

Company Name Avery Coal
 Project Avery Coal
 Site Name Pine Glen Operation-1



AMDTREAT

**AMD TREAT
 AMD TREAT MAIN COST FORM**

Costs

<u>Passive Treatment</u>	<u>A</u>	<u>S</u>	
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
<u>Active Treatment</u>			
Caustic Soda			\$0
Hydrated Lime			\$0
Pebble Quick Lime	1	0	\$35,437
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
Active Subtotal:			\$0
<u>Ancillary Cost</u>			
Ponds	1	0	\$5,000
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost	1	0	\$4,044
Ancillary Subtotal:			\$9,044
Other Cost (Capital Cost)			\$0
Total Capital Cost:			\$44,481
<u>Annual Costs</u>			
Sampling	1	0	\$2,294
Labor	1	0	\$7,280
Maintenance	1	0	\$1,415
Pumping			\$0
Chemical Cost	1	0	\$1,373
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$1,420
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			\$13,782
Other Cost			

Water Quality

Calculated Acidity	<input type="text" value="0.00"/>	mg/L
Alkalinity	<input type="text" value="0.00"/>	mg/L
<input checked="" type="checkbox"/> Calculate Net Acidity (Acid-Alkalinity)		
Enter Net Acidity manually		
Net Acidity (Hot Acidity)	<input type="text" value="1340.00"/>	mg/L
Design Flow	<input type="text" value="5.00"/>	gpm
Typical Flow	<input type="text" value="5.00"/>	gpm
Total Iron	<input type="text" value="270.00"/>	mg/L
Aluminum	<input type="text" value="26.70"/>	mg/L
Manganese	<input type="text" value="148.00"/>	mg/L
pH	<input type="text" value="2.60"/>	su
Ferric Iron	<input type="text" value="0.00"/>	mg/L
Ferrous Iron	<input type="text" value="0.00"/>	mg/L
Sulfate	<input type="text" value="3163.00"/>	mg/L
Filtered Fe	<input type="text" value="0.00"/>	mg/L
Filtered Al	<input type="text" value="0.00"/>	mg/L
Filtered Mn	<input type="text" value="0.00"/>	mg/L
Specific Conductivity	<input type="text" value="0.00"/>	uS/cm
Total Dissolved Solids	<input type="text" value="0.00"/>	mg/L
Dissolved Oxygen	<input type="text" value="0.00"/>	mg/L
Typical Acid Loading	<input type="text" value="14.6"/>	tons/yr

**Total Annual Cost: per
 1000 Gal of H2O Treated \$5.240**

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COMMENTS:

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AMD TREAT PEBBLE QUICK LIME

Pebble Quick Lime Name:

Opening Screen
Water Parameters

Influent Water Parameters that Affect Pebble Quick Lime

Calculated Acidity
 mg/L
Alkalinity
 mg/L

Calculate Net
Acidity
(Acid-Alkalinity)

Enter Net Acidity
manually

Net Acidity
(Hot Acidity)
 mg/L

Design Flow
 gpm

Typical Flow
 gpm

Total Iron
 mg/L

Aluminum
 mg/L

Manganese
 mg/L

Record Number

1 of 1

- 1. Annual Pebble Quick Lime tons/yr
- 2. Pebble Quick Lime 50 Lbs Bags per day
- 3. Pounds per Hour of Pebble Quick Lime lbs/hr
- 4. Refill Frequency for 1 Ton Bin days
- 5. Refill Frequency for 35 Ton Silo days
- 6. Purity of Pebble Quick Lime %
- 7. Mixing Efficiency of Pebble Quick Lime %
- 8. Titration? lbs of Pebble
Lime
/gal of H2O
- 9. Pebble Quick Lime Titration Amount
- 10. Excavation Unit Cost \$/yd3
- 11. Aggregate Unit Cost \$/yd3
- 12. Aggregate Placement Unit Cost \$/yd3

13. Ditching System

Default Ditching System Based on Flow

14. Default Ditch Length ft

15. Default Ditch Bottom Width ft

16. Default Ditch Depth ft

Custom Ditching System

17. Ditch Length ft

18. Ditch Bottom Width ft

19. Ditch Depth ft

20. Slope Ratio of Ditch Sides Run : Rise

21. Rock Depth in Ditch ft

22. Length of Rock Lined Ditch ft

23. Clearing and Grubbing?

- 24a. Land Multiplier ratio
- 24b. Clear/Grub Acres acres
- 25. Clear and Grub Cost \$/acre

26. Select One Delivery System

- 1 Ton Bin System \$
- 35 Ton Silo System \$

27. Electric Mixer ?

28. Electric Mixer System Cost \$

29. Slaker ?

30. Slaker Cost \$

Pebble Quick Lime Sub-Totals

- 31. Clear Grub Area acres
- 32. Storage System Cost \$
- 33. Electric Mixer Cost \$
- 34. Aggregate Cost \$
- 35. Ditch Excavation Cost \$
- 36. Clear and Grub Cost \$
- 37. Slaker Cost \$

38. Total Cost \$

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AMD TREAT PONDS

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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 ft

9. Pond Width at Top of Freeboard ft

	Run	Rise
10. Slope Ratio of Pond Sides	<input type="text" value="2.0"/>	<input type="text" value="1"/>
11. Freeboard Depth	<input type="text" value="2.0"/> ft	
12. Water Depth	<input type="text" value="4.0"/> ft	
13. Excavation Unit Cost	<input type="text" value="5.50"/> \$/yd3	
14. Total Length of Effluent / Inlet Pipe	<input type="text" value="0.00"/> ft	
15. Unit Cost of Pipe	<input type="text" value="10.00"/> \$/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 mg/L

Alkalinity mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity) mg/L

Design Flow gpm

Typical Flow gpm

Total Iron mg/L

Aluminum mg/L

Manganese mg/L

Record Number
1 of 1

23. Revegetation Cost \$/acre

24. Cost of Baffles \$

Calculated Pond Dimensions per Pond

25. Length at Top of Freeboard ft

26. Width at Top of Freeboard ft

27. Freeboard Volume yd3

28. Water Volume yd3

29. Estimated Annual Sludge yd3/yr

30. Volume of Sludge per Removal yd3/removal

31. Excavation Volume acre ft

32. Excavation Volume yd3

33. Clear and Grub Area acres

34. Liner Area yd2

35. Calculated Retention Time hours

Ponds Sub-Totals per Pond

36. Excavation Cost \$

37. Pipe Cost \$

38. Liner Cost \$

39. Clearing and Grubbing Cost \$

40. Revegetation Cost \$

41. Baffle Cost \$

42. Estimated Cost \$

43. Accept Minimum Pond Cost?

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

44. Recommended Minimum Cost \$

45. Total Cost \$

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AMD TREAT ENGINEERING COST

1. Capital Cost * \$

2. Per Cent of Capital Cost %

3. Actual Engineering Cost \$

4. Total Engineering Cost \$

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

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AMD TREAT SAMPLING

Sampling Name

Estimate Sampling Cost

1. Unit Labor Cost \$/hr

2. Collection Time per Sample hours/sample

3. Travel Time hr

4. Sample Frequency samples/mo

5. Lab Cost Per Sample \$/sample

6. Number of Sample Points points

Enter Established Annual Sampling Cost

7. Actual Annual Sampling Cost \$

Sampling Sub-Totals

8. Yearly Sample Analysis Cost \$

9. Yearly Travel Cost \$

10. Yearly Collection Cost \$

11. Sampling Cost \$

Record Number 1 of 1

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LABOR

Labor Name

Estimate Labor Cost

1. Site Visits per Week

2. Site Labor Time per Visit hours

3. Travel Time per Visit hours

4. Unit Labor Cost \$/hour

Enter Established Annual Labor Cost

5. Actual Annual Labor Cost \$

6. Total Cost \$

Record Number 1 of 1

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AMD TREAT

MAINTANENCE

☛ Estimate Maintenance Cost

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

☛ Enter Established Annual Maintenance Cost

5. Annual Maintenance Cost \$

Maintenance Sub-Totals

- 6 Total Maintenance Active Cost \$
- 7. Total Maintenance Passive Cost \$
- 8. Total Maintenance Ancillary Cost \$
- 9. Total Maintenance Other Capital Cost \$

10. Total Maintenance Cost \$

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

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AMD TREAT CHEMICAL COST

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Chemical Cost Name:

Opening Screen Water Parameters

Influent Water Parameters that Affect Chemical Cost

Calculated Acidity
 mg/L
 Alkalinity
 mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

 Net Acidity (Hot Acidity)
 mg/L

Design Flow
 gpm
 Typical Flow
 gpm
 Total Iron
 mg/L
 Aluminum
 mg/L
 Manganese
 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 of caustic / 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

18. Flocculents?

19. Flocculent Consumption gal/hr

20. Flocculent Unit Cost \$/gal

E. Anhydrous Ammonia ?

21. Titration?
 22. Ammonia Titration 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	1,373	24,958 lbs
35. Total Caustic Soda Cost	0	0 gals
36. Total Anhydrous Ammonia Cost	0	0 lbs
37. Total Soda Ash Cost	0	0 lbs
38. Total Known Chemical Cost	0	
39. Total Flocculent Cost	0	0 gals

40. Selected Chemical: **PEBBLE QUICK LIME**

Annual Chemical Cost \$

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AMD TREAT SLUDGE REMOVAL

Opening Screen Water Parameters

Sludge Removal Name

Influent Water Parameters that Affect Sludge Removal

Calculated Acidity
 mg/L

Alkalinity
 mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity)
 mg/L

Design Flow
 gpm

Typical Flow
 gpm

Total Iron
 mg/L

Aluminum
 mg/L

Manganese
 mg/L

Selection for Method of Removing Sludge

1. Select One

Sludge Removal by \$ per Gallon

2. Sludge Removal Unit Cost \$/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 \$

Concentrations from Main Water Quality Screen

14. Iron Concentration mg/L

15. Manganese Concentration mg/L

16. Aluminum Concentration mg/L

17. Total Miscellaneous Concentration mg/L

18. Percent Solids %

19. Sludge Density lbs/gal

20. Titration?

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

22. Estimated Sludge Volume yd³/yr

Cost for Sludge Removal Types

23. Removal by \$ per Gallon	<input type="text" value="1,419"/> \$
24. Removal by Vacuum Truck	<input type="text" value="0"/> \$
25. Removal by Mechanical Excavation	<input type="text" value="0"/> \$
26. Removal by Lagoon Cleaner	<input type="text" value="0"/> \$
27. Actual Sludge Removal Cost	<input type="text" value="0"/> \$

Sludge Removal Sub-Totals

28. Currently Selected Removal Cost Plus Off Site Disposal Cost \$

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AMD TREAT RECAPITIALIZATION COST

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Calculation Period yrs Inflation Rate % Net Return Rate %

Recapitalization 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. Storage System	25,000	1	25,000	15	5	42,397
2. Mixer	2,500	1	2,500	15	5	4,240
3. Aggregate Cost	6,548	1	6,548	15	5	11,105
4. Ditch Excavation Cost	1,344	1	1,344	15	5	2,279
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 \$ PV Grand Total \$