Printed on 03/11/2008

Company Name

Project Greene County Coal S2A

Site Name Mcnatt

AMD TREAT

Costs AMD TREAT MAIN COST FORM

AMDTREAT

Passive Treatment	A	S	
Vertical Flow Pond			$0
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands			$0
Manganese Removal Bed	1	0	$4,677
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$4,677**
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	1	0	$5,000
Roads			$0
Land Access	1	0	$2,110
Ditching			$0
Engineering Cost			$0
Ancillary Subtotal:			**$7,110**
Other Cost (Capital Cost)			$5,000
Total Capital Cost:			**$16,787**
Annual Costs			
Sampling			$0
Labor			$0
Maintenance			$0
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:			**$0**
Other Cost	1	0	

Water Quality

Calculated Acidity	0.00	mg/L
Alkalinity	47.00	mg/L

(•) Calculate Net Acidity (Acid-Alkalinity)
( ) Enter Net Acidity manually

Net Acidity (Hot Acidity)	-47.00	mg/L
Design Flow	15.00	gpm
Typical Flow	10.00	gpm
Total Iron	4.98	mg/L
Aluminum	1.40	mg/L
Manganese	16.00	mg/L
pH	6.70	su
Ferric Iron	0.00	mg/L
Ferrous Iron	4.40	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 $0.000

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT
MANGANESE REMOVAL BED

AMDTREAT

MN Removal Bed Name

SIZING METHODS Select One

Tons of Limestone Needed	443.56	○ Based on Retention Time	1. Retention Time		days
Tons of Limestone Needed	200.00	◉ Based on Tons of Limestone	2. Limestone Needed	200	tons
Tons of Limestone Needed	919.45	○ Based on Dimensions	3. Length at Top of Freeboard		ft
Tons of Limestone Needed	284.93	○ 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 15.00 gpm

Typical Flow 0.00 gpm

Total Iron 0.00 mg/L

Aluminum 0.00 mg/L

Manganese 16.00 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	97.24	ft
23. Top Width at Freeboard	52.62	ft
25. Freeboard Volume	336	yd3
26. Limestone Surface Area	3,982.2	ft2
27. Limestone Volume	137.7	yd3
28. Tons of Limestone	200	tons
29. Excavation Volume	137	yd3
30. Clear and Grub Area	0.1	acres
31. Liner Area	957	ft2
32. Theoretical Retention Time	0.45	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	2,400	$
34. Limestone Placement Cost	0	$
35. Excavation Cost	620	$
36. Liner Cost	1,436	$
37. Clear and Grub Cost	221	$
38. Total Cost	4,677	$

Record Number 1 of 1

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT

PONDS

AMDTREAT

Pond Name

Pond Design Based On:

- ( ) Retention Time
  - 1. Desired Retention Time ____ hours
  - [ ] 2. Include Sludge Removal?
  - 3. Sludge Removal Frequency ____ times/year
  - [ ] 4. Titration?
    - 5. Sludge Rate ____ gal sludge/ gal H2O
    - 6. Percent Solids ____ %
    - 7. Sludge Density ____ lbs./gal
- (•) Pond Size
  - 8. Pond Length at Top of Freeboard 40.000 ft
  - 9. Pond Width at Top of Freeboard 40.000 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

[x] 19. Clearing and Grubbing?

- (•) 20. Land Multiplier 1.50 ratio
- ( ) 21. Clear/Grub Acres ____ acres
- 22. Clear and Grub Unit Cost 1256.00 $/acre

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 40 ft
27. Width at Top of Freeboard 40 ft
28. Freeboard Volume 184 yd3
29. Water Volume 88 yd3
30. Estimated Annual Sludge 0 yd3/yr
31. Volume of Sludge per Removal 0 yd3/ removal
32. Excavation Volume 0.05 acre ft
33. Excavation Volume 88 yd3
34. Clear and Grub Area 0.05 acres
35. Liner Area 245 yd2
36. Calculated Retention Time 19 hours

Ponds Sub-Totals per Pond

37. Excavation Cost 648 $
38. Pipe Cost 0 $
39. Liner Cost 250 $
40. Clearing and Grubbing Cost 69 $
41. Revegetation Cost 27 $
42. Baffle Cost 0 $

[x] 43. Estimated Cost 996 $

[x] 44. Accept Minimum Pond Cost?

The Recommended Minimum Construction Cost of Building a Pond is $ 5,000

45. Recommended Minimum Cost 5,000 $

46. Total Cost 5,000 $

[ ] **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 15.00 gpm

Typical Flow 10.00 gpm

Total Iron 4.98 mg/L

Aluminum 1.40 mg/L

Manganese 16.00 mg/L

Record Number 1 of 1

Company Name

Printed on 03/11/2008

Project Greene County Coal S2A

Site Name Mcnatt

AMD TREAT

LAND ACCESS

Land Access Name

(•) **Buy**

1. Cost per Acre	1000.00	$
2. Number of Acres	2.00	acres
3. Closing Cost	110.00	$

( ) **Lease**

4. Annual Lease Cost		$

6. Buy Total Cost	2110	$
7. Lease Total Cost	1.00	$

8. Selected Cost	2,110	$	**Capital Cost**

Record Number 1 of 1

Printed on 03/11/2008

Company Name

Project Greene County Coal S2A

Site Name Mcnatt

AMD TREAT

OTHER COST

AMDTREAT

Oher Cost Name

	A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost / Annual Cost
1.	Ditch thru T515 for S2A (includes pipe)	5,000.00	1	5,000	Capital Cost
2.		0.00	0	0	Capital Cost
3.		0.00	0	0	Capital Cost
4.		0.00	0	0	Capital Cost
5.		0.00	0	0	Capital Cost
6.		0.00	0	0	Capital Cost
7.		0.00	0	0	Capital Cost
8.		0.00	0	0	Capital Cost
9.		0.00	0	0	Capital Cost
10.		0.00	0	0	Capital Cost
11.		0.00	0	0	Capital Cost
12.		0.00	0	0	Capital Cost
13.		0.00	0	0	Capital Cost
14.		0.00	0	0	Capital Cost
15.		0.00	0	0	Capital Cost

Record Number 1 of 1

Curent Capital Cost 5,000 $

Current Annual Cost 0 $

Total Capital Cost 5,000 $

Total Annual Cost 0 $

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Company Name

Project Greene County Coal S2A

Site Name Mcnatt

AMD TREAT
RECAPITIZALITION COST

AMDTREAT

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

Recapitizalition Name S2A Green County Coal

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. Mang Removal Bed replacement	4,670	1	4,670	15	5	7,920
2. Pond Replacement	5,000	1	5,000	15	5	8,479
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 9,670 $ PV Grand Total 16,399 $

RECEIVED TIME MAY. 8. 10:43AM PRINT TIME MAY. 8. 10:44AM

Printed on 03/11/2008

Company Name

Project Greene County Coal S2B

Site Name McNatt

AMD TREAT

Costs AMD TREAT MAIN COST FORM

AMDTREAT

Passive Treatment	A	S	
Vertical Flow Pond	1	0	$10,412
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands	1	0	$9,119
Manganese Removal Bed	1	0	$3,020
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$22,551**
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	1	0	$10,000
Roads			$0
Land Access			$0
Ditching			$0
Engineering Cost			$0
Ancillary Subtotal:			**$10,000**
Other Cost (Capital Cost)			$4,500
Total Capital Cost:			**$37,051**
Annual Costs			
Sampling	1	0	$2,655
Labor	1	0	$1,137
Maintenance	1	0	$1,297
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:			**$5,089**
Other Cost	1	0	

Water Quality

Calculated Acidity	138.00	mg/L
Alkalinity	31.00	mg/L

( ) Calculate Net Acidity (Acid-Alkalinity)

(•) Enter Net Acidity manually

Net Acidity (Hot Acidity)	107.00	mg/L
Design Flow	10.00	gpm
Typical Flow	5.00	gpm
Total Iron	23.00	mg/L
Aluminum	9.00	mg/L
Manganese	35.00	mg/L
pH	5.30	su
Ferric Iron	0.00	mg/L
Ferrous Iron	20.00	mg/L
Sulfate	2000.00	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 $1.935

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT
VERTICAL FLOW POND (VFP)

AMDTREAT

VFP Name

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect VFP

Calculated Acidity: 138.00 mg/L

Alkalinity: 31.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

◉ Enter Net Acidity manually

Net Acidity (Hot Acidity): 107.00 mg/L

Design Flow: 10.00 gpm

Typical Flow: 0.00 gpm

Total Iron: 0.00 mg/L

Aluminum: 0.00 mg/L

Manganese: 0.00 mg/L

Record Number

1 of 1

SIZING METHODS Select One

1. Tons of Limestone Needed	86	VFP Based on Acidity Neutralization
2. Tons of Limestone Needed	197	○ VFP Based on Retention Time
3. Tons of Limestone Needed	405	○ VFP Based on Alkalinity Generation Rate
4. Tons of Limestone Needed	283	◉ VFP Based on Tons Limestone Entered
5. Tons of Limestone Needed	1,921	○ VFP Based on Dimensions

6. Retention Time: hours

7. Alkalinity Generation Rate: g/m2/day

8. Limestone Needed: 283 tons

9. Length at Top of Freeboard: ft

10. Width at Top of Freeboard: ft

11. % Void Space of LS. Bed	35.00	%
12. System Life		years
13. Limestone Purity	90.00	%
14. Limestone Efficiency		%
15. Density of Loose Limestone	107.53	lbs/ft3
16. Limestone Unit Cost	12.00	$/ton
17. LS Placement Unit Cost	0.00	$/yd3

Run of Slope : Rise of Slope

18. Slope of Pond Sides: 2.0 : 1

19. Freeboard Depth	3.00	ft
20. Free Standing Water Depth	2.0	ft
21. Organic Matter Depth	1.0	ft
22. Organic Matter Unit Cost	19.00	$/yd3
23. Organic Matter Spreading Unit Cost	3.50	$/yd3
24. Limestone Depth	3.0	ft
25. Excavation Unit Cost	4.50	$/yd3

Liner Cost

◉ No Liner

○ Clay Liner

11. Clay Liner Unit Cost: $/yd3

12. Thickness of Clay Liner: ft

○ Synthetic Liner

13. Synthetic Liner Unit Cost: $/yd2

☐ 29. Clearing and Grubbing?

○ 30a. Land Multiplier		ratio
○ 30b. Clear/Grub Acres		acres
31. Clear and Grub Unit Cost		$/acre
32. Nbr. of Valves	0	nbr
33. Unit Cost of Valves	0.00	$ ea.

◉ AMDTreat Piping Costs

34. Total Length of Effluent / Influent Pipe	20	ft
35. Pipe Install Rate	11.00	ft/hr
36. Labor Rate	35.00	$/hr
37. Segment Len. of Trunk Pipe	20	ft/pipe seg.
38. Trunk Pipe Cost	6.70	$/ft
39. Trunk Coupler Cost	6.60	$/coupler
40. Spur Cost	1.83	$/ft
41. Spur Coupler Cost	2.43	$/spur
42. "T" Connector Cost	90.00	$/T coupler
43. Segment Len. of Spur Pipe	20	ft/pipe seg.
44. Spur Pipe Spacing	10.0	ft

○ Custom Piping Costs

	Length		Diameter		Unit Cost	
45. Pipe #1		ft		in		$
46. Pipe #2		ft		in		$
47. Pipe #3		ft		in		$

VFP Sizing Summaries

48. Length at Top of Freeboard	92.20	ft
49. Width at Top of Freeboard	58.10	ft
50. Freeboard Volume	500	yd3
51. Water Surface Area	3,697	ft2
52. Total Water Volume	238	yd3
53. Organic Matter Volume	93	yd3
54. Limestone Surface Area	2,325	ft2
55. Limestone Volume	195.54	yd3
56. Excavation Volume	527.5	yd3
57. Clear and Grub Area	0.0	acr.
58. Liner Area	0.0	ft2
59. Theoretical Retention Time	23.03	hrs

VFP Cost Summaries

60. Organic Matter Cost	1,784	$
61. Limestone Cost	3,406	$
62. Limestone and Organic Matter Placement Cost	328	$
63. Excavation Cost	2,374	$
64. Liner Cost	0	$
65. Clear and Grub Cost	0	$
66. Valve Cost	0	$
67. Pipe Cost	2,520	$
68. Total Cost	10,412	$

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT

AEROBIC WETLANDS

AMDTREAT

Aerobic Wetlands Name

☐ **Opening Screen Water Parameters**

Influent Water Parameters that Affect Aerobic Wetlands

Calculated Acidity: 138.00 mg/L

Alkalinity: 31.00 mg/L

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

Net Acidity (Hot Acidity): 107.00 mg/L

Design Flow: 10.00 gpm

Typical Flow: 0.00 gpm

Total Iron: 23.00 mg/L

Aluminum: 0.00 mg/L

Manganese: 35.00 mg/L

pH: 5.30 su

SIZING METHODS Select One

- ○ Aerobic Wetland Based on Metal Removal Rates — 1. Iron Removal Rate: g/m2/day — 2. Mn Removal Rate: g/m2/day
- ◉ Aerobic Wetland Based on Dimensions — 3. Top Length at Freeboard: 200 ft — 4. Top Width at Freeboard: 50 ft
- ○ Aerobic Wetland Based on Iron Oxidation Kinetics — 5. Rate Constant: moles/sec — 6. Effluent Fe Concentration: mg/l
- 7. Dissolved Oxygen: mg/l — 8. H2O Temperature: °C

	Length		Width
9. Length to Width Ratio		:	
	Run of Slope		Rise of Slope
10. Slope of Wetland Sides	2.0	:	1.000
11. Freeboard Depth	1.50 ft		
12. Free Standing Water Depth	0.50 ft		
13. Organic Matter Depth	1.00 ft		
14. Organic Matter Unit Cost	19.00 $/yd3		
15. Organic Matter Spreading Unit Cost	3.50 $/yd3		
16. Excavation Unit Cost	4.50 $/yd3		
17. Wetland Planting Unit Cost	3600 $/acre		

Liner Cost

- ◉ No Liner
- ○ Clay Liner
  - 18. Clay Liner Unit Cost: $/yd3
  - 19. Thickness of Clay Liner: ft
- ○ Synthetic Liner
  - 20. Synthetic Liner Unit Cost: $/yd2

☐ 21. Clearing and Grubbing?

- ○ 22. Land Multiplier: ratio
- ○ 23. Clear/Grub Acres: acres

24. Clear and Grub Unit Cost: $/acre

Aerobic Wetland Sizing Summaries

25. Length at Top of Freeboard	200.00	ft
26. Width at Top of Freeboard	50.00	ft
27. Freeboard Volume	514	yd3
28. Water Surface Area	8,536	ft2
29. Water Volume	153	yd3
30. Organic Matter Volume	281	yd3
31. Excavation Volume	435	yd3
32. Clear and Grub Area	0.0	acres
33. Liner Area	0	ft2
34. Retention Time	51	hrs

Aerobic Cost Summaries

35. Organic Matter Cost	6,334	$
36. Excavation Cost	1,959	$
37. Liner Cost	0	$
38. Clear and Grub Cost	0	$
39. Wetland Planting Cost	826	$
40. Total Cost	9,119	$

Record Number 1 of 1

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT
MANGANESE REMOVAL BED

AMDTREAT

MN Removal Bed Name

SIZING METHODS	Select One			
Tons of Limestone Needed	295.70	○ Based on Retention Time	1. Retention Time	days
Tons of Limestone Needed	200.00	● Based on Tons of Limestone	2. Limestone Needed	200 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: 10.00 gpm

Typical Flow: 0.00 gpm

Total Iron: 0.00 mg/L

Aluminum: 0.00 mg/L

Manganese: 35.00 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

15. Slope of Pond Sides: Run 2.0 : Rise 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	97.24	ft
23. Top Width at Freeboard	52.62	ft
25. Freeboard Volume	336	yd3
26. Limestone Surface Area	3,982.2	ft2
27. Limestone Volume	137.7	yd3
28. Tons of Limestone	200	tons
29. Excavation Volume	137	yd3
30. Clear and Grub Area	0.0	acres
31. Liner Area	0	ft2
32. Theoretical Retention Time	0.67	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	2,400	$
34. Limestone Placement Cost	0	$
35. Excavation Cost	620	$
36. Liner Cost	0	$
37. Clear and Grub Cost	0	$
38. Total Cost	3,020	$

Record Number 1 of 1

Company Name

Project

Site Name

Printed on 03/11/2008

AMD TREAT

PONDS

AMDTREAT

Pond Name

Pond Design Based On:

- ( ) Retention Time
  - 1. Desired Retention Time ____ hours
  - [ ] 2. Include Sludge Removal?
    - 3. Sludge Removal Frequency ____ times/year
    - [ ] 4. Titration?
      - 5. Sludge Rate ____ gal sludge/ gal H2O
      - 6. Percent Solids ____ %
      - 7. Sludge Density ____ lbs./gal
- (•) Pond Size
  - 8. Pond Length at Top of Freeboard 40.000 ft
  - 9. Pond Width at Top of Freeboard 40.000 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 ____ $/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

[ ] **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 10.00 gpm

Typical Flow 5.00 gpm

Total Iron 23.00 mg/L

Aluminum 9.00 mg/L

Manganese 35.00 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	40	ft
27. Width at Top of Freeboard	40	ft
28. Freeboard Volume	184	yd3
29. Water Volume	88	yd3
30. Estimated Annual Sludge	0	yd3/yr
31. Volume of Sludge per Removal	0	yd3/ removal
32. Excavation Volume	0.05	acre ft
33. Excavation Volume	88	yd3
34. Clear and Grub Area	0.05	acres
35. Liner Area	0	yd2
36. Calculated Retention Time	29	hours

Ponds Sub-Totals per Pond

37. Excavation Cost	398	$
38. Pipe Cost	0	$
39. Liner Cost	0	$
40. Clearing and Grubbing Cost	0	$
41. Revegetation Cost	27	$
42. Baffle Cost	0	$

[x] 43. Estimated Cost 426 $

[x] 44. Accept Minimum Pond Cost?

The Recommended Minimum Construction Cost of Building a Pond is $ 5,000

45. Recommended Minimum Cost 10,000 $

46. Total Cost 10,000 $

Printed on 03/11/2008

Company Name

Project

Site Name

AMDTREAT

AMD TREAT

OTHER COST

Oher Cost Name

	A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost / Annual Cost
1.	Aeration ladder/rock stair steps, etc	500.00	1	500	Capital Cost
2.	Ditching between ponds (including rock)	4,000.00	1	4,000	Capital Cost
3.		0.00	0	0	Capital Cost
4.		0.00	0	0	Capital Cost
5.		0.00	0	0	Capital Cost
6.		0.00	0	0	Capital Cost
7.		0.00	0	0	Capital Cost
8.		0.00	0	0	Capital Cost
9.		0.00	0	0	Capital Cost
10.		0.00	0	0	Capital Cost
11.		0.00	0	0	Capital Cost
12.		0.00	0	0	Capital Cost
13.		0.00	0	0	Capital Cost
14.		0.00	0	0	Capital Cost
15.		0.00	0	0	Capital Cost

Record Number
1 of 1

Curent Capital Cost 4,500 $
Current Annual Cost 0 $

Total Capital Cost 4,500 $
Total Annual Cost 0 $

Company Name

Printed on 03/11/2008

Project Greene County Coal S2B

Site Name McNatt

AMD TREAT

SAMPLING

Sampling Name

Estimate Sampling Cost

1. Unit Labor Cost	35.00	$/hr
2. Collection Time per Sample	0.25	hours/sample
3. Travel Time	1.50	hr
4. Sample Frequency	1.00	samples/mo
5. Lab Cost Per Sample	25.00	$/sample
6. Number of Sample Points	5	points

Enter Established Annual Sampling Cost

7. Actual Annual Sampling Cost		$

Sampling Sub-Totals

8. Yearly Sample Analysis Cost	1,500	$
9. Yearly Travel Cost	630	$
10. Yearly Collection Cost	525	$
11. Sampling Cost	2,655	$

Record Number 1 of 1

Company Name

Printed on 03/11/2008

Project Greene County Coal S2B

Site Name McNatt

AMD TREAT

LABOR

AMDTREAT

Labor Name

Estimate Labor Cost

1. Site Visits per Week	0.25	
2. Site Labor Time per Visit	1.00	hours
3. Travel Time per Visit	1.50	hours
4. Unit Labor Cost	35.00	$/hour

Enter Established Annual Labor Cost

5. Actual Annual Labor Cost		$

6. Total Cost	1,137	$

Record Number 1 of 1

Printed on 03/11/2008

Company Name

Project Greene County Coal S2B

Site Name McNatt

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	789	$
8. Total Maintenance Ancillary Cost	350	$
9. Total Maintenance Other Capital Cost	157	$
10. Total Maintenance Cost	1,297	$

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

Company Name

Project Greene County Coal S2B

Site Name McNatt

Printed On 03/11/2008

AMD TREAT
RECAPITIZALITION COST

AMDTREAT

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. VFP Work	5,000	1	5,000	15	5	8,479
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 5,000 $ PV Grand Total 8,479 $

Printed on 03/11/2008

Company Name

Project Green County Coal S1B and S2C

Site Name Mcnatt

AMD TREAT

Costs AMD TREAT MAIN COST FORM

AMDTREAT

Passive Treatment	A	S	
Vertical Flow Pond			$0
Anoxic Limestone Drain			$0
Anaerobic Wetlands			$0
Aerobic Wetlands			$0
Manganese Removal Bed	1	0	$3,020
Oxic Limestone Channel	1	0	$1,770
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$4,790**
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			$0
Ancillary Subtotal:			**$0**
Other Cost (Capital Cost)			$2,000
Total Capital Cost:			**$6,790**
Annual Costs			
Sampling			$0
Labor			$0
Maintenance			$0
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:			**$0**
Other Cost	1	0	

Water Quality

Calculated Acidity	28.00	mg/L
Alkalinity	10.00	mg/L

(•) Calculate Net Acidity (Acid-Alkalinity)
( ) Enter Net Acidity manually

Net Acidity (Hot Acidity)	18.00	mg/L
Design Flow	7.00	gpm
Typical Flow	5.00	gpm
Total Iron	0.30	mg/L
Aluminum	3.10	mg/L
Manganese	9.00	mg/L
pH	5.00	su
Ferric Iron	0.00	mg/L
Ferrous Iron	0.05	mg/L
Sulfate	1300.00	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 $0.000

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Company Name

Project

Site Name

AMD TREAT
MANGANESE REMOVAL BED

AMDTREAT

MN Removal Bed Name

SIZING METHODS Select One

Tons of Limestone Needed	206.99	○ Based on Retention Time	1. Retention Time		days
Tons of Limestone Needed	200.00	◉ Based on Tons of Limestone	2. Limestone Needed	200	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 7.00 gpm

Typical Flow 0.00 gpm

Total Iron 0.00 mg/L

Aluminum 0.00 mg/L

Manganese 9.00 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

15. Slope of Pond Sides — Run 2.0 : Rise 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	97.24	ft
23. Top Width at Freeboard	52.62	ft
25. Freeboard Volume	336	yd3
26. Limestone Surface Area	3,982.2	ft2
27. Limestone Volume	137.7	yd3
28. Tons of Limestone	200	tons
29. Excavation Volume	137	yd3
30. Clear and Grub Area	0.0	acres
31. Liner Area	0	ft2
32. Theoretical Retention Time	0.96	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	2,400	$
34. Limestone Placement Cost	0	$
35. Excavation Cost	620	$
36. Liner Cost	0	$
37. Clear and Grub Cost	0	$
38. Total Cost	3,020	$

Record Number 1 of 1

Company Name

Project

Site Name

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AMD TREAT

Oxic Limestone Channel (OLC)

AMDTREAT

Oxic Limestone Channel Name

1. Ditch Length Rock	100	ft
2. Bottom Width of the Ditch	4.0	ft
3. Ditch Depth	3.00	ft
4. Geo Textile Unit Cost	0.50	$/yd2
5. Length of GeoTextile	100	ft
6. Slope Ratio of Ditch Sides (Run : Rise)	2.00 : 1.00	
☐ 7. Surveying?		
8. Survey Rate		acres/day
9. Survey Unit Cost		$/day
☐ 10. Clearing and Grubbing?		
11. Clear and Grub Cost		$/acre

12. Ditch Depth of Limestone	1.00	ft
13. Cost of Limestone	18.00	$/yd3
14. Cost to Place Limestone	0.00	$/yd3
15. Excavation Unit Cost	4.50	$/yd3
16. Revegetation Unit Cost	1500.00	$/acre

OLC Sub-Totals

17. Excavation Cost	500	$
18. Survey Cost	0	$
19. Clear and Grub Cost	0	$
20. Limestone Cost	1,161	$
21. Filter Fabric Cost	97	$
22. Revegetation Cost	12	$
23. Total Cost	1,770	$

Record Number 1 of 1

Printed on 03/11/2008

Company Name

Project

Site Name

AMDTREAT

AMD TREAT

OTHER COST

Oher Cost Name

	A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost / Annual Cost
1.	S1B ditching across road and tie into S2	2,000.00	1	2,000	Capital Cost
2.		0.00	0	0	Capital Cost
3.		0.00	0	0	Capital Cost
4.		0.00	0	0	Capital Cost
5.		0.00	0	0	Capital Cost
6.		0.00	0	0	Capital Cost
7.		0.00	0	0	Capital Cost
8.		0.00	0	0	Capital Cost
9.		0.00	0	0	Capital Cost
10.		0.00	0	0	Capital Cost
11.		0.00	0	0	Capital Cost
12.		0.00	0	0	Capital Cost
13.		0.00	0	0	Capital Cost
14.		0.00	0	0	Capital Cost
15.		0.00	0	0	Capital Cost

Record Number
1 of 1

Curent Capital Cost 2,000 $
Current Annual Cost 0 $

Total Capital Cost 2,000 $
Total Annual Cost 0 $

Company Name

Project Green County Coal S1B and S2C

Site Name Mcnatt

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. Replace LS In channel	1,200	1	1,200	10	7	3,215
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 1,200 $ PV Grand Total 3,215 $