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Company Name L & B Coal CO
Project SP4A
Site Name #5

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			$0
Oxic Limestone Channel			$0
Limestone Bed			$0
BIO Reactor			$0
Passive Subtotal:			**$0**
Active Treatment			
Caustic Soda	1	0	$4,887
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			$0
Ditching			$0
Engineering Cost	1	0	$1,977
Ancillary Subtotal:			**$6,977**
Other Cost (Capital Cost)			$0
Total Capital Cost:			**$11,864**
Annual Costs			
Sampling	2	0	$1,226
Labor	1	0	$10,920
Maintenance	1	0	$147
Pumping			$0
Chemical Cost	1	0	$221
Oxidant Chem Cost			$0
Sludge Removal	1	0	$16
Other Cost (Annual Cost)			$0
Land Access (Annual Cost)			$0
Total Annual Cost:			**$12,530**
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)	40.00	mg/L
Design Flow	10.00	gpm
Typical Flow	2.00	gpm
Total Iron	5.00	mg/L
Aluminum	5.00	mg/L
Manganese	5.00	mg/L
pH	5.00	su
Ferric Iron	0.00	mg/L
Ferrous Iron	0.00	mg/L
Sulfate	250.00	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 $11.911

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Site Name #5

AMD TREAT

CAUSTIC SODA

AMDTREAT

☑ **Opening Screen Water Parameters**

Caustic Soda Name: proposed caustic system

Influent Water Parameters that Affect Caustic Soda

Calculated Acidity: 0.00 mg/L

Alkalinity: 0.00 mg/L

○ Calculate Net Acidity (Acid-Alkalinity)

○ Enter Net Acidity manually

Net Acidity (Hot Acidity): 40.00 mg/L

Design Flow: 10.00 gpm

Typical Flow: 2.00 gpm

Total Iron: 5.00 mg/L

Aluminum: 5.00 mg/L

Manganese: 5.00 mg/L

1. Gallons of Caustic per Year	176.84	gal/yr
2. Gallons of Caustic per Month	14.73	gal/mo
3. Gallons of Caustic per Day	0.48	gal/day
☐ 4. Titration?		
5. Caustic Titration Volume		gal caustic/gal water treated
6. Purity of Caustic Solution	99.00	purity of 20% caustic solution
7. Mixing Efficiency of Caustic Solution	80.00	%
8. Tank Cost	500	$
9. Tank Volume	500	gal
10. Delivery Frequency	1	times/yr
11. Valve Unit Cost	50.00	$
12. Number of Valves	2	nbr
13. Feeder Line Length	20	ft
14. Feeder Line Unit Cost	0.35	$/ft
15. Installation of System Unit Cost	35.00	$/hr
16. Installation Hours	8	hours

☐ 17. Automatic System?		
18. PID pH Proportional Control		$
19. pH Probe		$
20. Chemical Metering Pump		$
☑ 21. Water Wheel Dispenser		
22. Dispenser Cost	4000.00	$

Caustic Sub-Totals

23. Number of Tanks Required	1	nbr
24. Tank Cost	500	$
25. Automatic System or Wheel Dispenser Cost	4,000	$
26. Cost of Valves	100	$
27. Feeder Line Cost	7	$
28. Labor Cost	280	$
29. Total Capital Cost	4,887	$

Record Number 1 of 1

Company Name L & B Coal CO

Project SP4A

Site Name #5

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AMD TREAT

PONDS

AMDTREAT

Pond Name

Pond Design Based On:

- (•) Retention Time
  - 1. Desired Retention Time: 16.0 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: 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: 4.3 ft
- 13. Excavation Unit Cost: 2.50 $/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

- 23. Revegetation Cost: 1500.00 $/acre
- 24. Number of Ponds for this Design: 2 number
- 25. Cost of Baffles: 0 $

Calculated Pond Dimensions per Pond

- 26. Length at Top of Freeboard: 44 ft
- 27. Width at Top of Freeboard: 26 ft
- 28. Freeboard Volume: 115 yd3
- 29. Water Volume: 47 yd3
- 30. Estimated Annual Sludge: 0 yd3/yr
- 31. Volume of Sludge per Removal: 0 yd3/ removal
- 32. Excavation Volume: 0.02 acre ft
- 33. Excavation Volume: 47 yd3
- 34. Clear and Grub Area: 0.04 acres
- 35. Liner Area: 0 yd2
- 36. Calculated Retention Time: 16 hours

Ponds Sub-Totals per Pond

- 37. Excavation Cost: 237 $
- 38. Pipe Cost: 0 $
- 39. Liner Cost: 0 $
- 40. Clearing and Grubbing Cost: 0 $
- 41. Revegetation Cost: 40 $
- 42. Baffle Cost: 0 $

[x] 43. Estimated Cost: 278 $

[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 $

[x] **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): 40.00 mg/L

Design Flow: 10.00 gpm

Typical Flow: 2.00 gpm

Total Iron: 5.00 mg/L

Aluminum: 5.00 mg/L

Manganese: 5.00 mg/L

Record Number 1 of 1

Company Name L & B Coal CO

Project SP4A

Site Name #5

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AMD TREAT

ENGINEERING COST

1. Capital Cost *	9,887	$
(•) 2. Per Cent of Capital Cost	20.00	%
( ) 3. Actual Engineering Cost		$
4. Total Engineering Cost	1,977	$

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

Company Name L & B Coal CO

Project SP4A

Site Name #5

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AMD TREAT

SAMPLING

AMDTREAT

Sampling Name monthly - final

Estimate Sampling Cost

1. Unit Labor Cost	35.00	$/hr
2. Collection Time per Sample	0.25	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	1	points

Enter Established Annual Sampling Cost

7. Actual Annual Sampling Cost		$

Sampling Sub-Totals

8. Yearly Sample Analysis Cost	300	$
9. Yearly Travel Cost	420	$
10. Yearly Collection Cost	105	$
11. Sampling Cost	825	$

Record Number 1 of 2

Company Name L & B Coal CO

Project SP4A

Site Name #5

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AMD TREAT

SAMPLING

AMDTREAT

Sampling Name quarterly - raw, upstr, downstr

Estimate Sampling Cost

1. Unit Labor Cost	35.00	$/hr
2. Collection Time per Sample	0.25	hours/sample
3. Travel Time	0.00	hr
4. Sample Frequency	0.33	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	297	$
9. Yearly Travel Cost	0	$
10. Yearly Collection Cost	104	$
11. Sampling Cost	401	$

Record Number 2 of 2

Company Name L & B Coal CO

Project SP4A

Site Name #5

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AMD TREAT

LABOR

Labor Name: weekly

Estimate Labor Cost

1. Site Visits per Week	3.00	
2. Site Labor Time per Visit	1.00	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	10,920	$

Record Number 1 of 1

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Company Name L & B Coal CO

Project SP4A

Site Name #5

AMD TREAT

MAINTANENCE

Estimate Maintenance Cost

1. Percent of Active Cost	3.00	%
2. Percent of Passive Cost	1.00	%
3. Percent of Ancillary Cost *	0.00	%
4. Percent of Other Capital Cost	0.00	%

Enter Established Annual Maintenance Cost

5. Annual Maintenance Cost		$

Maintenance Sub-Totals

6 Total Maintenance Active Cost	147	$
7. Total Maintenance Passive Cost	0	$
8. Total Maintenance Ancillary Cost	0	$
9. Total Maintenance Other Capital Cost	0	$
10. Total Maintenance Cost	147	$

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

Company Name L & B Coal CO

Project SP4A

Site Name #5

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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) 40.00 mg/L

Design Flow 10.00 gpm

Typical Flow 2.00 gpm

Total Iron 5.00 mg/L

Aluminum 5.00 mg/L

Manganese 5.00 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 ____ %

4. Mixing Efficiency of Hydrated Lime ____ %

5. Hydrated Lime Unit Cost ____ $/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 99.00 purity of 20% caustic solution

15. Mixing Efficiency of Caustic 80.00 %

○ Non-Bulk Delivery

16. Caustic Non-Bulk Unit Cost ____ $/gal

◉ Bulk Delivery

17. Caustic Bulk Unit Cost 1.25 $/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	0	$	0	lbs
34. Total Pebble Lime Cost	0	$	0	lbs
35. Total Caustic Soda Cost	221	$	176	gals
36. Total Limestone Cost	4	$	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: **CAUSTIC SODA**

Annual Chemical Cost 221 $

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Company Name L & B Coal CO

Project SP4A

Site Name #5

AMD TREAT

SLUDGE REMOVAL

AMDTREAT

☑ **Opening Screen Water Parameters**

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): 40.00 mg/L

Design Flow: 10.00 gpm

Typical Flow: 2.00 gpm

Total Iron: 5 mg/L

Aluminum: 5 mg/L

Manganese: 5 mg/L

Sludge Removal Name:

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: 5.00 mg/L

15. Manganese Concentration: 5.00 mg/L

16. Aluminum Concentration: 5.00 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: 1 yd3/yr

Cost for Sludge Removal Types

23. Removal by $ per Gallon: 15 $

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: 16 $

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Company Name L & B Coal CO

Project SP4A

Site Name #5

AMD TREAT
RECAPITIZALITION COST

AMDTREAT

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

Recapitizalition Name SP 4A - bond

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 all components	9,887	1	9,887	25	3	8,646
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 9,887 $ PV Grand Total 8,646 $