

Company Name POWER OPR CO INC

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE



AMDTREAT

AMD TREAT

Costs AMD TREAT MAIN COST FORM

<u>Passive Treatment</u>	<u>A</u>	<u>S</u>	
Vertical Flow Pond	1	1	\$43,783
Anoxic Limestone Drain			\$0
Anaerobic Wetlands			\$0
Aerobic Wetlands			\$0
Manganese Removal Bed	1	0	\$13,395
Oxic Limestone Channel			\$0
Limestone Bed			\$0
BIO Reactor			\$0
Passive Subtotal:			\$57,178
<u>Active Treatment</u>			
Caustic Soda			\$0
Hydrated Lime			\$0
Pebble Quick Lime			\$0
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
Active Subtotal:			\$0
<u>Ancillary Cost</u>			
Ponds	3	0	\$137,184
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost			\$0
Ancillary Subtotal:			\$137,184
Other Cost (Capital Cost)			\$0
Total Capital Cost:			\$194,362
<u>Annual Costs</u>			
Sampling	1	0	\$1,736
Labor	1	0	\$1,820
Maintenance	1	0	\$6,803
Pumping			\$0
Chemical Cost			\$0
Oxidant Chem Cost			\$0
Sludge Removal			\$0
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			\$10,359
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 \$0.695**

Company Name POWER OPR CO INC

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE

COMMENTS:



AMDTREAT

**AMD TREAT
VERTICAL FLOW POND (VFP)**

VFP Name

Opening Screen Water Parameters

SIZING METHODS Select One

- | | | | | | |
|-----------------------------|------------------------------------|---|-------------------------------|------------------------------------|----------|
| 1. Tons of Limestone Needed | <input type="text" value="666"/> | <input type="radio"/> VFP Based on Acidity Neutralization | 6. Retention Time | <input type="text" value="24.00"/> | hours |
| 2. Tons of Limestone Needed | <input type="text" value="633"/> | <input checked="" type="radio"/> VFP Based on Retention Time | 7. Alkalinity Generation Rate | <input type="text"/> | g/m2/day |
| 3. Tons of Limestone Needed | <input type="text" value="2,577"/> | <input type="radio"/> VFP Based on Alkalinity Generation Rate | 8. Limestone Needed | <input type="text"/> | tons |
| 4. Tons of Limestone Needed | <input type="text" value="1,088"/> | <input type="radio"/> VFP Based on Tons Limestone Entered | 9. Length at Top of Freeboard | <input type="text"/> | ft |
| 5. Tons of Limestone Needed | <input type="text" value="1,684"/> | <input type="radio"/> VFP Based on Dimensions | 10. Width at Top of Freeboard | <input type="text"/> | ft |

Influent Water Parameters that Affect VFP

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

- | | | |
|--|---|----------------------------|
| 11. % Void Space of LS. Bed | <input type="text" value="43.00"/> | % |
| 12. System Life | <input type="text" value="20.00"/> | years |
| 13. Limestone Purity | <input type="text" value="85.00"/> | % |
| 14. Limestone Efficiency | <input type="text" value="60.00"/> | % |
| 15. Density of Loose Limestone | <input type="text" value="94.30"/> | lbs/ft3 |
| 16. Limestone Unit Cost | <input type="text" value="22.00"/> | \$/ton |
| 17. LS Placement Unit Cost | <input type="text" value="0.00"/> | \$/yd3 |
| 18. Slope of Pond Sides | <input type="text" value="2.0"/> : <input type="text" value="1"/> | Run of Slope Rise of Slope |
| 19. Freeboard Depth | <input type="text" value="3.00"/> | ft |
| 20. Free Standing Water Depth | <input type="text" value="2.0"/> | ft |
| 21. Organic Matter Depth | <input type="text" value="1.0"/> | ft |
| 22. Organic Matter Unit Cost | <input type="text" value="20.00"/> | \$/yd3 |
| 23. Organic Matter Spreading Unit Cost | <input type="text" value="4.50"/> | \$/yd3 |
| 24. Limestone Depth | <input type="text" value="3.0"/> | ft |
| 25. Excavation Unit Cost | <input type="text" value="5.50"/> | \$/yd3 |

Liner Cost

- No Liner
- Clay Liner
- | | | |
|-----------------------------|----------------------|--------|
| 11. Clay Liner Unit Cost | <input type="text"/> | \$/yd3 |
| 12. Thickness of Clay Liner | <input type="text"/> | ft |
- Synthetic Liner
- | | | |
|-------------------------------|-----------------------------------|--------|
| 13. Synthetic Liner Unit Cost | <input type="text" value="5.50"/> | \$/yd2 |
|-------------------------------|-----------------------------------|--------|

29. Clearing and Grubbing?

- 30a. Land Multiplier ratio
- 30b. Clear/Grub Acres acres
31. Clear and Grub Unit Cost \$/acre

32. Nbr. of Valves nbr
33. Unit Cost of Valves \$ ea.

AMDTreat Piping Costs

- | | | |
|--|------------------------------------|--------------|
| 34. Total Length of Effluent / Influent Pipe | <input type="text" value="20"/> | ft |
| 35. Pipe Install Rate | <input type="text" value="11.00"/> | ft/hr |
| 36. Labor Rate | <input type="text" value="35.00"/> | \$/hr |
| 37. Segment Len. of Trunk Pipe | <input type="text" value="20"/> | ft/pipe seg. |
| 38. Trunk Pipe Cost | <input type="text" value="15.00"/> | \$/ft |
| 39. Trunk Coupler Cost | <input type="text" value="6.60"/> | \$/coupler |
| 40. Spur Cost | <input type="text" value="7.00"/> | \$/ft |
| 41. Spur Coupler Cost | <input type="text" value="3.00"/> | \$/spur |
| 42. "T" Connector Cost | <input type="text" value="90.00"/> | \$/T coupler |
| 43. Segment Len. of Spur Pipe | <input type="text" value="20"/> | ft/pipe seg. |
| 44. Spur Pipe Spacing | <input type="text" value="10.0"/> | ft |

Custom Piping Costs

- | | Length | Diameter | Unit Cost |
|-------------|----------------------|----------------------|----------------------|
| 45. Pipe #1 | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 46. Pipe #2 | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 47. Pipe #3 | <input type="text"/> | <input type="text"/> | <input type="text"/> |

VFP Sizing Summaries

- | | | |
|--------------------------------|--------------------------------------|------|
| 48. Length at Top of Freeboard | <input type="text" value="127.54"/> | ft |
| 49. Width at Top of Freeboard | <input type="text" value="75.77"/> | ft |
| 50. Freeboard Volume | <input type="text" value="943"/> | yd3 |
| 51. Water Surface Area | <input type="text" value="7,368"/> | ft2 |
| 52. Total Water Volume | <input type="text" value="494"/> | yd3 |
| 53. Organic Matter Volume | <input type="text" value="210"/> | yd3 |
| 54. Limestone Surface Area | <input type="text" value="5,360"/> | ft2 |
| 55. Limestone Volume | <input type="text" value="497.41"/> | yd3 |
| 56. Excavation Volume | <input type="text" value="1,201.9"/> | yd3 |
| 57. Clear and Grub Area | <input type="text" value="0.0"/> | acr. |
| 58. Liner Area | <input type="text" value="1,726.9"/> | ft2 |
| 59. Theoretical Retention Time | <input type="text" value="24.00"/> | hrs |

VFP Cost Summaries

- | | | |
|---|-------------------------------------|----|
| 60. Organic Matter Cost | <input type="text" value="4,205"/> | \$ |
| 61. Limestone Cost | <input type="text" value="13,931"/> | \$ |
| 62. Limestone and Organic Matter Placement Cost | <input type="text" value="946"/> | \$ |
| 63. Excavation Cost | <input type="text" value="6,611"/> | \$ |
| 64. Liner Cost | <input type="text" value="9,498"/> | \$ |
| 65. Clear and Grub Cost | <input type="text" value="0"/> | \$ |
| 66. Valve Cost | <input type="text" value="0"/> | \$ |
| 67. Pipe Cost | <input type="text" value="8,592"/> | \$ |
| 68. Total Cost | <input type="text" value="43,783"/> | \$ |

Company Name POWER OPR CO INC
 Project POWER LAKE TRUST
 Site Name DUGAN 4 MINE



AMDTREAT

AMD TREAT MANGANESE REMOVAL BED

MN Removal Bed Name

SIZING METHODS Select One			
Tons of Limestone Needed	887.12	<input checked="" type="radio"/> Based on Retention Time	1. Retention Time <input style="width: 50px;" type="text" value="1.00"/> days
Tons of Limestone Needed	200.00	<input type="radio"/> Based on Tons of Limestone	2. Limestone Needed <input style="width: 50px;" type="text"/> tons
Tons of Limestone Needed	919.45	<input type="radio"/> Based on Dimensions	3. Length at Top of Freeboard <input style="width: 50px;" type="text"/> ft
Tons of Limestone Needed	0.00	<input type="radio"/> Based on Kinetics	4. Width at Top of Freeboard <input style="width: 50px;" type="text"/> ft
			5. Rate Constant (k) <input style="width: 50px;" type="text"/> 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 \$

Record Number 1 of 1

Company Name POWER OPR CO INC

Printed on 05/20/2008

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE

AMD TREAT PONDS



AMDTREAT

Pond Name Collection Pond (Power Lake)

Pond Design Based On:

Retention Time

1. Desired Retention Time hours

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 800.000 ft

9. Pond Width at Top of Freeboard 250.000 ft

Run Rise

10. Slope Ratio of Pond Sides 2.0 : 1

11. Freeboard Depth 2.0 ft

12. Water Depth 4.0 ft

13. Excavation Unit Cost 4.50 \$/yd3

14. Total Length of Effluent / Inlet Pipe 100.00 ft

15. Unit Cost of Pipe 14.22 \$/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. Cost of Baffles 0 \$

Calculated Pond Dimensions per Pond

25. Length at Top of Freeboard 800 ft

26. Width at Top of Freeboard 250 ft

27. Freeboard Volume 41,687 yd3

28. Water Volume 27,181 yd3

29. Estimated Annual Sludge 0 yd3/yr

30. Volume of Sludge per Removal 0 yd3/removal

31. Excavation Volume 16.84 acre ft

32. Excavation Volume 27,181 yd3

33. Clear and Grub Area 6.88 acres

34. Liner Area 0 yd2

35. Calculated Retention Time 3,050 hours

Ponds Sub-Totals per Pond

36. Excavation Cost 122,318 \$

37. Pipe Cost 1,422 \$

38. Liner Cost 0 \$

39. Clearing and Grubbing Cost 0 \$

40. Revegetation Cost 3,443 \$

41. Baffle Cost 0 \$

42. Estimated Cost 127,184 \$

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)

258.80 mg/L

Design Flow

30.00 gpm

Typical Flow

28.33 gpm

Total Iron

40.08 mg/L

Aluminum

5.12 mg/L

Manganese

25.42 mg/L

Record Number

1 of 3

Company Name POWER OPR CO INC
 Project POWER LAKE TRUST
 Site Name DUGAN 4 MINE

Printed on 05/20/2008



AMD TREAT PONDS

AMDTREAT

Pond Name Final 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	<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="4.50"/> \$/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 3**

Company Name POWER OPR CO INC

Printed on 05/20/2008

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE



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="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

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
3 of 3

Company Name POWER OPR CO INC

Printed on 05/20/2008

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE



AMDTREAT

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 POWER OPR CO INC

Printed on 05/20/2008

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE



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 POWER OPR CO INC
Project POWER LAKE TRUST
Site Name DUGAN 4 MINE



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

Company Name POWER OPR CO INC

Project POWER LAKE TRUST

Site Name DUGAN 4 MINE



AMD TREAT RECAPITIALIZATION COST

AMDTREAT

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. VFP Liner	9,498	1	9,498	30	2	5,931
2. VFP Organic Material	4,205	1	4,205	15	5	7,131
3. VFP Limestone	13,931	1	13,931	15	5	23,625
4. Mn Bed Limestone Cost	10,645	1	10,645	15	5	18,053
5. VFP Piping Cost	8,592	1	8,592	15	5	14,571
6. Mn Bed Excavation	2,750	1	2,750	15	5	4,664
7. VFP Excavation	6,611	1	6,611	15	5	11,212
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 \$

RECEIVED TIME JUN. 5. 11:52AM

PRINT TIME JUN. 5. 11:58AM