

Company Name Big J  
 Project MD1 chemical  
 Site Name Sorber



### 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	\$6,387
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	1	0	\$5,000
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost	1	0	\$2,277
<b>Ancillary Subtotal:</b>			<b>\$7,277</b>
Other Cost (Capital Cost)			\$0
<b>Total Capital Cost:</b>			<b>\$13,664</b>
<u>Annual Costs</u>			
Sampling	2	0	\$1,226
Labor	1	0	\$10,920
Maintenance	1	0	\$192
Pumping			\$0
Chemical Cost	1	0	\$10,279
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$447
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
<b>Total Annual Cost:</b>			<b>\$23,064</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

**Total Annual Cost: per  
 1000 Gal of H2O Treated \$1,461**

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## AMD TREAT CAUSTIC SODA

**AMDTREAT**

**Opening Screen  
Water Parameters**

Caustic Soda Name

**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**

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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="2.50"/>	\$/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

**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. 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  \$

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**AMD TREAT  
ENGINEERING COST**



**AMDTREAT**

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 2

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AMDTREAT

## AMD TREAT SAMPLING

Sampling Name

<b>Estimate Sampling Cost</b>	
1. Unit Labor Cost	<input type="text" value="35.00"/> \$/hr
2. Collection Time per Sample	<input type="text" value="0.25"/> hours/sample
3. Travel Time	<input type="text" value="0.00"/> hr
4. Sample Frequency	<input type="text" value="0.33"/> samples/mo
5. Lab Cost Per Sample	<input type="text" value="25.00"/> \$/sample
6. Number of Sample Points	<input type="text" value="3"/> points
<b>Enter Established Annual Sampling Cost</b>	
7. Actual Annual Sampling Cost	<input type="text"/> \$

### Sampling Sub-Totals

8. Yearly Sample Analysis Cost  \$  
9. Yearly Travel Cost  \$  
10. Yearly Collection Cost  \$

\$

**Record Number 2 of 2**

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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

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**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 not 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

- 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	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="10,279"/> \$	<input type="text" value="8,223"/> gals
36. Total Limestone Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> tons
37. Total Anhydrous Ammonia Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
38. Total Soda Ash Cost <input type="text" value="0"/> \$	<input type="text" value="0"/> lbs
39. Total Known Chemical Cost <input type="text" value="0"/> \$	

40. Selected Chemical: **CAUSTIC SODA**

Annual Chemical Cost  \$

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**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  \$

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  yd<sup>3</sup>/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

**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. replace all caustic components	11,387	1	11,387	25	3	9,958
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  \$    PV Grand Total  \$