E facts Bond $0 (handwritten)

AMD TREAT
AMD TREAT MAIN COST FORM

AMDTREAT

Costs

Passive Treatment	A	S	
Vertical Flow Pond			$0
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands			$0
Manganese Removal Bed	1	0	$116,772
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$116,772**
Active Treatment			
Caustic Soda			$0
Hydrated Lime	1	0	$111,398
Pebble Quick Lime			$0
Ammonia			$0
Oxidants			$0
Soda Ash			$0
Active Subtotal:			**$0**
Ancillary Cost			
Ponds	1	0	$9,498
Roads			$0
Land Access			$0
Ditching	1	0	$4,195
Engineering Cost	1	0	$24,186
Ancillary Subtotal:			**$37,879**
Other Cost (Capital Cost)			$0
Total Capital Cost:			**$266,049**
Annual Costs			
Sampling	1	0	$1,736
Labor	1	0	$21,840
Maintenance	1	0	$7,324
Pumping			$0
Chemical Cost	1	0	$6,348
Oxidant Chem Cost			$0
Sludge Removal	1	0	$3,637
Other Cost (Annual Cost)			$0
Land Access (Annual Cost)			$0
Total Annual Cost:			**$40,885**
Other Cost			

Water Quality

Calculated Acidity	0.00	mg/L
Alkalinity	0.00	mg/L

○ Calculate Net Acidity (Acid-Alkalinity)
● Enter Net Acidity manually

Net Acidity (Hot Acidity)	282.20	mg/L

Design Flow	200.00	gpm
Typical Flow	120.00	gpm
Total Iron	24.60	mg/L
Aluminum	22.10	mg/L
Manganese	10.00	mg/L
pH	3.40	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

**Total Annual Cost: per
1000 Gal of H2O Treated $0.647**

Company Name

Project

Site Name

AMD TREAT
MANGANESE REMOVAL BED

AMDTREAT

MN Removal Bed Name [   ]

SIZING METHODS Select One

Tons of Limestone Needed	5,914.15	⦿ Based on Retention Time	1. Retention Time	1.00 days
Tons of Limestone Needed	200.00	○ Based on Tons of Limestone	2. Limestone Needed	tons
Tons of Limestone Needed	919.45	○ Based on Dimensions	3. Length at Top of Freeboard	ft
Tons of Limestone Needed	0.00	○ 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
[0.00] mg/L

Alkalinity
[0.00] mg/L

⦿ Calculate Net Acidity (Acid-Alkalinity)

○ Enter Net Acidity manually

Net Acidity (Hot Acidity)
[0.00] mg/L

Design Flow
[200.00] gpm

Typical Flow
[0.00] gpm

Total Iron
[0.00] mg/L

Aluminum
[0.00] mg/L

Manganese
[10.00] 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	12.00	$/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	4.50	$/yd3
17. Thickness of Clay Liner	1.00	ft

○ Synthetic Liner

18. Synthetic Liner Unit Cost		$/yd2

☑ 19. Clearing and Grubbing?

⦿ 20. Land Multiplier	1.50	ratio
○ 21. Clear/Grub Acres		acres
22. Clear and Grub Unit Cost	1256.00	$/acre

Manganese Removal Bed Sizing Summaries

23. Top Length at Freeboard	480.03	ft
23. Top Width at Freeboard	244.01	ft
25. Freeboard Volume	8,464	yd3
26. Limestone Surface Area	111,410.7	ft2
27. Limestone Volume	4,074.0	yd3
28. Tons of Limestone	5,914	tons
29. Excavation Volume	4,074	yd3
30. Clear and Grub Area	4.0	acres
31. Liner Area	14,935	ft2
32. Theoretical Retention Time	1.00	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	70,970	$
34. Limestone Placement Cost	0	$
35. Excavation Cost	18,333	$
36. Liner Cost	22,403	$
37. Clear and Grub Cost	5,066	$

38. Total Cost	116,772	$

Record Number 1 of 1

Company Name

Project   Global Coal Recovery

Site Name   37 and 62

AMD TREAT
HYDRATED LIME

AMDTREAT

Hydrated Lime Name

□ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Hydrated Lime

Calculated Acidity
0.00 mg/L

Alkalinity
0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity
◉ manually

Net Acidity (Hot Acidity)
282.20 mg/L

Design Flow
200.00 gpm

Typical Flow
120.00 gpm

Total Iron
24.60 mg/L

Aluminum
22.10 mg/L

Manganese
10.00 mg/L

Record Number
1 of 1

1. Annual Hydrated Lime | 126,950.7 | lbs/yr
2. Annual Hydrated Lime | 63.4 | tons/yr
3. Daily Hydrated Lime | 347.8 | lbs/day
4. Pounds per Hour of Hydrated Lime | 14.492094 | lbs/hr
5. Purity of Hydrated Lime | 96 | %
6 Mixing Efficency of Hydrated Lime | 90 | %
□ 7. Titration?
8. Titration Amount | | lbs of hydrated lime /gal of h2o

9. Mechanical Aeration System | 0.00 | $

Silo Storage System

	Quantity	Price		Refill Freq. Days
10. □ 20 Ton			$	115
11. □ 35 Ton			$	201
12. □ 50 Ton			$	287
13. □ 60 Ton			$	345

14. Clarifier

○ Cost of Clarifier | | $
○ Cost Est based on Clarifier Diameter
15. Diameter | | ft
16. Cost Muliplier | |
◉ Cost Est based on Flow
17. Design Flow | 200.00 | gpm
18. Estimated Diameter | 24.72 | ft
19. Cost Muliplier | 4000.0 |

20. Vibrator Air Sweep | 0
21. Pneumatic Air Sweep | 0
22. Blower Blocks | 0

23. Mixing Tank   (Assumes a Two Cell Mixing Tank)

◉ Mixing Tank Cost | 0 | $
○ Cost Est based on Volume of Mixing Tank
24. Tank Volume | | gal
○ Cost Est. based on Desired Retention Time
25. Mixing Tank Volume | 0.0 | gal
26. Design Flow | 200.00 | gpm
27. Retention Time | | min

Specifications of Concrete Tank

28. Tank Wall Thickness | | ft
29. Tank Bottom Thickness | | ft
30. Tank Freeboard | | ft
31. Construction Labor Cost | | $
32. Concrete Unit Cost | | $/yd3
33. Excavation Unit Cost | | $/yd3

34. Number of Motorized Mixers | 2 | qty
35. Unit Cost of Motorized Mixer | 1000 | $
36. Number of Slide Gates | 5 | qty
37. Unit Cost of Slide Gate | 750 | $
38. Cost of Electric Panel | 2000 | $

39. Control Building

○ Cost of Control Building | | $
◉ Cost Est. Based on Building Area
40. Building Length | 15 | ft
41. Building Width | 15 | ft.
42. Building Unit Cost | 10.0 | $/ft2

□ 43. Polymer Feed System | | $

☑ 44. Clearing and Grubbing?
45. Clear and Grub Area | 2.00 | acres
46. Clear and Grub Costs | 1256.00 | $/acre

Hydrated Lime Sizing Summaries

47. Tank Length | 0.0 | ft
48. Tank Width | 0.0 | ft
49. Tank Depth | 3 | ft
50. Excavation Volume for Mixing Tank | 0.0 | yd3
51. Volume of Concrete for Mixing Tank | 12 | ft3

Hydrated Lime Cost Summaries

52. Silo(s) Cost | 0 | $
53. Clarifier Cost | 98,886 | $
54. Mixing Tank Cost | 0 | $
55. Construction Labor (Mixing Tank) | 0 | $
56. Excavation Cost (Mixing Tank) | 0 | $
57. Concrete Cost (MixingTank) | 0 | $
58. Motorized Mixer & Aeration Cost | 2,000 | $
59. Sweep and Blower Cost | 0 | $
60. Slide Gate Cost | 3,750 | $
61. Electric Control Panel Cost | 2,000 | $
62. Building Cost | 2,250 | $
63. Polymer Feed System | 0 | $
64. Clear and Grub Cost | 2,512 | $
65. Total Cost | 111,398 | $

AMD TREAT

PONDS

AMDTREAT

Pond Name [   ]

Pond Design Based On:

◉ Retention Time

1. Desired Retention Time [24.0] hours

☑

3. Sludge Removal Frequency [1.00] times/year

☐ 4. Titration?

5. Sludge Rate [   ] gal sludge/ gal H2O

6. Percent Solids [30.00] %

7. Sludge Density [8.35] lbs./gal

○ Pond Size

8. Pond Length at Top of Freeboard [   ] ft

9. Pond Width at Top of Freeboard [   ] ft

	Run	Rise
10. Slope Ratio of Pond Sides	2.0 :	1

11. Freeboard Depth [2.0] ft

12. Water Depth [4.0] ft

13. Excavation Unit Cost [4.50] $/yd3

14. Total Length of Effluent / Influent Pipe [0.00] ft

15. Unit Cost of Pipe [0.00] $/ft

Liner Cost

○ No Liner

◉ Clay Liner

16. Clay Liner Unit Cost [4.50] $/yd3

17. Thickness of Clay Liner [1.0] ft

○ Synthetic Liner

18. Synthetic Liner Unit Cost [   ] $/yd2

☑ 19. Clearing and Grubbing?

◉ 20. Land Multiplier [1.50] ratio

○ 21. Clear/Grub Acres [   ] acres

22. Clear and Grub Unit Cost [1256.00] $/acre

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Ponds

Calculated Acidity
[0.00] mg/L

Alkalinity
[0.00] mg/L

◉ Calculate Net Acidity (Acid-Alkalinity)

○ Enter Net Acidity manually

Net Acidity (Hot Acidity)
[0.00] mg/L

Design Flow
[200.00] gpm

Typical Flow
[120.00] gpm

Total Iron
[24.60] mg/L

Aluminum
[22.10] mg/L

Manganese
[10.00] mg/L

Record Number
1 of 1

23. Revegetation Cost [1500.00] $/acre

24. Number of Ponds for this Design [1] number

25. Cost of Baffles [0] $

Calculated Pond Dimensions per Pond

26. Length at Top of Freeboard [161] ft

27. Width at Top of Freeboard [84] ft

28. Freeboard Volume [2,427] yd3

29. Water Volume [1,485] yd3

30. Estimated Annual Sludge [59] yd3/yr

31. Volume of Sludge per Removal [59] yd3/ removal

32. Excavation Volume [0.92] acre ft

33. Excavation Volume [1,485] yd3

34. Clear and Grub Area [0.47] acres

35. Liner Area [888] yd2

36. Calculated Retention Time [24] hours

Ponds Sub-Totals per Pond

37. Excavation Cost [7,676] $

38. Pipe Cost [0] $

39. Liner Cost [993] $

40. Clearing and Grubbing Cost [591] $

41. Revegetation Cost [235] $

42. Baffle Cost [0] $

43. Estimated Cost [9,498] $

Project <u>Global Coal Recovery</u>

Site Name <u>37 and 62</u>

AMD TREAT

DITCHING

AMDTREAT

Ditching Name [   ]

1. Ditch Length Rock	100	ft	13. Ditch Depth of Rock	1.50	ft
2. Ditch Length Grass	100	ft	14. Cost of Ditch Surface Rock	18.00	$/yd3
3. Bottom Width of Ditch	4.0	ft	15. Cost to Place Rock	12.00	$/yd3
4. Ditch Depth	3.00	ft	16. Excavation Unit Cost	4.50	$/yd3
5. Geo Textile Unit Cost	0.50	$/yd2	17. Length of Silt Fence	0.00	ft
6. Length of Geo Textile	100	ft	18. Unit Cost of Silt Fence	1.00	$/ft
			19. Revegetation Unit Cost	1500.00	$/acre

7. Slope Ratio of Ditch Sides Run [2.00] : Rise [1.00]

Ditching Sub-Totals

☐ 8. Surveying?

9. Survey Rate [   ] acres/day

10. Survey Unit Cost [   ] $/day

☑ 11. Clearing and Grubbing?

12. Clear and Grub Cost [1256.00] $/acre

20. Excavation Cost	1,000	$
21. Survey Cost	0	$
22. Clear and Grub Cost	111	$
23. Aggregate Cost	2,903	$
24. Filter Fabric Cost	97	$
25. Silt Fence Cost	0	$
26. Revegetation Cost	84	$

Record Number 1 of 1

27. Total Cost	4,195	$

Project   Global Coal Recovery

Site Name   37 and 62

AMD TREAT

ENGINEERING COST

1. Capital Cost * | 241,864 | $

2. Per Cent of Capital Cost | 10.00 | %

3. Actual Engineering Cost | | $

4. Total Engineering Cost | 24,186 | $

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

Project   Global Coal Recovery

Site Name   37 and 62

AMD TREAT

SAMPLING

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	1.00	samples/mo
5. Lab Cost Per Sample	25.00	$/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	900	$
9. Yearly Travel Cost	420	$
10. Yearly Collection Cost	416	$

11. Sampling Cost	1,736	$

Record Number 1 of 1

Project   Global Coal Recovery

Site Name   37 and 62

AMD TREAT

LABOR

AMDTREAT

Labor Name [   ]

⊙ **Estimate Labor Cost**

1. Site Visits per Week	3.00	
2. Site Labor Time per Visit	2.00	hours
3. Travel Time per Visit	2.00	hours
4. Unit Labor Cost	35.00	$/hour

○ **Enter Established Annual Labor Cost**

5. Actual Annual Labor Cost [   ] $

6. Total Cost [21,840] $

Record Number 1 of 1

Company Name

Project Global Coal Recovery

Site Name 37 and 62

AMD TREAT

MAINTANENCE

⊙ **Estimate Maintenance Cost**

1. Percent of Active Cost	3.00	%
2. Percent of Passive Cost	3.00	%
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	3,342	$
7. Total Maintenance Passive Cost	3,503	$
8. Total Maintenance Ancillary Cost	479	$
9. Total Maintenance Other Capital Cost	0	$
10. Total Maintenance Cost	7,324	$

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

AMD TREAT
CHEMICAL COST

AMDTREAT

Chemical Cost Name: [   ]

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Chemical Cost

Calculated Acidity
[0.00] mg/L

Alkalinity
[0.00] mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity)
[282.20] mg/L

Design Flow
[200.00] gpm

Typical Flow
[120.00] gpm

Total Iron
[24.60] mg/L

Aluminum
[22.10] mg/L

Manganese
[10.00] mg/L

Record Number

1 of 1

◉ A. Hydrated Lime ?

☐ 1 Titration?

2. Hydrated Lime Titration Amount [   ] lbs of hydrated lime / gal of H2O

3. Hydrated Lime Purity [96.00] %

4. Mixing Efficiency of Hydrated Lime [90.00] %

5. Hydrated Lime Unit Cost [0.0500] $/lb

○ B. Pebble Quick Lime ?

☐ 6. Titration?

7. Pebble Lime Titration Amount [   ] lbs of Pebble Lime / gal of H2O

8. Pebble Lime Purity [   ] %

9. Mixing Efficiency of Pebble Lime [   ] %

○ Delivered in Bags
10. Pebble Lime Bag Unit Cost [   ] $/lb

○ Bulk Delivery
11. Pebble Lime Bulk Unit Cost [   ] $/lb

○ C. Caustic Soda ?

☐ 12. Titration?

13. Caustic Titration Amount [   ] gal ofcaustic / gal H2O

14. Caustic Purity [   ] purity of 20% caustic solution

15. Mixing Efficiency of Caustic [   ] %

○ Non-Bulk Delivery
16. Caustic Non-Bulk Unit Cost [   ] $/gal

○ Bulk Delivery
17. Caustic Bulk Unit Cost [   ] $/gal

○ D. Limestone ?

18. Limestone Purity [   ] %

19. Limestone Efficiency [   ] %

20 Limestone Unit Cost [   ] $/ton

○ E. Anhydrous Ammonia ?

☐ 21. Titration?

22. AmmoniaTitration Amount [   ] lbs of ammonia / gal H2O

23. Ammonia Purity [   ] %

24. Mixing Efficiency of Ammonia [   ] %

○ Non-Bulk Delivery
25. Ammonia Non-Bulk Unit Cost [   ] $/lb

○ Bulk Delivery
26. Ammonia Bulk Unit Cost [   ] $/lb

○ F. Soda Ash ?

☐ 27. Titration?

28 Soda Ash Titration Amount [   ] lbs of soda ash / gal of H2O

29. Soda Ash Purity [   ] %

30. Mixing Efficiency of Soda Ash [   ] %

31 Soda Ash Unit Cost [   ] $/lb

○ G. Known Chemical Cost ?

32. Known Annual Chemical Cost [   ] $

Chemical Cost Sub-Totals

		Annual Amount of Chemicals Consumed	
33. Total Hydrated Lime Cost	[6,348] $	[126,950]	lbs
34. Total Pebble Lime Cost	[0] $	[0]	lbs
35. Total Caustic Soda Cost	[0] $	[0]	gals
36. Total Limestone Cost	[0] $	[0]	tons
37. Total Anhydrous Ammonia Cost	[0] $	[0]	lbs
38. Total Soda Ash Cost	[0] $	[0]	lbs
39. Total Known Chemical Cost	[0] $		

40. Selected Chemical: HYDRATED LIME

Annual Chemical Cost [6,348] $

Company Name

Project <u>Global Coal Recovery</u>

Site Name <u>37 and 62</u>

AMD TREAT

SLUDGE REMOVAL

AMDTREAT

☐ **Opening Screen**
Water Parameters

Sludge Removal Name [   ]

Influent Water Parameters that Affect Sludge Removal

Calculated Acidity
[0.00] mg/L

Alkalinity
[0.00] mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity)
[282.20] mg/L

Design Flow
[200.00] gpm

Typical Flow
[120.00] gpm

Total Iron
[25] mg/L

Aluminum
[22] mg/L

Manganese
[10] mg/L

1. Select One — Selection for Method of Removing Sludge

◉ Sludge Removal by $ per Gallon

2. Sludge Removal Unit Cost [0.05] $/gal

○ Sludge Removal by Vacuum Truck

3. Vacuum Truck Unit Cost [   ] $/hr

4. Mobilization Cost [   ] $

5. Hours to be Used [   ] hr

○ Sludge Removal by Mechanical Excavation

6. Mechanical Excavation Unit Rate [   ] $/hr

7. Mobilization Cost [   ] $

8. Hours to be Used [.   ] hr

○ Sludge Removal by Lagoon Cleaner

9. Lagoon Cleaning Unit Rate [   ] $/hr

10. Mobilization Cost [   ] $

11. Hours to be Used [   ] hr

○ Actual Sludge Removal Cost

12. Actual Sludge Removal Cost [   ] $

13. Off Site Disposal Cost [0.00] $

Record Number 1 of 1

14. Iron Concentration [24.60] mg/L

15. Manganese Concentration [10.00] mg/L

16. Aluminum Concentration [22.10] mg/L

17. Total Miscellaneous Concentration [0] mg/L

18. Percent Solids [5.00] %

19. Sludge Density [8.33] lbs/gal

☐ 20 Titration?

21. Gal. of Sludge per Gal of Water Treated [   ] gal

22. Estimated Sludge Volume [360] yd3/yr

Cost for Sludge Removal Types

23. Removal by $ per Gallon [3,637] $

24. Removal by Vacuum Truck [0] $

25. Removal by Mechanical Excavation [0] $

26. Removal by Lagoon Cleaner [0] $

27. Actual Sludge Removal Cost [0] $

Sludge Removal Sub-Totals

28. Currently Selected Removal Cost Plus Off Site Disposal Cost [3,637] $

Company Name

Project   Global Coal Recovery

Site Name   37 and 62

AMD TREAT
RECAPITIZALITION COST

AMDTREAT

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

Recapitizalition Name [Global Coal Recovery - 37 and 62]

A. Description of Item	B Unit Cost Per Item	C Quantity	D Total Item Cost	E Life Cycle	F Number of Periods	G Total PV
1. Mn Removal Bed	116,772	1	116,772	15	5	198,032
2. Pond	9,498	1	9,498	15	5	16,108
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 [126,270] $ PV Grand Total [214,140] $