

Energy Efficiency Business Case for Custer Aerator Replacement

Green Project Reserve Type

The City of Custer, South Dakota is proposing to replace fourteen existing pond aerators, with twelve new pond aerators. The aerators are 25 years old and located in two aeration ponds. The new aerators will be able to operate more efficiently than the existing units by requiring two less aerators and using less power by the individual units. These aerators will also be capable of providing more oxygen to the ponds increasing the treatment capabilities of the wastewater treatment facility while lower operational costs. High efficiency motors will be installed on the aerators to further maximize energy efficiency in aerator operation.

The consultant for the City of Custer has calculated the anticipated energy savings for the proposed new aerators versus keeping the existing aerators in operation for the next five years. For the purpose of comparison each of the two alternatives were calculated on a kilowatt-hour per year basis. Existing and estimated future average daily power consumption information and operation and maintenance cost estimates were supplied by Aeration Industries International, LLC. This information is provided in Appendix A. It is estimated that an energy savings of 42.8 percent for the five year period could be realized with the new aerators.

The calculated anticipated cost savings for the project is based on an energy charge rate of \$0.064 per kilowatt-hour for all energy used for the five-year period. As seen in Appendix A, it is estimated that an overall cost savings would then equate to \$99,881 for the proposed project.

Documents submitted and reviewed by the State:

1. Facilities Plan Aerator Replacement Wastewater Treatment Plant, Custer, South Dakota, March 2012
2. Appendix A: Four Front Design, Inc letter and Aeration Industries International, LLC operation and maintenance cost estimates
3. Supplementary Table to Appendix A: Aire-02 Triton Aerators for Custer WWTP

List of eligible Green Project Reserve components:

1. Aerator Replacement: \$492,200 (refer to attached cost breakdown)
2. Total Project Cost: \$1,633,000 (Engineer's Estimate)
3. Total project cost eligible for Green Project Reserve: \$492,200

Green Project Reserve – Business Case Evaluation:

As stated in the USEPA March 2, 2009 Memorandum, for traditional projects that are not categorically green, for the project, or components of the project, to be counted towards the Green project Reserve requirement, the State project files must contain documentation that a clear business case for the project (or portion) investment includes achievement of identifiable and substantial benefits that qualify as Green Project benefits. The documentation should reference to a preliminary engineering or other planning document that makes clear that the basis upon which the project (or portion) was undertaken included identifiable and substantial benefits qualifying for the Green Project Reserve. The March 12, 2009 USEPA webcast slides 20 and 21 state that two components, the technical component and financial component, must be provided in the Business Case.

Green Project Reserve Type:

This project is an energy efficiency project based on a business case.

Technical Component Evaluation:

The consultant for the City of Custer has calculated the energy requirements and savings for the existing fourteen aerators versus the proposed twelve new aerators.

The consultant has provided a table of estimated power consumption for the next five years in order to identify the overall estimated percent of power consumption savings from the aerator replacement project.

Financial Component Evaluation:

As shown in Appendix A; the total estimated energy savings for the project comes out to be a financial savings of \$99,881 for the five-year period analyzed. This reflects a 42.8 percent average total energy savings.

$$(685,900 \text{ kW-hrs/year} - 391,900 \text{ kW-hrs/year}) / (685,900 \text{ kW-hrs/year}) = 42.8\%$$

Green Project Reserve – Evaluation Conclusion:

Base on the attached information, the State has determined that replacing the fourteen existing aerators with twelve new aerators provides technical and financial benefits in the form of energy savings. The State has identified 30.1 percent of the \$1,633,000 loan as green project reserve, pending EPA approval.



RECEIVED

NOV - 2 2012

Division of Financial
& Technical Assistance

October 29, 2012

Ms. Claire Peschong
Natural Resources Engineer
South Dakota DENR
Joe Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

RE: Green Project Reserve Funding Application

Dear Ms. Peschong:

As you know, Custer City is replacing its aerators at its wastewater treatment facility. The primary reason for replacement of the aerators is the realization of energy savings and the respective cost savings to the utility's customers. The City appreciates the incentive that the SDDENR and the EPA offer to communities to initiate cost saving programs. Without these incentives it would be very difficult to capitalize these programs for most smaller communities.

Custer City is hereby requesting funding through the Green Project Reserve. Supporting documentation is enclosed for your consideration. The ANNUAL POWER COSTS sheet shows that over the next five years the total estimated savings is \$99,881.00. That averages to \$19,976.20 per year. Power consumption is reduced from 78.30 kW to 44.74 kW. If additional information is required, such as a business case, please advise.

Sincerely,

Dirk Jablonski, P.E.
Principal Engineer

cc: Bob Morrison, Public Works Director
Custer City, South Dakota



Aeration Industries International, LLC
Operations and Maintenance Cost Estimate

Custer SD WWTP Date: 10/24/2012

Prepared By: TAM

Revision:

ANNUAL POWER COSTS
with 3% annual increase

	Calculated @	\$0.064	/kW-h	
	Total		Annual	
	<u>Operating HP</u>	<u>Equiv. kW</u>	<u>Power</u>	<u>Consumption Notes</u>
AireO ₂ Aspirator Aerators	105	78.30	\$43,897.27	14x7.5hp existing aspirator units total 24 hours of aeration+mixing/day
AireO ₂ Triton Aerators	60	44.74	\$25,084.15	12 x 5hp Triton units total 24 hours of aeration+mixing/day

ASPIRATOR MAINTENANCE COSTS

	Cost Per		Frequency
	<u>Item</u>		<u>Item</u>
Replace Aspirator bearing once/5 years	\$240.00		every 5 yrs
Grease for Aerator motor bearings - 4 tubes per year	\$80.00		every 3 months

LIFE CYCLE COSTS:

	Estimated	Annual	Annual
<u>Year</u>	<u>Annual</u>	<u>Lubricant</u>	<u>Bearing/Seal</u>
	<u>Electrical Costs</u>	<u>Costs</u>	<u>Costs</u>
1	\$43,897.27	\$80.00	
2	\$45,214.19	\$82.40	
3	\$46,570.61	\$84.87	
4	\$47,967.73	\$87.42	
5	\$49,406.77	\$90.04	\$3,360.00
Subtotals:	\$233,056.57	\$424.73	\$3,360.00
Total Estimated O&M Costs over 5 years:	\$236,841.30		

* indicates assumed values

Custer SD WWTP

Date: 10/24/2012

Prepared By: TAM

Revision:

TRITON MAINTENANCE COSTS

	Cost Per Maintenance <u>Item</u>	<u>Frequency</u>
Replace Triton bearing once/10 years	\$600.00	every 10 yrs
Grease for Aerator motor bearings - 2 tubes per year	\$20.00	every 6 months
Clean Triton Blower Intake Filter	\$0.00	every 6 months

LIFE CYCLE COSTS:

<u>Year</u>	Estimated Annual <u>Electrical Costs</u>	Annual Lubricant <u>Costs</u>	Annual Bearing/Seal <u>Costs</u>
1	\$25,084.15	\$20.00	
2	\$25,836.68	\$20.60	
3	\$26,611.78	\$21.22	
4	\$27,410.13	\$21.85	
5	\$28,232.44	\$22.51	
Subtotals:	\$133,175.18	\$106.18	\$0.00

Total Estimated O&M Costs over 5 years: \$133,281.37

5 YEAR POWER SAVINGS USING TRITONS VS. ASPIRATORS

	5 Year Power <u>Consumption</u>
AireO ₂ Aspirator Aerators	\$233,057
AireO ₂ Triton Aerators	\$133,175
Total Savings	\$99,881

* indicates assumed values



Aeration Industries International, Inc.
P.O. Box 59144 • Minneapolis, MN 55459 • USA

AIRE-02[®] TRITON AERATORS FOR CUSTER WWTP





Aeration Industries' calculations for determining the aeration equipment required to fulfill the oxygen and/or mixing demand of biological wastewater treatment systems

Note: The methods and data presented herein are intended for use by the designer to estimate the aeration equipment for the oxygen demand using AIRE-O₂ aeration equipment. This method is not intended to cover every application. Questions can be answered by contacting AII at 1-800-329-9287

Input Data (Blue Cells)

1	Flowrate =	0.56	MGD
2	Volume =	2.80	MG
3	BOD in =	202	mg/l
4	BOD out =	30	mg/l
5	NH ₄ -N =	26	mg/l
6	Other =		mg/l
7	BOD net =	172.0	mg/l
8	BOD net =	800.4	lb/day
9	NH ₄ -N net =	121.0	lb/day
10	Other =	0.0	lb/day

Description

Input flowrate
 Input volume
 Influent BOD
 Design output BOD
 Design ammonia or TKN removal
 line 7 = (line 3) - (line 4)
 line 8 = (line 7) x (line 1) x 8.34
 line 9 = (line 5) x (line 1) x 8.34
 line 10 = (line 6) x (line 1) x 8.34

Project Name:

Custer WWTP
 05/20/2010-GRH

Project Number:

10-05-0236E

Notes:

Combined lagoon volume.

ASSUMPTIONS

11	O ₂ : BOD =	1.5	lb O ₂ / lb BOD
12	O ₂ : NH ₃ -N =	4.6	lb O ₂ / lb NH ₄ -N
13	O ₂ : Other =		lb O ₂ / lb Other

Typically varies between 1 and 2
 Typical value is 4.6
 Depends on species

O₂ REQUIREMENT UNDER FIELD CONDITIONS (AOR)

14	O ₂ for BOD =	1200.7	lb O ₂ / day
15	O ₂ for NH ₄ -N =	556.6	lb O ₂ / day
16	O ₂ for Other =	0.0	lb O ₂ / day
17	AOR =	1757.2	lb O ₂ / day
18	AOR =	73.2	lb O ₂ / hour

line 14 = (line 11) x (line 8)
 line 15 = (line 12) x (line 9)
 line 16 = (line 13) x (line 10)
 line 17 = (line 14) + (line 15) + (line 16)
 line 18 = (line 17) / (24)

CORRECTION FACTORS TO DETERMINE O₂ REQUIREMENT UNDER STANDARD CONDITIONS (SOR)

19	Air Temperature =	70	°F
20	Basin Temperature =	59	°F
21	Elevation =	5245	feet above msl
22	C _w =	2.0	mg/l
23	α =	0.80	
24	β =	0.95	
25	C _{s20} =	9.09	mg/l
26	τ =	1.10	
27	Ω =	0.81	
28	C _s =	8.1	mg/l

Input Air temperature
 Input Basin temperature
 Input Basin elevation
 Operating O₂ conc. of wastewater
 Correction factor for type of waste
 Correction factor for salinity, TDS, etc.
 O₂ saturation conc. at 68 deg F
 Temperature correction factor
 Altitude correction factor
 O₂ saturation conc. at field conditions

(Standardized) SOR = **164.3** lb O₂ / hour SOR =
$$\frac{(AOR) * (C_{s20})}{(\alpha)^{\tau} (\beta * C_s - C_w) * (1.024)^{E-20}}$$

HP REQUIREMENTS

OXYGEN

29	AIRE-O ₂ Triton SAE	3.0	lb O ₂ / HP hour
30	AIRE-O ₂ Aspirator SAE	2.0	lb O ₂ / HP hour
31	AIRE-O ₂ Turbo SAE	3.0	lb O ₂ / HP hour
32	AIRE-O ₂ Triton	54.6	HP line 32 = (line 28) / (line 29)
33	AIRE-O ₂ Aspirator	82.2	HP line 33 = (line 28) / (line 30)
34	AIRE-O ₂ Turbo	64.8	HP line 34 = (line 28) / (line 31)

MIXING

Process	Triton	Aspirator	
Activated Sludge	60	120	HP / MG
Complete Mix Lagoon	30	60	HP / MG
Partial Mix Lagoon	10	20	HP / MG
Facultative Lagoon	5	10	HP / MG
Chosen Process:			Partial Mix Lagoon
AIRE-O ₂ Triton	29.8	HP	process (HP/MG) * V
AIRE-O ₂ Aspirator	88.0	HP	process (HP/MG) * V
HRT	5.92	Days	volume / flow

RECOMMENDATIONS

Based on the information provided, this system is oxygen limited. We recommend installing (12) 5 HP AIRE-O₂ Triton aerators to supply the oxygen and mixing required for treatment.



Aeration Industries International, Inc.

Lagoons in Series Design Calculations

Project Name: Custer WWTP
 Project No.: 10-05-0236E

Date 5/20/2010
 Prepared By GRH
 Revision:

Design Flow = 374,000 gpd = 1415.59 m³/d
 Lagoon Water Depth = 11.0 ft = 3.4 m

BOD Removal Zone

Total Lagoon Volume = 2.80 MG = 10598 m³
 Total HRT = 7.49 days

Suspended Growth BOD Removal Calculations

Aerated Lagoon Reactors In Series
 (Metcalf & Eddy, 4th Ed., p.271)

$$S = S_o / [1 + (k_T / n) * \tau]^n$$

where

- S = effluent BOD concentration, mg/l
- S_o = influent BOD concentration, mg/l
- τ = total retention time, days
- T = wastewater temperature, C
- k_T = reaction coefficient, days⁻¹
- n = number of reactors

$$k_T = k_{20} (\theta^{T-20})$$

where

- k₂₀ = reaction coefficient at 20 deg. C = 2.36 days⁻¹
- θ = temperature factor = 1.04

REACTORS IN SERIES

Number of Reactors = 1

Min. Lagoon Temperature

T = 9 C
 τ = 7.49 days
 S_o = 202 mg/l

k_T = 1.53 days⁻¹

$$S = 16 \text{ mg/l}$$

Max. Lagoon Temperature

T = 15 C
 τ = 7.49 days
 S_o = 202 mg/l

k_T = 1.94 days⁻¹

$$S = 13 \text{ mg/l}$$



Aeration Industries International, Inc.

Lagoons in Series Design Calculations

Project Name: Custer WWTP
 Project No.: 10-05-0236E

Date 5/20/2010
 Prepared By GRH
 Revision:

Design Flow = 558,000 gpd = 2112.03 m³/d
 Lagoon Water Depth = 11.0 ft = 3.4 m

BOD Removal Zone

Total Lagoon Volume = 2.80 MG = 10598 m³
 Total HRT = 5.02 days

Suspended Growth BOD Removal Calculations

Aerated Lagoon Reactors In Series
 (Metcalf & Eddy, 4th Ed., p.271)

$$S = S_o / [1 + (k_T / n) * \tau]^n$$

where

S = effluent BOD concentration, mg/l
 S_o = influent BOD concentration, mg/l
 τ = total retention time, days
 T = wastewater temperature, C
 k_T = reaction coefficient, days⁻¹
 n = number of reactors

$$k_T = k_{20} (\theta^{T-20})$$

where

k₂₀ = reaction coefficient at 20 deg. C = 2.36 days⁻¹
 θ = temperature factor = 1.04

REACTORS IN SERIES

Number of Reactors = 1

Min. Lagoon Temperature

T = 9 C
 τ = 5.02 days
 S_o = 202 mg/l

k_T = 1.53 days⁻¹

S = 23 mg/l

Max. Lagoon Temperature

T = 15 C
 τ = 5.02 days
 S_o = 202 mg/l

k_T = 1.94 days⁻¹

S = 19 mg/l



Aeration Industries International, Inc.

P.O. Box 59144 • Minneapolis, MN 55459 • USA

PROJECT NO.: 10-05-0236E

DATE: 05-24-2010

TO: Bob Morrison / PWD
Ph: 605-673-4824
Email: ctybob@gwtc.net

Energy Savings Upgrade

RE: Aeration/Mixing Equipment
PROJECT NAME: Custer SD WWTP Retrofit

REPRESENTATIVE: PEP / AIII
CONTACT: Phil Parsons / Todd Martin
PHONE: 262-241-1199 / 952-556-5740

AIRE-O₂® TRITON® AERATOR

AERATION INDUSTRIES INTERNATIONAL, INC. is pleased to offer the following:

- 12 **5HP AIRE-O₂® Triton® Aerators, p/n 520049** consisting of:
- * **5HP** TEFC, 230/460 volt, 3 phase, 60 Hz, 900 RPM **cast iron motor**
 - * **K04 1.5HP** 230/460 volt, 3 phase, 60 Hz, 3600 RPM **HI-E** Regenerative blower
 - * Field replaceable, water lubricated lower bearing
 - * Field replaceable wear-resistant sleeve
 - * **3.5HP Draw** Dual-bladed primary PowerMix™ propeller, bronze
 - * 304 Stainless steel Saturn Ring™ diffuser
 - * 304 Stainless steel housing, mounting flange, & hollow shaft
- Aerators shall arrive fully assembled
- 12 **Tri-Flotation Assemblies, model# 520060** each features:
- * Three (3) molded low-density polyethylene, closed cell foam filled, pontoons.
 - * Hot-dipped galvanized steel rails and mounting hardware
 - * Floating anti-vortex shield cabled to the frame
- Flotation devices require field assembly.
- 1 **Day of Factory Technician start-up and training**
- 3 **Year Non-Pro-rated Warranty (see terms and conditions attached)**
- 1 **Pre-paid shipping and handling charge to job-site**

BUDGETARY PRICE: \$ 149,800.00

EXCLUSIONS: Installation, duties and taxes are not included. Electrical cabling and controls, and anchoring hardware and cables are not included.

NOTE: Submittals, if required, will be done two weeks from receipt of purchase order. Delivery is six to eight weeks from submittal approval. Quotation is valid for 60 days.

TERMS: General Terms and Conditions Attached (2 pages).

AERATION INDUSTRIES INTERNATIONAL, INC. GENERAL TERMS AND CONDITIONS

1. PRICE. Published prices are subject to change without notice and shall not be binding on Seller until reduced to writing signed by Seller. All priced are F.O.B. Chaska, MN and do not include transportation costs or charges relating to transportation, which costs and charges shall be solely the responsibility of Purchaser. Prices quoted include standard packing according to Sellers specifications. Special packing requested by Purchaser, including packing for exports, shall be by Purchaser at an additional charge.

2. TAXES. To the extent legally permissible, all present and future taxes imposed by Federal, State, Local or Foreign authority which Seller may be required to pay or collect, upon or with reference to the sale, purchase, transportation, delivery, storage, use of consumption of goods or services, including taxes upon, or measured by the receipts therefrom, shall be paid by Purchaser. Amounts covered hereby shall be added to the price, or billed as a separate item as the law may require or as the Seller may determine. No offset against or reduction in price shall be allowed Purchaser by reason of taxes owed, paid or payable by Purchaser, or charged to Purchasers account.

3. CREDIT AND PAYMENT. Credit account will be opened only with firms or individuals approved by Sellers Credit Department. Unless otherwise provided, in any case where delivery is made on credit, Purchaser shall have thirty (30) days from date of the invoice in which to make payment for the goods. Seller reserves the right at anytime upon notice to Purchaser, to alter or suspend credit, or to change the credit terms provided herein, when in its sole opinion the financial condition of the Purchaser so warrants. In addition, the Seller may at anytime, with or without notice to Purchaser, and at its option, suspend work and shipment under this contract if, in the Sellers sole opinion the financial condition of the Purchaser so warrants. In such cases, in addition to any other remedied herein or by law provided, cash payment or satisfactory security from the Purchaser may be required by the Seller before credit is restored or Seller continues performance. If the Purchaser fails to make payment or fails to furnish security satisfactory to the Seller, then Seller shall also have the right to enforce payment of the full contract price of the work completed and in process. Upon default by Purchaser in payment due, Purchaser shall pay immediately to Seller the entire unpaid amounts for any and all shipments made to the Purchaser irrespective of the terms of said shipments and whether said shipments are made pursuant to this contract or any other contracts of sale between Seller and Purchaser, and Seller may withhold all subsequent shipments until the full account is settled. Acceptance by the Seller of less than full payment shall not be a waiver of any of its rights hereunder. The Seller reserves the right, at its discretion, to charge up to 11/2% per month for amounts not paid within stated terms.

4. CANCELLATION. Cancellation of orders once placed with and accepted by us can only be made by us. Should the Purchaser, due to change in design or other good and sufficient cause, desire to effect cancellation of the order, same will be accepted on the following basis: (1) Purchaser shall pay in full the cost of all material, dies, tools, patterns and fixtures provided for this order, that are on hand or for which we are obligated, together with all labor and other expense occurred in connection therewith. Invoices covering said costs shall be due and payable immediately upon our acceptance of cancellation; (2) Purchaser shall pay all shipping and a percentage of purchase price for all goods already shipped to Purchaser but returned to us due to cancellation.

5. RISK OF LOSS, TITLE. The risk of loss of the goods shall pass to the Purchaser as soon as they are deposited with the carrier for shipment to the Purchaser, but title to the goods shall remain in the Seller until the Purchase price therefore has been paid.

6. SHIPMENT. All shipments shall be F.O.B. Chaska, MN and the date of shipment shall be contingent upon the date of acceptance of Sellers offer. Sellers obligation with respect to shipments of goods shall not extend beyond a) putting the goods in the possession of such a carrier and making such a contract for the transportation thereof as may be reasonable having regard to the nature of the goods, b) obtaining and delivering within a reasonable time such documents as may be necessary for Purchaser to obtain possession of goods and, c) notifying the Purchaser of the shipment within a reasonable time. Seller shall have the right to ship all of the goods at one time or in portions from time to time within the time of shipment. This contract shall be deemed separable as to the goods sold. Purchaser may not refuse to accept any lot or portion of the goods shipped hereunder on the grounds that there has been a failure to ship any other lot or that the goods in any other lot were nonconforming. Any such default by Seller will not substantially impair the value of this contract as a whole and will not constitute a breach of the contract as a whole. The goods shall be deemed to have been tendered to Purchaser when they have been deposited with the carrier.

7. INSPECTION AND ACCEPTANCE. Purchaser shall have the right to inspect the goods upon receipt of them and shall have the opportunity, at that time, to run adequate tests to determine whether the goods shipped conform to the specifications of this contract. Purchaser shall recompense Seller, at the contract price, for all goods used in testing and Purchaser shall bear any expense incurred in the inspection of the goods used in testing, whether or not the goods are non-conforming. Failure to inspect the goods or failure to notify the Seller in writing that the goods are nonconforming within ten (10) days of the receipt of the goods by Purchaser, shall constitute a waiver of Purchasers rights of inspection and rejection for nonconformity and shall be equivalent to an irrevocable acceptance of the goods by Purchaser. Acceptance - Unless we receive notification to the contrary promptly from you, we will consider the foregoing conditions as being acceptable to you.

8. PATENTS. To the best of our knowledge, the articles purchased herein under do not infringe any Letters Patent granted to others by the United States of America or by any country foreign thereto. We do not assume any responsibility or liability for any claim of infringement brought against the Purchaser, its successors, assigns, customers or users of its product. The Purchaser agrees to hold us harmless against any claim of infringement which arises out of compliance by us with specifications furnished by the Purchaser.

9. EXCUSE IN SELLERS PERFORMANCE. This contract is subject to and the Seller shall not be responsible or liable for any delay directly or indirectly resulting from or contributed by limitations on the Sellers production capabilities, prompt settlement of all details relating to the materials covered by this proposal, and to delays due to fires, explosions, acts of God, strikes or other differences with workmen, shortage of utility, facility, components of labor, delay in transportation, breakdown or accident, war and acts of war, compliance with or other action taken to carry out the intent or purposes of any law or regulation, changes or revisions, accidents or any other causes or contingencies not caused by Seller or over which Seller has no reasonable control. In the event that any one or more deliveries hereunder is suspended or delayed by reason of any one or more of the occurrences or contingencies aforesaid, any and all deliveries so suspended or delayed shall be made after such disabilities have ceased to exist, and nothing herein contained shall be construed as lessening in any event the full amount of goods herein purchased and sold but only as deferring delivery and payment in the events and to the extent herein provided for. Neither shall any delay in shipment be considered as a default under this contract or give rise to any liability on the part of the Seller for items of incidental, special or consequential damage unless such delay was directly and proximately caused by the willful and wanton act or gross negligence of Seller. Acceptance of material on delivery shall constitute a waiver of any claims against Seller for damages on account of delay.

10. WARRANTY. Seller warrants that it will, at its option repair or replace the goods, or return the purchase price thereof, which are found to be defective in material or workmanship or not in conformity with the contract requirements provided that, within Three (3) year of shipment thereof, Purchaser gives written notice of such defect to Seller, the Purchaser returns the goods to the Seller at point of original manufacture, with transportation charges prepaid by the Purchaser, and an examination by the Seller discloses to its satisfaction the existence of such defect or nonconformity with the contract requirements. In no event shall Seller be liable for any incidental, special or consequential damages resulting from said defects or nonconformity.

THE FOREGOING DOES NOT APPLY TO COMPONENTS WHICH WERE NOT MANUFACTURED BY SELLER, AND IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANT OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FOREGOING. NO AGENT, EMPLOYEE OR REPRESENTATIVE OF THE SELLER HAS ANY AUTHORITY TO BIND THE SELLER TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE GOODS SOLD UNDER THIS SALES CONTRACTOR, AND UNLESS AN AFFIRMATION, REPRESENTATION OR WARRANTY MADE BY AN AGENT, EMPLOYEE OR REPRESENTATIVE IS SPECIFICALLY INCLUDED WITHIN THIS WRITTEN AGREEMENT, IT SHALL NOT BE ENFORCEABLE BY THE PURCHASER.

11. REMEDIES OF PURCHASER. If goods are tendered which do not conform with the specifications under the sales contract and these goods are rejected by Purchaser, Seller shall have the right to cure the tender by either correcting the goods or substituting conforming goods. In the event that such substituted goods fail to conform to the contract or in the event of any other breach or repudiation of this contract by Seller, Purchaser shall not be entitled to recover any incidental or consequential damages as those terms are defined in Section 2-715 of the Minnesota Uniform Commercial Code and Purchasers right to damages shall be limited to the difference between the contract and the market price of the goods as provided in Section 2-713 of the Minnesota Uniform Commercial Code. Purchaser shall not have the right to recover as provided in Section 2-712 of the Minnesota Uniform Commercial Code nor any rights to recover damages for any loss resulting in the ordinary course of events from nonconformity of tender as contained in Section 2-714(1) of the Minnesota Uniform Commercial Code.

12. ASSIGNMENT. No right or interest in this contract shall be assigned by Purchaser, without the written permission of Seller, and no delegation of any obligation owned by Purchaser shall be made without the written permission of the Seller. Any attempted assignment of delegation shall be wholly void and totally ineffective for all purposes.

13. ALTERATIONS, INTERPRETATIONS AND DEFINITIONS. This contract shall be governed by the laws of Minnesota and is intended also as a complete and exclusive statement of the terms of their agreement. No course of prior dealings between the parties, and no usage of the trade shall be relevant to shipment or explain any term used in this contract. Acceptance or acquiescence to a course of performance rendered under this contract shall not be relevant to determine the meaning of this contract, even though the accepting or acquiescing party has knowledge of the nature of the performance and opportunity or objection. Waiver by Seller of a breach by Purchaser of any provision of this contract shall not be deemed a waiver of future compliance therewith, and such provision shall remain in full force and effect. Any term used in this contract which is not defined herein shall have the same definition as that contained in the Minnesota Uniform Commercial Code.



Aeration Industries International, Inc.
Operations and Maintenance Cost Estimate

Custer SD WWTP	Date: 8/24/2010
Prepared By: TAM	
Revision:	

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with 3% annual increase

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4	\$47,967.73	\$87.42	
5	\$49,406.77	\$90.04	\$3,360.00
Subtotals:	\$233,056.57	\$424.73	\$3,360.00
Total Estimated O&M Costs over 5 years:	\$236,841.30		

* indicates assumed values

Custer SD WWTP

Date: 5/24/2010

Prepared By: TAM

Revision:

TRITON MAINTENANCE COSTS

	Cost Per Maintenance Item	Frequency
Replace Triton bearing once/10 years	\$600.00	every 10 yrs
Grease for Aerator motor bearings - 2 tubes per year	\$20.00	every 6 months
Clean Triton Blower Intake Filter	\$0.00	every 6 months

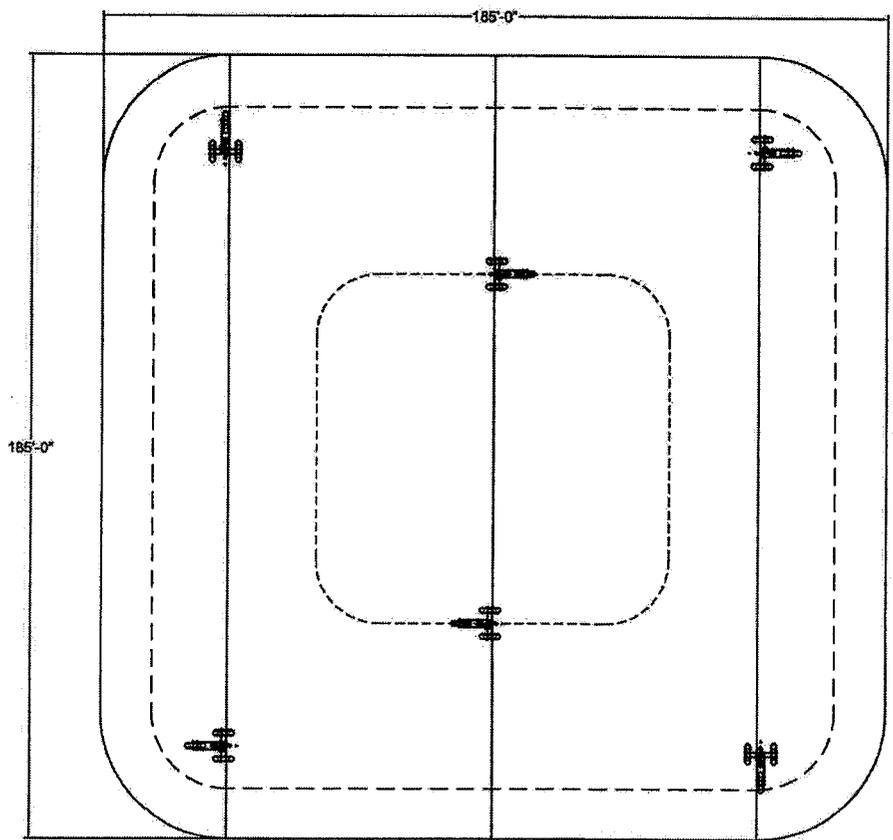
LIFE CYCLE COSTS:

Year	Estimated Annual Electrical Costs	Annual Lubricant Costs	Annual Bearing/Seal Costs
1	\$26,084.15	\$20.00	
2	\$25,836.68	\$20.60	
3	\$26,611.78	\$21.22	
4	\$27,410.13	\$21.85	
5	\$28,232.44	\$22.81	
Subtotals:	\$133,175.18	\$106.18	\$0.00
Total Estimated O&M Costs over 5 years:	\$133,281.37		

5 YEAR POWER SAVINGS USING TRITONS VS. ASPIRATORS

	5 Year Power Consumption
AireO ₂ Aspirator Aerators	\$233,067
AireO ₂ Triton Aerators	\$133,175
Total Savings	\$99,881

* indicates assumed values



(6) 5HP AIRE-O2 TRITONS
TYPICAL ONE OF TWO LAGOONS

 Aeration Industries International, Inc. P.O. Box 39144 Minneapolis, MN 55439 USA Telephone: 1(952)448-8788 Fax: 1(952)448-7293		TITLE	
		CUSTER WWTP	
<small>Aeration Industries International, Inc. warrants that the drawings are based on the information furnished to it. It does not warrant that the drawings are based on the information furnished to it. It does not warrant that the drawings are based on the information furnished to it. It does not warrant that the drawings are based on the information furnished to it.</small>		PROJECT NO.	REV.
DESIGN	DATE	10-05-0236E	
CRY	5/26/10	SCALE	PLOTT
REVISED	DATE	SHEET	OF
		1	1



Aerator Replacement
Wastewater Treatment Plant
Custer, South Dakota
Preliminary Opinion of Probable Cost
1/31/2012

Site Bid Items	Unit	Quantity	Unit Cost	Total
Remove and Dispose Catwalk and Cables	EA	6	\$1,000.00	\$6,000.00
Remove and Dispose Existing Aerator	EA	13	\$400.00	\$5,200.00
Install Mooring Post	EA	4	\$1,500.00	\$6,000.00
Install Two (2) Aerator Units and One (1) Cable	EA	6	\$3,500.00	\$21,000.00
Topsoil and Reseeding	LS	1	\$3,300.00	\$3,300.00
Mobilization	LS	1	\$25,000.00	\$25,000.00
Miscellaneous and Incidental	LS	1	\$8,000.00	\$8,000.00
Site Electrical Equipment and Installation	LS	1	\$145,000.00	\$145,000.00
Electrical Start Up Costs	TRIP	3	\$2,500.00	\$7,500.00
Aerator Package	LS	1	\$190,000.00	\$190,000.00
Subtotal				\$417,000.00
Contingency (10%)				\$41,700.00
Construction Administration				\$29,200.00
Legal - Bond Counsel				\$5,000.00
Total				\$492,900.00