	

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