

Company Name REM Coal Co., Inc.

Project 33803040-RAW

Site Name Orcutt



**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:			<b>\$0</b>
<b>Active Treatment</b>			
Caustic Soda	1	0	\$4,387
Hydrated Lime			\$0
Pebble Quick Lime			\$0
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
Active Subtotal:			<b>\$0</b>
<b>Ancillary Cost</b>			
Ponds	2	0	\$10,000
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost	1	0	\$2,877
Ancillary Subtotal:			<b>\$12,877</b>
Other Cost (Capital Cost)			\$0
Total Capital Cost:			<b>\$17,264</b>
<b>Annual Costs</b>			
Sampling	1	0	\$856
Labor	1	0	\$16,380
Maintenance	1	0	\$504
Pumping			\$0
Chemical Cost	1	0	\$22,089
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$7,035
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			<b>\$46,864</b>
Other Cost			

**Water Quality**

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

pH  su

Ferric Iron  mg/L

Ferrous Iron  mg/L

Sulfate  mg/L

Filtered Fe  mg/L

Filtered Al  mg/L

Filtered Mn  mg/L

Specific Conductivity  uS/cm

Total Dissolved Solids  mg/L

Dissolved Oxygen  mg/L

Typical Acid Loading  tons/yr

**Total Annual Cost: per  
1000 Gal of H2O Treated \$2.408**

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COMMENTS:

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**AMDTREAT**

## AMD TREAT CAUSTIC SODA

Caustic Soda Name

**Opening Screen  
Water Parameters**

**Influent Water  
Parameters  
that Affect  
Caustic Soda**

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

1. Gallons of Caustic per Year  gal/yr
2. Gallons of Caustic per Month  gal/mo
3. Gallons of Caustic per Day  gal/day

4. Titration?

5. Caustic Titration Volume  gal caustic/gal water treated
6. Purity of Caustic Solution  purity of 20% caustic solution
7. Mixing Efficiency of Caustic Solution  %
8. Tank Cost  \$
9. Tank Volume  gal
10. Delivery Frequency  times/yr
11. Valve Unit Cost  \$
12. Number of Valves  nbr
13. Feeder Line Length  ft
14. Feeder Line Unit Cost  \$/ft
15. Installation of System Unit Cost  \$/hr
16. Installation Hours  hours

17. Automatic System?

18. PID pH Proportional Control  \$
19. pH Probe  \$
20. Chemical Metering Pump  \$
21. Water Wheel Dispenser
22. Dispenser Cost  \$

**Caustic Sub-Totals**

23. Number of Tanks Required  nbr
24. Tank Cost  \$
25. Automatic System or Wheel Dispenser Cost  \$
26. Cost of Valves  \$
27. Feeder Line Cost  \$
28. Labor Cost  \$

\$

**Record Number 1 of 1**



# 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  ft

9. Pond Width at Top of Freeboard  ft

Run      Rise

10. Slope Ratio of Pond Sides  :

11. Freeboard Depth  ft

12. Water Depth  ft

13. Excavation Unit Cost  \$/yd3

14. Total Length of Effluent / Influent Pipe  ft

15. Unit Cost of Pipe  \$/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  \$/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  \$

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 2



# 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  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 / Influent Pipe	<input type="text" value="0.00"/> ft		
15. Unit Cost of Pipe	<input type="text" value="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  \$/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  \$

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  
2 of 2**

Company Name REM Coal Co., Inc.

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Project 33803040-RAW

Site Name Orcutt



**AMDTREAT**

**AMD TREAT  
ENGINEERING COST**

1. Capital Cost *	<input type="text" value="14,387"/>	\$
2. Per Cent of Capital Cost	<input type="text" value="20.00"/>	%
3. Actual Engineering Cost	<input type="text"/>	\$
4. Total Engineering Cost	<input type="text" value="2,877"/>	\$

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

Company Name REM Coal Co., Inc.

Printed on 03/31/2008

Project 33803040-RAW

Site Name Orcutt

## 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

Company Name REM Coal Co., Inc.

Printed on 03/31/2008

Project 33803040-RAW

Site Name Orcutt



## AMD TREAT

### LABOR

AMD TREAT

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



Company Name REM Coal Co., Inc.

Project 33803040-RAW

Site Name Orcutt



AMDTREAT

## 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



## AMD TREAT CHEMICAL COST

**AMDTREAT**

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 <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
34. Total Pebble Lime Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
35. Total Caustic Soda Cost <input type="text" value="22,089"/> \$	<input type="text" value="36,815"/> gals
36. Total Anhydrous Ammonia Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
37. Total Soda Ash Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
38. Total Known Chemical Cost <input type="text" value="0"/> \$	
39. Total Flocculent Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> gals

40. Selected Chemical: **CAUSTIC SODA**

Annual Chemical Cost  \$

Company Name REM Coal Co., Inc.

Project 33803040-RAW

Site Name Orcutt



**AMDTREAT**

## 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

**1. Select One** Selection for Method  
of Removing Sludge

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  \$

24. Removal by Vacuum Truck  \$

25. Removal by Mechanical Excavation  \$

26. Removal by Lagoon Cleaner  \$

27. Actual Sludge Removal Cost  \$

**Sludge Removal Sub-Totals**

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

Record Number 1 of 1

Company Name REM Coal Co., Inc.

Project 33803040-RAW

Site Name Orcutt



## AMD TREAT RECAPITIALIZATION COST

**AMDTREAT**

Calculation Period  yrs    Inflation Rate  %    Net Return Rate  %

Recapitalization Name

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. Caustic System	4,387	1	4,387	20	3	4,796
2. Ponds	10,000	1	10,000	20	3	10,932
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  \$    PV Grand Total  \$

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Small



### AMD TREAT

#### Costs AMD TREAT MAIN COST FORM

AMDTREAT

<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
<b>Passive Subtotal:</b>			<b>\$0</b>
<u>Active Treatment</u>			
Caustic Soda	1	0	\$2,387
Hydrated Lime			\$0
Pebble Quick Lime			\$0
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
<b>Active Subtotal:</b>			<b>\$0</b>
<u>Ancillary Cost</u>			
Ponds	2	0	\$10,000
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost	1	0	\$2,477
<b>Ancillary Subtotal:</b>			<b>\$12,477</b>
<b>Other Cost (Capital Cost)</b>			<b>\$0</b>
<b>Total Capital Cost:</b>			<b>\$14,864</b>
<u>Annual Costs</u>			
Sampling	1	0	\$1,152
Labor	1	0	\$16,380
Maintenance	1	0	\$434
Pumping			\$0
Chemical Cost	1	0	\$4,654
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$1,540
<b>Other Cost (Annual Cost)</b>			<b>\$0</b>
<b>Land Access (Annual Cost)</b>			<b>\$0</b>
<b>Total Annual Cost:</b>			<b>\$24,160</b>
<b>Other Cost</b>			

#### Water Quality

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

pH  su

Ferric Iron  mg/L

Ferrous Iron  mg/L

Sulfate  mg/L

Filtered Fe  mg/L

Filtered Al  mg/L

Filtered Mn  mg/L

Specific Conductivity  uS/cm

Total Dissolved Solids  mg/L

Dissolved Oxygen  mg/L

Typical Acid Loading  tons/yr

**Total Annual Cost: per  
1000 Gal of H2O Treated \$2.702**

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Smail

COMMENTS:

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Small



**AMDTREAT**

## AMD TREAT CAUSTIC SODA

Caustic Soda Name

**Opening Screen  
Water Parameters**

**Influent Water  
Parameters  
that Affect  
Caustic Soda**

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

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

17. Automatic System?

18. PID pH Proportional Control  \$
19. pH Probe  \$
20. Chemical Metering Pump  \$
21. Water Wheel Dispenser
22. Dispenser Cost  \$

**Caustic Sub-Totals**

23. Number of Tanks Required  nbr
24. Tank Cost  \$
25. Automatic System or Wheel Dispenser Cost  \$
26. Cost of Valves  \$
27. Feeder Line Cost  \$
28. Labor Cost  \$

29. Total Capital Cost  \$

**Record Number 1 of 1**



# 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  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 / Influent Pipe	<input type="text" value="0.00"/> ft		
15. Unit Cost of Pipe	<input type="text" value="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  \$/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  \$

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 2





# 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  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="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  \$/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  \$

**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**  
2 of 2

Company Name REM Coal Co., Inc.

Printed on 03/31/2008

Project 33743044-ALD

Site Name Smail



**AMD TREAT**

**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

Company Name REM Coal Co., Inc.

Printed on 03/31/2008

Project 33743044-ALD

Site Name Smail



**AMDTREAT**

## AMD TREAT

### 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

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Smail



**AMDTREAT**

## 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



# AMD TREAT CHEMICAL COST

AMDTREAT

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**

33. Total Hydrated Lime Cost  \$

34. Total Pebble Lime Cost  \$

35. Total Caustic Soda Cost  \$

36. Total Anhydrous Ammonia Cost  \$

37. Total Soda Ash Cost  \$

38. Total Known Chemical Cost  \$

39. Total Flocculent Cost  \$

**Annual Amount of  
Chemicals Consumed**

lbs

lbs

gals

lbs

lbs

gals

40. Selected Chemical: **CAUSTIC SODA**

Annual Chemical Cost  \$

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Small



**AMDTREAT**

**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  \$

24. Removal by Vacuum Truck  \$

25. Removal by Mechanical Excavation  \$

26. Removal by Lagoon Cleaner  \$

27. Actual Sludge Removal Cost  \$

**Sludge Removal Sub-Totals**

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

**Record Number 1 of 1**

Company Name REM Coal Co., Inc.

Project 33743044-ALD

Site Name Smail



## AMD TREAT RECAPITIALIZATION COST

**AMDTREAT**

Calculation Period  yrs    Inflation Rate  %    Net Return Rate  %

Recapitalization Name

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. Caustic System	2,387	1	2,387	20	3	2,609
2. Ponds	10,000	1	10,000	20	3	10,932
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  \$    PV Grand Total  \$