

Company Name

Project Rumble

Site Name 1S

Effects DONA

\$24,500

Printed on 08/21/2007



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	1	0	\$3,575
Oxic Limestone Channel			\$0
Limestone Bed			\$0
BIO Reactor			\$0
Passive Subtotal:			\$3,575
<u>Active Treatment</u>			
Caustic Soda			\$0
Hydrated Lime			\$0
Pebble Quick Lime	1	0	\$32,282
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			\$0
Ancillary Subtotal:			\$5,000
Other Cost (Capital Cost)			\$0
Total Capital Cost:			\$40,857
<u>Annual Costs</u>			
Sampling	1	0	\$1,736
Labor	1	0	\$21,840
Maintenance	1	0	\$1,430
Pumping			\$0
Chemical Cost	1	0	\$109
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$65
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			\$25,180
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

**Total Annual Cost: per
1000 Gal of H2O Treated \$15.958**

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AMDTREAT

AMD TREAT MANGANESE REMOVAL BED

MN Removal Bed Name

SIZING METHODS Select One

Tons of Limestone Needed
 Tons of Limestone Needed
 Tons of Limestone Needed
 Tons of Limestone Needed

- Based on Retention Time
- Based on Tons of Limestone
- Based on Dimensions
- Based on Kinetics

1. Retention Time days
 2. Limestone Needed tons
 3. Length at Top of Freeboard ft
 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 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

6. Stone Diameter inches
 7. Effluent Mn Concentration mg/l
 8. % Void Space of Limestone Bed %
 9 Density of Loose Limestone lbs/ft3
 10. Limestone Unit Cost \$/ton
 11. Limestone Placement Unit Cost \$/yd3
 12. Freeboard Depth ft
 13. Limestone Depth ft
 14. Excavation Unit Cost \$/yd3
 Run Rise
 15. Slope of Pond Sides :

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 ft
 23. Top Width at Freeboard ft
 25. Freeboard Volume yd3
 26. Limestone Surface Area ft2
 27. Limestone Volume yd3
 28. Tons of Limestone tons
 29. Excavation Volume yd3
 30. Clear and Grub Area acres
 31. Liner Area ft2
 32. Theoretical Retention Time days

Manganese Removal Bed Sub-Totals

33. Limestone Cost \$
 34. Limestone Placement Cost \$
 35. Excavation Cost \$
 36. Liner Cost \$
 37. Clear and Grub Cost \$

38. Total Cost \$

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AMDTREAT

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

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- 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

Run Rise

20. Slope Ratio of Ditch Sides :

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 settling pond

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. Number of Ponds for this Design number

25. Cost of Baffles \$

Calculated Pond Dimensions per Pond

26. Length at Top of Freeboard ft

27. Width at Top of Freeboard ft

28. Freeboard Volume yd3

29. Water Volume yd3

30. Estimated Annual Sludge yd3/yr

31. Volume of Sludge
per Removal yd3/
removal

32. Excavation Volume acre ft

33. Excavation Volume yd3

34. Clear and Grub Area acres

35. Liner Area yd2

36. Calculated Retention Time hours

Ponds Sub-Totals per Pond

37. Excavation Cost \$

38. Pipe Cost \$

39. Liner Cost \$

40. Clearing and Grubbing Cost \$

41. Revegetation Cost \$

42. Baffle Cost \$

43. Estimated Cost \$

44. Accept Minimum Pond Cost?

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

45. Recommended Minimum Cost \$

46. 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

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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 \$

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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 \$

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MAINTENANCE

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 \$

\$

* Ancillary Cost does not 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

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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

D. Limestone ?

18. Limestone Purity %
19. Limestone Efficiency %
20. Limestone Unit Cost \$/ton

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 Limestone Cost \$
37. Total Anhydrous Ammonia Cost \$
38. Total Soda Ash Cost \$
39. Total Known Chemical Cost \$

**Annual Amount of
Chemicals Consumed**

lbs
 lbs
 gals
 tons
 lbs
 lbs

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

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 \$

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

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AMD TREAT RECAPITIALIZATION COST

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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. Manganese Removal Bed	3,575	1	3,575	15	5	6,063
2. Settling Pond	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 \$ PV Grand Total \$