Printed on 03/31/2008

Company Name Gurosik Coal Company, Inc.

Project 33830117-BOG

Site Name King

AMD TREAT

AMD TREAT MAIN COST FORM

Costs

Passive Treatment	A	S	
Vertical Flow Pond			$0
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands			$0
Manganese Removal Bed	1	0	$57,730
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$57,730**
Active Treatment			
Caustic Soda			$0
Hydrated Lime			$0
Pebble Quick Lime			$0
Ammonia			$0
Oxidants			$0
Soda Ash			$0
Active Subtotal:			**$0**
Ancillary Cost			
Ponds			$0
Roads			$0
Land Access			$0
Ditching			$0
Engineering Cost	1	0	$11,546
Ancillary Subtotal:			**$11,546**
Other Cost (Capital Cost)			$0
Total Capital Cost:			**$69,276**
Annual Costs			
Sampling	1	0	$597
Labor	1	0	$1,365
Maintenance	1	0	$2,021
Pumping			$0
Chemical Cost			$0
Oxidant Chem Cost			$0
Sludge Removal			$0
Other Cost (Annual Cost)			$0
Land Access (Annual Cost)			$0
Total Annual Cost:			**$3,983**
Other Cost			

Water Quality

Calculated Acidity	25.80	mg/L
Alkalinity	0.00	mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity)	25.80	mg/L
Design Flow	40.00	gpm
Typical Flow	20.00	gpm
Total Iron	5.00	mg/L
Aluminum	0.44	mg/L
Manganese	9.88	mg/L
pH	5.10	su
Ferric Iron	0.00	mg/L
Ferrous Iron	0.00	mg/L
Sulfate	0.00	mg/L
Filtered Fe	0.00	mg/L
Filtered Al	0.00	mg/L
Filtered Mn	0.00	mg/L
Specific Conductivity	0.00	uS/cm
Total Dissolved Solids	0.00	mg/L
Dissolved Oxygen	0.00	mg/L
Typical Acid Loading	1.1	tons/yr

Total Annual Cost: per 1000 Gal of H2O Treated **$0.378**

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COMMENTS:

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AMD TREAT
MANGANESE REMOVAL BED

AMDTREAT

MN Removal Bed Name

SIZING METHODS Select One

Tons of Limestone Needed	1,182.83	○ Based on Retention Time	1. Retention Time		days
Tons of Limestone Needed	2,300.00	◉ Based on Tons of Limestone	2. Limestone Needed	2300	tons
Tons of Limestone Needed	919.45	○ Based on Dimensions	3. Length at Top of Freeboard		ft
Tons of Limestone Needed	444.91	○ Based on Kinetics	4. Width at Top of Freeboard		ft
			5. Rate Constant (k)		hr/ft

☑ **Opening Screen Water Parameters**

Influent Water Parameters that Affect MN Removal Bed

Calculated Acidity 25.80 mg/L

Alkalinity 0.00 mg/L

◉ Calculate Net Acidity (Acid-Alkalinity)

○ Enter Net Acidity manually

Net Acidity (Hot Acidity) 25.80 mg/L

Design Flow 40.00 gpm

Typical Flow 20.00 gpm

Total Iron 5.00 mg/L

Aluminum 0.44 mg/L

Manganese 9.88 mg/L

6. Stone Diameter	1.00	inches
7. Effleunt Mn Concentration	5.00	mg/l
8. % Void Space of Limestone Bed	35.00	%
9 Density of Loose Limestone	107.53	lbs/ft3
10. Limestone Unit Cost	22.00	$/ton
11. Limestone Placement Unit Cost	0.00	$/yd3
12. Freeboard Depth	2.00	ft
13. Limestone Depth	1.00	ft
14. Excavation Unit Cost	4.50	$/yd3

	Run		Rise
15. Slope of Pond Sides	2.0	:	1

Liner Cost

○ No Liner

○ Clay Liner

16. Clay Liner Unit Cost $/yd3

17. Thickness of Clay Liner ft

○ Synthetic Liner

18. Synthetic Liner Unit Cost $/yd2

☐ 19. Clearing and Grubbing?

○ 20. Land Multiplier ratio

○ 21. Clear/Grub Acres acres

22. Clear and Grub Unit Cost $/acre

Manganese Removal Bed Sizing Summaries

23. Top Length at Freeboard	303.49	ft
23. Top Width at Freeboard	155.74	ft
25. Freeboard Volume	3,366	yd3
26. Limestone Surface Area	43,659.9	ft2
27. Limestone Volume	1,584.3	yd3
28. Tons of Limestone	2,300	tons
29. Excavation Volume	1,584	yd3
30. Clear and Grub Area	0.0	acres
31. Liner Area	0	ft2
32. Theoretical Retention Time	1.94	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	50,600	$
34. Limestone Placement Cost	0	$
35. Excavation Cost	7,130	$
36. Liner Cost	0	$
37. Clear and Grub Cost	0	$
38. Total Cost	57,730	$

Record Number 1 of 1

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AMD TREAT

ENGINEERING COST

1. Capital Cost *	57,730	$
(•) 2. Per Cent of Capital Cost	20.00	%
( ) 3. Actual Engineering Cost		$
4. Total Engineering Cost	11,546	$

*** Total Capital Cost minus Engineering and Land Access Capital Cost**

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AMD TREAT

SAMPLING

AMDTREAT

Sampling Name

Estimate Sampling Cost

1. Unit Labor Cost	35.00	$/hr
2. Collection Time per Sample	0.33	hours/sample
3. Travel Time	1.00	hr
4. Sample Frequency	0.33	samples/mo
5. Lab Cost Per Sample	27.00	$/sample
6. Number of Sample Points	3	points

Enter Established Annual Sampling Cost

7. Actual Annual Sampling Cost		$

Sampling Sub-Totals

8. Yearly Sample Analysis Cost	321	$
9. Yearly Travel Cost	139	$
10. Yearly Collection Cost	137	$
11. Sampling Cost	597	$

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AMD TREAT

LABOR

Labor Name

Estimate Labor Cost

1. Site Visits per Week	0.25	
2. Site Labor Time per Visit	2.00	hours
3. Travel Time per Visit	1.00	hours
4. Unit Labor Cost	35.00	$/hour

Enter Established Annual Labor Cost

5. Actual Annual Labor Cost		$

6. Total Cost	1,365	$

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AMD TREAT

MAINTANENCE

Estimate Maintenance Cost

1. Percent of Active Cost	3.50	%
2. Percent of Passive Cost	3.50	%
3. Percent of Ancillary Cost *	3.50	%
4. Percent of Other Capital Cost	3.50	%

Enter Established Annual Maintenance Cost

5. Annual Maintenance Cost		$

Maintenance Sub-Totals

6 Total Maintenance Active Cost	0	$
7. Total Maintenance Passive Cost	2,021	$
8. Total Maintenance Ancillary Cost	0	$
9. Total Maintenance Other Capital Cost	0	$
10. Total Maintenance Cost	2,021	$

* Ancillary Cost does int include Cost for Land Access and Engineering Cost

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AMD TREAT
RECAPITIZALITION COST

Calculation Period 75 yrs Inflation Rate 3.10 % Net Return Rate 6.00 %

Recapitizalition Name

A.	B	C	D	E	F	G
Description of Item	Unit Cost Per Item	Quantity	Total Item Cost	Life Cycle	Number of Periods	Total PV
1. Manganese Bed	57,730	1	57,730	20	3	63,110
2.	0	0	0	0	0	0
3.	0	0	0	0	0	0
4.	0	0	0	0	0	0
5.	0	0	0	0	0	0
6.	0	0	0	0	0	0
7.	0	0	0	0	0	0
8.	0	0	0	0	0	0
9.	0	0	0	0	0	0
10.	0	0	0	0	0	0
11.	0	0	0	0	0	0
12.	0	0	0	0	0	0
13.	0	0	0	0	0	0
14.	0	0	0	0	0	0
15.	0	0	0	0	0	0
16.	0	0	0	0	0	0
17.	0	0	0	0	0	0
18.	0	0	0	0	0	0
19.	0	0	0	0	0	0
20.	0	0	0	0	0	0

Total Capital Cost 57,730 $ PV Grand Total 63,110 $