Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

February 1, 1999

9839514Y/F1/WP/4

New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Attention: Mr. A. A. Linero, P.E., Administrator

RE: Oleander Power Project; DEP File No. 0090180-001-AC (PSD-FL-258)
Request for Additional Information

Dear Al:

This correspondence is submitted to address the information requested in your letters dated December 17, 1998 and December 22, 1998. We have organized our responses according to how the information requested was listed in your letters. Each question and comment are reiterated in bold, followed by our response.

ADDITIONAL INFORMATION - DECEMBER 17, 1998 LETTER

DEP Comment 1. Please provide a detailed cost analysis in terms of overall and marginal cost effectiveness (annualized dollars/ton of nitrogen oxides removed) for the following distillate fuel oil use scenarios. This does not constitute any intent regarding a Best Available Control Technology (BACT) determination. It is for cost sensitivity purposes.

Hours of Distillate Fuel Oil Used	*NO_x, ppmvd @ 15% O_2*
First 500	*42*
Second 500	*36*
Third 500	*30*
Fourth 500, 2000 total	*24*

Response: Oleander Power Project, L.P. has selected General Electric Company (GE) as its primary vendor to supply the turbines for the project due to the ability of GE combustion turbines to meet a NO_x emission level of 9 ppmvd (corrected to 15 percent O_2). The applicant requests the ability to purchase a different manufacturer's machines, if they can meet the same emission characteristics as the GE machine and the emission limits approved by FDEP in the final permit. As indicated in the application, the machines will be the advanced Frame "7" class (or GE Frame 7FA), which would be capable of achieving a nitrogen oxides (NO_x) emission rate of 9 ppmvd corrected to 15 percent oxygen (dry) when firing natural gas. When firing low sulfur distillate fuel oil, GE will only guarantee a NO_x emissions rate of 42 ppmvd corrected to 15 percent oxygen. While increased water injection may further reduce NO_x emissions, manufacturers are unwilling to guarantee such levels. Without any guarantees, Oleander cannot provide reasonable assurance to the Department that lower levels can

be met. However, Oleander would commit to a program that investigates the possibility of producing lower NO_x levels through increased water injection while maintaining proper machine performance and combustor stability. Oleander could carry out such a program while firing distillate oil during the first 18 months of operation. If the NO_x emission rate can be reduced, a new permit condition with the lower NO_x limit would be accepted. Oleander suggests the following permit condition:

> Within 18 months after the initial compliance test, the permittee shall prepare and submit for the Department's review an engineering report regarding the lowest NO_x emission rate that can be consistently achieved when firing distillate oil with a reasonable operating margin, taking into account long-term performance expectations and good operating operation and maintenance practices.

DEP Comment 2. Please provide the rationale for the 16 ppmvd @ 15% O2 limit proposed for CO as BACT. The combustors capable of meeting 9 ppm NO_x typically achieve 12 ppm of CO.

Response: The GE Frame 7FA advanced combustion turbine can achieve 12 ppmvd for CO when firing natural gas and 20 ppmvd when firing distillate oil. These levels represent emission limits that Oleander would require in the performance guarantee.

DEP Comment 3. Please describe the adequacy of the 60-foot stack height with respect to both plume rise/bouyancy and possibilities of localized downwash.

Response: The air dispersion modeling for the 60-foot stack heights for the combustion turbines accounted for both plume rise/ buoyancy and localized downwash conditions due to building downwash effects. Using five years of hourly meteorological data (approximately 44,000 hours), hourly concentrations from the CTs operating for a range of loads (i.e., from 50 to 100 percent) and two ambient temperatures (32 and 95°F) were made using the Industrial Source Complex Short-Term (ISCST) model. For each hour, plume rise calculations were made using the recommended EPA and FDEP methods that incorporate buoyancy and momentum effects based on temperature and velocity of the exhaust gases. These methods also incorporated the potential effects of adjacent or nearby buildings that could lower the plume heights. The buildings included in the analysis were the CT structure, CT air inlet, fuel oil tanks, and demineralized water tank. In all instances, procedures recommended by the EPA and FDEP were followed in predicting the maximum concentrations due to the CTs operating for the expected range of operating loads. Based on the modeling analyses that used these procedures, the maximum pollutant concentrations for the project were predicted to be less than U.S. Environmental Protection Agency's (EPA) and FDEP's significant impact levels and well below the National and Florida Ambient Air Quality Standards.

DEP Comment 4. Please submit overlays (isopleths) of the maximum ground-level concentrations of NO_x PM/PM10, CO and SO2 with respect to residential communities up to 2 miles (3.2 kilometers) from the proposed site.

Response: The overlays (isopleths) of the maximum ground-level pollutant concentrations are provided in Attachment 1.

DEP Comment 5. Please provide a detailed map showing the location of all of the fence-line receptors used in the air quality impact analysis. These receptor locations should be shown in UTM coordinates since the UTM coordinate system is used in the modeling. In addition send us diskettes containing all of the air quality impact analysis modeling output files.

Response: A map showing the location of fence-line receptors is provided as Attachment 2. Diskettes containing the modeling output files of the air quality impact analysis is included with this letter.

DEP Comment 6. How will fuel oil be delivered to the site, e.g. pipeline or trucks?

Response: The fuel will be transported to the site by tanker trucks with a capacity of distillate fuel oil of about 7,000. The tanker trucks will likely come from Port Canaveral. (see response to December 22, 1998 letter.)

DEP Comment 7. At the rated of 100,000 pounds per hour per turbine, the amount of fuel oil used in one day for the entire facility is 1.5 million gallons. The two 2.8 million gallon storage tanks can store only four days worth of fuel oil. Please comment on the practicality of actually operating 2000 hours per year on fuel oil given this apparent limitation.

Response: As stated in the application, the primary fuel will be natural gas with distillate oil as backup. The application included a request to allow up to 2,000 hours/year of distillate oil usage as backup to the primary fuel of natural gas. From Oleander's perspective, natural gas is the preferred fuel since it generally is much less expensive than distillate oil and machine operation is better with less added maintenance and ancillary costs. However, since the Project is being developed to provide peaking and emergency power, distillate oil must be available for use. Recognizing the environmental differences between the fuels, Oleander would accept permit conditions that would limit the maximum distillate fuel usage to no more than 1,500 hours per year. Thus, the maximum operation during any year would be 3,390 hours/year with a maximum of 1,500 hours/year on distillate oil and the remainder on natural gas. Portions of the application have been updated and are attached reflecting this commitment. As shown on the attached application replacement tables (Attachment 3), the overall emissions are lower than our original application.

DEP Comment 8. The emission limits proposed do comport with recent Department Best Available Control Technology (BACT) determinations for natural gas firing with fuel oil back-up. However the Department's BACT determinations include minimization of fuel oil-firing and maximization of natural gas use.

Response: As stated above, Oleander will limit the maximum amount of fuel oil used to 1,500 hours per year. By this reduction in oil use, the cost effectiveness of alternative controls available to the project, such as for NO_x emissions, will increase even with

further reduction in NO_x emissions. The cost effectiveness of "hot" SCR is $13,757 per ton of NO_x or about 21 percent higher than the cost effectiveness originally submitted. The revised calculations are attached to this letter. It should also be emphasized that use of distillate oil has economic disadvantages from a maintenance and water use perspective. These additional cost are about $0.3 per mmBtu ($3 per MW-hr generated) for maintenance and water costs and about $0.54 per mmBtu ($5.4 per MW-hr generated) for fuel differential (December 1998 fuel costs). The maintenance and water costs alone are a substantial disincentive of using oil even if there is no price differential between fuels. In the future, the average projected price differential of natural gas compared to oil is $0.60/mmBtu ($6/MW-hr) in favor of gas. If available, natural gas has considerable economic advantages and is the preferred fuel, not withstanding the lower amount of air pollutant emissions.

DEP Comment 9. Please re-examine the use of natural gas versus fuel oil and the cost-effectiveness of NOx emission control strategies from the stand-point of average expected revenues and profitability per MW-hr versus pollution control costs per MW-hr. The approach towards cost-effectiveness of pollution control in peaking operation mode should parallel the economics of a project that presumably maximizes revenues and profitability under peaking mode. Because the project otherwise comports with very recent and draft BACT Department determinations (especially for peaking units), this analysis is not required if Oleander can agree to minimize its operation in the fuel oil use mode.

Response: As noted in our response to Item 8 above, the cost effectiveness is high relative to determinations the Department has made in the past. As noted in the letter, the proposed emission limits proposed for the project are similar to other BACT determinations. In fact, the proposed NO_x emissions limit for natural gas firing will be the lowest of any simple cycle gas turbine project in Florida. When firing oil, while the emission limit will be similar to other projects, the efficiency of the advanced combustion turbine will produce from 10 to 25 percent less NO_x on a megawatt-hour (MW-hr) basis. For the proposed project, the NOx emissions will be 0.35 lb/MW-hr for gas firing and 1.78 lb/MW-hr for oil firing; the average will be 0.98 lb/MW-hr. It should also be recognized that the requested amount of hours of distillate fuel usage is 1,500 hours which is lower than other simple cycle projects approved in the 1990s. The other projects include Gainesville Regional Utilities' project (2,000 hours of oil; PSD-FL-222); Florida Power Corporation's (FPC's) Debary Project (up to 3,390 hours of oil; PSD-FL-167); and FPC's Intercession City Project (up to 3,390 hours of oil; PSD-FL-180).

Florida has about 110 simple-cycle combustion turbine peaking units with a net summer capability of about 5,000 MW with approval to generate up to about 35,000,000 MW-hrs. Of this about 49 percent can be fired with only light distillate oil while 51 percent are both gas and oil-firing capable. New units, i.e., units representing units with low NO_x emissions of 42 ppmvd on oil and less than 25 ppmvd on gas, represent about 27 percent of the total peaking generating capability. Of this about one-fourth are oil-only capable; the remaining three quarters can fire both oil and gas. The addition of the Oleander facility represents about 17 percent increase in the total simple cycle generating capability in Florida and a 34 percent increase in CTs capable of firing natural gas. More importantly however, the project represents an increase of over 50 percent in the generating units with lower NO_x emissions (i.e., NSPS and lower). Moreover, the use of

the advanced combustion turbine represents almost a 200 percent increase in the advanced, more energy efficient simple cycle turbines. These machines are at least 20 percent more efficient than the bulk of simple cycle combustion turbines available to generate peaking power in Florida. The Oleander project will provide peaking power at the lowest average NO_x emission rate of any peaking unit or plant permitted in Florida on both a concentration basis and a pound/MW-hr basis.

We are not aware of any FDEP or EPA regulations, or EPA guidance where cost effectiveness is evaluated against expected revenues and profitability. Indeed, it is clear from EPA policy that the cost effectiveness of control technologies is determined to be revenue and profitability neutral. Moreover, we are not aware that the FDEP has included expected revenue and profitability evaluations in any BACT determination that would vary from EPA guidance.

DEP Comment 10. Please provide the emission characteristics of the Siemens, Westinghouse, General Electric and ABB combustion turbines under consideration for this project. Include any information regarding their ability to meet 9 ppm NO_x by Dry Low NO_x (DLN) technology or high temperature selective catalytic reduction. If a vendor has been identified and the information is available, it will not be necessary to provide the information regarding other suppliers.

Response: As indicated above, the GE Frame 7FA is the preferred turbine for this project. This machine is identical, except for the oil firing capability, to that approved by the Department in the BACT determination for the City of Tallahassee's Purdom Project and the FDEP's air construction permit for Florida Power & Light Company's Fort Myers Repowering Project.

DEP Comment 11. Provide the worst case start-up and shutdown emissions characteristics for the units under consideration including start-up curves and duration of excess emissions. The Department plans to address excess emissions in its BACT determination.

Response: The units will comply with FDEP Rule 62-210.700(1) which allows for excess emissions resulting from start-up, shutdown, and malfunction provided that best operational practices are used to minimize emissions and that the duration of excess emissions shall not exceed two hours in any 24-hour period. We are not requesting a longer duration of excess emissions from that allowed under the rule.

ADDITIONAL INFORMATION - DECEMBER 22, 1998 LETTER

DEP Comment 1. What commitment has been received from FGT concerning their ability to supply OPP's gas consumption requirements? Please provide documentation from FGT specifying that:

- *FGT is capable of accommodating OPP's gas supply needs. (Based upon application, the requirements appear to be 1.81 mmcf/hr per machine or 9.05 mmcf/hr for all 5 machines)*

- *What quantity of the 9 mmcf/hr gas is to be contracted as readily available or "firm."*
- *What quantity of the 9 mmcf/hr gas is to be considered as occasionally available or "interruptible."*

Response: Oleander Power Project, L.P. (OPP) has worked closely with FGT and gas suppliers to assure that the proposed project's needs are met. Attachment 4 contains a letter from FGT that addresses the ability to provide gas. OPP project consultants have also met with FGT to confirm the ability to construct a lateral from the FGT easement to the proposed site.

OPP may contract with Suppliers that have firm gas supply and would sell this supply for use at the proposed project. Negotiations are ongoing and, as a result, quantities of "firm" and "interruptible" can not be quantified at this time.

DEP Comment 2. For " interruptible" supplies, please provide FGT's probability estimates for gas availability during peak power periods in quantities up to 9mmcf/hr.

Response: OPP has requested FGT to provide the probability estimates that you requested for interruptible gas supply during peak power periods. This documentation will be provided to you upon receipt. OPP has also requested the quantification of gas availability from gas marketing firms that have capacity reserved on the FGT system but do not use the reserved capacity. This information will also be provided upon receipt by OPP.

Florida's peaking plants have relied on natural gas for approximately 36% of the total peaking generation. For facilities that have dual fuel (oil and gas) capability, natural gas has been used as the fuel for these peaking units for 80% of the time that these peaking units were in operation.

DEP Comment 3. What commitments have been received concerning water supplies? Please provide documentation from local water suppliers (e.g. the City of Cocoa) or appropriate permitting agencies that:

- *OPP's water supply needs for NO_x control (water injection during oil firing) can be met [based upon application, the requirements appear to be at least 120,900 lb/hr per machine or 362,000 gallons/hr for all 5 machines]*
- *Annual water consumption for NO_x control of 724 million gallons per year can be met [assumes 2,000 hours per year oil operation on all 5 turbines].*

Response: The following data presents OPP's water supply needs for NO_x control. This estimate is based on a worst case (i.e., maximum water use) scenario of low temperature (ambient dry bulb temperature of 32°F), high ambient relative humidity (80 percent), and a planned daily plant operation duration of 17 hours.

- 271.8 gallons per minute per machine or 81,540 gallons per hour for all five machines,
- 1,386,180 gallons per day for all five machines (when burning distillate fuel oil),

- The annual consumption of water for NO_x control is calculated to be 122,310,000 gallons (for operation using fuel oil at 1,500 hours per year).

The City of Cocoa has informed Constellation that they will be interested in supplying reclaimed and potable water to the site. The primary source of water for plant operations will be reclaimed water/stormwater with potable water as backup. On an average annual basis, the City of Cocoa can supply 400,000 gallons per day of reclaimed water and additional stormwater, with the remainder being supplied by potable water. Based on the fact that the City has undertaken extensive aquifer storage and recovery efforts to ensure a long term sustainable water supply source, the City should be able to meet the plant requirements even if reclaimed water/stormwater is not readily available on any given day.

Reclaimed water/stormwater was chosen by OPP based upon availability, as well as being attractive from a water conservation standpoint. Additionally, the use of reclaimed water/stormwater reduces the discharge of surplus reclaimed water into the Indian River Lagoon during hours of operation. This is desirable since the Indian River Lagoon is an environmentally sensitive waterway that is 1) classified as a Class II water body (shellfish propagation or harvesting), 2) an Aquatic Preserve, and 3) a National Estuarine Waterbody.

DEP Comment 4. Describe the impacts of the fuel oil delivery. Based upon the application, trucking of the fuel oil is contemplated. At 2000 hours per year of oil operation on all 5 turbines, an annual oil consumption of approximately 146 million gallons may be consumed or approximately 20,000 truckloads.

Response: The proposed project will contain two unloading stations to allow fuel trucks to unload fuel oil. Because a tanker truck requires at least 20 minutes to unload, a maximum of six trucks per hour will arrive/depart the site.

Traffic analyses were conducted with an assumption that trucks could arrive or depart the site in either the AM or PM peak hours. Background traffic was based on a Florida Department of Transportation (FDOT) traffic count on August 13, 1998 at a location on State Road (SR) 520, one half mile west of SR 501. The background traffic was increased by 3 percent per year to evaluate conditions when the plant would become operational in 2000. In addition to fuel truck traffic, vehicular traffic from facility operational staff was added to the future background traffic volumes. It was assumed that three quarters of the staff would arrive/depart during the peak hour and vehicle occupancy ratios would be a conservative 1 occupant per vehicle.

The FDOT's Level of Service Standards and Guidelines Manual, Table 5-2 (for peak hour directional volumes in areas transitioning to urban areas) was used to estimate the operating condition of SR 520. In 2000, each direction of traffic would operate at a Level of Service B. Traffic impacts from the proposed project under the maximum traffic generation conditions during operations (i.e., operating on fuel oil) would result in SR 520 continuing to operate at a Level of Service. Pre and post project traffic on Townsend Road results in a Level of Service C.

Analysis was also conducted of the unsignalized intersection of SR 520 with Townsend Road. The operation of the unsignalized intersection was reviewed using the latest version of the Highway Capacity Software for the AM and PM peak hours. The results of the analysis indicates that the unsignalized intersection would operate at Level of Service A for the AM peak hour and Level of Service B for the PM peak hour both during operation of the facility under maximum project traffic generation conditions.

Project impacts from fuel truck traffic are anticipated to be minor due to the high Level of Service of area roads which will be used by the trucks. Relatively free flow conditions on the area road network will allow the trucks to efficiently ingress and egress the plant site.

Oleander appreciates this opportunity to provide the Department with further information. Please call or contact me via e-mail if you have questions or would like to discuss this further.

Sincerely,

GOLDER ASSOCIATES INC.

Robert C. McCann Jr.
for

Kennard F. Kosky, P.E.
Project Engineer

KFK/arz

Enclosures

cc: Rick Wolfinger, Oleander Power Project
R.C. McCann, Golder

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CC: EPA
NPS
Central District

M. Williams
M. Stallings
K. Whitfield

February 25, 1999 983-9514-0300

New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Attention: Mr. A. A. Linero, P.E., Administrator

RE: Oleander Power Project
PSD-FL-258

Dear Al:

As a follow-up to my letter sent to you on February 1, 1999 and to keep the Department informed of changes to the project, Oleander Power Project has decided to further limit the maximum amount of distillate fuel oil that would be allowed for this project. This decision is based on Oleander's latest review of natural gas that would be available to the project.

It is proposed that fuel oil be limited to an effective 1,000 hours per year per combustion turbine operating at maximum load. On behalf of Oleander, we are requesting that the maximum fuel usage be limited on a project basis, which would be equal to the amount of fuel oil that each combustion turbine would use at maximum load for 1,000 hours.

Oleander appreciates this opportunity to provide the Department with this additional information. Please call or contact me via e-mail if you have questions or would like to discuss this further.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Project Engineer

KFK/tla

cc: R. Wolfinger, Oleander Power Project
R.A. Zwolak, GAI

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Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

March 17, 1999

9839514Y/F1/WP/3

New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
111 S. Magnolia Drive, Suite 4
Tallahassee, FL 32301

Attention: Mr. A. A. Linero, P.E., Administrator

RE: Oleander Power Project
PSD-FL-258

Dear Al:

As a follow-up to my letter dated February 25, 1999 regarding Oleander's decision to limit oil used to an equivalent 1,000 hours/year/CT at full load, I am enclosing sections of the application form and changes in the appended material that reflect this commitment. In addition, the updated forms and information reflect data representative of the General Electric (GE) Frame 7FA combustion turbine as the primary vendor, which I indicated in my February 1, 1999 letter. The changes specific to the GE machine reflect a decrease in the emission rate of particulate matter (PM) for distillate fuel oil-firing, and a decrease in the emission rates for carbon monoxide (CO) and volatile organic compounds (VOCs) for both actual gas- and oil-firing. Taken together, the total reduction in pollutant emissions is about 30 percent lower than the previous information submitted. The reduction by pollutant is: PM - 53%, sulfur dioxide (SO_2) - 29%, nitrogen oxides (NO_x) - 22%, CO - 41.4% and VOC - 32.6%.

Over the last several months, the applicant has recognized the concern by the Department and the general public over the higher emission rates when firing distillate fuel oil relative to natural gas. Both the reduction in hours of firing oil and the lower emission rates with the GE machine substantially reduce emissions, a desired goal.

We have also reviewed the relationships of the ambient ozone concentrations for the various monitoring sites in the Central Florida region. For 1998, the data appear to follow a similar temporal trend among the monitoring stations located in Orange County, Brevard County, and St. Lucie County. This suggests a regional relationship in ozone concentrations. Because ozone is currently monitored at two locations in Brevard County, additional monitoring in the vicinity of the Oleander site that was suggested at the March 4, 1999 public meeting would be unwarranted. In addition, the maximum VOC emissions from the project is proposed as 64 tons/year which is well below the Prevention of Significant Deterioration (PSD) *de minimis* monitoring criteria of 100 tons/year for VOCs.

These emission reductions coupled with our previous air quality impacts analyses clearly indicate that the project will fully comply with EPA's and the Department's ambient air quality standards. Indeed, the impacts are many times lower than the Department's significant impact levels for both natural gas- and distillate oil-firing. The air quality modeling was also performed assuming that either natural gas or oil would be used at all times over the 5 years of meteorological data used in the model. This produces very conservative estimates of impacts given that the facility is a peaking plant and will not operate over all hours in any year.

Oleander appreciates this opportunity to provide the Department with this additional information. Please call or contact me via e-mail if you have questions or would like to discuss this further.

Sincerely,

GOLDER ASSOCIATES INC.

Robert E McLean Jr.

Kennard F. Kosky, P.E.
Project Engineer

KFK/arz

cc: R. Wolfinger, Oleander Power Project
R.A. Zwolak, GAI

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Golder Associates Fax

To: MIKE HALPIN
Fax Number: (850)922-6979
Company: FLORIDA DEP
Date: 3/19/99
From: BOB MCCANN/ KEN KOSKY
e-mail: bob-mccann@golder.com
Our ref: 983-9514
Voice Mail:
RE: D LEANDER POWER PROJECT
Total pages (including cover): 2
Hard copy to follow ☐

MESSAGE

MIKE –

see attached CO cost for BACT analysis.

Thanks for reviewing and checking info

Bob

Golder Associates
6241 NW 23rd St., Suite 500
Gainesville, FL 32653
U.S.A.
Telephone: (352) 336-5600
Fax: (352) 336-6603

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Offices in Australia, Canada, Finland, Germany, Hong Kong, Hungary, Indonesia, Italy, South America, Sweden, United Kingdom, United States

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Table B-7b. Annualized Cost for CO Catalyst for Frame "F" Simple Cycle Operation

Cost Component	Cost	Basis of Cost Estimate
Direct Annual Costs		
Operating Personnel	$8,320	8 hours/week at $20/hr
Supervision	$1,248	15% of Operating Personnel;OAQPS Cost Control Manual
Maintenance - Labor	$4,368	0.5 hr per shift, $24/hr; OAQPS Cost Manual
- Materials	$4,368	100% of maintenance labor; OAQPS Cost Manual
Inventory Cost	$27,401	Capital Recovery (11.74%) for 1/3 catalyst
Catalyst Disposal Cost	$35,793	$28/1,000 lb/hr mass flow over 3 years; developed from vendor quotes
Contingency	$2,445	3% of direct costs
Total Direct Annual Costs (TDAC)	$83,943	
Energy Costs		
Heat Rate Penalty	$66,105	0.7% of MW output; EPA, 1993 (Page 6-20)
MW Loss Penalty	$46,800	2 days replacement energy costs @ $0.01 kWh each three period
Fuel Escalation	$3,387	Escalation of fuel over inflation; 3% of energy costs
Contingency	$11,629	10% of energy costs
Total Energy Costs (TEC)	$127,921	
Indirect Annual Costs		
Overhead	$8,362	60% of Operating/Supervision Labor and Ammonia
Property Taxes, insurance, admin.	$73,191	4% of Total Capital Costs
Annualized Total Direct Capital	$132,681	11.75% Capital Recovery Factor of 10% over 20 years times sum of TDCC, TDIC and TInCC
Annualized Total Direct Recurring	$281,557	40.21% Capital Recovery Factor of 10% over 3 years times RCC
Total Indirect Annual Costs (TIAC)	$495,790	
TOTAL ANNUALIZED COSTS	$707,655	Sum of TDAC, TEC and TIAC
COST EFFECTIVENESS	$11,437	